INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

BROOKHURST STREET IMPROVEMENT PROJECT

Prepared for

City of Anaheim
Public Works Department
200 South Anaheim Boulevard, Suite 276
Anaheim, California 92805
Contact: Rudy Emami, Capital Programs Manager
(714) 765-5065

Prepared by

BonTerra Consulting
2 Executive Circle, Suite 175
Irvine, California 92614

November 27, 2012

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SECTION 1.0 INTRODUCTION

1.1 PURPOSE OF THE INITIAL STUDY

The purpose of this Initial Study (IS) is to (1) describe the proposed Brookhurst Street Improvement Project (hereinafter referred to as the "Project," which is located along Brookhurst Street from State Route (SR) 91 to the north and Interstate (I) 5 to the south in the City of Anaheim and (2) provide an evaluation of potential environmental effects associated with the Project's construction and use. This IS has been prepared pursuant to the California Environmental Quality Act (CEQA), as amended (*Public Resources Code* §21000 et seq.) and in accordance with the State CEQA Guidelines (*California Code of Regula*tions §15000 et seq.).

Pursuant to Section 15367 of the State CEQA Guidelines, the City of Anaheim is the lead agency for the Project. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment. The City of Anaheim, as the lead agency, has the authority for Project approval and certification of the accompanying environmental documentation.

The proposed Project is also subject to the National Environmental Policy Act (NEPA) for which a separate document is being prepared and will be evaluated independent of this IS.

1.2 SUMMARY OF FINDINGS

Based on the environmental checklist form prepared for the Project (included in Section 4) and supporting environmental analysis (provided in Section 5), the proposed Project would have no impact or less than significant impacts in the following environmental areas: aesthetics; agriculture and forest resources; geology and soils; greenhouse gas emissions; hazards and hazardous materials; hydrology and water quality; land use and planning; mineral resources; noise; population and housing; public services; recreation; and utilities and service systems. The proposed Project has the potential to have significant impacts on the following topics unless the recommended mitigation measures described herein are incorporated into the Project: air quality, biological resources, and cultural resources.

The Project site is currently developed as a four-lane roadway (two lanes in each direction) from the southern end in the vicinity of La Palma Avenue to the intersection with SR-91. Because the Project site has been previously disturbed during roadway development, physical impacts—which would typically be experienced during site preparation (e.g., changes in topography)—would not occur with the proposed Project.

According to the CEQA Guidelines, it is appropriate to prepare a Mitigated Negative Declaration (MND) for the proposed Project because, after incorporation of the recommended mitigation measures, potentially significant environmental impacts would be eliminated or reduced to a level considered less than significant.

1.3 PROJECT APPROVAL

This IS and proposed MND have been submitted to potentially affected agencies and individuals. Notices of the availability of the IS and the proposed MND for review and comment have been posted at the Project site and at the City of Anaheim Public Works Department. The environmental documentation is available at the City of Anaheim for review.

A 30-day public review period has been established for the IS and the proposed MND. The review period has been established in accordance with Section 15073 of the CEQA Guidelines.

During review of the IS and MND, affected public agencies and the interested public should focus on the document's adequacy in identifying and analyzing the potential environmental impacts and the ways in which the potentially significant effects of the Project area can be avoided or mitigated. Comments on the IS and the analysis contained herein may be sent to:

Mr. Tiberius Rosu
City of Anaheim Department of Public Works
200 S. Anaheim Boulevard, Suite 276
Anaheim, CA 92805
trosu@anaheim.net

Following receipt and evaluation of comments from agencies, organizations, and/or individuals, the City of Anaheim will determine whether any substantial new environmental issues have been raised. If so, further documentation—such as an Environmental Impact Report (EIR) or an expanded IS—may be required. If not, the Project and the environmental documentation are tentatively scheduled to be submitted to the City Council for consideration.

1.4 ORGANIZATION OF THE INITIAL STUDY

The IS is organized into sections, as described below.

- ***Section 1: Introduction.*** This section provides an overview of the conclusions in the IS.

- ***Section 2: Project Location and Environmental Setting.*** This section provides a brief description of the Project location and describes the existing environmental setting of the Project site and vicinity.

- ***Section 3: Project Description.*** This section provides a description of the proposed Project and necessary discretionary approvals.

- ***Section 4: Environmental Checklist Form.*** The completed City of Anaheim environmental checklist form provides an overview of the potential impacts that may or may not result from Project implementation. The environmental checklist form also includes "mandatory findings of significance", as required by CEQA.

- ***Section 5: Environmental Evaluation.*** This section contains an analysis of environmental impacts identified in the environmental checklist and identifies standard conditions and regulations (SC) and mitigation measures (MM) that have been recommended to eliminate any potentially significant effects or reduce them to a level considered less than significant.

- ***Section 6: Report Preparers.*** This section lists the authors, including staff from the City of Anaheim, who assisted in preparation and review of the IS.

- ***Section 7: References.*** This section identifies the references used in preparation of the IS.

SECTION 2.0 PROJECT LOCATION AND ENVIRONMENTAL SETTING

2.1 PROJECT LOCATION

The Project site is located entirely in the City of Anaheim in Orange County, California. The regional and local vicinities of the Project site are depicted in Exhibit 1, Regional Location, and Exhibit 2, Local Vicinity, respectively. As shown on Exhibit 2, the site is linear in nature and generally bound by SR-91 to the north and I-5 to the south. The actual end points for the transportation improvements are proposed from the intersection of Brookhurst Street and the eastbound SR-91 ramps to approximately 600 feet north of I-5. These improvements would connect to the existing lane configuration at the southern end of the project limits of three through lanes in each direction along Brookhurst Street. Regional access to the site is provided by I-5 and SR-91.

2.2 ENVIRONMENTAL SETTING

The Project site spans approximately 0.4 mile and is currently developed as a major arterial roadway. On-site vegetation is limited to ornamental landscaping along the perimeters of the Project site and within the residential and commercial areas adjacent to Brookhurst Street. As shown in the aerial photograph provided in Exhibit 3, Aerial Photograph, land uses surrounding the Project site include single-family residential neighborhoods to the east and west; and, near the intersection of Brookhurst Street and La Palma Avenue, the Sa-Rang Community Church (also referred to as a “community and religious assembly use”) is located to the west and commercial, educational, community and religious assembly and medical office uses are located to the east.

Existing roadways in the study area include the Project roadway, Brookhurst Street, and multiple local streets that provide access to surrounding neighborhoods. In the vicinity of the Project site, Brookhurst Street is a four-lane roadway (two lanes in each direction) from the southern end in the vicinity of La Palma Avenue to the north at the intersection with SR-91. There are four signalized intersections along the Project corridor, including at La Palma Avenue, West Falmouth Avenue, and the SR-91 westbound and eastbound ramps. The remaining intersections are one-way stop-sign-controlled intersections.

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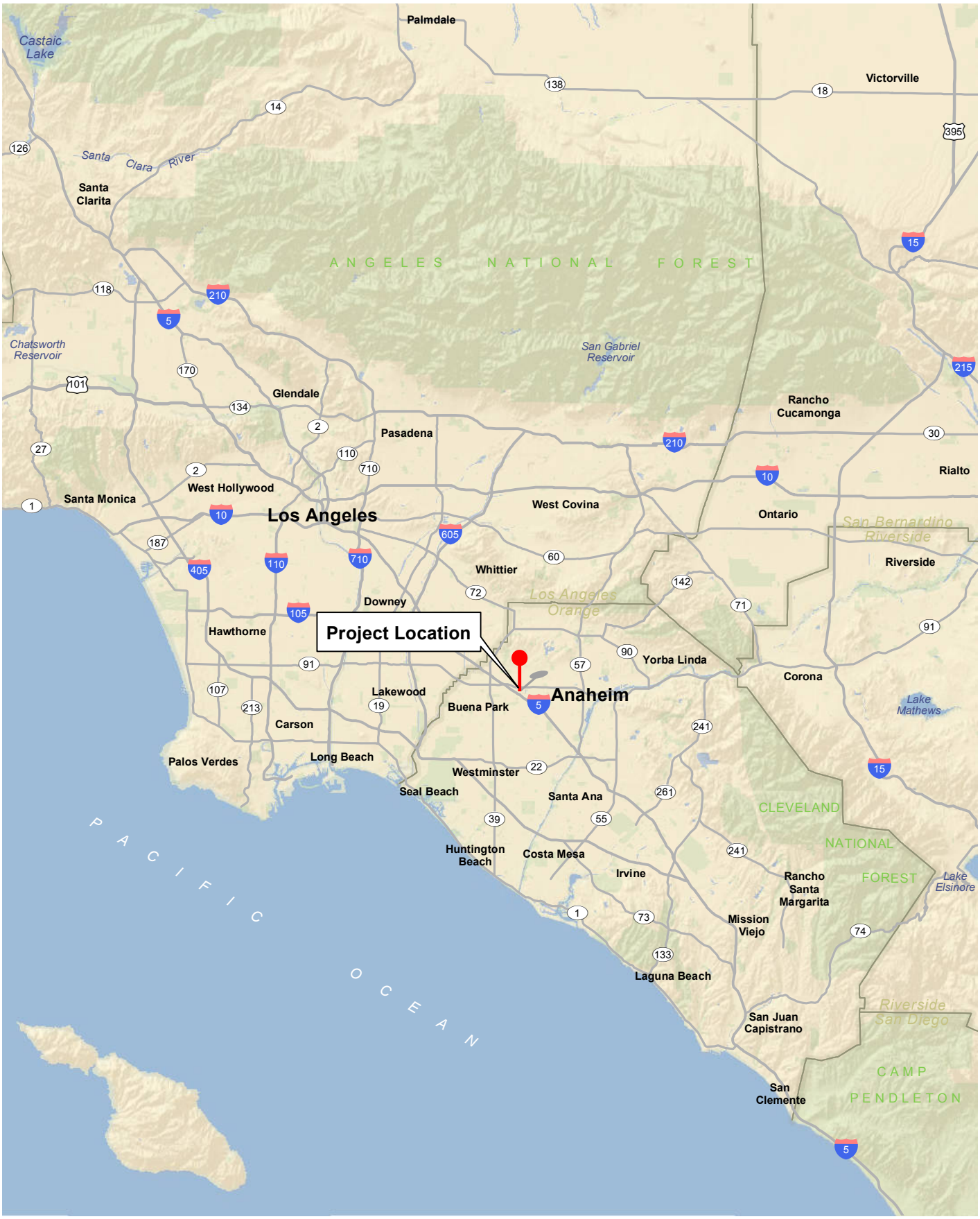

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Regional Location

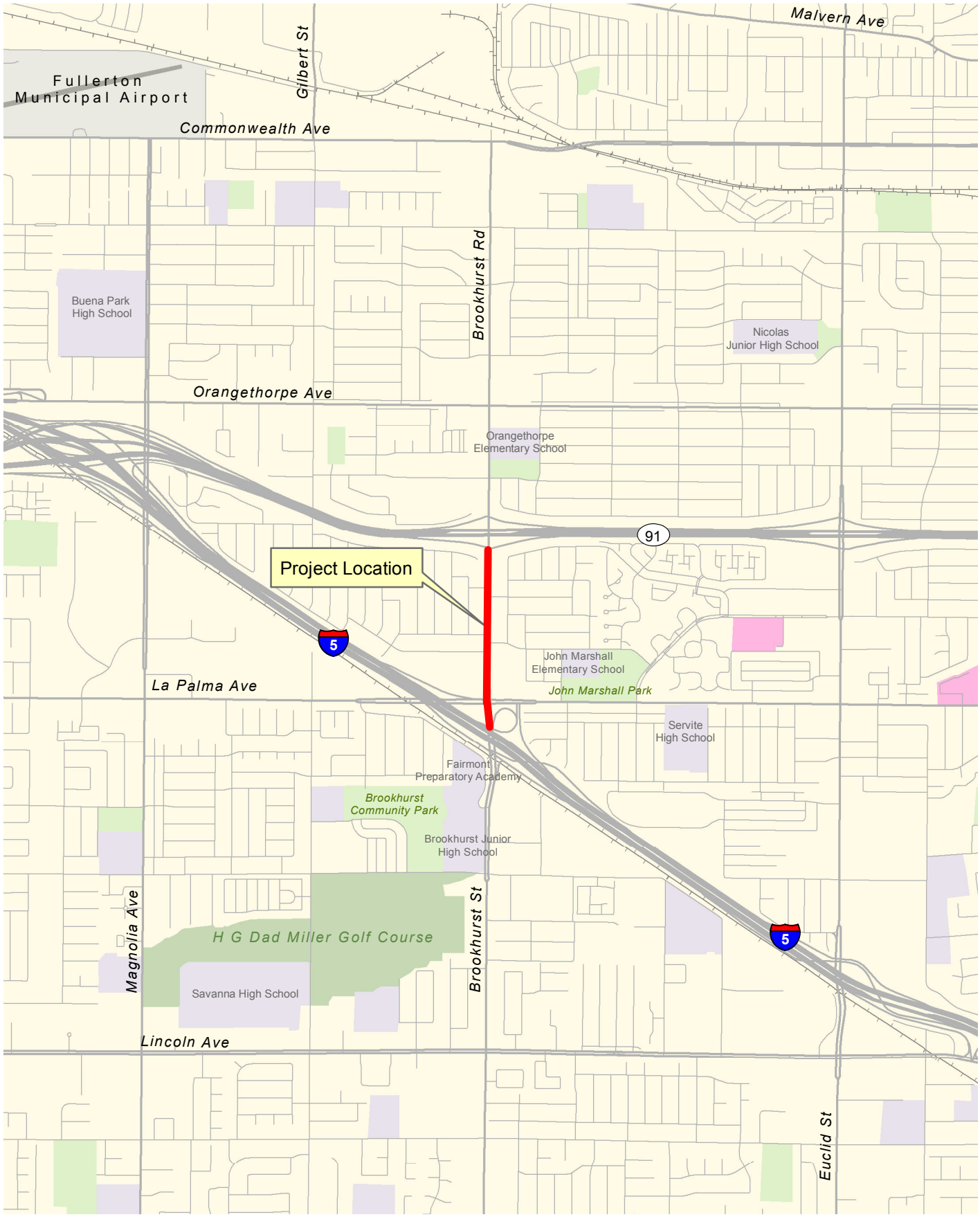
Exhibit 1

Brookhurst Street Roadway Improvement Project

N W E S

10 5 0 10 Miles

(Rev: 10-31-2012 MMD) Projects\Kreuzer\J005\Graphics\MND\ex1_RL.pdf



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Local Vicinity

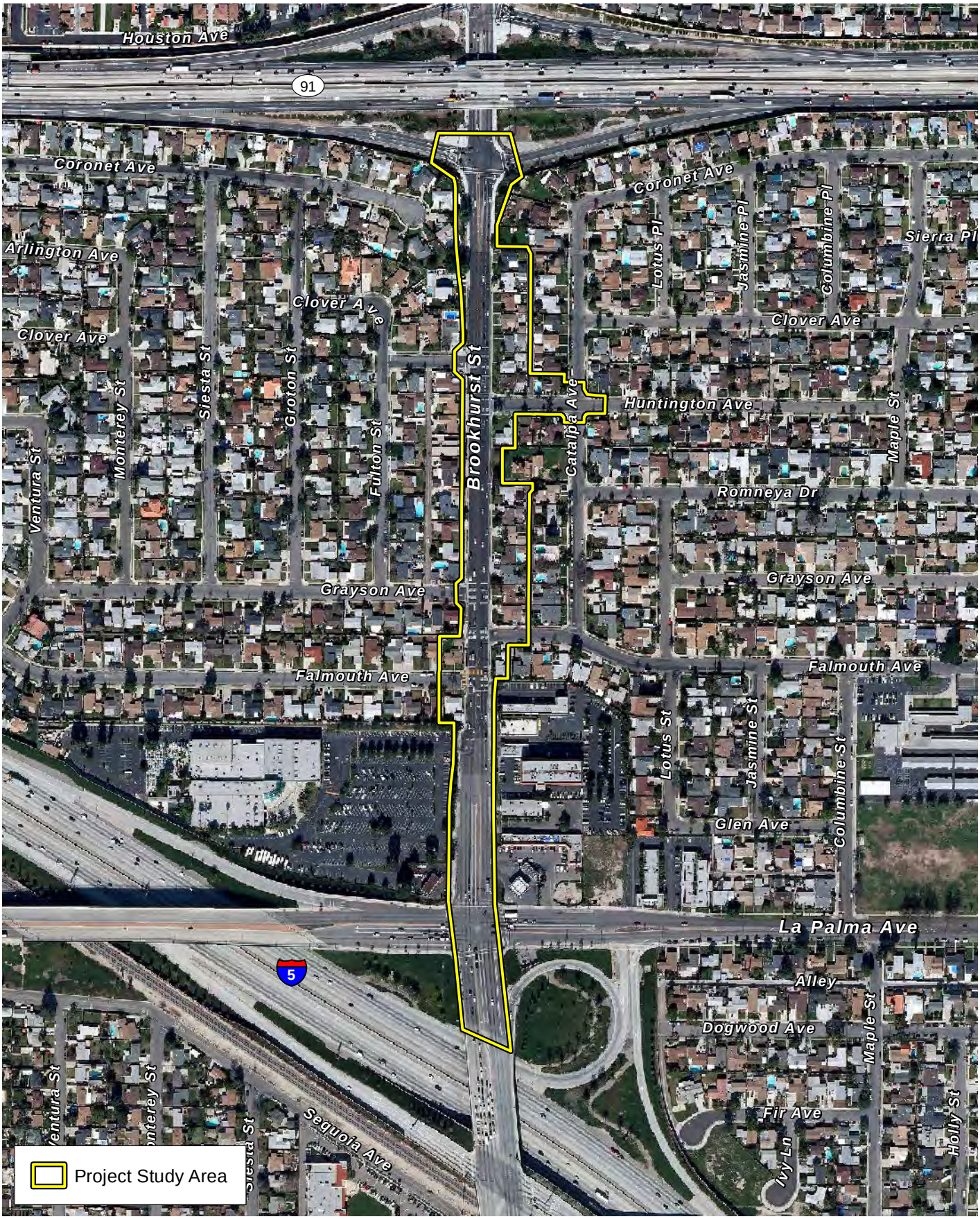
Exhibit 2

Brookhurst Street Roadway Improvement Project

N W E S

2,000 1,000 0 2,000 Feet

(Rev: 11-14-2012MMD) Projects\Kruezer\J005\Graphics\MND\ex2_lv.pdf



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Aerial Photograph

Exhibit 3

Brookhurst Street Roadway Improvement Project

N W E S

400 200 0 400

Feet

(Rev: 10-31-2012 MMD) Projects\Kreuzer\J005\Graphics\MND\ex3_Alt2B_east_aerial.pdf

SECTION 3.0 PROJECT DESCRIPTION

3.1 PHYSICAL CHARACTERISTICS

The proposed Project would involve widening an approximate 0.4-mile portion of Brookhurst Street from SR-91 to the north and I-5 to the south. The primary purpose of the Project is to relieve congestion along the roadway and provide continuity in the number of lanes on Brookhurst Street within the City of Anaheim. A secondary purpose is to enhance aesthetics and improve drainage along the corridor. Key Project components are described below. Exhibits 4a and 4b, Preliminary Project Plans, depict the conceptual Project plan for the proposed Project.

3.2 ROADWAY WIDENING

The Project proposes to widen Brookhurst Street from a four-lane facility to a six-lane facility, with three northbound through lanes and three southbound through lanes from the SR-91 to I-5. The Project proposes to shift the roadway centerline a maximum of 22 feet to the east and widen the roadway right-of-way in order to accommodate (1) the additional lanes in the northbound and southbound directions and (2) the proposed bikeways, sidewalks, and landscaped areas, as described in more detail below under "Improvements". The Project would require 19 full and 13 partial property acquisitions totaling 134,519 square feet (sf) along the street corridor within City of Anaheim jurisdiction, as shown in yellow on Exhibits 4a and 4b. Full property takes would involve demolition of 19 single-family residences (refer to Exhibits 4a and 4b) to accommodate the proposed Project actions. The proposed partial property takes would involve non-structural areas of residential and commercial properties along Brookhurst Street. The Project includes the construction of new storm drain main line facilities in Brookhurst Street, along with new catch basins and connector pipes in order to improve the City's existing storm drain system and to meet the City's drainage requirements identified in the Master Plan of Storm Drainage (MPSD) for the Fullerton Creek Channel Tributary Area. The Project would also require encroachment onto California Department of Transportation (Caltrans) District 12 property in order to tie in the proposed roadway improvements to SR-91's eastbound on- and off-ramps.

3.3 OTHER IMPROVEMENTS

In addition to widening the roadway to accommodate additional traffic lanes, the Project would also include the improvements listed below.

- Six-foot-wide northbound and southbound Class II bikeways would be provided along the length of the roadway segment. These bikeways would be striped and identified by signs.
- Parkways, including the landscaped area and sidewalk, would be reconstructed. The landscaped areas on the east side of the street would include landscaped bioswales and pervious areas to enhance on-site drainage and bioretention and would include drought-tolerant and low-maintenance plantings.[1]
- Raised medians would be installed along the 0.4-mile segment of Brookhurst Street and would allow for two intersection breaks at Falmouth Avenue and Huntington Avenue. An additional median break and northbound left-turn pocket would be installed at the Sa-

[1] It should be noted that earlier project plans presented at the first public meeting included the possible development of a Community Garden along the east side of Brookhurst Street between Falmouth Avenue and Huntington Avenue. Based on further review, the City has eliminated this optional project component.

Rang Community Church. Landscaping in the proposed medians would include drought-tolerant and low-maintenance plantings.

- Eight- to ten-foot-high concrete block walls would be constructed adjacent to residential areas along the Project alignment except in areas where a wall would impede vehicular access or where existing walls are already located.

- East Huntington Avenue to the north from Catalpa Avenue to Brookhurst Street would be realigned to eliminate the currently off-set intersections of East Huntington Avenue and Brookhurst Street and West Huntington Avenue and Brookhurst Street and to create a single intersection. As part of this realignment, a traffic signal would be installed. Along the north side of East Huntington Avenue, sidewalks would be constructed, and landscaped areas would be installed. Along the south side of East Huntington Avenue, a sidewalk would be constructed and there would be a large area of remnant parcels that would be landscaped to complement the proposed landscaping along Brookhurst Street.

3.4 CONSTRUCTION ACTIVITIES AND PROJECT PHASING

Demolition and construction associated with the proposed Project is expected to occur in 3 phases over a 12-month period. The construction phases are discussed below.

PHASE 1

- ***Month 1.*** Demolish structures along the east side of Brookhurst Street.

- ***Months 1–4.*** Install storm drains and utilities along the east side of Brookhurst Street.

- ***Months 3–4.*** Construct block walls and sidewalks along the east side of Brookhurst Street.

- ***Month 5.*** Install paving and landscaping along the east side of Brookhurst Street.

PHASE 2

- ***Month 6.*** Demolish structures along the west side of Brookhurst Street.

- ***Months 6–8.*** Install storm drains and utilities along the west side of Brookhurst Street.

- ***Months 7–9.*** Construct block walls and sidewalks along the west side of Brookhurst Street.

- ***Month 10.*** Install paving and landscaping along the west side of Brookhurst Street.

PHASE 3

- ***Months 11–12.*** Construct the median island and install associated landscaping.

- ***Month 12.*** Complete paving and stripe the entire street within the Project corridor.

Construction staging and parking would be accommodated within the Project site, and a minimum of a single-vehicle travel lane would be maintained in either direction at all times.

LA PALMA AVE TRAFFIC VOLUMES

EXISTING

Approach	Movement	AM	MID	PM
Southbound (top)	Right	211	166	215
	Through	659	324	546
	Left	328	180	271
Eastbound (left)	Left	329	205	302
	Through	1098	907	1358
	Right	305	172	264
Westbound (right)	Right	307	216	256
	Through	1111	714	1024
	Left	142	114	138
Northbound (bottom)	Left	287	245	307
	Through	597	499	925
	Right	99	96	146

YEAR 2035 PROJECTED

Approach	Movement	AM	MID	PM
Southbound (top)	Right	138	-	197
	Through	793	-	666
	Left	736	-	604
Eastbound (left)	Left	181	-	266
	Through	1339	-	1602
	Right	199	-	170
Westbound (right)	Right	632	-	590
	Through	1476	-	1299
	Left	389	-	248
Northbound (bottom)	Left	177	-	187
	Through	571	-	1022
	Right	210	-	216

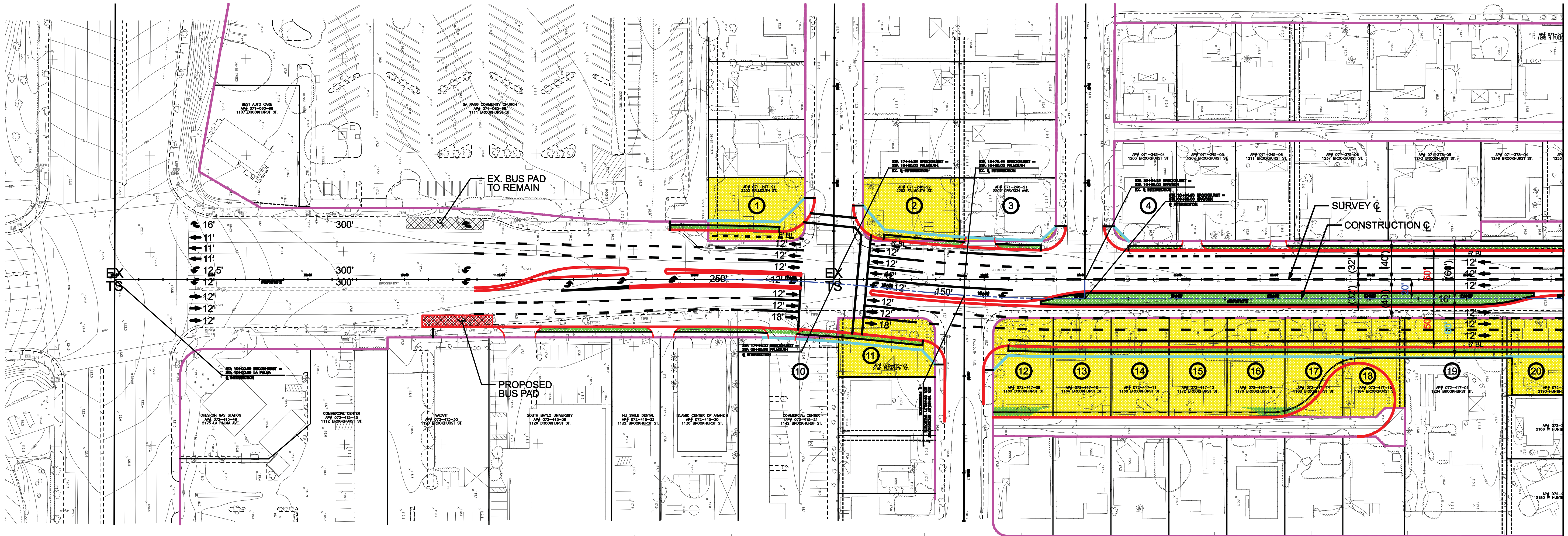
FALMOUTH AVE (W) TRAFFIC VOLUMES

EXISTING

Approach	Movement	AM	MID	PM
Southbound (top)	Right	172	63	111
	Through	0	0	0
	Left	58	17	14
Eastbound (left)	Left	79	71	127
	Through	1346	1118	1626
	Right	-	-	-
Westbound (right)	Right	7	6	23
	Through	1385	865	1304
	Left	-	-	-
Northbound (bottom)	Left	-	-	-
	Through	-	-	-
	Right	-	-	-

YEAR 2035 PROJECTED

Approach	Movement	AM	MID	PM
Southbound (top)	Right	171	-	109
	Through	0	-	0
	Left	57	-	14
Eastbound (left)	Left	71	-	158
	Through	2057	-	2260
	Right	-	-	-
Westbound (right)	Right	7	-	7
	Through	2317	-	2317
	Left	15		
Northbound (bottom)	Left	-	-	-
	Through	-	-	-
	Right	-	-	-



LEGEND

- PROPOSED CURB
- PROPOSED STREET RIGHT-OF-WAY
- EXISTING CURB
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY ACQUISITION
- (#) PARCEL DESIGNATION (SEE SHEET 2)

N

SCALE: 1"= 100'

0 1 2

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES

DESIGN SPEED = 50 MPH

Source: Kreuzer Consulting Group 2012

Preliminary Project Plans

Exhibit 4a

Brookhurst Street Roadway Improvement Project

(10/30/12 MMD) Projects\Kreuzer\J005\Graphics\MND\ex4a_Kreuzer_PrelimProjPlans.pdf

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HUNTINGTON AVE TRAFFIC VOLUMES

HUNTINGTON AVE

EXISTING				YEAR 2035 PROJECTED			
AM	38	10	23	AM	57	13	35
MID	25	4	15	MID	-	-	-
PM	15	4	11	PM	23	5	17
AM MID PM				AM MID PM			
28 19 30				93 - 153			
1300 1079 1533				1950 - 2300			
25 24 41				38 - 52			
AM MID PM				AM MID PM			
22 23 23				33 - 35			
1283 963 1299				1940 - 1904			
68 45 73				102 - 110			
AM	26	7	48	AM	39	9	72
MID	10	11	46	MID	-	-	-
PM	24	9	37	PM	36	12	56

SR-91 EASTBOUND TRAFFIC VOLUMES

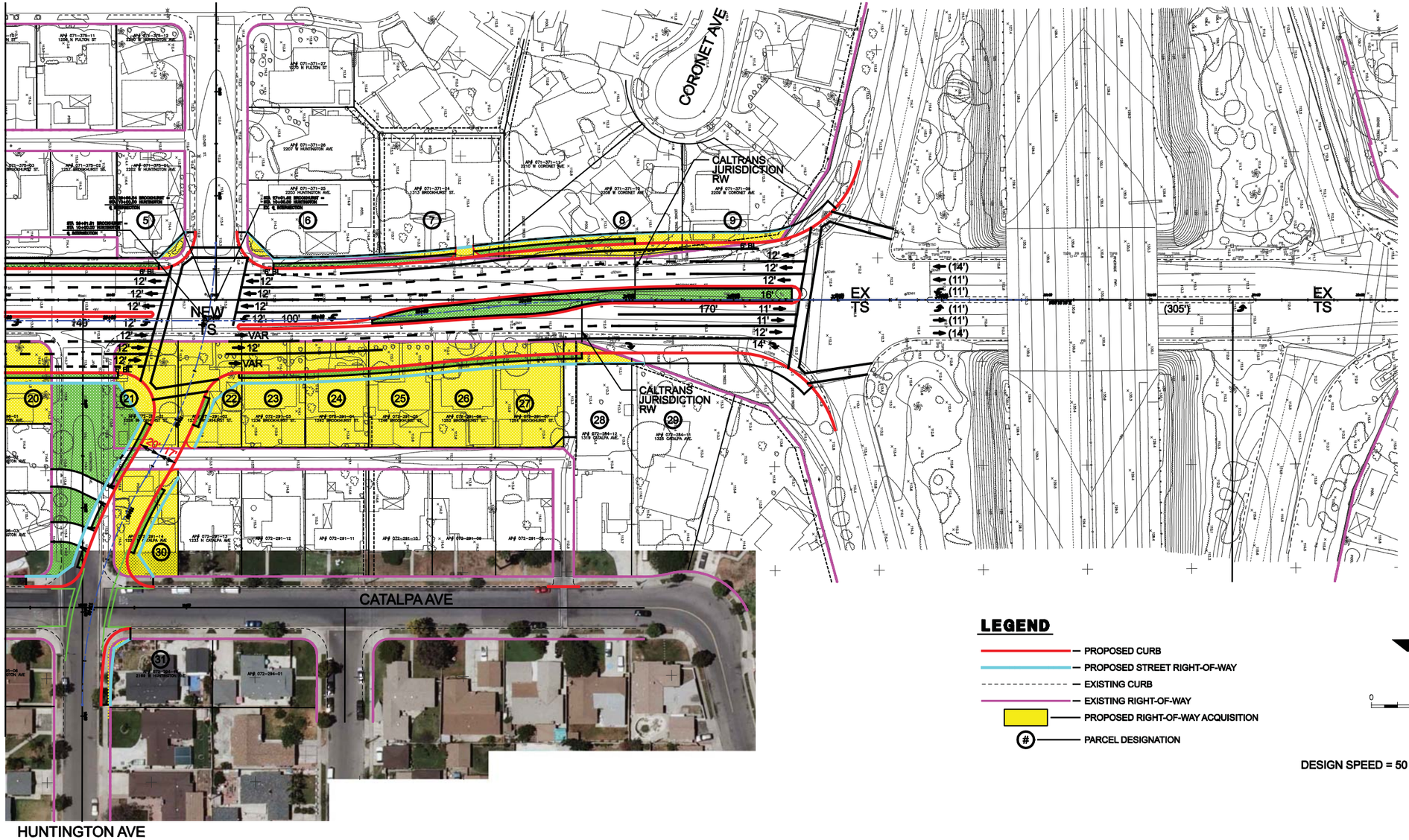
EXISTING				YEAR 2035 PROJECTED			
AM	97	1	193	AM	189	0	297
MID	72	4	178	MID	-	-	-
PM	128	1	317	PM	136	1	342
AM MID PM				AM MID PM			
751 681 1078				1200 - 1162			
612 429 467				847 - 504			
AM MID PM				AM MID PM			
- - -				- - -			
1218 872 1220				1994 - 1318			
303 166 221				277 - 239			
AM	-	-	-	AM	-	-	-
MID	-	-	-	MID	-	-	-
PM	-	-	-	PM	-	-	-

SR-91 WESTBOUND TRAFFIC VOLUMES

EXISTING				YEAR 2035 PROJECTED			
AM	-	-	-	AM	-	-	-
MID	-	-	-	MID	-	-	-
PM	-	-	-	PM	-	-	-
AM MID PM				AM MID PM			
102 - 75				- - -			
647 - 1301				- - -			
- - -				- - -			
AM MID PM				AM MID PM			
293 - 186				128 - 168			
1063 - 857				1257 - 1406			
- - -				- - -			
168 - 203				AM	305	0	453
2163 - 926				MID	-	-	-
- - -				PM	625	0	399
AM	413	-	183				
MID	-	-	-				
PM	579	-	389				

HUNTINGTON AVE

SR-91



RIGHT OF WAY ACQUISITION SUMMARY

#	APN	USE	F/T	P/T	ACQUISITION AREA (S.F.)
1	071-247-21	SFR	X		6,824
2	071-248-22	SFR	X		6499
3	071-246-21	SFR	X		6,527
4	071-245-04	SFR		X	77
5	071-375-01	SFR		X	284
6	071-371-25	SFR		X	373
7	071-371-24	SFR		X	1,008
8	071-371-10	SFR		X	3,515
9	071-371-09	SFR		X	1,297
10	072-415-21	COMMERCIAL		X	151
11	072-415-20	SFR	X		6,111
12	072-417-09	SFR	X		6,303
13	072-417-10	SFR	X		6,146
14	072-417-11	SFR	X		6,148
15	072-417-12	SFR	X		6,150
16	072-417-13	SFR	X		6,151
17	072-417-14	SFR	X		6,153
18	072-417-15	SFR	X		6,315
19	072-417-01	SFR		X	4,233
20	072-298-01	SFR	X		8,111
21	072-291-01	SFR	X		6,273
22	072-291-02	SFR	X		6,287
23	072-291-03	SFR	X		6,289
24	072-291-04	SFR	X		6,271
25	072-291-05	SFR	X		6,273
26	072-291-06	SFR	X		6,275
27	072-291-07	SFR	X		6,888
28	072-284-12	SFR		X	983
29	072-284-11	SFR		X	22
30	072-291-14	SFR	X		6,306
31	072-294-16	SFR		X	215

SUMMARY

- 19 FULL TAKES (121,233 SF / 2.78 Ac)
- 12 PART TAKES (12,368 SF / 0.28 Ac)

REMNANT PARCELS

- WEST SIDE - 9,649 SF / 0.22 Ac
- EAST SIDE - 50,858 SF / 1.17 Ac
- TOTAL - 60,507 SF / 1.39 Ac

LEGEND

- PROPOSED CURB
- PROPOSED STREET RIGHT-OF-WAY
- EXISTING CURB
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY ACQUISITION
- (#) PARCEL DESIGNATION

N

SCALE: 1"= 100'

0 1 2

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES

DESIGN SPEED = 50 MPH

Source: Kreuzer Consulting Group 2012

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Preliminary Project Plans

Exhibit 4b

Brookhurst Street Roadway Improvement Project

3.5 DISCRETIONARY APPROVALS

This IS/MND is intended to serve as the primary CEQA environmental document for all actions associated with the proposed Brookhurst Street Improvement Project, including all discretionary approvals requested or required to implement the Project. In addition, this is the primary reference document for the formulation and implementation of a mitigation monitoring program for the proposed Project.

The primary actions which the City of Anaheim needs to consider for the proposed Project and that are evaluated in this document are described below.

- ***Approval of Initial Study/Mitigated Negative Declaration.*** The City is requesting approval of the IS/MND.

- ***Building Permit.*** The City is requesting issuance of a building permit for the construction of on-site structures (i.e., blockwalls).

- ***Right-of-Way Construction Permit.*** The City is requesting issuance of a right-of-way construction permit for construction activities.

- ***Acquisition of Private Property.*** The City is requesting approval for acquisition of private property for construction activities and project implementation.

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SECTION 4.0 ENVIRONMENTAL CHECKLIST

CITY OF ANAHEIM
ENVIRONMENTAL CHECKLIST FORM

Form Revision Date: 1/20/2010

CASE NO.: Brookhurst Street Widening **SITE ADDRESS:** Brookhurst Street between I-5 and SR-91

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

DETERMINATION: (To be completed by the City)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☑ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

J. E. B.
Signature of City of Anaheim Representative

11-26-12
Date

Jonathan E. Borrego / Principal Planner
Printed Name/Title

(714) 765-5016
Phone No.

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

2) A list of "Supporting Information Sources" must be attached and other sources used or individuals contacted should be cited in the Narrative Summary for each section.

3) Response Column Heading Definitions:

   a) **Potentially Significant Impact** is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

   b) **Potentially Significant Unless Mitigation Incorporated** applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". The mitigation measures must be described, along with a brief explanation of how they reduce the effect to a less than significant level.

   c) **Less Than Significant Impact** applies where the project creates no significant impacts, only Less Than Significant impacts.

   d) **No Impact** applies where a project does not create an impact in that category. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one proposed (e.g., the project falls outside of a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

4) Earlier analyses may be used where, pursuant to a tiering, program EIR, Master EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration (Section 15062(c)(3)(D)). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated", describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

Incorporate into the checklist any references to information sources for potential impacts (e.g., the General Plan, zoning ordinance). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway or local scenic expressway, scenic highway, or eligible scenic highway?	☐	☐	☐	☑
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☑
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☑
II. AGRICULTURE & FOREST RESOURCES -- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c) 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))?	☐	☐	☐	☑
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☑
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☑	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☑	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☑
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?	☐	☐	☐	☑
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines and/or identified on the Qualified Historic Structures list of the Anaheim Colony Historic District Preservation Plan (July 20, 1999)?	☐	☐	☑	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines?	☐	☑	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☑	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☑	☐
ii) Strong seismic ground shaking?	☐	☐	☑	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☑	☐
iv) Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☑	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑
VII. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☑
VIII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☑	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☑	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan (Los Alamitos Armed Forces Reserve Center or Fullerton Municipal Airport), would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, heliport or helistop, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑
IX. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☑	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☑	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☑	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
f) Otherwise substantially degrade water quality?	☐	☐	☑	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☑
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j) Inundation by seiche or mudflow?	☐	☐	☐	☑

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
k) Substantially degrade water quality by contributing pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling, or storage, delivery areas, loading docks or other outdoor work areas?	☐	☐	☑	☐
l) Substantially degrade water quality by discharge which affects the beneficial uses (i.e., swimming, fishing, etc.) of the receiving or downstream waters?	☐	☐	☑	☐
X. LAND USE AND PLANNING -- Would the project:				
a) Physically divide an established community?	☐	☐	☑	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑
XI. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑
XII. NOISE -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
e) For a project located within an airport land use plan (Los Alamitos Armed Forces Reserve Center or Fullerton Municipal Airport), would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, heliport or helistop, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☑	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
1) XIV. PUBLIC SERVICES -- Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which 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?	☐	☐	☑	☐
XV. RECREATION -- Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☑
XVI. TRANSPORTATION/TRAFFIC -- Would the project:				
a) 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?	☐	☐	☐	☑
b) 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?	☐	☐	☐	☑
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?	☐	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☑	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☑
XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑	☐
b) Require or result in the construction of new water or wastewater treatment facilities (including sewer (waste water) collection facilities) or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
d) Have sufficient water supplies available to serve the project (including large-scale developments as defined by Public Resources Code Section 21151.9 and described in Question No. 20 of the Environmental Information Form) from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑	☐
g) Comply with Federal, State, and local statutes and regulations related to solid waste?	☐	☐	☑	☐
h) Result in a need for new systems or supplies, or substantial alterations related to electricity?	☐	☐	☑	☐
l) Result in a need for new systems or supplies, or substantial alterations related to natural gas?	☐	☐	☑	☐
j) Result in a need for new systems or supplies, or substantial alterations related to telephone service?	☐	☐	☑	☐
k) Result in a need for new systems or supplies, or substantial alterations related to television service/reception?	☐	☐	☑	☐
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE --				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☑	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐	☐

Fish and Game Determination

(Per Section 21089(b) of the Public Resources Code, all project applicants and public agencies subject to the California Environmental Quality Act shall pay a Fish and Game filing fee for each proposed project that would adversely affect wildlife resources.)*

Based on the responses contained in this Environmental Checklist, there is no evidence that the project has a potential for a change that would adversely affect wildlife resources or the habitat upon which the wildlife depends. Has the presumption of adverse effect set forth in 14 CCR 753.5 (d) been rebutted by substantial evidence?

_____ Yes (Certificate of Fee Exemption and County Administrative fee required)

__X__ No (Pay fee)

***Note:** Fish and Game Code Section 711.4(c)(2)(A) states that projects that are Categorically Exempt from CEQA are also exempt from filing fee.

SECTION 5.0 DISCUSSION OF ENVIRONMENTAL CHECKLIST QUESTIONS

I. AESTHETICS

IMPACT ANALYSIS

Would the Project:

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway or local scenic expressway, scenic highway, or eligible scenic highway?

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

No Impact. The proposed Project includes improvements along Brookhurst Street from the SR-91 to I-5 in the City of Anaheim, as shown in Exhibits 4a and 4b. According to the *City of Anaheim General Plan's* Circulation Element (2004), Brookhurst Street is not designated as a scenic roadway. There are no scenic vistas within or adjacent to the Project limits. As part of the Project, a raised median and new parkway areas are proposed. As discussed in the Project description, the Project includes implementation of a landscape plan along the roadway segment including landscaped medians; a sidewalk and a landscaped parkway along the northbound and southbound sides of the street; and greenbelt areas with meandering walking paths along the northbound side of the street. In accordance with Section 13.12.060 of the *Anaheim Municipal Code,* any street tree removed would be replaced as part of the proposed median or greenbelt in accordance with the Official Tree Species List and Tree Master Plan. Additionally, any mature vegetation removed would also be replaced within the proposed landscaped areas. With the proposed landscape and hardscape improvements, the aesthetics of Brookhurst Street within the Project area would be enhanced.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No Impact. The Project proposes widening of an existing roadway, including installation of landscaped medians and parkway areas. None of the proposed elements would create additional light or glare. Additional landscaping, including trees, would create additional shade that would reduce existing levels of glare along the street. As part of the Project, existing street lighting would be relocated to accommodate the wider roadways; however, no new lighting elements are proposed.

II. AGRICULTURE & FOREST RESOURCES

IMPACT ANALYSIS

Would the Project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) 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))?

No Impact. Data from the State of California Department of Conservation, Farmland Mapping and Monitoring Program indicate that the proposed Project contains no land designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance (FMMP 2008). In addition, the Project site is not in agricultural use or under Williamson Act contracts. No agricultural-related impacts would result from Project implementation.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. According to Section 12220(g) of the *California Public Resources Code,* "forest land is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits". The Project alignment is comprised of a roadway and surrounding land uses, including residential, commercial and religious assembly, educational institutions, medical office, and limited commercial uses. The Project site does not meet the definition of forest land; therefore, no impact related to loss or conversion of forest land would occur.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. As discussed previously, the Project site is not considered to be farmland of significance, land in agricultural use, or forest land. Therefore, implementation of the proposed Project would not result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

III. AIR QUALITY

IMPACT ANALYSIS

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The South Coast Air Quality Management District's (SCAQMD's) *Final 2007 Air Quality Management Plan* (AQMP) is the air quality plan that was adopted by the SCAQMD on June 1, 2007. The 2007 AQMP is an update to the 2003 AQMP and incorporates new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The California Air Resources Board (CARB) approved the plan when the State Strategy for the State Implementation Plan (SIP) was adopted on September 27, 2007.

On November 28, 2007, CARB submitted a SIP revision to the U.S. Environmental Protection Agency (USEPA) for ozone (O_3), fine particulate matter with a diameter of 2.5 microns or less (PM2.5), carbon monoxide (CO), and nitrogen dioxide (NO_2) in the South Coast Air Basin

(SoCAB); this revision is identified as the "2007 South Coast SIP". The 2007 AQMP/2007 South Coast SIP demonstrates attainment of the federal PM2.5 standard in the SoCAB by 2014 and attainment of the federal 8-hour O_3 standard by 2023. The SIP also includes a request to reclassify the O_3 attainment designation from "severe" to "extreme". The USEPA approved the redesignation effective June 4, 2010. The Extreme designation requires the attainment of the 8-hour O_3 standard in the SoCAB by June 2024. CARB approved PM2.5 SIP revisions in April 2011 and O_3 SIP revisions in July 2011. The USEPA approved 3 of the 5 PM2.5 SIP requirements on January 9, 2012 and has approved 47 of the 62 O_3 SIP requirements (USEPA 2012).

The SCAQMD has drafted the 2012 AQMP, which is a regional and multi-agency effort (SCAQMD, CARB, the Southern California Association of Governments [SCAG], and USEPA). The 2012 AQMP will incorporate the latest scientific and technical information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); updated emission inventory methodologies for various source categories; and SCAG's latest growth forecasts. It is expected that the 2012 AQMP will be approved by the SCAQMD Governing Board in December 2012 (SCAQMD 2012a, 2012b). The Brookhurst Widening project is included in the regional emissions analysis conducted by SCAG for the RTP/SCS (SCAG 2012). The Project is listed on Page 236 in the Financially-Constrained RTP Projects section of the RTP/SCS Project List as RTP ID 2A0704, an Orange County project on the Local Highway System.

The main purpose of an AQMP is to bring an area into compliance with the requirements of federal and State air quality standards. For a Project to be consistent with the AQMP, the pollutants emitted from the Project should not exceed the SCAQMD CEQA air quality significance thresholds or cause a significant impact on air quality. As shown in Response III(b) below, pollutant emissions from the proposed Project would be less than the SCAQMD thresholds and would not result in a significant impact. Further, the proposed Project, being the improvement of an existing transportation facility in order to reduce congestion, would not result in development that may not have been anticipated in the AQMP. No conflict with the AQMP would occur with the proposed Project.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less than Significant with Mitigation. The Project site is located in Orange County, which is part of the SoCAB and is under the jurisdiction of the SCAQMD. Both the State of California (State) and the federal government have established health-based Ambient Air Quality Standards (AAQS) for seven air pollutants, which are known as "criteria pollutants". These pollutants include O_3, CO, NO_2, sulfur dioxide (SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM10), PM2.5, and lead. The State has also established AAQS for additional pollutants. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. Federal and State standards for pollutants that are addressed in this analysis are shown in Table 1.

TABLE 1
CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[a]	Secondary[b]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary
PM10	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
PM2.5	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	15.0 µg/m^3	Same as Primary
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
SO_2	24 Hour	0.04 ppm (105 µg/m^3)	–	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM10: large particulate matter with a diameter of 10 microns or less; AAM: Annual Arithmetic Mean; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; km: kilometer; –: No Standard.

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

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

Note: More detailed information in the data presented in this table can be found at the CARB website (www.arb.ca.gov).

Source: CARB 2012a.

Regional air quality is defined by whether the area has attained or not attained State and federal standards, as determined by monitoring. Areas that are in nonattainment are required to prepare plans and implement measures that will bring the region into attainment. When an area has been reclassified from nonattainment to attainment for a federal standard, the status is identified as “maintenance”, and there must be a plan and measures established that will keep the region in attainment for the following ten years. For the CARB, an “Unclassified” designation

indicates that the air quality data for the area are incomplete and do not support a designation of attainment or nonattainment. Table 2 summarizes the attainment status in the SoCAB for the criteria pollutants.

TABLE 2
DESIGNATIONS OF CRITERIA POLLUTANTS IN THE SOUTH COAST AIR BASIN

Pollutant	State	Federal
O_3 (1-hour)	Nonattainment	No Standard
O_3 (8-hour)		Extreme Nonattainment
PM10	Nonattainment	Serious Nonattainment
PM2.5	Nonattainment	Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Nonattainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Nonattainment/Attainment*	Nonattainment/Attainment
All others	Attainment/Unclassified	No Standards

O3: ozone; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; CO: carbon monoxide; NO2: nitrogen dioxide; SO2: sulfur dioxide.

* Los Angeles County is classified as nonattainment for lead; the remainder of the SoCAB is in attainment of the State and federal standards.

Source: CARB 2012b.

Construction

Mass Daily Emissions

Construction would include demolition of 19 homes; clearing of acquired property for road widening; grading and excavation; relocation of utilities and underground infrastructure; soil export; import of subgrade materials; paving; construction of privacy walls; and landscaping of acquired lands not used for roadway widening. The roadway would be open through all phases of construction; therefore, no detours are expected to be necessary. During demolition and construction, the proposed Project would generate pollutants such as volatile organic compounds (VOC), oxides of nitrogen (NOx), CO, and suspended PM. VOC and NOx are the two principal precursors of O_3. The impacts of these activities would vary each day as construction progresses.

A potential source of PM would be windblown dust generated during demolition, excavation, grading, hauling, and various other activities. Both SCAQMD Rule 403 and Caltrans Standard Specifications, Section 14, require dust control.

Emissions Calculations

Criteria pollutant emissions were calculated by using California Emissions Estimator Model (CalEEMod) version 2011.1.1 for the following: roadway widening activities of grubbing/land clearing; grading; relocation of utilities and underground structures; and paving and the ancillary activities of demolition of acquired structures, privacy wall construction, and landscaping activities. CalEEMod is a computer program accepted by the SCAQMD that can be used to estimate anticipated emissions associated with land development projects in California. CalEEMod has separate databases for specific counties and air districts, and the Orange County database was used for the proposed Project. Dust control by watering was assumed, consistent

with the requirements of SCAQMD Rule 403 and Caltrans Standard Specifications. PM10 emissions from on-road hauling of demolition debris were manually calculated using USEPA/CalEEMod equations due to an error in the CalEEMod program.

Project-specific input was based on general information provided in the Project description and default model settings in order to estimate reasonable worst-case conditions. It was assumed that construction would last for approximately 12 months. In order to develop a reasonable worst-case scenario for maximum daily emissions, conservative assumptions were made for individual parameters, including grading disturbance of 0.3 acre in 1 day, which would occur in the expanded right-of-way and export of 160 cubic yards and import of 16 cubic yards of materials in 1 day. Because the Project could be built in phases that could overlap, it was assumed that demolition of homes, construction of privacy walls, and landscaping could all occur concurrently with road widening, with each activity occurring on a different section of the alignment. Further, because the Project is linear, it was assumed that all four phases of road widening could occur concurrently.

Maximum daily emissions of VOCs, CO, NOx, PM10, and PM2.5 are shown in Table 3. CalEEMod data sheets (showing equipment assumptions and detailed emissions) are in Appendix A. As shown in Table 3, maximum daily emissions of NOx would exceed the SCAQMD CEQA significance thresholds; emissions of VOCs, CO, PM10, and PM2.5 would be less than the thresholds.

TABLE 3
PROJECT CONSTRUCTION – MAXIMUM DAILY EMISSIONS
WITHOUT MITIGATION

Construction Activity	Pollutant Emissions (pounds per day)				
	VOC	**NOx**	**CO**	**PM10**	**PM2.5**
Road Widening Activities					
Grubbing/Land Clearing	4	34	21	7	5
Grading/Excavation	3	26	16	7	4
Drainage/Utilities/Sub-Grade	3	19	15	1	1
Paving	2	9	6	1	1
Additional Activities					
Demolition	4	32	21	3	2
Wall Construction	1	3	4	0.4	0.2
Landscaping	1	8	6	1	0.4
Reasonable worst case total (all activities concurrent)	**18**	**131**	**89**	**20**	**14**
SCAQMD Significance Threshold	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?	**No**	**Yes**	**No**	**No**	**No**

VOC: volatile organic compounds; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less.

Emissions rounded to the whole pound/day except when less than 0.5 pound/day.

Source: SCAQMD 2011b (thresholds). See Appendix A for CalEEMod data.

In order to avoid exceedance of the NOx threshold, mitigation measure (MM) AQ-1 would be incorporated into the Project. This MM specifies that all off-road diesel-powered construction

equipment greater than 50 horsepower (hp) shall meet Tier 3 or better off-road emissions standards. As shown in Table 4, with implementation of MM AQ-1, NOx emissions would be less than the SCAQMD significance threshold and Project construction emissions would not violate any air quality standard or contribute substantially to an existing or projected air quality violation.

TABLE 4
PROJECT CONSTRUCTION – MAXIMUM DAILY EMISSIONS
WITH MITIGATION

Construction Activity	Pollutant Emissions (pounds per day)				
	VOC	**NOx**	**CO**	**PM10**	**PM2.5**
Road Widening Activities					
Grubbing/Land Clearing	3	24	21	4	3
Grading/Excavation	2	18	16	5	2
Drainage/Utilities/Sub-Grade	2	11	16	1	1
Paving	1	4	6	1	0.4
Additional Activities					
Demolition	3	20	20	3	1
Wall Construction	0.4	2	4	0.4	0.2
Landscaping	1	5	7	1	0.4
Reasonable worst case total (all activities concurrent)	**12**	**84**	**90**	**15**	**8**
SCAQMD Significance Threshold	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**

VOC: volatile organic compounds; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less

Emissions rounded to the whole pound/day except when less than 0.5 pound/day.

Source: SCAQMD 2011b (thresholds). See Appendix A for CalEEMod data.

Local Concentrations

In addition to the mass daily emission thresholds established by the SCAQMD, short-term on-site emissions of NO_2, CO, PM10, and PM2.5 are examined for local impacts to nearby sensitive receptors based on the SCAQMD localized significance thresholds (LST). To assess local air quality impacts for development projects of five acres or less without complex dispersion modeling, the SCAQMD developed screening (lookup) tables, which were used for this analysis. The closest receptors to the proposed site are the single-family homes that are located less than 25 feet to the east and west of the right-of-way along Brookhurst Street, and near the existing structures to be demolished. For purposes of analysis, the area where active grading/construction would occur on any day proximate to any single receptor was identified as a half acre, which is approximately the size of 3 lots, or a length of 75 feet, in each direction from any given receptor.

To evaluate local impacts to a single receptor, it is reasonably assumed that the various construction activities would not occur concurrently within 25 meters[2] (approximately 82 feet) of any individual receptor. Table 5 shows the construction emission estimates for maximum daily

[2] In the SCAQMD LST methodology, source-receptor distances are stated in meters.

on-site emissions for each phase of construction compared with the SCAQMD thresholds. The emissions values in Table 5 for each activity are less than in Table 4 because Table 4 includes off-site and on-site emissions while Table 5 includes only on-site emissions. As described above, implementation of SCAQMD Rule 403 (i.e., dust-control measures) would minimize dust emissions. As shown in Table 5, the projected emissions of NOx, CO, PM10, and PM2.5 would not exceed threshold values. No significant impacts would occur.

TABLE 5
LOCAL CONSTRUCTION ON-SITE EMISSIONS

Construction Activity	Emissions (pounds per day)			
	NOx	CO	PM10[a]	PM2.5[a]
Grubbing/Land Clearing	10	12	3	2
Grading/Excavation	8	10	3	2
Drainage/Utilities/Sub-Grade	11	15	1	1
Paving	4	5	<0.5	<0.5
Demolition	14	16	2	1
Sound Wall Construction	2	3	<0.5	<0.5
Landscaping	5	6	<0.5	<0.5
Maximum day for construction – single activity	14	16	3	2
LST/Regional SCAQMD Thresholds[b]	81	485	4	3
Exceed threshold?	**No**	**No**	**No**	**No**

NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; LST: localized significance threshold; SCAQMD: South Coast Air Quality Management District.

[a] Values include implementation of SC AQ-1 and MM AQ-1.
[b] Thresholds for source-receptor area 17, Central Orange County.

Source: SCAQMD 2008 (methodology), 2009 (thresholds).

Operations

Potential air quality impacts from the operation of the proposed Project are primarily associated with the differences in traffic volumes and speeds. The proposed Project will add an additional lane on Brookhurst Street in each direction; provide a landscaped median; and provide a signalized intersection at Huntington Avenue. The improvements would decrease traffic congestion; improve traffic flow; and decrease delay at intersections.

Mass Daily Emissions

Increases in traffic volume and vehicle miles traveled (VMT) will result in increased vehicle pollutant emissions. Traffic volumes on Brookhurst Street are expected to increase under future conditions, resulting in potentially greater emissions in future years than under existing conditions. However, there would be offsetting decreases (with or without the proposed Project) because of the increased fraction of "cleaner" vehicles. This would occur because newer vehicles would be phased in over time; because of the requirements of the Corporate Average Fuel Economy (CAFE) standards; and because of a joint USEPA and National Highway Traffic Safety Administration rule that sets improved average fuel economy standards for passenger cars and light trucks manufactured between 2012 and 2016.[3] For the With Project Scenario, the

[3] Additional CAFE requirements for model years 2017–2025 were proposed in July 2012.

increase in traffic speed and restoration of a free-flowing traffic pattern would reduce the amount of pollutant emissions when compared to the Without-Project Scenario.

The removal of 19 homes would eliminate the existing pollutant emissions resulting from the use of vehicles, natural gas, landscape equipment, consumer products, and architectural coatings. It is assumed that the displaced residents would relocate to other homes in the SoCAB and would generate similar emissions at those homes. Therefore, this analysis is limited to the anticipated changes in vehicle operations on Brookhurst Street.

A quantitative estimate of vehicle pollutant emissions comparing the existing condition and the 2015 and 2035 With and Without Project Scenarios was made using EMFAC 2011 emission rates. EMFAC2011 includes the latest data on California's car and truck fleets and travel activity. The model also reflects the emissions benefits of the CARB's rulemakings including on-road diesel fleet rules, Pavley Clean Car Standards, and the Low Carbon Fuel Standard. For purposes of analysis it was assumed that the primary changes in average traffic speed would occur for 4 hours per day (the AM and PM peak hours) and would occur over a 0.25-mile-long segment of Brookhurst Street. Peak hour volumes and average speeds were estimated after reviewing the Project traffic study. Data are shown in Table 6. Calculation details are included in Appendix A.

TABLE 6
ESTIMATED CHANGES IN OPERATIONAL EMISSIONS

Year	Scenario	Peak Hour Volume (vph)	Average Speed (mph)	Emissions (pounds per day)				
				VOC	NOx	CO	PM10	PM2.5
2012	Existing	2,800	42	0.33	1.59	13.06	0.011	0.010
2015	Without Project	3,200	40	0.25	1.33	10.96	0.010	0.010
2015	With Project	3,200	45	0.22	1.32	10.36	0.010	0.009
2035	Without Project	4,400	38	0.09	0.62	6.02	0.016	0.015
2035	With Project	4,400	44	0.08	0.60	5.44	0.014	0.013
SCAQMD Thresholds				*55*	*55*	*550*	*150*	*55*
Exceed Threshold?				***No***	***No***	***No***	***No***	***No***

vph: vehicles per hour; mph: miles per hour; VOC: volatile organic compound; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less.

As shown in Table 6, comparison of With Project and Without Project Scenarios shows that emissions of each pollutant would be reduced with implementation of the Project, with the one exception where PM10 emissions in 2015 would be the same without or with the Project. The proposed Project would not increase long-term pollutant emissions, and the impact would be less than significant.

Carbon Monoxide Hotspots

A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. An initial screening procedure is provided in the procedures and guidelines contained in the *Transportation Project-Level Carbon Monoxide Protocol* (the CO Protocol) to determine whether a Project poses the potential for a CO hotspot (UCD ITS 1997). The SoCAB is in a CO attainment area that was redesignated as "attainment" after the 1990 Clean Air Act and "continued attainment" been verified based on the Draft 2012 AQMP that states, "In 2011, no areas exceeded the CO air quality standards. . . . All areas of

the Basin have continued to remain below the federal standard level since 2003" (SCAQMD 2012a). Based on this status, Section 4.7.1 of the CO Protocol states, "only those projects that are likely to worsen air quality necessitate further analysis". The criteria for worsening air quality are (1) increasing the percentage of vehicles in cold start modes by two percent or more; (2) increasing traffic volumes by five percent or more over existing volumes (or less if there is a reduction in traffic speed); (3) making traffic flow worse by reducing average speed or, at an intersection, increasing average delay.

The proposed Project would improve traffic flow and increase average vehicle speeds along Brookhurst Street relative to future Without-Project conditions. The proposed Project will improve or have little to no effect on the overall performance of the intersections in the study area (ADVANTEC 2012). Therefore, according to the CO Protocol, the Project is satisfactory and no further analysis is required. There would be no potential for a CO hotspot or exposure of persons to CO in excess of SCAQMD criteria for ambient air quality for CO. The impact would be less than significant.

Summarizing, Project operational emissions would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. No mitigation is required.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

Less Than Significant Impact. The region is a federal and State nonattainment area for PM10, PM2.5, and O_3. The Project would contribute PM10, PM2.5, and the ozone precursors VOC and NOx to the area during short-term Project construction. As described in Response to Item III(b) above, these emissions would be less than SCAQMD regional thresholds. Furthermore, because the construction emissions would occur over a relatively short duration, the Project contribution would not be considerable. There are no known projects in the vicinity of the proposed Project where major construction would occur concurrently with the proposed Project. Therefore, there would be no local cumulative occurrence of construction emissions.

As shown in Table 6, long-range operational VOC, NOx, PM10, and PM2.5 emissions would decrease with implementation of the proposed Project. Therefore, the Project's long-term contribution of these pollutants would not be cumulatively considerable and would result in a less than significant impact. No mitigation is required.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. Exposure of sensitive receptors is addressed for three situations: CO hotspots; local construction emissions of NO_2, CO, PM10, and PM2.5; and toxic air contaminants (TACs). Exposure due to CO hotspots and local construction emissions were analyzed above and found to be less than significant. Exposure to TACs is discussed below.

TACs are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness or that may pose a present or potential hazard to human health. TACs include both organic and inorganic chemical substances that may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and testing facilities. TACs are different than the "criteria" pollutants previously discussed in that AAQS have not been established for them. TACs occurring at extremely low levels may still cause adverse health effects, and it is typically difficult to identify levels of exposure that do not produce adverse health effects.

Diesel engines emit a complex mixture of air pollutants composed of gaseous and solid material. In 1998, California identified diesel exhaust PM as a TAC. Based on year 2005 emissions in California, diesel PM contributes each year to approximately 3,500 premature deaths; thousands of hospital admissions; asthma attacks and other respiratory symptoms; and lost workdays. Overall, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants (CARB 2009a).

Construction

Project construction would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for construction activities, and from on-road diesel equipment used to transport materials to and from the Project site. Exposure is a combination of the emissions rate and the length of time exposed, with exposures calculated over periods of 9 to 70 years. The proposed Project would have relatively little diesel equipment; the period of construction would be approximately 12 months; and construction near any receptor would be on the order of days rather than years. Because exposure to diesel exhaust would be well below the 9- to 70-year exposure period, construction of the proposed Project is not anticipated to result in an elevated cancer risk to exposed persons. As such, Project-related TAC exposure impacts during construction would be less than significant.

Operations

Projects of concern for diesel PM exposure are those projects that would be located near high-traffic freeways; urban roads with more than 100,000 vehicles per day and a high heavy truck concentration; rail yards; ports; and distribution centers. The maximum traffic volume anticipated on Brookhurst Street is less than 49,000 vehicles per day (ADVANTEC 2012). The proposed Project would not introduce any other substantial sources or concentration of diesel or other TAC emissions. There would be no potential for a significant impact.

e) Create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. According to the SCAQMD *CEQA Air Quality Handbook* (SCAQMD 1993), land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed Project does not include any of these land uses and therefore would not produce objectionable odors.

Diesel exhaust fumes would be generated by equipment during site preparation and construction. Diesel fumes would result in odors that may be perceptible to residents of homes in the immediate vicinity of the Project site. However, emissions would be expected to dissipate within a short distance from the Project site, and odors associated with vehicle emissions would not be expected to affect a substantial number of people, if any. The Project would result in a less than significant impact related to creation of odors, and no mitigation is required.

MITIGATION PROGRAM

Standard Condition

SC AQ-1 During construction of the proposed Project, the Contractor shall be required to comply with SCAQMD Rules 402 and 403, which will reduce short-term particulate emissions. SCAQMD Rule 402 requires that air pollutant emissions not be a nuisance off site. SCAQMD Rule 403 requires that fugitive dust be controlled with the best available control measures so that the presence of such

dust does not remain visible in the atmosphere beyond the property line of the emission source. This requirement shall be included as notes on the contractor specifications.

Mitigation Measure

MM AQ-1 ***Off-road Construction Equipment Engines.*** Prior to issuance of each grading and demolition permit, each contractor shall demonstrate to the City of Anaheim that the following measures will be implemented (as shown on construction documents):

a. All off-road diesel-powered construction equipment greater than 50 horsepower (hp) shall meet Tier 3 or better off-road emissions standards.

b. A copy of each unit's certified Tier specification shall be provided at the time of mobilization of each applicable unit of equipment.

IV. BIOLOGICAL RESOURCES

The following analysis is based on site reconnaissance dated June 1, 2012, conducted by BonTerra Consulting Ecologist Raeanne Murphy.

IMPACT ANALYSIS

Would the Project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant With Mitigation. The Project site is currently developed as a four-lane, asphalt-paved roadway in an urban area. On-site vegetation is limited to ornamental species associated with landscaping. Shrub and herb species used for landscaping include lantana (*Lantana* sp.), cape plumbago (*Plumbago auricalata*), Indian hawthorne (*Raphiolepis* sp.), and English ivy (*Hedera* helix). Tree species used for landscaping include Peruvian pepper tree (*Schinus* molle), pine (*Pinus* sp.), evergreen pear (*Pyrus kawakamii*), gum (*Eucalyptus* sp.), date palm (*Phoenix* sp.), and fan palm (*Washingtonia* sp.). No native vegetation types occur on the Project site.

Vegetation on the Project site provides little habitat for native wildlife species; only urban-tolerant wildlife would be expected to occur. Wildlife species observed in the Project area include the mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhyncos*), black phoebe (*Sayornis nigricans*), and house sparrow (*Passer domesticus*). No amphibian, reptile, or mammal species were observed. Due to the urban setting of the Project site, the site does not provide suitable habitat for special status plant and wildlife species, and they are not expected to occur.

The Project site contains ornamental trees that have the potential to support nesting birds and a limited potential to support nesting raptors. Activities having the potential to disturb active bird nests are prohibited by the Migratory Bird Treaty Act (MBTA), and activities having the potential to disturb active raptor nests are prohibited by CDFG regulations (*California Fish and Game Code* §3503, §3503.5, and §3513). Therefore, if construction is initiated during the raptor nesting season (February 1 to June 30), the Project has the potential to impact nesting raptors,

thus resulting in a significant impact. This impact would be reduced to a level considered less than significant with implementation of MM B-1.

Federal requirements prohibit the planting of exotic species (Executive Order 13112) that have been identified as invasive, as seeds from invasive species could escape to natural areas and degrade natural vegetation. Plantings within any landscaped areas must be consistent with this Executive Order; therefore, the proposed Project would not plant any invasive exotic species. Additionally, there are no natural open space areas adjacent to the Project site that could be invaded. Therefore, no impact is expected to occur as a result of invasive exotic species.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Services?

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. As previously stated, on-site vegetation is limited to ornamental species associated with landscaping. This vegetation is not considered to be riparian habitat or another sensitive community identified in local or regional plans or policies, or by the California Department of Fish and Game (CDFG) or the U.S. Fish and Wildlife Service (USFWS). Additionally, the Project site does not support any federally protected wetlands as defined by Section 404 of the Clean Water Act; therefore, the proposed Project would not result in an adverse effect on any marsh, vernal pool, or coastal habitats. No impact would occur and no mitigation is required.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

No Impact. A wildlife dispersal or migration corridor is a strip of habitat that is free of any physical barriers or impediments and that connects two or more larger areas of habitat. The Project is surrounded by development (including major roadways, structures and walls) that would impede wildlife movement; therefore, it does not function as a wildlife movement corridor. Project construction and operation would not be expected to interfere with the movement of any native wildlife resident or migratory fish/wildlife species. Additionally, the Project site is located within a fully developed area of the City and lacks suitable habitat to serve as a native wildlife nursery site. No related impact would occur and no mitigation is required.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. As part of the Project, demolition and construction activities would remove several ornamental trees. As discussed previously in I. Aesthetics, the Project would comply with Section 13.12.060 of the *Anaheim Municipal Code* related to replacement of removed street trees. There are no additional applicable tree preservation policies or ordinances related to the protection of biological resources because the Project site is not located within a Scenic Corridor overlay area. Therefore, no impact would occur and no mitigation is required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

No Impact. According to the *City of Anaheim General Plan,* the Project site is not located within a designated or proposed Natural Community Conservation Plan (NCCP) area. Additionally, development of the Project would not conflict with the provisions of any local, regional, or State Habitat Conservation Plan. No impact would occur and no mitigation would be required.

MITIGATION PROGRAM

Mitigation Measure

MM B-1 The City shall ensure that a survey for active raptor nests occurs within seven days prior to commencement of any demolition or construction activities during the raptor nesting season (February 1 through June 30). A survey for active bird nests shall occur within three days prior to commencement of any demolition or construction activities during the peak bird nesting season (March 15 through September 15). Should an active nest be identified, restrictions will be placed on construction activities in the vicinity of any active nest observed until the nest is no longer active, as determined by a qualified Biologist. These restrictions may include a 300- to 500-foot buffer zone designated around a nest to allow construction to proceed while minimizing disturbance to the active nest. Once the nest is no longer active, construction can proceed within the buffer zone.

V. CULTURAL RESOURCES

IMPACT ANALYSIS

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines and/or identified on the Qualified Historic Structures list of the Anaheim Colony Historic District Preservation Plan (July 20, 1999)?

Less Than Significant. A Historic Resources Evaluation Report (HRER) was prepared by Daly & Associates in September 2012 for the proposed Project and is available for review at the City of Anaheim Public Works Department. The HRER evaluated the historical significance of impacted properties, including the federal, State, and local significance and eligibility of built-environment resources.

The South Central Coastal Information Center (SCCIC), at the California State University, Fullerton is a branch of the California Historic Resources Information System (CHRIS) established by the Office of Historic Preservation (OHP) that maintains information concerning cultural resources and associated studies recorded in Orange County. A cultural resources records search for the current Project was performed by Pamela Daly of Daly & Associates at the SCCIC on June 25, 2012. The records search provides information on historic resources recorded within a 0.5-mile radius surrounding the Study Area. During the records search, the OHP's Historic Property Data File (HPDF) for Orange County and a variety of publications and manuscripts were consulted.

In addition to the records search, historical maps dating from 1896 until 1965 were reviewed and individuals and agencies were contacted to determine known history and use of the properties. For commercial properties, dates of construction and alterations were researched using City of Anaheim building permit files. A pedestrian-level investigation, including

photographic documentation of both structures and streetscape, was performed by a Qualified Architectural Historian.

The Project requires full property acquisitions of 19 single-family residences to accommodate the proposed Project actions. The partial acquisition of 12 properties is also required. In addition to the 31 properties to be acquired in part or in whole for this Project, an additional 42 properties adjacent to those directly affected by the proposed Project actions were subject to a pedestrian-level survey to determine the potential for historical significance.

The residences are all located within five housing tracts (Tracts 2093, 2197, 2659, 3501, and 2201) dating from the 1950s. Two of the 73 properties (i.e., the individual properties located at 1204 North Brookhurst Street and 1313 North Brookhurst Street) were surveyed and evaluated as individual resources for their association with the history of citrus groves in Anaheim from the 1910s, even though the properties are located within the boundaries to Tracts 2093 and 2659, respectively. Tracts 2093, 2197, 2659, 3501, and 2201 were surveyed in their entirety as potential historic districts. Six commercial properties located on North Brookhurst Street, north of La Palma Avenue were surveyed as individual resources. None of the residential or commercial properties had been previously surveyed or evaluated.

The study determines that the properties that will be directly impacted by proposed Project activities, and those located adjacent to the area of direct impacts do not have the potential to be considered historic properties or to be listed in the National Register of Historic Places (NRHP).

The properties at 1204 North Brookhurst Street and 1313 North Brookhurst Street, with houses constructed in 1911 and 1914, respectively, were also determined not eligible for listing individually in the NRHP or California Register of Historic Resources (CRHR) as they do not meet the criteria to be deemed significant built environment resources.

The remaining 62 properties located in the Area of Potential Effects (APE), and constructed in the mid-1950s as part of Tracts 2093, 2197, 2659, 3501, and 2201, were evaluated individually and as contributors to a potential historic district. Individually, the properties do not meet the criteria to be determined eligible for listing in the NRHP or the CRHR. Evaluated within their respective tracts, the properties do not present a cohesive collection of buildings with sufficient levels of integrity to convey the architectural significance of post-World War II tract houses.

In summary, although the Project would create an adverse effect related to the loss of structures over 50 years in age, none of the structures or properties that would be impacted are considered to be significant historical resources; therefore, impacts would be less than significant.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines?

Less Than Significant With Mitigation. A CHRIS records search was conducted on April 12, 2012, at the SCCIC. Findings indicate that no recorded cultural resources, historic properties, or historical resources have been identified in the Study Area. Native American Consultation was undertaken for this Project with initial letters being sent to tribes and individuals on April 19, 2012. Follow up telephone calls and/or emails were completed on July 12, 2012.

Patrick Maxon, RPA, of BonTerra Consulting conducted the archaeological field examination of the Study Area on May 29, 2012. No archaeological sites were identified, and the study area is

noted as covered by streets, sidewalks, parking lots, structures, and other forms of built environment. The entire Project site is developed, and no natural areas remain.

At this time, because of the highly urbanized nature of the Study Area, it is not possible, short of mechanical excavations, to access the subsurface to definitively determine whether portions of the Study Area may have buried historic properties and historical resources. Therefore, the potential for archaeological resources to be present in the Project site is low. However, it is possible that unknown resources remain buried beneath development. In the event that archaeological resources are inadvertently discovered during construction activities, implementation of MM CR-1 would reduce potential impacts to a level considered less than significant.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant With Mitigation. A paleontological records search was conducted on December 28, 2009, at the Natural History Museum of Los Angeles County for a previous roadway improvement Project along Brookhurst Street, approximately two miles south of the proposed Project. Because the records search went beyond the previous Project boundaries to include the local area, it is applicable to the proposed Project as well.

Results of the records search determine that the nearest known fossil locality is located 6.11 miles east of the Project site. It should be noted that paleontological resources are more likely to be found in the steep slopes and ridgelines of the Hill and Canyon areas of the City. The Project area is covered by young Quaternary gravels, which are not paleontologically sensitive at relatively shallow depths. Slightly older but deeper alluvial sediments with a high degree of sensitivity are unlikely to be encountered during excavation activities associated with the proposed Project. Because the Project site is not underlain by any paleontologically rich formations and does not contain rock outcroppings, it is unlikely that paleontological resources would be uncovered during Project construction. However, this does not preclude the potential that paleontological resources could be present on the Project site should grading activities disturb subsurface soils. Implementation of MM CR-2 would reduce potential paleontological impacts to a level considered less than significant.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant. The Native American Heritage Commission (NAHC) was contacted on April 17, 2012, for a Sacred Lands Records Search inquiry. An April 18, 2012, the response received from the NAHC indicates that no on site cultural resources were identified within the Study Area. A list of 16 contacts for inquiry was also provided. On April 19, 2012, each individual on the list was sent an informational letter with a description of the Project. Follow-up telephone calls were made to the individuals on the list on July 12, 2012, and comments were gathered concerning the potential presence of unknown resources such as human remains. There is the potential of unanticipated discovery of sensitive items such as human remains; therefore, in the event that buried human remains are inadvertently discovered during construction activities, implementation of SC CR-1 would reduce potential impacts to a level considered less than significant.

MITIGATION PROGRAM

Standard Conditions and Regulations

SC CR-1 If human remains are encountered during any excavation or other ground-disturbing work, Section 7050.5 of the *California Health and Safety Code* states that no further disturbances shall occur until the Orange County Coroner has made a determination of origin and disposition pursuant to Section 5097.98 of the *California Public Resources Code.* The Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of being granted access to the site. The MLD may recommend scientific removal and nondestructive analysis of the human remains and items associated with Native American burials.

Mitigation Measures

MM CR-1 Should any archaeological resources be uncovered during grading or excavation activities, these activities shall be diverted to a part of the site away from the find, and an Orange County-certified Archaeologist shall be contacted by the contractor to (1) ascertain the significance of the resource; (2) establish protocol with the Project Applicant to protect or recover such resources; (3) ascertain the presence of additional resources; and (4) provide additional monitoring of the site, if deemed appropriate.

MM CR-2 Should any paleontological resources be uncovered during grading or excavation activities, these activities shall be diverted to a part of the site away from the find, and an Orange County-certified Paleontologist shall be contacted by the contractor to (1) ascertain the significance of the resource; (2) establish protocol with the Project Applicant to protect such resources; (3) ascertain the presence of additional resources; and (4) provide additional monitoring of the site, if deemed appropriate.

VI. GEOLOGY AND SOILS

IMPACT ANALYSIS

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii) Strong seismic ground shaking?

Less than Significant Impact. The Project site, as with the entire Southern California region, is subject to secondary effects from earthquakes. The Project area would potentially be subject to seismic ground shaking due to future earthquakes on regionally active faults; however, the Project does not propose construction of habitable structures of any kind. Therefore, the potential for seismic ground shaking would not represent a significant new hazard to people or structures.

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Based on the *City of Anaheim General Plan's* Safety Element (May 2004), the Project is located within an area with a potential for liquefaction. However, the Project would not involve development of any structures intended for human occupancy. Additionally, the Project would comply with standard building practices as set forth in the 2010 California Building Code. Therefore, potential impacts related to seismic-related ground failure including liquefaction are considered less than significant.

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

iv) Landslides?

No Impact. Based on the *City of Anaheim General Plan's* Safety Element (May 2004), the Project is not located within an area that is subject to severe seismic-related effects. There are no known faults traversing the Project site, nor is it located within an Alquist-Priolo Fault Zone. The Project site is flat and developed; both of these characteristics limit the potential for landslides. Furthermore, the Safety Element does not identify the site as having potential for earthquake-induced landslides.

b) Result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. Due to the nature of the Project and the location of the site within a relatively flat and developed area, the Project is not anticipated to result in substantial erosion or loss of topsoil. The Project site is an existing roadway, and the majority of the site is currently an asphalt-paved surface. Therefore, minimal soil disturbance is anticipated during construction of the roadway median or parkways. Furthermore, construction activities would be performed pursuant to the current National Pollutant Discharge Elimination System (NPDES) permit requirements, which limit sediment-laden runoff from the Project site. The proposed Project's compliance with the NPDES permit is discussed in greater detail in Section IX, Hydrology and Water Quality.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less than Significant Impact. The *City of Anaheim General Plan's* Safety Element (May 2004) identifies that the Project site is underlain by alluvium. Due to the site's relatively flat topography and historically developed nature as an existing roadway, the risk of hazard associated with

unstable or expansive soils, lateral spreading, subsidence, liquefaction, or collapse would not be significant. Furthermore, all construction activities would be performed pursuant to the current California Building Code.

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

No Impact. The proposed Project would not involve the use of septic tanks or alternative wastewater disposal systems.

VII. GREENHOUSE GASES

INTRODUCTION

Climate change refers to any significant change in climate, such as the average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of greenhouse gas (GHG) emissions in the atmosphere. GHGs trap heat in the atmosphere which, in turn, increases the Earth's surface temperature. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through fossil fuel combustion, in conjunction with other human activities, appears to be closely associated with global warming (OPR 2008).

GHGs, as defined under California's Assembly Bill 32 (AB 32), include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). General discussions on climate change often include water vapor, ozone, and aerosols in the GHG category. Water vapor and atmospheric ozone are not gases that are formed directly in the construction or operation of development projects, nor can they be controlled in these projects. Aerosols are not gases. While these elements have a role in climate change, they are not considered by regulatory bodies, such as CARB, or climate change groups, such as the California Climate Action Registry (CCAR), as gases to be reported or analyzed for control. Therefore, no further discussion of water vapor, ozone, or aerosols is provided herein.

GHGs vary widely in the power of their climatic effects; therefore, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both its potency and lifespan in the atmosphere as compared to CO_2. For example, since CH_4 and N_2O are approximately 21 and 310 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 21 and 310, respectively (CO_2 has a GWP of 1). Carbon dioxide equivalent (CO_2e) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the emission rate of that gas to produce the CO_2e emissions. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 7.

TABLE 7
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50.0–200.0	1
Methane (CH_4)	12.0	21
Nitrous Oxide (N_2O)	114.0	310
HFC-134a	48.3	1,300
PFC: Tetrafluoromethane (CF_4)	50,000.0	6,500
PFC: Hexafluoroethane (C_2F_6)	10,000.0	9,200
Sulfur Hexafluoride (SF_6)	3,200.0	23,900
Source: CCAR 2009.		

AB 32, the California Global Warming Solutions Act of 2006, recognizes that California is the source of substantial amounts of GHG emissions. The statute states that:

> Global warming poses a serious threat to the economic well being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

In order to avert these consequences, Assembly Bill 32 establishes a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 16 percent from forecasted emission levels, with further reductions to follow (CARB 2011).

Existing GHG Emissions

Table 8 shows the magnitude of GHG emissions on the global, national, State, and regional scales.

TABLE 8
ESTIMATED GHG EMISSIONS BY GEOGRAPHIC AREA

Geographic Area Source	Annual GHG Emissions ($MMTCO_2e$)
Worldwide (2006)	29,000
United States (2010)	6,822[a]
California (2008)	474[b]
Orange County (2008)	21
Transportation Sources in Orange County	13
Construction Sources in Orange County	0.04

$MMTCO_2e$: million metric tons of carbon dioxide equivalent

[a] Down from a high of 7,263 in 2007 but up 3.2%from 2009.
[b] Down from emissions of 477 in 2007 .

Source: WRI 2009; USEPA 2012; CARB 2010; SCAG 2011.

Existing sources of GHG emissions on the Project site include the vehicles using Brookhurst Street and the homes that would be removed by implementing the proposed Project. GHG emissions from the homes occur with the combustion of natural gas for heating and hot water, and the indirect emissions associated with providing electricity and water; treating wastewater; and disposing of solid waste.

IMPACT ANALYSIS

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact. The City of Anaheim has not formally adopted a quantitative GHG emissions significance criterion to date. Beginning in April 2008, the SCAQMD convened a Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold of 10,000 metric tons of CO_2 equivalent per year (MTCO2e/yr) for projects where the SCAQMD is the lead agency (SCAQMD 2008). In September 2010, the Working Group presented a revised tiered approach to determining GHG significance for residential and commercial projects, which is discussed below (SCAQMD 2010). However, these proposals have not yet been considered by the SCAQMD Governing Board.

At Tier 1 of the proposed approach, GHG emissions impacts would be less than significant if the project qualifies under a categorical or statutory CEQA exemption. At Tier 2, for projects that do not meet the Tier 1 criteria, the GHG emissions impact would be less than significant if the project is consistent with a previously adopted GHG reduction plan that meets specific

requirements.[4] At Tier 3, the Working Group proposed to extend the 10,000 $MTCO_2e$/yr screening threshold that is currently applicable to industrial projects where the SCAQMD is the lead agency, described above, to other lead agency industrial projects. For residential and commercial projects, the Working Group proposed the following Tier 3 screening values: either (1) a single 3,000 $MTCO_2e$/yr threshold for all land use types or (2) separate thresholds of 3,500 $MTCO_2e$/yr for residential projects, 1,400 $MTCO_2e$/yr for commercial projects, and 3,000 $MTCO_2e$/yr for mixed use projects. A project with emissions less than the applicable screening value would be considered to have less than significant GHG emissions. A project with emissions greater than the screening threshold would have to demonstrate achievement of performance standards (Tier 4) and/or provide mitigation offsets. The Working Group did not address transportation projects.

The Working Group has not convened since the fall of 2010. As of September 2012, the proposal has not been considered or approved for use by the SCAQMD Board. While the SCAQMD Board may consider the recommendations in 2012, they are subject to change and may not represent what is ultimately approved. In the meantime, no GHG significance thresholds are approved for use in the SoCAB.

Construction

The principal source of GHG emissions during the construction of the proposed Project would be the internal combustion engines of construction equipment, on-road construction vehicles, and workers' commuting vehicles. The CalEEMod program that is used to calculate criteria pollutant emissions for the road widening elements of the Project, described in Section III, Air Quality, also calculates CO_2e emissions.

Because impacts from construction activities occur over a relatively short-term period of time, they contribute a relatively small portion of the overall lifetime Project GHG emissions. In addition, GHG emission reduction measures for construction equipment are relatively limited. Therefore, SCAQMD staff recommended that construction emissions be amortized over the Project lifetime, suggested to be 30 years, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008). As shown in Table 9, for the proposed Project, GHG emissions during construction are estimated at 395 $MTCO_2e$ and the 30-year amortized construction emissions would be 13 $MTCO_2e$/yr. Calculation data are included in Appendix A.

[4] The plan must (A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area; (B) Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable; (C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area; (D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level; (E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels; (F) Be adopted in a public process following environmental review (Section 15183.5 of the CEQA Guidelines).

TABLE 9
PROJECT CONSTRUCTION GHG EMISSIONS

Year	Emissions $MTCO_2e$
Road Widening Activities	
Grubbing/Land Clearing	45
Grading/Excavation	155
Drainage/Utilities/Sub-Grade	73
Paving	14
Additional Activities	
Demolition	75
Wall Construction	12
Landscaping	20
Total	**395**
Annual Emissions*	**13**

$MTCO_2e$: metric tons of carbon dioxide equivalent
* Combined total amortized over 30 years

Operations

Increases in traffic volume and VMT will result in increased vehicle GHG emissions. Traffic volumes on Brookhurst Street are expected to increase under future conditions, resulting in potentially greater emissions in future years than under existing conditions. However, there would be offsetting decreases both with and without the proposed Project because of the increased fraction of "cleaner" vehicles due to the phasing in of newer vehicles and the requirements of the Corporate Average Fuel Economy (CAFE) standards; these are a joint rule of the USEPA and the Department of Transportation's National Highway Traffic Safety Administration to set improved average fuel economy standards for passenger cars and light trucks manufactured between 2012 and 2016.[5] For the With Project Scenario, the increase in traffic speed and restoration of a free-flowing traffic pattern would reduce the amount of GHG emissions when compared to the Without Project Scenario.

The removal of 19 homes would eliminate the existing GHG emissions resulting from the use of vehicles, natural gas, electricity, water; the treatment of wastewater; and the disposal of solid waste. It is assumed that the displaced residents would relocate to other homes in the SoCAB and would generate similar emissions at those homes. Therefore, this analysis is limited to the anticipated changes in vehicle operations on Brookhurst Street.

A quantitative estimate of vehicle GHG emissions comparing the existing condition and the 2015 and 2035 With and Without Project Scenarios was made using EMFAC 2011 as described in Section III, Air Quality. For purposes of analysis, it was assumed that the primary changes in average traffic speed would occur for 4 hours per day (the AM and PM peak hours) and would occur over a 0.25-mile-long segment of Brookhurst Street. Peak hour volumes and average speeds were estimated from review of the Project traffic study. Data are shown in Table 10. Calculation details are included in Appendix A.

[5] Additional CAFE requirements for model years 2017–2025 were proposed in July 2012.

TABLE 10
PROJECT OPERATIONS GHG EMISSIONS

Year	2012	2015		2035	
Scenario	**Existing**	**Without Project**	**With Project**	**Without Project**	**With Project**
Peak hour volume (vph)	2,800	3,200		4,400	
Average speed (mph)	42	40	45	38	44
CO_2 emissions (Metric tons per year)	**368**	**399**	**385**	**438**	**407**

CO_2: carbon dioxide; VMT: vehicle miles traveled.

Note: These data are for the limited application of comparing Project scenarios. The gross emissions values are limited to CO_2 running emissions corresponding to the VMT and speed assumptions.

As shown in Table 10, implementation of the proposed Project would reduce GHG emissions by approximately 14 $MTCO_2e$/year in 2015 and by approximately 31 $MTCO_2e$/yr in 2035. These reductions in GHG emissions would more than offset the amortized annual construction emissions of 13 $MTCO_2e$. Because GHG emissions would be less with the Project than without the Project, the impact would be less than significant.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact. As discussed above, the principal State plan and policy adopted for the purpose of reducing GHG emissions is AB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. Statewide plans and regulations, such as GHG emissions standards for vehicles and the Low Carbon Fuel Standard, are being implemented at the statewide level, and compliance at the specific plan or Project level is not addressed. Therefore, the proposed Project does not conflict with these plans and regulations.

Regional policies addressing GHG reductions include the following.

Southern California Association of Governments and Senate Bill 375

Signed September 30, 2008, SB 375 provides for a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32 (*California Government Code* §65080; *California Public Resources Code* §21159.28). SB 375 requires Metropolitan Planning Organizations, including SCAG, to incorporate a Sustainable Communities Strategy (SCS) in their regional transportation plans that will achieve GHG emission reduction targets set by the CARB by reducing VMT and encouraging more compact, complete, and efficient communities for the future (*California Government Code* §65080). In February 2011, CARB adopted GHG emission reduction targets; for SCAG, the targets are an 8 percent reduction in GHG emissions per capita by 2020 relative to 2005, and a 13 percent reduction by 2035 (CARB 2011). SCAG's SCS is included in the SCAG 2012 Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS) (SCAG 2012). The document was adopted in April 2012. The goals and policies of the RTP/SCS focus on transportation and land use planning that include building compact infill projects; locating residents closer to where they work and play; designing walkable environments; and designing communities so there is access to high quality transit service.

Orange County

In early 2010, a joint committee with equal representation from the Orange County Council of Governments (COG) and the Orange County Transportation Authority (OCTA) was formed to develop the Orange County 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 (OCTA/OCCOG 2011). Orange County SCS utilizes the transportation system along with land use and Best Management Practice strategies to help the County to achieve the State-mandated emissions reduction targets. The Orange County SCS includes the following Sustainability Strategies that are applicable to the proposed Project:

- Eliminate bottlenecks and reduce delay on freeways, toll roads, and arterials.

- Implement near-term (Transportation Improvement Program and Measure M2 Early Capital Action Plan) and long-term (LRTP 2035 Preferred Plan) transportation improvements to provide mobility choices and sustainable transportation options.

Consistent with the SCAG and Orange County COG/OCTA policies, the proposed Project would improve the efficiency of the transportation network. By providing a consistent number of lanes throughout the Brookhurst Street corridor in the City of Anaheim, the Project would remove an existing bottleneck. As demonstrated above, implementation of the Project would result in a net reduction of GHG emissions. Additionally, the proposed Project would provide bicycle lanes, thereby encouraging the use of bicycles as an alternative mode of transportation.

The proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. There would be no impact.

VIII. HAZARDS AND HAZARDOUS MATERIALS

IMPACT ANALYSIS

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

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

Less than Significant Impact. The proposed Project is located along Brookhurst Street between the SR-91 and I-5. This roadway has the potential to be used to transport hazardous materials. However, the proposed Project would widen the existing roadway to better accommodate existing and future projected traffic volumes and would not increase the frequency of hazardous materials transport, nor would it directly result in the release of hazardous materials. Impacts are considered less than significant.

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

No Impact. John Marshall Elementary School, Fairmont Preparatory Academy, Orangethorpe Elementary School, and Brookhurst Junior High School are located within ¼ mile of the Project site. However, the proposed Project involves improvements to an existing roadway and does not include the use, storage, or transport of hazardous materials. Therefore, the proposed Project would not result in hazardous emissions or require the handling of hazardous materials and would not impact the identified schools. No impact would result and no mitigation is required.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less than Significant Impact. A search of government databases was conducted to determine the presence or absence of significant hazardous materials or conditions. The EDR Radius Map™ with GeoCheck® was conducted by Environmental Data Resources Inc. (EDR) for the Project site and is available for review at the City of Anaheim.

There were nine database listings reported for properties within a ¼-mile radius of the Project site. As described in Table 11, five of these database listings were identified for the same site: 2175 West La Palma Avenue.

TABLE 11
GOVERNMENT DATABASE LISTINGS

Listing Name	Address	Database	Comments	Status
Circle Seal Controls Technetics Div.	1111 North Brookhurst Street	RCRA-SQG, FINDS, LUST, CA FID UST, UST, HIST UST, SWEEPS UST, HAZNET	Listed as a cleanup site with a leak discovered during tank testing. The site has undergone groundwater extraction/reinjection which was discontinued in 2004 due to loss of access. Methane sparging/vapor extraction activities ceased in June 2006.	Active long term post remediation monitoring.
Tune Up & Lube	1107 North Brookhurst Street	RCRA-SQG, FINDS, HIST CORTESE, LUST HAZNET	Gasoline contaminated soil discovered in 1994 at 15 feet below ground surface (bgs) in an area formerly occupied by 4 underground storage tanks. Two additional borings were drilled up to 35 feet bgs and no additional contamination was encountered.	Clean up case closed July 1995.

TABLE 11 (Continued)
GOVERNMENT DATABASE LISTINGS

Listing Name	Address	Database	Comments	Status
Chevron #93558	2175 West La Palma Avenue	LUST, HIST	Groundwater was reportedly contaminated with gasoline. Vapor extraction performed between 1994 and 1995 and again in 1996. Confirmation samples indicated the soil was "relatively" clean. Tank site closed in 1999.	Remediation completed; tank site closed in November 1999.
		HIST UST	Three underground storage tanks were installed in 1974.	No Violations or Releases Reported.
		HIST CORTESE, LUST	Gasoline contamination discovered. Groundwater was reported to be contaminated and facility was remediated with vapor extraction.	Case Closed issued November 1999.
		UST	Listed underground storage tank location.	No Violations or Releases Reported.
		CA FID UST, SWEEPS UST, HAZNET	Listed as an active underground storage tank location. Six underground storage tanks identified.	Active Facility – No Violations or Releases Reported.
Marshall Elementary School	2066 West Falmouth Avenue	SCH, ENVIROSTOR	Listed as a school investigation due to past use for agriculture row crops.	No Further Action issued November 2011.
Martin Luther Hospital	1830 Romneya	HIST CORTESE, LUST	Diesel contaminated soil discovered in 1995.	Case Closed issued March 1996.

RCRA-SQG: Resource Conservation and Recovery Act- Small Quantity Generator ; FINDS: Facility Index System ; LUST: Leaking Underground Storage Tanks Incident Report ; CA FID UST: Facility Inventory Database Underground Storage Tank List ; UST: Underground Storage Tank Database ; HIST UST: Historical Underground Storage Tank Registered Database ; SWEEPS UST: Statewide Environmental Evaluation and Planning System Underground Storage Tank List ; HAZNET: Department of Toxic Substances Control Hazardous Waste Data ; HIST CORTESE: Hazardous Waste and Substances Sites; SCH: California Department of Toxic Substances Control Database; ENVIROSTOR: Brownfields and Environmental Restoration Program.

Source: EDR 2012.

Based on information provided in the EDR Report, properties in the vicinity of the Project site have been historically included on various government agency lists of hazardous materials; however, none of the identified property database listings would impact the Project site. With the exception of the "Circle Seals Control, Technetics Div." site located at 1111 North Brookhurst Street, there are no open cases requiring investigation or remediation. The property listed at 1111 North Brookhurst Street is undergoing long-term post-remediation monitoring for contaminated groundwater. The depth of groundwater at the Project site is approximately 40 feet below ground surface (bgs). As part of preliminary soil testing, borings were performed on site which extended up to 20 feet bgs and no groundwater was encountered. Proposed improvements would not exceed 10 feet bgs; therefore, proposed improvements would not encounter any potentially contaminated groundwater associated with the "Circle Seals Control,

Technetics Div." site. The proposed Project would not create a significant hazard to the public or the environment. As a result, impacts would be considered less than significant.

e) For a project located within an airport land use plan (Los Alamitos Armed Forces Reserve Center or Fullerton Municipal Airport), would the project result in a safety hazard for people residing or working in the project area?

f) For a project within the vicinity of a private airstrip, heliport or helistop, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The nearest airport is the Fullerton Municipal Airport, which is located approximately 1.5 miles northwest of the Project site. According to the Fullerton Plan, the Project site is located within the Part 77 Airspace Plan for the Fullerton Municipal Airport; however, the Project site is not within a designated Accident Potential Zone (Fullerton 2012). The Project does not propose construction of any habitable structures that would expose additional people to safety hazards related to airport operations.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. According to the *City of Anaheim General Plan's* Safety Element (May 2004), the City has an emergency preparedness plan that complies with State law and that interfaces with other cities and counties within Southern California. Implementation of the Project would neither impair implementation of, nor would it interfere with, an emergency response plan or emergency evacuation plan. Proposed Project improvements would improve traffic flow along Brookhurst Street, thus improving emergency response. As a result, impacts are considered less than significant.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The Project site is located within an urban, developed area and would not be subject to wildland fire risks. According to the *City of Anaheim General Plan's* Public Safety Element (May 2004), the Project site is not within a designated Special Protection Area or Very High Fire Hazard Severity Zone. As a result, the Project would not be subject to a significant risk of wildland fires.

IX. HYDROLOGY AND WATER QUALITY

IMPACT ANALYSIS

Would the project:

a) Violate any water quality standards or waste discharge requirements?

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

f) Otherwise substantially degrade water quality?

k) Substantially degrade water quality by contributing pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling, or storage, delivery areas, loading docks or other outdoor work areas?

l) Substantially degrade water quality by discharge which affects the beneficial uses (i.e., swimming, fishing, etc.) of the receiving or downstream waters?

Less than Significant Impact. The proposed Project would continue to function as a major arterial and would not be used for material storage; for vehicle or equipment fueling; for vehicle or equipment maintenance; for waste handling; hazardous materials handling or storage; or as a delivery area, loading dock, or other outdoor work area. The Project would be subject to the requirements of the existing Municipal NPDES Permit (Order No. R8-2010-0062), which requires implementation of best management practices during Project construction and operation in order to control/reduce the discharge of pollutants to "Waters of the U.S." to the maximum extent practicable. Therefore, it is not expected that there would be a significant degradation of water quality. Further, the Project would not increase the amount of impervious surface area within the Project area; therefore, the volume of storm water flow from the Project site would be unchanged from existing conditions.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Less than Significant Impact. The proposed Project would not deplete groundwater supplies or substantially interfere with groundwater recharge. A substantial portion of the site is covered with impervious surface, which limits its current ability to contribute to groundwater recharge. Landscaped medians, parkways, and greenbelts are proposed under the Project, thus resulting in an increase in pervious surface. The site would continue to be served through the City water system for landscape irrigation purposes.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less than Significant Impact. Within the Project area, Brookhurst Street currently has no underground storm drain facilities except for one 54-inch line that terminates just south of the SR-91 eastbound ramps. This existing line drains northerly under SR-91 and outlets into Fullerton Channel north of SR-91.

Storm waters in the Project area generally flow from east to west through the existing residential subdivisions on the east side of Brookhurst Street. Once storm flows reach Brookhurst Street, the storm water flows in a northerly direction along Brookhurst Street and enters the aforementioned 54-inch pipe just south of SR-91.

Implementation of the proposed Project would not create an increase in impervious surface area; therefore, the Project would not increase the volume of storm water flowing from the Project site. As part of the proposed Project, a new storm drain system (including storm drain lines ranging from 36- to 60-inch in diameter and sized to capture anticipated storm water flows) and its associated catch basins and inlets would be constructed within Brookhurst Street to improve the interception of overland storm flows. Linear greenbelts would be installed along the east side of Brookhurst Street, as depicted on Exhibits 5a and 5b, and would serve as bioretention/biofiltration areas. These biofiltration areas would be underlaid with a PVC liner and subdrain, allowing filtration within the upper three to four inches of soil and then draining to the proposed storm drain system via a perforated pipe system. Storm flows would be diverted from the street and into the linear greenbelt retention areas via curb breaks along Brookhurst Street and reverse parkway culverts in Falmouth Avenue and Huntington Avenue. A series of small culverts would be constructed to allow storm water flow from Brookhurst Street to pass beneath the proposed pedestrian sidewalk along its east side. The swales would drain to drainage inlets which would be connected to the proposed storm drain system. Inlets would be set above the adjacent grade to maximize the potential for retention and/or infiltration in the greenbelt swale areas. These greenbelt areas would serve to treat the "first flush" storm flows via infiltration before they are transmitted to the storm drain system via an underground perforated pipe system, thus improving the existing storm water treatment capabilities over that of existing Project conditions.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

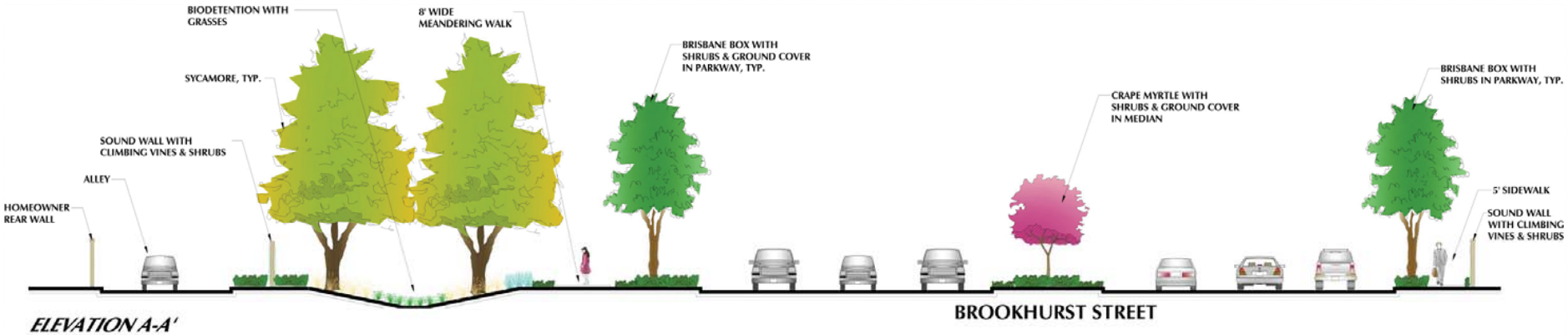
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

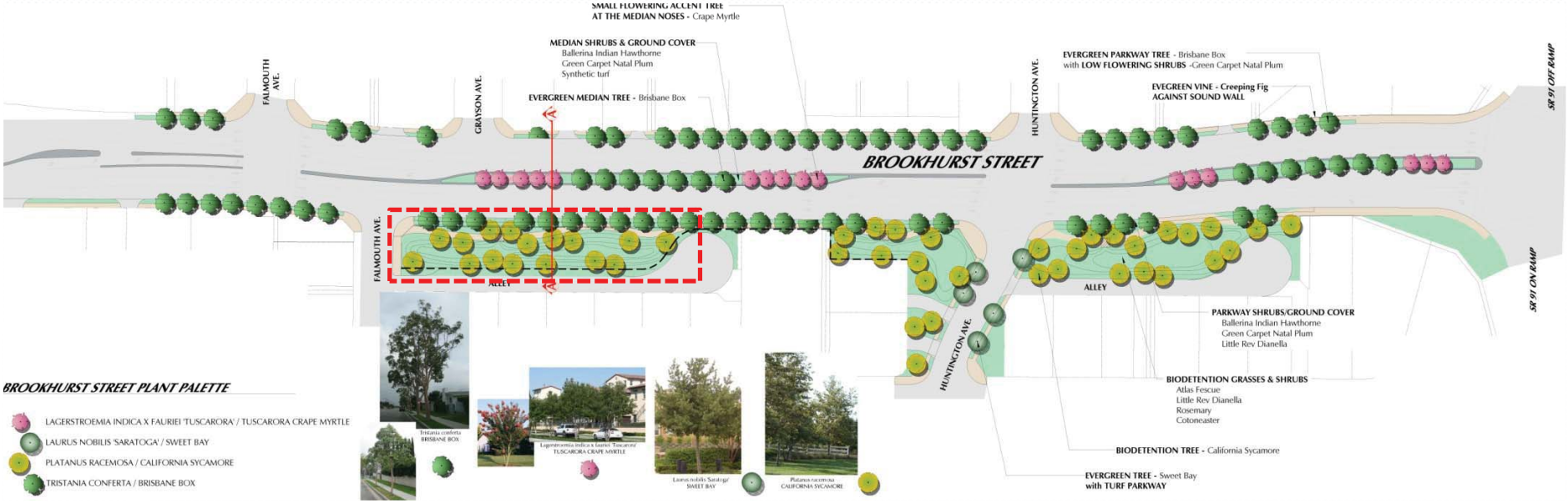
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. According to Federal Emergency Management Agency (FEMA) Q3 Flood Data, the Project site is located within the X500 zone, which is defined as an area inundated by 500-year flooding under 1 foot or with drainage areas less than 1 square mile. However, the Project does not propose construction of any habitable structures and would not expose people or structures to a significant risk of loss, injury, or death involving flooding. As a result, no impacts are anticipated.

j) Inundation by seiche or mudflow?

No Impact. The Project site is not located near any large water bodies; therefore, there is no potential for inundation of the Project site by seiche. Additionally, the site is located within a developed area and would not be subject to mudflow. Consequently, no impacts are anticipated.





Landscape Concept

Exhibit 5a

Brookhurst Street Roadway Improvement Project

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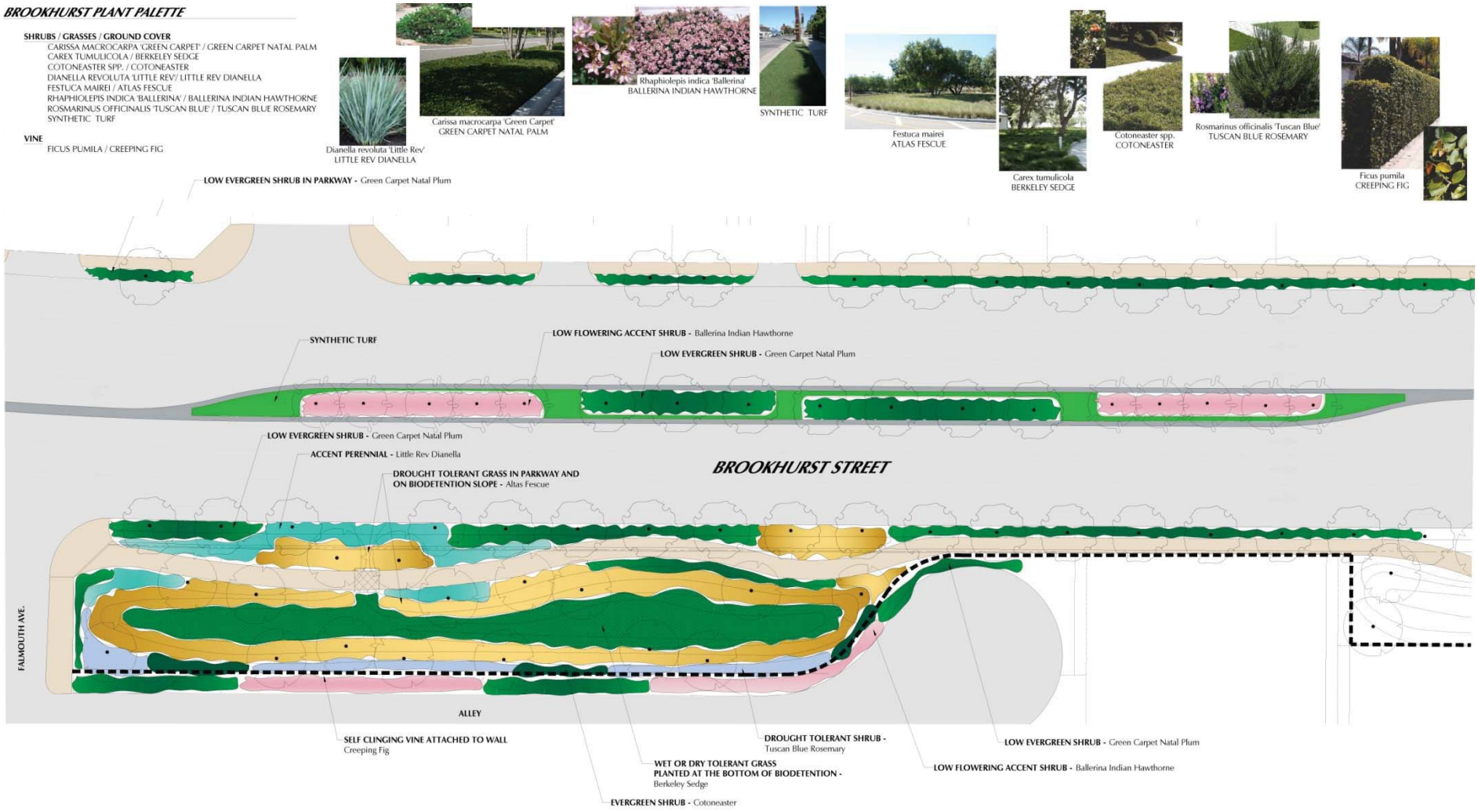

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Landscape Concept

Exhibit 5b

Brookhurst Street Roadway Improvement Project

X. LAND USE AND PLANNING

IMPACT ANALYSIS

Would the project:

a) Physically divide an established community?

Less Than Significant Impact. As shown on the Project Plans (refer to Exhibits 4a and 4b) and in Table 12 below, the proposed Project would require 13 partial property takes and 19 full property takes in the form of right-of-way acquisition for a total of 134,056 square feet (sf) in property acquisition along Brookhurst Street. The proposed Project has the potential to result in the displacement of homeowners and tenants. As a result and due to the potential for future federal funding, the proposed Project would be subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act), introduced in 1970, which requires public entities to provide procedural protections and benefits when businesses, homeowners, and tenants are displaced in the process of implementing a public Project for a public benefit (refer to SC LU-1). The City of Anaheim has initiated the process of notifying impacted property owners to negotiate the terms for relocation through means of individual meetings and a public meeting, which was held on May 10, 2012. Although this impact is adverse for the impacted property owners, compliance with State law would ensure that a significant environmental impact would not occur. The proposed modifications to the neighborhood would change the scale and appearance of the community through demolition of residences; however, the remaining neighborhood would continue to be a single, contiguous neighborhood.

TABLE 12
CITY OF ANAHEIM RIGHT OF WAY ACQUISITION

Assessors Parcel Number	Existing Land Use	Acquisition Area (sf)
Partial Property Acquisition		
071-245-04	Single-Family Residential	65
071-246-21	Single-Family Residential	151
071-371-25	Single-Family Residential	253
071-371-24	Single-Family Residential	1,262
071-371-10	Single-Family Residential	3,705
071-371-09	Single-Family Residential	1,301
071-375-01	Single-Family Residential	66
072-415-21	Commercial	151
072-417-01	Single-Family Residential	4,656
072-284-12	Single-Family Residential	1,014
072-284-11	Single-Family Residential	23
072-294-16	Single-Family Residential	153
072-291-13	Single-Family Residential	23
Full Property Acquisition		
071-247-21	Single-Family Residential	6,524
071-246-22	Single-Family Residential	6,499
072-415-20	Single-Family Residential	6,111
072-417-09	Single-Family Residential	6,303
072-417-10	Single-Family Residential	6,146
072-417-11	Single-Family Residential	6,148

TABLE 12 (Continued)
CITY OF ANAHEIM RIGHT OF WAY ACQUISITION

Assessors Parcel Number	Existing Land Use	Acquisition Area (sf)
072-417-12	Single-Family Residential	6,150
072-417-13	Single-Family Residential	6,151
072-417-14	Single-Family Residential	6,153
072-417-15	Single-Family Residential	6,315
072-296-01	Single-Family Residential	8,111
072-291-01	Single-Family Residential	6,273
072-291-02	Single-Family Residential	6,267
072-291-03	Single-Family Residential	6,269
072-291-04	Single-Family Residential	6,271
072-291-05	Single-Family Residential	6,273
072-291-06	Single-Family Residential	6,275
072-291-07	Single-Family Residential	6,688
072-291-14	Single-Family Residential	6,306
Source: Kreuzer Consulting Group 2012.		

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. According to the *City of Anaheim General Plan's* Circulation Element (May 2004), Brookhurst Street is considered a major arterial defined as a roadway that connects to freeways and that typically has 6 lanes including a median; left-turn pockets; parking lanes adjacent to each curb; and a right-of-way width of 120 feet. After Project implementation, Brookhurst Street would exist as a six-lane roadway with left-turn pockets, thus improving traffic flow. Therefore, the Project would not conflict with any land use plans for the Project area. No adverse impacts would occur.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. According to the *City of Anaheim General Plan*, the Project site is not located within a designated or proposed habitat conservation plan or NCCP area.

MITIGATION PROGRAM

Standard Conditions and Regulations

SC LU-1 As the City of Anaheim acquires any real property associated with project implementation, the City shall comply with all applicable rules set forth in the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (42 U.S.C. 4601 et seq.) related to fair, consistent, and equitable treatment of property owners and persons displaced as a direct result of the project.

XI. MINERAL RESOURCES

IMPACT ANALYSIS

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. According to the *City of Anaheim General Plan's* Green Element (May 2004), the Project is not located in an area designated as a Mineral Resource Zone (MRZ) or Regionally Significant Aggregate Resources Area. As a result, no impacts to mineral resources would occur.

XII. NOISE

INTRODUCTION

The traffic noise analysis is based on information provided in the *Noise Study Report, Brookhurst Street Widening Project (Between La Palma Avenue and State Route SR 91), City of Anaheim*, prepared by Entech Consulting Group in September 2012 (Entech 2012). Because the Project may have federal funding, the noise study report (NSR) was prepared using Federal Highway Administration (FHWA) regulatory standards and according to California Department of Transportation (Caltrans) protocol.

Environmental Setting

Noise is typically defined as unwanted sound and is described in terms of a sound's intensity or loudness, pitch, and duration. The ambient noise environment is comprised of stationary and mobile noise sources. Stationary noise sources occur in a single location and may be constant or short-term in nature; mobile noise sources are typically transportation-related and are generally not considered a constant noise source.

The physical measure of sound, or sound level, is measured in decibels (dB), which are based on a logarithmic scale. Therefore, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud). The A-weighted decibel scale relates noise to human sensitivity. Common noise levels are measured in terms of the "A-weighted decibel", abbreviated dBA. Table 13 provides examples of various noises and their typical A-weighted noise level.

TABLE 13
TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet fly-over at 300 m (1,000 ft)	100	
Gas Lawn Mower at 1 m (3 ft)	90	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	80	Food Blender at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower at 30 m (100 ft)	70	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	60	Normal speech at 1 m (3 ft)
Quiet Urban Daytime	50	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing
dBA: A-weighted decibels; m: meter; ft: feet; km/hr: kilometers per hour; mph: miles per hour Source: Caltrans 2009		

Although human perception of sound is somewhat subjective, it is widely accepted that the average healthy ear (1) can barely perceive an increase or decrease of 3 dBA; (2) can readily perceive a change of 5 dBA; and (3) can notice that an increase of 10 dBA sounds twice as loud.

Noise, or sound over a period of time, can be measured using a number of methods. The two most common methods are the equivalent sound level (L_{eq}) and the community noise equivalent (CNEL). The average noise levels over a period of minutes or hours is expressed as dBA L_{eq}. L_{eq} can be measured for any time period, but a 1-hour average is assumed when no period is specified. The CNEL scale represents the average of 24 hourly noise measurements and adjusts or penalizes the dBA during certain sensitive time periods to account for increased noise sensitivity during the evening and nighttime periods. The evening time period (7 PM to 10 PM) penalizes noises by 5 dBA, while nighttime (10 PM to 7 AM) noises are penalized by 10 dBA.

Applicable Standards

General Plan

The *City of Anaheim General Plan's* Noise Element is the guiding document for the City's noise/land use compatibility policy and is designed to protect residents and businesses from excessive and persistent noise intrusions.

The Noise Element includes the noise compatibility guidelines, which are derived from the State General Plan Guidelines. These guidelines are primarily used to assess transportation noise impacts to proposed new developments. For single-family residential areas, an ambient noise level between 55 and 70 dBA CNEL is considered "conditionally acceptable", and levels between 70 and 75 dBA CNEL are considered "normally unacceptable". For multi-family

residential areas, an ambient noise level between 60 and 70 dBA CNEL is considered "conditionally acceptable", and levels between 70 and 75 dBA CNEL are considered "normally unacceptable". For land use planning, the City's Noise Element has also adopted the noise standards included in Table 14, City of Anaheim Noise Standards. For single-family and multi-family residential uses, the exterior noise standard is 65 dBA CNEL and the interior noise standard is 45 dBA CNEL.

TABLE 14
CITY OF ANAHEIM NOISE STANDARDS

Land Use		CNEL (dBA)	
Categories	**Uses**	**Interior[a]**	**Exterior[b]**
Residential	Single- and multi-family, duplex	45[c]	65
	Mobile Homes	—	65[d]
Commercial	Hotel, motel, transient housing	45	—
	Commercial retail, bank, restaurant	55	—
	Office building, research and development, professional offices	50	—
	Amphitheater, concert hall, auditorium, movie theater	45	—
	Gymnasium (Multipurpose)	50	—
	Sports Club	55	—
	Manufacturing, warehousing, wholesale, utilities	65	—
	Movie Theaters	45	—
Institutional/Public	Hospital, school classrooms/playground	45	65
	Church, Library	45	—
	Parks	—	65

CNEL: Community Noise Equivalent Level; dBA: A-weighted decibel.

[a] Interior environment excludes bathrooms, kitchens, toilets, closets, and corridors.

[b] Exterior environment is limited to:

- Private yard of single-family dwellings;
- Multi-family private patios or balconies accessed from within the dwelling (balconies 6 feet deep or less are exempt);
- Mobile home parks;
- Park picnic areas;
- School playgrounds; and
- Hospital patios.

[c] Noise level requirement with closed windows, mechanical ventilation, or other means of natural ventilation shall be provided as per Chapter 12, Section 1205 of the *Uniform Building Code*.

[d] Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL.

City of Anaheim Municipal Code

Chapter 6.70 of the Anaheim Municipal Code, Sound Pressure Levels, establishes limits on sound generated from premises to the property line. However, traffic sounds, sound created by emergency activities, and sound created by governmental units or their contractors shall be exempt from the limits. Further, sound created by construction or building repair of any premises within the City is exempt from the limits during the hours of 7:00 AM to 7:00 PM. Additional work hours may be permitted if deemed necessary by the Director of Public Works or Building Official.

Sensitive Receptors

Noise-sensitive receptors, or receivers, are generally considered to be those people engaged in activities or utilizing land uses that may be subject to the stress of significant interference from noise. Activities usually associated with sensitive receptors include, but are not limited to, talking, reading, and sleeping. Land uses often associated with sensitive receptors include residences, schools, libraries, hospitals, churches, and hotels. Land uses along Brookhurst Street between I-5 and SR-91 include community and religious assembly, educational institutions, medical offices, commercial uses and residential parcels. The non-residential areas are located near the southern portion of the Project site between La Palma Avenue and Falmouth Avenue. Land uses north of Nettleton Road are predominately residential.

Existing Noise Levels

Measured Noise Levels

Short-term monitoring was conducted at six locations at or adjacent to residential land uses in March 2012 using Larson David Model 824 Type 1 sound level meters. Measurements were taken for 20 minutes at each site; the locations are identified in Exhibits 6a through 6d, Noise Receivers, Measurement Locations, and Privacy Walls. Table 15 summarizes the results of the short-term noise monitoring.

TABLE 15
SUMMARY OF SHORT-TERM MEASUREMENTS

Measurement Number	Address	Land Use Category	Measurement Date and Time	Measured dBA	Concurrent Traffic Counts[a]		
					Auto	Medium Trucks	Heavy Trucks
ST-1	2202 W Falmouth Ave	SFR	1:43 PM 3/29/2012	67.4	837	9	7
ST-2	1168 N Brookhurst St	SFR	9:51 AM 3/29/2012	69.0	655	6	2
ST-3	1249 N Brookhurst St	SFR	1:09 PM 3/29/2012	65.2	700	14	5
ST-4	1242 N Brookhurst St	SFR	11:02 AM 3/29/2012	69.5	538	4	6
ST-5[b]	2208 W Coronet Ave	SFR	12:34 PM 3/29/2012	57.7	–[c]	–[c]	–[c]
ST-6[b]	1327 N Catalpa Ave	SFR	11:40 AM 3/29/2012	61.1	–[c]	–[c]	–[c]

dBA: A-weighted decibel; ST: Short term measurement identifier; SFR: Single-family residence; dBA: decibel or A-weighted sound level.

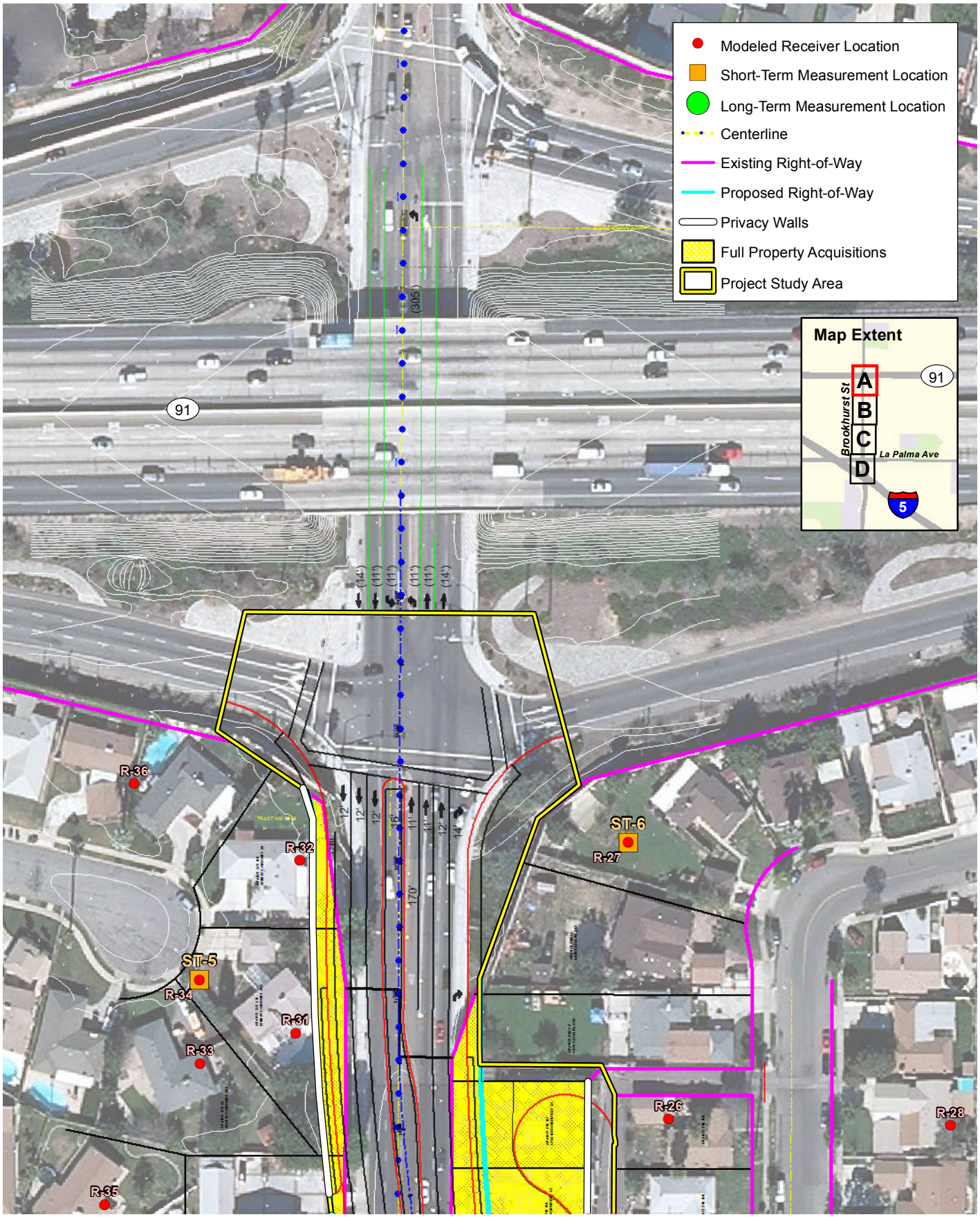
[a] Concurrent traffic counts were taken during 20-minute short-term measurements.

[b] Due to field conditions, concurrent traffic counts were not taken at ST-5 and ST-6. However, noise levels are shown for background sound levels.

[c] No traffic counts were taken at this receiver location.

Source: Entech 2012

A long-term noise level measurement was performed at 1249 N Brookhurst Street from 12:00 PM on Wednesday, April 4, 2012, to 12:00 PM on Thursday, April 5, 2012. Data are shown in Table 16 and show that traffic noise peaks during the 6:00 to 7:00 PM hour. The noisiest hour, or worst hour, noise level is used for analysis in the Noise Study Report. The



Noise Receivers, Measurement Locations, and Privacy Walls

Exhibit 6a

Brookhurst Street Roadway Improvement Project

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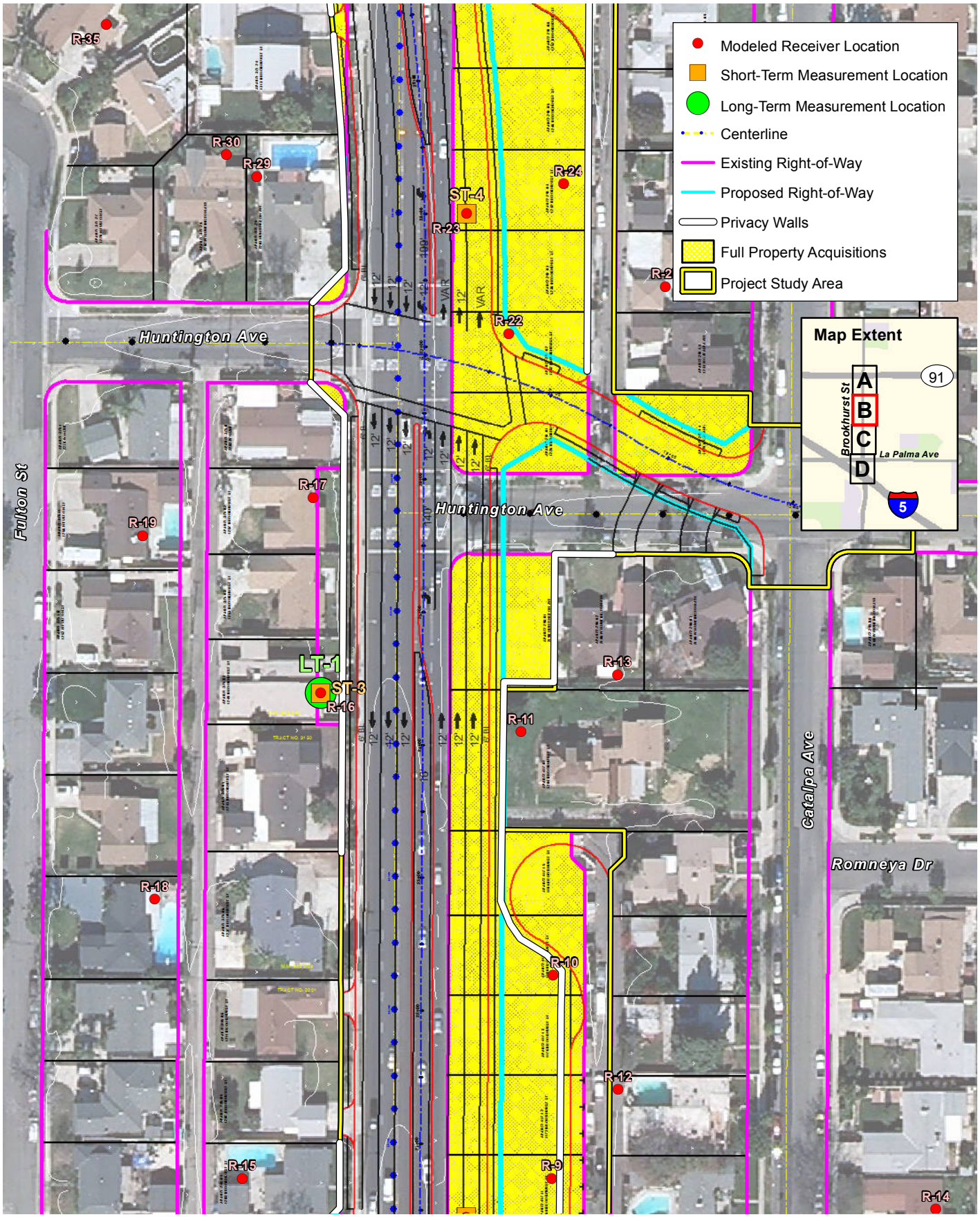

Noise Receivers, Measurement Locations, and Privacy Walls

Exhibit 6b

Brookhurst Street Roadway Improvement Project

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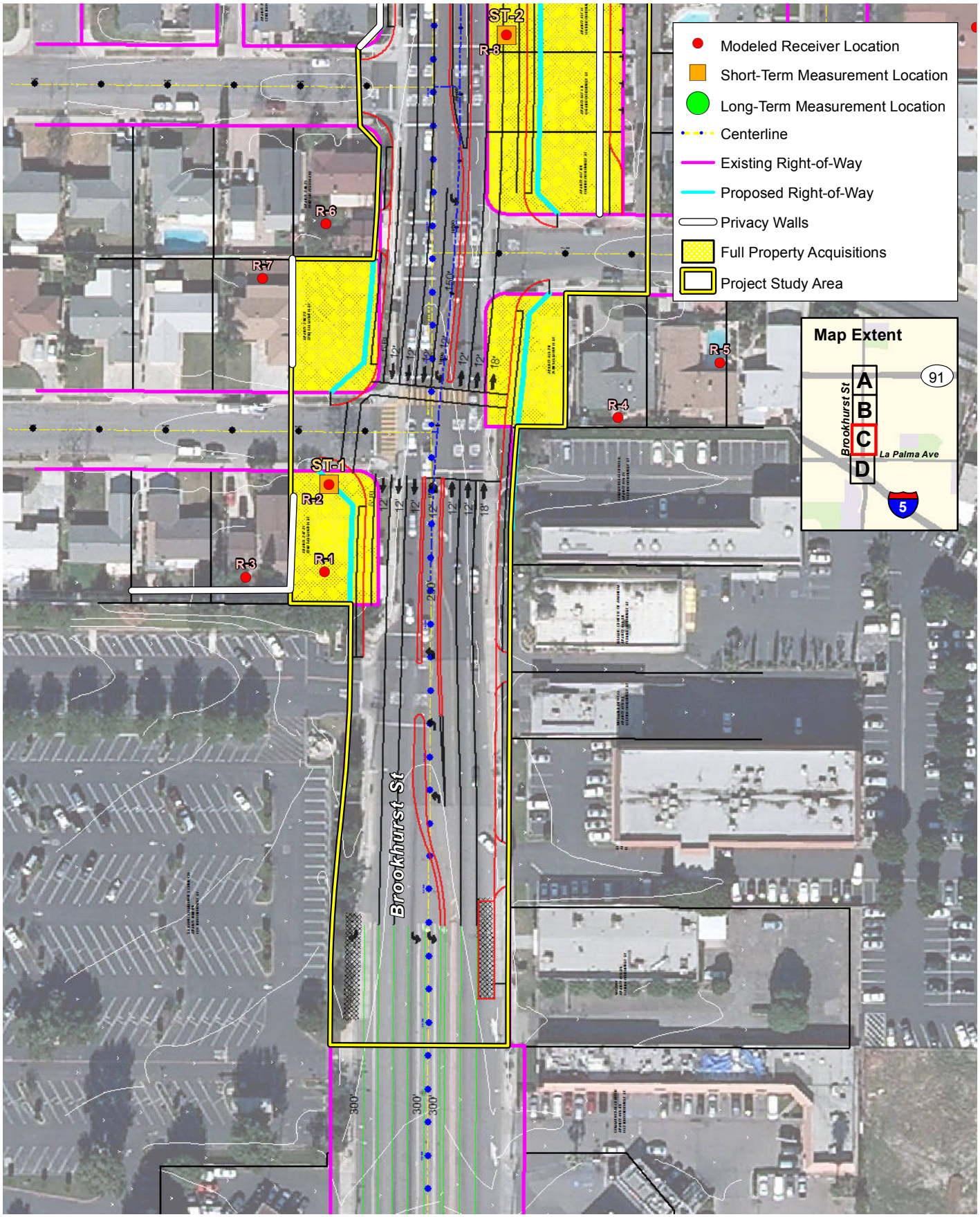

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Noise Receivers, Measurement Locations, and Privacy Walls

Exhibit 6c

Brookhurst Street Roadway Improvement Project

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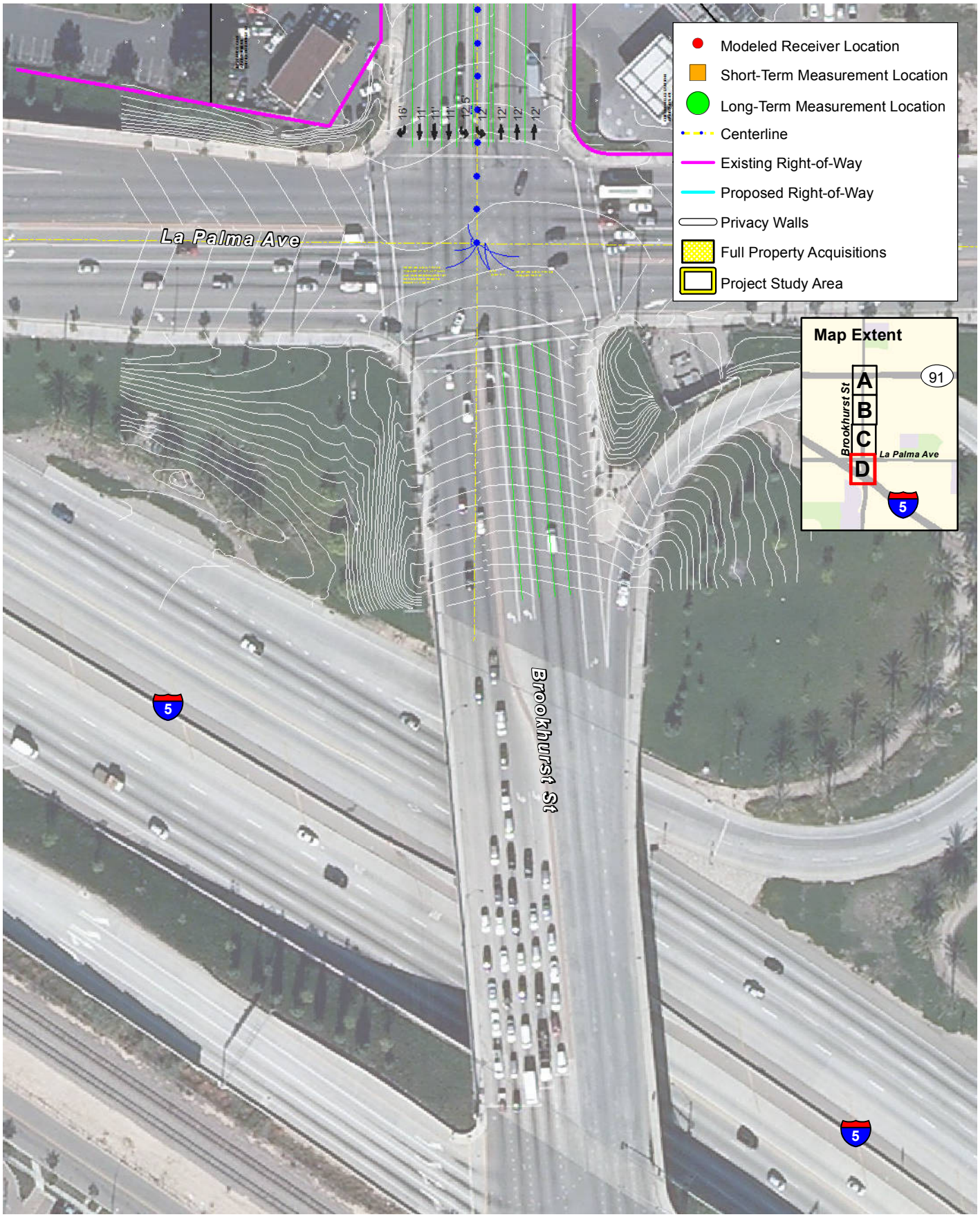

Noise Receivers, Measurement Locations, and Privacy Walls

Exhibit 6d

Brookhurst Street Roadway Improvement Project

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CNEL for this monitoring period was calculated to be 69.5 dBA, which is 2.2 dBA greater than the loudest hour noise level. Additional noise measurement field data are included.

TABLE 16
SUMMARY OF LONG-TERM MONITORING

Time	1-Hour Average (dBA L_{eq}[h])	Difference from Loudest Hour
12:00 PM	66.4	0.8
1:00 PM	65.5	1.7
2:00 PM	65.5	1.8
3:00 PM	65.1	2.2
4:00 PM	66.1	1.1
5:00 PM	65.8	1.5
6:00 PM	**67.3**	**0.0**
7:00 PM	65.9	1.4
8:00 PM	64.7	2.6
9:00 PM	64.1	3.2
10:00 PM	63.5	3.8
11:00 PM	61.9	5.4
12:00 AM	60.5	6.8
1:00 AM	57.6	9.7
2:00 AM	58.7	8.5
3:00 AM	56.2	11.1
4:00 AM	60.6	6.6
5:00 AM	64.0	3.3
6:00 AM	65.4	1.8
7:00 AM	66.4	0.8
8:00 AM	65.8	1.4
9:00 AM	65.4	1.9
10:00 AM	64.7	2.6
11:00 AM	64.9	2.3

dBA – decibels or A-weighted sound level; L_{eq} - Equivalent Sound Level.

Note: Worst noise hour noise level is shown in bold.

Source: Entech 2012.

Calculated Noise Levels

The noise monitoring data was used to calibrate the FHWA Traffic Noise Model Version 2.5 (TNM 2.5) and to calculate existing noisiest hour noise levels at the residential receivers shown in Exhibits 6a through 6d. The existing traffic noise levels were calculated using the traffic volumes provided in the Project's Traffic Study (ADVANTEC 2012) and posted travel speeds. The noise levels are shown in Table 17.

TABLE 17
CALCULATED EXISTING NOISE LEVELS

Receiver No.	Location	Modeled Existing Peak Noise Level, dBA L_{eq}	Receiver No.	Location	Modeled Existing Peak Noise Level, dBA L_{eq}
R-1	W Falmouth Ave	56	**R-19**	N Fulton St	60
R-2/ST-1	W Falmouth Ave	70	**R-20**	N Fulton St	57
R-3	W Falmouth Ave	58	**R-21**	N Fulton St	61
R-4	W Falmouth Ave	60	**R-22**	N Brookhurst St	61
R-5	W Falmouth Ave	57	**R-23/ST-4**	N Brookhurst St	72
R-6	W Falmouth Ave	63	**R-24**	N Brookhurst St	63
R-7	W Grayson Ave	59	**R-25**	N Catalpa Ave	63
R-8/ST-2	N Brookhurst St	71	**R-26**	N Catalpa Ave	64
R-9	N Brookhurst St	59	**R-27/ST-6**	N Catalpa Ave	64
R-10	N Brookhurst St	59	**R-28**	N Catalpa Ave	62
R-11	N Brookhurst St	62	**R-29**	W Huntington Ave	64
R-12	N Catalpa Ave	56	**R-30**	W Huntington Ave	63
R-13	W Huntington Ave	59	**R-31**	W Coronet Ave	65
R-14	N Catalpa Ave	52	**R-32**	W Coronet Ave	71
R-15	N Brookhurst St	59	**R-33**	W Coronet Ave	65
R-16/ST-3	N Brookhurst St	64	**R-34/ST-5**	W Coronet Ave	67
R-17	N Brookhurst St	66	**R-35**	W Coronet Ave	63
R-18	N Fulton St	49	**R-36**	W Coronet Ave	65

dBA: A-weighted decibels; L_{eq}: average noise level.
See Exhibits 6a through 6b for receiver locations.
Source: Entech 2012.

IMPACT ANALYSIS

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Potential noise impacts are commonly divided into two groups: temporary (or short-term) and long-term. Temporary impacts are usually associated with noise generated by construction activities. Long-term impacts take into consideration the proposed Project's impacts to surrounding and on-site land uses as well as impacts to proposed uses from existing uses, including mobile sources.

Short-Term Construction-Related Impacts (Items a and d)

Less Than Significant Impact. Construction noise represents a short-term impact on ambient noise levels. Site preparation and construction would require approximately 12 months, and would include demolition of existing structures; excavation; relocation of utilities; construction of curbs, gutters, raised medians, and sound walls; and asphalt paving.

The principal noise sources would be the diesel engines of construction equipment used for demolition of existing structures; excavation of the sidewalk areas; and removal and placement of materials. Assumed equipment includes a paver, a dozer, a loader, a trencher, and miscellaneous equipment. There would also be the occasional use of jackhammers, concrete saws, or similar tools for pavement removal. Mobile equipment such as pavers, dozers, and loaders move around a construction site with power applied in cyclic fashion. Noise impacts for mobile construction equipment are assessed as emanating from the center of the equipment activity or construction site. For linear construction (e.g., a roadway or pipeline), construction noise is considered to emanate from the centerline of the alignment. The nearest homes are located as close as 60 feet to the road centerline. Noise from localized point sources (such as construction) decreases by approximately 6 dBA with each doubling of distance from the source to receptor. The intermittent noise levels from the pavement removal tools would be between 85 and 90 dBA at a distance of 50 feet. This equipment would not operate continuously at full power, and there would be many periods when the equipment would not operate at all during periods of hand labor. Therefore, the average noise level (i.e., L_{eq}), would be 5 to 10 dBA less than the maximum noise level (L_{max}). Grading equipment noise (such as from excavators and dump trucks) can reach levels of up to 85 dBA L_{max} at 50 feet. Assuming the operation of a dump truck and an excavator, the combined average short-term noise level at the nearest residential property line, approximately 60 feet from the road centerline (unmitigated front yard), would be 82 dBA L_{eq}. Construction activities would be heard above the existing noise levels and would create temporary annoyance; however, construction would not be adjacent to any single residence for more than a few days because the Project would proceed down the road. As the center of construction activity moves, the impacts of construction noise at a single residence would diminish with distance.

Construction activities would have the potential to generate temporary noise impacts above the existing ambient noise levels ranging from 65 to 69 L_{eq} (Table 15) at the home facades facing Brookhurst Street. According to the noise standards listed in the City of Anaheim Municipal Code, noise sources associated with construction or building repair of any premises within the City shall be exempt from the noise ordinance standards during the hours of 7:00 AM to 7:00 PM. While the implementation of the proposed Project would result in a temporary increase in ambient noise resulting from the use of construction equipment near residences, the increase in noise levels would be reduced as construction moves away from a residence and would cease upon completion of the proposed Project. To comply with the City of Anaheim ordinance, SC N-1 requires that Project construction would be limited to the hours prescribed in the *Anaheim Municipal Code*. Because the Project is anticipated to have Caltrans jurisdiction and in accordance with Caltrans Standard Specifications, SC N-2 provides a limit on equipment noise, and SC N-3 requires equipment to have proper mufflers. Although a significant impact is not expected to occur, to further minimize construction noise impacts, MM N-1 would be incorporated into the Project to provide noise mitigation measures as appropriate, based on individual construction factors.

In summary, while noise levels would generate temporary noise impacts above the existing ambient noise levels, the noise impacts at each sensitive receptor would diminish with distance as construction proceeds down the alignment. SCs N-1 through N-3 and MM N-1 would help to limit and abate construction noise. With the incorporation of these measures and because the potential noise impacts during construction at each residence will occur for a relatively short period and would cease when construction is over, the short-term noise impact would be less than significant.

Long-Term Operational Related Impacts (Items a and c)

Less Than Significant Impact. This analysis evaluates the long-term impacts associated with removal of 19 existing homes adjacent to Brookhurst Street; reconfiguration of the road lanes; changes in traffic patterns; construction of 8- and 10-foot-high privacy walls; and repaving.

CEQA does not define the magnitude of a significant noise increase. The City of Anaheim General Plan EIR includes the following (Anaheim 2004b):

> Noise impacts can be broken down into three categories. The first is "audible" impacts, which refers to increases in noise level that are perceptible to humans. Audible increases in noise levels generally refer to a change of 3 dBA or more since this level has been found to be barely perceptible in exterior environments. A change of 5 dBA is readily audible to most people in an exterior environment. The second category, "potentially audible", refers to a change in noise level between 1 and 3 dBA. This range of noise levels was found to be noticeable to sensitive people in laboratory environments. The last category includes changes in noise level of less than 1 dBA that are typically "inaudible" to the human ear except under quiet conditions in controlled environments. Only "audible" changes in noise level are considered potentially significant.
>
> Mobile-source noise (i.e., vehicle noise) is preempted from local regulation, but is still subject to CEQA. Here, a change of 5 dBA would denote a significant impact if the resultant noise level were to remain within the objectives of the General Plan (e.g., 65 dBA CNEL at a residential location), or 3 dBA if the resultant level were to meet or exceed the objectives of the General Plan. (Note that Caltrans defines a noise increase as substantial when the predicted noise levels with the project would exceed existing noise levels by 12 dBA L_{eq}.) Also note that an impact is only potentially significant if it affects a receptor. An increase in noise in an uninhabited location would not denote a significant impact.

Based on the above factors, a traffic noise increase of 3 dBA would be potentially significant.

Traffic noise levels were predicted using TNM 2.5. The predicted future worst-case traffic noise levels for With Project and Without Project (or No Project) scenarios at the representative sensitive receiver locations within the Project area were determined using traffic volumes from the Project's Traffic Study (ADVANTEC 2012) and the design capacity and speed for the noisiest future (design year) conditions. Traffic mix assumptions were based on observed traffic on Brookhurst Street and Caltrans data for SR-91.

The traffic noise modeling results for Existing and the Without Project and With Project scenarios are presented in Table 18. Not all receivers shown on Exhibits 6a through 6d appear in Table 18 as some properties would be removed by the proposed Project. Predicted traffic noise levels with the proposed Project are compared to existing conditions and to No Project conditions. It is noted that Caltrans methodology prescribes that modeling results are rounded to

the nearest decibel before comparisons are made. In some cases, this can result in relative changes that may not appear intuitive. An example would be a comparison between sound levels of 64.4 and 64.5 dBA L_{eq}. The difference between these two values is 0.1 dBA. However, after rounding, the difference is reported as 1 dBA. All noise level data shown in Table 18 are the average noise level for the noisiest hour. As shown by the analysis of the long-term noise measurement, the CNEL at each receiver would be approximately 2 dBA higher than the L_{eq}.

TABLE 18
EXISTING AND FUTURE NOISE LEVELS

Receiver I.D.[a]	No. of Dwelling Units	Address	Existing Noise Level $L_{eq}(h)$, dBA[b]	Design Year Noisiest Hour Noise Level dBA $L_{eq}(h)$		Design Year Noise Level Without Project minus Existing Conditions dBA	Design Year Noise Level With Project minus No Project Conditions dBA
				Without Project	With Project		
R-3	1	2206 W Falmouth Ave	58	60	61	2	1
R-4	1	2188 W Falmouth Ave	60	61	63	1	2
R-5	1	2184 W Falmouth Ave	57	59	59	2	0
R-6	2	2207 W Falmouth Ave	63	65	62	2	-3
R-7	2	2202 W Grayson Ave	59	61	60	2	-1
R-11	1	1204 N Brookhurst St	62	64	61	2	-3
R-12	3	1173 N Catalpa Ave	56	57	57	1	0
R-13	1	2186 W Huntington Ave	59	60	59	1	-1
R-14	3	1166 N Catalpa Ave	52	52	52	0	0
R-15	3	1203 N Brookhurst St	59	61	60	2	-1
R-16	3	1249 N Brookhurst St	64	66	63	2	-3
R-17	3	1257 N Brookhurst St	66	68	63	2	-5
R-18	3	1236 N Fulton St	49	51	50	2	-1
R-19	3	1256 N Fulton St	60	61	61	1	0
R-20	3	1247 N Fulton St	57	58	58	1	0
R-21	3	1269 N Fulton St	61	61	61	0	0
R-25	3	1237 N Catalpa Ave	63	63	63	0	0
R-26	3	1313 N Catalpa Ave	64	64	64	0	0
R-27	1	1327 N Catalpa Ave	64	65	65	1	0
R-28	3	1312 N Catalpa Ave	62	62	62	0	0
R-29	1	2203 W Huntington Ave	64	65	63	1	-2
R-30	1	2207 W Huntington Ave	63	64	63	1	-1
R-31	1	2208 W Coronet Ave	65	66	64	1	-2
R-32	1	2209 W Coronet Ave	71	72	65	1	-7
R-33	1	2210 W Coronet Ave	65	65	65	0	0

TABLE 18 (Continued)
EXISTING AND FUTURE NOISE LEVELS

Receiver I.D.[a]	No. of Dwelling Units	Address	Existing Noise Level $L_{eq}(h)$, dBA[b]	Design Year Noisiest Hour Noise Level dBA $L_{eq}(h)$		Design Year Noise Level Without Project minus Existing Conditions dBA	Design Year Noise Level With Project minus No Project Conditions dBA
				Without Project	With Project		
R-35	1	2211 W Coronet Ave	63	64	64	1	0
R-36	1	2217 W Clover Ave	65	65	65	0	0

[a] See Exhibits 6a-6d for receiver locations
[b] Noise levels were adjusted to existing peak hour.

Source: Entech 2012

As shown in Table 18, under Without Project conditions, future worst case noise levels are expected to increase by 1 to 2 dB over existing noise levels. The traffic noise modeling results for the design year with implementation of the proposed Project range from 52 to 65 dBA L_{eq}. When comparing the proposed Project to the No Project condition, noise levels would increase by 1 dBA at receiver R-3 and by 2 dBA at receiver R-4. At 13 receivers, there would be no change in noise levels with or without the Project. At 12 receivers, implementation of the Project would result in a decrease of 1 to 7 dBA when compared to No Project conditions. Changes in noise levels resulting from implementation of the Project would be caused by (1) moving the traffic closer to or further from receivers; (2) removing existing structures that currently provide shielding to receivers that will remain; and (3) building privacy walls.

The noise level increases at receivers R-3 and R-4 that would result from implementing the proposed Project would be less than the 3 dBA significance criterion. Based on the significance criteria established in the Anaheim General Plan EIR, the increase would be less than significant. No mitigation is required.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. There are no federal, State, or local standards for construction-related vibration impacts. The Federal Transit Administration (FTA) has developed impact assessment guidelines in their publication *Transit Noise and Vibration Impact Assessment* (FTA 2006). Caltrans has also published guidelines in their *Transportation- and Construction-Induced Vibration Guidance Manual* (Caltrans 2004). For older residential structures, the structural vibration damage threshold for continuous/frequent intermittent sources (e.g., impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment) is 0.3 inch per second (in/sec) peak particle velocity (ppv) (Caltrans 2004). Below this level, there is virtually no risk of building damage. Based on Caltrans guidelines, the criteria for vibration annoyance potential for construction of the proposed Project are barely perceptible at up to 0.025 in/sec ppv, becoming distinctly perceptible at 0.1 in/sec ppv, and strongly perceptible at 0.5 in/sec ppv.[6]

The nearest structures are located approximately 60 feet from the road centerline and approximately 12 feet from the proposed curb. Table 19 presents vibration levels at distances of 12 and 60 feet from typical equipment used during roadway construction Projects. The operation of jackhammers and heavy equipment has the potential to generate barely to distinctly perceptible vibration levels at receptors within 12 feet, and barely perceptible vibration levels at receptors within 60 feet. Table 19 shows that the predicted vibration levels generated by heavy equipment as close as 12 feet would be less than the 0.3 in/sec ppv level that could create structural damage. Large equipment working within 20 feet of residences may produce vibrations that are distinctly perceptible.

[6] Values are interpreted from guidelines for transient sources and frequent sources.

TABLE 19
ESTIMATED VIBRATION LEVELS DURING TYPICAL ROADWAY CONSTRUCTION PROJECTS

Equipment	ppv at 25 ft (in/sec)	ppvat 12 ft (in/sec)	ppvat 60 ft (in/sec)
Large Bulldozer	0.089	0.268	0.024
Loaded trucks	0.076	0.229	0.020
Jackhammer	0.035	0.105	0.009
Small bulldozer	0.003	0.009	0.001
ppv: peak particle velocity; ft: feet; in/sec: inches per second Vibration at 12 and 60 feet calculated from reference values at 25 feet. Source: FTA 2006.			

As shown in Table 19, vibration levels are reduced within short distances. Construction equipment would be moving around the site and would typically be more than 12 feet away from the nearest homes, and residential land uses adjoining Brookhurst Street would not likely be subject to distinctly perceptible vibration levels over extended periods of time. Because vibration levels would be below the threshold for structural damage and the relatively short duration of potentially perceptible vibration levels at any individual sensitive receptor, the impact would not be excessive and would be less than significant. No mitigation is required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. There are no public airports, public use airports, or private airstrips in the Project vicinity. The Project would not expose people residing or working in the area to aircraft noise. There would be no impact.

MITIGATION PROGRAM

Standard Conditions and Requirements

SC N-1 Construction shall occur between the hours of 7:00 AM and 7:00 PM (Anaheim Municipal Code).

SC N-2 The noise level from the Contractor's operations, between the hours of 9:00 PM and 6:00 AM shall not exceed 86 dBA at a distance of 50 feet from the job site (Caltrans Standard Specifications Section 14-8.02, Noise Control).

SC N-3 All internal combustion engines shall be equipped with the manufacturer recommended muffler. Internal combustion engines shall not be operated on the construction site without the appropriate muffler (Caltrans Standard Specifications in Section 14-8.02, Noise Control).

Mitigation Measure

MM N-1 In coordination with the City of Anaheim, the contractor will implement appropriate noise mitigation measures, including changing the location of stationary construction equipment; turning off idling equipment; rescheduling construction activity; notifying adjacent residents in advance of construction work; and installing acoustic barriers around stationary construction noise sources.

XIII. POPULATION AND HOUSING

IMPACT ANALYSIS

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less than Significant Impact. The proposed Project involves the widening of an existing roadway to better serve traffic flow. The Project would not generate substantial growth in the area, nor would it impact local or regional population and housing growth. Although the Project would displace the occupants of the 19 residences proposed for full property takes, there are adequate relocation opportunities to allow the impacted persons to relocate to areas throughout the City of Anaheim. No new housing is proposed, and the proposed roadway improvements would accommodate existing and future projected traffic volumes; therefore, the demolition and associated relocation of occupants of the 19 impacted residential properties would not induce population growth.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. As discussed previously, the proposed Project would result in the displacement of homeowners and tenants currently residing in the properties designated for full property acquisition. As a result, the proposed Project would be subject to the California Relocations Assistance Act, introduced in 1970, which requires public entities to provide procedural protections and benefits when businesses, homeowners, and tenants are displaced in the process of implementing a public project for a public benefit. According to the California Department of Finance, as of January 1, 2012, the housing vacancy rate estimate in the City of Anaheim is at 3.52 percent (DOF 2012). Therefore, it can be reasonably assumed that displaced individuals from the 19 residences proposed for demolition could be accommodated in existing housing and the Project would not necessitate the construction of replacement housing elsewhere. No impact would occur.

XIV. PUBLIC SERVICES

IMPACT ANALYSIS

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, and other public facilities?

Less than Significant Impact. Due to the nature of the proposed Project, no new demand for public services such as schools, fire protection, public safety, or libraries would occur. The Project would result in increased maintenance related to street surface and sidewalks and/or upkeep related to landscaping; however, these areas would be under the City of Anaheim's jurisdiction, and the City's Public Works and Community Services departments would be responsible and able to maintain these areas under their current staffing and resource levels. As a result, impacts would be considered less than significant.

XV. RECREATION

IMPACT ANALYSIS

Would the project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The Project would involve the widening of an existing roadway to better serve traffic flow. As indicated previously, the Project is not anticipated to induce population growth, nor would it directly impact any local recreational facilities. Proposed greenbelt and landscaped areas would be maintained by the City of Anaheim Community Services Department; however, it is expected that current staffing and resource levels would be adequate to maintain these areas. No impacts related to demand or use of recreation facilities would occur.

XVI. TRANSPORTATION/TRAFFIC

IMPACT ANALYSIS

Would the project:

a) 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?

No Impact. A Traffic Study for Brookhurst Street Widening Project was prepared by ADVANTEC Consulting Engineers (ADVANTEC) in June 2012 and is included as Appendix B. There are eight existing intersections in the Project limits. With the proposed Project, the number of intersections would be reduced to five. Therefore, in consultation with the City of Anaheim, these five study intersections were selected for evaluation. Four of the five study locations are currently signalized intersections. The remaining study intersection is the Huntington Avenue intersection, which would be realigned as part of the Project to remove the current offset configuration at Brookhurst Street; a signal is proposed for installation at this intersection. The five study intersections along Brookhurst Street include:

1. SR-91 Westbound Ramps (Signalized).
2. SR-91 Eastbound Ramps (Signalized).
3. Huntington Avenue – East Leg (New Signal with Project).
4. Falmouth Avenue – West Leg (Signalized).
5. La Palma Avenue (Signalized).

The Traffic Study also analyzes impacts to driveways along Brookhurst Street, which are identified by the relevant assessor parcel number(s) (APN):

1. APN 072-415-49 (Chevron Gas Station).
2. APN 071-060-96 (Best Auto Care).
3. APN 072-415-45 (Subway).
4. APN 071-060-99 (Sa-Rang Church South Driveway).
5. APN 071-060-99 (Sa-Rang Church North Driveway).
6. APN 072-415-36 (Baylo University).
7. APN 072-415-33 and 072-415-30 (Nu Smile Dental and Islamic Center).
8. APN 071-246-21 and 071-246-22 (2202-2203 Grayson Avenue).
9. APN 072-417-09 (1160 Brookhurst Street).
10. APN 072-417-11 (1168 Brookhurst Street).
11. APN 071-245-05 (1207 Brookhurst Street).
12. APN 072-417-13 (1176 Brookhurst Street).
13. APN 071-245-06 (1211 Brookhurst Street).
14. APN 071-371-24 (1313 Brookhurst Street).
15. APN 072-291-06 (1252 Brookhurst Street).

In addition to the study intersections and driveways, the Traffic Study analyzes impacts to the arterial roadway segment along Brookhurst Street between I-5 to the south and the SR-91 to the north.

Methodology

The Traffic Study Report analyzes the proposed Project's potential traffic impacts under the following scenarios:

- Existing (Year 2011) Base Conditions Without Project.
- Existing (Year 2011) Conditions With Project.
- Opening (Year 2015) Base Conditions Without Project.
- Opening (Year 2015) Conditions With Project.
- Future (Year 2035) Base Conditions Without Project.
- Future (Year 2035) Conditions With Project.

Weekday peak hour turning movement, pedestrian, and bicycle counts were collected on Tuesday November 15 and Thursday November 17, 2011, at all 8 study intersections and 15 driveways along Brookhurst Street between the hours of 7:00 AM to 9:00 AM; noon to 2:00 PM; and 4:00 PM to 6:00 PM. The south driveway to Sa-Rang Community Church was closed during the week and no counts could be collected. Counts were, instead, collected at the Sa-Rang Church driveway on Sunday, November 13, 2011, between 9:00 AM and 11:00 AM.

In discussions with the City staff, Year 2015 was identified as the Project opening year and Year 2035 was identified as the horizon year for the traffic study. A one percent traffic growth factor was used for the Project in calculating Year 2015 volumes from the existing 2011 traffic counts. Year 2035 traffic was provided by the City of Anaheim.

Trip Generation Methodology

Future trip generation for the Project's opening year, Year 2015, was calculated based on an annual traffic growth rate factor of one percent, which was applied to existing traffic counts along Brookhurst Street between I-5 and SR-91. Year 2035 traffic volumes were provided by the City of Anaheim.

ICU Methodology

Level of Service (LOS) is a qualitative and quantitative measure used to describe the operational conditions within a traffic stream and a motorist's and/or passenger's perception of the roadway's performance. Levels of service range from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion). Table 20 summarizes the LOS definitions for signalized and stop-controlled intersections.

The Intersection Capacity Utilization (ICU) methodology was used to determine the level of service for signalized intersections. Following the Orange County Congestion Management Program (CMP), a saturation flow rate of 1,700 vehicles per lane per hour and a lost time factor of 0.05 (5 percent) was applied to the ICU calculations.

TABLE 20
LEVEL OF SERVICE DEFINITIONS

LOS	Signalized ICU	Stop-Controlled Intersection Based on Vehicle Delay (sec)	Definition
A	<0.600	<10	***Excellent.*** No vehicle wait is longer than one red light and no approach phase is fully used.
B	0.601–0.700	>10 and <15	***Very good.*** An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701–0.800	>15 and <25	***Good.*** Occasionally drivers may have to wait through more than 1 red light; backups may develop behind turning vehicles.
D	0.801–0.900	>25 and <35	***Fair.*** Delays may be substantial during portion of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901–1.000	>35 and <50	***Poor.*** Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>1.00	>50	***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.

LOS: level of service; ICU: Intersection Capacity Utilization; sec: seconds.
Source: ADVANTEC 2012.

Per the City's guidelines, mid-block roadway segments should be maintained at LOS C in order to maintain LOS D at intersections. For arterial roadway segments and intersections, the increase in volume-to-capacity ratio (V/C) or ICU due to the addition of Project traffic is the measure of significant traffic impacts. The increase in V/C or ICU is compared to the City's impact criteria to determine if the increase is significant. Based on City guidelines, a project's traffic impact on a roadway segment or at an intersection in considered significant if it meets the criteria set forth in Table 21.

TABLE 21
CRITERIA FOR SIGNIFICANT TRAFFIC IMPACTS

LOS	Final V/C or ICU Ratio	Project-Related Increase in V/C or ICU
C	>0.700–0.800	Equal to or greater than 0.050
D	>0.800–0.900	Equal to or greater than 0.030
E,F	>0.900	Equal to or greater than 0.010

LOS: level of service; V/C: volume-to-capacity ratio; ICU: intersection capacity utilization.
Source: Anaheim 2004.

Arterial Segment Volume to Capacity Methodology

The V/C analysis compares the daily traffic volume on a roadway segment to the capacity of the segment in order to determine the LOS. The arterial roadway criteria for the City of Anaheim involve the use of Average Daily Traffic (ADT) V/C ratios. LOS C (V/C not to exceed 0.80) is the performance standard that has been adopted for the study area circulation system by the City of Anaheim. If a road segment exceeds this daily threshold, then the peak hours are analyzed for this segment. If the peak V/C is greater than 0.90, then a deficiency exists on that segment.

Impact Discussion

As described in Section 2.0, Project Description, the Project proposes to widen Brookhurst Street between I-5 and the SR-91 to accommodate additional travel lanes as well as roadway improvements. Additionally, existing traffic patterns would be modified due to the construction of raised medians along Brookhurst Street between the SR-91 and I-5. Left-turn movements would be prohibited into and out of some of the local streets and driveways. With the proposed re-alignment of Brookhurst Street, some driveways on the west side of Brookhurst Street would be removed for widening and there would be no traffic to/from these driveways upon completion of the Project by Year 2015. In addition, the Project would eliminate left-turn access to and from four residential driveways along the west side of Brookhurst Street (Assessor Parcel Numbers 071-246-21, 071-245-06, 071-245-06, and 071-371-24) and two driveways serving commercial uses, medical offices, an educational institution (Baylo University) and a community and religious assembly use (Islamic Center) along the east side of Brookhurst Street (serving APNs 072-415-35, 072-415-36, 072-415-33, and 072-415-30). Future access at these driveways would be restricted to right-in and right-out movements; all other traffic to and from these driveways would need to make U-turns at adjacent intersections. The existing traffic pattern would be altered due to the construction of the landscaped median along Brookhurst Street.

Intersection Operations

The existing traffic conditions at study area intersections are based on ICU methodology to determine the LOS for each signalized intersection and Highway Capacity Manual (HCM) methodology for unsignalized intersections. Table 22 provides a comparison of peak-hour operations at the study intersections for the Existing and Existing Plus Project Scenarios. Traffic impacts created by the proposed Project were determined by comparing the existing base Without Project conditions to existing base With Project conditions.

TABLE 22
VOLUME TO CAPACITY RATIO AND INTERSECTION LEVEL OF SERVICE: EXISTING CONDITIONS

Intersection	Peak Period	Existing		Existing Plus Project		Significant Impact?
		V/C or Delay	LOS	V/C or Delay	LOS	
Brookhurst St and SR-91 WB Ramps	AM	0.528	A	0.528	A	No
	PM	0.659	B	0.659	B	No
Brookhurst St and SR-91 EB Ramps	AM	0.679	B	0.500	A	No
	PM	0.615	B	0.589	A	No
Brookhurst St and Huntington Ave*	AM	6.3*	A	0.398	A	No
	PM	9.7*	A	0.432	A	No
Brookhurst St and Falmouth Ave	AM	0.682	B	0.535	A	No
	PM	0.642	B	0.485	A	No
Brookhurst St and La Palma Ave	AM	0.624	B	0.617	B	No
	PM	0.669	B	0.662	B	No

V/C: volume-to-capacity; LOS: level of service; SR: State Route; WB: westbound; EB: eastbound
* LOS based on HCM methodology of average delay (seconds/vehicle) due to existing stop-sign controls.
Source: ADVANTEC 2012.

As shown under both Existing and Existing Plus Project conditions, each of the five intersections would operate at acceptable levels of service and no impact would occur. Implementation of the proposed Project would not result in a significant impact.

Table 23 summarizes intersection levels of service during the AM and PM peak hours for Future Year 2015 conditions both without and with the Project.

TABLE 23
VOLUME TO CAPACITY RATIO AND INTERSECTION LEVEL OF SERVICE: YEAR 2015

Intersection	Peak Period	Future (Year 2015) Without Project		Future (Year 2015) With Project		Significant Impact?
		V/C or Delay	LOS	V/C or Delay	LOS	
Brookhurst St and SR-91 WB Ramps	AM	0.567	A	0.567	A	No
	PM	0.709	C	0.709	C	No
Brookhurst St and SR-91 EB Ramps	AM	0.729	C	0.537	A	No
	PM	0.661	B	0.633	B	No
Brookhurst St and Huntington Ave*	AM	>50*	F	0.443	A	No
	PM	>50	F	0.480	A	No
Brookhurst St and Falmouth Ave	AM	1.157	F	0.577	A	No
	PM	1.147	F	0.537	A	No
Brookhurst St and La Palma Ave	AM	0.671	B	0.667	B	No
	PM	0.719	C	0.717	C	No

V/C: volume-to-capacity; LOS: level of service; SR: State Route; WB: westbound; EB: eastbound

* LOS based on HCM methodology of average delay (seconds/vehicle) due to existing stop-sign controls.

Source: ADVANTEC 2012.

As shown, all study area intersections are forecasted to operate at satisfactory LOS (LOS D or better) with implementation of the proposed Project, and no impact would occur. Implementation of the Project would serve to improve intersection LOS from unacceptable conditions to acceptable conditions for three of the study intersections.

Table 24 summarizes intersection levels of service during the AM and PM peak hours for Future Year 2035 conditions both without and with the Project.

TABLE 24
VOLUME TO CAPACITY RATIO AND INTERSECTION LEVEL OF SERVICE: YEAR 2035

Intersection	Peak Period	Future (Year 2035) Without Project		Future (Year 2035) With Project		Significant Impact?
		V/C or Delay	LOS	V/C or Delay	LOS	
Brookhurst St and SR-91 WB Ramps	AM	0.757	C	0.757	C	No
	PM	0.801	D	0.687	B	No
Brookhurst St and SR-91 EB Ramps	AM	0.758	C	0.758	C	No
	PM	0.841	D	0.554	A	No
Brookhurst St and Huntington Ave*	AM	>50*	F	0.571	A	No
	PM	>50*	F	0.641	B	No
Brookhurst St and Falmouth Ave	AM	1.542	F	0.705	C	No
	PM	0.817	D	0.694	B	No
Brookhurst St and La Palma Ave	AM	0.782	C	0.788	C	No
	PM	0.841	D	0.839	D	No

V/C: volume-to-capacity; LOS: level of service; SR: State Route; WB: westbound; EB: eastbound
* LOS based on HCM methodology of average delay (sec/veh) due to existing stop-sign controls
Source: ADVANTEC 2012.

As shown, all study area intersections are forecasted to operate at satisfactory LOS (LOS D or better) with implementation of the proposed Project and no impact would occur. Implementation of the Project would serve to improve intersection LOS from unacceptable conditions to acceptable conditions for two of the study intersections.

Arterial Segment Volume to Capacity Operations

As discussed previously, the arterial roadway criteria involve the use of ADT V/C ratios. An ADT analysis was conducted on Brookhurst Street between I-5 and SR-91 for each analysis scenario. Year 2009 and Year 2035 ADT volumes were provided by City staff; traffic volumes for existing year 2011 and opening year 2015 were projected using calculated growth between 2009 and 2035. V/C ratios were calculated using a capacity of 37,500 vehicles per day for 4-lane roadways and 56,300 vehicles per day for 6-lane roadways. Table 25 provides a summary of the V/C analysis results.

TABLE 25
AVERAGE DAILY TRAFFIC VOLUMES AND VOLUME TO CAPACITY RATIO SUMMARY

Scenario	ADT Volumes	V/C	LOS
Existing 2011 – Without Project	40,500	1.47	F
Existing 2011 – With Project	40,500	0.72	C
Opening Year 2015 – Without Project	42,501	1.55	F
Opening Year 2015 – With Project	42,501	0.75	C
Horizon Year 2035 – Without Project	48,970	1.78	F
Horizon Year 2035 – With Project	48,970	0.87	D
ADT: average daily traffic; V/C: volume-to-capacity; LOS: level of service. Source: ADVANTEC 2012.			

As shown in Table 25, without the Project the roadway segment would operate at an unacceptable LOS F under each scenario. With implementation of the Project, operation of the roadway segment would improve to LOS C and no impact would occur.

b) 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?

No Impact. The traffic study area for the proposed Project does not include any intersections that have been designated by the Orange County Transportation Authority as Congestion Management Program intersections; therefore, no impact would occur.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The proposed Project is a roadway improvement project involving roadway widening to accommodate existing and future Project traffic volumes. The Project would have no effect on air travel volumes nor would it impact air traffic patterns. No impact would occur.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?

No Impact. The existing traffic pattern in the Project vicinity would be altered due to the construction of the landscaped medians along Brookhurst Street. Left-turn access to and from several residential- and commercial-serving driveways would be eliminated throughout the study area corridor and vehicles exiting the Sa Rang Community Church parking lot would be limited to right turns only. Although these modifications may be inconvenient for some drivers, the elimination of left-turn movements from the local streets would have negligible effect to the overall traffic flow in the study area. The peak hours for the church are generally not occurring as the same time as the peak hours for traffic (rush hour), and there are opportunities for U-turns at Falmouth Avenue, which is about 200 feet north of the church driveway. As a result, the Project would increase vehicular safety along the Project segment of Brookhurst Street because, with the proposed elimination of some left-turn movements along Brookhurst Street, accident rates in the Project area are expected to decrease due to the reduction of cross-traffic movements along Brookhurst Street. No impact would occur.

e) Result in inadequate emergency access?

Less Than Significant. The Project would eliminate left-turn access to and from four residential driveways along the west side of Brookhurst Street (Assessor Parcel Numbers 071-246-21, 071-245-06, 071-245-06, and 071-371-24) and driveways serving commercial uses, medical offices, an educational institution (Baylo University) and a community and religious assembly use (Islamic Center) along the east side of Brookhurst Street (serving APNs 072-415-35, 072-415-36, 072-415-33, and 072-415-30). These medians would restrict left-turn movements from local streets and driveways along Brookhurst Street, forcing traffic onto alternate routes via side streets or allowing traffic to make a U-turn at the remaining open intersections along Brookhurst Street. Because alternate routes are available to accommodate both regular and emergency vehicles which do not require substantial added trip time, the Project's impact to emergency access would be less than significant.

f) 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 Impact. As described in Section 2.0, Project Description, the Project proposes to improve Brookhurst Street by adding northbound and southbound bicycle lanes and constructing an eight- to ten-foot-wide sidewalk along both sides of Brookhurst Street. Additionally, all existing bus pads will be reconstructed as part of the Project, thereby encouraging use of public transportation. Therefore, the proposed Project would be supportive of alternative transportation programs, plans, and policies and no impact would occur.

XVII. UTILITIES AND SERVICE SYSTEMS

IMPACT ANALYSIS

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

b) Require or result in the construction of new water or wastewater treatment facilities (including sewer (waste water) collection facilities) or expansion of existing facilities, the construction of which could cause significant environmental effects?

d) Have sufficient water supplies available to serve the project (including large-scale developments as defined by Public Resources Code Section 21151.9 and described in Question No. 20 of the Environmental Information Form) from existing entitlements and resources, or are new or expanded entitlements needed?

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

g) Comply with Federal, State, and local statutes and regulations related to solid waste?

l) Result in a need for new systems or supplies, or substantial alterations related to natural gas?

j) Result in a need for new systems or supplies, or substantial alterations related to telephone service?

k) Result in a need for new systems or supplies, or substantial alterations related to television service/reception?

Less than Significant Impact. The City would be required to coordinate with utility providers prior to development of the proposed Project. Due to the nature of the Project, no new demand for utilities would occur, and there would be no need for new systems or supplies or substantial alterations to existing utilities. Therefore, impacts related to utilities would be considered less than significant.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less than Significant Impact. As discussed previously, the Project would include construction of new storm drain main line facilities in Brookhurst Street, along with new catch basins and connector pipes in order to improve the City's existing storm drain system and to meet the City's drainage requirements identified in the Master Plan of Storm Drainage (MPSD) for the Fullerton Creek Channel Tributary Area. These improvements would enhance drainage within the Project area, thereby reducing the frequency of flooding along Brookhurst Street and connecting residential streets. The capacity of the overall storm drain system would remain unchanged and on-site improvements including bioretention and bio-filtration areas would encourage infiltration. This impact would be considered less than significant.

h) Result in a need for new systems or supplies, or substantial alterations related to electricity?

Less than Significant Impact. The Project proposes to relocate existing lighting standards within the general Project area. The number and type of street light standards would not change from the existing condition; therefore, no additional demand for electricity would occur. This impact would be considered less than significant.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

IMPACT ANALYSIS

Does the project:

a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant Impact with Mitigation. As described in the analysis in Section 5.0, with the incorporation of the identified mitigation measures, implementation of the proposed Project would not degrade the quality of the environment; substantially reduce the habitats of fish or wildlife species; cause a fish or wildlife population to drop below self sustaining levels; threaten to eliminate a plant or animal; or eliminate important examples of major periods of California history or prehistory.

b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental efforts of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects)?

Less Than Significant Impact with Mitigation. The Project would have the potential to impact the environment; however, specific standard conditions and mitigation measures would be implemented to reduce these impacts to a less than significant level. As detailed throughout this document, potential cumulative impacts would be mitigated to a less than significant level.

c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant With Mitigation. Implementation of the Project would potentially result in significant impacts related to air quality, biological resources, and cultural resources, having the potential to indirectly impact human beings. However, implementation of the mitigation programs described throughout this document would reduce all potential impacts to less than significant levels.

SECTION 6.0 REPORT PREPARERS

6.1 CITY OF ANAHEIM

Department of Public Works

City Engineer ..... Mark K. Vukojevic, P.E.
Capital Programs Manager ..... Rudy Emami M.S., P.E.
Principal Civil Engineer ..... Khanh Chu, P.E.
Senior Civil Engineer ..... Tiberius Rosu, P.E.
Real Property Analyst ..... Richard M. Garcia
Principal Traffic Engineer ..... Taher Jalai, P.E.

Planning Department

Senior Planner .....Susan Kim

6.2 CONSULTANTS

BonTerra Consulting

Principal ..... Kathleen Brady
Project Manager..... Jennifer Marks
Biologist ..... Raeanne Murphy
Air Quality/Greenhouse Gas Emissions/Acoustical Analysis.....Jim Kurtz
GIS/Graphics .....Jon Zimmer
Technical Editor .....Julia Black
Lead Word Processor .....Sheryl Kristal

Kreuzer Consulting Group

President.....Rick Kreuzer, P.E.

ADVANTEC Consulting Engineers

Transportation Engineer .....Edward Miller, Jr., P.E., T.E.

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APPENDIX A

CALEEMOD CALCULATIONS

Brookhurst Widen - onroad - 091112

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Other Asphalt Surfaces	1.9	Acre

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Anaheim Public Utilities
Climate Zone	8		2.2		
		Precipitation Freq (Days)			
			30		

1.3 User Entered Comments

Project Characteristics - road widening activites -construction only - op year 2015

Land Use - 0.4 miles x 40 ft widen - 1.9 acre

Construction Phase - prep 3/1-31(21); grade 4/1-8/15(99); drain/util 8/16-11/15(65);pave 11/16-12/30(32)
durations based on Sac Road Const Model

Off-road Equipment - OFFROAD 2011 load factors
Site prep-dozer, loader, grader (default)

Off-road Equipment - Grade- dozer, loader, grader (default)

Off-road Equipment - Drain/util/subgrade-fork, loader/backhoe, excavator, grader, genset

Off-road Equipment - Pave-mortar mixer, paver, roller, loader

Grading - site prep 5000 cy; grade 15,000 cy

Construction Off-road Equipment Mitigation - dust mitig - water 2x daily per SCAQMD rule 403
Diesel mitig - Offroad diesel Tier 3

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	3.94	34.18	21.37	0.05	6.13	1.53	7.49	2.99	1.53	4.52			0.00	0.30	0.00	4,715.75
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	3.00	24.38	21.13	0.05	3.63	1.27	4.59	1.39	1.27	2.67			0.00	0.30	0.00	4,715.75
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.35	0.00	5.35	2.90	0.00	2.90						0.00
Off-Road	2.54	20.05	12.12	0.02		0.99	0.99		0.99	0.99				0.23		2,202.52
Total	**2.54**	**20.05**	**12.12**	**0.02**	**5.35**	**0.99**	**6.34**	**2.90**	**0.99**	**3.89**				**0.23**		**2,202.52**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.36	14.08	8.78	0.02	0.49	0.53	1.02	0.08	0.53	0.62				0.07		2,423.88
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.05	0.05	0.47	0.00	0.12	0.00	0.13	0.00	0.00	0.01				0.00		89.36
Total	**1.41**	**14.13**	**9.25**	**0.02**	**0.61**	**0.53**	**1.15**	**0.08**	**0.53**	**0.63**				**0.07**		**2,513.24**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.41	0.00	2.41	1.31	0.00	1.31						0.00
Off-Road	1.60	10.25	11.88	0.02		0.74	0.74		0.74	0.74				0.23		2,202.52
Total	**1.60**	**10.25**	**11.88**	**0.02**	**2.41**	**0.74**	**3.15**	**1.31**	**0.74**	**2.05**				**0.23**		**2,202.52**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.36	14.08	8.78	0.02	0.49	0.53	1.02	0.08	0.53	0.62				0.07		2,423.88
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.05	0.05	0.47	0.00	0.12	0.00	0.13	0.00	0.00	0.01				0.00		89.36
Total	**1.41**	**14.13**	**9.25**	**0.02**	**0.61**	**0.53**	**1.15**	**0.08**	**0.53**	**0.63**				**0.07**		**2,513.24**

3.3 Grading/Excavation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.55	0.00	4.55	2.49	0.00	2.49						0.00
Off-Road	2.10	16.62	10.00	0.02		0.82	0.82		0.82	0.82				0.19		1,821.43
Total	**2.10**	**16.62**	**10.00**	**0.02**	**4.55**	**0.82**	**5.37**	**2.49**	**0.82**	**3.31**				**0.19**		**1,821.43**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.86	8.96	5.59	0.01	1.46	0.34	1.80	0.05	0.34	0.39				0.04		1,542.47
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.05	0.05	0.47	0.00	0.12	0.00	0.13	0.00	0.00	0.01				0.00		89.36
Total	**0.91**	**9.01**	**6.06**	**0.01**	**1.58**	**0.34**	**1.93**	**0.05**	**0.34**	**0.40**				**0.04**		**1,631.83**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.05	0.00	2.05	1.12	0.00	1.12						0.00
Off-Road	1.32	8.49	9.75	0.02		0.61	0.61		0.61	0.61				0.19		1,821.43
Total	**1.32**	**8.49**	**9.75**	**0.02**	**2.05**	**0.61**	**2.66**	**1.12**	**0.61**	**1.73**				**0.19**		**1,821.43**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.86	8.96	5.59	0.01	1.46	0.34	1.80	0.05	0.34	0.39				0.04		1,542.47
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.05	0.05	0.47	0.00	0.12	0.00	0.13	0.00	0.00	0.01				0.00		89.36
Total	**0.91**	**9.01**	**6.06**	**0.01**	**1.58**	**0.34**	**1.93**	**0.05**	**0.34**	**0.40**				**0.04**		**1,631.83**

3.4 Drainage/utilities/subgrade - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.60	18.96	14.08	0.02		1.19	1.19		1.19	1.19				0.23		2,322.13
Total	**2.60**	**18.96**	**14.08**	**0.02**		**1.19**	**1.19**		**1.19**	**1.19**				**0.23**		**2,322.13**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.08	0.08	0.76	0.00	0.20	0.01	0.21	0.01	0.01	0.01				0.01		145.21
Total	**0.08**	**0.08**	**0.76**	**0.00**	**0.20**	**0.01**	**0.21**	**0.01**	**0.01**	**0.01**				**0.01**		**145.21**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.78	11.19	15.09	0.02		1.01	1.01		1.01	1.01				0.23		2,322.13
Total	**1.78**	**11.19**	**15.09**	**0.02**		**1.01**	**1.01**		**1.01**	**1.01**				**0.23**		**2,322.13**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.08	0.08	0.76	0.00	0.20	0.01	0.21	0.01	0.01	0.01				0.01		145.21
Total	**0.08**	**0.08**	**0.76**	**0.00**	**0.20**	**0.01**	**0.21**	**0.01**	**0.01**	**0.01**				**0.01**		**145.21**

3.5 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.35	8.59	6.06	0.01		0.70	0.70		0.70	0.70				0.12		878.72
Paving	0.16					0.00	0.00		0.00	0.00						0.00
Total	**1.51**	**8.59**	**6.06**	**0.01**		**0.70**	**0.70**		**0.70**	**0.70**				**0.12**		**878.72**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.06	0.06	0.58	0.00	0.15	0.00	0.16	0.01	0.00	0.01				0.01		111.70
Total	**0.06**	**0.06**	**0.58**	**0.00**	**0.15**	**0.00**	**0.16**	**0.01**	**0.00**	**0.01**				**0.01**		**111.70**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.74	4.43	5.46	0.01		0.44	0.44		0.44	0.44				0.12		878.72
Paving	0.16					0.00	0.00		0.00	0.00						0.00
Total	**0.90**	**4.43**	**5.46**	**0.01**		**0.44**	**0.44**		**0.44**	**0.44**				**0.12**		**878.72**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.06	0.06	0.58	0.00	0.15	0.00	0.16	0.01	0.00	0.01				0.01		111.70
Total	**0.06**	**0.06**	**0.58**	**0.00**	**0.15**	**0.00**	**0.16**	**0.01**	**0.00**	**0.01**				**0.01**		**111.70**

Brookhurst Widening - La Palma to SR 91 080112

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
User Defined Recreational	1	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Anaheim Public Utilities
Climate Zone	8		2.2		
		Precipitation Freq (Days)			
			30		

1.3 User Entered Comments

Project Characteristics - Demolition and Sound Wall const- op year 2015

Land Use - 1.5 acre net acquired for landscaping (the rest is road widen)

Construction Phase - Demo 1/2-3/1/14 acquired homes; build3/2-5/1/2014 soundwalls;
Site prep 5/2-7/1/14 for landscaping; dates not relevant- approx durations

Off-road Equipment - Build walls - forklift, backhoe/loader

Off-road Equipment - Demo - dozer, 3 loader, saw

Off-road Equipment - OFFROAD 2011 load factors
site prep/landscape - grader, backhoe/loader

Trips and VMT - Bldg trips reduced - only walls

Demolition - demo 105,000 sq ft of bldgs

Grading - All import export in road const model

Vehicle Trips - No operations

Consumer Products - No operations

Area Coating - No operations

Construction Off-road Equipment Mitigation - Dust Mit - Water at least 2x day per Rule 403

Notes: Shading indicates PM10 data revised from non-CalEEMod calculations to correct error in CalEEMod

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	4.06	31.55	20.79	0.04	3.03	1.75	4.78	0.04	1.75	1.79			0.00	0.34	0.00	3,938.36
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	2.86	19.55	19.96	0.04	1.68	1.34	3.02	0.04	1.34	1.38			0.00	0.34	0.00	3,938.36
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

3.2 Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.46	0.00	2.46	0.00	0.00	0.00						0.00
Off-Road	3.46	26.08	16.68	0.03		1.54	1.54		1.54	1.54				0.31		2,866.27
Total	**3.46**	**26.08**	**16.68**	**0.03**	**2.46**	**1.54**	**4.00**	**0.00**	**1.54**	**1.54**				**0.31**		**2,866.27**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.52	5.38	3.36	0.01	0.37	0.20	0.57	0.03	0.20	0.24				0.03		926.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.08	0.08	0.76	0.00	0.20	0.01	0.21	0.01	0.01	0.01				0.01		145.21
Total	**0.60**	**5.46**	**4.12**	**0.01**	**0.57**	**0.21**	**0.78**	**0.04**	**0.21**	**0.25**				**0.04**		**1,072.10**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.11	0.00	1.11	0.00	0.00	0.00						0.00
Off-Road	2.26	14.09	15.84	0.03		1.13	1.13		1.13	1.13				0.31		2,866.27
Total	**2.26**	**14.09**	**15.84**	**0.03**	**1.11**	**1.13**	**2.24**	**0.00**	**1.13**	**1.13**				**0.31**		**2,866.27**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.52	5.38	3.36	0.01	0.37	0.20	0.57	0.03	0.20	0.24				0.03		926.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.08	0.08	0.76	0.00	0.20	0.01	0.21	0.01	0.01	0.01				0.01		145.21
Total	**0.60**	**5.46**	**4.12**	**0.01**	**0.57**	**0.21**	**0.78**	**0.04**	**0.21**	**0.25**				**0.04**		**1,072.10**

3.3 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.46	3.25	2.73	0.00		0.22	0.22		0.22	0.22				0.04		433.09
Total	**0.46**	**3.25**	**2.73**	**0.00**		**0.22**	**0.22**		**0.22**	**0.22**				**0.04**		**433.09**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.01	0.15	0.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01				0.00		26.89
Worker	0.07	0.07	0.70	0.00	0.18	0.01	0.19	0.01	0.01	0.01				0.01		134.04
Total	**0.08**	**0.22**	**0.80**	**0.00**	**0.19**	**0.01**	**0.20**	**0.01**	**0.01**	**0.02**				**0.01**		**160.93**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.34	2.12	2.81	0.00		0.20	0.20		0.20	0.20				0.04		433.09
Total	**0.34**	**2.12**	**2.81**	**0.00**		**0.20**	**0.20**		**0.20**	**0.20**				**0.04**		**433.09**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.01	0.15	0.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01				0.00		26.89
Worker	0.07	0.07	0.70	0.00	0.18	0.01	0.19	0.01	0.01	0.01				0.01		134.04
Total	**0.08**	**0.22**	**0.80**	**0.00**	**0.19**	**0.01**	**0.20**	**0.01**	**0.01**	**0.02**				**0.01**		**160.93**

3.4 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.02	0.00	0.02	0.00	0.00	0.00						0.00
Off-Road	1.11	8.11	5.97	0.01		0.50	0.50		0.50	0.50				0.10		967.63
Total	**1.11**	**8.11**	**5.97**	**0.01**	**0.02**	**0.50**	**0.52**	**0.00**	**0.50**	**0.50**				**0.10**		**967.63**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.03	0.03	0.29	0.00	0.08	0.00	0.08	0.00	0.00	0.01				0.00		55.85
Total	**0.03**	**0.03**	**0.29**	**0.00**	**0.08**	**0.00**	**0.08**	**0.00**	**0.00**	**0.01**				**0.00**		**55.85**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.01	0.00	0.01	0.00	0.00	0.00						0.00
Off-Road	0.73	4.63	6.29	0.01		0.42	0.42		0.42	0.42				0.10		967.63
Total	**0.73**	**4.63**	**6.29**	**0.01**	**0.01**	**0.42**	**0.43**	**0.00**	**0.42**	**0.42**				**0.10**		**967.63**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00		0.00
Worker	0.03	0.03	0.29	0.00	0.08	0.00	0.08	0.00	0.00	0.01				0.00		55.85
Total	**0.03**	**0.03**	**0.29**	**0.00**	**0.08**	**0.00**	**0.08**	**0.00**	**0.00**	**0.01**				**0.00**		**55.85**

Brookhurst Street
Fugitive PM from Hauling on Public Paved Roads

EF=k(sl/2)^0.65(w/3)^1.5

Formula for emission factor (EF)
from CalEEMod Appendix A

k = particle size multiplier; PM10 factor from USEPA AP-42
sl =silt loading, g/m^2, CalEEMod default (for public roads)
w= average vehicle weight, tons, CalEEMod default (for public roads)

EF	k-PM10 #	sl	w
0.001633	0.016	0.1	2.4

Emissions=EF*miles

Demolition

trips	478
VMT/trip	20
VMT	9560
days	42
VMT/day	228
PM10	0.37

Widening - Site Prep

trips	625
VMT/trip	20
VMT	12500
days	42
VMT/day	298
PM10	0.49

Widening- grade & subgrade

trips	1875
VMT/trip	20
VMT	37500
days	42
VMT/day	893
PM10	1.46

EMFAC 2011
2012 Estimated Annual Emission Rates
EMFAC 2011 Vehicle Categories
Orange COUNTY
South Coast AIR BASIN
South Coast AQMD

										2012		2015			2035	
										40 mph	45mph	40 mph	45 mph	35 mph	40 mph	45 mph
Area	CalYr	Season	Veh	Fuel	MdlYr	Speed	Pop	VMT	Trips	ROG_RUNI	ROG_RUNI	ROG_RUNI	ROG_RUNI	ROG_RUNI	ROG_RUNI	ROG_RUNEX
						(Miles/hr)	(Vehicles)	(Miles/day	(Trips/day)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)
Orange (SC	2012	Annual	LDA	GAS	AllMYr	40	0	4051381	0	0.037867	0.035332	0.022235	0.02068	0.008284	0.007159	0.006598
Orange (SC	2012	Annual	LDT1	GAS	AllMYr	40	0	455275	0	0.087053	0.080917	0.055687	0.051508	0.010662	0.009218	0.008486
Orange (SC	2012	Annual	LDT2	GAS	AllMYr	40	0	1514872	0	0.037521	0.034743	0.025438	0.023522	0.010374	0.008966	0.008261
Orange (SC	2012	Annual	MDV	GAS	AllMYr	40	0	1237187	0	0.056295	0.052109	0.045954	0.042456	0.015129	0.013074	0.012037
Orange (SC	2012	Annual	MH	GAS	AllMYr	40	0	14382.52	0	0.219681	0.187947	0.120444	0.102967	0.008852	0.007283	0.006266

2012		2015		2035		
40 mph CO_RUNEX (gms/mile)	45mph CO_RUNEX (gms/mile)	40 mph CO_RUNEX (gms/mile)	45 mph CO_RUNEX (gms/mile)	35 mph CO_RUNEX (gms/mile)	40 mph CO_RUNEX (gms/mile)	45 mph CO_RUNEX (gms/mile)
1.461897	1.386549	1.044518	0.988259	0.591489	0.544757	0.51061
3.137014	2.980381	2.359145	2.234197	0.731078	0.673359	0.63105
1.862828	1.752923	1.410848	1.328003	0.704451	0.648873	0.608049
2.453403	2.314206	2.126625	2.005935	0.975099	0.898169	0.841646
7.279296	6.91462	4.063124	3.865922	0.151307	0.13614	0.129931

2012		2015		2035		
40 mph NOX_RUNE (gms/mile)	45mph NOX_RUNE (gms/mile)	40 mph NOX_RUNE (gms/mile)	45 mph NOX_RUNE (gms/mile)	35 mph NOX_RUNE (gms/mile)	40 mph NOX_RUNE (gms/mile)	45 mph NOX_RUNEX (gms/mile)
0.132401	0.129792	0.093125	0.090666	0.051069	0.049087	0.04728
0.307127	0.302621	0.230665	0.225766	0.06106	0.058718	0.056608
0.226049	0.220129	0.160638	0.155711	0.063524	0.06107	0.058839
0.325315	0.31738	0.268523	0.260883	0.088372	0.085006	0.082004
1.16403	1.202886	0.829421	0.854903	0.136564	0.142156	0.146621

2012		2015		2035		
40 mph PM10_RUN (gms/mile)	45mph PM10_RUN (gms/mile)	40 mph PM10_RUN (gms/mile)	45 mph PM10_RUN (gms/mile)	35 mph PM10_RUN (gms/mile)	40 mph PM10_RUN (gms/mile)	45 mph PM10_RUNEX (gms/mile)
0.001729	0.001591	0.001314	0.001207	0.0019131	0.0016593	0.001518
0.003781	0.00347	0.002946	0.002699	0.001905	0.0016525	0.001512
0.001604	0.001471	0.001309	0.001199	0.0018973	0.0016456	0.001506
0.001718	0.001577	0.00154	0.001412	0.0018279	0.0015856	0.001451
0.002593	0.002225	0.001665	0.001429	1.60E-04	1.32E-04	1.13E-04

2012		2015		2035		
40 mph PM2_5_RU (gms/mile)	45mph PM2_5_RU (gms/mile)	40 mph PM2_5_RU (gms/mile)	45 mph PM2_5_RU (gms/mile)	35 mph PM2_5_RU (gms/mile)	40 mph PM2_5_RU (gms/mile)	45 mph PM2_5_RUNEX (gms/mile)
0.001572	0.001445	0.001204	0.001106	0.001775	0.0015396	0.0014087
0.00345	0.003164	0.002709	0.002481	0.0017675	0.0015333	0.0014027
0.001471	0.001349	0.001205	0.001104	0.0017604	0.0015269	0.0013971
0.001579	0.001449	0.001419	0.0013	0.001696	0.0014712	0.001346
0.002295	0.001969	0.001504	0.001291	1.49E-04	1.22E-04	1.05E-04

Vehicle	fraction	ROG						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	0.037867	0.035332	0.022235	0.02068	0.00828434	0.007159	0.006598
LDT1	0.074	0.087053	0.080917	0.055687	0.051508	0.01066229	0.009218	0.008486
LDT2	0.242	0.037521	0.034743	0.025438	0.023522	0.01037362	0.008966	0.008261
MDV1	0.11	0.056295	0.052109	0.045954	0.042456	0.01512927	0.013074	0.012037
other (MH)	0.068	0.219681	0.187947	0.120444	0.102967	0.00885219	0.007283	0.006266
Comp factor		0.055813	0.050786	0.034773	0.03164	0.00975747	0.008408	0.007716
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
ROG EF	gm/vmt	0.052797		0.034773	0.03164		0.009218	0.007854
ROG	#/day	0.33		0.25	0.22		0.09	0.08

Vehicle	fraction	CO						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	1.461897	1.386549	1.044518	0.988259	0.59148914	0.544757	0.51061
LDT1	0.074	3.137014	2.980381	2.359145	2.234197	0.73107823	0.673359	0.63105
LDT2	0.242	1.862828	1.752923	1.410848	1.328003	0.70445135	0.648873	0.608049
MDV1	0.11	2.453403	2.314206	2.126625	2.005935	0.97509947	0.898169	0.841646
other (MH)	0.068	7.279296	6.91462	4.063124	3.865922	0.15130678	0.13614	0.129931
Comp factor		2.18753	2.071106	1.554749	1.470302	0.64142033	0.590559	0.553631
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
CO EF	gm/vmt	2.117675		1.554749	1.470302		0.621076	0.561016
CO	#/day	13.06		10.96	10.36		6.02	5.44

Vehicle	fraction	Nox						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	0.132401	0.129792	0.093125	0.090666	0.05106928	0.049087	0.04728
LDT1	0.074	0.307127	0.302621	0.230665	0.225766	0.06105987	0.058718	0.056608
LDT2	0.242	0.226049	0.220129	0.160638	0.155711	0.06352366	0.06107	0.058839
MDV1	0.11	0.325315	0.31738	0.268523	0.260883	0.08837185	0.085006	0.082004
other (MH)	0.068	1.16403	1.202886	0.829421	0.854903	0.13656376	0.142156	0.146621
Comp factor		0.259365	0.258048	0.189003	0.187096	0.06473945	0.062979	0.061342
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
NOx EF	gm/vmt	0.258575		0.189003	0.187096		0.064035	0.06167
Nox	#/day	1.59		1.33	1.32		0.62	0.60

Vehicle	fraction	PM10						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	0.001729	0.001591	0.001314	0.001207	0.00191308	0.001659	0.001518
LDT1	0.074	0.003781	0.00347	0.002946	0.002699	0.00190502	0.001653	0.001512
LDT2	0.242	0.001604	0.001471	0.001309	0.001199	0.00189727	0.001646	0.001506
MDV1	0.11	0.001718	0.001577	0.00154	0.001412	0.00182795	0.001586	0.001451
other (MH)	0.068	0.002593	0.002225	0.001665	0.001429	0.00016011	0.000132	0.000113
Comp factor		0.001908	0.001743	0.001482	0.001353	0.00178009	0.001544	0.001412
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
PM10 EF	gm/vmt	0.001809		0.001482	0.001353		0.001685	0.001438
PM10	#/day	0.011		0.010	0.010		0.016	0.014

Vehicle	fraction	PM2.5						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	0.001572	0.001445	0.001204	0.001106	0.00177502	0.00154	0.001409
LDT1	0.074	0.00345	0.003164	0.002709	0.002481	0.00176755	0.001533	0.001403
LDT2	0.242	0.001471	0.001349	0.001205	0.001104	0.00176035	0.001527	0.001397
MDV1	0.11	0.001579	0.001449	0.001419	0.0013	0.00169603	0.001471	0.001346
other (MH)	0.068	0.002295	0.001969	0.001504	0.001291	0.00014856	0.000122	0.000105
Comp factor		0.001736	0.001585	0.00136	0.001241	0.00165163	0.001432	0.00131
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
PM2.5 EF	gm/vmt	0.001646		0.00136	0.001241		0.001564	0.001334
PM2.5	#/day	0.010		0.010	0.009		0.015	0.013

Year	Scenario	Peak Hour Volume	Average Speed	Emissions - pounds per day				
		vph	mph	VOC	NOx	CO	PM10	PM2.5
2012	Existing	2800	42	0.33	1.59	13.06	0.011	0.010
2015	Without Project	3200	40	0.25	1.33	10.96	0.010	0.010
2015	With Project	3200	45	0.22	1.32	10.36	0.010	0.009
2035	Without Project	4400	38	0.09	0.62	6.02	0.016	0.015
2035	With Project	4400	44	0.08	0.60	5.44	0.014	0.013
SCAQMD Thresholds (Table 6)				*55*	*55*	*550*	*150*	*55*
Exceed Threshold?				***No***	***No***	***No***	***No***	***No***

VOC: volatile organic compound; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less

Brookhurst Widen - onroad - 091112

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Other Asphalt Surfaces	1.9	Acre

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Anaheim Public Utilities
Climate Zone	8		2.2		
		Precipitation Freq (Days)			
			30		

1.3 User Entered Comments

Project Characteristics - road widening activites -construction only - op year 2015

Land Use - 0.4 miles x 40 ft widen - 1.9 acre

Construction Phase - prep 3/1-31(21); grade 4/1-8/15(99); drain/util 8/16-11/15(65);pave 11/16-12/30(32)
durations based on Sac Road Const Model

Off-road Equipment - OFFROAD 2011 load factors
Site prep-dozer, loader, grader (default)

Off-road Equipment - Grade- dozer, loader, grader (default)

Off-road Equipment - Drain/util/subgrade-fork, loader/backhoe, excavator, grader, genset

Off-road Equipment - Pave-mortar mixer, paver, roller, loader

Grading - site prep 5000 cy; grade 15,000 cy

Construction Off-road Equipment Mitigation - dust mitig - water 2x daily per SCAQMD rule 403
Diesel mitig - Offroad diesel Tier 3

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.30	2.34	1.60	0.00	2.38	0.12	2.51	0.16	0.12	0.28			287.05	0.02	0.00	287.52
Total	**0.30**	**2.34**	**1.60**	**0.00**	**2.38**	**0.12**	**2.51**	**0.16**	**0.12**	**0.28**			**287.05**	**0.02**	**0.00**	**287.52**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.22	1.52	1.61	0.00	2.23	0.10	2.33	0.07	0.10	0.17			287.05	0.02	0.00	287.52
Total	**0.22**	**1.52**	**1.61**	**0.00**	**2.23**	**0.10**	**2.33**	**0.07**	**0.10**	**0.17**			**287.05**	**0.02**	**0.00**	**287.52**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.06	0.00	0.06	0.03	0.00	0.03			0.00	0.00	0.00	0.00
Off-Road	0.03	0.21	0.13	0.00		0.01	0.01		0.01	0.01			20.93	0.00	0.00	20.97
Total	**0.03**	**0.21**	**0.13**	**0.00**	**0.06**	**0.01**	**0.07**	**0.03**	**0.01**	**0.04**			**20.93**	**0.00**	**0.00**	**20.97**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.01	0.14	0.09	0.00	0.14	0.01	0.14	0.00	0.01	0.01			23.13	0.00	0.00	23.14
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.87	0.00	0.00	0.87
Total	**0.01**	**0.14**	**0.10**	**0.00**	**0.14**	**0.01**	**0.14**	**0.00**	**0.01**	**0.01**			**24.00**	**0.00**	**0.00**	**24.01**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.03	0.00	0.03	0.01	0.00	0.01			0.00	0.00	0.00	0.00
Off-Road	0.02	0.11	0.12	0.00		0.01	0.01		0.01	0.01			20.93	0.00	0.00	20.97
Total	**0.02**	**0.11**	**0.12**	**0.00**	**0.03**	**0.01**	**0.04**	**0.01**	**0.01**	**0.02**			**20.93**	**0.00**	**0.00**	**20.97**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.01	0.14	0.09	0.00	0.14	0.01	0.14	0.00	0.01	0.01			23.13	0.00	0.00	23.14
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.87	0.00	0.00	0.87
Total	**0.01**	**0.14**	**0.10**	**0.00**	**0.14**	**0.01**	**0.14**	**0.00**	**0.01**	**0.01**			**24.00**	**0.00**	**0.00**	**24.01**

3.3 Grading/Excavation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.23	0.00	0.23	0.12	0.00	0.12			0.00	0.00	0.00	0.00
Off-Road	0.10	0.82	0.49	0.00		0.04	0.04		0.04	0.04			81.59	0.01	0.00	81.77
Total	**0.10**	**0.82**	**0.49**	**0.00**	**0.23**	**0.04**	**0.27**	**0.12**	**0.04**	**0.16**			**81.59**	**0.01**	**0.00**	**81.77**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.04	0.41	0.27	0.00	1.95	0.02	1.97	0.00	0.02	0.02			69.39	0.00	0.00	69.43
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00			4.10	0.00	0.00	4.10
Total	**0.04**	**0.41**	**0.29**	**0.00**	**1.96**	**0.02**	**1.98**	**0.00**	**0.02**	**0.02**			**73.49**	**0.00**	**0.00**	**73.53**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.10	0.00	0.10	0.06	0.00	0.06			0.00	0.00	0.00	0.00
Off-Road	0.07	0.42	0.48	0.00		0.03	0.03		0.03	0.03			81.59	0.01	0.00	81.77
Total	**0.07**	**0.42**	**0.48**	**0.00**	**0.10**	**0.03**	**0.13**	**0.06**	**0.03**	**0.09**			**81.59**	**0.01**	**0.00**	**81.77**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.04	0.41	0.27	0.00	1.95	0.02	1.97	0.00	0.02	0.02			69.39	0.00	0.00	69.43
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00			4.10	0.00	0.00	4.10
Total	**0.04**	**0.41**	**0.29**	**0.00**	**1.96**	**0.02**	**1.98**	**0.00**	**0.02**	**0.02**			**73.49**	**0.00**	**0.00**	**73.53**

3.4 Drainage/utilities/subgrade - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.08	0.62	0.46	0.00		0.04	0.04		0.04	0.04			68.30	0.01	0.00	68.45
Total	**0.08**	**0.62**	**0.46**	**0.00**		**0.04**	**0.04**		**0.04**	**0.04**			**68.30**	**0.01**	**0.00**	**68.45**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.03	0.00	0.01	0.00	0.01	0.00	0.00	0.00			4.37	0.00	0.00	4.38
Total	**0.00**	**0.00**	**0.03**	**0.00**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**			**4.37**	**0.00**	**0.00**	**4.38**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.06	0.36	0.49	0.00		0.03	0.03		0.03	0.03			68.30	0.01	0.00	68.45
Total	**0.06**	**0.36**	**0.49**	**0.00**		**0.03**	**0.03**		**0.03**	**0.03**			**68.30**	**0.01**	**0.00**	**68.45**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.03	0.00	0.01	0.00	0.01	0.00	0.00	0.00			4.37	0.00	0.00	4.38
Total	**0.00**	**0.00**	**0.03**	**0.00**	**0.01**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**			**4.37**	**0.00**	**0.00**	**4.38**

3.5 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.02	0.14	0.10	0.00		0.01	0.01		0.01	0.01			12.71	0.00	0.00	12.75
Paving	0.00					0.00	0.00		0.00	0.00			0.00	0.00	0.00	0.00
Total	**0.02**	**0.14**	**0.10**	**0.00**		**0.01**	**0.01**		**0.01**	**0.01**			**12.71**	**0.00**	**0.00**	**12.75**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			1.66	0.00	0.00	1.66
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**1.66**	**0.00**	**0.00**	**1.66**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.01	0.07	0.09	0.00		0.01	0.01		0.01	0.01			12.71	0.00	0.00	12.75
Paving	0.00					0.00	0.00		0.00	0.00			0.00	0.00	0.00	0.00
Total	**0.01**	**0.07**	**0.09**	**0.00**		**0.01**	**0.01**		**0.01**	**0.01**			**12.71**	**0.00**	**0.00**	**12.75**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			1.66	0.00	0.00	1.66
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**1.66**	**0.00**	**0.00**	**1.66**

Brookhurst Widening - La Palma to SR 91 080112

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
User Defined Recreational	1	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Anaheim Public Utilities
Climate Zone	8		2.2		
		Precipitation Freq (Days)			
			30		

1.3 User Entered Comments

Project Characteristics - Demolition and Sound Wall const- op year 2015

Land Use - 1.5 acre net acquired for landscaping (the rest is road widen)

Construction Phase - Demo 1/2-3/1/14 acquired homes; build3/2-5/1/2014 soundwalls;
Site prep 5/2-7/1/14 for landscaping; dates not relevant- approx durations

Off-road Equipment - Build walls - forklift, backhoe/loader

Off-road Equipment - Demo - dozer, 3 loader, saw

Off-road Equipment - OFFROAD 2011 load factors
site prep/landscape - grader, backhoe/loader

Trips and VMT - Bldg trips reduced - only walls

Demolition - demo 105,000 sq ft of bldgs

Grading - All import export in road const model

Vehicle Trips - No operations

Consumer Products - No operations

Area Coating - No operations

Construction Off-road Equipment Mitigation - Dust Mit - Water at least 2x day per Rule 403
Diesel Mit - All Tier 2

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.12	0.91	0.65	0.00	0.27	0.05	0.33	0.01	0.05	0.06			106.81	0.01	0.00	107.01
Total	**0.12**	**0.91**	**0.65**	**0.00**	**0.27**	**0.05**	**0.33**	**0.01**	**0.05**	**0.06**			**106.81**	**0.01**	**0.00**	**107.01**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.09	0.55	0.64	0.00	0.24	0.04	0.29	0.00	0.04	0.05			106.81	0.01	0.00	107.01
Total	**0.09**	**0.55**	**0.64**	**0.00**	**0.24**	**0.04**	**0.29**	**0.00**	**0.04**	**0.05**			**106.81**	**0.01**	**0.00**	**107.01**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

3.2 Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.05	0.00	0.05	0.01	0.00	0.01			0.00	0.00	0.00	0.00
Off-Road	0.07	0.55	0.35	0.00		0.03	0.03		0.03	0.03			54.47	0.01	0.00	54.59
Total	**0.07**	**0.55**	**0.35**	**0.00**	**0.05**	**0.03**	**0.08**	**0.01**	**0.03**	**0.04**			**54.47**	**0.01**	**0.00**	**54.59**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.01	0.11	0.07	0.00	0.21	0.00	0.22	0.00	0.00	0.00			17.69	0.00	0.00	17.70
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00			2.82	0.00	0.00	2.83
Total	**0.01**	**0.11**	**0.09**	**0.00**	**0.21**	**0.00**	**0.22**	**0.00**	**0.00**	**0.00**			**20.51**	**0.00**	**0.00**	**20.53**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.02	0.00	0.02	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Off-Road	0.05	0.30	0.33	0.00		0.02	0.02		0.02	0.02			54.47	0.01	0.00	54.59
Total	**0.05**	**0.30**	**0.33**	**0.00**	**0.02**	**0.02**	**0.04**	**0.00**	**0.02**	**0.02**			**54.47**	**0.01**	**0.00**	**54.59**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.01	0.11	0.07	0.00	0.21	0.00	0.22	0.00	0.00	0.00			17.69	0.00	0.00	17.70
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00			2.82	0.00	0.00	2.83
Total	**0.01**	**0.11**	**0.09**	**0.00**	**0.21**	**0.00**	**0.22**	**0.00**	**0.00**	**0.00**			**20.51**	**0.00**	**0.00**	**20.53**

3.3 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.01	0.07	0.06	0.00		0.00	0.00		0.00	0.00			8.62	0.00	0.00	8.64
Total	**0.01**	**0.07**	**0.06**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**			**8.62**	**0.00**	**0.00**	**8.64**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.54	0.00	0.00	0.54
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00			2.73	0.00	0.00	2.73
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**3.27**	**0.00**	**0.00**	**3.27**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.01	0.05	0.06	0.00		0.00	0.00		0.00	0.00			8.62	0.00	0.00	8.64
Total	**0.01**	**0.05**	**0.06**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**			**8.62**	**0.00**	**0.00**	**8.64**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.54	0.00	0.00	0.54
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00			2.73	0.00	0.00	2.73
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**3.27**	**0.00**	**0.00**	**3.27**

3.4 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Off-Road	0.02	0.17	0.13	0.00		0.01	0.01		0.01	0.01			18.83	0.00	0.00	18.87
Total	**0.02**	**0.17**	**0.13**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**			**18.83**	**0.00**	**0.00**	**18.87**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			1.11	0.00	0.00	1.11
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**1.11**	**0.00**	**0.00**	**1.11**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Off-Road	0.02	0.10	0.14	0.00		0.01	0.01		0.01	0.01			18.83	0.00	0.00	18.87
Total	**0.02**	**0.10**	**0.14**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**			**18.83**	**0.00**	**0.00**	**18.87**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			1.11	0.00	0.00	1.11
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**1.11**	**0.00**	**0.00**	**1.11**

EMFAC 2011
2015 Estimated Annual Emission Rates
EMFAC 2011 Vehicle Categories
Orange COUNTY
South Coast AIR BASIN
South Coast AQMD

Area	CalYr	Season	Veh	Fuel	MdlYr	2012 40 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2012 45 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2015 40 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2012-2015 40 mph reduction	2015 45 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2015 40-45 reduction	2035 35 CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2035 40 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2015-2035 40 mph reduction	2035 45 mph CO2_RUNEX(Pavley I+LCFS) (gms/mile)	2015-2035 45 mph reduction	2035 40-45 reduction	CO2_IDLEX(Pavley I+LCFS) (gms/vehic	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
Orange (SC	2015	Annual	LDA	GAS	AllMYr	280.2555	270.5979	252.8498	9.8	244.4392	3.3	191.3198	176.975	30.0	171.1139	30.0	3.3	0	0
Orange (SC	2015	Annual	LDT1	GAS	AllMYr	325.4281	314.1359	298.9496	8.1	288.9188	3.4	230.1406	212.9042	28.8	205.8164	28.8	3.3	0	0
Orange (SC	2015	Annual	LDT2	GAS	AllMYr	389.1626	375.7093	361.0377	7.2	348.9769	3.3	297.1852	274.9237	23.9	265.7787	23.8	3.3	0	0
Orange (SC	2015	Annual	MDV	GAS	AllMYr	500.1446	482.8385	473.3457	5.4	457.5035	3.3	393.0862	363.6494	23.2	351.5367	23.2	3.3	0	0
Orange (SC	2015	Annual	MH	GAS	AllMYr	472.857	449.7956	463.3524	2.0	440.7544	4.9	475.0619	427.7098	7.7	406.8503	7.7	4.9	0	0
Orange (SC	2015	Annual	MH	DSL	AllMYr	1099.095	1060.127	1078.674	1.9	1040.43	3.5	1056.802	1008.616	6.5	972.8559	6.5	3.5	0	0

Vehicle	fraction	CO2						
		2012	2012	2015	2015	2035	2035	2035
		40	45	40	45	35	40	45
LDA	0.506	280.2555	270.5979	252.8498	244.4392	191.319846	176.975	171.1139
LDT1	0.074	325.4281	314.1359	298.9496	288.9188	230.140594	212.9042	205.8164
LDT2	0.242	389.1626	375.7093	361.0377	348.9769	297.185229	274.9237	265.7787
MDV1	0.11	500.1446	482.8385	473.3457	457.5035	393.086188	363.6494	351.5367
other (MH)	0.068	785.976	754.9611	771.0133	740.5921	765.932075	718.1631	689.8531
Comp factor		368.5306	355.5398	341.9323	330.2043	281.079933	260.6723	251.7115
Volume	vph	2800		3200	3200		4400	4400
hours		4		4	4		4	4
miles		0.25		0.25	0.25		0.25	0.25
VMT	vmt/day	2800		3200	3200		4400	4400
av speed		42		40	45		38	44
CO2 EF	gm/vmt	360.7361		341.9323	330.2043		272.9169	253.5037
CO2=GHG	MT/yr	368		399	385		438	407
assume 365 days								

Year	2012	2015		2035	
Scenario	Existing	No-Build	Build	No-Build	Build
Peak hour volume-vehicles per hour	2800	3200		4400	
Average speed-miles per hour	42	40	45	38	44
CO2 emissions-Metric tons per year	368	399	385	438	407

APPENDIX B

TRAFFIC STUDY

Traffic Study for
Brookhurst Street Widening Project
From I-5 to SR 91

Prepared for:

ANAHEIM

Prepared by:

ADVANTEC Consulting Engineers

21700 Copley Drive, Suite 350
Diamond Bar, CA 91765

June 2012
(Final)

TABLE OF CONTENTS

Volume I

Volume II

FIGURES

TABLES

This traffic study report is prepared under the supervision of a California Registered Traffic Engineer.

1. Introduction

1.1 Background

ADVANTEC Consulting Engineers (ADVANTEC) prepared this report to document the traffic study findings for the proposed widening of Brookhurst Street between Interstate 5 (I-5) and State Route 91. The report has been separated in two volumes: Volume I presents traffic study and Volume II contains the study data. The proposed widening (project) will increase the travel lanes along the corridor from two to three lanes in each direction. A raised median will be constructed along the project corridor which will prohibit left-turn movements into and out of certain local side streets and driveways within the project area.

The following sections evaluate the proposed widening improvements during the weekday morning, midday, and afternoon peak hours at all intersections along Brookhurst Street between I-5 and State Route 91. The scope and methodologies used for this traffic study were developed in consultation with the City of Anaheim staff. Tasks undertaken for this traffic analysis include definition of study approach, determination of existing and future traffic conditions, assignment of traffic to be re-routed due to the proposed raised median, and evaluation of the proposed improvements. This report follows the approach and methodology used in the City of Anaheim Traffic Study for Brookhurst Street Widening between Katella Avenue and Ball Road, approved in March 2010.

1.2 Study Area

There are eight existing intersections within the project limits. With the proposed improvements, the number of intersections will be reduced to five. Therefore, for this traffic analysis, these five study intersections were selected for evaluation in consultation with City staff. Four of the five study locations are currently signalized intersections. A new signal is proposed at Huntington Avenue along with realignment to remove the current offset configuration on Brookhurst. The study intersections are as follows:

1. SR 91 Westbound Ramps (Signalized)
2. SR 91 Eastbound Ramps (Signalized)
3. Huntington Avenue – East Leg (New Signal with Project Condition)
4. Falmouth Avenue – West Leg (Signalized)
5. La Palma Avenue (Signalized)

In addition to the intersections, the following driveways identified from north to south along the project corridor, with parcel identification and land use, were evaluated in this study:

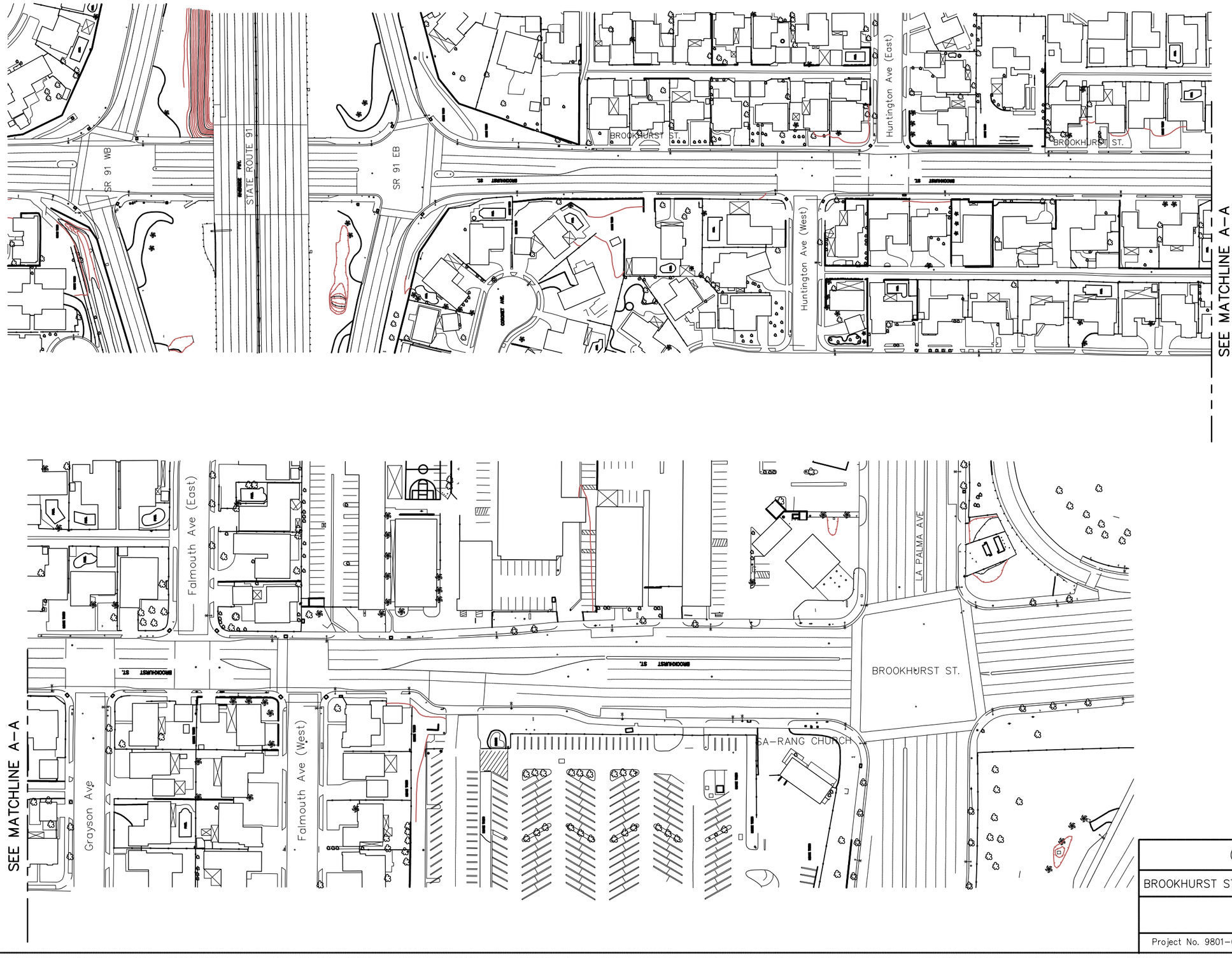
1. AP#072-415-49 (Chevron Gas Station)
2. AP#071-060-96 (Best Auto Care)
3. AP#072-415-45 (Subway)
4. AP#071-060-99 (Sa-Rang Church South Driveway)
5. AP#071-060-99 (Sa-Rang Church North Driveway)
6. AP#072-415-36 (S. Baylo University)

7. AP#072-415-33 & 30 (Nu Smile Dental & Islamic Center)
8. AP#071-246-21 & 22 (2202-2203 Grayson Avenue)
9. AP#072-417-09 (1160 Brookhurst St)
10. AP#072-417-11 (1168 Brookhurst St)
11. AP#071-245-05 (1207 Brookhurst St)
12. AP#072-417-13 (1176 Brookhurst St)
13. AP#071-245-06 (1211 Brookhurst St)
14. AP#071-371-24 (1313 Brookhurst St)
15. AP#072-291-06 (1252 Brookhurst St)

On-street parking is not permitted at any time on Brookhurst Street within the project limits. Therefore no parking impacts from the proposed widening of Brookhurst Street.

Figure 1.1 depicts the project area with the location of driveways and intersections depicted on Figure 1.2.

OCTA provides bus service along Brookhurst Street, Route 35, and La Palma Avenue, Route 38.



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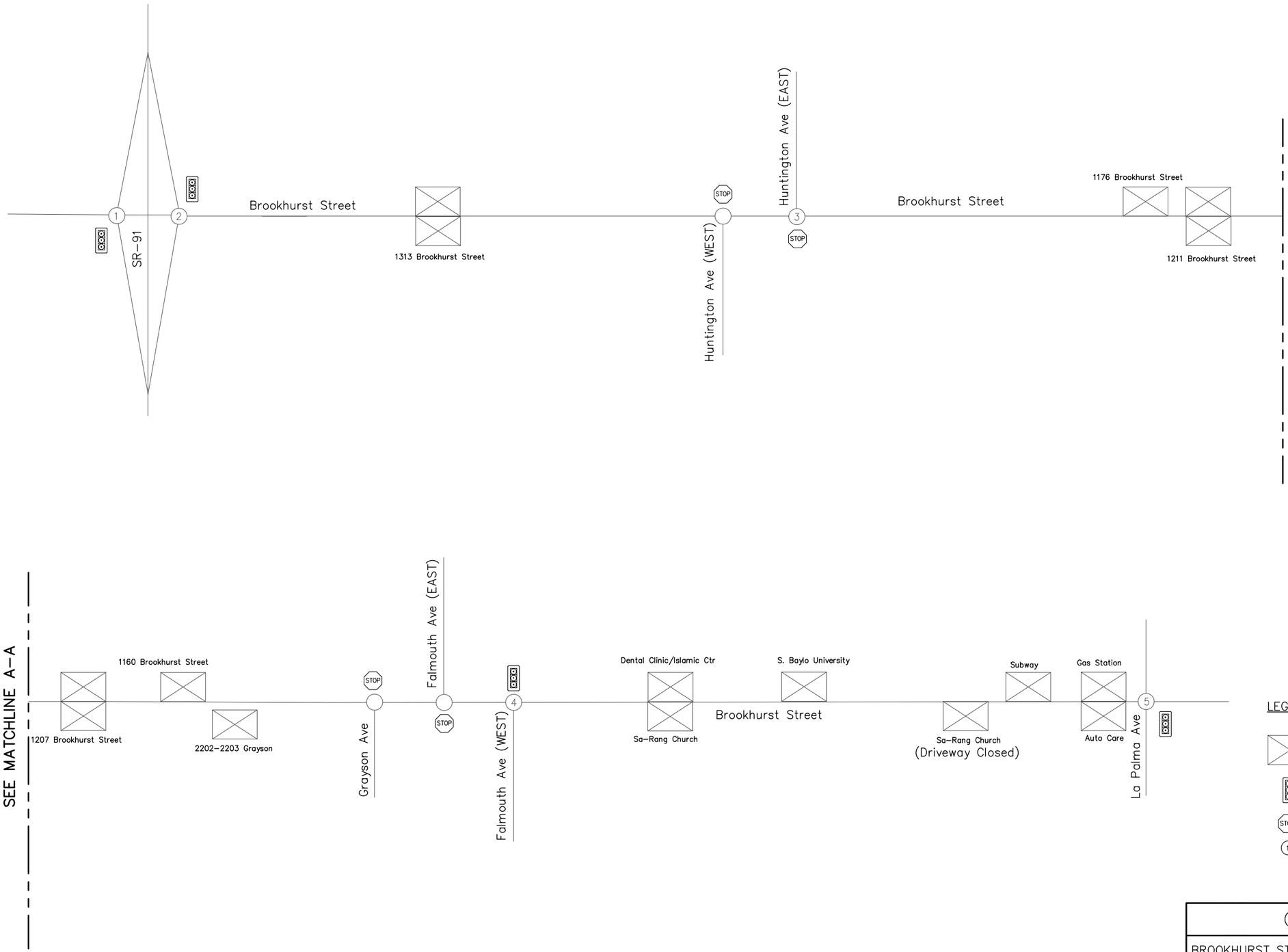
BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 1.1

Project Area

Project No. 9801–0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 1.2

Intersection and Driveway Locations & Signal Control

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

1.3 Study Methodology

ADVANTEC prepared this report in discussions with City staff in determining the approach and methodology to be utilized in this study. Coordination with City staff was conducted at the start of this study to achieve consensus on assumptions such as study scenarios and traffic growth. The following describes the methodology utilized for this report as discussed with City staff.

Study Alignments

There are two alignments proposed for the widening of Brookhurst Street:

- East Alignment (Alternative A)
- West Alignment (Alternative B)

Weekday morning, midday, and afternoon peak hour traffic operations were evaluated at the study intersections for each of the following scenarios:

- Opening (Year 2015) Base Conditions without Project
- Opening (Year 2015) Conditions with Project
- Future (Year 2035) Base Conditions without Project
- Future (Year 2035) Conditions with Project

Existing Period Conditions

Weekday peak hour turning movement; pedestrian and bicycle counts were collected on Tuesday November 15 and Thursday November 17, 2011 at all eight study intersections and fifteen driveways along Brookhurst Street between the hours of 7:00 AM to 9:00 AM, noon to 2:00 PM, and 4:00 PM to 6:00 PM. The south driveway to Sa-Rang Church was closed during the week and no counts could be collected. Counts were collected at Sa-Rang Church driveway on Sunday, November 13, 2011 between 9:00 AM to 11:00 AM.

Future Conditions

In discussions with the City staff, Year 2015 was identified as the project opening year and Year 2035 was identified as the horizon year for this study. A 1% percent traffic growth was used for the project in calculating Year 2015 volumes from the existing 2011 traffic counts. Year 2035 traffic was provided by the City of Anaheim.

Estimated Traffic Shifts

Existing traffic patterns will be modified due to the construction of raised median along Brookhurst Street between the SR 91 eastbound ramps and La Palma Avenue intersections. Left-turn movements will be prohibited into and out of some of the local streets and driveways. With the proposed re-alignment of Brookhurst Street, driveways on either east or west side of the Brookhurst Street will be removed for widening (depending on the alignment) and there will be no traffic to/from these driveways upon completion of this project by Year 2015. In addition, all left-turn movements to and from "closed off" the local side streets and driveways will make u-turns at adjacent intersections. The assumptions utilized in estimating new traffic patterns are further discussed in latter part of this report.

Level of Service Methodology

The Intersection Capacity Utilization (ICU) methodology was used to determine the level of service for signalized intersections. Following the Orange County Congestion Management Program (CMP), a saturation flow rate of 1700 vehicles per lane per hour and a lost time factor of 0.05 (5%) was applied to the ICU calculations. For stop-controlled intersections, Levels of Service were evaluated using stop-controlled methodologies from the 2000 Highway Capacity Manual.

Level of service (LOS) values range from LOS A to LOS F. LOS A indicates excellent operating conditions with little delay to motorists, whereas LOS F represents congested conditions with excessive vehicle delay. LOS E is typically defined as the operating "capacity" of a roadway. Table 1.1 summarizes the LOS definitions for signalized and stop-controlled intersections.

Table 1.1 Level of Service Definitions

Level of Service	Signalized Intersection Based on Volume/Capacity Ratio	Stop-Controlled Intersection Based on Vehicle Delay (sec)	Definition
A	<0.600	<10	EXCELLENT. No vehicle wait is longer than one red light, and no approach phase is fully used.
B	0.601-0.700	>10 and <15	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles
C	0.701-0.800	>15 and <25	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801-0.900	>25 and <35	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	0.901-1.000	>35 and <50	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>1.00	>50	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

Arterial Segment V/C Analysis

The arterial roadway criteria for the City of Anaheim involve the use of Average Daily Traffic (ADT) V/C ratios. LOS C (V/C not to exceed 0.80) is the performance standard that has been adopted for the study area circulation system by the City of Anaheim. If a road segment exceeds this daily threshold, then the peak hours are analyzed for this segment. If the peak hour v/c is greater than 0.90, then a deficiency exists on that segment.

2. Existing Conditions (Year 2011)

2.1 Existing Roadways

Figure 2.1 depicts the lane geometrics and traffic control for the project at the study intersections. The following is a description of the streets within the project limits:

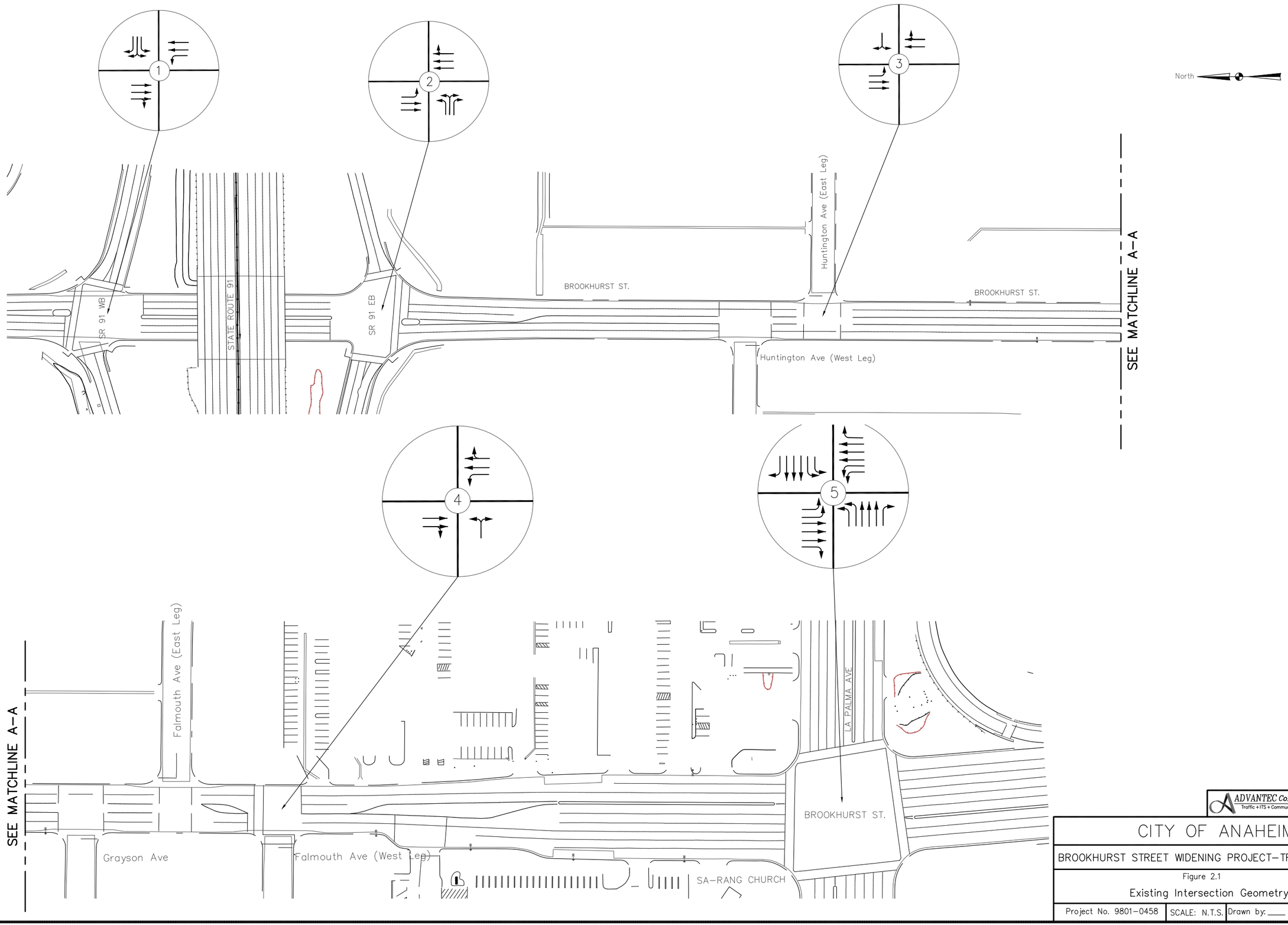
Brookhurst Street – Brookhurst Street is a north-south major arterial providing two travel lanes in each direction with striped left-turn lanes. The posted speed limit is 40 miles per hour and on-street parking is not permitted at any time of the day.

La Palma Avenue – La Palma Avenue is an east-west primary arterial roadway providing two travel lanes in each direction. Left-turn pockets are provided at Brookhurst Street intersection. Parking is generally prohibited along the corridor. The posted speed limit is 40 miles per hour.

Falmouth Avenue – Falmouth Avenue is an east-west local street that provides one lane in each direction with parking permitted in both directions.

Grayson Avenue – Grayson Avenue is an east-west local street similar to Falmouth Avenue that leads to a residential community.

Huntington Avenue – Huntington Avenue is an east-west local street that provides access to the residential neighborhoods.



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 2.1

Existing Intersection Geometry

Project No. 9801–0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

2.2 Existing Peak Hour Traffic Volumes

Peak hour intersection and driveway turning movement counts were collected between the hours of 7:00 AM to 9:00 AM, noon to 2:00 PM, and 4:00 PM to 6:00 PM. Bicycle and pedestrian counts were also collected at the intersections for the same time periods. Peak hour turning movement counts were collected on Tuesday, November 15 and Thursday November 17, 2011. A detailed analysis of count data revealed that the peak traffic occurred on Thursday, November 17, 2011. Figures 2.2a – 2.2c summarize the morning, midday, and afternoon peak hour traffic volumes, respectively. Vehicle classification counts were also conducted for the same study periods and are provided along with detailed peak hour traffic counts in Volume II of this report.

2.3 Existing Pedestrian/Bicycle Counts and Transit Routes

An analysis of bicycle and pedestrian count data reveals very light pedestrian and bicycle traffic in the project limits. Only the Brookhurst St/La Palma Ave Intersection was observed to have moderately high pedestrian and bicycle activity in the AM peak (193 total all approaches). Detailed pedestrian and bicycle counts for the five study locations are provided in Volume II of this report.

OCTA provides bus service along Brookhurst Street, Route 35, and on La Palma Avenue, Route 38. Bus Route 35 operates in both directions along the entire Brookhurst Street project limits while Bus Route 38 only operates in both directions on La Palma Avenue at the southerly project limits.

2.4 Existing Year 2011Condition Levels of Service

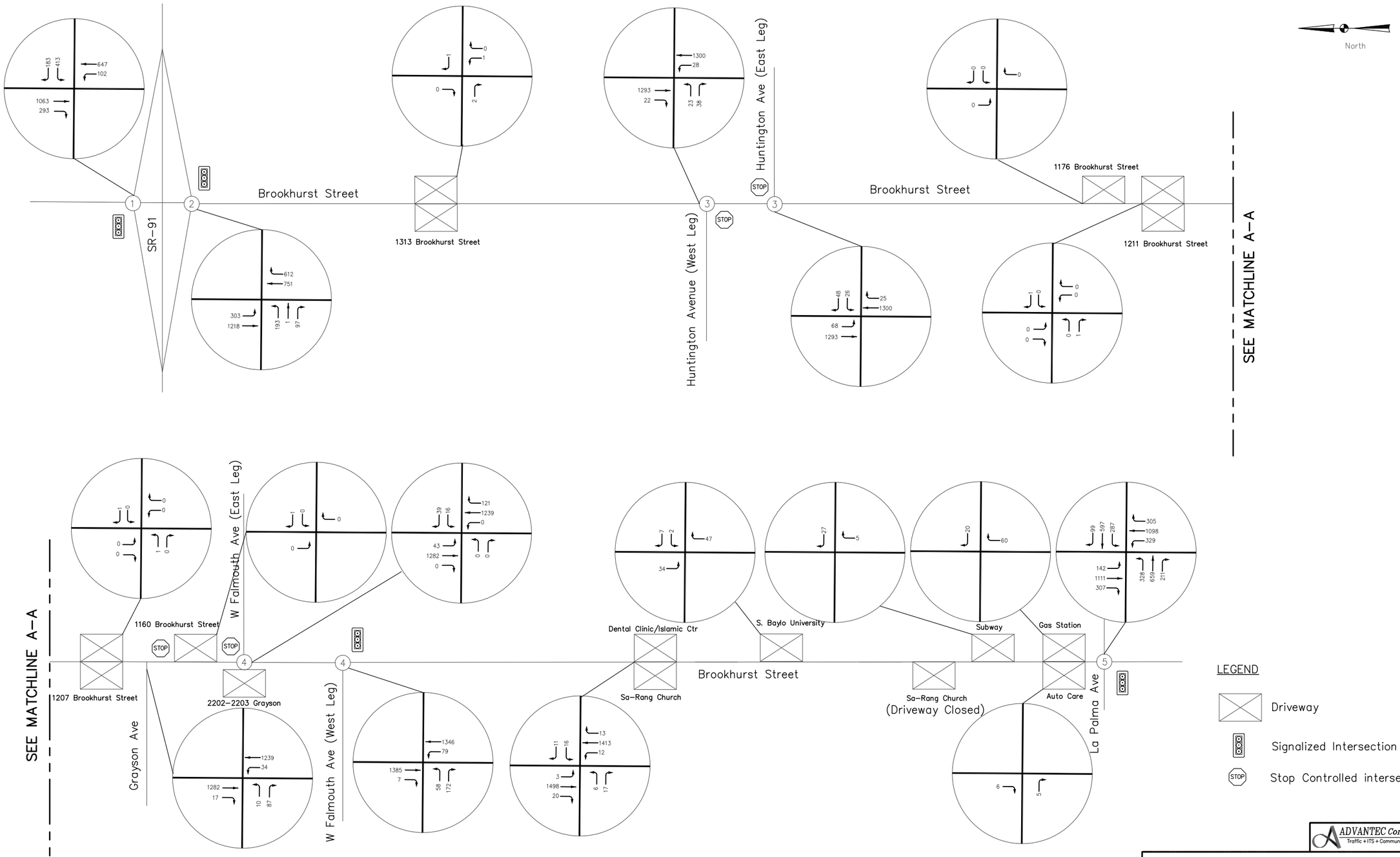
To analyze existing year 2011 condition, ICU methodology was used in determining the LOS for each signalized intersection, whereas the HCM methodology was used for unsignalized intersection.

Table 2.1 summarizes the LOS of the study area intersections under this scenario.

Table 2.1 Level of Service Analysis – Existing Year (2011) Conditions

Loc.#	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.528	A	0.659	B
2	Brookhurst St and SR-91 EB Ramps	0.679	B	0.615	B
3	Brookhurst Street and Huntington Avenue*	6.3 *	A	9.7 *	A
4	Brookhurst St and Falmouth Avenue	0.682	B	0.642	B
5	Brookhurst St and La Palma Avenue	0.624	B	0.669	B
*Note: * LOS based on HCM methodology of average delay (sec/veh)*					

For Existing Year conditions, all five study intersections are projected to operate at LOS B or better during peak periods. The traffic analysis worksheets for existing year 2011 base conditions are provided in Volume I.



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 2.2(a)

Existing AM Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

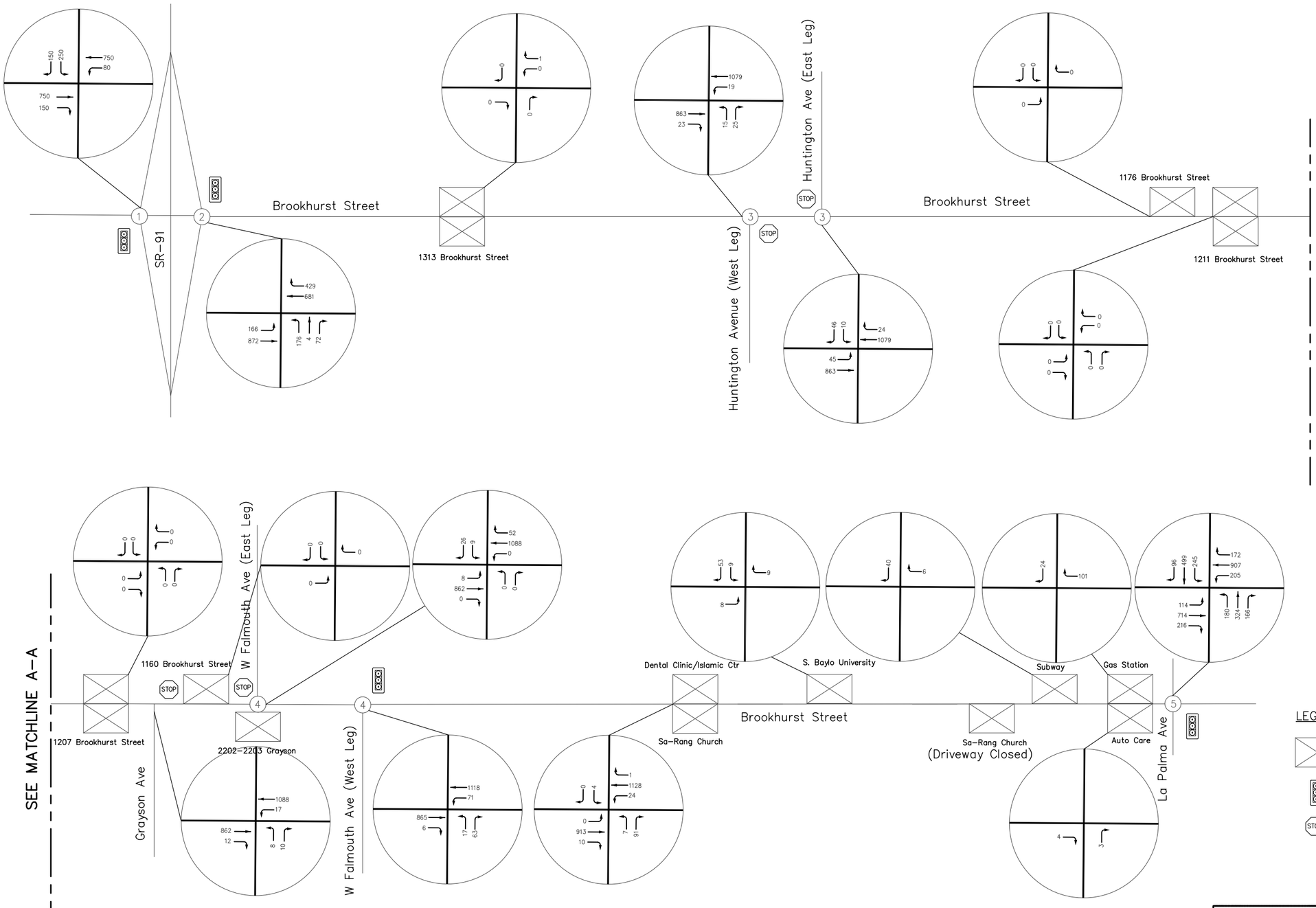

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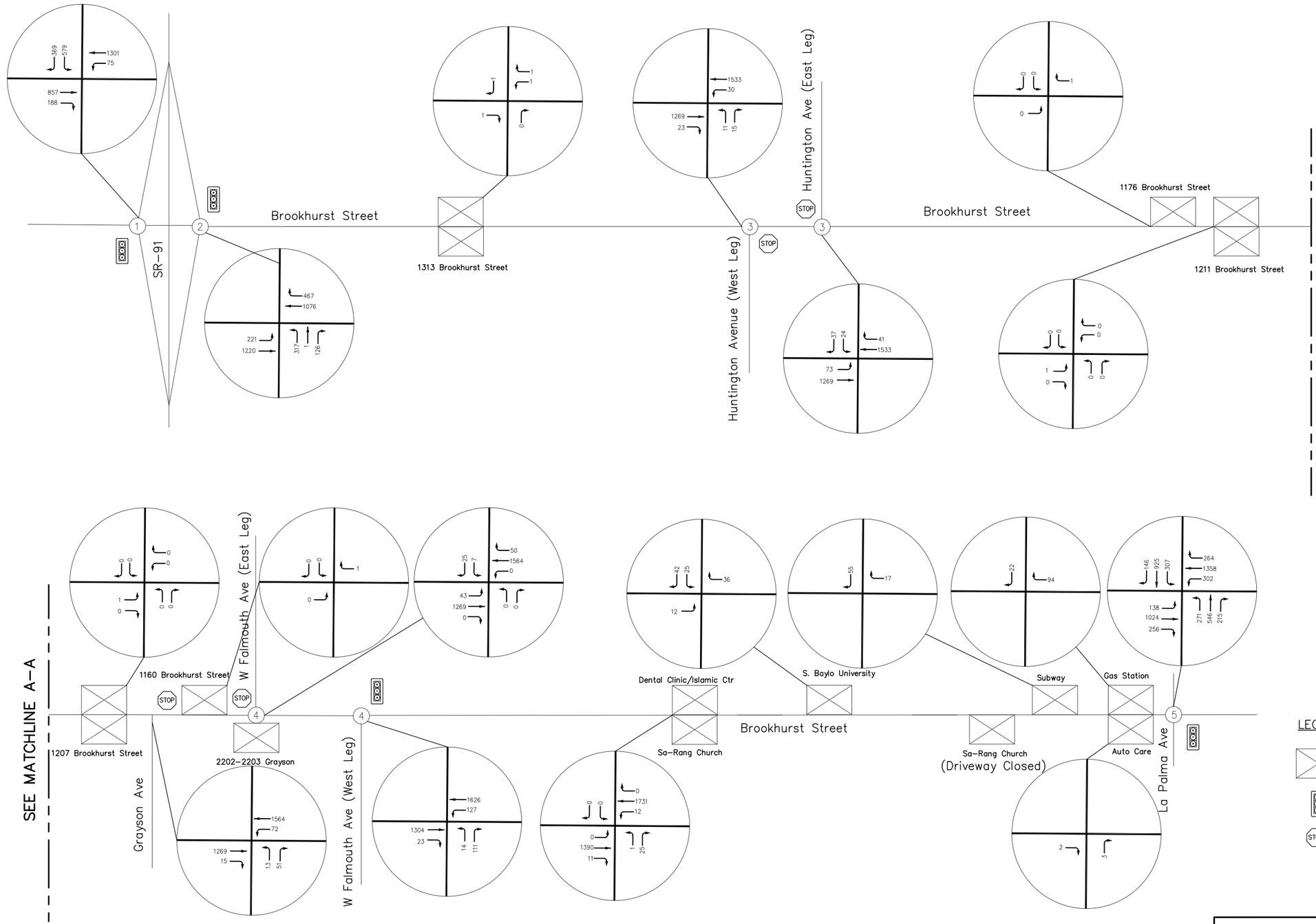
Figure 2.2 (b)

Existing Mid-Day Peak Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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BROOKHURST STREET WIDENING PROJECT—TRAFFIC STUDY

Figure 2.2(c)

Existing PM Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

3. Future Condition

3.1 Future Traffic Growth

For the analysis of background traffic when the widening is expected to be completed (Year 2015), an annual traffic growth rate factor of 1% was utilized to provide for increases in traffic from the existing traffic counts along Brookhurst Street between the SR 91 Ramps and I-5.

Year 2035 Project traffic volumes was provided by City staff.

3.2 Year 2015 Base Condition Peak Hour Traffic Volumes

Utilizing a 1% per year linear growth traffic volumes for the project were calculated for the year 2015. Year 2015 base conditions are provided in Figures 3.1a – 3.1c for morning, midday, and afternoon peak hours, respectively.

3.3 Year 2015 Base Condition Levels of Service

To analyze year 2015 base conditions, volumes were processed under the ICU methodology in determining the LOS for each study intersection.

Table 3.1 below summarizes the LOS for each study intersection in year 2015 base conditions.

Table 3.1 Level of Service Analysis – Year 2015 Base Conditions

Loc. #	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.567	A	0.709	C
2	Brookhurst St and SR-91 EB Ramps	0.729	C	0.661	B
3	Brookhurst Street and Huntington Avenue*	>50 *	F	>50 *	F
4	Brookhurst St and Falmouth Avenue	1.157	F	1.147	F
5	Brookhurst St and La Palma Avenue	0.671	B	0.719	C
*Note: * LOS based on HCM methodology of average delay (sec/veh)*					

The traffic analysis worksheets for year 2015 base conditions are provided in Volume II.

3.4 Year 2035 Base Condition Peak Hour Traffic Volumes

Utilizing the 2035 traffic model projections provided by the City, the future base condition of the traffic volumes along the side streets and driveways was determined for the year 2035. The 2035 base condition peak-hour turn movement volumes are provided in Figures 3.2a – 3.2b for morning and afternoon peak hours, respectively. Mid-day traffic projections are not available for evaluation.

3.5 Year 2035 Base Condition Levels of Service

To analyze future 2035 base conditions, project volumes were processed under the ICU methodology in determining the LOS for each study intersection.

Table 3.2 summarizes the LOS of the study area intersections under this scenario.

Table 3.2 Level of Service Analysis – Year 2035 Base Conditions

Loc. #	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.757	C	0.801	D
2	Brookhurst St and SR-91 EB Ramps	0.758	C	0.841	D
3	Brookhurst Street and Huntington Avenue *	>50 *	F	>50 *	F
4	Brookhurst St and Falmouth Avenue	1.542	F	0.817	D
5	Brookhurst St and La Palma Avenue	0.782	C	0.841	D
*Note: * LOS based on HCM methodology of average delay (sec/veh)*					

The traffic analysis worksheets for future base conditions are provided in Volume II of this report.

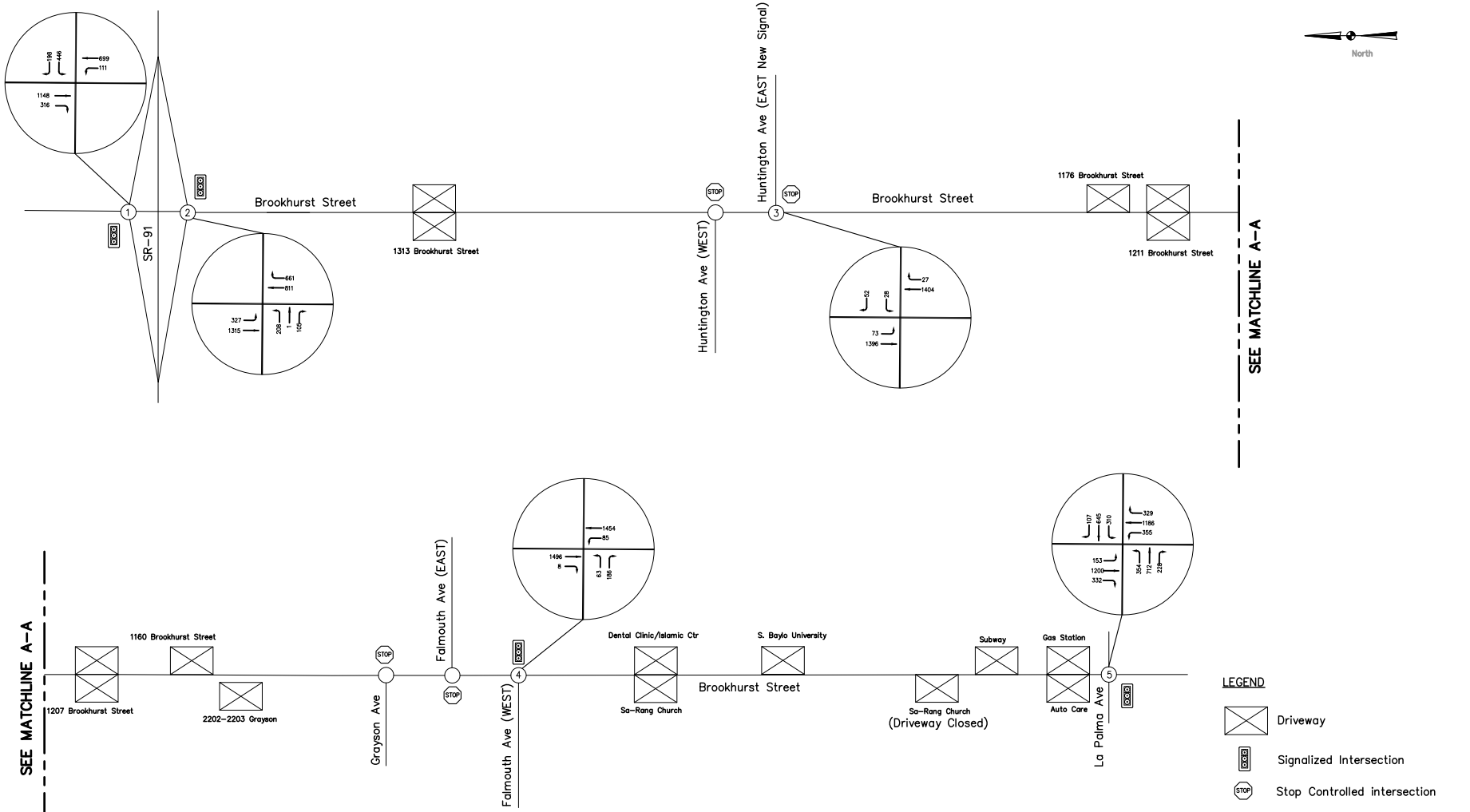

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Figure 3.1(a)

Year 2015 AM Base Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ___	Checked by: ___

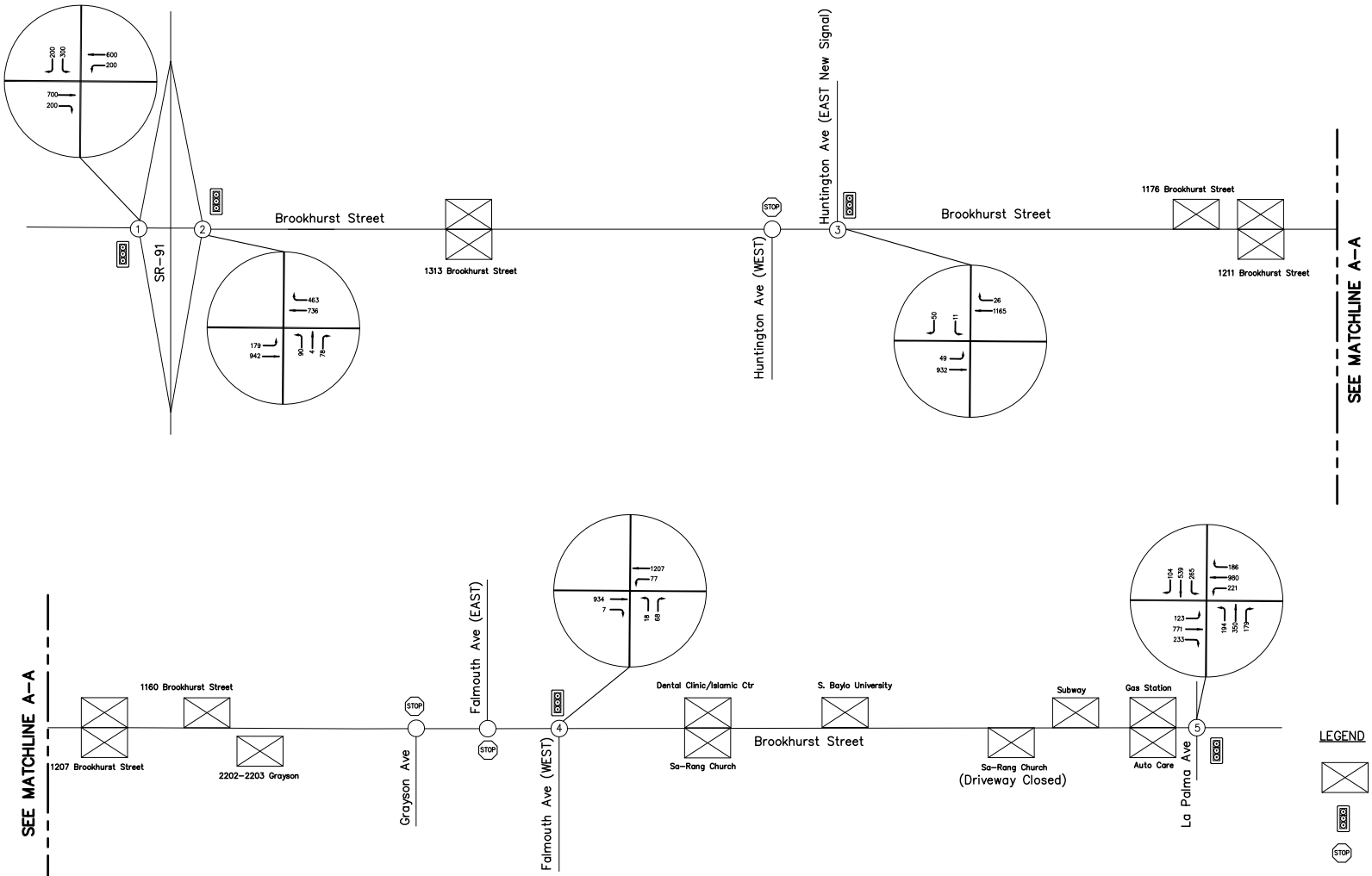

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Figure 3.1(b)

Year 2015 Base MidDay Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ___	Checked by: ___

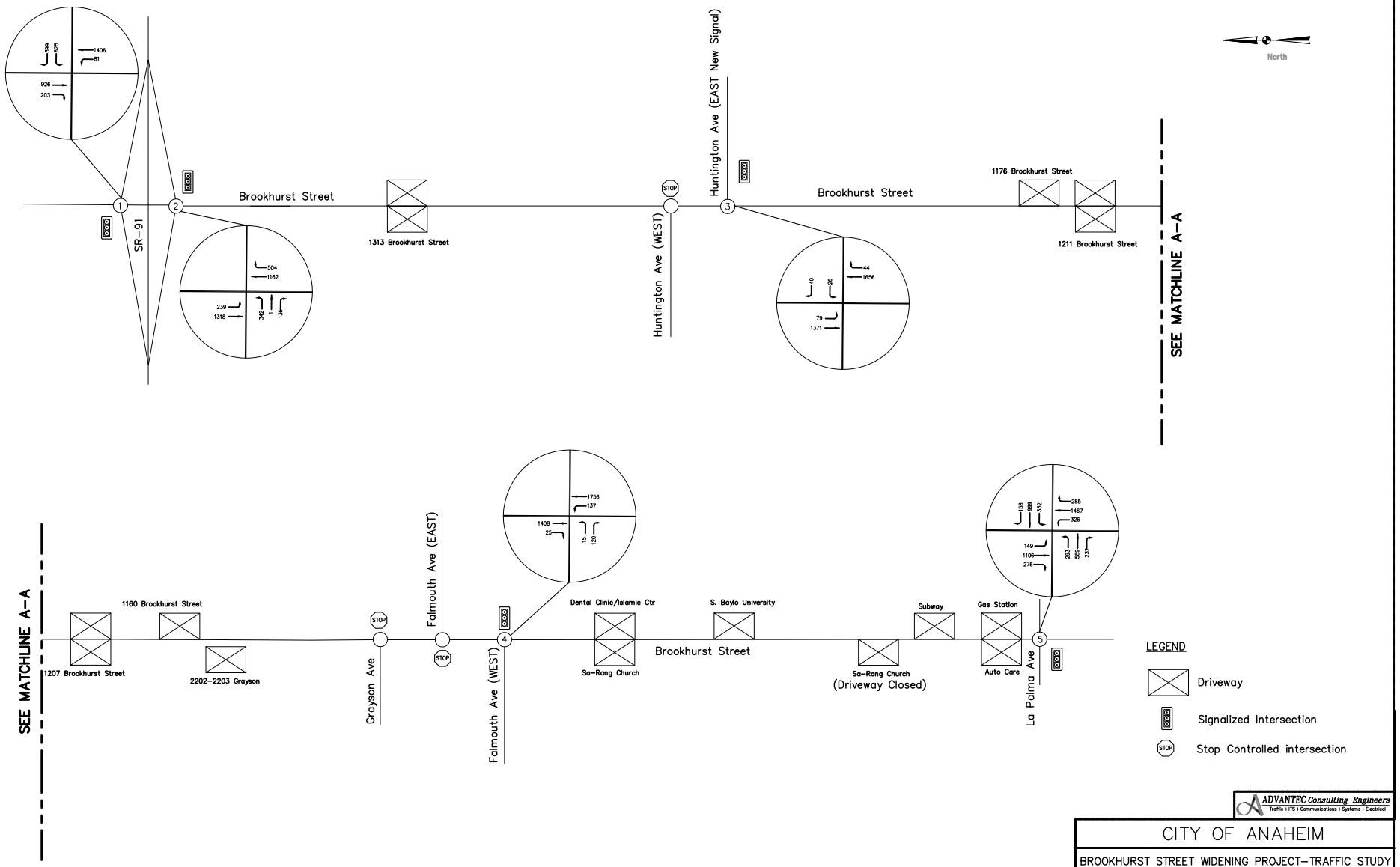

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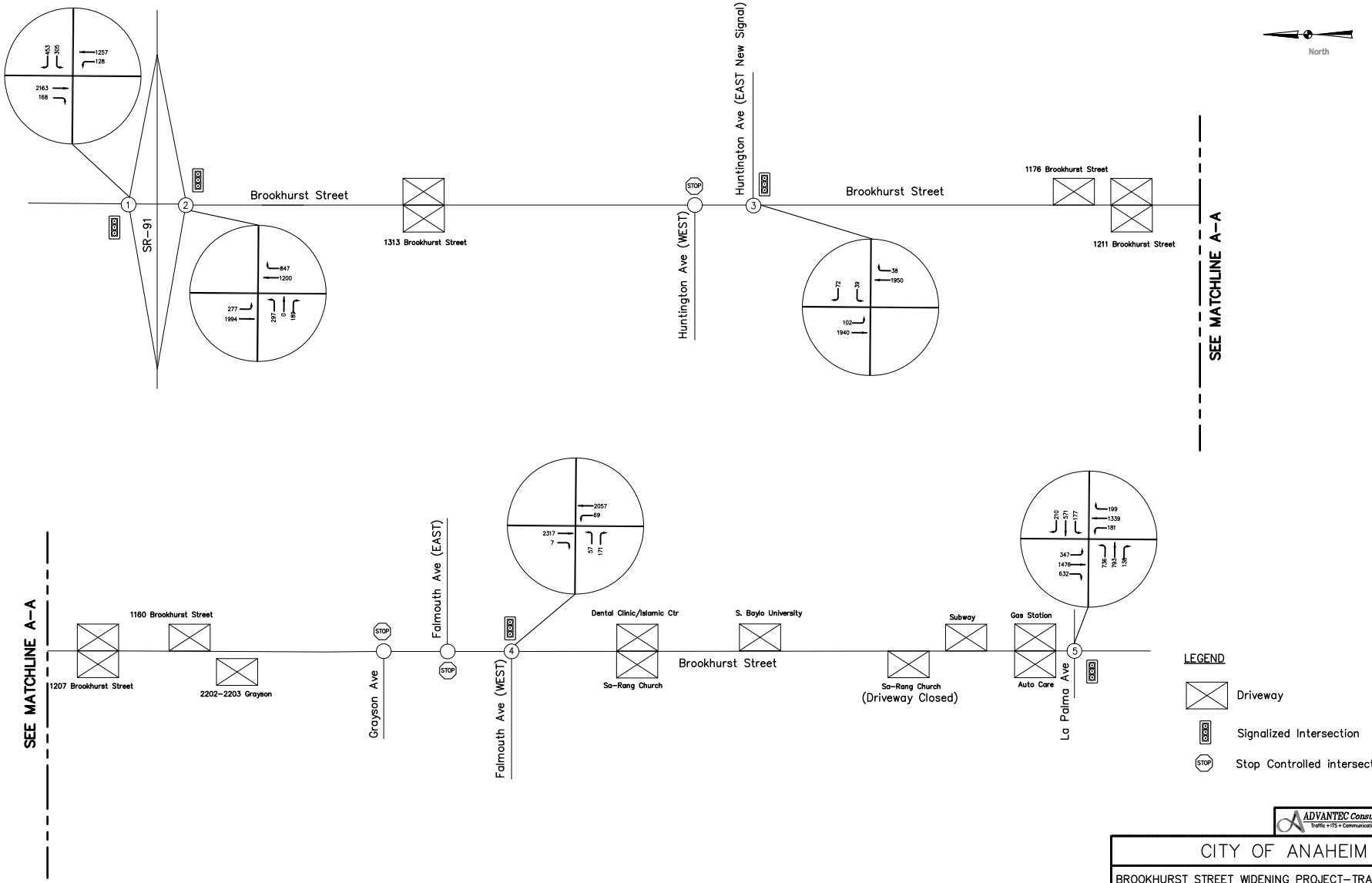
Figure 3.1(c)

Year 2015 Base PM Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ___	Checked by: ___



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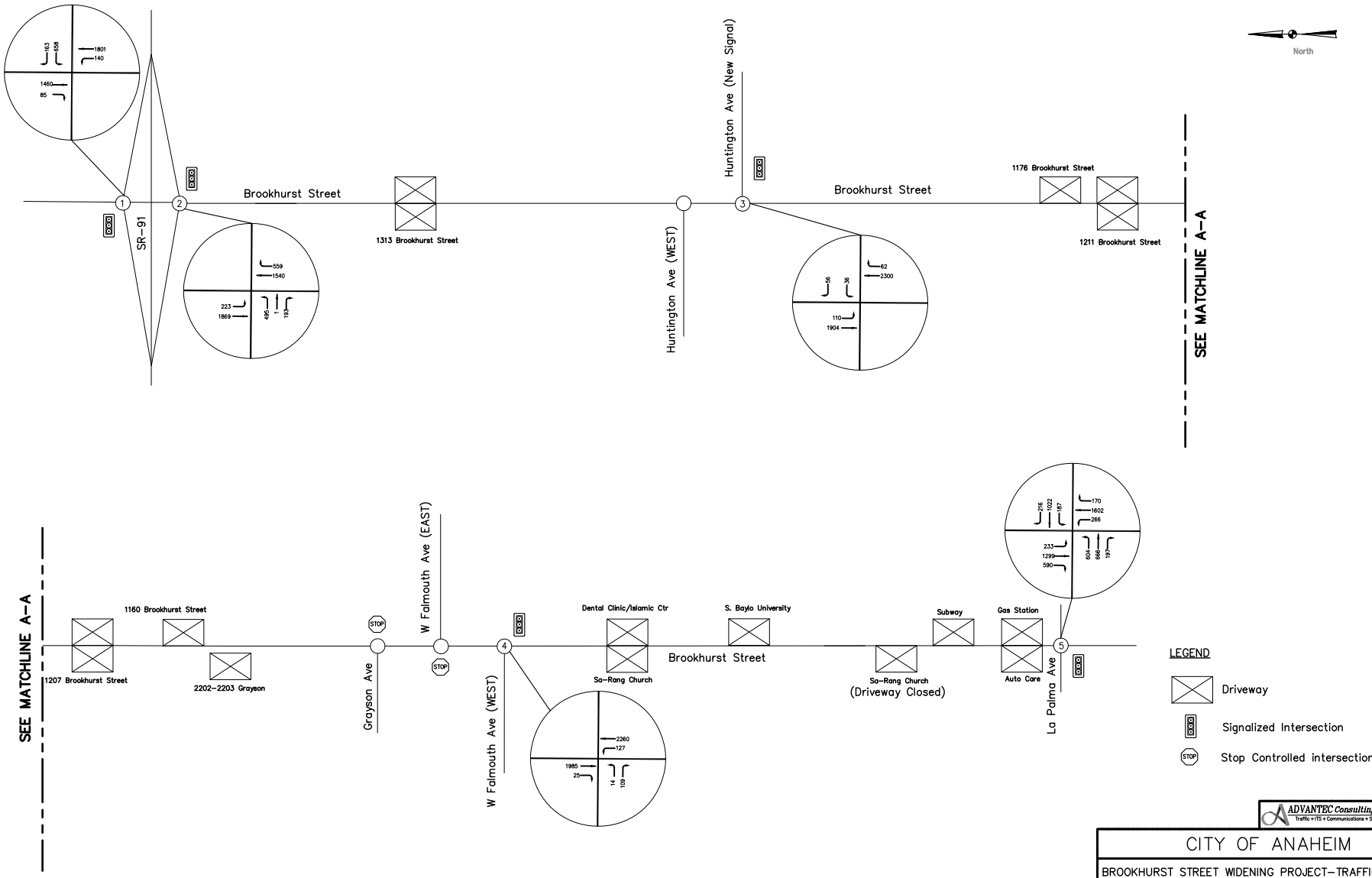
BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.2(a)

Year 2035 Base AM Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ___	Checked by: ___



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.2(b)

Year 2035 Base PM Peak Hour Turning Movements

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ___	Checked by: ___

3.6 Proposed Brookhurst Street Improvements (Project)

The project proposes to widen Brookhurst Street between Interstate 5 and State Route 91 Eastbound Ramps, from two to three lanes in each direction. Raised medians will be constructed along the corridor which will prohibit left-turn movements to and from local side streets and driveways along Brookhurst Street. Left turns will be provided at the Sa-Rang Church north driveway (NB only), the existing Falmouth Avenue signalized intersection and a new signalized intersection with a "combined" Huntington Avenue.

Figures 3.3a and 3.3b depict the proposed east and west alignment alternatives along Brookhurst Street from Interstate 5 to State Route 91 eastbound ramps. The East Alignment shall acquire properties predominantly on the east side of the Brookhurst Street and the West Alignment shall acquire properties predominantly to the west side of Brookhurst Street for the proposed improvements. Both alignments have medians and intersections at exact same locations and therefore neither of the two alignments are identified further for purposes of the traffic analysis.

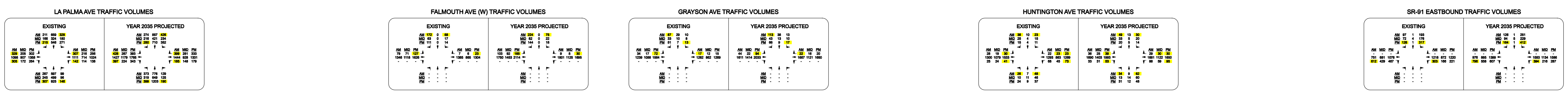
3.7 Traffic Shifts

Traffic patterns will be modified due to the proposed medians along Brookhurst Street. Left-turn movements to and from "closed off" local side streets and driveways will make u-turns at an adjacent signalized intersection.

Figures 3.4a – 3.4b and Figures 3.5a – 3.5b identify the estimated traffic shifts estimated for the AM and PM peak periods for the years 2015 and 2035, respectively. The traffic shift was determined by assuming that due to the proposed median, the existing left-turn movements from the "closed off" local side streets and driveways would be right-turn movements. These vehicles will make u-turns at the next signalized intersection with left-turn pockets. Furthermore, redirected left-turn movements from Brookhurst Street into the "closed off" local side street or driveways will make u-turns at the adjacent signalized intersection with left-turn pockets.

3.8 Future Condition with Project Peak Hour Traffic Volumes

Future with project conditions was derived by adding the estimated traffic shifts calculated above to the future base traffic volumes. Figures 3.6a – 3.6c illustrate the morning, midday, and afternoon peak hour turn movement volumes, respectively, at the study intersections under the year 2015 with project scenario and Figures 3.7a – 3.7b illustrate the morning and afternoon peak hour turning movement for the year 2035 with project scenario. The mid-day peak hour scenario for 2035 was not analyzed.



RIGHT OF WAY ACQUISITION

#	AP#	USE	F/T	P/T	ACQUISITION AREA (S.F.)
1	071-247-21	SFR	X		6,523
2	071-246-22	SFR	X		6,499
3	071-246-21	SFR	X		6,527
4	071-245-04	SFR		X	77
5	071-371-25	SFR		X	109
6	071-371-24	SFR		X	1,009
7	071-371-10	SFR		X	3,515
8	071-371-09	SFR		X	1,297
9	072-415-21	COMMERCIAL		X	1,969
10	072-415-20	SFR	X		6,115
11	072-417-09	SFR	X		6,303
12	072-417-10	SFR	X		6,180
13	072-417-11	SFR	X		6,180
14	072-417-12	SFR	X		6,180
15	072-417-13	SFR	X		6,180
16	072-417-14	SFR	X		6,180
17	072-417-15	SFR	X		6,315
18	072-417-01	SFR		X	4,233
19	072-296-01	SFR	X		8,111
20	072-291-01	SFR	X		6,273
21	072-291-02	SFR	X		6,283
22	072-291-03	SFR	X		6,283
23	072-291-04	SFR	X		6,283
24	072-291-05	SFR	X		6,283
25	072-291-06	SFR	X		6,283
26	072-291-07	SFR	X		6,695
27	072-291-12	SFR		X	983
28	072-291-11	SFR		X	22
29	072-291-14	SFR	X		6,306
30	072-291-13	SFR		X	56
31	072-294-16	SFR		X	214

SUMMARY
- 20 FULL TAKES (113,905 SF / 2.61 Ac)
- 11 PART TAKES (27,563 SF / 0.63 Ac)

REMNANT PARCELS
- 3 WEST SIDE (14,453 SF / 0.33 Ac)
- 17 EAST SIDE (61,635 SF / 1.41 Ac)

LEGEND
- PROPOSED CURB
- PROPOSED STREET RIGHT-OF-WAY
- EXISTING CURB
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY ACQUISITION

DESIGN SPEED = 50 MPH

N

SCALE: 1"= 50'

0 1 2

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES

PREPARED BY:
Kreuzer Consulting Group
320 MAIN STREET
UNIT D
SEAL BEACH, CA 90740
714-656-0160

REVISIONS				
NO.	DATE	DESCRIPTION	ENGR.	APPROV.

SCALE: AS SHOWN DESIGNED BY: EG REVIEWED BY: RK

REGISTERED PROFESSIONAL ENGINEER RICK KREUZER No. 42407 Exp. 3-31-12 CIVIL STATE OF CALIFORNIA

PLAN PREPARED BY:
#42407
R.C.E. No. DATE

CITY OF ANAHEIM CALIFORNIA FOUNDED 1857

CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS
200 SOUTH ANAHEIM BLVD. #276
ANAHEIM, CA 92805
(714) 765-5176
www.anaheim.net

SCALE: 1" = 50' DATE
DRAWN BY
CHECKED BY
APPROVED CITY ENGINEER
APPROVED DESIGN MANAGER

BROOKHURST STREET
LA PALMA AVENUE TO SR-91
EAST ALIGNMENT

CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS

12/13/2011

LA PALMA AVE TRAFFIC VOLUMES

EXISTING	AM	MID	PM
North approach	211 / 659 / 328	166 / 324 / 180	215 / 546 / 271
West approach	329 / 1098 / 305	205 / 907 / 172	302 / 1358 / 264
East approach	307 / 1111 / 142	216 / 714 / 114	256 / 1024 / 138
South approach	287 / 597 / 99	245 / 499 / 96	307 / 925 / 146

YEAR 2035 PROJECTED	AM	MID	PM
North approach	274 / 857 / 426	216 / 421 / 234	280 / 710 / 352
West approach	426 / 1427 / 387	267 / 1179 / 224	393 / 1765 / 343
East approach	399 / 1444 / 185	281 / 928 / 148	333 / 1331 / 179
South approach	373 / 776 / 129	319 / 649 / 125	399 / 1203 / 190

FALMOUTH AVE (W) TRAFFIC VOLUMES

EXISTING	AM	MID	PM
North approach	172 / 0 / 58	63 / 0 / 17	111 / 0 / 14
West approach	79 / 1346 / -	71 / 1118 / -	127 / 1626 / -
East approach	7 / 1385 / -	6 / 865 / -	23 / 1304 / -
South approach	- / - / -	- / - / -	- / - / -

YEAR 2035 PROJECTED	AM	MID	PM
North approach	224 / 0 / 75	82 / 0 / 22	144 / 0 / 18
West approach	103 / 1750 / -	92 / 1453 / -	165 / 2114 / -
East approach	9 / 1801 / -	8 / 1125 / -	30 / 1695 / -
South approach	- / - / -	- / - / -	- / - / -

GRAYSON AVE TRAFFIC VOLUMES

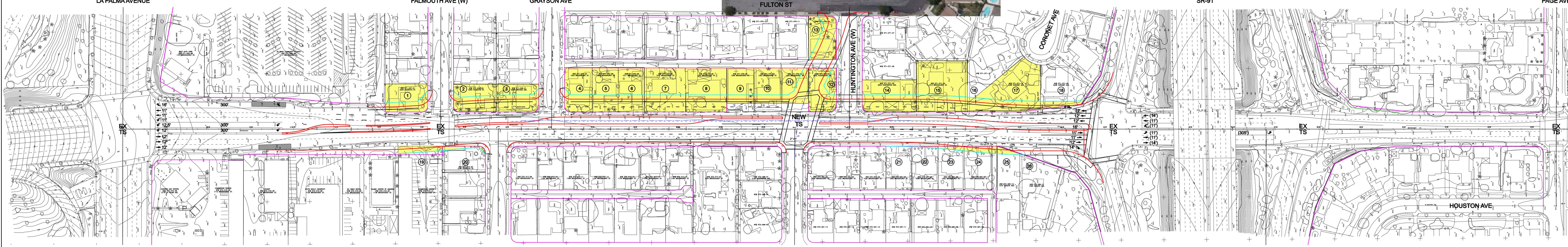
EXISTING	AM	MID	PM
North approach	87 / 29 / 10	33 / 10 / 8	51 / 7 / 13
West approach	34 / 1239 / -	17 / 1086 / -	72 / 1564 / -
East approach	17 / 1282 / -	12 / 862 / -	15 / 1269 / -
South approach	- / - / -	- / - / -	- / - / -

YEAR 2035 PROJECTED	AM	MID	PM
North approach	113 / 36 / 13	43 / 13 / 10	66 / 9 / 17
West approach	44 / 1611 / -	22 / 1414 / -	84 / 2033 / -
East approach	22 / 1667 / -	16 / 1121 / -	20 / 1650 / -
South approach	- / - / -	- / - / -	- / - / -

SR-91 EASTBOUND TRAFFIC VOLUMES

EXISTING	AM	MID	PM
North approach	97 / 1 / 193	72 / 4 / 176	126 / 1 / 317
West approach	- / 751 / 612	- / 681 / 429	- / 1076 / 467
East approach	1218 / 303	872 / 166	1220 / 221
South approach	- / - / -	- / - / -	- / - / -

YEAR 2035 PROJECTED	AM	MID	PM
North approach	126 / 1 / 251	94 / 5 / 229	164 / 1 / 412
West approach	- / 976 / 796	- / 885 / 558	- / 1399 / 607
East approach	1583 / 394	1134 / 216	1586 / 287
South approach	- / - / -	- / - / -	- / - / -



FALMOUTH AVE (E) TRAFFIC VOLUMES

EXISTING	AM	MID	PM
North approach	- / - / -	- / - / -	- / - / -
West approach	- / 1346 / 121	- / 1118 / 52	- / 1626 / 50
East approach	- / 1385 / 43	- / 865 / 8	- / 1304 / 43
South approach	216 / 39 / 39	9 / 13 / 26	7 / 15 / 25

YEAR 2035 PROJECTED	AM	MID	PM
North approach	- / - / -	- / - / -	- / - / -
West approach	- / 1750 / 157	- / 1453 / 68	- / 2114 / 65
East approach	- / 1801 / 56	- / 1125 / 10	- / 1695 / 56
South approach	21 / 51 / 51	12 / 17 / 34	9 / 20 / 33

HUNTINGTON AVE TRAFFIC VOLUMES

EXISTING	AM	MID	PM
North approach	38 / 10 / 23	25 / 4 / 15	15 / 4 / 11
West approach	28 / 1300 / 25	19 / 1079 / 24	30 / 1533 / 41
East approach	22 / 1293 / 68	23 / 863 / 45	23 / 1269 / 73
South approach	26 / 7 / 48	10 / 11 / 46	24 / 9 / 37

YEAR 2035 PROJECTED	AM	MID	PM
North approach	49 / 13 / 30	33 / 5 / 20	20 / 5 / 14
West approach	36 / 1690 / 33	25 / 1403 / 31	39 / 1993 / 53
East approach	29 / 1681 / 88	30 / 1122 / 59	30 / 1650 / 95
South approach	34 / 9 / 62	13 / 14 / 60	31 / 12 / 48

RIGHT OF WAY ACQUISITION

#	AP#	USE	F/T	P/T	ACQUISITION AREA (S.F.)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

#	AP#	USE	F/T	P/T	ACQUISITION AREA (S.F.)
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

SUMMARY
- 16 FULL TAKES
- 10 PART TAKES

REMNANT PARCELS
- 16 WEST SIDE
- 0 EAST SIDE

LEGEND

- PROPOSED CURB
- PROPOSED STREET RIGHT-OF-WAY
- EXISTING CURB
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY ACQUISITION

DESIGN SPEED = 50 MPH

N

SCALE: 1" = 50'

0 1 2

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES

PREPARED BY:
Kreuzer Consulting Group
320 MAIN STREET
UNIT D
SEAL BEACH, CA 90740
714-656-0160

REVISIONS				
NO.	DATE	DESCRIPTION	ENGR.	APPROV.

SCALE: AS SHOWN DESIGNED BY: EG REVIEWED BY: RK

PLAN PREPARED BY:

REGISTERED PROFESSIONAL ENGINEER RICK KREUZER No. 42407 Exp. 3-31-12 CIVIL STATE OF CALIFORNIA

#42407
R.C.E. No. DATE

CITY OF ANAHEIM CALIFORNIA FOUNDED 1857

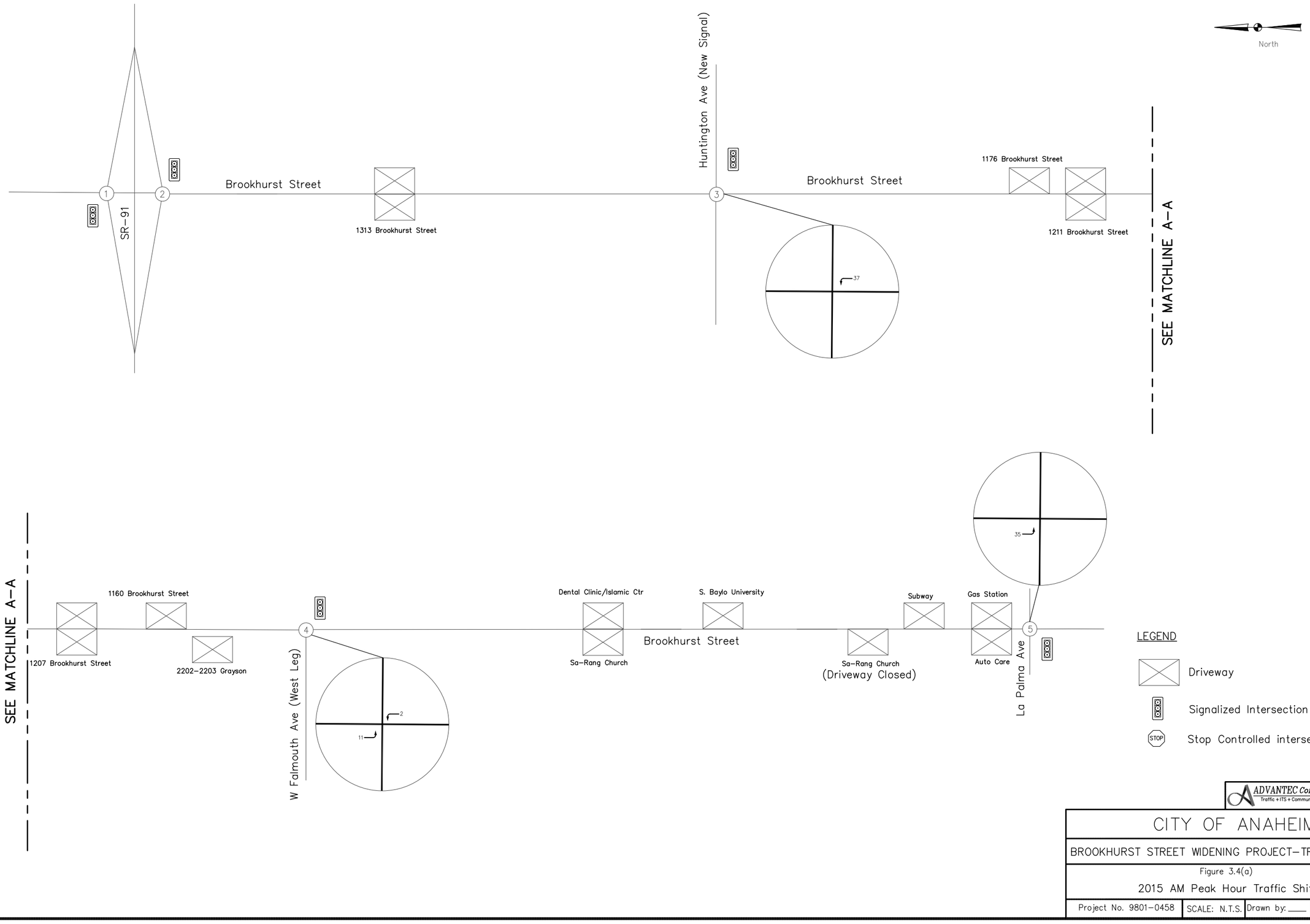
CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS
200 SOUTH ANAHEIM BLVD. #276
ANAHEIM, CA 92805
(714) 765-5176
www.anaheim.net

SCALE: 1" = 50' DATE
DRAWN BY
CHECKED BY
APPROVED CITY ENGINEER
APPROVED DESIGN MANAGER

BROOKHURST STREET
LA PALMA AVENUE TO SR-91
WEST ALIGNMENT

CITY OF ANAHEIM
DEPARTMENT OF PUBLIC WORKS

12/13/2011



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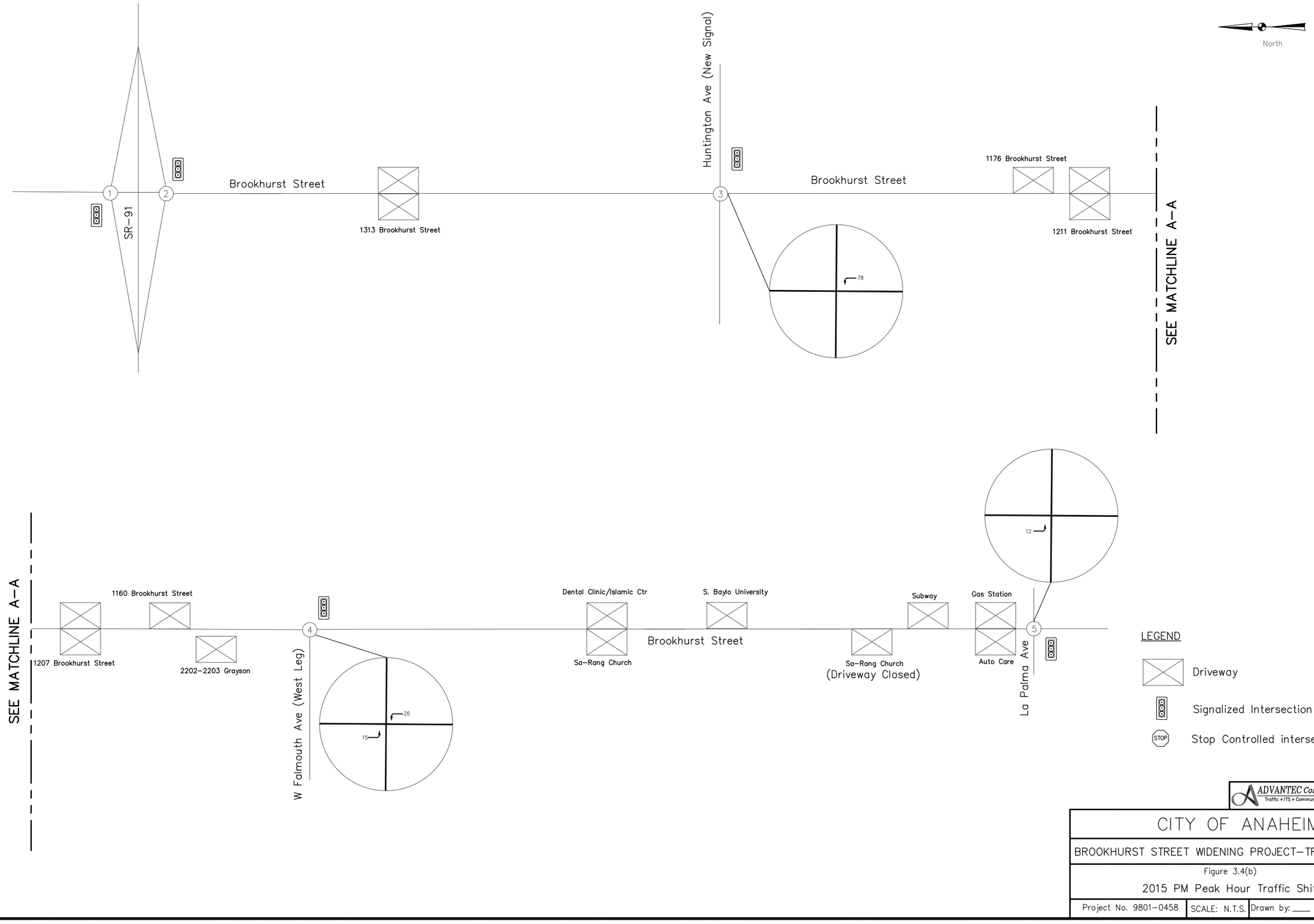
CITY OF ANAHEIM

BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.4(a)

2015 AM Peak Hour Traffic Shift

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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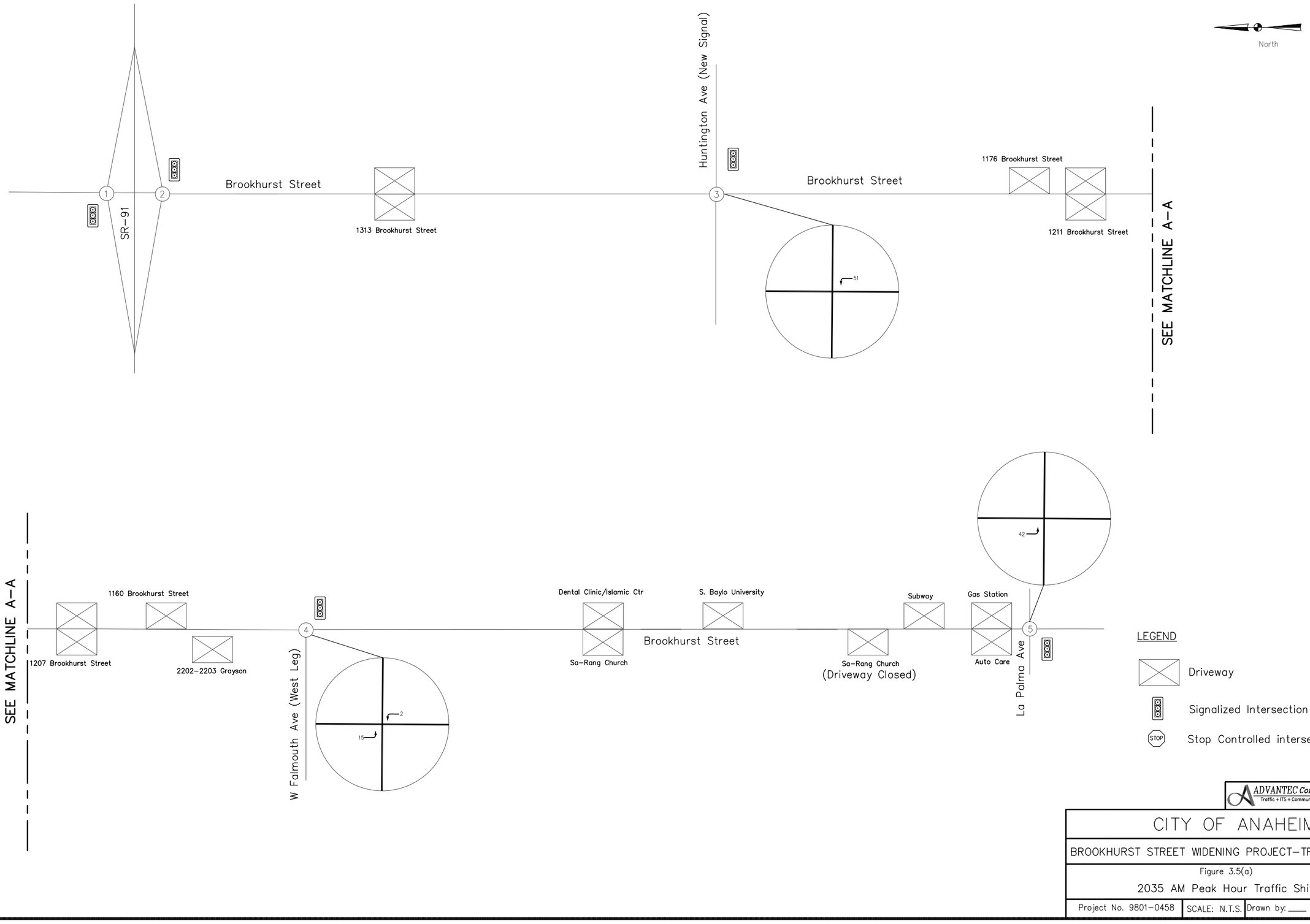
BROOKHURST STREET WIDENING PROJECT—TRAFFIC STUDY

Figure 3.4(b)

2015 PM Peak Hour Traffic Shift

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.5(a)

2035 AM Peak Hour Traffic Shift

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

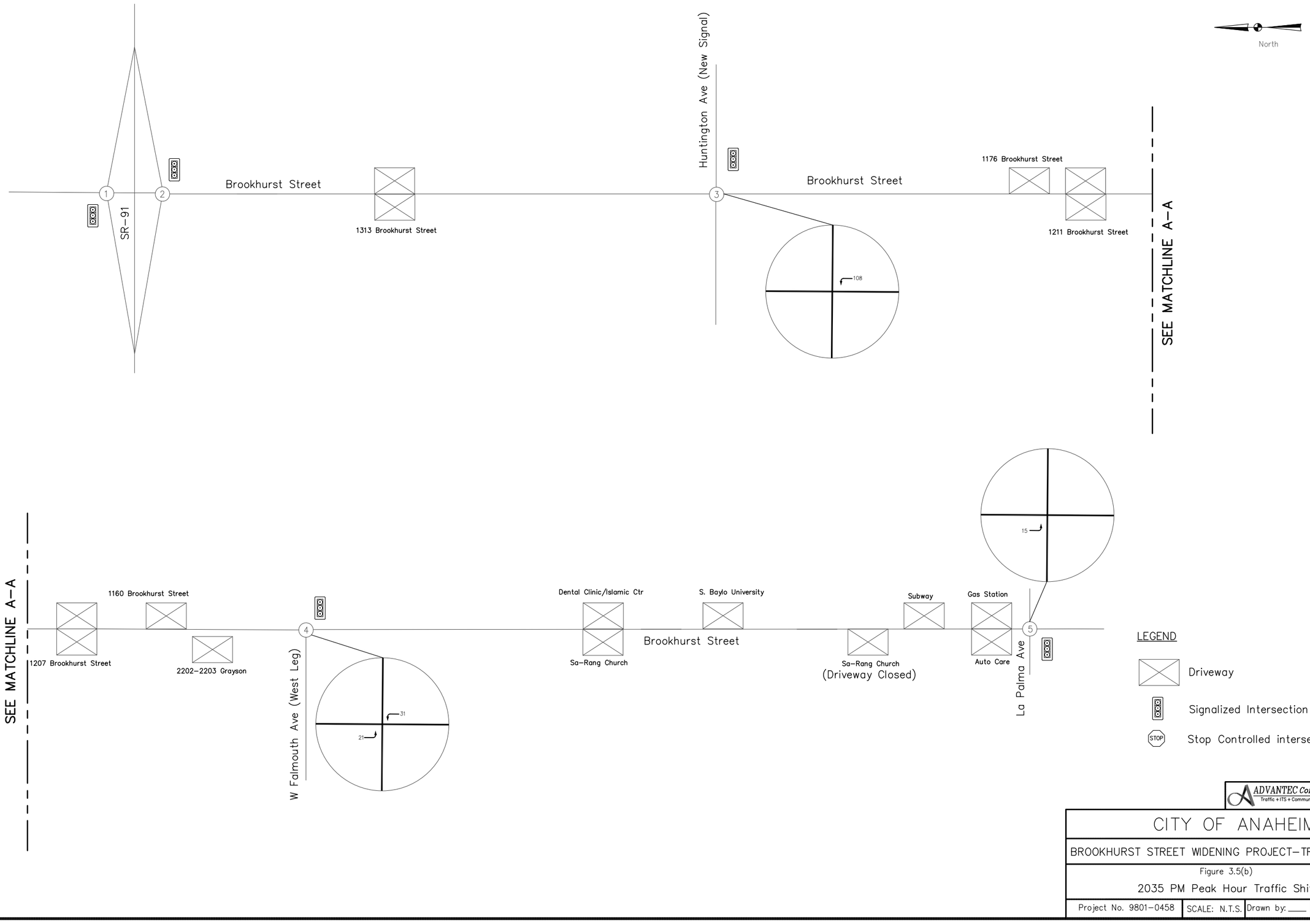

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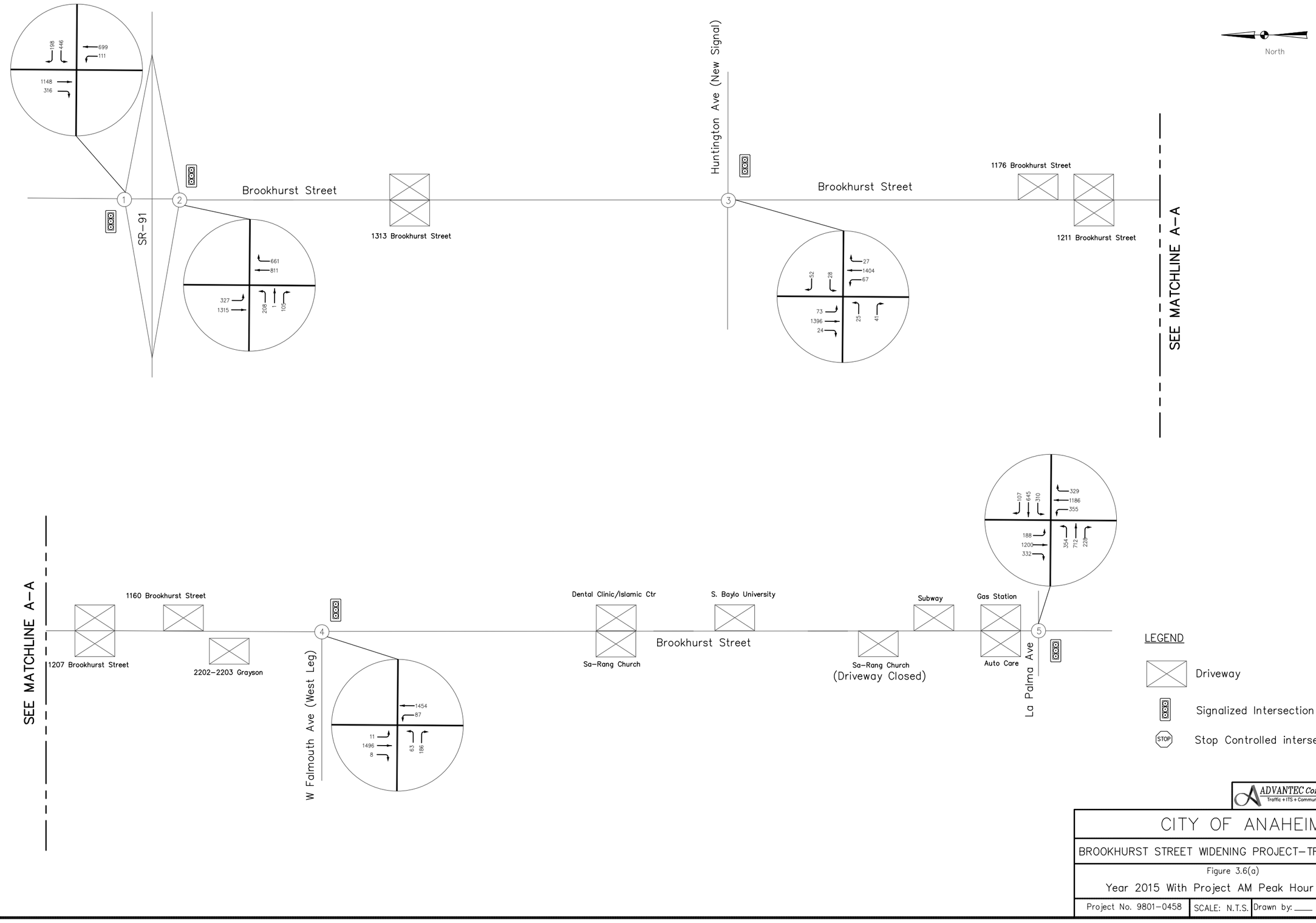
Figure 3.5(b)

2035 PM Peak Hour Traffic Shift

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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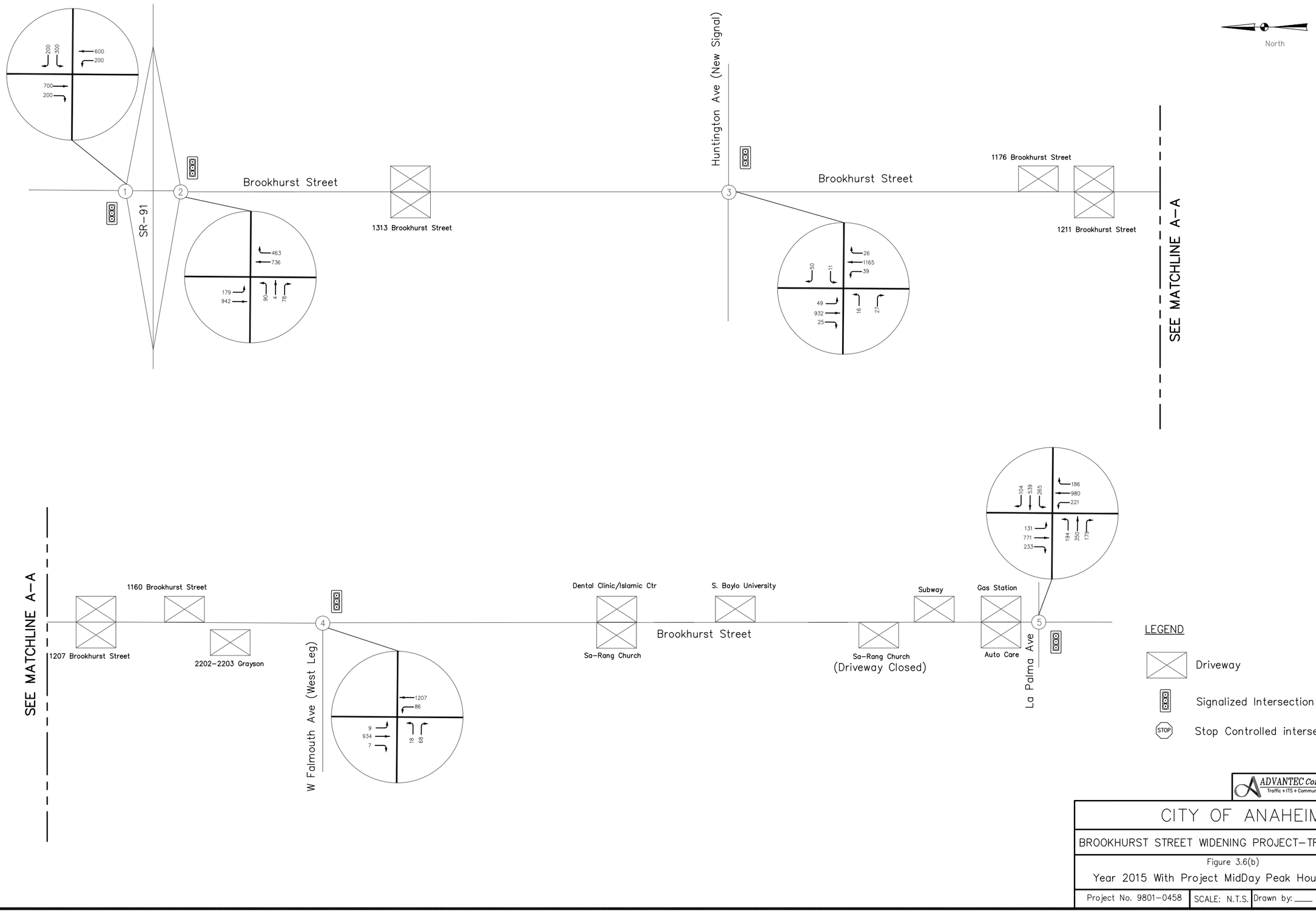
BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.6(a)

Year 2015 With Project AM Peak Hour Volumes

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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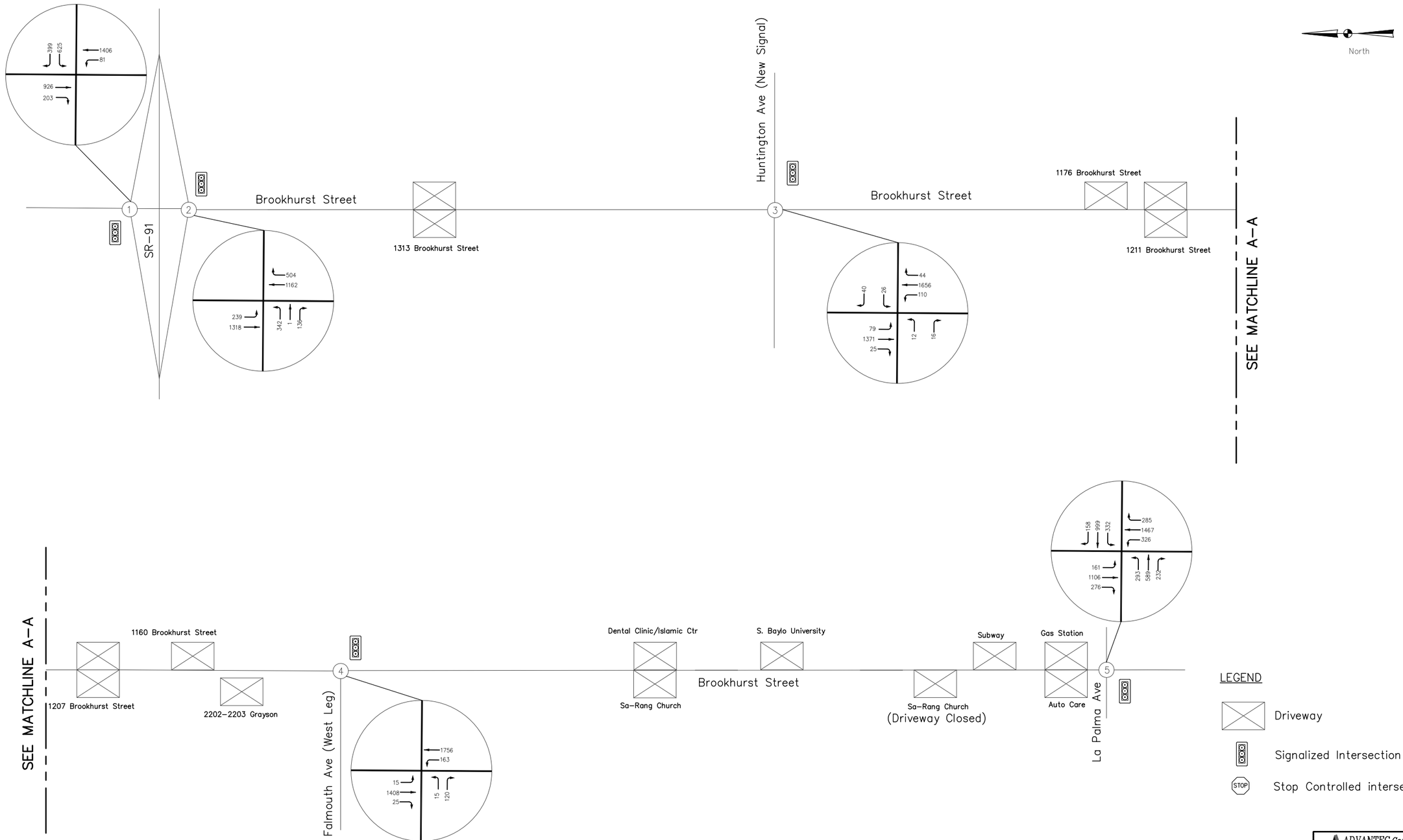
BROOKHURST STREET WIDENING PROJECT—TRAFFIC STUDY

Figure 3.6(b)

Year 2015 With Project MidDay Peak Hour Volumes

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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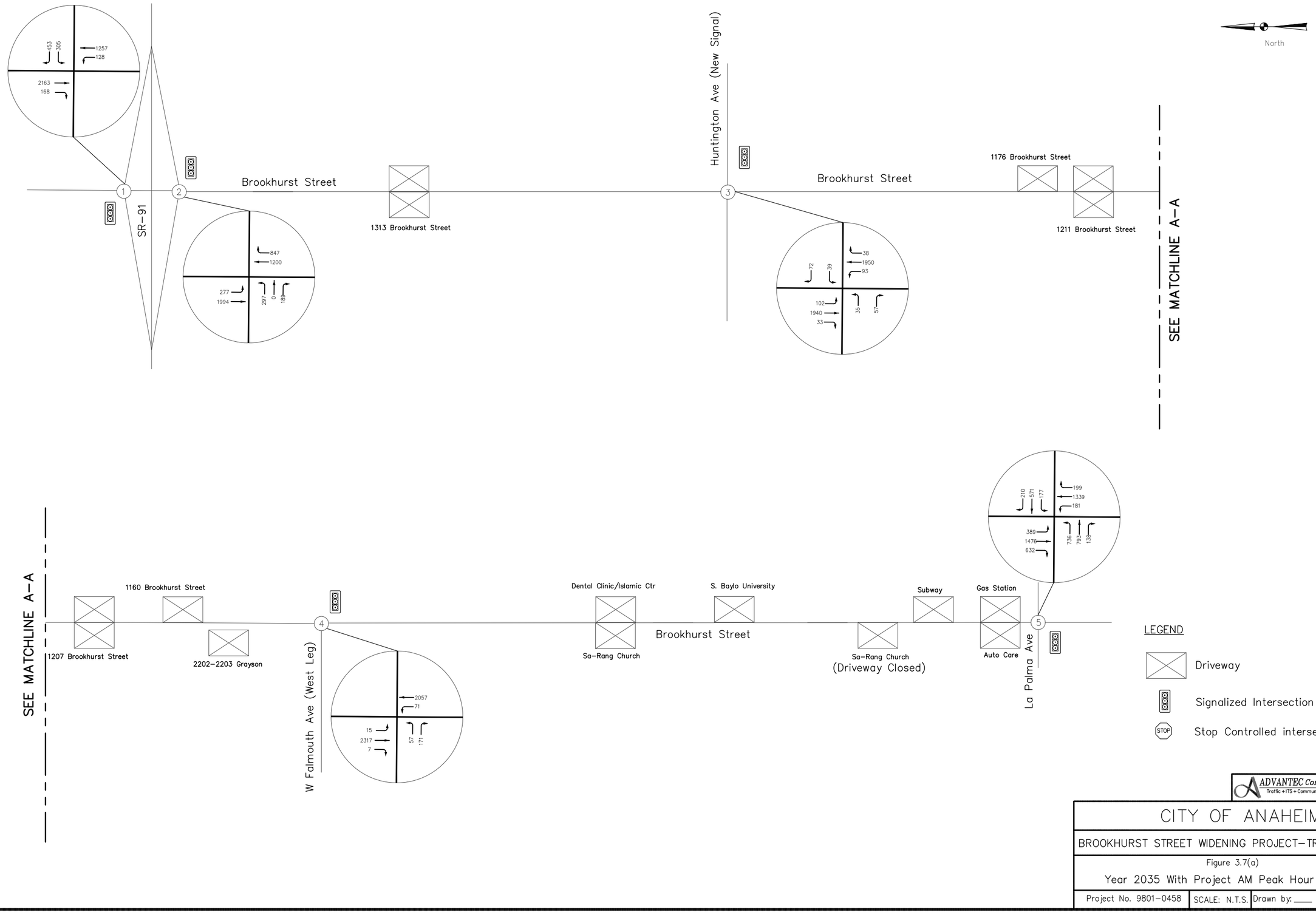
BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.6(c)

Year 2015 With Project PM Peak Hour Volumes

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____



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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.7(a)

Year 2035 With Project AM Peak Hour Volumes

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

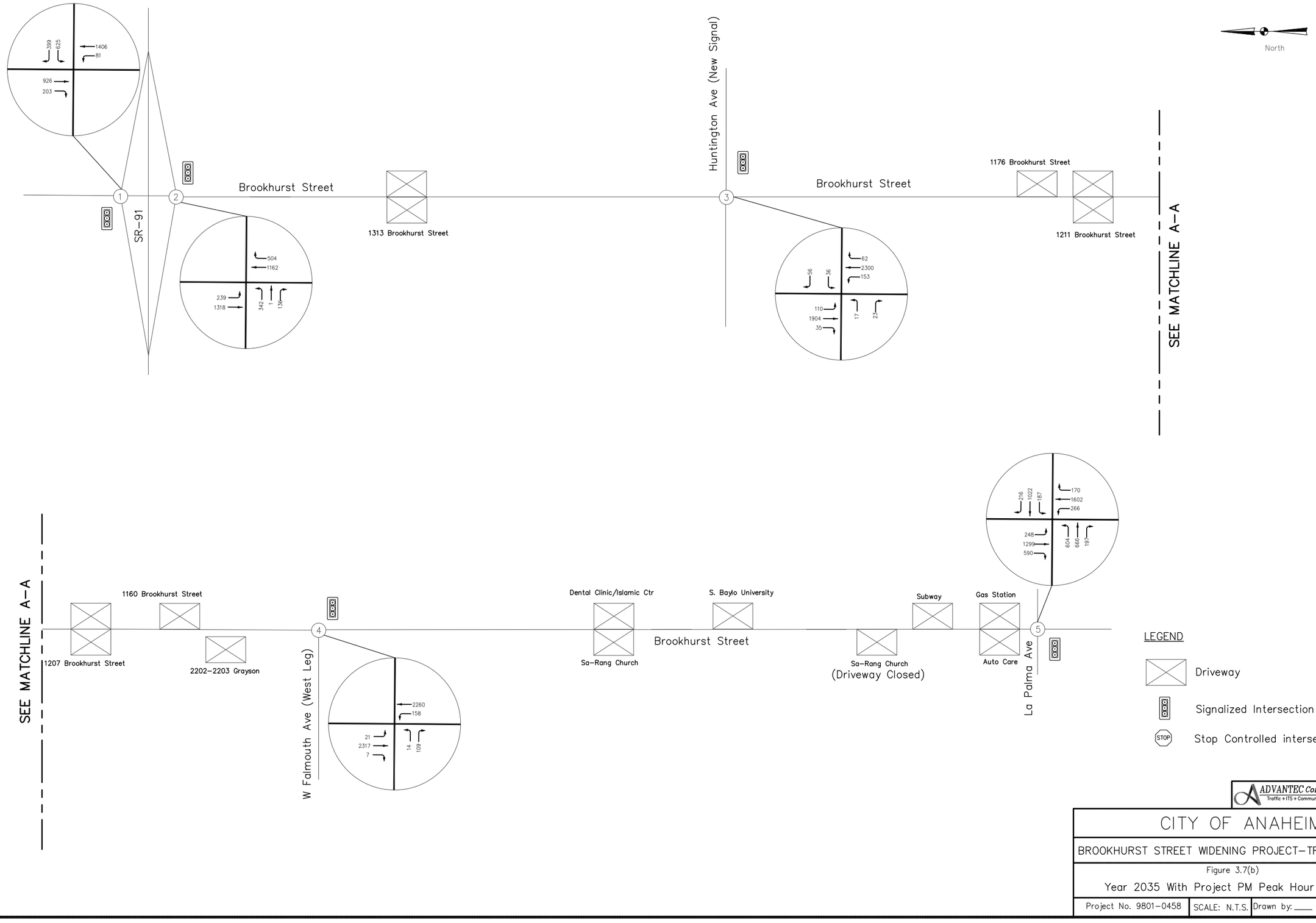

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Figure 3.7(b)

Year 2035 With Project PM Peak Hour Volumes

Project No. 9801-0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

3.9 Existing Year 2011 Condition with Project Levels of Service

In analyzing the existing condition with project, future lane geometries of all study intersections and traffic volumes were processed to determine the level of service of each study intersection. Table 3.3 summarizes the resulting LOS values at the study locations for year 2011 with project conditions. Under this scenario, the study intersections are projected to operate at LOS C or better with the proposed improvements along Brookhurst Street.

Table 3.3 Level of Service Analysis – Existing Year 2011 with Project Conditions

Loc.#	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.528	A	0.659	B
2	Brookhurst St and SR-91 EB Ramps	0.500	A	0.589	A
3	Brookhurst Street and Huntington Avenue	0.398	A	0.432	A
4	Brookhurst St and Falmouth Avenue	0.535	A	0.485	A
5	Brookhurst St and La Palma Avenue	0.617	B	0.662	B

The traffic analysis worksheets for year 2011 with project are provided in Volume II.

3.10 Year 2015 Condition with Project Levels of Service

In analyzing the future condition with project, future lane geometries of all study intersections and year 2015 traffic volumes were processed to determine the level of service of each study intersection. Table 3.4 summarizes the resulting LOS values at the study locations for year 2015 with project conditions Under this scenario, the study intersections are projected to operate at LOS D or better due to the proposed improvements along Brookhurst Street.

Table 3.4 Level of Service Analysis – Year 2015 with Project Conditions

Loc. #	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.567	A	0.709	C
2	Brookhurst St and SR-91 EB Ramps	0.537	A	0.633	B
3	Brookhurst Street and Huntington Avenue	0.443	A	0.480	A
4	Brookhurst St and Falmouth Avenue	0.577	A	0.537	A
5	Brookhurst St and La Palma Avenue	0.667	B	0.717	C

The traffic analysis worksheets for year 2015 with project are provided in Volume II.

3.11 Year 2035 Condition with Project Levels of Service

In analyzing the future condition with project, future lane geometries of all study intersections and future traffic volumes were processed to determine the level of service of each study intersection. Table 3.5 summarizes the resulting LOS values at the study locations for year 2035 with project conditions. Under this scenario, the study intersections are projected to operate at LOS E or better with the proposed widening along Brookhurst Street.

Table 3.5 Level of Service Analysis – Year 2035 with Project Conditions

Loc.#	Intersection	AM Peak Hour		PM Peak Hour	
		V/C or Delay	LOS	V/C or Delay	LOS
1	Brookhurst St and SR-91 WB Ramps	0.757	C	0.687	B
2	Brookhurst St and SR-91 EB Ramps	0.758	C	0.554	A
3	Brookhurst Street and Huntington Avenue	0.571	A	0.641	B
4	Brookhurst St and Falmouth Avenue	0.705	C	0.694	B
5	Brookhurst St and La Palma Avenue	0.788	C	0.839	D

The traffic analysis worksheets for year 2035 with project are provided in Volume II.

3.12 Arterial Segment V/C Analysis

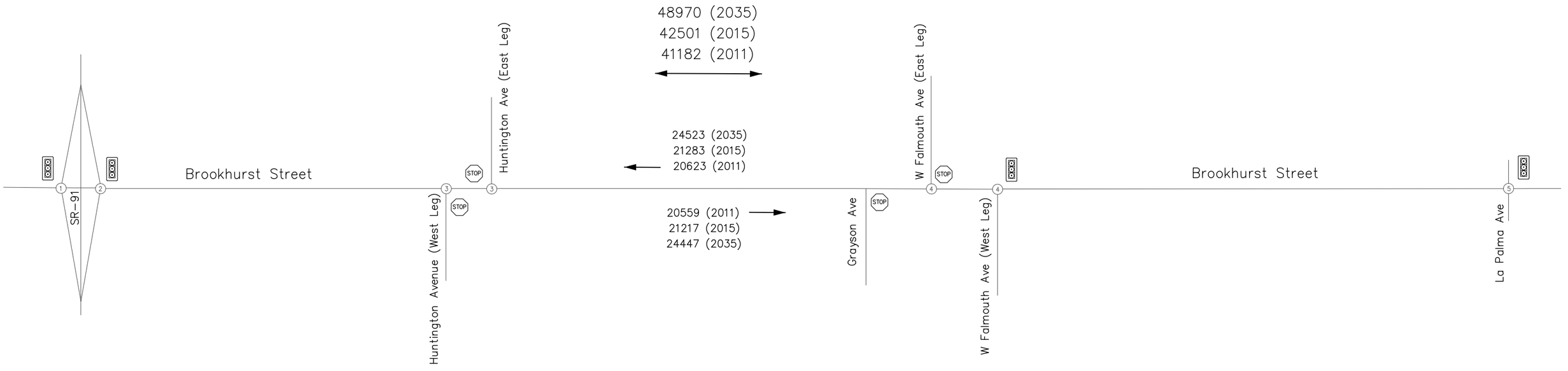
The arterial roadway criteria for the City of Anaheim involves the use of Average Daily Traffic (ADT) V/C ratios. An ADT V/C analysis was conducted on Brookhurst Street between La Palma Avenue and SR-91 WB ramps intersection for each analysis scenario. Year 2009 and year 2035 ADT volumes were provided by the City staff, traffic volumes for existing year 2011 and opening year 2015 were projected using calculated growth between 2009 and 2035. V/C ratios were calculated using a capacity of 37,500 vehicles per day for 4-lane roadways and 56,300 vehicles per day for 6-lane roadways.

Table 3.6 provides a summary of the V/C analysis results. Figure 3.8 presents ADT volumes for each analysis scenario.

Table 3.6 Arterial Segment V/C Summary

Analysis Scenario	Average Daily Traffic (ADT) Volumes	Volumes/ Capacity (V/C)	Level of Service (LOS)
Existing 2011 - no project	40500	1.47	F
Existing 2011 - with project	40500	0.72	C
Opening Year 2015 - no project	42501	1.55	F
Opening Year 2015 - with project	42501	0.75	C
Horizon Year 2035 - no project	48970	1.78	F
Horizon Year 2035 - with project	48970	0.87	D
**note: ADT volumes in both directions*			

Based on the results shown in Table 3.6, the V/C ratios result in LOS F for without project conditions in the years 2011, 2015 and 2035. With the proposed Brookhurst Street widening project, the V/C ratios are improved from LOS F to LOS C in existing year 2011 and opening year 2015, and LOS D in horizon year 2035.



LEGEND

- Existing Signalized Intersection
- Stop Controlled intersection
- XX — Average Daily Traffic (ADT) Volumes – Both Directions (Year)
- XX — Average Daily Traffic (ADT) Volumes – One Direction (Year)

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BROOKHURST STREET WIDENING PROJECT–TRAFFIC STUDY

Figure 3.8

Average Daily Traffic (ADT) Volumes

Project No. 9801–0458	SCALE: N.T.S.	Drawn by: ____	Checked by: ____

4. Conclusions and Recommendations

The following are the conclusions made from the analysis within this report.

- For the future Year 2015 and Year 2035 with project condition scenarios, all five study intersections are projected to operate at acceptable levels of service (LOS D or better) during AM and PM peak hours. The arterial segment V/C analysis projects Brookhurst Street to operate from LOS F to LOS D or better for years 2015 and 2035 with project conditions.

- At the intersection of Brookhurst Street/La Palma Avenue, signal timing was incorporated as part of the mitigation measure for 'with project' scenarios due to an increase in traffic volumes. The intersection was optimized with a different cycle length (120 seconds, compared to 100 seconds in 'no project' condition). Therefore, ICU results were improved in 'with project' scenarios at the intersection.

- Since the proposed median breaks for both east and west alignments are exactly at the same locations, the alignments do not have any difference in LOS or impact on traffic flow.