

DRAFT
HOME DEPOT TRAFFIC IMPACT ANALYSIS

PREPARED FOR:
Home Depot

PREPARED BY:

FEHR PEERS

3850 Vine Street, Suite 140
Riverside, CA 92507
p (951) 274-4800

August 12, 2011

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1. ANALYSIS PARAMETERS	1
PROPOSED PROJECT	1
PROJECT STUDY AREA.....	3
ANALYSIS SCENARIOS.....	3
ANALYSIS METHODOLOGIES	5
TRAVEL DEMAND FORECASTING	6
CUMULATIVE PROJECTS	7
SIGNIFICANCE CRITERIA	7
2. EXISTING CONDITIONS	9
EXISTING ROADWAY FACILITIES	9
EXISTING BUS TRANSIT FACILITIES.....	10
PEDESTRIAN NETWORK	11
TRAFFIC VOLUMES AND LANE CONFIGURATIONS.....	11
EXISTING INTERSECTION OPERATIONS	11
3. PROJECT OPENING YEAR (2013) NO PROJECT TRAFFIC CONDITIONS.....	14
TRAFFIC VOLUMES.....	14
ROADWAY IMPROVEMENTS.....	14
INTERSECTION OPERATIONS	14
4. PROJECT OPENING YEAR (2013) PLUS PROJECT TRAFFIC CONDITIONS	17
TRAFFIC VOLUMES.....	17
ROADWAY IMPROVEMENTS.....	20
INTERSECTION OPERATIONS	20
IMPACT ASSESSMENT	24
QUEUING ASSESSMENT	25
5. PROJECT OPENING YEAR (2013) PLUS PROJECT MITIGATION MEASURES	28
IMPACTS AND MITIGATION MEASURES.....	28
6. FUTURE YEAR BUILDOUT (2030) TRAFFIC CONDITIONS	30

TRAFFIC VOLUMES.....	30
ROADWAY IMPROVEMENTS.....	30
INTERSECTION OPERATIONS.....	30
IMPACT ASSESSMENT	30
QUEUING ASSESSMENT	30
7. CUMULATIVE (2030) PLUS PROJECT MITIGATION MEASURES	37
IMPACTS AND MITIGATION MEASURES.....	37
FAIR SHARE ASSESSMENT	39
8. PROJECT SITE PLAN REVIEW	41
SITE ACCESS AND ON-SITE CIRCULATION	41
PARKING ASSESSMENT	41

APPENDICES

APPENDIX A:	
EXISTING TRAFFIC COUNTS	
APPENDIX B:	
EXISTING LOS RESULTS	
APPENDIX C:	
OPENING YEAR (2013) LOS RESULTS	
APPENDIX D:	
OPENING YEAR (2013) PLUS PROJECT LOS RESULTS	
APPENDIX E:	
OPENING YEAR (2013) PLUS PROJECT WITH MITIGATION LOS RESULTS	
APPENDIX F:	
CUMULATIVE BASE (2030) LOS RESULTS	
APPENDIX G:	
CUMULATIVE (2030) PLUS PROJECT LOS RESULTS	
APPENDIX H:	
CUMULATIVE (2030) PLUS PROJECT WITH MITIGATION LOS RESULTS	
APPENDIX I:	
CUMULATIVE PROJECTS LIST	
APPENDIX J:	
CITY OF SAN BERNARDINO REFERENCE DOCUMENTS	
APPENDIX K:	
COUNTY OF SAN BERNARDINO CMP ANALYSIS – LOS RESULTS	
APPENDIX L:	
CALTRANS FREEWAY RAMPS QUEUING ANALYSIS RESULTS	

LIST OF FIGURES

Figure I – Potential Mitigation Measures.....	ii
Figure 1 – Project Site Plan	2
Figure 2 - Project Study Area and Intersections	4
Figure 3 – Map of Pending and Approved Projects	8
Figure 4 – Existing Lane Configurations and Traffic Volumes.....	12
Figure 5 – 2013 No Project Volumes and Lane Configurations.....	15
Figure 6 – Project Trip Distribution	19
Figure 7 – Project Trip Assignment.....	21
Figure 8 – Pass By Trip Assignment.....	22
Figure 9 – Opening Year plus Project Condition Volumes and Lane Configurations.....	23
Figure 10 – Future Buildout Year (2030) No Project Condition Volumes and Lane Configurations.....	32
Figure 11 – Future Buildout Year (2030) With Project Condition Volumes and Lane Configurations.....	33

LIST OF TABLES

TABLE 1 - INTERSECTION LOS CRITERIA.....	5
TABLE 2 - SIGNIFICANCE CRITERIA.....	7
TABLE 3 - INTERSECTION LEVELS OF SERVICE: EXISTING CONDITIONS	13
TABLE 4 - INTERSECTION LEVELS OF SERVICE: OPENING YEAR (2013) NO PROJECT.....	16
TABLE 5 –PROJECT TRIP GENERATION.....	1
TABLE 6 - INTERSECTION LEVELS OF SERVICE: OPENING YEAR (2013) PLUS PROJECT.....	20
TABLE 7 - IMPACTS FOR SIGNALIZED INTERSECTIONS: OPENING YEAR (2013) PLUS PROJECT.....	24
TABLE 9 - CALTRANS QUEUING ANALYSIS: OPENING YEAR (2013) PLUS PROJECT	26
TABLE 10 - INTERSECTION LEVELS OF SERVICE: FUTURE BUILDOUT (2030) NO PROJECT	31
TABLE 11 - INTERSECTION LEVELS OF SERVICE: FUTURE BUILDOUT (2030) WITH PROJECT	34
TABLE 12 - IMPACTS FOR SIGNALIZED INTERSECTIONS: FUTURE BUILDOUT (2030) PLUS PROJECT	35
TABLE 13 - CALTRANS QUEUING ANALYSIS: FUTURE BUILDOUT (2030) PLUS PROJECT	36
TABLE 14 – TRAFFIC IMPACT FEES	39

TABLE 15 – FAIR SHARE ASSESSMENT	40
TABLE 16 - PARKING ASSESSMENT.....	41

EXECUTIVE SUMMARY

Fehr & Peers has completed an assessment for the proposed Home Depot shopping center in the City of San Bernardino, California. The Home Depot shopping center project is bounded by Highland Avenue to the north, State Route 210 (SR-210) to the northeast, 20th Street to the south, Arden Avenue to the east, and Guthrie Street to the west. The project site is currently vacant but used to contain 296 multi-family dwelling units. The project will consist of a Home Depot store, retail shops, a bank, a fast-food restaurant, and a gas station.

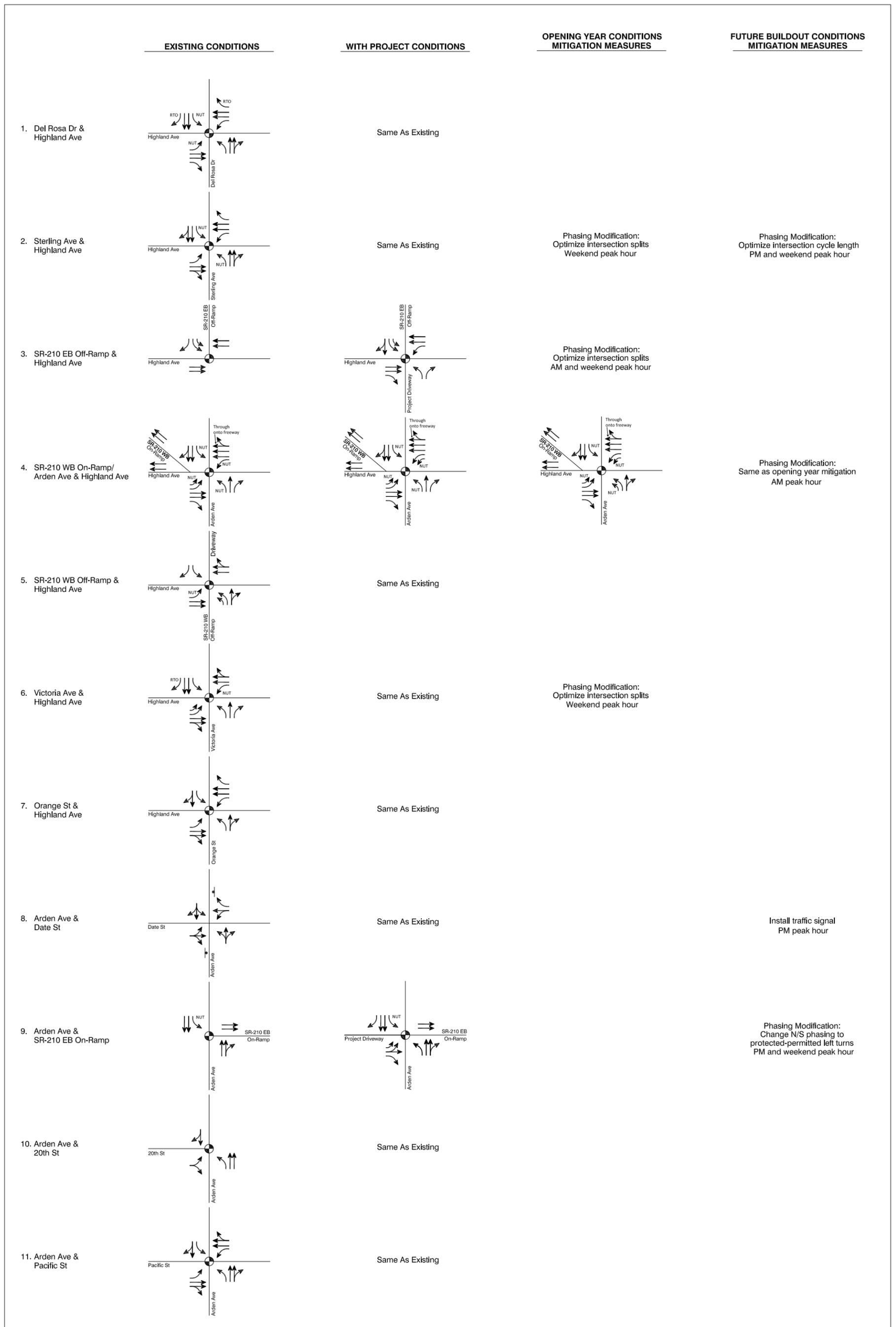
The project includes modification of three Caltrans-controlled intersections to provide primary access to the project site.

As part of Fehr & Peers' assessment, the following scenarios were evaluated:

- Existing Conditions (2011) – Consists of existing counts collected in the study area.
- Opening Year (2013) Conditions – Applies an ambient growth rate of 3% per year to existing traffic volumes. This assessment provides an estimate of traffic conditions in the project's proposed opening year of 2013.
- Opening Year (2013) Plus Project Conditions – Applies traffic generated from the proposed project to Opening Year (2013) volumes.
- Future Buildout No Project (2030) Conditions – Applies an ambient growth of 3% per year to existing traffic volumes in addition to traffic generated from pending and approved projects in the vicinity of the proposed project.
- Future Buildout (2030) plus Project Conditions – Applies traffic generated from the proposed project to Cumulative Base (2030) traffic volumes.

Significant impacts were identified and measures to mitigate impacts were recommended. These recommendations are summarized on Figure I.

Site access, on-site circulation, and parking were also reviewed and minor recommendations were made.



1. ANALYSIS PARAMETERS

This chapter outlines the geographic scope of the traffic impact analysis, including study intersections and roadways, and analysis methodologies and significance criteria employed in this study.

PROPOSED PROJECT

Project Description

The proposed project is located at the southwest corner of Arden Avenue & Highland Avenue in the City of San Bernardino. The State Route 210 (SR-210) freeway overpass runs diagonally adjacent to the project site, with two freeway ramps that provide direct access to the project site. South of the project are Col. Joseph C. Rodriguez Prep Academy and Emmerton Elementary School. Also immediately to the south is a large soccer complex, which frequently hosts tournaments on the weekends. Directly east of the project is a large apartment complex.

Although the site is currently vacant, it previously contained multi-family dwelling units. The proposed project is a shopping center anchored by a Home Depot store, retail shops, a gas station, a bank, and a fast food restaurant. The project will include approximately 214,000 square feet of leasable space. The project is expected to open in June 2013.

Parking

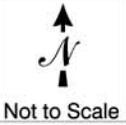
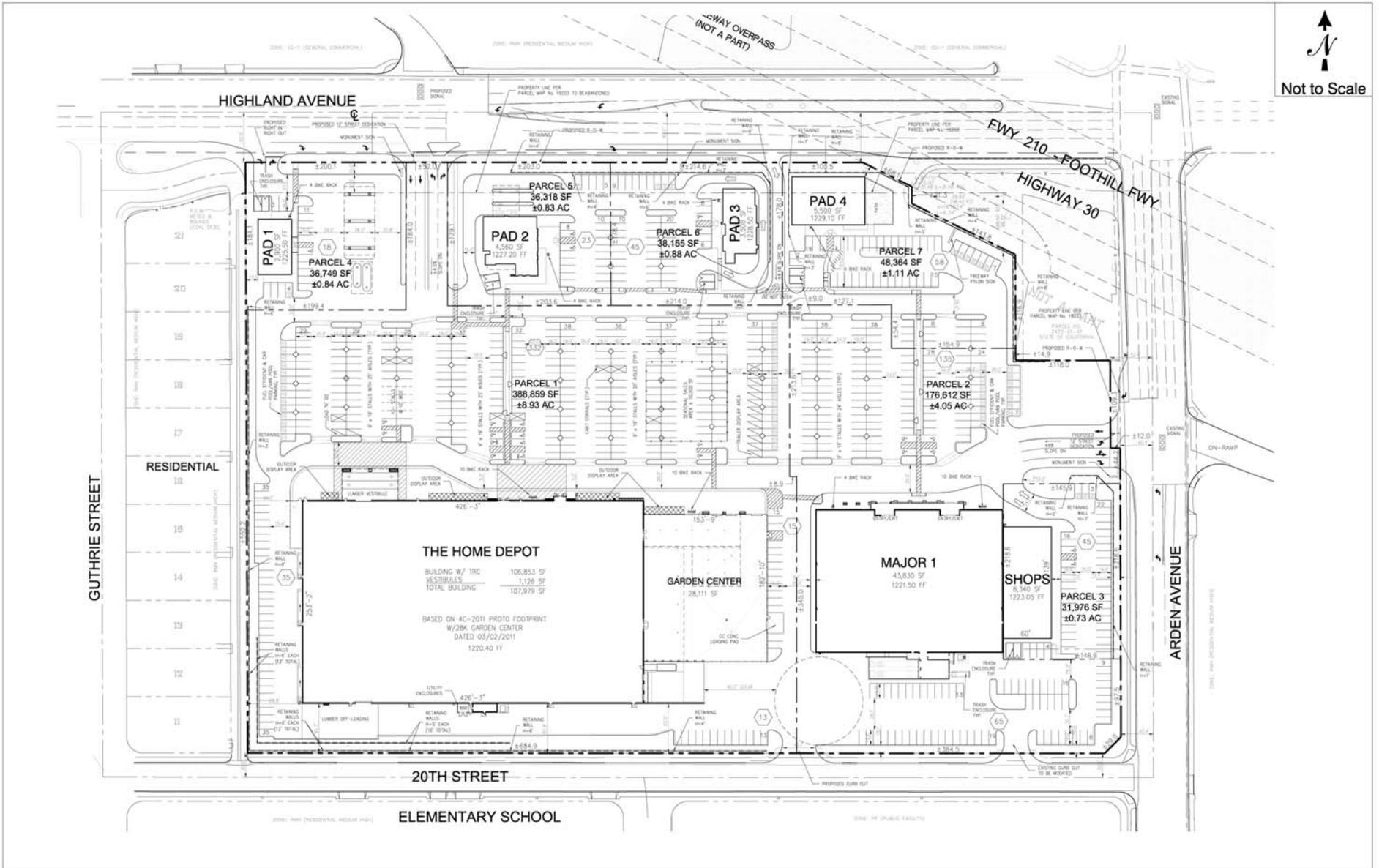
The project proposes to provide approximately 795 parking spaces for the site. The parking area will have landscaping covering approximately 15 percent of the ground area.

Access

There are six access points for the proposed Home Depot shopping center, as described below:

- Highland Avenue access – Three access points in total:
 - The western access is right-turn only for both inbound and outbound vehicles.
 - There is a full access driveway located opposite the SR-210 eastbound freeway off-ramp. The northbound approach of this intersection is designed to prohibit vehicles from entering the off-ramp.
 - The eastern access is a right-turn only ingress driveway between Pad 3 and Pad 4.
- Arden Avenue access – There is a full access driveway on Arden Avenue, forming the fourth leg of the Arden Avenue/SR-210 eastbound freeway on-ramp.
- 20th Street access - Two driveways provide passenger vehicle access to 20th Street.

In addition, the site plan shows pedestrian sidewalks on Highland Avenue, Arden Avenue, and 20th Street around the project site. There are no designated bicycle facilities in the study area.



PROJECT STUDY AREA

Eleven study intersections were selected for evaluation in this study in collaboration with City staff, as documented in the Project Scoping Form attached to this document. The study intersections are identified below and shown on Figure 2.

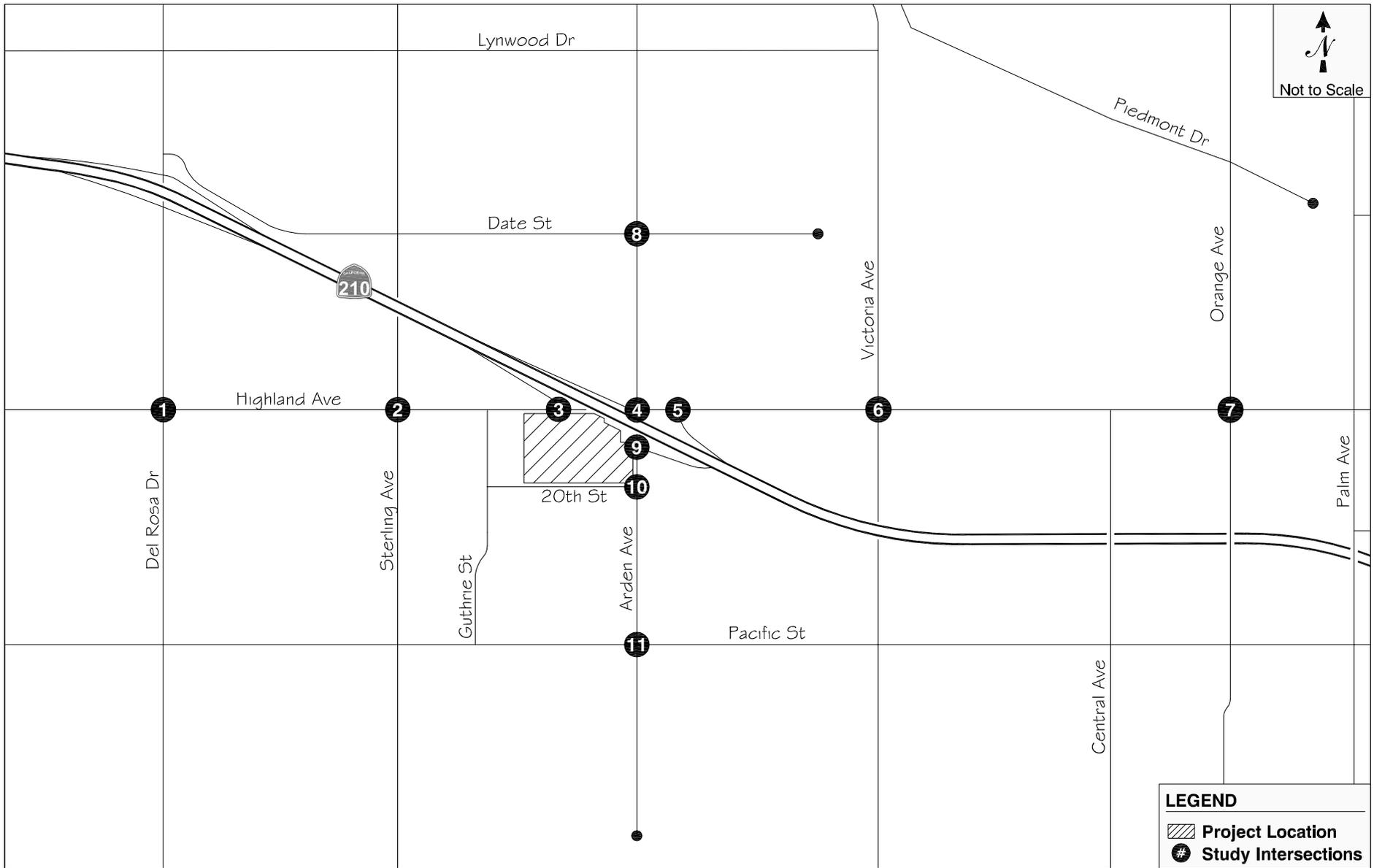
1. Del Rosa Drive & Highland Avenue
2. Sterling Avenue & Highland Avenue
3. SR-210 Eastbound Off-Ramp & Highland Avenue
4. Arden Avenue & Highland Avenue (including the westbound SR-210 on-ramp)
5. SR-210 Westbound Off-Ramp & Highland Avenue
6. Victoria Avenue & Highland Avenue
7. Orange Avenue & Highland Avenue
8. Arden Avenue & Date Street
9. Arden Avenue & SR-210 Eastbound On-Ramp
10. Arden Avenue & 20th Street
11. Arden Avenue & Pacific Street

ANALYSIS SCENARIOS

To identify significant project impacts, Fehr & Peers evaluated the following scenarios as part of the proposed project consistent with the City of San Bernardino Traffic Impact Analysis Guidelines and the requirements set forth in the San Bernardino County Congestion Management Program (CMP):

- Existing Conditions – Consists of existing (April and July 2011) counts collected at the study intersection locations. Existing counts were conducted on Tuesday, April 26, 2011 from 7:00 to 9:00 AM for the morning peak hour, 4:00 to 6:00 PM for the evening peak hour, and on Saturday, July 23, 2011 from 12:00 to 2:00 PM for the weekend peak hour.
- Project Opening Year (2013) Base Conditions – Consists of the Existing Conditions traffic volumes plus an annual growth factor of three percent per year over the two-year period between the existing counts and the project opening year.
- Project Opening Year (2013) plus Project Conditions – Consists of Project Opening Year (2013) Base Conditions plus traffic generated from the proposed project.
- Future Build-Out Year (2030) Base Conditions – Consists of Existing Conditions traffic volumes plus a three percent per year growth factor plus traffic generated from approved and pending projects in the proposed project's vicinity.
- Future Build-Out Year (2030) plus Project Conditions – Consists of Future Build-Out Year (2030) Base Conditions plus traffic generated from the proposed project.

The scenarios described above were evaluated during the weekday morning, weekday evening, and weekend mid-day peak hours. Appendix A provides the intersection counts sheets for all analyzed intersections.



ANALYSIS METHODOLOGIES

Fehr & Peers' analysis of intersections employs a methodology based on empirical research conducted by the Transportation Research Board and other authorities. Signalized and unsignalized intersection operations were evaluated using methodologies provided in *Highway Capacity Manual* (HCM 2000) (Transportation Research Board), are considered the state-of-the-practice methodologies for evaluating intersection operations, and are consistent with the City of San Bernardino and CMP analysis requirements.

The HCM 2000 methodology for signalized and all-way stop-controlled intersections estimates the average control delay for the vehicle at the intersection. For side-street stop-controlled intersections, the methodology estimates the control delays for each turning movement and identifies the delay for the longest delayed approach (if there is a shared lane, delay is averaged for all turning movements from that lane). After the quantitative delay estimates are complete, the methodology assigns a qualitative letter grade that represents the operations of the intersection. These grades range from level of service (LOS) A (minimal delay) to LOS F (excessive congestion). LOS E represents at-capacity operations. Descriptions of the LOS letter grades for signalized and unsignalized intersections are provided in Table 1.

TABLE 1 - INTERSECTION LOS CRITERIA				
Level of Service	Description	Signalized Delay (Seconds)	Unsignalized Delay (Seconds)	Volume-to-Capacity (V/C) Ratio
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤ 15.0	≤ 10.0	0.000-0.600
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 15.0 to 25.0	>10.0 to 15.0	0.601-0.700
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 25.0 to 35.0	>15.0 to 25.0	0.701-0.800
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	>25.0 to 35.0	0.801-0.900
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0	>35.0 to 50.0	0.901-1.000
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0	>50.0	Greater than 1.000

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

For all of the signalized and unsignalized intersections, Synchro software version 6.14 was used to calculate delays and associated levels of service.

Per the County CMP requirements, the following assumptions were included in the level of service assessment:

- 2% heavy vehicles at the study intersections
- Existing and Opening Year peak hour factor (PHF) was based on the counts collected

- Future Build-Out Year PHF is 0.95
- Existing and Opening Year saturation flow rates assumed to be:
 - 1800 for exclusive through and exclusive right
 - 1700 for exclusive left
 - 1600 for dual lefts
- Future Build-Out Year saturation flow rates assumed to be:
 - 1900 for exclusive through and exclusive right
 - 1800 for exclusive left
 - 1700 for dual lefts
- Existing signal timings based on timing data received from City staff and Caltrans
- For Future Build-Out Year, timing splits were optimized and a maximum cycle length of 130 seconds was utilized

TRAVEL DEMAND FORECASTING

The San Bernardino Traffic Study guidelines contain the following language:

Use of the City's East Valley Travel Forecast Model or other approved model may be required to determine the future traffic volumes and growth. In the absence of traffic model information, the future build-out year base traffic volumes shall be estimated using an annual growth factor of 3 percent per year, unless a different rate can be justified and is approved and/or required by the City Engineer.

The use of a locally valid Travel Demand Forecasting (TDF) model generally projects the most accurate results as the purpose of a TDF model is to accurately estimate the change in volume of a roadway given changes in land use and changes in the transportation network. For this project, Fehr & Peers reviewed the model developed for the City of San Bernardino's general plan, the East Valley travel forecasting model, and the Southern California Association of Governments (SCAG) model; all of which include the San Bernardino area. However, Fehr & Peers' review indicated that none of the models were locally valid for the City of San Bernardino's existing conditions. Specifically, these models were either built off information from 1997 or lacked sufficient detail to accurately forecast data in the area.

Additionally, SANBAG is currently developing a focused travel demand model for San Bernardino County, which should be completed later this year, and would supersede use of the East Valley or SCAG models in San Bernardino County. Once completed, that model should incorporate the most up to date information for the City of San Bernardino and would be a more appropriate tool to utilize for the assessment.

Therefore, in conformance with the City's guidelines, we applied a three-percent per year growth rate to existing volumes to develop future conditions. To develop a conservative assessment of future conditions, manual assignment of trips from approved and pending projects in the project study area were also applied to future year forecasts.

One anomaly that occurred when applying the 3% growth factor was the increase in traffic to and from the San Manuel Casino. This essentially represents an increase in casino trips of 75% over existing conditions. This growth application increased all intersection turning movements from the eastbound SR-210 off-ramp to Victoria Avenue by an extensive and potentially unrealistic amount. This analysis does not modify the 3% growth factor; an extremely conservative assumption.

CUMULATIVE PROJECTS

Cumulative projects are defined as all projects that were pending, approved, or under construction in the City of San Bernardino as of May 2011. This list was supplied by the City of San Bernardino planning staff. The 2030 scenario therefore analyzes the cumulative conditions impacts from nearby projects expected to influence the study area.

Fehr & Peers estimated the number of trips generated from each project using *Trip Generation, 8th Edition* (Institute of Transportation Engineers (ITE), 2008). Figure 3 shows a map of cumulative projects in the study area. Appendix B provides a list of all cumulative projects, as well as the number of trips generated from each project.

SIGNIFICANCE CRITERIA

The following significance criteria were employed to determine if the project causes significant traffic impacts. The criteria are based on the City of San Bernardino's General Plan, the City's Traffic Impact Analysis Guidelines, and the County's CMP.

Traffic Impacts

The City of San Bernardino considers traffic impacts at intersections to be "significant" if the following volume-to-capacity (V/C) ratios occur between the "without project" and "with project" conditions shown in Table 2.

TABLE 2 - SIGNIFICANCE CRITERIA	
Level of Service	V/C Difference
C	> 0.0400
D	> 0.0200
E,F	> 0.0100

Source: City of San Bernardino Traffic Impact Study Guidelines (2004) and *Highway Capacity Manual* (Transportation Research Board, 2000).

For unsignalized intersections, a traffic impact is considered to be "significant" if the addition of project-generated traffic degrades operations below LOS C and the project adds traffic such that it satisfies the Peak Hour Signal Warrant.

Mitigation Requirements

The City of San Bernardino requires that any intersections with significant impacts be mitigated to improved LOS D or better for intersections and LOS C or better for roadway segments.



2. EXISTING CONDITIONS

This chapter discusses the existing transportation conditions in the project study area. This discussion addresses the roadway, transit network, and pedestrian networks.

EXISTING ROADWAY FACILITIES

Regional access to the project site is provided by State Route 210 (SR-210) State Route 330 (SR-330). Local access is provided by Highland Avenue, Arden Avenue, Del Rosa Drive, Sterling Avenue, Victoria Avenue, Orange Street, Date Street, and Pacific Street. These roadways are described in detail below.

Regional Roads

- SR-210 Freeway – SR-210 begins in Pasadena and extends southeast through San Bernardino before terminating at its junction with I-10 in Redlands. Through the study area, SR-210 is generally a two- to three-lane freeway. Access to the project site is provided at interchanges with Highland Avenue. The project proposes to position one of its driveways on the northern extent of the project directly across from the SR-210 eastbound off-ramp. The project also proposes to position a driveway on the east extent directly across from the SR-210 eastbound on-ramp.

Local Access Roads

- Highland Avenue – Highland Avenue is an east/west divided road with two lanes in each direction. It extends from Easton Street to the west and curves south, east of SR-210 where it turns into Weaver Street, and ends at Greenspot Road. SR-210 has a freeway interchange at Highland Avenue proximate to the project site. The posted speed limit on Highland Avenue is 40 miles per hour (mph). Highland Avenue is classified as a Major Arterial in the City of San Bernardino General Plan.
- Arden Avenue – Arden Avenue is north/south divided road with two lanes in the northbound direction and one lane in the southbound direction south of the SR-210 eastbound on-ramp. Between Highland Avenue and the SR-210 eastbound on-ramp, Arden Avenue is an undivided roadway with three lanes in each direction. North of Highland Avenue, Arden Avenue is an undivided roadway with one lane in each direction. It extends from Mesquite Drive to the north and ends south of Pacific Street to the south. The posted speed limit on Arden Avenue is 25 mph next to the project site and 35 mph at Date Street. Arden Avenue is classified as a Secondary Arterial in the City of San Bernardino General Plan.
- Del Rosa Drive – Del Rosa Drive is a north/south divided road with two lanes in each direction. It extends from Bonita Vista Drive to the north and ends at Harry Shepard Boulevard to the south. Del Rosa Drive is a direct connector to the SR-210 northwest of the project site. The posted speed limit on Del Rosa Drive is 45 mph. Del Rosa Drive is classified as a Major Arterial in the City of San Bernardino General Plan.
- Sterling Avenue – Sterling Avenue is a north/south divided road with two lanes in each direction. It extends from Daley Canyon Road to the north and ends at 3rd Street to the south. The posted speed limit on Sterling Avenue is 40 mph. Sterling Avenue is classified as a Major Arterial in the City of San Bernardino General Plan.
- Victoria Avenue – Victoria Avenue is a north/south divided road with one lane in each direction north of Highland Avenue and two lanes in each direction south of Highland Avenue. It extends from Amber Hill Drive to the north and ends at 3rd Street to the south. The posted speed limit on Victoria Avenue is 40 mph. Victoria Avenue is classified as a Secondary Arterial in the City of San Bernardino General Plan.

- Orange Street – Orange Street is a north/south divided road with one lane in each direction. It extends from just north of Piedmont Drive to the north and ends at 13th Street to the south. The posted speed limit on Orange Street is 25 mph. Orange Street is classified as a Collector in the City of San Bernardino General Plan.
- Date Street – Date Street is an east/west divided road with two lanes in each direction. It extends west to Del Rosa Drive where it continues west, south of SR-210 and ends east of Rockford Avenue. The posted speed limit on Date Street is 25 mph. Date Street is classified as a Collector in the City of San Bernardino General Plan.
- Pacific Street – Pacific Street is an east/west undivided residential road with one lane in each direction. It extends from Perris Hill Park Road to the west and continues east where it overpasses the SR-210 and ends at Grove Avenue. The posted speed limit on Pacific Street is 25 mph. Pacific Street is classified as a Secondary Arterial in the City of San Bernardino General Plan.

EXISTING BUS TRANSIT FACILITIES

There are three transit lines that currently operate in the study area. The lines, operated by Omnitrans, are described in detail below. There is currently a bus stop located at the Highland Avenue / Guthrie Street intersection which provides access from the project site to Route 3/4. Route 1 is accessible via a transit stop on Sterling Avenue at Highland Avenue, and Route 5 is accessible via a transit stop on Del Rosa Avenue at Highland Avenue.

- Route 1 – Route 1 (ARMC-San Bernardino-Del Rosa Route) provides service from Lynwood Drive diagonally southwest past the I-215 freeway to Valley Boulevard along various roads, connecting the City of San Bernardino and City of Colton. In the project study area, Route 1 travels from Sterling Avenue to Highland Avenue to Valencia Avenue where it proceeds to the City of Colton. Service is provided at 15- and 30-minute headways on weekdays and at 30-minute headways on weekends. Service runs from approximately 5AM-11 PM on weekdays and 6AM-7:30PM on weekends.
- Routes 3/4 – Routes 3/4 (Baseline – Highland-San Bernardino) run almost identical routes, but in the counter-clockwise direction on Route 3 and in the clockwise direction on Route 4. The bus route provides round-trip service along various roads in the City of San Bernardino that include Highland Avenue to the north, 2nd Street and Baseline Street to the south, Medical Center Drive to the west and Boulder Avenue to the east. In the project study area, the route travels along Highland Avenue from Medical Center Drive to Boulder Avenue. Service is provided at 20-minute headways every day. Route 3, service runs from approximately 4:30AM-11PM on weekdays and 6AM-7PM on weekends, while Route 4 runs from 4:30AM-11PM on weekdays and 6:30AM-7:30PM on weekends.
- Route 5 – Bust Route 5 (San Bernardino-Del Rosa-Cal State) provides service from Cal State University of San Bernardino diagonally southeast to Del Rosa Drive then southwest toward the Carousel Mall on E Street along various roads. In the project study area, Bus Route 5 travels along Del Rosa Drive from Eureka Street to the north to Pacific Street to the south. Service is provided at 30-minute headways on weekdays and at 60-minute headways on weekends. Service runs from approximately 5AM-10:30PM on weekdays and 7AM-6:30PM on Saturdays and 6:30AM-7:30PM on Sundays.

The City of San Bernardino General Plan contains several references to public transit in the policy statements including:

- Policy 6.6.1: Support the efforts of regional, state, and federal agencies to provide additional local and express bus service in the City.

Policy 6.6.2: In cooperation with Omnitrans, require new development to provide transit facilities, such as bus shelters and turnouts, as necessary and warranted by the scale of the development.

Policy 6.6.3: Encourage measures that will reduce the number of vehicle-miles traveled during peak periods, including the following examples of these types of measures:

- Incentives for car-pooling and vanpools
- Preferential parking for car-pools and vanpools
- An adequate, safe, and interconnected system of pedestrian and bicycle paths

The project is consistent with these policy statements through existing bus stops located along Highland Avenue and preferential parking for carpools and alternative fuel vehicles.

PEDESTRIAN NETWORK

The pedestrian network in the study area consists of sidewalks and pedestrian crosswalks, with appropriate pedestrian crossing controls, at signalized intersections.

TRAFFIC VOLUMES AND LANE CONFIGURATIONS

Fehr & Peers collected existing traffic counts at the study intersections in April 2011 during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak hours, and in July 2011 during the mid-day (12:00 to 2:00 PM) weekend peak hour. Figure 4 shows the existing lane configurations and traffic volumes at the study intersections. Existing traffic counts are provided in Appendix A.

EXISTING INTERSECTION OPERATIONS

Fehr & Peers utilized the existing traffic volumes, lane configurations, and signal timing information to evaluate operations at the study intersections for the existing AM, PM, and weekend peak hour conditions. The results are summarized in Table 3. The technical calculations are presented in Appendix C.

As shown in Table 3, most of the intersections operate at LOS C or better during the peak hours. Only the following two intersections operate at LOS D during the peak hours:

- SR-210 Eastbound Off Ramp/Highland Avenue – LOS D or E during the AM, PM and Saturday peak hours
- SR-210 Westbound On-Ramp/Arden Avenue/Highland Avenue – LOS D during the AM peak hour

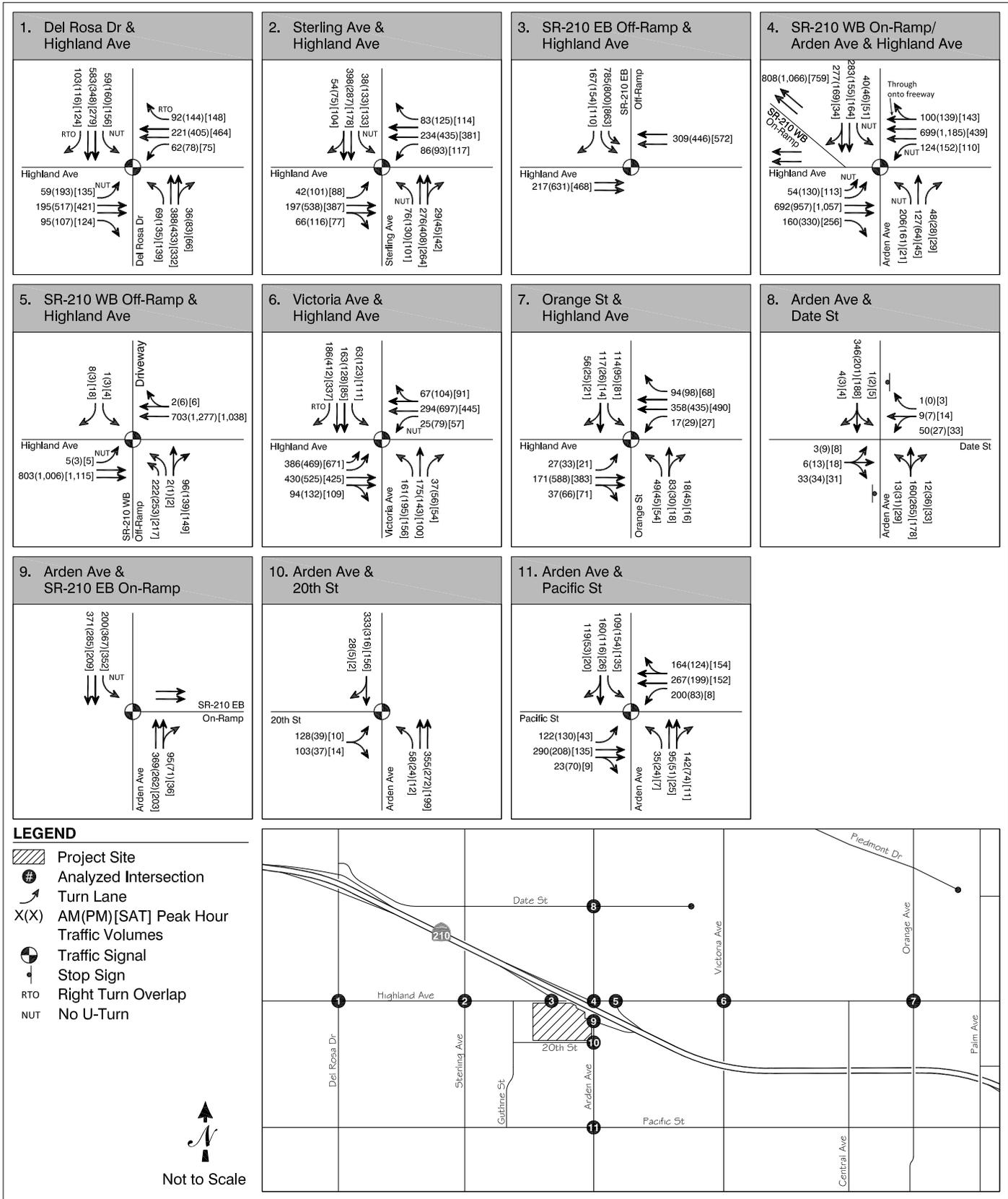


TABLE 3 - INTERSECTION LEVELS OF SERVICE: EXISTING CONDITIONS

Intersection	Control	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
		Delay ¹	LOS	Delay	LOS	Delay	LOS
		1. Del Rosa Drive & Highland Avenue ²	Signalized	27.2	C	31.7	C
2. Sterling Avenue & Highland Avenue ²	Signalized	28.1	C	32.4	C	27.8	C
3. SR-210 Eastbound Off-Ramps & Highland Avenue ²	Signalized	38.5	D	41.5	D	60.5	E
4. SR-210 Westbound On-Ramps/Arden Avenue & Highland Avenue ²	Signalized	42.8	D	23.4	C	24.4	C
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	Signalized	8.4	A	10.5	B	9.5	A
6. Victoria Avenue & Highland Avenue ²	Signalized	21.4	C	27.1	C	25.7	C
7. Orange Avenue & Highland Avenue	Signalized	19.4	B	11.1	B	10.5	B
8. Arden Avenue & Date Street	SSSC ²	19.8	C	17.0	C	14.7	B
9. Arden Avenue & SR-210 Eastbound On-Ramps	Signalized	6.9	A	12.1	B	6.9	A
10. Arden Avenue & 20 th Street	Signalized	15.3	B	5.2	A	4.3	A
11. Arden Avenue & Pacific Street	Signalized	18.0	B	10.4	B	8.8	A

Notes:
1- Delay for intersections based on application of *2000 Highway Capacity Manual* Methodology. Delay was calculated using Synchro 6.0 software.
2- CMP intersection
3- V/C = Volume to Capacity ratio. Note – V/C is not calculated for unsignalized intersections.
Source: Fehr & Peers, 2011

3. PROJECT OPENING YEAR (2013) NO PROJECT TRAFFIC CONDITIONS

This section documents the conditions in the Opening Year (2013) scenario. This scenario analyzes the intersection conditions with the addition of ambient growth per year from the existing volumes to 2013 (the opening year for the proposed project). This scenario also includes traffic from the previously constructed multi-family use development that occupied the site.

TRAFFIC VOLUMES

A 3% ambient growth per year, over the two year period between the existing and opening year scenario (equal to 6.09%) was applied to the existing conditions volumes per City of San Bernardino Traffic Impact Study Guidelines. Opening year (2013) peak hour traffic volumes for the study intersections are shown on Figure 5.

This scenario includes additional traffic that was generated by the construction of a multi-family use housing development at the project site. This included 296 units. At the direction of City of San Bernardino staff, Fehr & Peers has included the impacts of traffic generated by this development at all study intersections under the no project condition.

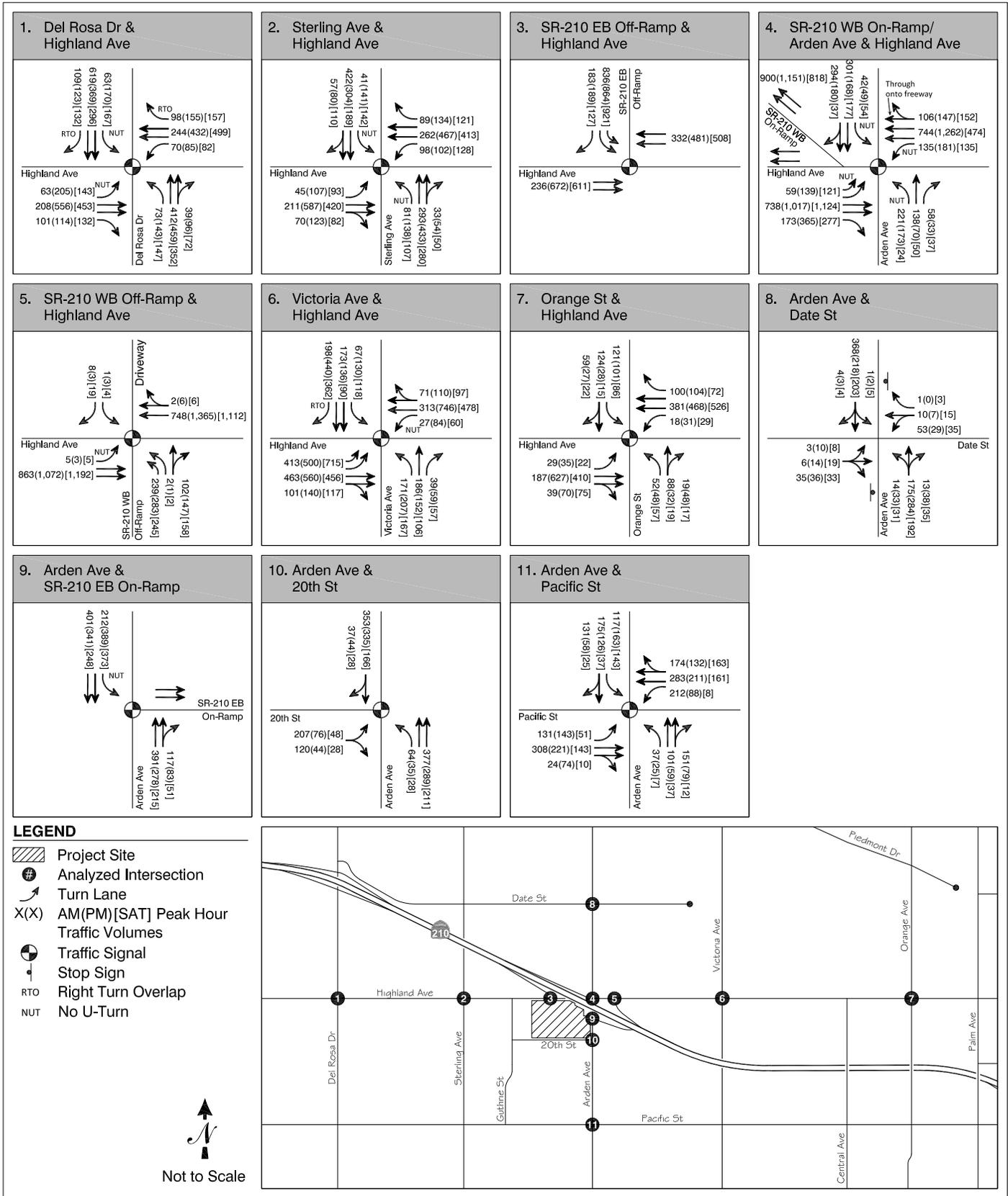
ROADWAY IMPROVEMENTS

There are no roadway improvements planned and funded at the study intersections that will be completed by 2013.

INTERSECTION OPERATIONS

Intersection level of service analysis results for opening year (2013) are summarized in Table 4. Analysis sheets are provided in Appendix D. As shown in this table, with the application of ambient growth, most of the study intersections will continue to operate at LOS C or better, with the exception of the following three intersections:

- Sterling Avenue/Highland Avenue – LOS D during the PM peak hour
- SR-210 Eastbound Off Ramp/Highland Avenue – LOS D during the AM and PM peak hours; LOS E during the weekend peak hour
- SR-210 Westbound On-Ramp/Arden Avenue/Highland Avenue – LOS D during the AM peak hour



OPENING YEAR (2013) NO PROJECT LANE CONFIGURATIONS AND PEAK HOUR TRAFFIC VOLUMES

TABLE 4 - INTERSECTION LEVELS OF SERVICE: OPENING YEAR (2013) NO PROJECT

Intersection	Control	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
		Delay ¹	LOS	V/C ³	Delay ¹	LOS	V/C ³	Delay	LOS	V/C
1. Del Rosa Drive & Highland Avenue ²	Signalized	27.8	C	0.42	32.4	C	0.61	27.5	C	0.56
2. Sterling Avenue & Highland Avenue ²	Signalized	28.5	C	0.50	36.2	D	0.62	27.7	C	0.49
3. SR-210 Eastbound Off-Ramps & Highland Avenue ²	Signalized	43.4	D	0.53	49.6	D	0.73	76.6	E	0.75
4. SR-210 Westbound On-Ramps/Arden Avenue & Highland Avenue ²	Signalized	49.6	D	0.83	26.5	C	0.65	30.4	C	0.71
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	Signalized	8.6	A	0.44	11.5	B	0.62	10.9	B	0.55
6. Victoria Avenue & Highland Avenue ²	Signalized	23.3	C	0.55	29.2	C	0.65	32.6	C	0.61
7. Orange Avenue & Highland Avenue	Signalized	19.1	B	0.36	11.3	B	0.37	8.6	A	0.28
8. Arden Avenue & Date Street	SSSC	21.9	C	n/a	18.3	C	n/a	15.6	C	n/a
9. Arden Avenue & SR-210 Eastbound On-Ramps	Signalized	7.2	A	0.45	12.0	B	0.40	13.3	B	0.38
10. Arden Avenue & 20 th Street	Signalized	33.8	C	0.90	7.0	A	0.39	6.4	A	0.22
11. Arden Avenue & Pacific Street	Signalized	19.8	B	0.70	10.5	B	0.36	9.1	A	0.27

Notes:
1- Delay for intersections based on application of 2000 Highway Capacity Manual Methodology. Delay was calculated using Synchro 6.0 software.
2- CMP intersection
3- V/C = Volume to Capacity ratio. Note – V/C is not calculated for unsignalized intersections.
Source: Fehr & Peers, 2011

4. PROJECT OPENING YEAR (2013) PLUS PROJECT TRAFFIC CONDITIONS

This section documents the conditions in the Opening Year (2013) plus Project scenario. This scenario analyzes the opening year (2013) conditions plus the project. This condition is used to evaluate the net change in traffic conditions and to identify potential traffic impacts associated with the proposed project.

TRAFFIC VOLUMES

Traffic was estimated for the proposed project using a three step process: Trip Generation, Trip Distribution, and Trip Assignment. In the first step, the numbers of trips generated by the project are estimated. Then, the directions from which these trips approach and depart the site are projected. Finally, the project trips are assigned to the roadway system and the study intersections. Each of these steps is described in detail below.

Please note that all of these assumptions were circulated to City staff and Caltrans as part of the scoping form prior to initiating any assessment for the site.

Project Trip Generation

Fehr & Peers estimated the project trip generation by applying standard trip generation rates, based on ITE's *Trip Generation 8th Edition, 2008*. Use of these rates is consistent with state of the practice procedures for estimating traffic impacts. According to the *ITE Trip Generation Handbook, 2004*, the number of trips a proposed land use generates can be reduced by a specified percentage to account for travelers that would have already been on travelling on an adjacent or near-by street to the project. These "pass-by" and "diverted-link" trips would affect the project and Caltrans ramps, but not the adjacent roadway traffic external to the project site. Therefore these trips are estimated and accounted for separately. Table 5 summarizes the trip generation estimates for the proposed project.

The proposed project was assumed to consist of the following land uses:

- Home Depot Store – The Home Depot store is 136,090 square feet (sf) and includes a garden center.
- Retail Shops – 57,670 sf of leasable floor area will be occupied by retail shops.
- Gas Station with Convenience Market – The gas station is 2,900 sf with three islands totaling 12 fueling stations.
- Bank with Drive-Thru – The bank is 4,560 sf and has three drive-thru lanes.
- Fast-food with Drive-Thru Window – The fast-food restaurant is 3,500 sf with one drive-thru lane that wraps around the building.

Trip Distribution

The project trip distributions reflect the likely approach and departure routes to the project site, as determined through multiple sources such as the location of complementary land uses and existing traffic volumes on study area roadways. Distributions for the project trips are shown on Figure 6.



Trip Assignment

Based on the trip distribution, project trips were assigned to the study area roadways and intersections. The assignment of these trips is shown on Figure 7. The assignment of trips at project site-access driveways and pass-by/diverted link trips is shown on Figure 8.

The project-related trips described above were added to the Opening Year No Project volumes shown on Figure 5 to develop Opening Year with Project volumes. These volumes are shown on Figure 9.

ROADWAY IMPROVEMENTS

The proposed project includes the following intersection improvements shown on the project site plan:

- Highland Avenue/SR-210 eastbound off-ramp – The addition of a fourth southern leg to the intersection forming a project-site driveway including the addition of a westbound left-turn lane to provide access to the project site.
- Highland Avenue/Arden Avenue – Addition of a second westbound left-turn lane.
- Arden Avenue/SR-210 eastbound on-ramp – The addition of a fourth western leg to the intersection forming a project-site driveway.

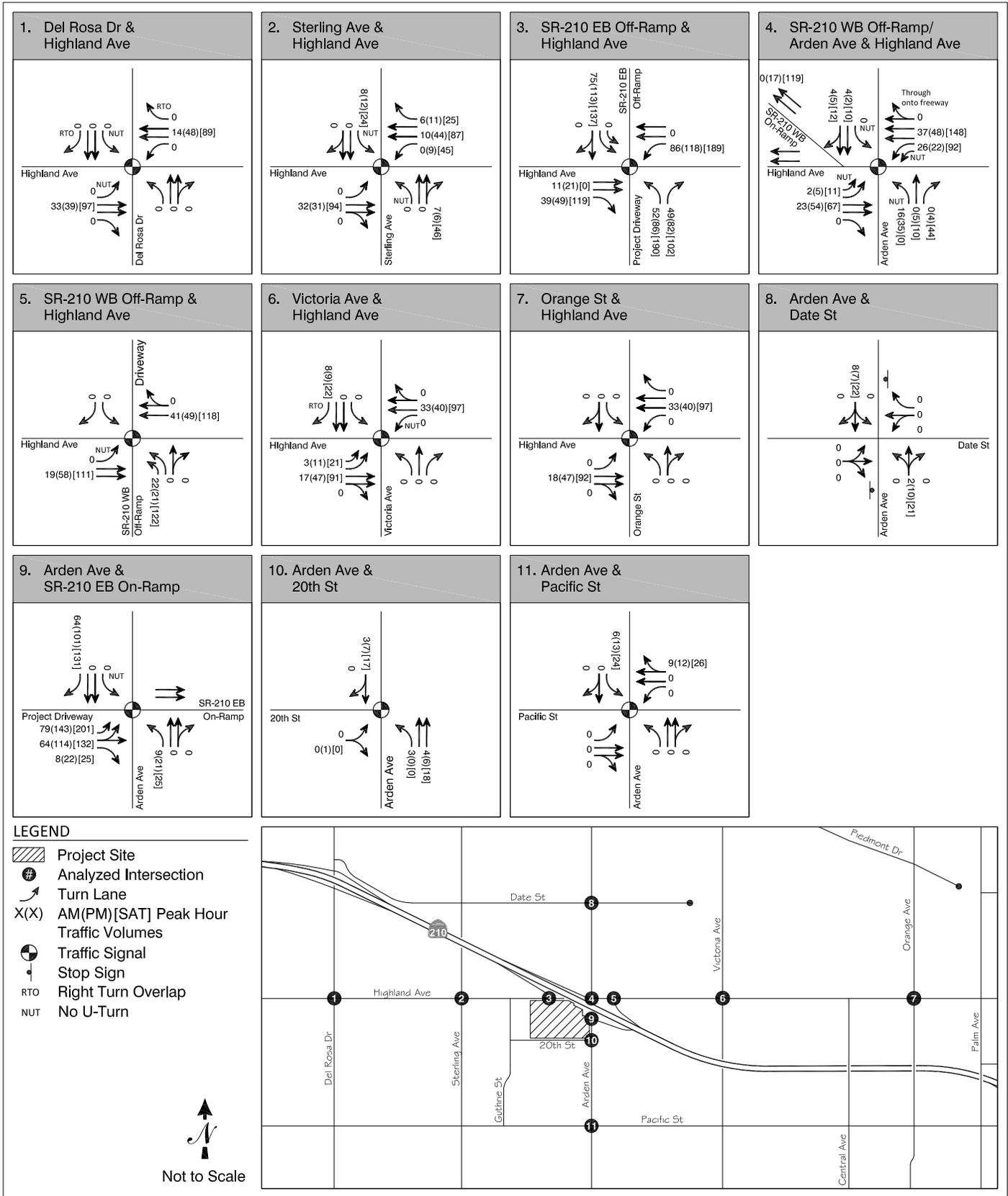
The above referenced improvements were included in the “with project” conditions assessment.

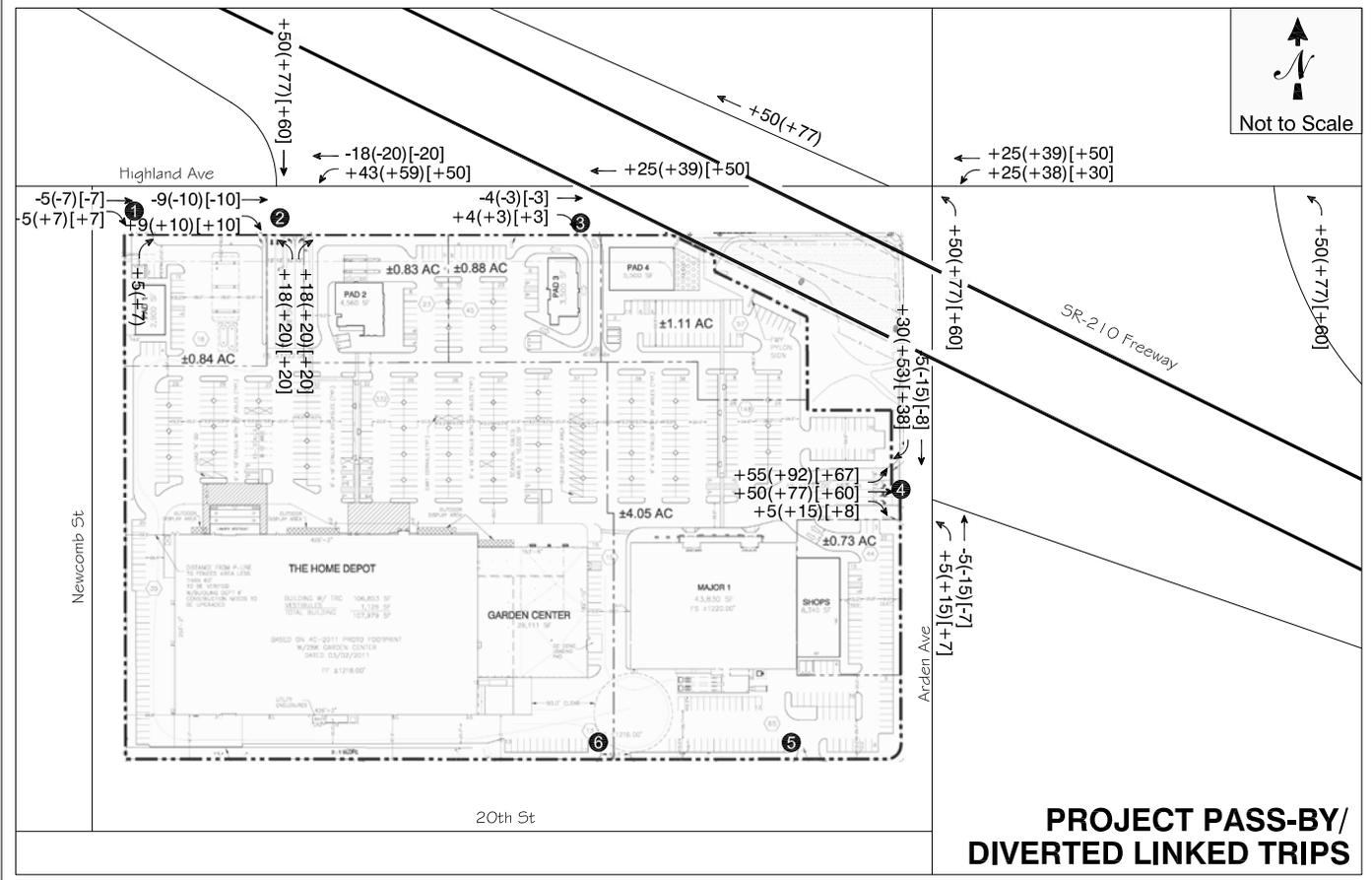
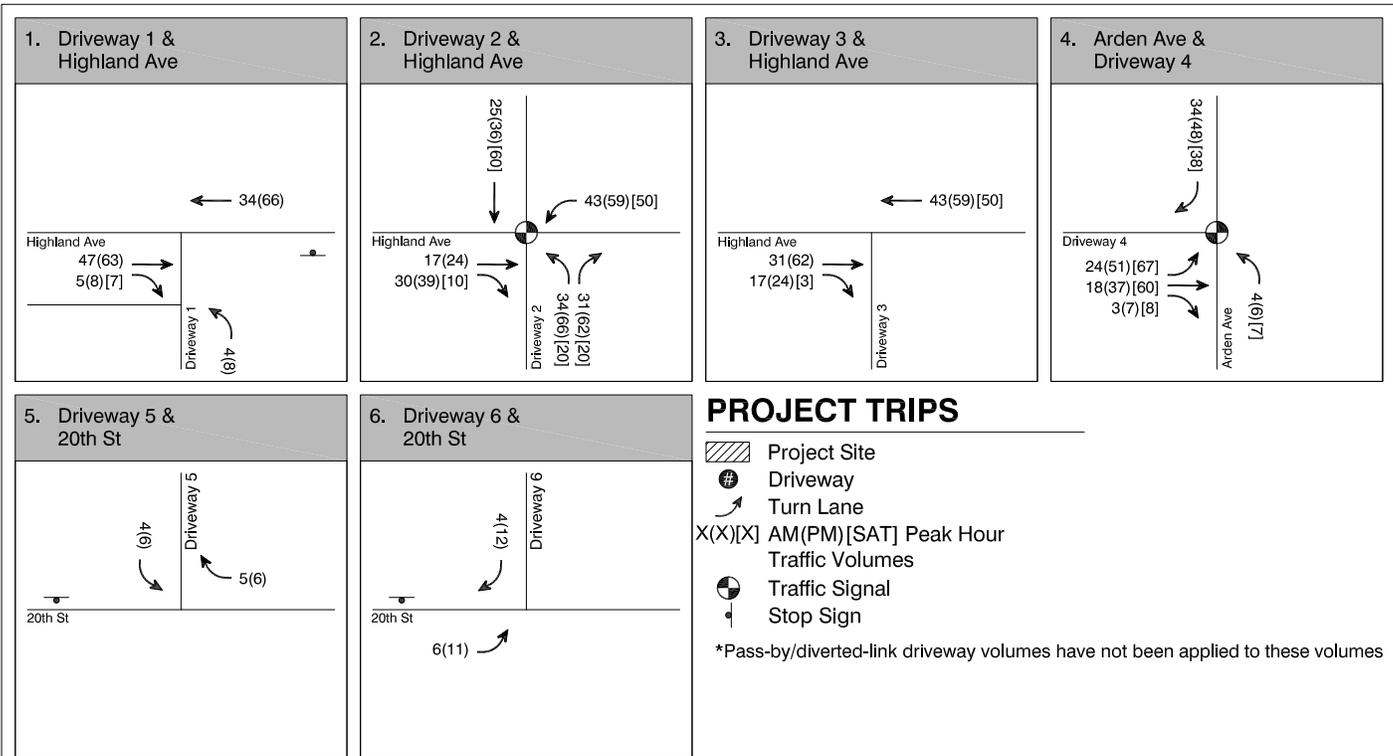
INTERSECTION OPERATIONS

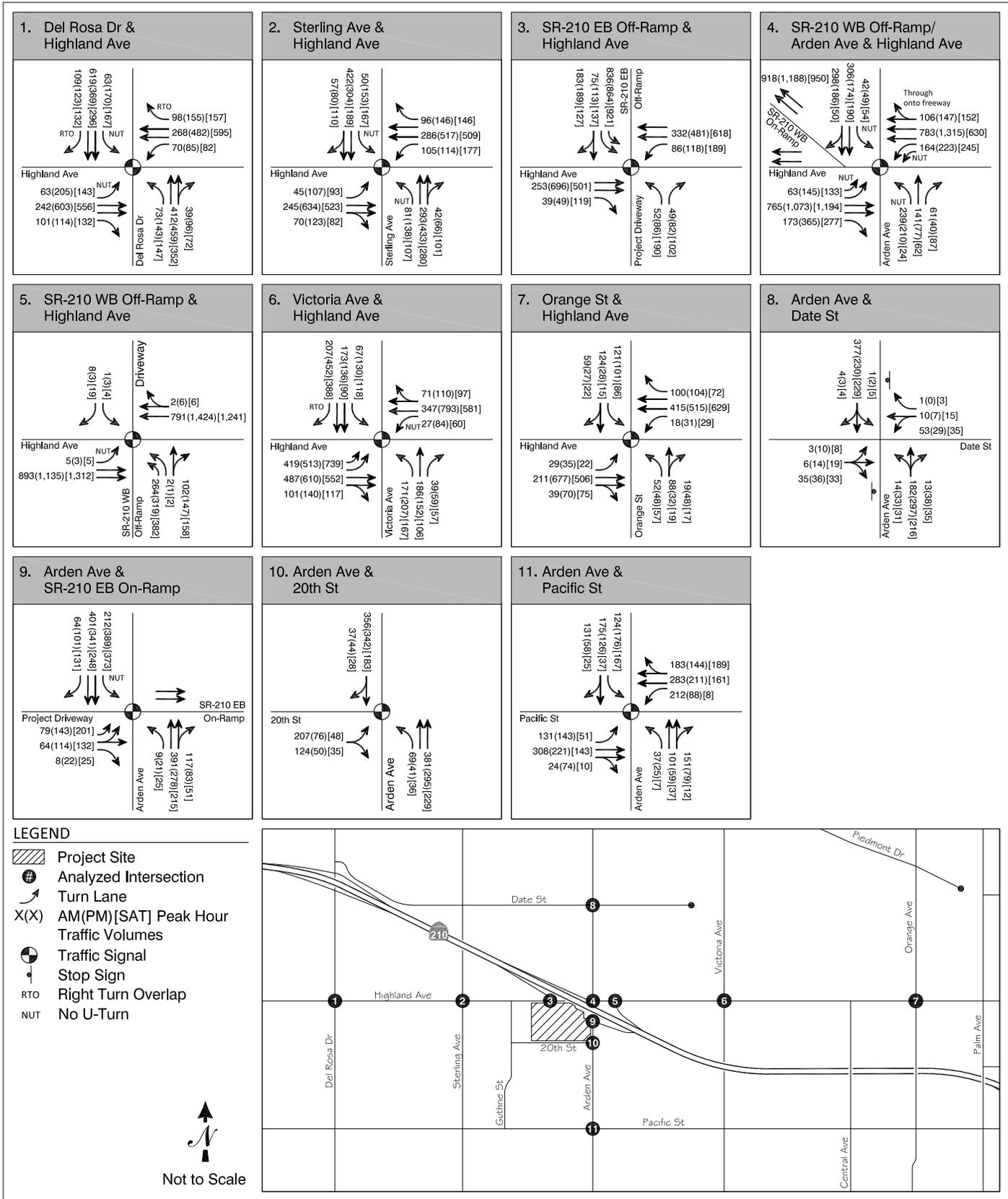
Intersection level of service results are summarized in Table 6 and calculations are provided in Appendix D.

TABLE 6 - INTERSECTION LEVELS OF SERVICE: OPENING YEAR (2013) PLUS PROJECT										
Intersection	Control	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
		Delay ¹	LOS	V/C ³	Delay ¹	LOS	V/C ³	Delay	LOS	V/C
1. Del Rosa Drive & Highland Avenue ²	Signalized	27.6	C	0.41	32.2	C	0.61	27.1	C	0.59
2. Sterling Avenue & Highland Avenue ²	Signalized	29.0	C	0.51	28.0	C	0.63	25.4	C	0.58
3. SR-210 Eastbound Off-Ramps & Highland Avenue ²	Signalized	47.2	D	0.67	31.7	C	0.68	69.7	E	0.82
4. SR-210 Westbound On-Ramps/Arden Avenue & Highland Avenue ²	Signalized	49.7	D	0.83	29.0	C	0.64	47.5	D	0.87
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	Signalized	8.9	A	0.46	12.3	B	0.64	14.0	B	0.65
6. Victoria Avenue & Highland Avenue ²	Signalized	23.7	C	0.56	30.5	C	0.67	38.2	D	0.66
7. Orange Avenue & Highland Avenue	Signalized	18.6	B	0.37	10.9	B	0.39	8.0	A	0.32
8. Arden Avenue & Date Street	SSSC	22.4	C	n/a	18.8	C	n/a	16.7	C	n/a
9. Arden Avenue & SR-210 Eastbound On-Ramps	Signalized	15.9	B	0.50	23.3	C	0.50	25.0	C	0.51
10. Arden Avenue & 20 th Street	Signalized	22.2	C	0.80	5.6	A	0.34	6.3	A	0.24
11. Arden Avenue & Pacific Street	Signalized	20.0	B	0.72	10.8	B	0.37	9.2	A	0.31

Notes:
 1- Delay for intersections based on application of 2000 Highway Capacity Manual Methodology. Delay was calculated using Synchro 6.0 software.
 2- CMP intersection
 3- V/C = Volume to Capacity ratio. Note – V/C is not calculated for unsignalized intersections.
 Source: Fehr & Peers, 2011







LEGEND

- Project Site
- Analyzed Intersection
- Turn Lane
- X(X)** AM(PM)[SAT] Peak Hour Traffic Volumes
- Traffic Signal
- Stop Sign
- RTO** Right Turn Overlap
- NUT** No U-Turn

Not to Scale

OPENING YEAR (2013) PLUS PROJECT LANE CONFIGURATIONS AND PEAK HOUR TRAFFIC VOLUMES

IMPACT ASSESSMENT

Table 7 compares the change in volume-to-capacity ratios at intersections that operate at LOS C, D, E, or F to determine project impacts. These V/C changes are compared to the allowable change shown in Table 2.

TABLE 7 - IMPACTS FOR SIGNALIZED INTERSECTIONS: OPENING YEAR (2013) PLUS PROJECT					
Intersection	LOS AM (PM) [SAT]	Allowable Δ V/C AM (PM) [SAT]	No Project AM (PM) [SAT]	With Project AM (PM) [SAT]	Δ V/C AM (PM) [SAT]
1. Del Rosa Drive & Highland Avenue ²	C (C) [C]	0.04 (0.04) [0.04]	0.42 0.61 0.56	0.41 0.61 0.59	0.01 0.00 0.03
2. Sterling Avenue & Highland Avenue ²	C (D) [C]	0.04 (0.02) [0.04]	0.50 0.62 0.49	0.51 0.63 0.58	0.01 0.01 0.09
3. SR-210 Eastbound Off-Ramp & Highland Avenue ²	D (D) [E]	0.02 (0.02) [0.01]	0.53 0.73 0.75	0.67 0.68 0.82	0.14 -0.05 0.07
4. SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue ²	D (C) [C]	0.02 (0.04) [0.04]	0.83 0.65 0.71	0.83 0.64 0.86	0.00 -0.01 0.15
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	A (B) [B]				
6. Victoria Avenue & Highland Avenue ²	C (C) [D]	0.04 (0.04) [0.04]	0.55 0.65 0.61	0.56 0.67 0.66	0.01 0.02 0.05
7. Orange Avenue & Highland Avenue	B (B) [A]				
8. Arden Avenue & Date Street	C (C) [C]	N/A	N/A	N/A	N/A
9. Arden Avenue & SR-210 Eastbound On-Ramps	A (B) [B]				
10. Arden Avenue & 20 th Street	C (A) [A]	0.04	0.90	0.80	-0.10
11. Arden Avenue & Pacific Street	B (B) [A]				

Notes:
1- V/C = Volume to Capacity ratio. Calculated using the Synchro 6 software package.
Shaded cells indicate where intersections operate at LOS A or B.
Bold-Italicized type indicates project impact.
Source: Fehr & Peers, 2011.

As shown in Table 7, the proposed project will impact the following locations:

- Sterling Avenue/Highland Avenue – Saturday Peak Hour
- SR-210 Eastbound Off-Ramp/Highland Avenue – AM and Saturday Peak Hour
- SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue – Saturday Peak Hour
- Victoria Avenue & Highland Avenue – Saturday Peak Hour

Measures to mitigate the identified impacts are discussed in detail in Chapter 6.

QUEUING ASSESSMENT

This section presents the results of queuing assessment prepared for the freeway ramp intersections being modified as part of the proposed project. This analysis was undertaken at the request of Caltrans to identify any locations where queues at freeway ramps could disrupt freeway traffic.

Analysis Methodology

Ramp queuing was assessed using Synchro version 6.14. The 95th percentile queue length is reported and compared against the available queue length measured from aerials or from the site plan. This information is provided to assist with the Caltrans encroachment permits and therefore only focuses on left-turn storage for Caltrans-controlled intersections.

Queuing Results

Table 9 summarizes the results of our peak hour queuing analysis:

TABLE 9 - CALTRANS QUEUING ANALYSIS: OPENING YEAR (2013) PLUS PROJECT

Intersection/Movement	Available Storage (ft)	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
3. SR-210 Eastbound Off-Ramp & Highland Avenue				
Westbound Left-Turn	175'	172'	167'	300'
Northbound Left-Turn	145'	122'	184'	418'
Northbound Right-Turn	145'	40'	51'	56'
Southbound Left-Turn ¹	985'	462'	408'	527'
Southbound Right-Turn ¹	985'	310'	195'	204'
4. SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue²				
Eastbound Left-Turn	250'	56'	104'	106'
Eastbound Right-Turn	220'	86'	209'	210'
Westbound Left-Turn	140'	122'	140'	171'
Northbound Left-Turn	275'	386'	324'	574'
Northbound Right-Turn	275'	25'	36'	45'
Southbound Left-Turn	115'	70'	69'	77'
9. SR-210 Eastbound On-Ramp & Arden Avenue²				
Eastbound Left-Turn	130'	70'	111'	143'
Eastbound Right-Turn	130'	25'	25'	25'
Northbound Left-Turn	320'	25'	34'	38'
Southbound Left-Turn	275'	150'	360'	335'
Southbound Right-Turn	75'	25'	25'	47'
Notes:				
1- Approximate length to the freeway gore point is 1,350'. Per AASHTO A Policy on Geometric Design of Highways and Streets, a stopping sight distance for facilities with a 65 MPH design speed requires at least 365' of stopping sight distance. Therefore, the queue storage is estimated to be 985 feet.				
Bold-Italicized type indicates insufficient storage.				
Minimum reported queue is 25'.				
Source: Fehr & Peers, 2011.				

The results of the queuing assessment indicate that the following movements will have insufficient queuing storage:

- SR-210 Eastbound Off-Ramp & Highland Avenue – Westbound Left-Turn exceeds available storage by 125' during the weekend peak hour, which would queue back to the SR-210 Westbound On-Ramp/Arden Avenue/Highland Avenue intersection. To minimize this effect, it is recommended that the project sponsor work with Caltrans to provide a signal interconnect between the two intersections and coordinate them to coordinate the southbound approaches and “hold” the queue at the upstream intersection. Queuing also exceeds storage for the Northbound Left-Turn by 275' during the weekend peak hour, which would interfere with operations inside the project site.
- SR-210 Westbound On-Ramp/Arden Avenue/Highland Avenue – Northbound Left-Turn exceeds available storage by 50' – 300' during the peak hours, which would queue through the SR-210 Eastbound On-Ramp/Arden Avenue intersection. To minimize this effect, it is recommended that the project sponsor work with Caltrans to provide a signal interconnect between the two intersections and coordinate them to coordinate the northbound approaches and “hold” the queue at the upstream intersection. Queuing also

exceeds storage for the Westbound Left-Turn by 30' during the weekend peak hour, which would back up towards the Westbound Off-Ramp/Highland Avenue intersection.

- SR-210 Eastbound On-Ramp/Arden Avenue – Southbound left-turn exceeds the available storage by approximately 65' - 90' during the PM peak hour, which would queue back to the Highland Avenue/Arden Avenue intersection. To minimize this effect, it is recommended that the project sponsor work with Caltrans to provide a signal interconnect between the two intersections and coordinate them to coordinate the southbound approaches and “hold” the queue at the upstream intersection.

5. PROJECT OPENING YEAR (2013) PLUS PROJECT MITIGATION MEASURES

As noted in Chapter 5, the implementation of the proposed project resulted in impacts at three study intersections. The impacts and mitigation measures are described in this chapter.

IMPACTS AND MITIGATION MEASURES

Intersections

Per the City of San Bernardino Traffic Study Guidelines, the following intersections are significantly impacted with the addition of project traffic:

- Sterling Avenue at Highland Avenue (Weekend peak hour)
- SR-210 Eastbound Off-Ramp at Highland Avenue (AM and Weekend peak hour)
- SR-210 Westbound On-Ramp/Arden Avenue at Highland Avenue (Weekend peak hour)
- Highland Avenue at Victoria Avenue (Weekend peak hour)

A description of each project impact and potential mitigation measures are proposed below:

Sterling Avenue/Highland Avenue (Weekend Peak Hour)

Impact

The intersection operates at LOS C during the Weekend peak hour with the addition of project-generated traffic. However, it will increase the V/C ratio by 0.09, creating a project impact at the intersection.

Mitigation

To mitigate the impact, the east/west left-turn phasing would need to be modified from protected phase to permitted/protected phasing. Additionally, intersection timing splits would need to be optimized. With the measures, the V/C ratio is reduced to 0.53. This reduces the increase to 0.04 which is the maximum allowable increase based on the significance criteria. With this improvement, the impact is reduced to a less-than-significant level and no further mitigation is required. It should be noted that the intersection already operates at LOS C, and this phasing plan may be inconsistent with the Highland Avenue corridor plan.

SR-210 Eastbound Off-Ramp at Highland Avenue (AM and Weekend Peak Hour)

Impact

The intersection operates at LOS D during the AM peak hour and LOS E during the weekend peak hour with the addition of project-generated traffic. This will increase the V/C ratio by 0.14 and 0.07, respectively, creating a project impact at the intersection.

Mitigation

Work with Caltrans staff to optimize intersection timing splits. With optimized timing splits, the V/C ratio is reduced to 0.50 during the AM peak hour, which is 0.03 less than the No Project scenario. With this improvement, the impact is reduced to a less-than-significant level and no further mitigation is required. The V/C ratio is reduced to 0.80 during the weekend peak hour, which is still 0.05 more than the no project scenario. However, optimization will also improve level of service to LOS C, which meets criteria for less-than-significant impact.

SR-210 Westbound On-Ramp/Arden Avenue at Highland Avenue (Weekend peak hour)

Impact

The intersection operates at LOS C with during the Weekend peak hour with the addition of project-generated traffic. However, it will increase the V/C ratio by 0.15, creating a project impact at the intersection.

Mitigation

Change the northbound middle-through lane to a left-turn lane to increase left turn capacity per cycle. The current northbound right turn lane will become a through/right-turn lane. With this geometry modification, the intersection would operate at LOS C with a V/C ratio of 0.75, which is 0.04 higher than the no project condition, which meets the criteria of a less-than-significant level and no further mitigation is required. Since this is a Caltrans-controlled intersection, Caltrans would ultimately be responsible for approving and implementing the identified improvements.

Highland Avenue at Victoria Avenue (Weekend peak hour)

Impact

The intersection operates at LOS D with during the Weekend peak hour with the addition of project-generated traffic with an increase in the V/C ratio by 0.05, creating a project impact at the intersection.

Mitigation

Work with City staff to optimize intersection timing splits. With optimized timing splits, the level of service is improved to LOS C, which meets the criteria for a less-than-significant impact. With this improvement, the impact is reduced to a less-than-significant level and no further mitigation is required.

6. FUTURE YEAR BUILDOUT (2030) TRAFFIC CONDITIONS

This section documents the conditions in the 2030 scenario.

TRAFFIC VOLUMES

A 3% annual growth rate was applied to existing traffic counts to develop 2030 traffic volumes. A list of pending and approved projects was also used to determine the amount of traffic generated from related projects which were added to the traffic volumes in addition to the 3% growth factor. These projects are shown on Figure 3.

The Future Year Buildout (2030) No Project peak hour traffic volumes for the study intersections are shown on Figure 11. Traffic generated by the proposed project, shown on Figures 7 and 8, were added to these volumes to develop Future Year Buildout (2030) With Project peak hour volumes shown on Figure 12.

ROADWAY IMPROVEMENTS

Fehr & Peers reviewed the SCAG 2008 RTP to identify any programmed roadway improvements in the study area. No improvements were identified and therefore no improvements were assumed in this analysis.

INTERSECTION OPERATIONS

The LOS results are summarized in Table 10 for the Future Year Buildout No Project Condition. Table 11 summarizes the results for the Future Year Buildout With Project Conditions. The analysis sheets are provided in Appendix E and F.

IMPACT ASSESSMENT

Table 12 compares the change in volume-to-capacity ratios at intersections that operate at LOS C, D, E, or F to determine project impacts. These V/C changes are compared to the allowable change shown in Table 2.

As shown in Table 12, the proposed project will impact the following locations:

- Sterling Avenue/Highland Avenue – PM and Weekend Peak Hour
- SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue – AM Peak Hour
- Arden Avenue/SR-210 Eastbound On-Ramp – PM and Weekend Peak Hour

Measures to mitigate the identified impacts are discussed in detail in Chapter 8.

QUEUING ASSESSMENT

This section presents the results of queuing assessment prepared for the freeway ramp intersections being modified as part of the proposed project.

Queuing Results

Table 13 summarizes the results of our peak hour queuing analysis:

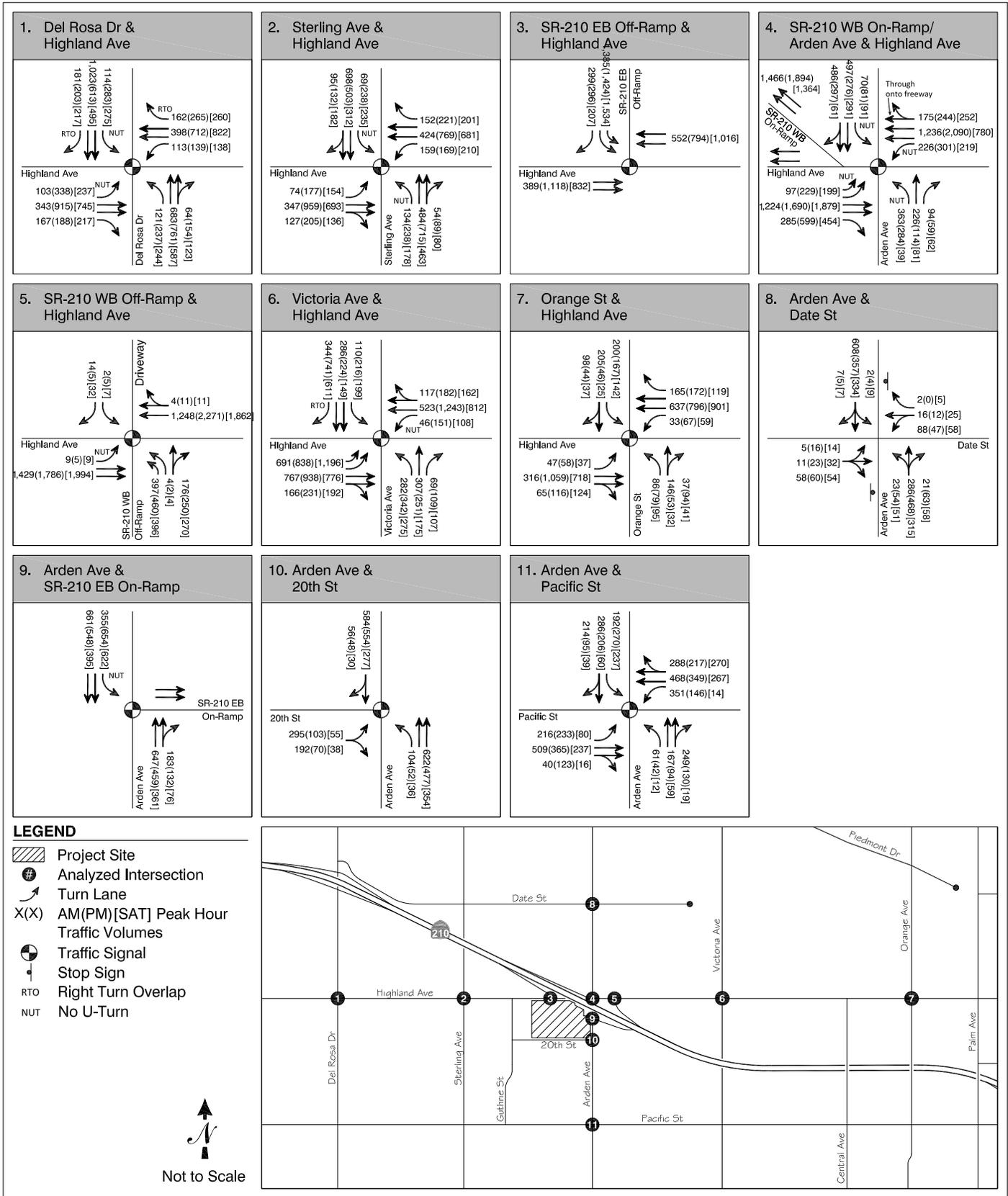
TABLE 10 - INTERSECTION LEVELS OF SERVICE: FUTURE BUILDOUT (2030) NO PROJECT										
Intersection	Control	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
		Delay ¹	LOS	V/C ³	Delay ¹	LOS	V/C ³	Delay	LOS	V/C
1. Del Rosa Drive & Highland Avenue ²	Signalized	31.1	C	0.59	64.8	E	0.97	40.6	D	0.83
2. Sterling Avenue & Highland Avenue ²	Signalized	30.1	C	0.59	72.6	E	0.88	46.9	D	0.73
3. SR-210 Eastbound Off-Ramps & Highland Avenue ²	Signalized	34.1	C	0.79	187.7	F	1.09	134.8	F	1.11
4. SR-210 Westbound On-Ramps/Arden Avenue & Highland Avenue ²	Signalized	67.8	E	0.98	118.3	F	1.07	104.4	F	1.04
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	Signalized	12.8	B	0.61	36.2	D	0.93	20.4	C	0.77
6. Victoria Avenue & Highland Avenue ²	Signalized	45.7	D	0.75	152.8	F	1.27	234.3	F	1.13
7. Orange Avenue & Highland Avenue	Signalized	14.4	B	0.43	10.8	B	0.56	8.7	A	0.41
8. Arden Avenue & Date Street	SSSC	57.5	F	n/a	40.8	E	n/a	30.4	D	n/a
9. Arden Avenue & SR-210 Eastbound On-Ramps	Signalized	11.9	B	0.49	19.1	B	0.61	20.3	C	0.54
10. Arden Avenue & 20 th Street	Signalized	14.7	B	0.73	6.9	A	0.48	5.1	A	0.24
11. Arden Avenue & Pacific Street	Signalized	17.8	B	0.65	13.6	B	0.58	10.2	A	0.38

Notes:
 1- Delay for intersections based on application of 2000 Highway Capacity Manual Methodology. Delay was calculated using Synchro 6.0 software.
 2- CMP intersection
 3- V/C = Volume to Capacity ratio. Note – V/C is not calculated for unsignalized intersections.
 Source: Fehr & Peers, 2011

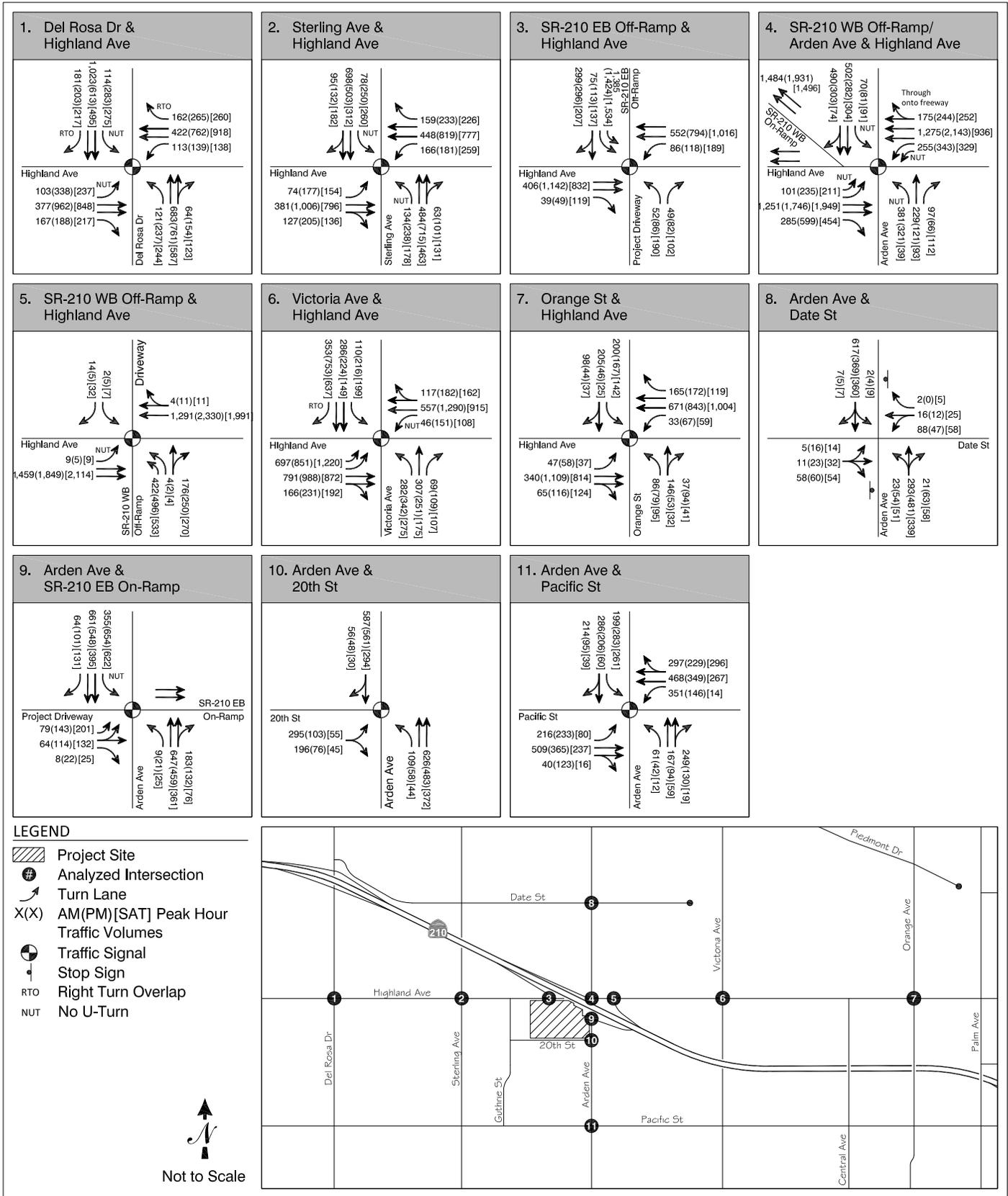
The results of the queuing assessment indicate that the following movements will have insufficient queuing storage:

- SR-210 Eastbound Off-Ramp & Highland Avenue
 - Westbound Left-Turn – Weekend Peak Hour
 - Northbound Left-Turn – Weekend Peak Hour
 - Southbound Left-Turn – Weekend Peak Hour

Westbound Left-Turn exceeds available storage by 125' during the weekend peak hour, which would queue back to the SR-210 Westbound On-Ramp/Arden Avenue/Highland Avenue intersection. To minimize this effect, it is recommended that the project sponsor work with Caltrans to provide a signal interconnect between the two intersections and coordinate them to coordinate the southbound approaches and "hold" the queue at the upstream intersection. Queuing also exceeds storage for the Northbound Left-Turn by 275' during the weekend peak hour, which would interfere with operations inside the project site. The Southbound Left-Turn queuing exceeds the storage on the Off-Ramp. This is the result of significant increase in volume exiting the freeway to reach the San Manuel Casino. This is not classified as a project impact. The City is currently investigating construction of an interchange at Victoria Avenue that would service the casino and alleviate congestion at this intersection.



**FUTURE BUILD-OUT YEAR (2030)
LANE CONFIGURATIONS AND
PEAK HOUR TRAFFIC VOLUMES**



FUTURE BUILD-OUT YEAR (2030) PLUS PROJECT LANE CONFIGURATIONS AND PEAK HOUR TRAFFIC VOLUMES

TABLE 11 - INTERSECTION LEVELS OF SERVICE: FUTURE BUILDOUT (2030) WITH PROJECT

Intersection	Control	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
		Delay ¹	LOS	V/C ³	Delay ¹	LOS	V/C ³	Delay	LOS	V/C
1. Del Rosa Drive & Highland Avenue ²	Signalized	30.9	C	0.59	64.9	E	0.98	39.5	D	0.84
2. Sterling Avenue & Highland Avenue ²	Signalized	30.3	C	0.61	78.8	E	0.93	58.1	E	0.83
3. SR-210 Eastbound Off-Ramps & Highland Avenue ²	Signalized	24.8	C	0.71	75.3	E	0.98	95.5	F	1.07
4. SR-210 Westbound On-Ramps/Arden Avenue & Highland Avenue ²	Signalized	72.4	E	1.01	126.4	F	1.05	148.5	F	1.18
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	Signalized	13.3	B	0.62	41.2	D	0.95	28.9	C	0.85
6. Victoria Avenue & Highland Avenue ²	Signalized	45.1	D	0.75	155.0	F	1.28	73.3	E	1.02
7. Orange Avenue & Highland Avenue	Signalized	17.3	B	0.44	10.8	B	0.57	8.6	A	0.44
8. Arden Avenue & Date Street	SSSC	59.9	F	N/A	42.6	E	N/A	40.1	E	n/a
9. Arden Avenue & SR-210 Eastbound On-Ramps	Signalized	19.6	B	0.54	27.6	C	0.69	30.7	C	0.65
10. Arden Avenue & 20 th Street	Signalized	12.3	B	0.68	6.3	A	0.42	5.3	A	0.25
11. Arden Avenue & Pacific Street	Signalized	17.9	B	0.65	14.0	B	0.59	10.6	B	0.41

Notes:
1- Delay for intersections based on application of 2000 Highway Capacity Manual Methodology. Delay was calculated using Synchro 6.0 software.
2- CMP intersection
3- V/C = Volume to Capacity ratio. Note – V/C is not calculated for unsignalized intersections.
Source: Fehr & Peers, 2011

- Arden Avenue/Highland Avenue/SR-210 Eastbound On-Ramp
 - Eastbound Right-Turn – PM and Weekend Peak Hour
 - Westbound Left-Turn – PM and Weekend Peak Hour
 - Northbound Left-turn – AM, PM and Weekend Peak Hours

Northbound Left-Turn exceeds available storage by 210' – 375' during the peak hours, which would queue through the SR-210 Eastbound On-Ramp/Arden Avenue intersection. To minimize this effect, it is recommended that the project sponsor work with Caltrans to provide a signal interconnect between the two intersections and coordinate them to coordinate the northbound approaches and “hold” the queue at the upstream intersection. Queuing also exceeds storage for the Westbound Left-Turn by 80' during the PM and weekend peak hour, and for the Eastbound Right-Turn by 130' – 330'. To improve queuing conditions at this intersection, it is recommended that the project sponsor work with Caltrans to implement an eastbound right-turn overlap phase and implement coordination through the corridor.

TABLE 12 - IMPACTS FOR SIGNALIZED INTERSECTIONS: FUTURE BUILDOUT (2030) PLUS PROJECT					
Intersection	LOS AM (PM) [SAT]	Allowable Δ V/C AM (PM) [SAT]	No Project AM (PM) [SAT]	With Project AM (PM) [SAT]	Δ V/C AM (PM) [SAT]
1. Del Rosa Drive & Highland Avenue ²	C (E) [D]	0.04 (0.01) [0.02]	0.59 0.97 0.83	0.59 0.98 0.84	0.00 0.01 0.01
2. Sterling Avenue & Highland Avenue ²	C (E) [E]	0.04 (0.01) [0.01]	0.59 0.88 0.73	0.61 0.93 0.83	0.02 0.05 0.10
3. SR-210 Eastbound Off-Ramp & Highland Avenue ²	C (E) [F]	0.04 (0.01) [0.01]	0.79 1.09 1.11	0.71 0.98 1.07	-0.08 -0.11 -0.04
4. SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue ²	E (F) [F]	0.01 (0.01) [0.01]	0.98 1.07 1.04	1.01 1.05 1.02	0.03 -0.02 -0.02
5. SR-210 Westbound Off-Ramps & Highland Avenue ²	B (D) [C]	0.02 0.04	0.93 0.82	0.95 0.85	0.02 0.03
6. Victoria Avenue & Highland Avenue ²	D (F) [E]	0.02 (0.01) [0.01]	0.75 1.27 1.13	0.75 1.28 1.02	0.00 0.01 -0.11
7. Orange Avenue & Highland Avenue	B (B) [A]				
8. Arden Avenue & Date Street	F (E) [E]	N/A	N/A	N/A	N/A
9. Arden Avenue & SR-210 Eastbound On-Ramps	B (C) [C]	0.04 0.04	0.61 0.54	0.69 0.65	0.08 0.11
10. Arden Avenue & 20 th Street	B (A) [A]				
11. Arden Avenue & Pacific Street	B (B) [B]				

Notes:
1- V/C = Volume to Capacity ratio. Calculated using the Synchro 6 software package.
Shaded cells indicate where intersections operate at LOS A or B.
Bold-Italicized type indicates project impact.
Source: Fehr & Peers, 2011.

TABLE 13 - CALTRANS QUEUING ANALYSIS: FUTURE BUILDOUT (2030) PLUS PROJECT

Intersection/Movement	Available Storage (ft)	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
3. SR-210 Eastbound Off-Ramp & Highland Avenue				
Westbound Left-Turn	175'	156'	156'	264'
Northbound Left-Turn	145'	127'	140'	339'
Northbound Right-Turn	145'	50'	70'	55'
Southbound Left-Turn ¹	985'	894'	548'	1017'
Southbound Right-Turn ¹	985'	283'	129'	270'
4. SR-210 Westbound On-Ramp/Arden Avenue & Highland Avenue²				
Eastbound Left-Turn	250'	75'	213'	176'
Eastbound Right-Turn	220'	166'	552'	350'
Westbound Left-Turn	140'	157'	220'	212'
Northbound Left-Turn	275'	608'	484'	650'
Northbound Right-Turn	275'	47'	43'	58'
Southbound Left-Turn	115'	87'	88'	95'
9. SR-210 Eastbound On-Ramp & Arden Avenue²				
Eastbound Left-Turn	130'	87'	156'	198'
Eastbound Right-Turn	130'	25'	25'	25'
Northbound Left-Turn	320'	25'	42'	48'
Southbound Left-Turn	275'	314'	543'	502'
Southbound Right-Turn	75'	25'	25'	15'
Notes:				
1- Approximate length to the freeway gore point is 1,350'. Per AASHTO <i>A Policy on Geometric Design of Highways and Streets</i> , a stopping sight distance for facilities with a 65 MPH design speed requires at least 365' of stopping sight distance. Therefore, the queue storage is estimated to be 985 feet.				
Bold-Italicized type indicates insufficient storage.				
Minimum reported queue is 25'.				
Source: Fehr & Peers, 2011.				

- SR-210 Eastbound On-Ramp/Arden Avenue
 - Eastbound Left-Turn – PM and Weekend Peak Hour
 - Southbound Left-Turn – AM, PM and Weekend Peak Hours

Operations would improve with optimized signal timings and signal coordination. The optimized timings would reduce the eastbound queue to 126'. A signal interconnect with appropriate coordination timing plans would "meter" southbound traffic from the upstream intersection such that queues would be controlled and would not interfere with traffic operations

7. CUMULATIVE (2030) PLUS PROJECT MITIGATION MEASURES

As noted in Chapter 5, the implementation of the proposed project would result in impacts at study intersections. The impacts and mitigation measures are described in this chapter.

IMPACTS AND MITIGATION MEASURES

Intersections

Per the City of San Bernardino Traffic Study Guidelines, the following intersections are cumulatively impacted with the addition of project traffic:

- Sterling Avenue at Highland Avenue (PM and Weekend peak hour)
- SR-210 Westbound On-Ramp/Arden Avenue at Highland Avenue (AM peak hour)
- Arden Avenue at Date Street
- SR-210 Eastbound On-Ramp at Arden Avenue (PM peak hour)

A description of each project impact and potential mitigation measures are proposed below. ***The proposed project would be responsible for a fair-share contribution toward the following identified improvements:***

Sterling Avenue/Highland Avenue (PM and Weekend peak hour)

Impact

The intersection operates at LOS E during the PM and Weekend peak hours with the addition of project-generated traffic. It will increase the V/C ratio by 0.05 and 0.10, respectively, creating a project impact at the intersection.

Mitigation

Contribute a fair-share contribution toward optimize signal timings by modifying the cycle length to 105 seconds and optimizing the timing parameters. However, since this signal is part of a coordinated system, it should be conducted in the future as part of a corridor timing strategy. With the improvement, the intersection would operate at LOS D.

SR-210 Westbound On-Ramp/Arden Avenue at Highland Avenue (AM peak hour)

Impact

The intersection operates at LOS E during the AM peak hour with the addition of project-generated traffic. It will increase the V/C ratio by 0.03, creating a project impact at the intersection.

Mitigation

Contribute a fair-share contribution to modify the northbound middle-through lane to a left turn lane to increase left turn capacity per cycle. The current northbound right turn lane would be restriped as a through/right-turn lane. With this geometry modification, the intersection would operate at LOS D with a V/C ratio of 0.92, which is 0.06 lower than the no project condition, which meets the criteria of a less-than-significant level and no further

mitigation is required. Since this is a Caltrans-controlled intersection, Caltrans would ultimately be responsible for approving the identified modifications.

Date Street at Arden Avenue (PM peak hour)

Impact

The intersection operates at LOS F and LOS E during the peak hours. The intersection is expected to satisfy the MUTCD peak hour volume warrant for traffic signal installation¹.

Mitigation

For the intersection to operate at an acceptable level, the project would be responsible to contribute a fair share contribution toward a traffic signal. With installation of a traffic signal, the intersection would operate at an acceptable level.

SR-210 Eastbound On-Ramp at Arden Avenue (PM and Weekend peak hour)

Impact

The intersection operates at LOS C during the PM and weekend peak hour with the addition of project-generated traffic. However, it will increase the V/C ratio by 0.08 and 0.11, respectively, creating a project impact at the intersection.

Mitigation

To mitigate the impact, the north/south left-turn phasing would need to be modified from protected phase to permitted/protected phasing. With this phasing modification, the intersection would operate at LOS B. Since this is a Caltrans-controlled intersection, Caltrans would ultimately be responsible for approving and implementing the phasing modification. Additionally, it may not be appropriate to provide protected/permitted phasing to over 600 southbound left-turns at this location. Alternatively, a second southbound left-turn lane would be needed.

¹ This analysis is intended to examine the general correlation between the planned level of future development and the need to install new traffic signals. It estimates future development-generated traffic compared against a sub-set of the standard traffic signal warrants recommended in the Federal Highway Administration *Manual on Uniform Traffic Control Devices* and associated State guidelines. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured, rather than forecast, traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. The responsible state or local agency should undertake regular monitoring of actual traffic conditions and accident data, and timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization. The signal warrant information is provided in the appendix.

FAIR SHARE ASSESSMENT

At the request of the City, fair share calculations were developed for the proposed project and its associated impacts. These calculations include the City's local circulation fee, the regional circulation fee, and the calculated fair-share contribution for the proposed project.

The local and regional circulation fees are based on adopted fee programs, were provided by the City of San Bernardino, and are summarized in Table 14. These fees were applied to the proposed project to calculate the fees for the proposed project, also summarized in Table 14.

Table 15 summarizes the fair share calculations for the cumulative project impacts. Fair share was calculated using the Caltrans' fair share calculation methodology, which was calculated as follows:

$$\text{Fair Share} = \frac{\text{Project Trips}}{\text{Year 2033 with Project Traffic Volume}} - (\text{Existing Traffic Volume})$$

TABLE 14 – TRAFFIC IMPACT FEES			
Land Use Designation	Size	Fee Obligation	Estimated Fee
Local Fee Program			
Home Improvement Store	107,979 sq. ft.	\$0.252 / sq. ft	\$27,210.71
Garden Area	28,111 sq. ft.	\$0.252 / sq. ft	\$7,083.97
Shopping Center	43,830 sq. ft.	\$0.252 / sq. ft	\$11,045.16
Gas Station with Convenience Market	2,900 sq. ft.	\$0.252 / sq. ft	\$730.80
Remaining 5 Pads	24,800 sq. ft.	\$0.252 / sq. ft	\$6,249.6
Total Local Fee Obligation:			\$52,320.24
Regional Fee Program			
Home Improvement Store	107,979 sq. ft.	\$2.625 / sq. ft	\$283,444.88
Garden Area	28,111 sq. ft.	\$2.625 / sq. ft	\$73,791.38
Shopping Center	43,830 sq. ft.	\$2.625 / sq. ft	\$115,053.75
Gas Station with Convenience Market	2,900 sq. ft.	\$2.625 / sq. ft	\$7,612.50
Remaining 5 Pads	24,800 sq. ft.	\$2.625 / sq. ft	\$65,100
Total Regional Fee Obligation:			\$545,002.50
Source: City of San Bernardino Development Impact Fees, July 15, 2010. Fehr & Peers 2011			

TABLE 15 – FAIR SHARE ASSESSMENT

Location/Impact	Peak Hour	Existing Volume	Project Volume	Year 2030 With Project Volume	Total New Traffic	Project Fair Share Percentage
Sterling Ave./ Highland Ave.	PM	2,486	145	4,560	2,074	7%
	Weekend	1,986	349	3,874	1,888	18%
Arden Ave./ Highland Ave.	AM	2,810	132	5,111	2,301	6%
Date St./ Arden Ave.	PM	628	25	1,134	506	5%
SR-210 Eastbound On-Ramp/ Arden Ave.	PM	985	401	2,194	1,209	33%
	Weekend	800	514	1,968	1,168	44%

Fehr & Peers 2011

8. PROJECT SITE PLAN REVIEW

Fehr & Peers reviewed the project site plan in April 2011 and provided comments to Greenberg Farrow. Those comments are summarized in this chapter, along with our parking assessment to verify that sufficient parking is provided.

SITE ACCESS AND ON-SITE CIRCULATION

In general, the site plan provides more than adequate accessibility for all users to access and circulation through the site. However, the following minor suggestions were made to further improve accessibility:

- The one-way access roadway between Pad 3 and Pad 4 needs to be clearly delineated. Clear on-site markings are recommended to minimize the potential for wrong-way travel. It is also recommended that sufficient shrubs are provide between this access roadway and the drive-thru lane at Pad 3 to ensure that vehicle headlights don't disrupt driver vision at night.
- Request that the City of San Bernardino Fire Department review the site plan to ensure adequate emergency accessibility.

PARKING ASSESSMENT

Table 16 summarizes the results of our parking assessment. As shown in Table 16, the proposed project contains sufficient parking based on City parking requirements.

TABLE 16 - PARKING ASSESSMENT			
Land Use Designation	Size	Parking Code Requirement	Required Spaces
Home Improvement Store	107.979	4 spaces per KSF of floor area	432
Garden Area	28.111	1 space per 2.5 KSF floor area	12
Shopping Center	43.83 KSF	4 spaces per KSF of floor area	176
Gas Station with Convenience Market	3 Pump Islands	1 space for each pump island	3
Remaining 5 Pads	24.8 KSF	1 space per 180 SF	138
<i>Parking Spaces Required:</i>			761
<i>Number of Proposed Parking Spaces:</i>			784
Source: City of San Bernardino Zoning Code Fehr & Peers 2011			