

Appendix K

Transportation Impact Study

Imperial Avalon

Transportation Impact Study

Prepared for:
Imperial Avalon, LLC

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LB19-0002

FEHR  PEERS

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1. Introduction

This report documents the assumptions, methodologies, and findings of a transportation impact study conducted by Fehr & Peers to evaluate the potential transportation impacts of the Imperial Avalon project (herein after referred to as the “Project”) in the City of Carson, California, on a 27-acre site located to the west of Avalon Boulevard between the I-405 freeway interchange and 213th Street.

1.1 Project Description

The Project is proposed to be developed in the City of Carson in the South Bay area of Los Angeles County on a site currently containing a mobile home park known as Imperial Avalon Mobile Estates. It is located approximately 17 miles south of downtown Los Angeles and approximately 6.5 miles east of the Pacific Ocean. The Project site is comprised of approximately 27 acres located to the west of Avalon Boulevard between the I-405 freeway interchange and 213th Street. The Project site is bounded by the District at South Bay development (currently under construction) and the Torrance Lateral Flood Control Channel to the north, the potential mixed-use Kott development to the east and south, and other residential uses to the west and south. Figure 1 illustrates the Project site plan.

The Project as analyzed in this study involves the construction of:

- 122 studio apartment units
- 368 one-bedroom apartment units
- 163 two-bedroom apartment units
- 380 townhome units
- 180 senior independent living units
- 10,352 square feet of restaurant space

The Project, as illustrated in the site plan in Figure 1, will have signalized access and egress at one main driveway location. This main Project driveway will provide access to and from Avalon Boulevard. Site access will also be served by two side-street stop-controlled driveways to and from Grace Avenue to the west. One additional stop-controlled right-turn-in/right-turn-out only driveway will be constructed along southbound Avalon Boulevard to the south of the main driveway.

1.2 Study Scope

This transportation impact study will be incorporated into the environmental impact report (EIR) being prepared for the Project and follows the California Environmental Quality Act (CEQA) guidance for determining transportation impacts in accordance with Senate Bill (SB) 743. Since the City of Carson has not yet set its own vehicle miles traveled (VMT) metrics and thresholds, this study is consistent with the approach provided in the Governor’s Office of Planning and Research (OPR) Technical Advisory on Evaluating



Transportation Impacts in CEQA (December 2018) and interim City guidance based on discussions with City staff.





 Stop Sign
  Signalized Intersection



Figure 1



2. SB 743 Overview

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process to fundamentally change transportation impact analysis conducted as part of CEQA compliance. OPR was charged with developing new guidelines for evaluating transportation impacts under CEQA using methods that no longer focus on measuring automobile delay and level of service (LOS). This change at the state level recognizes the unintended consequences of using LOS as an impact metric, which results in understating potential transportation impacts in greenfield areas and discouraging more sustainable infill projects and active transportation projects. SB 743 directs agencies to develop new guidelines that use a transportation performance metric which will help promote: the reduction of greenhouse gas emissions, the development of multimodal networks, and a more sustainable diversity of land uses.

OPR issued proposed updates to the CEQA guidelines in support of these goals in November 2017¹ and a supporting technical advisory in December 2018². The updates establish VMT as the primary metric for evaluating a project's environmental impacts on the transportation system. The changes to CEQA guidelines Section 15064.3 to implement SB 743 were certified by the State in December of 2018. Lead agencies, including the City of Carson, have until July 2020 to implement these new requirements.

The City of Carson has not yet adopted new significance thresholds for transportation impacts based on VMT and has not yet revised its transportation impact assessment processes and guidelines accordingly. In lieu of City guidelines, VMT analysis based on the standard OPR guidance and interim City guidance based on discussions with City staff was conducted for the Project.

2.1 VMT Analysis

The OPR technical advisory describes the four components of a VMT analysis necessary to comply with the new CEQA guidelines:

1. **VMT Screening & Qualitative Review:** The first step is to determine when a VMT analysis is required. OPR recommends that projects be screened from a VMT analysis based on their size, location, and/or accessibility to transit.
2. **VMT Analysis Methodology:** If a project is not screened from requiring a VMT analysis, the City can use the regional travel demand model to estimate a project's VMT. OPR recommends that VMT be reported as "Home-Based VMT" per capita for residential projects and "Home-Based Work VMT" per employee for the employees of a project site.

¹ State of California, Governor's Office of Planning and Research, *Proposed Updates to the CEQA Guidelines, Final*, November 2017.

² State of California, Governor's Office of Planning and Research, *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018.



Home-Based VMT includes all vehicle roundtrips originating from the residence of the trip-maker. Home-Based Work VMT includes only vehicle roundtrips between the residence of the trip-maker and their place of work.

3. **VMT Impact Thresholds:** The City has discretion to develop and adopt its own VMT thresholds, or rely on thresholds recommended by other agencies, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence. OPR recommends that projects with VMT exceeding 15 percent below existing VMT per capita or per employee when compared to a regional or citywide average of these metrics may indicate project impacts. Fehr & Peers recommends utilizing citywide average VMT to determine the thresholds for this analysis, consistent with recent VMT analyses conducted for nearby developments and the City's General Plan Update.
4. **VMT Mitigation:** The types of mitigation that affect VMT are those that reduce the number of single-occupant vehicles generated by a project. Mitigation can be accomplished by altering the proposed land uses or by implementing transportation demand management (TDM) measures.

Table 1 presents a summary of the new SB 743 criteria and OPR's recommended guidance for VMT screening, analysis and thresholds. Since the City has yet to establish its own VMT significant impact thresholds and guidelines, the VMT analysis in this study conforms to the methodology shown in Table 1 and the OPR Technical Advisory.



TABLE 1
SUMMARY OF CEQA GUIDANCE AND OPR TECHNICAL ADVISORY

CEQA Criteria	OPR Technical Advisory
<i>VTM Screening & Qualitative Review</i>	
If existing models or methods are not available to estimate VMT for the project being considered, a lead agency may analyze the project's VMT qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc.	Generally, qualitative analyses should only be conducted when methods do not exist for undertaking a quantitative analysis. OPR suggests screening for small projects, retail uses less than 50 KSF, and projects located in high quality transit areas.
<i>VTM Analysis Methodology</i>	
A lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use a model to estimate a project's VMT and may revise those estimates to reflect professional judgment based on substantial evidence.	OPR recommends reporting VMT as follows: Residential = Home-Based VMT per capita Office = Home-Based Work VMT per employee Retail = Change in total VMT OPR also recommends using a regional travel demand model to estimate VMT.
<i>VTM Impact Thresholds</i>	
Lead agencies have discretion to develop and adopt their own thresholds, or rely on thresholds recommended by other agencies, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.	OPR recommends the following: Residential: A proposed project exceeding a level of 15% below existing regional or Citywide VMT per capita may indicate a significant transportation impact. Office: A proposed project exceeding a level of 15% below existing regional VMT per employee may indicate a significant transportation impact. Retail: A net increase in total VMT may indicate a significant transportation impact.

3. VMT Screening

VMT is heavily dependent on the land uses and location of a project. For example, a development site located in an urban area will typically have lower VMT because people have more options to walk, bike, take transit or drive short distances to nearby destinations in comparison to a suburban or rural environment where most people drive longer distances for their everyday work and household needs. Therefore, OPR has provided guidance related to several opportunities for screening projects that would generate low VMT as described in this chapter.

3.1 Project Type Screening

Projects that generate less than 110 daily trips may be screened from conducting a VMT analysis. Local serving commercial uses less than 50,000 square feet may also be presumed to have a less than significant VMT impact absent substantial evidence to the contrary. This is because local serving commercial generally improves the convenience of shopping and dining close to home and has the effect of reducing vehicle travel. All the Project's commercial uses are less than 50,000 square feet. Therefore, the commercial component of the Project is identified as local serving and screened from VMT analysis.

3.2 Low VMT Area Screening

Residential and office projects located within a low VMT generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use land use projects may qualify for screening if the project can reasonably be expected to generate VMT per resident or per worker that is similar to the existing land uses in the low VMT area.

The Southern California Association of Governments (SCAG) Regional Travel Demand Model, which includes Los Angeles County and the City of Carson, is the most appropriate model to use for VMT forecasting within the City of Carson. This analysis used the SCAG model to measure the VMT performance for the Project's traffic analysis zone (TAZ) during Base Year 2016 (the most recently adopted SCAG base year³) conditions. TAZs are geographic polygons similar to Census block groups used to represent areas of homogenous travel behavior. The VMT metrics for the Project's TAZ are discussed in further detail below as part of the screening for residential land uses.

Low VMT areas for residential projects are defined as TAZs that generate VMT on a per capita basis that is at least 15% lower than the citywide average. Low VMT areas for office projects are defined as TAZs that generate VMT on a per employee basis that is at least 15% lower than the citywide average. The Project's TAZ is estimated to generate VMT per capita greater than 15% below the City's baseline VMT. Therefore,

³ Although an updated SoCal Connect RTP/SCS document was adopted by SCAG in 2020, they have not yet released the corresponding Base Year 2020 travel demand model data. Therefore, Base Year 2016 is still the latest existing conditions dataset.



the Project is not in an area with low residential VMT, which means the residential component of the Project cannot be presumed to have a less than significant VMT impact and may require further VMT analysis.

3.3 Transit Priority Area (TPA) Screening

Projects located within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor (HQTC) may also be exempt from VMT analysis⁴. Major transit stops are defined in the technical advisory as rail or bus rapid transit stations, ferry terminals served by transit, or the intersection of two HQTCs (defined as corridors with fixed-route bus service with no longer than 15-minute headways during peak commute periods).

Based on OPR guidance, projects located within a TPA may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, this presumption may not be appropriate if the project:

- Has a Floor Area Ratio (FAR) of less than 0.75
- Includes more parking for use by residents, customers, or employees than required by the City (unless additional parking is being provided for design feasibility, such as completing the floor of a subterranean or structured parking facility, or if additional parking is located within the project site to serve adjacent uses)
- Is inconsistent with the applicable SCS (as determined by the City)
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units

The closest major transit stops to the Project are along the LA Metro Silver Line bus rapid transit route. However, the Project is more than one mile away from the closest Silver Line stop at the I-110/Carson Street interchange. Also, there are no HQTCs near the Project. Therefore, the Project is not within a transit priority area.

3.4 Screening Summary

Based on the screening criteria recommended by OPR, only the commercial component of the Project is exempt from VMT analysis. The residential component of the Project will need to be analyzed for potential VMT impacts.

⁴ California Code of Regulations, Title 14, Division 6, Chapter 3, Section 15064.3(b)(1)



4. VMT Analysis Methodology

For projects that do not meet any of the screening criteria described in the previous chapter, a VMT analysis is required. The VMT analysis relies on the best available data to inform trip generation and trip length estimates for each project land use. For projects consisting of residential, office, and commercial land uses, the VMT analysis can be conducted using the SCAG model. The SCAG 2016 RTP/SCS model was used to collect data and perform the VMT analysis for this study.

The following steps were undertaken to estimate the VMT generated by the Project.

4.1 Step 1 – Determine Average Person Trip Rates

The SCAG model was used to estimate average person trip rates for the residential component of the Project. Person trip generation rates for each TAZ in the City were averaged to obtain a home-based production trip rate per resident. The home-based production person trip rate per resident is 1.7 for the City using this method. This study assumes these citywide average trip rates reasonably reflect the Project's person trip generation potential.

4.2 Step 2 – Average Person Trip Rate to Vehicle Trips Conversion

Before conducting the VMT calculations, the person trips calculated in Step 1 need to be converted to vehicle trips. Average mode splits for the City were obtained from the SCAG model and used to estimate the Project's vehicle trip generation.

This step requires an estimate of the total resident and employee population of the Project. This study assumes the following average dwelling unit populations:

- Studio Apartments 1.6 persons per household⁵
- One-Bedroom Apartments 2.0 persons per household⁶
- Two-Bedroom Apartments 2.9 persons per household⁷
- All Townhome Units 3.6 persons per household⁸
- All Senior Dwelling Units 1.5 persons per household⁹

⁵ Based on U.S. Census Bureau American Community Survey (ACS) data for multifamily rental studio units in Los Angeles County (higher than the City of Carson rate – 1.3)

⁶ Based on U.S. Census Bureau ACS data for multifamily rental one-bedroom units in City of Carson

⁷ Based on U.S. Census Bureau ACS data for multifamily rental two-bedroom units in City of Carson

⁸ Based on Carson Housing Element, SCAG and CFD general/blended rate

⁹ Based on City of Los Angeles VMT Calculator Tool blended senior/special needs rate



These averages incorporate data from U.S. Census block groups in the surrounding area, the SCAG model and input from the Project development team and the City. Using these average population rates, the total resident population of the Project is 3,042.

Based on data from the SCAG model, this study estimates 92% of residential person trips occur in vehicles (not including bicycles or transit vehicles), with 47% trips in vehicles occupied by one person and the other 45% in vehicles occupied by an average of 2.5 people. The remaining 8% of residential person trips are forecasted to use other modes such as walking, biking, or transit, and as a result are not included in the VMT calculations. Using these estimates, the Project will generate 3,368 daily residential vehicle trips¹⁰.

4.3 Step 3 – Estimate Trip Length

The trip lengths for the Project were estimated using data from the SCAG model. The SCAG model can produce average trip lengths for each TAZ in the City. For the TAZ including the Project site, the average trip length for home-based production trips is 9.1 miles.

4.4 Step 4 – VMT Calculations

The final step to calculate VMT is to multiply the number of vehicle trips by the average trip length for those trips. The total VMT for the Project's residential uses is projected to be 30,649. The residential VMT is then divided by the 3,042 residents to obtain a VMT per capita of 10.1. These results are presented in Table 2 below.

¹⁰ The daily residential vehicle trips utilized in the VMT analysis is lower than the daily residential vehicle trips utilized for the Project's other CEQA impact analyses, such as air quality, greenhouse gas emissions, energy and noise. The other CEQA impact analyses utilized the ITE-based daily trip estimates as shown in the Appendix of this report. The ITE-based daily trip estimates are intended to be conservative to represent a worst-case scenario for assessing potential impacts to air quality, greenhouse gas emissions, energy and noise. The VMT analysis, which requires running the 2016 RTP/SCS SCAG model, must use the same methodology for deriving Project trip generation as was used to calculate the VMT threshold of significance, which in this case is the citywide average home-based VMT per capita from the 2016 RTP/SCS SCAG model. Therefore, to be internally consistent, the VMT analysis for this Project uses the SCAG model derived trip generation.



TABLE 2
PROJECT VMT RESULTS
HOME-BASED VMT PER CAPITA

Land Use	Population	Trip Length (mi)	Daily Vehicle Trips	VMT	Home-Based VMT per Capita
Residential	3,042	9.1	3,368	30,649	10.1

5. VMT Impact Thresholds

The 2016 RTP/SCS SCAG model was used to determine an appropriate baseline of VMT for projects in the City of Carson. The City's baseline VMT for Home-Based trips (per capita) is shown in Table 3.

Following the standard OPR guidance, a threshold of 15% below baseline VMT is used to determine if the Project will cause significant transportation impacts. If the Project generates VMT higher than this threshold, then it is expected to have a significant impact. If the Project generates VMT lower than this threshold, then it is expected to not have a significant impact.

Table 3 compares the City's baseline VMT with the residential VMT for the Project. The Home-Based VMT per capita for the Project (10.1) is 30% below the citywide average (14.4).

Based on the standard OPR thresholds and interim City guidance, the Project does not have any significant VMT impacts. The Project is estimated to generate VMT per capita of less than 15% below the citywide average for this metric. All commercial uses included in the Project are each less than 50,000 square feet and therefore identified as local serving. Since the Project has no significant impacts, no VMT mitigation is required.



TABLE 3 PROJECT VMT IMPACT ASSESSMENT HOME-BASED VMT PER CAPITA				
VMT Metrics	2016 Citywide Average [1]	Project Average [1]	% Below Citywide Average	Significant Impact?
Home-Based VMT per Capita	14.40	10.10	30%	NO

[1] Citywide and project VMT averages generated using the 2016 RTP/SCS SCAG travel demand model

6. Non-VMT Transportation Impacts

CEQA guidelines include several transportation impact categories in addition to the SB 743/VMT impact category discussed in the previous chapters. This chapter summarizes the Project's potential non-VMT transportation impacts.

6.1 Freeway Safety Analysis

Based on the *Interim LDIGR Safety Review Practitioners Guide* (December 2020), Caltrans requires an assessment of potential safety impacts to Caltrans facilities caused by the addition of project vehicle trips. The Caltrans NOP comment letter (included in the Appendix of this report) for the Project identified the following locations to be assessed for potential safety impacts:

- **I-405/Avalon Blvd Interchange**
 - I-405 NB off-ramp to Avalon Blvd
 - I-405 SB off-ramp to Avalon Blvd¹¹
 - NBL turn pocket from Avalon Blvd to I-405 NB on-ramp
 - NB Avalon Blvd approach to I-405 SB on-ramp
- **I-110/220th Street Interchange**
 - I-110 NB off-ramp to 220th Street
 - NBL turn pocket from Figueroa Street to I-110 NB on-ramp

For the off-ramp locations, a potentially significant safety impact is identified if the addition of project vehicle trips would result in an off-ramp queue that extends onto the freeway mainline. An off-ramp queue which extends onto the freeway mainline causes a potential safety concern if a significant speed differential exists between the off-ramp queue vehicles and the freeway mainline vehicles.

For the on-ramp locations, Caltrans has not identified a set of criteria for evaluating potential significant safety impacts. In lieu of such guidance, this memorandum summarizes collision data at these locations from the previous five years and turn pocket queue lengths with the addition of project vehicle trips. Connections, if any, between the collision data, turn pocket queue lengths and the addition of project vehicle trips causing potential safety concerns will then be identified.

¹¹ The I-405 Southbound Off-Ramp & Avalon Boulevard interchange will be reconfigured in the future to accommodate the District at South Bay project. This analysis considers the current traffic signal configuration at the I-405 Southbound Off-Ramp & Avalon Boulevard intersection for the Existing and Existing plus Project scenarios and the future traffic signal configuration at the I-405 Southbound Off-Ramp & New Internal District at South Bay Road (tentatively called Lenardo Drive) intersection for the Future (Year 2027) Base and Future (Year 2027) plus Project scenarios.



The off-ramp and on-ramp safety assessment is conducted for four traffic volume scenarios: Existing, Existing plus Project, Future (Year 2027) Base and Future (Year 2027) plus Project scenarios. The two future scenarios consider additional traffic volume from ambient growth (0.5% linear growth per year) and related projects in the City of Carson and unincorporated Los Angeles County. Trip generation and distribution for the Project and the related projects included in this analysis are shown in the Appendix of this report.

6.1.1 Off-Ramp Locations

To evaluate the adequacy of the existing and future off-ramp storage lengths, Caltrans guidance indicates that the 95th percentile queue length should be compared to the off-ramp storage length measured from the stop bar back to the gore point. This analysis utilizes the *Highway Capacity Manual (HCM)*, 6th Edition methodology to calculate the 95th percentile queue lengths.

Three freeway off-ramps were evaluated to determine whether the Project would create potentially significant freeway safety impacts. The three freeway off-ramps evaluated include:

- I-405 NB off-ramp to Avalon Blvd
- I-405 SB off-ramp to Avalon Blvd
- I-110 NB off-ramp to 220th Street

Queue lengths were estimated using the Synchro traffic analysis software package. Intersection counts were collected at the ramp locations and signal timing information from Caltrans was used to accurately analyze operations. Detailed results from this analysis can be found in the Appendix of this report.

Table 4 presents a summary of the off-ramp queuing analysis for Existing, Existing plus Project, Future (Year 2027) Base and Future (Year 2027) plus Project scenarios. As shown in Table 4, the freeway off-ramp queues do not exceed the storage length in any scenario or time period. Therefore, no significant freeway safety impact is identified at the off-ramp locations with the addition of Project trips.

6.1.2 On-Ramp Locations

As with the off-ramp locations, this analysis utilizes the *HCM*, 6th Edition methodology to calculate the 95th percentile queue lengths for the two left-turn pockets leading to freeway on-ramps identified in the Caltrans NOP comment letter for potential safety concerns. The two left-turn pockets evaluated include:

- NBL turn pocket from Avalon Blvd to I-405 NB on-ramp
- NBL turn pocket from Figueroa Street to I-110 NB on-ramp

Queue lengths were estimated using the Synchro traffic analysis software package. Intersection counts were collected at the on-ramp locations and signal timing information from Caltrans was used to accurately analyze operations. Detailed results from this analysis can be found in the Appendix of this report.

Table 5 presents a summary of the left-turn pocket queuing analysis for Existing, Existing plus Project, Future (Year 2027) Base and Future (Year 2027) plus Project scenarios. As shown in Table 5, the NBL turn pocket from Avalon Blvd to I-405 NB on-ramp has a queue exceeding the storage length in both Future



Base and Future plus Project scenarios. The NBL turn pocket from Figueroa Street to I-110 NB on-ramp has a queue exceeding the storage length in all four scenarios. While both left-turn pockets experience queuing issues, these findings suggest the queueing issues would occur even without the addition of Project trips. The addition of Project trips increases the forecast queue by approximately 1 car length on Avalon Boulevard. The Project trips are not expected to affect the Figueroa Street queue length.

To further assess potential safety concerns at the on-ramp locations, collision data was compiled for the previous five years utilizing the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). The on-ramp locations where data was compiled include:

- NBL turn pocket from Avalon Blvd to I-405 NB on-ramp
- NB Avalon Blvd approach to I-405 SB on-ramp
- NBL turn pocket from Figueroa Street to I-110 NB on-ramp

Detailed summary tables and maps of collisions occurring near these locations are included in the Appendix of this report. As shown in these tables and maps, none of the collisions from the previous five years occur at or preceding the two left-turn pockets or the NB Avalon Blvd approach to I-405 SB on-ramp. There is a cluster of collisions which occurred on the I-405 NB on-ramp from Avalon Blvd, however based on the location of the collisions shown in the Appendix of this report these appear to be related to the SBR channelized merger rather than the NBL turn pocket. Therefore, no significant freeway safety impact is identified at the on-ramp locations with the addition of Project trips.

6.2 Other CEQA Transportation Impact Categories

CEQA guidelines include several potential transportation impact categories other than VMT and freeway safety analysis, as documented in Appendix G, Section XVII of the CEQA Guidelines Appendices¹². The remaining sections of this chapter summarize the other transportation impact categories and assess the Project for significant impacts under these categories.

6.2.1 Programs, Plans, Ordinances and Policies

CEQA Guideline: *"Would the project...Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?"*

The Project does not prevent the addition of planned improvements to the City's circulation system as described in City documents including the City of Carson General Plan and Master Plan of Bikeways. The Project will not degrade facilities on the existing circulation system either. Therefore, the Project does not cause significant impacts for this category.

¹² California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387



6.2.2 Geometric Design Features and Incompatible Uses

CEQA Guideline: *“Would the project...Substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?”*

The Project does not increase hazards due to a geometric design feature. All driveway access points are perpendicular to the public right-of-way and adequately spaced from existing signalized intersections. The construction of new intersections to serve the Project will conform to the latest *California Manual on Uniform Traffic Control Devices* (CAMUTCD) guidelines. The Project does not introduce incompatible uses with the surrounding community. Therefore, the Project does not cause significant impacts for this category.

6.2.3 Emergency Access

CEQA Guideline: *“Would the project...Result in inadequate emergency access?”*

The Los Angeles County Sheriff’s Department provides law enforcement services to the City of Carson. The Carson branch of the Sheriff’s Department is within a quarter mile of the Project site, to the south along Avalon Boulevard. The Los Angeles County Fire Department provides fire protection services to the City of Carson. The nearest fire station is within a 1.5-mile drive of the Project site, to the south on 223rd Street.

The Project provides several emergency access points from both Avalon Boulevard and Grace Avenue. The location and design of these access points, as well as the on-site internal roadways, would be designed to comply with applicable local requirements related to emergency vehicle access and circulation. Therefore, the Project does not cause significant impacts for this category.



TABLE 4
IMPERIAL AVALON PROJECT
FREEWAY OFF-RAMP QUEUE ANALYSIS

N/S Street Name	E/W Street Name	Ramp Direction	Ramp Storage Length (feet)	Analyzed Period	Existing	Existing Plus Project		Future Base	Future Plus Project	
					95 th ile queue length (feet) [1]	95 th ile queue length (feet) [1]	Extended Queuing?	95 th ile queue length (feet) [1]	95 th ile queue length (feet) [1]	Extended Queuing?
Avalon Blvd	NB 405 Off-Ramp	NB	975	AM	50	50	NO	100	100	NO
				PM	75	75	NO	150	150	NO
SB 405 Off-Ramp	Lenardo Dr	SB	750	AM				150	175	NO
				PM				150	200	NO
Avalon Blvd	SB 405 Off-Ramp	SB	1,000	AM	225	350	NO			
				PM	175	350	NO			
Figueroa St	NB 110 Off-Ramp	NB	1,150	AM	575	575	NO	700	700	NO
				PM	575	575	NO	850	850	NO

[1] 95th percentile queue lengths are rounded up to the next 25-foot increment based on the Synchro assumption of a 25 foot car length plus buffer space.

TABLE 5
IMPERIAL AVALON PROJECT
ON-RAMP LEFT-TURN POCKET QUEUE ANALYSIS

N/S Street Name	E/W Street Name	Left/Right Turn Pocket Movement	Ramp Storage Length (feet)	Analyzed Period	Existing	Existing Plus Project		Future Base	Future Plus Project	
					95%ile queue length (feet) [1]	95%ile queue length (feet) [1]	Extended Queuing?	95%ile queue length (feet) [1]	95%ile queue length (feet) [1]	Extended Queuing?
Avalon Blvd	NB 405 Off-Ramp	NBL	175	AM	150	175	NO	225	250	YES
				PM	100	125	NO	200	225	YES
Figueroa St	NB 110 Off-Ramp	NBL	300	AM	850	850	YES	875	875	YES
				PM	750	750	YES	775	775	YES

[1] 95th percentile queue lengths are rounded up to the next 25-foot increment based on the Synchro assumption of a 25 foot car length plus buffer space.

References

Highway Capacity Manual, 6th Edition, Transportation Research Board, 2016.

Enhancing Internal Trip Capture Estimation for Mixed-Use Developments, NCHRP Report 684

Trip Generation, 10th Edition, Institute of Transportation Engineers, 2017.

Proposed Updates to the CEQA Guidelines, Final, State of California, Governor's Office of Planning and Research, November 2017.

Technical Advisory on Evaluating Transportation Impacts in CEQA, State of California, Governor's Office of Planning and Research, December 2018.

California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387, State of California, 2020.

Interim LDIGR Safety Review Practitioners Guide, Caltrans, December 2020

City of Carson General Plan, City of Carson, October 2004

Carson Master Plan of Bikeways, City of Carson, August 2013



**APPENDIX:
Memorandum of
Understanding**

Memorandum

Date: September 8, 2020
To: Ryan Kim, City of Carson
CC: Saied Naaseh and Gena Guisar, City of Carson
Darren Embry, Faring
From: Drew Heckathorn and Michael Kennedy, Fehr & Peers
Subject: **Imperial Avalon CEQA Transportation Study Methodology and Assumptions**

LB19-0002

This document summarizes the methodology and assumptions for the study to address potential transportation-related impacts and mitigation measures for the Imperial Avalon project's CEQA environmental documents.

Overall Methodology

OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA* will guide the transportation impact analysis in-lieu of City-adopted guidelines.

VMT Methodology

The SCAG 2016 RTP/SCS model will be utilized to collect data and perform the VMT analysis for this study. Specifically, the SCAG model analysis will estimate the following:

- Citywide average person trip rates per resident and per employee
- Citywide average travel mode split for resident and employee person trips
- Average trip lengths for home-based production trips and home-based work attraction trips for the TAZ containing the project site

This model-derived data will be utilized to estimate VMT per capita (home-based production trips) for the residents of the project and VMT per employee (home-based work attraction trips) for the employees of the project.



Significant Impact Threshold

Following the standard OPR guidance, a threshold of 15% below baseline VMT is used to determine if the project will cause significant transportation impacts. If the project generates VMT higher than this threshold, then it is expected to have a significant impact. If the project generates VMT lower than this threshold, then it is expected to not have a significant impact. The citywide average VMT per capita and VMT per employee will serve as the baseline VMT metrics for this analysis.

Project Description

The project as analyzed will include:

- Multifamily Apartments 653 dwelling units
 - *Studios* 122 dwelling units
 - *One-Bedroom* 368 dwelling units
 - *Two-Bedrooms* 163 dwelling units
- Multifamily Townhomes 379 dwelling units
 - *Two-Bedrooms* 192 dwelling units
 - *Three-Bedrooms* 187 dwelling units
- Independent Living Senior Apartments 180 dwelling units
- Restaurant Space 7,152 square feet

To estimate the project's resident population, the following rates were determined in consultation with City staff and the project development team (see attached RCLCO memorandum for details):

- Studio Apartments 1.6 persons per household¹
- One-bedroom Apartments 2.0 persons per household²
- Two-bedroom Apartments 2.9 persons per household³
- All Townhouse Units 3.6 persons per household⁴
- All Senior Dwelling Units 1.5 persons per household⁵

Therefore, the project is expected to serve a resident population of about 3,040.

The restaurant components of the project are screened out from VMT analysis since these are considered local serving (i.e. minimal VMT impact) based on OPR guidelines.

¹ Based on U.S. Census Bureau American Community Survey (ACS) data for multifamily rental studio units in Los Angeles County (higher than the City of Carson rate – 1.3)

² Based on U.S. Census Bureau ACS data for multifamily rental one-bedroom units in City of Carson

³ Based on U.S. Census Bureau ACS data for multifamily rental two-bedroom units in City of Carson

⁴ Based on Carson Housing Element, SCAG and CFD general/blended rate

⁵ Based on City of Los Angeles VMT Calculator Tool blended senior/special needs rate



Other CEQA Transportation Study Components

Off-Ramp Queueing Analysis

This analysis will assess the 95th percentile queue length at the following freeway off-ramps:

1. Avalon Blvd at I-405 northbound/southbound off-ramps
2. Carson Street at I-405 northbound/southbound off-ramps
3. 220th Street at I-110 northbound off-ramp
4. Carson Street at I-110 southbound off-ramp

The length of each off-ramp will be measured from the interchange intersection to the off-ramp gore point. Any queueing beyond 85% of this length will be considered a significant safety impact due to a potential speed differential between the mainline freeway traffic and the off-ramp traffic. Both direct and cumulative impacts will be assessed. HCM, 6th Edition methodology and Synchro software will be utilized for this analysis.

Other Appendix G Transportation Items

A qualitative assessment of the other transportation items in the CEQA Appendix G checklist will be conducted to determine any non-VMT significant impacts.

Mitigation Measures

If the project creates any transportation-related significant impacts, potential mitigation measures will be explored. For VMT impacts, mitigation can be accomplished by altering the proposed land uses or by implementing transportation demand management (TDM) measures. Potential TDM measures will be considered first. Altering the proposed land uses will only be considered if TDM measures are not sufficient to mitigate potential impacts.

APPENDIX:
RCLCO Memorandum

MEMORANDUM

DATE: August 25, 2020

TO: CSG Consultants, Inc. – Gena Guisar, AICP, Principal Planner

FROM: RCLCO – Derek Wyatt, Managing Director

SUBJECT: Household Size Analysis for New Apartment Development in Carson, California.

CSG Consultants, Inc. (“CSG” and “Client”) is providing contract planning services to the City of Carson, California. One of the proposed projects in CSG’s Carson portfolio is Faring’s proposed large-scale residential development located at 21207 South Avalon Boulevard in Carson. The project is planned to be comprised of 70% rental apartment units and 30% for-sale townhomes. As part of the planning process, the City has requested a concurrent study that estimates the expected occupancy / household sizes of the various unit types and sizes encompassed in the project’s apartment development program (i.e., studio, one-bedroom, two-bedroom, etc.).

The city relies on household sizes determined by the Fiscal Impact Analysis, dated March 2019 and prepared by NBS Government Finance Group.¹ The FIA distinguishes two types of residential development in the City of Carson:

1. Residential Projects Studio/Apartment – Projects under this category consist of one-bedroom or less (studios) and assumes a person per unit household size of 2.0
2. Residential Projects – All Other – Projects under this category are defined as two-bedroom or more and assume a person per unit household size of 3.6.

It is important to note that the household size estimates for the residential project categories described above only distinguish by unit size (i.e., one-bedroom, two-bedroom, etc.) and do not categorize projects by other characteristics that have a meaningful impact on occupancy ratios, such as tenure (own vs. rent) or product type (single-family vs. multifamily).

To evaluate the appropriate occupancy metrics for the rental apartment units in the proposed project, CSG engaged RCLCO to analyze actual household sizes for comparable product in Carson and the broader Los Angeles County region.

According to demographic data from Esri, one of the premier providers of Geographic Information System (GIS) software and demographic data, Carson is estimated to have a population of 93,600 and 25,825 households in 2020, which equates to an average household size of 3.62 for the city overall.² It is important to note that this occupancy characteristic is likely to vary for different household and unit types. For example, approximately three-quarters of the households in the city own versus rent, which skews the data relative to the proposed project, which is planned to be comprised of approximately 70% rental apartment units and 30% for-sale townhomes.

To explore the demographics of the market for the rental apartment units at a deeper level, RCLCO relied on the U.S. Census Bureau’s American Community Survey (“ACS”).³ Data was collected through the Public Use Microdata Sample (“PUMS”) files, which are a set of untabulated records about individual people or housing units.⁴ This data set allows for more granular tabulation of household sizes based on a variety of household characteristics.

¹ <http://ci.carson.ca.us/content/files/pdfs/planning/docs/projects/CFD/NBSFiscalStudy032019.pdf>

² <https://www.esri.com/en-us/arcgis/products/data/data-portfolio/demographics>

³ <https://www.census.gov/programs-surveys/acs>

⁴ <https://www.census.gov/programs-surveys/acs/data/pums.html>

For the purposes of the proposed project, the RCLCO analysis focused on households that **rent in multifamily buildings** (defined as having five or more units). Considering this is a relatively limited sample set for the City of Carson, the analysis was also completed for all of Los Angeles County as a reference point. The average household sizes for the various unit types included in the proposed project's development program are shown in the table below:

Household Size by Unit Type for Renters in Multifamily Buildings (5+ Units)

UNIT TYPE	CITY OF CARSON	LOS ANGELES COUNTY
Studio	1.32	1.60
1BR	1.96	1.85
2BR	2.86	2.78
3BR	2.91	3.59

The metrics shown in the table above provide appropriate assumptions for estimating occupancy characteristics for the proposed project's rental apartment units considering the likely household composition by unit type, filtered for location (Carson and Los Angeles County), tenure (rent vs. own), and product type (multifamily vs. single-family).

General Limiting Conditions

Reasonable efforts have been made to ensure that the data contained in this study reflect accurate and timely information and are believed to be reliable. This study is based on estimates, assumptions, and other information developed by RCLCO from its independent research effort, general knowledge of the industry, and consultations with the client and its representatives. No responsibility is assumed for inaccuracies in reporting by the client, its agent, and representatives or in any other data source used in preparing or presenting this study. This report is based on information that to our knowledge was current as of the date of this report, and RCLCO has not undertaken any update of its research effort since such date.

Our report may contain prospective financial information, estimates, or opinions that represent our view of reasonable expectations at a particular time, but such information, estimates, or opinions are not offered as predictions or assurances that a particular level of income or profit will be achieved, that particular events will occur, or that a particular price will be offered or accepted. Actual results achieved during the period covered by our prospective financial analysis may vary from those described in our report, and the variations may be material. Therefore, no warranty or representation is made by RCLCO that any of the projected values or results contained in this study will be achieved.

Possession of this study does not carry with it the right of publication thereof or to use the name of "Robert Charles Lesser & Co." or "RCLCO" in any manner without first obtaining the prior written consent of RCLCO. No abstracting, excerpting, or summarization of this study may be made without first obtaining the prior written consent of RCLCO. This report is not to be used in conjunction with any public or private offering of securities or other similar purpose where it may be relied upon to any degree by any person other than the client without first obtaining the prior written consent of RCLCO. This study may not be used for any purpose other than that for which it is prepared or for which prior written consent has first been obtained from RCLCO.

APPENDIX:
Caltrans NOP Comment Letter

DEPARTMENT OF TRANSPORTATION

DISTRICT 7
100 S. MAIN STREET, MS 16
LOS ANGELES, CA 90012
PHONE (213) 269-1124
FAX (213) 897-1337
TTY 711
www.dot.ca.gov



Serious Drought.
Making Conservation
a California Way of Life.

February 23, 2021

Ms. Gena Guisar, Contract Planner
City of Carson, Planning Division
Community Development
Department 701 East Carson Street
Carson, CA 90745

RE: Imperial Avalon Mixed-Use Project
Vic. LA-405 PM 11.24, LA-110 PM 6.77
SCH # 2021010116
GTS # LA-2021-03470AL-NOP

Dear Ms. Guisar:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The Project would involve removal of the existing on-site uses and construction of two residential apartment buildings and two residential apartment mixed use buildings within the eastern half of the Project site, and 48 townhome buildings within the western half of the Project site. The Project would allow for the construction of 833 residential units within the four apartment buildings, 180 of which would be age-restricted for senior residents. The apartment buildings would contain a mix of studio, one-bedroom, and two-bedroom units. The Project would also include construction of 380 dwelling units within the townhome portion of the Project. The townhomes would consist of a mix of two- and three-bedroom units. A total of 1,213 residential dwelling units would be provided. The residential apartment mixed use buildings would contain one restaurant and one café respectively. The project is immediate adjacent to the I-405/Avalon Blvd. interchange.

The mission of Caltrans is to provide a safe and reliable transportation network that serves all people and respects environment. Senate Bill 743 (2013) has been codified into CEQA law. It mandates that CEQA review of transportation impacts of proposed developments be modified by using Vehicle Miles Traveled (VMT) as the primary metric in identifying transportation impacts. As a reminder, Vehicle Miles Traveled (VMT) is the standard transportation analysis metric in CEQA for land use projects after the July 1, 2020 statewide implementation date. You may reference The Governor's Office of Planning and Research (OPR) website for more information.

<http://opr.ca.gov/ceqa/updates/guidelines/>

This development should incorporate multi-modal and complete streets transportation elements that will actively promote alternatives to car use and better manage existing parking assets. Prioritizing and allocating space to efficient modes of travel such as bicycling and public transit can allow streets to transport more people in a fixed amount of right-of-way.

Caltrans supports the implementation of complete streets and pedestrian safety measures such as road diets and other traffic calming measures. Please note the Federal Highway Administration (FHWA) recognizes the road diet treatment as a proven safety countermeasure, and the cost of a road diet can be significantly reduced if implemented in tandem with routine street resurfacing.

Also, Caltrans has published the VMT-focused Transportation Impact Study Guide (TISG), dated, May 20, 2020 and Caltrans Interim Land Development and Intergovernmental Review (LD-IGR) Safety Review Practitioners Guidance, prepared on December 18, 2020.

<https://dot.ca.gov/programs/transportation-planning/office-of-smart-mobility-climate-change/sb-743>

Overall, the environmental report should include a Transportation Impact Study (TIS) to ensure all modes are well served by planning and development activities. This includes reducing single occupancy vehicle trips, ensuring safety, reducing vehicle miles traveled, supporting accessibility, and reducing greenhouse gas emissions.

We encourage the Lead Agency to evaluate the potential of Transportation Demand Management (TDM) strategies and Intelligent Transportation System (ITS) applications in order to better manage the transportation network, as well as transit service and bicycle or pedestrian connectivity improvements.

For additional TDM options, please refer to the Federal Highway Administration's Integrating Demand Management into the Transportation Planning Process: A Desk Reference (Chapter 8). This reference is available online at:

<http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf>

The proposed 1,213 residential dwelling units may have a traffic safety impact at the following locations:

1. I-405 NB off-ramp to Avalon Blvd and related intersection
2. I-405 NB on-ramp from NB Avalon Blvd and related intersection

These locations have been identified in Caltrans network screening process' as having existing traffic safety impacts and planned safety improvements. Additional analysis will be required when more detailed project trip data is provided to determine if additional safety countermeasures may be warranted for project identified safety impacts.

Freeway queuing analysis may be needed at the following ramp locations once more detailed project traffic data is available.

3. I-405 SB off-ramp to Avalon Blvd.
4. I-110 NB off-ramp to W 220th Street.

The project may conduct its own analysis to determine significant freeway queuing traffic safety impacts as outlined within the Caltrans Interim Land Development and Intergovernmental Review (LD-IGR) Safety Review Practitioners Guidance and provide that analysis as a submittal for review, or Caltrans will conduct such analysis once the required project trip data is provided.

5. Per a conversation between the City and Caltrans staffs on February 10, 2020, both agencies agree that a traffic safety analysis for the off-ramps and turn pockets should be conducted for the above study locations in addition to I-405 SB on-ramp from NB Avalon Blvd. (right-turn pocket).

If a potential safety impacts are identified, the following preferred traffic safety impact mitigation may be recommended as mitigation:

- Transportation demand management program(s) to reduce the traffic safety impacts, which may include increased transit access, commute trip reductions such as rideshare programs, shared mobility facilities (bicycle or vehicular), increased bicycle and pedestrian infrastructure;
- Investments to existing active transportation infrastructure, or transit system amenities (or expansion) to reduce the project's traffic safety impacts; and/or
- Potential change(s) to the ramp terminal operations including, but not limited to lane reassignment, traffic signalization, signal phasing or timing modifications, turn lane extensions to mitigate safety impacts from project traffic.

Caltrans recommends that project traffic data be provided as soon as it is available to allow for adequate time to review and provide analysis.

Ms. Gena Guisar, Contract Planner

February 23, 2021

Page 4 of 4

Any proposed changes to any infrastructure within Caltrans right of way will require an encroachment permit. This work will require additional review and may be subject to additional requirements to ensure current design standards and access management elements are being addressed.

Caltrans recommends early coordination on safety analysis and encroachment permit, if needed, so findings can be considered in the Draft Environmental Impact Report. If you have any questions, please feel free to contact Mr. Alan Lin the project coordinator at (213) 269-1124 and refer to GTS # LA-2021-03470AL-NOP.

Sincerely,

A handwritten signature in black ink that reads "Miya Edmonson". The signature is written in a cursive, flowing style.

MIYA EDMONSON

IGR/CEQA Branch Chief email:

State Clearinghouse

APPENDIX:
Trip Generation

**IMPERIAL AVALON PROJECT
ESTIMATED PROJECT TRIP GENERATION**

Land Use	ITE Land Use Code	Size	Trip Generation Rates [a]							Estimated Trip Generation								
			Daily	AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour Trips			PM Peak Hour Trips				
				Rate	In%	Out%	Rate	In%	Out%		In	Out	Total	In	Out	Total		
PROPOSED PROJECT																		
Multifamily Housing (Mid-Rise)	221	1,033 DU	5.44	0.36	26%	74%	0.44	61%	39%	5,620	97	275	372	278	177	455		
Less: Internal capture			5%		5%	9%		4%	7%	(281)	(5)	(25)	(30)	(11)	(12)	(23)		
Less: Walk/Bike/Transit Credit [b]			0%	0%			0%			0	0	0	0	0	0	0		
Net External Vehicle Trips										5,339	92	250	342	267	165	432		
Quality Restaurant	931	8.47 KSF	83.84	0.73	55%	45%	7.8	67%	33%	710	3	3	6	44	22	66		
Less: Internal capture			11%		20%	4%		14%	18%	(78)	(1)	0	(1)	(6)	(4)	(10)		
Less: Walk/Bike/Transit Credit [b]			0%	0%			0%			0	0	0	0	0	0	0		
Total Driveway Trips										632	2	3	5	38	18	56		
Less: Pass-by			43%	43%			43%			(272)	(1)	(1)	(2)	(16)	(8)	(24)		
Net External Vehicle Trips										360	1	2	3	22	10	32		
Coffee/Donut Shop without Drive-Through Window [c]	936	1.882 KSF	346.23	101.14	51%	49%	36.31	50%	50%	652	97	93	190	34	34	68		
Less: Internal capture			10%		20%	4%		14%	18%	(65)	(19)	(4)	(23)	(5)	(6)	(11)		
Less: Walk/Bike/Transit Credit [b]			0%	0%			0%			0	0	0	0	0	0	0		
Total Driveway Trips										587	78	89	167	29	28	57		
Less: Pass-by			43%	43%			43%			(252)	(34)	(38)	(72)	(12)	(12)	(24)		
Net External Vehicle Trips										335	44	51	95	17	16	33		
Senior Adult Housing - Attached	252	180 DU	3.85	0.2	35%	65%	0.26	55%	45%	693	13	23	36	26	21	47		
Less: Internal capture			0%		0%	0%		0%	0%	0	0	0	0	0	0	0		
Less: Walk/Bike/Transit Credit [b]			0%	0%			0%			0	0	0	0	0	0	0		
Net External Vehicle Trips										693	13	23	36	26	21	47		
TOTAL DRIVEWAY TRIPS										7,251	185	365	550	360	232	592		
TOTAL PROJECT EXTERNAL VEHICLE TRIPS										6,727	150	326	476	332	212	544		
EXISTING USE CREDIT																		
Mobile Home Park	-	225 DU	-	-	-	-	-	-	-	1,141	25	49	74	49	38	87		
	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TOTAL EXISTING DRIVEWAY TRIPS [d]										1,141	25	49	74	49	38	87		
NET INCREMENTAL EXTERNAL TRIPS										5,586	125	277	402	283	174	457		

Notes:

[a] Source: Institute of Transportation Engineers (ITE), *Trip Generation, 10th Edition*, 2017 and NCHRP 8-51, Internal Trip Capture Estimation Tool, Texas Transportation Institute.

[b] A 0% Walk/Bike/Transit Credit was used based on the site's general suburban context.

[c] ITE uses 933 - Fast-Food Restaurant without Drive-Through Window used for daily rate due to lack of daily rate data for ITE uses 936 - Coffee/Donut Shop without Drive-Through Window.

[d] 24-hour counts were taken at existing driveways at the proposed Project site in lieu of using estimated existing trips from ITE Trip Generation.



**IMPERIAL AVALON PROJECT
RELATED PROJECTS**

No.	Project Location	Land Use	Size		Trip Generation						
					Daily	AM			PM		
						IN	OUT	TOTAL	IN	OUT	TOTAL
1	CSUDH Master Plan	Mixed Use	[1]	[1]	N/A	2,299	1,415	3,714	1,940	2,286	4,226
2	The District at South Bay	Mixed Use	[1]	[1]	57,589	1,469	1,086	2,555	2,224	2,060	4,284
3	Jefferson at Avalon	Mixed Use	[1]	[1]	10,854	190	350	540	431	295	726
4	21138 S Western Ave	Gas Station	12	fp	1,461	56	48	104	52	51	103
5	Union South Bay (21521 S Avalon Blvd)	Multifamily	357	du	2,613	38	126	164	126	74	200
		Shopping	32,000	ksf	1,208	19	11	30	59	63	122
6	University Village	Shopping	47,000	ksf	1,774	27	17	44	86	93	179
7	1007 E Victoria St	Multifamily	38	du	278	4	13	17	13	8	21
8	NEC Victoria and Central	Multifamily	175	du	1,281	19	62	81	62	36	98
9	2254 E 223rd St	Warehousing	120,500	ksf	210	16	5	21	6	17	23
10	21900 S Wilmington Ave	Warehousing	411,840	ksf	717	54	16	70	21	57	78
11	Veterans Village	Multifamily	51	du	373	5	18	23	18	11	29
		General Housing	15,000	ksf	146	15	2	17	3	14	17
12	21809-21811 S Figueroa St	Multifamily	32	du	234	3	11	14	11	7	18
13	140 W 223rd st	Multifamily	2	du	15	0	1	1	1	0	1
14	123 E 223rd st	Multifamily	9	du	66	1	3	4	3	2	5
15	22410 Vermont Ave	Multifamily	41	du	300	4	15	19	14	8	22
16	939 W 223rd St	Warehousing	5,820	ksf	10	1	0	1	0	1	1
17	345/369 E 220th St	Multifamily	35	du	256	4	12	16	12	7	19
18	1054 W 204th St	Public Park	9	Acre	7	0	0	0	1	0	1
19	20850 Normandie Ave	Warehousing	204	ksf	469	36	14	50	12	41	53
20	402 Sepulveda Blvd	Senior Adult Housing	65	du	278	5	10	15	12	8	20
21	Carol Kimmelman Campus	Mixed Use	[1]	[1]	3,808	105	83	188	244	192	436
22	Creek Dominguez Hills	Mixed Use	[1]	[1]	16,132	580	384	964	727	669	1,396
23	21801 Vera St	Single Family	18	du	170	3	10	13	11	7	18
24	Carson Arts Project	Multifamily	46	du	337	5	16	21	16	10	26
25	Harbour UCLA Medical Center	Mixed Use	[1]	[1]	1,620	166	34	200	33	164	197
			Total		102,206	5,124	3,762	8,886	6,138	6,181	12,319

Notes:

du = dwelling unit

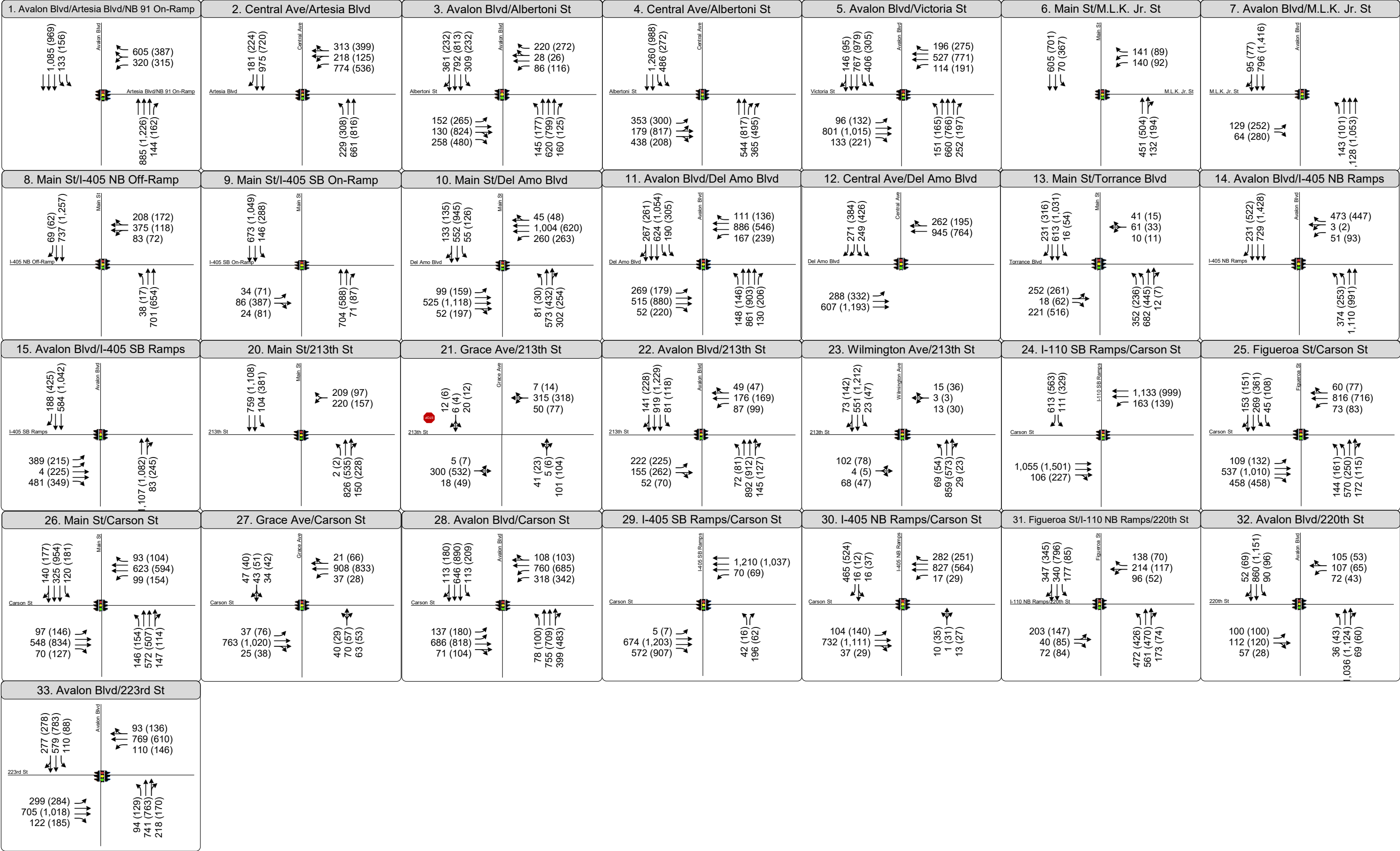
ksf = one thousand square feet

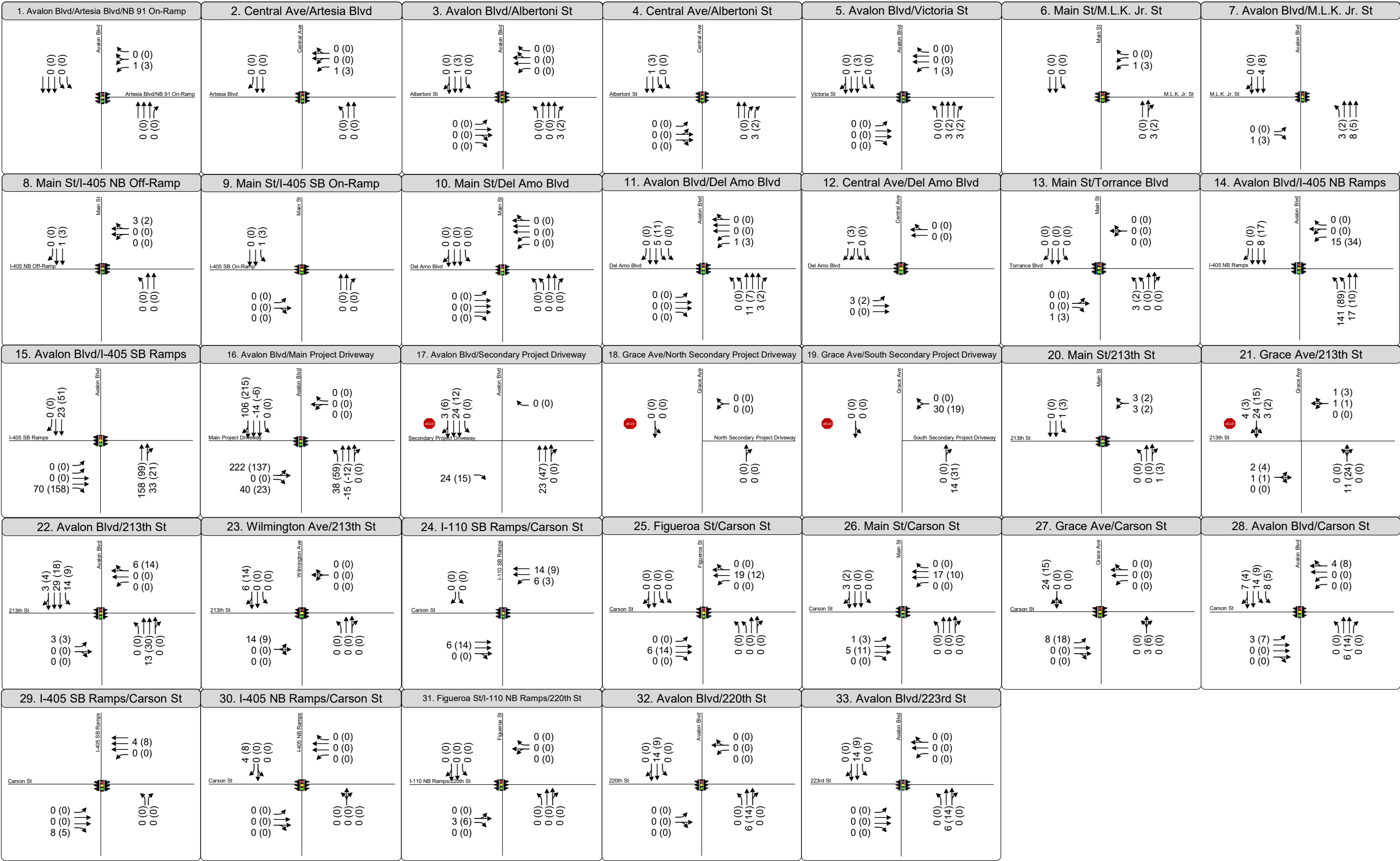
fp = fueling positions

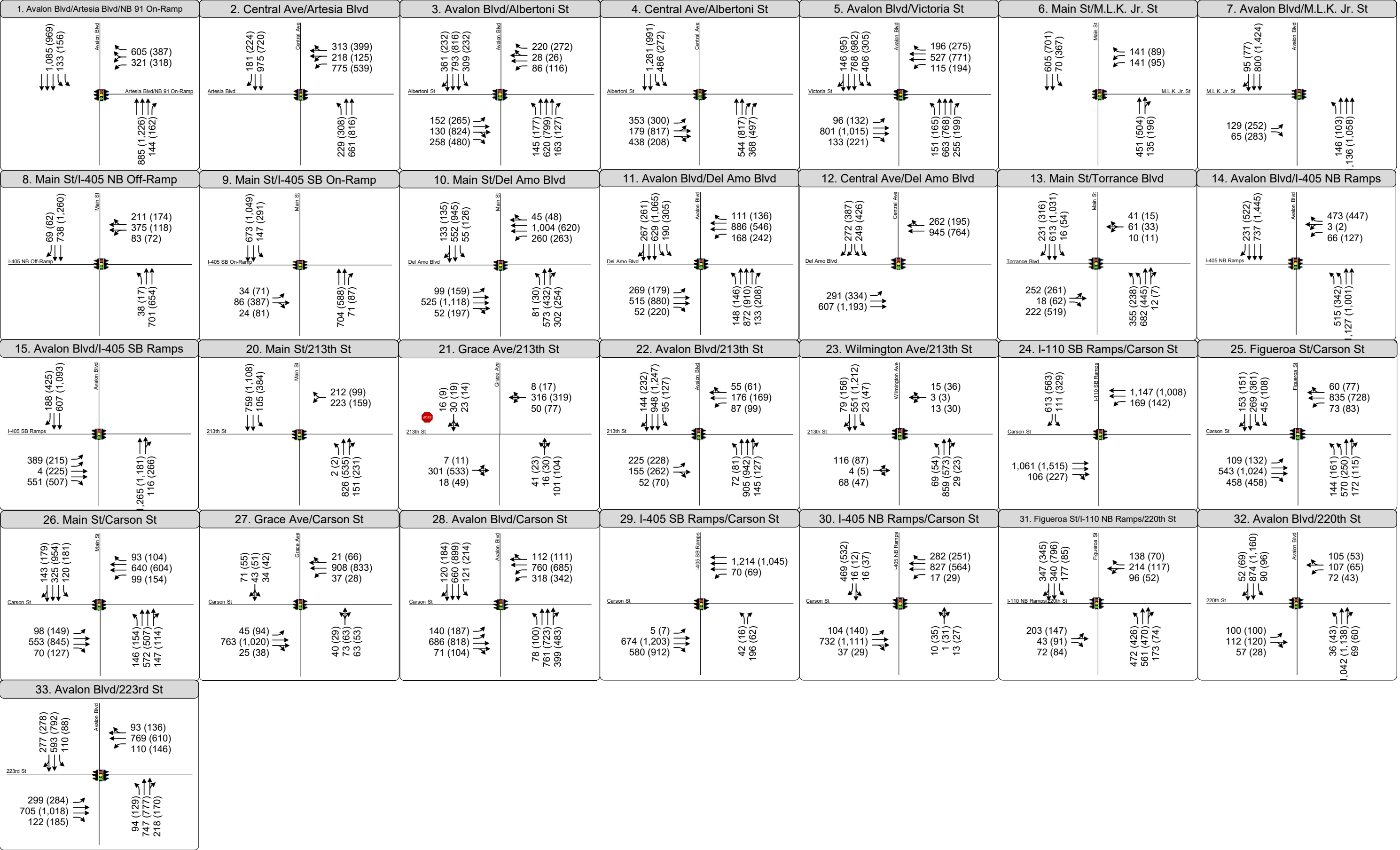
[1] Mixed Use developments contain more than one independent variable to calculate trip generation.

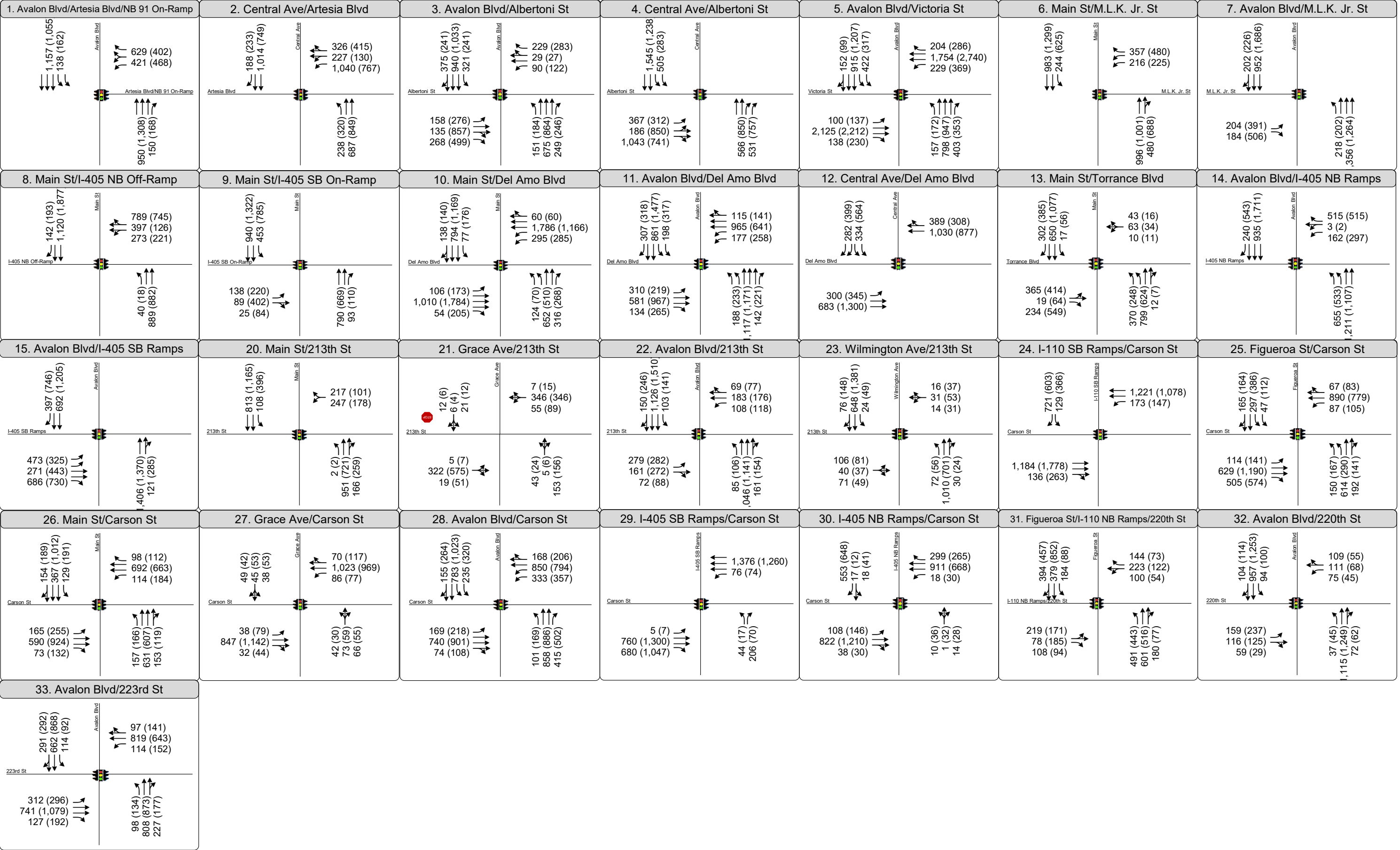
Related projects list is based on information provided by the City of Carson, the County of Los Angeles, publicly available environmental documentation, and trip generation rates contained in ITE Trip Generation, 10th Edition.

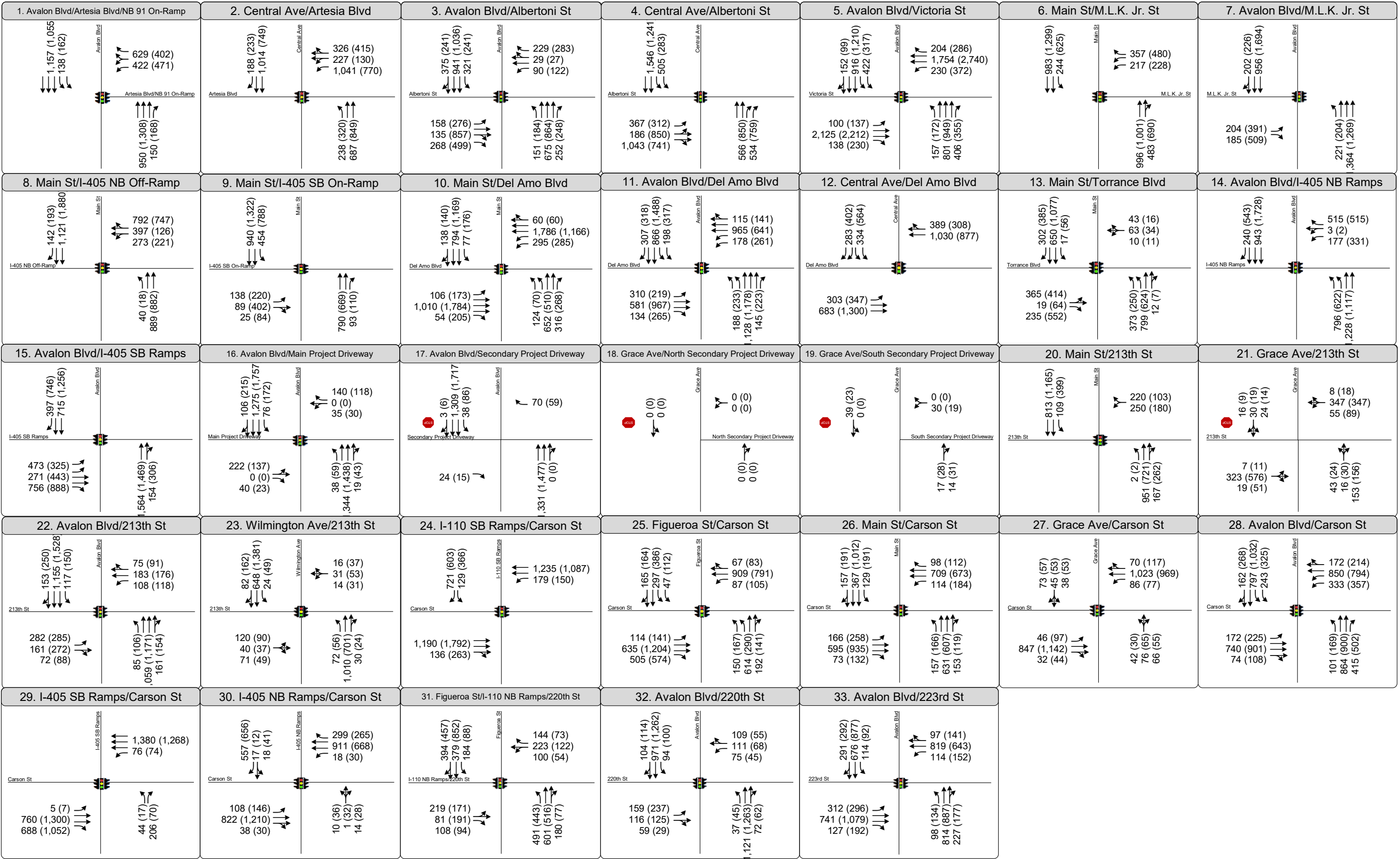
APPENDIX:
Lane Configurations and
Traffic Volumes











APPENDIX:
Collision Data

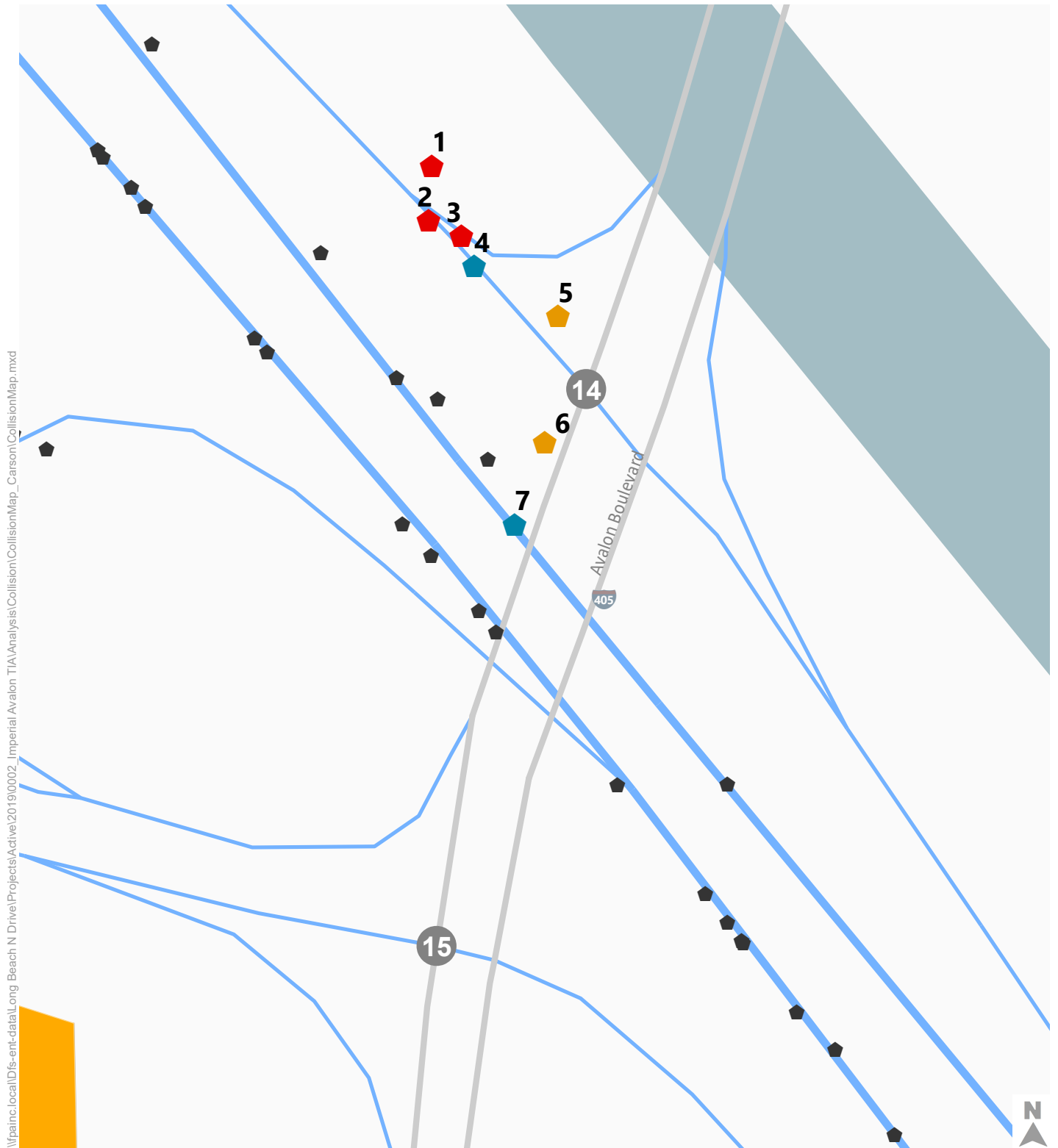
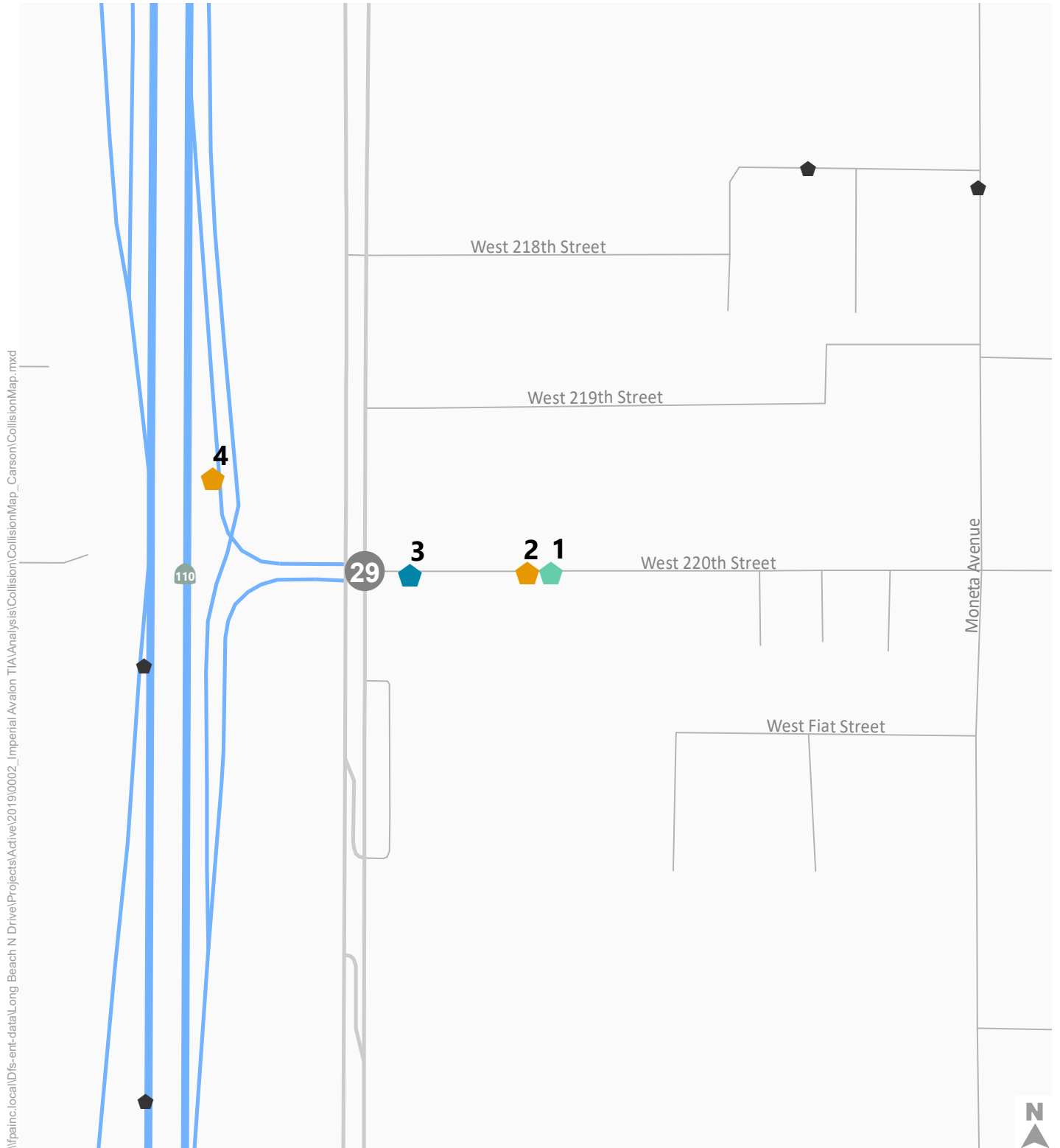


Figure 1

Collision Near Study Intersection Avalon Blvd & NB405 Off-Ramp





\\painsc.local\dfs-ent-data\Long Beach N Drive\Projects\Active\2019\0002_Imperial Avalon TIA\Analysis\Collision\CollisionMap_Carson\CollisionMap.mxd

-  Study Intersections
-  Proposed Project Site
-  Collision Near Study Intersections
-  B - Sideswipe
-  C - Rear End
-  D - Broadside
-  Other Collision
-  G - Vehicle/Pedestrian

Figure 1

Collision Near Study Intersection Figueroa St & NB 110 Off-Ramp



Collision Summary for Intersection #14 and #31.
From 2016/01/01-2020/12/31
Source: TIMS. SWITRS GIS Map. <https://tims.berkeley.edu/tools/gismap/>

Intersection Avalon Blvd & NB405 Off-Ramp

Collision Number	Case ID	Date	Location (Intersection)	Dist.&Dir. From intersection	Collision Severity	Injuries	Type of Collision	Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	91329649	10/20/2020	I-405 N/b From Avalon Blvd. & Avalon Blvd.	150.00 ft North	4 - Injury (Complaint of	0 Killed & 3 Injured	B - Sideswipe	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	P - Merging
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight
2	90940604	2/27/2019	I-405 N/b From Avalon Blvd. & Avalon Blvd.	50.00 ft West	4 - Injury (Complaint of	0 Killed & 3 Injured	B - Sideswipe	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	D - Making Right Turn
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	E - Making Left Turn
3	90502922	7/7/2017	I-405 N/b From Avalon Blvd. & Avalon Blvd.	105.00 ft North	4 - Injury (Complaint of	0 Killed & 1 Injured	B - Sideswipe	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	P - Merging
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight
4	90411221	3/4/2017	I-405 Nb From Avalon Blvd & Avalon Blvd.	30.00 ft North	4 - Injury (Complaint of Pain)	0 Killed & 2 Injured	C - Rear End	1	1 - Driver (including Hit and Run)	-- Not Stated	Yes	North	P - Merging
								2	1 - Driver (including Hit and Run)	D - Pickup or Panel Truck	No	North	B - Proceeding Straight
								3	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight
5	91179606	12/16/2019	I-405 N/b From Avalon Blvd. & Avalon Blvd.	85.00 ft North	4 - Injury (Complaint of	0 Killed & 1 Injured	D - Broadside	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	L - Entering Traffic
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight
6	8785261	12/15/2018	Avalon Bl & Dominguez St	800.00 ft South	4 - Injury (Complaint of	0 Killed & 1 Injured	D - Broadside	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	South	B - Proceeding Straight
								2	1 - Driver (including Hit and Run)	I - Other Bus	No	North	E - Making Left Turn
7	8403361	6/10/2017	Avalon Bl & Dominguez St	2500.00 ft South	4 - Injury (Complaint of	0 Killed & 1 Injured	C - Rear End	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	B - Proceeding Straight
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	A - Stopped

Intersection Figueroa St & NB 110 Off-Ramp

Collision Number	Case ID	Date & Time	Location (Intersection)	Dist.&Dir. From intersection	Collision Severity	Injuries	Type of Collision	Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	8081556	5/17/2016	220th St & Figueroa St	400.00 ft East	3 - Injury (Other Visible)	0 Killed & 1 Injured	G - Vehicle/Pedestrian	1	2 - Pedestrian	N - Pedestrian	Yes	South	R - Other
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	East	B - Proceeding Straight
2	8400963	6/12/2017	220th St & Figueroa St	350.00 ft East	4 - Injury (Complaint of	0 Killed & 1 Injured	D - Broadside	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	-	L - Entering Traffic
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	East	B - Proceeding Straight
3	8916498	8/8/2019	220th St & Figueroa St	100.00 ft East	4 - Injury (Complaint of	0 Killed & 1 Injured	C - Rear End	1	1 - Driver (including Hit and Run)	C - Motorcycle/Scooter	Yes	East	C - Ran Off Road
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	East	F - Making U-Turn
4	90380263	1/18/2017	I-110 N/b From 220th St. & 220th St.	150.00 ft South	4 - Injury (Complaint of	0 Killed & 1 Injured	D - Broadside	1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	B - Proceeding Straight
								2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight

**APPENDIX:
Signal Timing
Sheets**

Location: R405 NB @ Avalon Blvd

Designed By: HD

System:

District: 07

Installed By: HD

Master At: Here

I/C: NB-SB

Service Info:

Timing Change:

Date Start:

Date End:

Designed:

Installed:

11/25/2020

11/12/2020

11/25/2020

- 1)
P 2) NB Avalon Blvd (2 ped)
H 3)
A 4)
S 5) NBLT Avalon Blvd
E 6) SB Avalon Blvd
7)
8) NB off Ramp

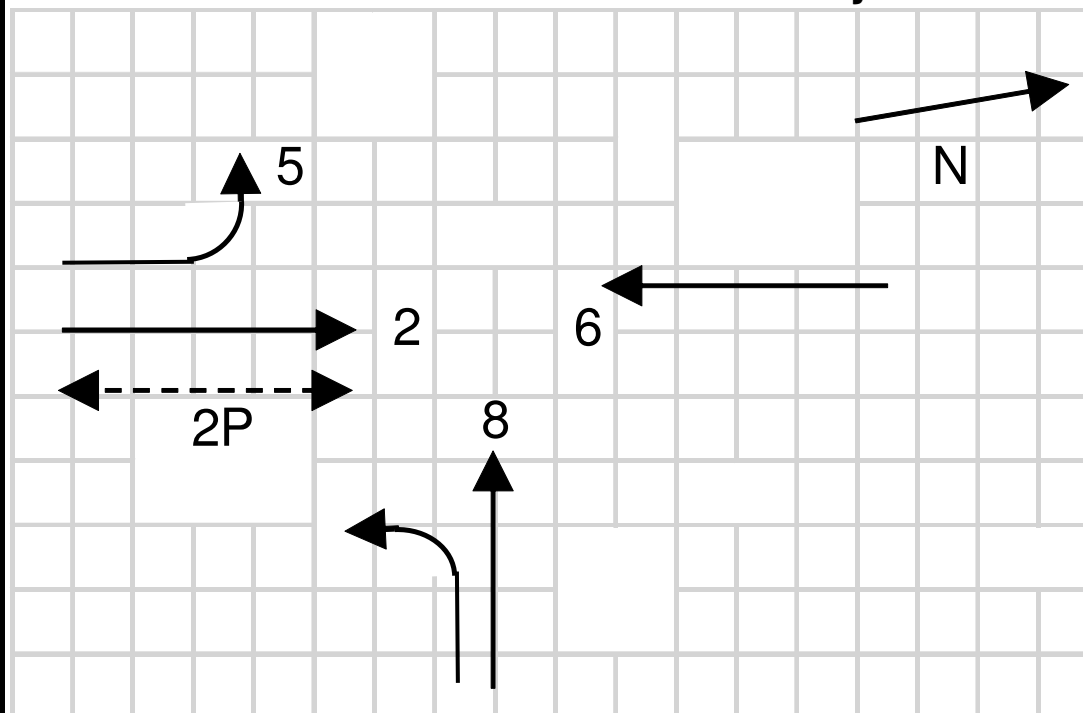
O A)
V B)
E C)
R D)
L E)
A F)
P

FLASH

[]
[]
[]
[]
[]
[]
[]
[]

[]
[]
[]
[]
[]
[]
[]

Intersection Layout



Comments and Notes:

RAM Checksum

Page 2: 3B49	Page 8: F1FF
Page 3: EA11	Page 9: D2FD
Page 4: 8EA7	Page 10: D42B
Page 5: 191A	Page 11: 675C
Page 6: 191A	Page 12: 1FB3
Page 7: 12D9	Page 13: 86F7

Post Mile: 11.27

Printed: 5/11/2021

CONFIGURATION PHASE FLAGS

Cabinet (9-3)
332
Configuration
CALTRANS

Phases (2-1-1-1)	
Permitted	. 2 . . 5 6 . 8
Restricted	

Phase Recalls (2-1-1-2)	
Vehicle Min	. 2 . . . 6 . .
Vehicle Max	
Pedestrian	
Bicycle	

Phase Locks (2-1-1-3)	
Red	 5 . .
Yellow	. 2 . . . 6 . .
Force/Max	

Phase Features (2-1-1-4)	
Double Entry	
Rest In Walk	
Rest In Red	
Walk 2	
Max Green 2	
Max Green 3	

Startup (2-1-1-5)	
First Green Phases	. 2 . . . 6 . .
Yellow Start Phases	 8
Vehicle Calls	. 2 . . 5 6 . 8
Pedestrian Calls	. 2
Yellow Start Overlaps	
Startup All-Red	6.0

Call To Phase (2-1-2-1)		Omit On Green	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	
Yellow Flash Overlaps	
Flash In Red Phases	
Flash In Red Overlaps	

Special Operation (2-1-2-3)	
Single Exit Phase	
Driveway Signal Phases	
Driveway Signal Overlaps	
Leading Ped Phases	

Protected Permissive (2-1-2-4)	
Protected Permissive	

Pedestrian (2-1-3)	
P1	
P2	. 2
P3	
P4	. . . 4
P5	
P6	 6 . .
P7	
P8	 8

Overlap (2-1-4)				
Overlap	Parent	Omit	No Start	Not
A				
B				
C				
D				
E				
F				

P H A S E T I M I N G

Phase (2-2)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 1 ---	0	7	0	10	0	0	0	0
Flash Don't Walk	0	10	0	10	0	0	0	0
Minimum Green	10	10	10	10	10	10	10	10
Det Limit	10	0	10	10	0	0	10	0
Max Initial	10	20	10	10	0	20	10	0
Max Green 1	50	40	50	50	20	40	50	25
Max Green 2	50	40	50	50	20	40	50	25
Max Green 3	50	40	50	50	20	40	50	25
Extension	5.0	4.0	5.0	5.0	2.5	4.0	5.0	4.0
Maximum Gap	5.0	5.0	5.0	5.0	2.5	5.0	5.0	5.0
Minimum Gap	5.0	3.0	5.0	5.0	2.5	3.0	5.0	3.0
Add Per Vehicle	1.0	2.0	1.0	1.0	0.0	2.0	1.0	0.0
Reduce Gap By	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Reduce Every	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Yellow	5.0	4.4	5.0	5.0	3.7	4.4	5.0	4.1
All-Red	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5)	
Time	5.0
All-Red Sec/Min (2-6)	
All-Red Sec/Min:	OFF

Max 2 Extension

Max/Gap Out (2-7)	
Max Cnt	0
Gap Cnt	0

Local Plan 1...9 (7-1) TIMING DATA**COORDINATION**

		[Offsets]			Green Factors or Press [F] to Select Force-Off										
		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Green Factor	80		.....	20				46			21	20		22
Plan 2	Green Factor	80		.....	20				46			21	20		22
Plan 3	Green Factor	80		.....	20				46			21	20		22
Plan 4	Green Factor			.....											
Plan 5	Green Factor			.....											
Plan 6	Green Factor			.....											
Plan 7	Green Factor			.....											
Plan 8	Green Factor			.....											
Plan 9	Green Factor			.....											

Local Plan 1...9 (7-1) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1	. 2 . 4 . 6 . 8	. 2 ... 6 ..	.....	.....	.....	.....	. 2 .....	.....
Plan 2	. 2 . 4 . 6 . 8	. 2 ... 6 ..	.....	.....	.....	.....	. 2 .....	.....
Plan 3	. 2 . 4 . 6 . 8	. 2 ... 6 ..	.....	.....	.....	.....	. 2 .....	.....
Plan 4	.....	.....	.....	.....	.....	.....	.....	.....
Plan 5	.....	.....	.....	.....	.....	.....	.....	.....
Plan 6	.....	.....	.....	.....	.....	.....	.....	.....
Plan 7	.....	.....	.....	.....	.....	.....	.....	.....
Plan 8	.....	.....	.....	.....	.....	.....	.....	.....
Plan 9	.....	.....	.....	.....	.....	.....	.....	.....

Master Timer Sync (7-A)	
Enable in Plans	
1-9	.....
11-19	.....
21-29	.....
Master Sub Master	
Input	
Output	

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
. 2 . 4 . 6 . 8	.....
Veh Min	Veh Max
. 2 ... 6 ..	.....
Ped	Bike
.....	
Cond	Cond Grn
.....	10

MANUAL COMMANDS

Manual Plan (4-1)		Plan: 1-29
Plan	OffSet	254 = Flash
	A	255 = Free
		Offset A, B, or C

Special Function Override (4-2)			
#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset	(4-3)
Local Manual (4-4)	OFF

Local Plan 11...19 (7-2) TIMING DATA**COORDINATION**

[Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 11	Green Factor			.....											
Plan 12	Green Factor			.....											
Plan 13	Green Factor			.....											
Plan 14	Green Factor			.....											
Plan 15	Green Factor			.....											
Plan 16	Green Factor			.....											
Plan 17	Green Factor			.....											
Plan 18	Green Factor			.....											
Plan 19	Green Factor			.....											

Local Plan 11...19 (7-2) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 11								
Plan 12								
Plan 13								
Plan 14								
Plan 15								
Plan 16								
Plan 17								
Plan 18								
Plan 19								

Local Plan 21...29 (7-3) TIMING DATA**COORDINATION**

[Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 21	Green Factor			.....											
Plan 22	Green Factor			.....											
Plan 23	Green Factor			.....											
Plan 24	Green Factor			.....											
Plan 25	Green Factor			.....											
Plan 26	Green Factor			.....											
Plan 27	Green Factor			.....											
Plan 28	Green Factor			.....											
Plan 29	Green Factor			.....											

Local Plan 21...29 (7-3) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 21								
Plan 22								
Plan 23								
Plan 24								
Plan 25								
Plan 26								
Plan 27								
Plan 28								
Plan 29								

DETECTORS

Detector Attributes (5-1)				Slot	Detector Configuration (5-2)				
Det	Type	Phases	Lock		Det	Delay	Extend	Recall	Port
1	COUNT+CALL+EXTEND	1	NO	I1U	1			10	3.2
2	COUNT+CALL+EXTEND	1	NO	I1L	2			10	7.2
3	COUNT+CALL+EXTEND	. 2	NO	I2U	3			10	1.1
4	COUNT+CALL+EXTEND	. 2	NO	I2L	4			10	1.5
5	COUNT+CALL+EXTEND	. 2	NO	I3U	5			10	4.5
6	CALL+EXTEND	. 2	NO	I3L	6			10	6.2
7	LIMITED	. 2	NO	I4U	7			10	2.1
8	COUNT+CALL+EXTEND	. 2	NO	I4L	8			10	7.4
9	COUNT+CALL+EXTEND	.. 3	NO	I5U	9			10	3.4
10	COUNT+CALL+EXTEND	.. 3	NO	I5L	10			10	7.6
11	COUNT+CALL+EXTEND	... 4	NO	I6U	11			10	1.3
12	COUNT+CALL+EXTEND	... 4	NO	I6L	12			10	1.7
13	COUNT+CALL+EXTEND	... 4	NO	I7U	13			10	4.7
14	CALL+EXTEND	... 4	NO	I7L	14			10	6.4
15	LIMITED	... 4	NO	I8U	15			10	2.3
16	COUNT+CALL+EXTEND	... 4	NO	I8L	16			10	7.8
17	COUNT+CALL+EXTEND	1	NO	I9U	17			10	3.6
18	COUNT+CALL+EXTEND	.. 3	NO	I9L	18			10	3.8
19	COUNT+CALL+EXTEND	. 2	NO	I10U	19			10	4.1
20	COUNT+CALL+EXTEND	... 4	NO	I10L	20			10	4.2
21	COUNT+CALL+EXTEND	 5 ...	NO	J1U	21			10	3.1
22	COUNT+CALL+EXTEND	 5 ...	NO	J1L	22			10	7.1
23	COUNT+CALL+EXTEND	 6 ..	NO	J2U	23			10	1.2
24	COUNT+CALL+EXTEND	 6 ..	NO	J2L	24			10	1.6
25	COUNT+CALL+EXTEND	 6 ..	NO	J3U	25			10	4.6
26	CALL+EXTEND	 6 ..	NO	J3L	26			10	6.3
27	LIMITED	 6 ..	NO	J4U	27			10	2.2
28	COUNT+CALL+EXTEND	 6 ..	NO	J4L	28			10	7.3
29	COUNT+CALL+EXTEND	 7 .	NO	J5U	29			10	3.3
30	COUNT+CALL+EXTEND	 7 .	NO	J5L	30			10	7.5
31	COUNT+CALL+EXTEND	 8	NO	J6U	31			10	1.4
32	COUNT+CALL+EXTEND	 8	NO	J6L	32			10	1.8
33	COUNT+CALL+EXTEND	 8	NO	J7U	33			10	4.8
34	CALL+EXTEND	 8	NO	J7L	34			10	6.5
35	LIMITED	 8	NO	J8U	35			10	2.4
36	COUNT+CALL+EXTEND	 8	NO	J8L	36			10	7.7
37	COUNT+CALL+EXTEND	 5 ...	NO	J9U	37			10	3.5
38	COUNT+CALL+EXTEND	 7 .	NO	J9L	38			10	3.7
39	COUNT+CALL+EXTEND	 6 ..	NO	J10U	39			10	4.3
40	COUNT+CALL+EXTEND	 8	NO	J10L	40			10	4.4
41	PEDESTRIAN	. 2	NO	I12U	41			10	5.1
42	PEDESTRIAN	... 4	NO	I12L	42			10	5.3
43	PEDESTRIAN	 6 ..	NO	I13U	43			10	5.2
44	PEDESTRIAN	 8	NO	I13L	44			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	.....
Detectors 9-16	.....
Detectors 17-24	.....
Detectors 25-32	.....
Detectors 33-40	.....
Detectors 41-44	.....

System Detector Assignment (5-5)								
Sys Det	1	2	3	4	5	6	7	8
Det Nu								
Sys Det	9	10	11	12	13	14	15	16
Det Nu								

CIC Operation (5-6-1)	
Enable in Plans	.....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

Detector-to-Phase Assignment (5-6-3)								
Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6	4.1	6.6	5.1	5.2	6.7
	7.2	1.5	6.2	7.4	7.6	1.7	6.4	7.8	3.8	4.2	2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5	4.3	2.8	5.5	5.6	2.5
	7.1	1.6	6.3	7.3	7.5	1.8	6.5	7.7	3.7	4.4	6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)			Table 2 (8-2-2)			Table 3 (8-2-3)			Table 4 (8-2-4)			Table 5 (8-2-5)			Table 6 (8-2-6)		
Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS
0630	2	A	0900	1	A			A			A			A			A
0900	1	A	1800	255	A			A			A			A			A
1500	3	A			A			A			A			A			A
1800	1	A			A			A			A			A			A
2000	255	A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES**Floating Holiday Table (8-2-8)**

#	Mnth	Week	DOW	Table
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Daylight Saving (8-1)

Enabled	YES	Month	Sunday
		Start	MAR 2nd
		End	NOV 1st

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	.....
Holiday	.....

TOD FUNCTIONS**TOD Functions (8-3)**

#	Start	End	DOW	Action	Phases
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Action Codes:

- 0. None
- 1. Permitted
- 2. Restricted
- 4. Veh Min Recall
- 5. Veh Max Recall
- 6. Ped Recall
- 7. Bike Recall
- 8. Red Lock
- 9. Yellow Lock
- 10. Force/Max Lock
- 11. Double Entry
- 12. Y-Coord C
- 13. Y-Coord D
- 14. Free
- 15. Flashing
- 16. Walk 2
- 17. Max Green 2

- 18. Max Green 3
- 19. Rest in Walk
- 20. Rest in Red
- 21. Free Lag Phases
- 22. Special Functions
- 23. Truck Preempt
- 24. Conditional Service
- 25. Conditional Service
- 26. Leading Ped
- 27. Traffic Actuated Max 2
- 41. Protected Permissive
- 42. Protected Permissive

Action Code = Phases added to normal setting

100+Action Code = Phases removed

200+Action Code = Phases replaced

COMMUNICATIONS

	C2 (6-1-1)	C20 (6-1-2)	C21 (6-1-3)
Address			
Baud	1200	1200	1200
Protocol	MASTER	AB3418	AB3418
Data Bits	8	8	8
Parity	NONE	NONE	NONE
Stop Bits	1	1	1
RTS On Time	20	20	20
RTS Off Time	20	20	20
Handshaking	NORMAL	NORMAL	NORMAL
Access Level	0	0	0

SOFT LOGIC

Soft Logic (6-2)							
#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

*Refer to User's Manual for Data and OP Codes

CALLBACK NUMBERS

Callback Numbers (6-3...3)			
Line Out			
Long Distance			
Local Toll			
Delay	10	10	10
Area Code			
Phone Number			

NETWORK

Network Parameters (6-4)	
Address	
Protocol	AB3418
Port	27000
Type	STATIC
Central Access	
Field Access	
ATSPM	OFF

IP Address	0	.	0	.	0	.	0
Netmask	255	.	255	.	255	.	0
Broadcast	0	.	0	.	0	.	255
Gateway	0	.	0	.	0	.	254

SPAT Network (6-5)		
SPAT	1	2
Protocol	NONE	NONE
UDP Port	0	0

IP Address 0 . 0 . 0 . 0

Access Levels:

0-Full Access

1-Status Only

2-Status, Set Pattern, Time

3-Status, Set Pattern, Time, Manual Plan

4-Reserved

5-Full Access with No Set Pattern

6-Full Access with No Set Time

7-Full Access with No Set Pattern, Manual Plan

8-Full Access with No Set Time, Pattern, Manual Plan

RAILROAD PREEMPTION

RR 1	Timing (3-1-1)		Phase Flags (3-1-2)			Pedestrian Flags (3-1-3)			Overlap Flags (3-1-4)						
	Clear 1	15	Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash				
	Clear 2	5	. 2 . . 5 . .	.....	.....	.....	.....	. 2 . 4 . 6 . 8	.....	.....	.....				
	Clear 3		. 2 . . 5 . .	.....	.....	.....	.....	. 2 . 4 . 6 . 8	.....	.....	.....				
	Hold		.....	.....	.....	.....	.....	.....	.....	.....	.....				
			1 . . 4 . . 7 8	.....	.....	.....	... 4 ... 8	. 2 ... 6 ..	.....	.....	.....				
	Min Gr		Exit Parameters (3-1-5)				Configuration (3-1-6)								
	Delay		Phase Green	Ovrlap Green	Veh Permit/Call	Ped Permit/Call	PR	XR	Gate	Isld	APP	Sign	Sign	Max On	Latching
	Exit		. 2 ... 6 ..		1 2 3 4 5 6 7 8	. 2 . 4 . 6 . 8	1							5	NO
	Ped Clr						2			Valid Inputs: 1.x, 2.x, 3.x, 4.x, 5.x, 6.x, 7.x, 8.x x=1 to 8 Valid Outputs: 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 18.x x=1 to 8					

RR 2	Timing (3-2-1)		Phase Flags (3-2-2)			Pedestrian Flags (3-2-3)			Overlap Flags (3-2-4)						
			Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash				
	Clear 1	15	. . . 4 . . 7 .					. 2 . 4 . 6 . 8							
	Clear 2	5	. . . 4 . . 7 .					. 2 . 4 . 6 . 8							
	Clear 3														
	Hold		1 2 3 . . 6 . .				. 2 . . . 6 . .	. . . 4 . . . 8							
	Min Gr		Exit Parameters (3-2-5)						Configuration (3-2-6)						
	Delay		Phase Green	Ovrlap Green	Veh Permit	Ped Permit	PR	XR	Gate	Isld	APP	Sign	Sign	Max On	Latching
	Exit		. 2 . . . 6 . .		1 2 3 4 5 6 7 8	. 2 . 4 . 6 . 8	1							5	NO
	Ped Clr						2			Valid Inputs: 1.x, 2.x, 3.x, 4.x, 5.x, 6.x, 7.x, 8.x x=1 to 8 Valid Outputs: 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 18.x x=1 to 8					

EMERGENCY VEHICLE PREEMPTION

EVA (3-A)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		8	30	. 2 . . 5 . .	.....
Port		Latching	Phase Termination		
		NO	ADVANCE		

EVC (3-C)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		8	30	1 6 . .	.....
Port		Latching	Phase Termination		
		NO	ADVANCE		

EVB (3-B)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		30	30	... 4 . . 7 .	.....
Port		Latching	Phase Termination		
		NO	ADVANCE		

EVD (3-D)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		8	30	.. 3 8	.....
Port		Latching	Phase Termination		
		NO	ADVANCE		

INPUTS

		7 Wire I/C (2-1-5-1)			
Enable	NO	Input	Port	Input	Port
Max ON		RR1		Free	
Max OFF		RR2		D2	
		RR3		D3	

Manual Control (2-1-5-2)	
Input	Port
Manual Advance	
Advance Enable	

Cabinet Status (2-1-5-3)	
Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)	
Input	Port
1	
2	
3	
4	

Battery Backup (2-1-5-5)	
Port	Operation
	NORMAL

Y-Coordination (2-1-5-6)	
Port C	Port D

OUTPUTS

Loadswitch Assignments (2-1-6)							
A	1	2	22	3	4	24	9
B	5	6	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:

0 Unused (no output)

1-8 Vehicle 1-8

9-14 Overlap A-F

21-28 Ped 1-8

41-47 Special Functions

41 Protected Permissive Flashing Phase 1

43 Protected Permissive Flashing Phase 3

45 Protected Permissive Flashing Phase 5

47 Protected Permissive Flashing Phase 7

51-57 Special Functions

71-72 Seven Wire I/C

+ middle output of
loadswitches 3 and 6
Channel 9 and 10

INTERVAL CONTROL

Interval Control (3-3-1)	
Time	
Step 1	
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	
Step 7	
Step 8	

Phase Control (3-3-2)		
Hold	Force	Advance
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Phase Recall (3-3-3)		
Veh Call	Ped Call	Int Call
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Phase Permitted (3-3-4)		
Phs Permit	Ped Permit	Overlap Permit
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Configuration (3-3-5)			
Input	Port	Delay	HRI Cross
1			
2			

HRI

HRI Configuration (3-4)			
RailRoad	51	WAYSIDE	ATC
Line		Subnode	
Group		Device	

TRANSIT PRIORITY

Local Plans (3-E) 1...9 11...19		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Green Factor											
Plan 2	Green Factor											
Plan 3	Green Factor											
Plan 4	Green Factor											
Plan 5	Green Factor											
Plan 6	Green Factor											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											
Plan 11	Green Factor											
Plan 12	Green Factor											
Plan 13	Green Factor											
Plan 14	Green Factor											
Plan 15	Green Factor											
Plan 16	Green Factor											
Plan 17	Green Factor											
Plan 18	Green Factor											
Plan 19	Green Factor											

Transit Priority Configuration (3-E-A)		Indicator Output			
Enable in Plans	Input	Type	Stop	Go	
Plan 1-9		0.0	NONE	0	0
Plan 11-19		0.0	NONE	0	0

Queue Jump (3-E-B)	
Grn Hold	Hold Phase
	
	

Free Plans (3-E-E)	
Max Grn Hold	Hold Phase
	

Access Utilities (9-5)	
Password	***
Timeout	30

YELLOW YIELD COORDINATION

					Force-Offs											
Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	.....	.....
Plan D													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	.....	.....

TRUCK PRIORITY

Truck Priority (3-F)	Passage	CarryOver	Clearance	Next Priority	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output
						0.0	0.0	0.0	0	0.0	0

CALTRANS

Model 170 Controller
Traffic Design Branch
District 7

C8 PROGRAM

Version 3.0

1 OF 6

LOCATION:

S/B RTE. 405 FWY @ AVALON

CO: L.A.

RTE: 405 P.M.: 11.22

CONTROL CODE "F"

PHASE TIMING																C		D		PRE-		F									
INTERVAL		1		2		3		4		5		6		7						8		E		FLAGS 1 2 3 4 5 6 7 8							
0	WALK				7				6				0			0			GAP SET		TB SEL	1	EV SEL	0	FZ PERMIT	X	X	X	X	0	
1	DON'T WALK				13				18				0			0			MAX SET		TB HR		RR1 CLR		RED LOCK		X			1	
2	MIN GREEN				25				24				25			24			C - SERV		TB MIN		EVA DLY		RED/YEL LOCK		X		X	2	
3	TYPE 3 DET				0				0				0			0					PED SEL	1	EVA CLR		VEH RECALL		X		X	3	
4	ADDED / ACT				0.0				0.0				0.0			0.0					7W SEL		EVB DLY		PED RECALL					4	
5	PASSAGE				5.0				3.0				5.0			5.0					PERM SEL		EVB CLR		PED PHASES		x	x	X	X	5
6	MAX GAP				5.0				3.0				5.0			5.0							EVC DLY		A ARROW					6	
7	MIN GAP				5.0				3.0				5.0			5.0							EVC CLR		B ARROW					7	
8	MAX EXT 1				50				25				50			50					OFF SEEK	1	EVD DLY		DOUBLE ENTRY			X		X	8
9	MAX EXT 2				50				25				50			50							EVD CLR		MAX 2					9	
A	MAX EXT 3				50				25				50			50			OLA GRN				EV MAX		LAG PHASES	OBSERVATION ONLY				A	
B																			OLB GRN				RR2 CLR		RED REST					B	
C	REDUCE BY				0.0				0.0				0.0			0.0			OLC GRN				EV CLR TMR		REST IN WALK					C	
D	" EVERY				0.0				0.0				0.0			0.0			OLD GRN				EV DLY TMR		MAX 3					D	
E	YELLOW				4.4				4.1				4.4			4.1							RR CLR TMR		YEL START-UP			X		X	E
F	ALL RED				1.0				1.0				1.0			1.0			RAM ADD				EV MAX TMR		FIRST PHASE		X		X	F	
DIRECTION			NB-SB				OFF-RAMP EB				DUMMY				DUMMY								CONTROL CODE "F"								
DATE					06 18 98				06 18 98				12 04 03				12 04 03				DATE START:		0 9								
																					6/18/98		0		CLK RST						
BY					CB				CB				HD				HD				DATE SUPERSEDED:		9 A		YEAR		MONTH				

OVERLAP PHASES	
A	
B	
C	
D	

P.M.: 11.22 2 OF 6

CONTROL CODE "C"																										
	0		CONTROL PLANS (MAXIMUM OF 9 PLANS)												A	B	Y-CORD "C"	Y-CORD "D"	FLAGS							
			1														C	D	E	F	1	2	3	4	5	6
0	LOC ADD	CYCLE LENGTH	62											LOCAL TIMER	MASTER TIMER	RAM TEST			TB TIMR	LAG FREE		X	X	X	X	0
1	MANUAL CP	FZ1 GRN FCTR												FZ1 FO	PERM FZ1	INITIAL FLASH			GAP CP1	LAG CP1		X	X	X	X	1
2	MASTER CP													FZ2 FO		DOWN LOAD	1		GAP CP2	LAG CP2		X	X	X	X	2
3	CURRENT CP	FZ3 GRN FCTR												FZ3 FO	PERM FZ3				GAP CP3	LAG CP3		X	X	X	X	3
4	LAST CP	FZ4 GRN FCTR	25											FZ4 FO	PERM FZ4	PERM TIME		PERM TIME	GAP CP4	LAG CP4		X	X	X	X	4
5	FLASH	FZ5 GRN FCTR												FZ5 FO	PERM FZ5	LAG OFS		LAG OFS	GAP CP5	LAG CP5		X	X	X	X	5
6	CURRENT OFS													FZ6 FO		FORCE OFF		FORCE OFF	GAP CP6	LAG CP6		X	X	X	X	6
7	TRANS. CP	FZ7 GRN FCTR												FZ7 FO	PERM FZ7	LONG GRN		LONG GRN	GAP CP7	LAG CP7		X	X	X	X	7
8	8 KEY BANK	FZ8 GRN FCTR	25											FZ8 FO	PERM FZ8	NO GRN		NO GRN	GAP CP8	LAG CP8		X	X	X	X	8
9	9 KEY BANK	MULTI CYCLE														PERM TIMER		PERM TIMER	GAP CP9	LAG CP9		X	X	X	X	9
A		OFFSET A	0											PRES OFS	DES OFS	YC OFS		YC OFS		YC LAG C						A
B		OFFSET B														OFS TIMER		OFS TIMER		YC LAG D						B
C		OFFSET C														LAG GRN TIMER		LAG GRN TIMER		COORD FZ		X		X		C
D	MANUAL OFS	FZ3 EXTENSION														FO TIMER		FO TIMER		HOLD	OBSERVATION ONLY					D
E		FZ7 EXTENSION														LONG GRN TIMER		LONG GRN TIMER		NEXT FZ	OBSERVATION ONLY					E
F		OFS INTERRUPT												LOC CYC	MAS CYC	NO GRN TIMER		NO GRN TIMER		FORCE	OBSERVATION ONLY					F
DIRECTION OF PROGRESSION			AVG																							OFF/ON
DATE																										1 X
BY			RS																							2 X
																										3 X
																										4 X
																										5 X
																										LOCATION

NOTES AND REMARKS:

412 PROM MODULE DIP SWITCH		OFF/ON	
1	X		LOCATION
2	X		
3	X		
4	X		
5	X		
6	X		
7	X		
8	X		
1	X		FEATURE
2	X		
3	X		
4	X		
5	X		
6	X		
7	X		
8	X		

CO: L.A. RTE: 405 P.M.: 11.22 3 OF 6

NOTES AND REMARKS:	
NOTE : IF THIS IS THE MASTER FOR THE SYSTEM, ENTER NO. OF SLAVES IN RAM LOCATION :	DATE START: 6/18/98 DATE SUPERSEDED:
D-0-0 =	

[illegible]

LOCATION: S/B RTE. 405 FWY @ AVALON

CO: L.A.

RTE: 405

P.M.: 11.22

4 OF 6

CONTROL CODE "9" (C-O-9 = 0 OR 1)												
	HR (HH)	MIN (MM)	CP	OFS		S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	05	00	1	A	E	X	X	X	X	X	X	X
1	22	00	E		E	X	X	X	X	X	X	X
2					E							
3					E							
4					E							
5					E							
6					E							
7					E							
8					E							
9					E							
A					E							
B					E							
C					E							
D					E							
E					E							
F					E							

CONTROL CODE "9" (C-O-9 = 2)												
	HR (HH)	MIN (MM)	CP	OFS		S 1	M 2	T 3	W 4	T 5	F 6	S 7
0					E							
1					E							
2					E							
3					E							
4					E							
5					E							
6					E							
7					E							
8					E							
9					E							
A					E							
B					E							
C					E							
D					E							
E					E							
F					E							

NOTES AND REMARKS

CONTROL CODE "7"												
	HR (HH)	MIN (MM)	ACT		ON 0	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0			E									
1			E									
2			E									
3			E									
4			E									
5			E									
6			E									
7			E									
8			E									
9			E									
A			E									
B			E									
C			E									
D			E									
E			E									
F			E									

ACTIVITY CODE (CONTROL CODE "7")												
1 = TYPE OF SIMULTANEOUS PHASE TERMINATION												
2 = MAX 2												
3 = MAX 3												
4 = CONDITIONAL SERVICE (1ST SELECT)												
5 = CONDITIONAL SERVICE (2ND SELECT)												
6 = ENERGIZE AUXILIARY OUTPUT												
7 = ENERGIZE AUXILIARY OUTPUT												
8 = ENERGIZE AUXILIARY OUTPUT												
9 = MAX RECALL 1												
A = TRAFFIC ACTUATED MAX 2 OPERATION												
B = MAX RECALL2												
C = YELLOW YIELD COORDINATION												
D = YELLOW YIELD COORDINATION												
E = FREE OPERATION												
F = FLASHING OPERATION												

DATE START:	6/18/98
DATE SUPERSEDED:	

LOCATION: S/B RTE. 405 FWY @ AVALON

CO: L.A. RTE: 405 P.M.: 11.22 5 OF 6

CONTROL CODE "D"									
	SYSTEM DETECTOR 0	INPUT SLOT	DELAY	CARRYOVER		INPUT SLOT	DELAY	CARRYOVER	
			1	3			2	4	
0		I1				J1			0
1		I2U				J2U			1
2		I2L				J2L			2
3		I3U				J3U			3
4		I3L				J3L			4
5		I4				J4			5
6		I5				J5			6
7		I6U				J6U			7
8		I6L				J6L			8
9		I7U				J7U			9
A		I7L				J7L			A
B		I8				J8			B
C		I9U				J9U			C
D		I9L				J9L			D

NOTES AND REMARKS:		
DATE START:	6/18/98	DETECTOR COUNT
DATE SUPERSEDED:		SAMPLING PERIOD
		F-C-F = 120
		E-1-6

CONTROL CODE "E"																				(THIS PAGE @ FCF=123)															
	INPUT FILE	C (PHASE DISPLAY)								D (FUNCTION DISPLAY)									INPUT FILE	E (PHASE DISPLAY)								F (FUNCTION DISPLAY)							
										RL YL				EX CO CA T3														RL YL				EX CO CA T3			
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8			1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
0	I1	*												*	*																				
1	I2U		*											*	*																				
2	I2L		*											*	*																				
3	I3U		*											*	*																				
4	I3L		*											*																					
5	I4		*														*	*												*	*				
6	I5			*										*	*																				
7	I6U				*									*	*																				
8	I6L				*									*	*																				
9	I7U				*									*	*																				
A	I7L				*									*																					
B	I8				*												*	*											*	*					
C	I9U	*												*	*																				
D	I9L			*										*	*																				

0	J1					*																							*	*		
1	J2U						*																						*	*		
2	J2L						*																						*	*		
3	J3U						*																						*	*		
4	J3L						*																						*			
5	J4						*																								*	*
6	J5								*																				*		*	
7	J6U									*										*									*	*		
8	J6L									*										*									*	*		
9	J7U									*										*									*	*		
A	J7L									*										*									*			
B	J8																		*											*	*	
C	J9U					*														*									*	*		
D	J9L									*										*									*	*		

* = Default Settings

X = New Settings

NOTE: Default settings (*) should remain unless replaced with new settings (X).

LOCATION: S/B RTE. 405 FWY @ AVALON

CO: L.A. RTE: 405 P.M.: 11.22 6 OF 6

CONTROL CODE "8": HOLIDAY 1-16 (C-0-8=11)											
	DAY (DD)	YEAR (YY)	MONTH (M)		TYPE						
					1	2	3	4	5	6	7
0				E							
1				E							
2				E							
3				E							
4				E							
5				E							
6				E							
7				E							
8				E							
9				E							
A				E							
B				E							
C				E							
D				E							
E				E							
F				E							

CONTROL CODE "9": HOLIDAY EVENT 1-16 (C-0-9=11)											
	TIME (HHMM)	CP	OFS		TYPE						
					1	2	3	4	5	6	7
0				E							
1				E							
2				E							
3				E							
4				E							
5				E							
6				E							
7				E							
8				E							
9				E							
A				E							
B				E							
C				E							
D				E							
E				E							
F				E							

CONTROL CODE "8": HOLIDAY 17-32 (C-0-8=12)											
	DAY (DD)	YEAR (YY)	MONTH (M)		TYPE						
					1	2	3	4	5	6	7
0				E							
1				E							
2				E							
3				E							
4				E							
5				E							
6				E							
7				E							
8				E							
9				E							
A				E							
B				E							
C				E							
D				E							
E				E							
F				E							

CONTROL CODE "9": HOLIDAY EVENT 17-32(C-0-9=12)											
	TIME (HHMM)	CP	OFS		TYPE						
					1	2	3	4	5	6	7
0				E							
1				E							
2				E							
3				E							
4				E							
5				E							
6				E							
7				E							
8				E							
9				E							
A				E							
B				E							
C				E							
D				E							
E				E							
F				E							

NOTES:

DATE START:
6/18/98
DATE SUPERSEDED:

Location: R110 NB @ 220th St - Figueroa St

Designed By: HD

System:

District: 07

Installed By: HD

Master At: N/A

I/C: N/A

Service Info:

Timing Change:

Date Start:

9/23/2020

Date End:

Designed:

9/10/2020

Installed:

9/23/2020

- FLASH
- 1) SBLT Figueroa St
 - P 2) NB Figueroa St (2 ped)
 - H 3)
 - A 4)
 - S 5) NBLT Figueroa St
 - E 6) SB Figueroa St (6 ped)
 - 7) NB off Ramp (7 ped)
 - 8) WB 220th St (8 ped)

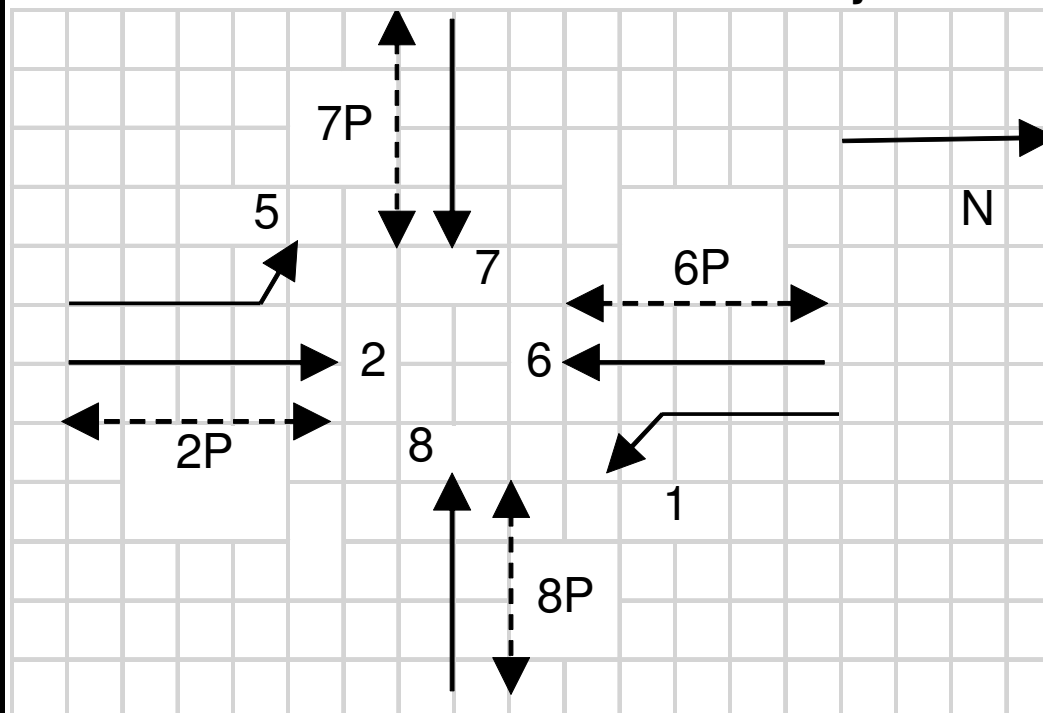
O A)
V B)
E C)
R D)
L E)
A F)
P

FLASH

[]
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[]

Intersection Layout



Comments and Notes:

RAM Checksum

Page 2: D803	Page 8: 85AF
Page 3: EC24	Page 9: D2FD
Page 4: F29E	Page 10: 36C6
Page 5: 191A	Page 11: C838
Page 6: 191A	Page 12: 1FB3
Page 7: 345C	Page 13: 86F7

Post Mile: 6.76

Printed: 5/11/2021

CONFIGURATION PHASE FLAGS

Cabinet (9-3)
332
Configuration
CALTRANS

Phases (2-1-1-1)	
Permitted	1 2 . . 5 6 7 8
Restricted	

Phase Recalls (2-1-1-2)	
Vehicle Min	. 2 . . . 6 . .
Vehicle Max	
Pedestrian	
Bicycle	

Phase Locks (2-1-1-3)	
Red	1 . . . 5 . .
Yellow	. 2 . . . 6 . .
Force/Max	

Phase Features (2-1-1-4)	
Double Entry	
Rest In Walk	
Rest In Red	
Walk 2	
Max Green 2	
Max Green 3	

Startup (2-1-1-5)	
First Green Phases	. 2 . . . 6 . .
Yellow Start Phases	 8
Vehicle Calls	1 2 . . 5 6 7 8
Pedestrian Calls	. 2 . . . 6 7 8
Yellow Start Overlaps	
Startup All-Red	6.0

Call To Phase (2-1-2-1)		Omit On Green	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	
Yellow Flash Overlaps	
Flash In Red Phases	
Flash In Red Overlaps	

Special Operation (2-1-2-3)	
Single Exit Phase	
Driveway Signal Phases	
Driveway Signal Overlaps	
Leading Ped Phases	

Protected Permissive (2-1-2-4)	
Protected Permissive	

Pedestrian (2-1-3)	
P1	
P2	. 2
P3	
P4	 7 .
P5	
P6	 6 . .
P7	
P8	 8

Overlap (2-1-4)				
Overlap	Parent	Omit	No Start	Not
A				
B				
C				
D				
E				
F				

P
H
A
S
ET
I
M
I
N
G

Phase (2-2)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 1 ---	0	7	0	10	0	7	7	7
Flash Don't Walk	0	14	0	10	0	22	21	21
Minimum Green	10	10	10	10	10	10	10	10
Det Limit	0	0	10	10	0	0	0	0
Max Initial	0	20	10	10	0	20	0	0
Max Green 1	20	30	50	50	25	30	20	20
Max Green 2	20	30	50	50	25	30	20	20
Max Green 3	20	30	50	50	25	30	20	20
Extension	2.5	4.0	5.0	5.0	3.0	4.0	3.0	3.0
Maximum Gap	2.5	5.0	5.0	5.0	3.0	5.0	3.0	3.0
Minimum Gap	2.5	3.0	5.0	5.0	3.0	3.0	3.0	3.0
Add Per Vehicle	0.0	2.0	1.0	1.0	0.0	2.0	0.0	0.0
Reduce Gap By	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Reduce Every	0.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0
Yellow	3.7	4.4	5.0	5.0	3.7	4.4	4.1	4.1
All-Red	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5)	
Time	5.0
All-Red Sec/Min (2-6)	
All-Red Sec/Min:	OFF

Max 2 Extension

Max/Gap Out (2-7)	
Max Cnt	0
Gap Cnt	0

Local Plan 1...9 (7-1) TIMING DATA**COORDINATION**

[Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Green Factor			.....											
Plan 2	Green Factor			.....											
Plan 3	Green Factor			.....											
Plan 4	Green Factor			.....											
Plan 5	Green Factor			.....											
Plan 6	Green Factor			.....											
Plan 7	Green Factor			.....											
Plan 8	Green Factor			.....											
Plan 9	Green Factor			.....											

Local Plan 1...9 (7-1) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1								
Plan 2								
Plan 3								
Plan 4								
Plan 5								
Plan 6								
Plan 7								
Plan 8								
Plan 9								

Master Timer Sync (7-A)**Enable in Plans**

1-9	.....
11-19	.....
21-29	.....

Master Sub Master

Input

Output

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
. 2 . 4 . 6 . 8	.....
Veh Min	Veh Max
. 2 ... 6 ..	.....
Ped	Bike
.....	
Cond	Cond Grn
.....	10

MANUAL COMMANDS**Manual Plan (4-1)**

Plan

OffSet

Plan: 1-29

254 = Flash

255 = Free

Offset A, B, or C

Special Function Override (4-2)

#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset

(4-3)

Local Manual (4-4)

OFF

Local Plan 11...19 (7-2) TIMING DATA**COORDINATION**

[Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 11	Green Factor			.....											
Plan 12	Green Factor			.....											
Plan 13	Green Factor			.....											
Plan 14	Green Factor			.....											
Plan 15	Green Factor			.....											
Plan 16	Green Factor			.....											
Plan 17	Green Factor			.....											
Plan 18	Green Factor			.....											
Plan 19	Green Factor			.....											

Local Plan 11...19 (7-2) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 11								
Plan 12								
Plan 13								
Plan 14								
Plan 15								
Plan 16								
Plan 17								
Plan 18								
Plan 19								

Local Plan 21...29 (7-3) TIMING DATA**COORDINATION**

[Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 21	Green Factor			.....											
Plan 22	Green Factor			.....											
Plan 23	Green Factor			.....											
Plan 24	Green Factor			.....											
Plan 25	Green Factor			.....											
Plan 26	Green Factor			.....											
Plan 27	Green Factor			.....											
Plan 28	Green Factor			.....											
Plan 29	Green Factor			.....											

Local Plan 21...29 (7-3) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 21								
Plan 22								
Plan 23								
Plan 24								
Plan 25								
Plan 26								
Plan 27								
Plan 28								
Plan 29								

DETECTORS

Detector Attributes (5-1)				Slot	Detector Configuration (5-2)				
Det	Type	Phases	Lock		Det	Delay	Extend	Recall	Port
1	COUNT+CALL+EXTEND	1	NO	I1U	1			10	3.2
2	COUNT+CALL+EXTEND	1	NO	I1L	2			10	7.2
3	COUNT+CALL+EXTEND	. 2	NO	I2U	3			10	1.1
4	COUNT+CALL+EXTEND	. 2	NO	I2L	4			10	1.5
5	COUNT+CALL+EXTEND	. 2	NO	I3U	5			10	4.5
6	CALL+EXTEND	. 2	NO	I3L	6			10	6.2
7	LIMITED	. 2	NO	I4U	7			10	2.1
8	COUNT+CALL+EXTEND	. 2	NO	I4L	8			10	7.4
9	COUNT+CALL+EXTEND	.. 3	NO	I5U	9			10	3.4
10	COUNT+CALL+EXTEND	.. 3	NO	I5L	10			10	7.6
11	COUNT+CALL+EXTEND	... 4	NO	I6U	11			10	1.3
12	COUNT+CALL+EXTEND	... 4	NO	I6L	12			10	1.7
13	COUNT+CALL+EXTEND	... 4	NO	I7U	13			10	4.7
14	CALL+EXTEND	... 4	NO	I7L	14			10	6.4
15	LIMITED	... 4	NO	I8U	15			10	2.3
16	COUNT+CALL+EXTEND	... 4	NO	I8L	16			10	7.8
17	COUNT+CALL+EXTEND	1	NO	I9U	17			10	3.6
18	COUNT+CALL+EXTEND	.. 3	NO	I9L	18			10	3.8
19	COUNT+CALL+EXTEND	. 2	NO	I10U	19			10	4.1
20	COUNT+CALL+EXTEND	... 4	NO	I10L	20			10	4.2
21	COUNT+CALL+EXTEND	 5 ...	NO	J1U	21			10	3.1
22	COUNT+CALL+EXTEND	 5 ...	NO	J1L	22			10	7.1
23	COUNT+CALL+EXTEND	 6 ..	NO	J2U	23			10	1.2
24	COUNT+CALL+EXTEND	 6 ..	NO	J2L	24			10	1.6
25	COUNT+CALL+EXTEND	 6 ..	NO	J3U	25			10	4.6
26	CALL+EXTEND	 6 ..	NO	J3L	26			10	6.3
27	LIMITED	 6 ..	NO	J4U	27			10	2.2
28	COUNT+CALL+EXTEND	 6 ..	NO	J4L	28			10	7.3
29	COUNT+CALL+EXTEND	 7 .	NO	J5U	29			10	3.3
30	COUNT+CALL+EXTEND	 7 .	NO	J5L	30			10	7.5
31	COUNT+CALL+EXTEND	 8	NO	J6U	31			10	1.4
32	COUNT+CALL+EXTEND	 8	NO	J6L	32			10	1.8
33	COUNT+CALL+EXTEND	 8	NO	J7U	33			10	4.8
34	CALL+EXTEND	 8	NO	J7L	34			10	6.5
35	LIMITED	 8	NO	J8U	35			10	2.4
36	COUNT+CALL+EXTEND	 8	NO	J8L	36			10	7.7
37	COUNT+CALL+EXTEND	 5 ...	NO	J9U	37			10	3.5
38	COUNT+CALL+EXTEND	 7 .	NO	J9L	38			10	3.7
39	COUNT+CALL+EXTEND	 6 ..	NO	J10U	39			10	4.3
40	COUNT+CALL+EXTEND	 8	NO	J10L	40			10	4.4
41	PEDESTRIAN	. 2	NO	I12U	41			10	5.1
42	PEDESTRIAN	 7 .	NO	I12L	42			10	5.3
43	PEDESTRIAN	 6 ..	NO	I13U	43			10	5.2
44	PEDESTRIAN	 8	NO	I13L	44			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	.....
Detectors 9-16	.....
Detectors 17-24	.....
Detectors 25-32	.....
Detectors 33-40	.....
Detectors 41-44	.....

System Detector Assignment (5-5)								
Sys Det	1	2	3	4	5	6	7	8
Det Nu								
Sys Det	9	10	11	12	13	14	15	16
Det Nu								

CIC Operation (5-6-1)	
Enable in Plans	.....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

Detector-to-Phase Assignment (5-6-3)								
Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6	4.1	6.6	5.1	5.2	6.7
	7.2	1.5	6.2	7.4	7.6	1.7	6.4	7.8	3.8	4.2	2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5	4.3	2.8	5.5	5.6	2.5
	7.1	1.6	6.3	7.3	7.5	1.8	6.5	7.7	3.7	4.4	6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)			Table 2 (8-2-2)			Table 3 (8-2-3)			Table 4 (8-2-4)			Table 5 (8-2-5)			Table 6 (8-2-6)		
Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES**Floating Holiday Table (8-2-8)**

#	Mnth	Week	DOW	Table
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Daylight Saving (8-1)

Enabled	YES	Month	Sunday
		Start	MAR 2nd
		End	NOV 1st

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	.....
Holiday	.....

TOD FUNCTIONS**TOD Functions (8-3)**

#	Start	End	DOW	Action	Phases
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Action Codes:

- 0. None
- 1. Permitted
- 2. Restricted
- 4. Veh Min Recall
- 5. Veh Max Recall
- 6. Ped Recall
- 7. Bike Recall
- 8. Red Lock
- 9. Yellow Lock
- 10. Force/Max Lock
- 11. Double Entry
- 12. Y-Coord C
- 13. Y-Coord D
- 14. Free
- 15. Flashing
- 16. Walk 2
- 17. Max Green 2

- 18. Max Green 3
- 19. Rest in Walk
- 20. Rest in Red
- 21. Free Lag Phases
- 22. Special Functions
- 23. Truck Preempt
- 24. Conditional Service
- 25. Conditional Service
- 26. Leading Ped
- 27. Traffic Actuated Max 2
- 41. Protected Permissive
- 42. Protected Permissive

 Action Code = Phases added to normal setting

100+Action Code = Phases removed

200+Action Code = Phases replaced

COMMUNICATIONS

	C2 (6-1-1)	C20 (6-1-2)	C21 (6-1-3)
Address			
Baud	1200	1200	1200
Protocol	AB3418	AB3418	AB3418
Data Bits	8	8	8
Parity	NONE	NONE	NONE
Stop Bits	1	1	1
RTS On Time	20	20	20
RTS Off Time	20	20	20
Handshaking	NORMAL	NORMAL	NORMAL
Access Level	0	0	0

SOFT LOGIC

Soft Logic (6-2)							
#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

CALLBACK NUMBERS

Callback Numbers (6-3...3)			
Line Out			
Long Distance			
Local Toll			
Delay	10	10	10
Area Code			
Phone Number			

NETWORK

Network Parameters (6-4)	
Address	
Protocol	AB3418
Port	27000
Type	STATIC
Central Access	
Field Access	
ATSPM	OFF

IP Address	0	.	0	.	0	.	0
Netmask	255	.	255	.	255	.	0
Broadcast	0	.	0	.	0	.	255
Gateway	0	.	0	.	0	.	254

SPAT Network (6-5)		
SPAT	1	2
Protocol	NONE	NONE
UDP Port	0	0

IP Address	0	.	0	.	0	.	0
------------	---	---	---	---	---	---	---

Access Levels:

0-Full Access

1-Status Only

2-Status, Set Pattern, Time

3-Status, Set Pattern, Time, Manual Plan

4-Reserved

5-Full Access with No Set Pattern

6-Full Access with No Set Time

7-Full Access with No Set Pattern, Manual Plan

8-Full Access with No Set Time, Pattern, Manual Plan

*Refer to User's Manual for Data and OP Codes

RAILROAD PREEMPTION

RR 1	Timing (3-1-1)		Phase Flags (3-1-2)			Pedestrian Flags (3-1-3)			Overlap Flags (3-1-4)						
	Clear 1	15	Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash				
	Clear 2	5	. 2 . . 5 . .	.....	.....	.....	.....	. 2 . 4 . 6 . 8	.....	.....	.....				
	Clear 3		. 2 . . 5 . .	.....	.....	.....	.....	. 2 . 4 . 6 . 8	.....	.....	.....				
	Hold														
	Min Gr		1 . . 4 . . 7 8	.....	.....	.....	... 4 ... 8	. 2 ... 6 ..	.....	.....	.....				
	Delay		Exit Parameters (3-1-5)				Configuration (3-1-6)								
	Exit		Phase Green	Ovrlap Green	Veh Permit/Call	Ped Permit/Call	PR	XR	Gate	Isld	APP	Sign	Sign	Max On	Latching
	Ped Clr		. 2 ... 6 ..		1 2 3 4 5 6 7 8	. 2 . 4 . 6 . 8	1							5	NO
							2			Valid Inputs: 1.x, 2.x, 3.x, 4.x, 5.x, 6.x, 7.x, 8.x x=1 to 8 Valid Outputs: 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 18.x x=1 to 8					

INPUTS

		7 Wire I/C (2-1-5-1)			
Enable	NO	Input	Port	Input	Port
Max ON		RR1		Free	
Max OFF		RR2		D2	
		RR3		D3	

Manual Control (2-1-5-2)	
Input	Port
Manual Advance	
Advance Enable	

Cabinet Status (2-1-5-3)	
Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)	
Input	Port
1	
2	
3	
4	

Battery Backup (2-1-5-5)	
Port	Operation
	NORMAL

Y-Coordination (2-1-5-6)	
Port C	Port D

OUTPUTS

Loadswitch Assignments (2-1-6)							
A	1	2	22	3	4	24	9
B	5	6	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:

0 Unused (no output)
 1-8 Vehicle 1-8
 9-14 Overlap A-F
 21-28 Ped 1-8
 41-47 Special Functions

41 Protected Permissive Flashing Phase 1
 43 Protected Permissive Flashing Phase 3
 45 Protected Permissive Flashing Phase 5
 47 Protected Permissive Flashing Phase 7
 51-57 Special Functions
 71-72 Seven Wire I/C

+ middle output of
 loadswitches 3 and 6
 Channel 9 and 10

INTERVAL CONTROL

Interval Control (3-3-1)	
Step	Time
Step 1	
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	
Step 7	
Step 8	

Phase Control (3-3-2)		
Hold	Force	Advance
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Phase Recall (3-3-3)		
Veh Call	Ped Call	Int Call
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Phase Permitted (3-3-4)		
Phs Permit	Ped Permit	Overlap Permit
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Configuration (3-3-5)			
Input	Port	Delay	HRI Cross
1			
2			

HRI

HRI Configuration (3-4)			
RailRoad	51	WAYSIDE	ATC
Line		Subnode	
Group		Device	

TRANSIT PRIORITY

Local Plans (3-E) 1...9 11...19		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Green Factor											
Plan 2	Green Factor											
Plan 3	Green Factor											
Plan 4	Green Factor											
Plan 5	Green Factor											
Plan 6	Green Factor											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											
Plan 11	Green Factor											
Plan 12	Green Factor											
Plan 13	Green Factor											
Plan 14	Green Factor											
Plan 15	Green Factor											
Plan 16	Green Factor											
Plan 17	Green Factor											
Plan 18	Green Factor											
Plan 19	Green Factor											

Transit Priority Configuration (3-E-A)		Indicator Output			
Enable in Plans	Input	Type	Stop	Go	
Plan 1-9		0.0	NONE	0	0
Plan 11-19		0.0	NONE	0	0

Queue Jump (3-E-B)	
Grn Hold	Hold Phase
	
	

Free Plans (3-E-E)	
Max Grn Hold	Hold Phase
	

Access Utilities (9-5)	
Password	***
Timeout	30

YELLOW YIELD COORDINATION

					Force-Offs											
Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	.....	.....
Plan D													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	.....	.....

TRUCK PRIORITY

Truck Priority (3-F)	Passage	CarryOver	Clearance	Next Priority	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output
						0.0	0.0	0.0	0	0.0	0

**APPENDIX:
HCM Queuing
Analysis**

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	29	29	514	407	1207	792	251
v/c Ratio	0.14	0.14	0.32	0.67	0.40	0.27	0.24
Control Delay	33.0	33.0	0.5	35.9	3.3	10.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	33.0	33.0	0.5	35.9	3.5	10.3	2.5
Queue Length 50th (ft)	13	13	0	98	97	79	0
Queue Length 95th (ft)	38	38	0	135	127	117	37
Internal Link Dist (ft)		1090			308	844	
Turn Bay Length (ft)	360		360	225			265
Base Capacity (vph)	481	484	1583	914	2995	2960	1026
Starvation Cap Reductn	0	0	0	0	979	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.06	0.32	0.45	0.60	0.27	0.24
Intersection Summary							

Queues

15: Avalon Blvd & I-405 SB Ramps

05/20/2021



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	423	4	523	1293	635	204
v/c Ratio	0.31	0.00	0.73	0.84	0.41	0.25
Control Delay	13.7	11.2	18.2	22.2	13.1	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	11.2	18.2	22.2	13.1	2.9
Queue Length 50th (ft)	55	0	113	210	80	0
Queue Length 95th (ft)	82	3	218	#345	122	32
Internal Link Dist (ft)		1457		794	308	
Turn Bay Length (ft)	195		145			
Base Capacity (vph)	1384	1427	730	1540	1546	806
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.00	0.72	0.84	0.41	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	264	78	337	150	513	798	192	747
v/c Ratio	4.98	0.19	1.05	0.36	1.50	0.84	0.77	0.88
Control Delay	1861.9	4.9	112.5	18.5	277.5	52.8	74.4	49.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1861.9	4.9	112.5	18.5	277.5	52.8	74.4	49.2
Queue Length 50th (ft)	~386	0	~316	34	~609	326	159	250
Queue Length 95th (ft)	#566	26	#508	97	#829	#458	238	330
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	53	421	321	421	341	946	307	896
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	4.98	0.19	1.05	0.36	1.50	0.84	0.63	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	52	51	486	275	1077	1552	567
v/c Ratio	0.24	0.23	0.31	0.55	0.38	0.53	0.49
Control Delay	34.1	34.0	0.5	35.8	3.9	12.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	34.1	34.0	0.5	35.8	4.3	12.6	2.8
Queue Length 50th (ft)	25	24	0	67	82	172	0
Queue Length 95th (ft)	57	56	0	100	121	248	50
Internal Link Dist (ft)		1090			310	844	
Turn Bay Length (ft)	360		360	225			265
Base Capacity (vph)	481	483	1583	914	2798	2912	1148
Starvation Cap Reductn	0	0	0	0	1023	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.11	0.31	0.30	0.61	0.53	0.49
Intersection Summary							

Queues

15: Avalon Blvd & I-405 SB Ramps

05/20/2021



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	234	245	379	1442	1133	462
v/c Ratio	0.17	0.18	0.59	0.93	0.73	0.48
Control Delay	12.7	12.7	17.6	29.4	17.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.4	0.0
Total Delay	12.7	12.7	17.6	29.4	18.1	3.3
Queue Length 50th (ft)	28	31	96	246	173	0
Queue Length 95th (ft)	47	50	171	#410	250	46
Internal Link Dist (ft)		1457		794	310	
Turn Bay Length (ft)	195		145			
Base Capacity (vph)	1384	1427	663	1545	1558	955
Starvation Cap Reductn	0	0	0	0	103	2
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.17	0.57	0.93	0.78	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	252	91	184	76	463	591	92	1240
v/c Ratio	5.14	0.21	0.76	0.22	1.29	0.49	0.53	1.44
Control Delay	1929.6	7.6	69.5	5.3	190.1	33.7	65.1	239.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1929.6	7.6	69.5	5.3	190.1	33.7	65.1	239.9
Queue Length 50th (ft)	~347	0	142	0	~470	186	72	~696
Queue Length 95th (ft)	#551	39	224	24	#733	282	131	#906
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	49	437	341	437	359	1217	323	859
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	5.14	0.21	0.54	0.17	1.29	0.49	0.28	1.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	37	38	514	560	1225	801	251
v/c Ratio	0.17	0.18	0.32	0.74	0.41	0.29	0.26
Control Delay	33.4	33.4	0.5	35.0	3.4	12.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	33.4	33.4	0.5	35.0	3.7	12.5	3.0
Queue Length 50th (ft)	17	17	0	135	98	89	0
Queue Length 95th (ft)	46	46	0	175	135	133	42
Internal Link Dist (ft)		1090			308	844	
Turn Bay Length (ft)	360		360	225			265
Base Capacity (vph)	481	484	1583	921	2989	2735	967
Starvation Cap Reductn	0	0	0	0	966	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.08	0.32	0.61	0.61	0.29	0.26
Intersection Summary							

Queues

15: Avalon Blvd & I-405 SB Ramps

05/20/2021



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	423	4	600	1500	660	204
v/c Ratio	0.31	0.00	0.84	0.98	0.43	0.25
Control Delay	13.6	11.0	26.0	38.9	13.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	11.0	26.0	38.9	13.4	2.9
Queue Length 50th (ft)	53	0	149	278	87	0
Queue Length 95th (ft)	82	3	#332	#441	127	32
Internal Link Dist (ft)		1457		794	308	
Turn Bay Length (ft)	195		145			
Base Capacity (vph)	1384	1427	723	1525	1535	802
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.00	0.83	0.98	0.43	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	268	78	337	150	513	798	192	747
v/c Ratio	5.15	0.19	1.05	0.36	1.50	0.84	0.77	0.88
Control Delay	1931.6	4.9	113.2	18.5	277.5	52.8	74.4	49.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1931.6	4.9	113.2	18.5	277.5	52.8	74.4	49.2
Queue Length 50th (ft)	~394	0	~316	34	~609	326	159	250
Queue Length 95th (ft)	#574	26	#509	97	#829	#458	238	330
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	52	421	321	421	341	946	307	896
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	5.15	0.19	1.05	0.36	1.50	0.84	0.63	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	70	69	486	370	1088	1570	567
v/c Ratio	0.31	0.30	0.31	0.64	0.39	0.57	0.51
Control Delay	34.8	34.6	0.5	35.9	4.2	14.7	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	34.8	34.6	0.5	35.9	4.6	14.7	3.1
Queue Length 50th (ft)	33	33	0	90	83	188	0
Queue Length 95th (ft)	71	70	0	125	132	280	56
Internal Link Dist (ft)	1090				308	844	
Turn Bay Length (ft)	360		360	225			265
Base Capacity (vph)	481	483	1583	914	2778	2766	1119
Starvation Cap Reductn	0	0	0	0	1006	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.14	0.31	0.40	0.61	0.57	0.51
Intersection Summary							

Queues

15: Avalon Blvd & I-405 SB Ramps

05/20/2021



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	234	245	546	1571	1186	462
v/c Ratio	0.17	0.17	0.84	1.03	0.77	0.49
Control Delay	12.4	12.4	29.5	51.4	19.4	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.4	0.0
Total Delay	12.4	12.4	29.5	51.4	19.7	3.3
Queue Length 50th (ft)	27	30	163	~342	192	0
Queue Length 95th (ft)	47	50	#333	#469	267	46
Internal Link Dist (ft)		1457		794	308	
Turn Bay Length (ft)	195		145			
Base Capacity (vph)	1384	1427	663	1523	1535	948
Starvation Cap Reductn	0	0	0	0	75	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.17	0.82	1.03	0.81	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	258	91	184	76	463	591	92	1240
v/c Ratio	5.38	0.21	0.76	0.22	1.29	0.49	0.53	1.44
Control Delay	2024.5	7.6	69.7	5.3	190.1	33.7	65.1	240.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2024.5	7.6	69.7	5.3	190.1	33.7	65.1	240.0
Queue Length 50th (ft)	~357	0	142	0	~470	186	72	~696
Queue Length 95th (ft)	#562	39	224	24	#733	282	131	#906
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	48	437	340	437	359	1216	323	859
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	5.38	0.21	0.54	0.17	1.29	0.49	0.28	1.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	90	89	560	712	1316	1016	261
v/c Ratio	0.38	0.37	0.35	0.78	0.48	0.45	0.31
Control Delay	35.3	35.2	0.6	33.7	5.1	18.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	35.3	35.2	0.6	33.7	5.6	18.6	4.0
Queue Length 50th (ft)	44	43	0	169	115	132	0
Queue Length 95th (ft)	85	84	0	210	188	205	51
Internal Link Dist (ft)	1090				308	844	
Turn Bay Length (ft)	360		360	200			265
Base Capacity (vph)	481	483	1583	971	2751	2241	843
Starvation Cap Reductn	0	0	0	0	884	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.35	0.73	0.70	0.45	0.31
Intersection Summary							

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	323	117	351	157	534	849	200	840
v/c Ratio	6.59	0.27	1.14	0.38	1.58	0.88	0.79	0.95
Control Delay	2567.8	9.0	140.4	19.7	311.9	56.2	75.9	58.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2567.8	9.0	140.4	19.7	311.9	56.2	75.9	58.4
Queue Length 50th (ft)	~497	0	~348	39	~647	357	165	302
Queue Length 95th (ft)	#689	51	#543	105	#869	#510	248	#432
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	49	429	308	417	337	962	303	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	6.59	0.27	1.14	0.38	1.58	0.88	0.66	0.94

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

34: Lenardo Dr & I-405 SB Ramps

05/20/2021



Lane Group	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	462	190	334	1092	200
v/c Ratio	0.40	0.24	0.33	0.57	0.21
Control Delay	14.5	13.6	1.9	8.0	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	13.6	1.9	8.0	1.8
Queue Length 50th (ft)	33	18	0	68	0
Queue Length 95th (ft)	53	37	27	138	21
Internal Link Dist (ft)	517	415		1198	
Turn Bay Length (ft)					
Base Capacity (vph)	2208	1537	1027	1905	967
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.12	0.33	0.57	0.21
Intersection Summary					

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	161	164	560	579	1203	1860	590
v/c Ratio	0.52	0.53	0.35	0.75	0.50	0.91	0.60
Control Delay	34.9	35.1	0.6	34.8	7.5	34.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	34.9	35.1	0.6	34.8	8.2	34.0	5.2
Queue Length 50th (ft)	77	80	0	139	123	308	0
Queue Length 95th (ft)	126	128	0	179	220	#547	83
Internal Link Dist (ft)		1090			308	844	
Turn Bay Length (ft)	360		360	200			265
Base Capacity (vph)	481	482	1583	925	2426	2035	986
Starvation Cap Reductn	0	0	0	0	815	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.34	0.35	0.63	0.75	0.91	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	387	102	192	79	482	645	96	1423
v/c Ratio	8.80	0.24	0.80	0.22	1.36	0.54	0.55	1.65
Control Delay	3596.8	9.5	73.4	5.8	216.7	35.7	66.2	328.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3596.8	9.5	73.4	5.8	216.7	35.7	66.2	328.8
Queue Length 50th (ft)	~591	1	150	0	~513	214	76	~864
Queue Length 95th (ft)	#827	49	236	27	#770	314	134	#1067
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	44	434	318	434	355	1196	319	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	8.80	0.24	0.60	0.18	1.36	0.54	0.30	1.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

34: Lenardo Dr & I-405 SB Ramps

05/20/2021



Lane Group	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	479	311	640	1149	227
v/c Ratio	0.40	0.38	0.55	0.61	0.23
Control Delay	14.4	14.7	2.8	8.6	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	14.7	2.8	8.6	1.8
Queue Length 50th (ft)	35	32	0	80	0
Queue Length 95th (ft)	55	57	37	150	22
Internal Link Dist (ft)	517	415		1198	
Turn Bay Length (ft)					
Base Capacity (vph)	2189	1523	1158	1888	972
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20	0.55	0.61	0.23
Intersection Summary					

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	98	97	560	865	1335	1025	261
v/c Ratio	0.40	0.39	0.35	0.78	0.49	0.53	0.34
Control Delay	35.5	35.4	0.6	29.9	5.4	22.7	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	35.5	35.4	0.6	29.9	5.9	22.7	4.7
Queue Length 50th (ft)	48	47	0	196	121	152	0
Queue Length 95th (ft)	90	89	0	248	199	222	54
Internal Link Dist (ft)	1090				308	844	
Turn Bay Length (ft)	360		360	200			265
Base Capacity (vph)	481	483	1583	1108	2740	1929	762
Starvation Cap Reductn	0	0	0	0	865	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.20	0.35	0.78	0.71	0.53	0.34
Intersection Summary							

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	326	117	351	157	534	849	200	840
v/c Ratio	6.65	0.27	1.14	0.38	1.58	0.88	0.79	0.95
Control Delay	2595.2	9.0	140.6	19.7	311.9	56.2	75.9	58.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2595.2	9.0	140.6	19.7	311.9	56.2	75.9	58.4
Queue Length 50th (ft)	~502	0	~348	39	~647	357	165	302
Queue Length 95th (ft)	#696	51	#543	105	#869	#510	248	#432
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	49	429	308	417	337	962	303	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	6.65	0.27	1.14	0.38	1.58	0.88	0.66	0.94

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

34: Lenardo Dr & I-405 SB Ramps

05/20/2021



Lane Group	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	468	205	334	1162	200
v/c Ratio	0.40	0.25	0.33	0.61	0.21
Control Delay	14.5	13.7	1.9	8.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	13.7	1.9	8.4	1.8
Queue Length 50th (ft)	34	20	0	75	0
Queue Length 95th (ft)	54	39	27	152	21
Internal Link Dist (ft)	517	415		1198	
Turn Bay Length (ft)					
Base Capacity (vph)	2205	1535	1026	1902	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.13	0.33	0.61	0.21
Intersection Summary					

Queues

14: Avalon Blvd & I-405 NB Ramps

05/20/2021



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	182	560	674	1214	1877	590
v/c Ratio	0.56	0.56	0.35	0.80	0.51	0.99	0.62
Control Delay	35.0	35.3	0.6	35.8	8.0	47.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	35.0	35.3	0.6	35.8	8.7	47.8	6.0
Queue Length 50th (ft)	86	88	0	161	130	334	4
Queue Length 95th (ft)	136	138	0	212	231	#567	95
Internal Link Dist (ft)		1090			308	844	
Turn Bay Length (ft)	360		360	200			265
Base Capacity (vph)	481	482	1583	933	2395	1890	950
Starvation Cap Reductn	0	0	0	0	785	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.38	0.35	0.72	0.75	0.99	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

31: Figueroa St & I-110 NB Ramps/220th St

05/20/2021



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	393	102	192	79	482	645	96	1423
v/c Ratio	8.93	0.24	0.80	0.22	1.36	0.54	0.55	1.65
Control Delay	3658.6	9.5	73.5	5.8	216.7	35.7	66.2	329.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3658.6	9.5	73.5	5.8	216.7	35.7	66.2	329.0
Queue Length 50th (ft)	~601	1	150	0	~513	214	76	~864
Queue Length 95th (ft)	#842	49	236	27	#770	314	134	#1067
Internal Link Dist (ft)	1163		595			462		664
Turn Bay Length (ft)				120	290		105	
Base Capacity (vph)	44	434	317	434	355	1196	319	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	8.93	0.24	0.61	0.18	1.36	0.54	0.30	1.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

34: Lenardo Dr & I-405 SB Ramps

05/20/2021



Lane Group	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	495	321	640	1300	227
v/c Ratio	0.41	0.38	0.55	0.69	0.23
Control Delay	14.5	14.7	2.8	9.8	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	14.7	2.8	9.8	1.8
Queue Length 50th (ft)	36	33	0	99	0
Queue Length 95th (ft)	57	58	37	184	22
Internal Link Dist (ft)	517	415		1198	
Turn Bay Length (ft)					
Base Capacity (vph)	2182	1518	1156	1883	970
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.21	0.55	0.69	0.23
Intersection Summary					