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TRAFFIC IMPACT ANALYSIS REPORT
TORRANCE TRANSIT CENTER

Torrance, California

April 29, 2013

Prepared for:

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EXECUTIVE SUMMARY
TORRANCE TRANSIT CENTER

Torrance, California

April 29, 2013

Project Description

- The proposed Torrance Transit Center consists of developing a regional transit center on 5.39 acres of a 15.06-acre triangular-shaped parcel of land that the City owns. The Project site, which is currently vacant, is located west of Crenshaw Boulevard and south of the proposed westerly extension of 208th Street. Within the subject property, the City proposes to develop a 16,620 square-foot (SF) transit center, which contains approximately 3,150 SF of transit oriented commercial/retail services and 251 surface parking spaces. The remaining 13,470 SF of the transit center will provide a lay-over facility for bus drivers (lounge, kitchenette, exercise room, etc.), a central ticket office, security office, training simulation room, and flex room for meetings by various public and service organizations. The proposed Project also includes a bus terminal with eight (8) bus berths.

  No development project has been identified for the remainder of the site, which after public roadway improvements (0.47 acres) and shared site roadway (0.47 acres) results in 7.81 acres of undeveloped land and a 0.92 acre expanded parking lot. It should be noted that this undeveloped land and the expanded parking lot are not part of the Project. Although no development plans are proposed, the City can accommodate a potential Metrolink Green Line Extension Station to the site and a parking structure. Specifically, the 15.06-acre triangular-shaped Project site is broken down into five basic land uses; 5.39 acres assigned to the transit site (transit center building, bus terminal, parking garage, bus access road, Kiss-N-Ride and landscaping/walks), 7.81 acres assigned to the undeveloped parcels, 0.47 acres assigned to public roadway improvements (consisting of the 208th Street expansion and Crenshaw Boulevard frontage improvements), 0.92 acres is reserved for the future garage expansion for the Metro Green Line Extension and 0.47 acres is assigned to the shared site roadways. Vehicular access to the Project site (parking garage and Kiss-N-Ride) will be provided via a proposed signalized driveway located along Crenshaw Boulevard and bus access will be provided via a driveway along the proposed western extension of 208th Street bordering the property on the north. The Project is anticipated to be completed and fully operational by Year 2015.

- The total combined trip generation for the 251 space parking lot component and the bus service component of the proposed Project, is expected to generate 2,426 daily PCE trips (one half arriving, one half departing), with 274 PCE trips (189 inbound, 85 outbound) produced in the AM peak hour and 252 PCE trips (87 inbound, 165 outbound) produced in the PM peak hour on a "typical" weekday.

- The seventeen (17) existing key study intersections and one (1) future Project driveway that have been selected for evaluation in this report provide both regional and local access to the study area. The key intersections analyzed in this report are as follows:

    1. Crenshaw Boulevard at 182nd Street
    2. I-405 Northbound Ramps at 182nd Street
    3. Crenshaw Boulevard at I-405 Southbound Ramps
    4. Prairie Avenue at 190th Street
    5. Crenshaw Boulevard at 190th Street
    6. Van Ness Avenue at 190th Street
    7. Prairie Avenue/Madrona Avenue at Del Amo Boulevard
    8. Maple Avenue at Del Amo Boulevard
    9. Crenshaw Boulevard at Del Amo Boulevard
    10. Van Ness Avenue at Del Amo Boulevard
    11. Western Avenue at Del Amo Boulevard
    12. Crenshaw Boulevard at 208th Street
    13. Madrona Avenue at Torrance Boulevard
    14. Crenshaw Boulevard at Torrance Boulevard
    15. Western Avenue at Torrance Boulevard
    16. Crenshaw Boulevard at Carson Street
    17. Crenshaw Boulevard at Sepulveda Boulevard
    18. Crenshaw Boulevard at Project Driveway [Future]

Related Projects Description

- The twenty-one (21) related projects are expected to generate a combined total of 15,581 daily trips (one half arriving, one half departing) on a "typical" weekday, with 1,139 trips (796 inbound and 343 outbound) forecast during the AM peak hour and 1,146 trips (378 inbound and 768 outbound) forecast during the PM peak hour.

Traffic Impact Analysis (ICU Methodology)

Existing Traffic Conditions (ICU Methodology)

- For the Existing traffic conditions, seven (7) of the seventeen (17) existing key study intersections currently operate at unacceptable level of services during the AM and/or PM peak hour when compared to the LOS standards defined in this report. The remaining ten (10) existing key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	0.964	E
2. I-405 Northbound Ramps at 182nd Street	--	--	0.900	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.092	F	--	--
4. Prairie Avenue at 190th Street	1.267	F	1.168	F
5. Crenshaw Boulevard at 190th Street	0.903	E	0.986	E
6. Van Ness Avenue at 190th Street	0.986	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.008	F

Existing With Project Traffic Conditions (ICU Methodology)

- For the Existing With Project traffic conditions, seven (7) of the seventeen (17) key study intersections are forecast to operate at unacceptable level of services during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining ten (10) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	0.967	E
2. I-405 Northbound Ramps at 182nd Street	--	--	0.904	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.103	F	--	--
4. Prairie Avenue at 190th Street	1.269	F	1.169	F
5. Crenshaw Boulevard at 190th Street	0.921	E	0.993	E
6. Van Ness Avenue at 190th Street	0.988	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.010	F

None of the seventeen (17) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

Year 2015 With Project Traffic Conditions (ICU Methodology)

- For the Year 2015 With Project traffic conditions twelve (12) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining five (5) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	1.018	F
2. I-405 Northbound Ramps at 182nd Street	--	--	0.999	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.233	F	1.007	F
4. Prairie Avenue at 190th Street	1.304	F	1.204	F
5. Crenshaw Boulevard at 190th Street	1.007	F	1.088	F
6. Van Ness Avenue at 190th Street	1.008	F	--	--
7. Prairie Ave/Madrona Ave at Del Amo Blvd	--	--	0.901	E
9. Crenshaw Boulevard at Del Amo Boulevard	0.907	E	0.963	E
11. Western Avenue at Del Amo Boulevard	0.909	E	0.905	E
15. Western Avenue at Torrance Boulevard	0.912	E	--	--
16. Crenshaw Boulevard at Carson Street	0.936	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.044	F

None of the seventeen (17) key study intersections will have a significant impact under the Year 2015 With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

Traffic Impact Analysis (HCM Methodology)

Existing Traffic Conditions (HCM Methodology)

- For the Existing traffic conditions, two (2) of the seventeen (17) existing key study intersections currently operate at unacceptable level of services during the AM and/or PM peak hour when compared to the LOS standards defined in this report. The remaining fifteen (15) existing key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
4. Prairie Avenue at 190th Street	98.5	F	74.4	E
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	70.8	E

Existing With Project Traffic Conditions (HCM Methodology)

- For the Existing With Project traffic conditions, two (2) of the seventeen (17) key study intersections are forecast to operate at unacceptable level of services during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining fifteen (15) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
4. Prairie Avenue at 190th Street	99.0	F	74.4	E
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	71.3	E

None of the seventeen (17) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

Year 2015 With Project Traffic Conditions (HCM Methodology)

- For the Year 2015 With Project traffic conditions five (5) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay**	**LOS**	**Delay**	**LOS**
3. Crenshaw Boulevard at I-405 SB Ramps	**78.4**	**E**	**--**	**--**
4. Prairie Avenue at 190th Street	106.9	F	79.7	E
5. Crenshaw Boulevard at 190th Street	--	--	56.9	E
11. Western Avenue at Del Amo Boulevard	62.4	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	77.1	E

One (1) of the seventeen (17) key study intersections will have a significant impact under the Year 2015 With Project traffic conditions when compared to the LOS criteria defined in this report. However, as shown in column (5) of *Table 8-2*, the implementation of recommended mitigation measures at the intersection of Crenshaw Boulevard at I-405 Southbound Ramps mitigates the impacts of the proposed Project and also offset the cumulative impacts. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at better than the pre-Project LOS.

Project-Specific Traffic Improvements

Project-Specific Planned Improvements

- The Project-specific planned improvements listed below are to be completed in conjunction with the Project development and have been assumed in the Existing With Project and Year 2015 With Project traffic conditions:
  - Intersection 12 – Crenshaw Boulevard at 208th Street: Construct the south side of 208th Street, west of Crenshaw Boulevard, along project frontage to ultimate half section width per the City of Torrance "Collector Street" design standards to include a 30-foot paved width and a 10-foot sidewalk/parkway. Within 30-feet of paved width, provide a 14-foot eastbound shared left/through/right turn-lane and a 16-foot westbound departure lane. Restripe the westbound approach on 208th Street to provide a left-turn lane, a shared left//through lane, and a right-turn lane. Restripe Crenshaw Boulevard to provide an exclusive northbound left-turn lane and convert the 3rd southbound through lane to a southbound shared through/right-turn lane. Provide a pedestrian crosswalk on the west of the intersection. Modify the existing traffic signal and convert from two-phase operation to six-phase operation (split phase on 208th Street).
  - Intersection 18 – Crenshaw Boulevard at Project Driveway: Install a traffic signal and design for three-phase operation. Construct the west leg (Project Driveway) of this intersection to provide an exclusive eastbound left-turn lane, an exclusive eastbound right-turn lane and two westbound departure lanes. Restripe Crenshaw Boulevard to provide an exclusive northbound left-turn lane with a minimum of 100 feet storage length with a 90 feet transition. Widen and/or restripe Crenshaw Boulevard to provide an exclusive southbound right-turn lane with a minimum of 100 feet storage length with a 90 feet transition. Provide pedestrian crosswalks on the west, north and south legs of the intersection.

Existing With Project Traffic Conditions Recommended Improvements (ICU Methodology)

- The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the of seventeen (17) key study intersections based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

Existing With Project Traffic Conditions Recommended Improvements (HCM Methodology)

- The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the of seventeen (17) key study intersections based on the *Highway Capacity Manual (HCM)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

Year 2015 With Project Traffic Conditions Recommended Improvements (ICU Methodology)

- The results of the Year 2015 With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the seventeen (17) key study intersections based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

Year 2015 With Project Traffic Conditions Recommended Improvements (HCM Methodology)

- The results of the Year 2015 With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the of seventeen (17) key study intersections. The remaining sixteen (16) key intersections will not have a significant impact under the Year 2015 With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis. The improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Year 2015 With Project traffic based on the *Highway Capacity Manual (HCM)* Method of Analysis:

  - Intersection 3 – Crenshaw Boulevard at I-405 Southbound Ramps: Widen and/or restripe Crenshaw Boulevard to provide an exclusive southbound right-turn lane. Modify the existing traffic signal. The implementation of this improvement is subject to review and approval of Caltrans and/or the City of Torrance. Please note that this improvement is consistent with the proposed improvements now under consideration as a part of proposed improvements to the Interstate 405/Crenshaw Boulevard Interchange, which also includes the construction of a new I-405 SB on-ramp from NB Crenshaw Boulevard as a part of the improvement alternatives.

Site Access and Internal Circulation Evaluation

- The access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Existing With Project traffic conditions based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

- The access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Existing With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis.

- The access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2015 With Project traffic conditions based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

- The access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2015 With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis.

- The on-site circulation was evaluated in terms of vehicle-pedestrian conflicts. Based on our review of the preliminary site plan, the overall layout does not create significant vehicle-pedestrian conflict points and the roadway throat lengths are sufficient such that access to driveways is not impacted by internal vehicle queuing/stacking. Project traffic is not anticipated to cause significant queuing/stacking at the Project access. The on-site circulation is acceptable based on our review of the proposed site plan. The alignment, spacing and throat length of the Project accesses is also deemed adequate. Turning movements into and out of the Project site at the Project accesses are anticipated to operate at an acceptable service levels. The proposed throat length at the Project accesses is sufficient for storing potential queuing vehicles. As such, motorists entering and exiting the Project site from this driveway will be able to do so comfortably, safely, and without undue congestion.

- Based on the Passenger Car and Bus-40 Turning Movement Analysis, passenger cars and buses could properly access the site from Crenshaw Boulevard and 208th Street and circulate the Project site. Based on our evaluation of the proposed site plan, it appears that curb return radii are adequate for passenger cars and buses. Vehicle turning templates ASSHTO P_M, and BUS-40 were utilized in this evaluation.

<u>Congestion Management Program Compliance Assessment</u>

- The closest CMP freeway monitoring location in the Project vicinity is the I-405 Freeway n/o Inglewood Avenue, at Compton Boulevard (CMP Station 1068 – Post Mile 18.63). Based on the Project's trip generation and distribution pattern, the proposed Project will not add more than 150 trips (in either direction) during either the weekday AM or PM peak hour at this CMP mainline freeway-monitoring location. Therefore a CMP freeway traffic impact analysis is not required.

- The proposed Project will not add greater than 50 trips at the CMP intersections listed in this report during the AM and PM peak hours and therefore does not meet the minimum threshold of 50 trips. Therefore a CMP arterial monitoring stations traffic impact analysis is not required.

TRAFFIC IMPACT ANALYSIS REPORT

TORRANCE TRANSIT CENTER

Torrance, California

April 29, 2013

1.0 INTRODUCTION

This traffic impact analysis evaluates the potential traffic impacts of the proposed Torrance Transit Center (hereinafter referred to as Project), on the area traffic circulation. The proposed Project consists of developing a regional transit center on 5.39 acres of a 15.06-acre triangular-shaped parcel of land that the City owns. The Project site, which is currently vacant, is located west of Crenshaw Boulevard and south of the proposed westerly extension of 208th Street. Within the subject property, the City proposes to develop a 16,620 square-foot (SF) transit center, which contains approximately 3,150 SF of transit oriented commercial/retail services and 251 surface parking spaces. The remaining 13,470 SF of the transit center will provide a lay-over facility for bus drivers (lounge, kitchenette, exercise room, etc.), a central ticket office, security office, training simulation room, and flex room for meetings by various public and service organizations. The proposed Project also includes a bus terminal with eight (8) bus berths.

No development project has been identified for the remainder of the site, which after public roadway improvements (0.47 acres) and shared site roadway (0.47 acres) results in 7.81 acres of undeveloped land and a 0.92 acre expanded parking lot. It should be noted that this undeveloped land and the expanded parking lot are not part of the Project. Although no development plans are proposed, the City can accommodate a potential Metrolink Green Line Extension Station to the site and a parking structure. Specifically, the 15.06-acre triangular-shaped Project site is broken down into five basic land uses; 5.39 acres assigned to the transit site (transit center building, bus terminal, parking garage, bus access road, Kiss-N-Ride and landscaping/walks), 7.81 acres assigned to the undeveloped parcels, 0.47 acres assigned to public roadway improvements (consisting of the 208th Street expansion and Crenshaw Boulevard frontage improvements), 0.92 acres is reserved for the future garage expansion for the Metro Green Line Extension and 0.47 acres is assigned to the shared site roadways. Vehicular access to the Project site (parking garage and Kiss-N-Ride) will be provided via a proposed signalized driveway located along Crenshaw Boulevard and bus access will be provided via a driveway along the proposed western extension of 208th Street bordering the property on the north. The Project is anticipated to be completed and fully operational by Year 2015.

This report documents the findings and recommendations of a traffic impact analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential impacts the Project may have on the local and/or regional network in the vicinity of the Project site. The traffic impact analysis evaluates the operating conditions at seventeen (17) existing key study intersections and one (1) future Project driveway within the Project vicinity, estimates the trip generation potential of the Project, estimates the trip generation potential of the related projects and forecasts future (existing and near-term) operating conditions without and with the Project. Information concerning related

projects (planned and/or approved) in the vicinity of the Project has been researched at the City of Torrance. Based on our research, there are twenty-one (21) planned and/or approved projects within the study area. These twenty-one (21) related projects were considered in the cumulative traffic analysis for this Project.

This traffic impact analysis has been prepared according to the traffic impact requirements of the *City of Torrance* and is consistent with the *Congestion Management Program (CMP) for Los Angeles County.* The traffic impact analysis also considers the requirements of Caltrans as published in the Caltrans *Guide for the Preparation of Traffic Impact Studies* for the ramp intersections. The Scope of Work for this traffic study was developed in conjunction with City of Torrance Public Works Department staff.

The Project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing (i.e. baseline) peak period traffic information has been collected at seventeen (17) key study intersections on a "typical" weekday for use in the preparation of intersection level of service calculations.

1.1 Study Area

The seventeen (17) existing key study intersections and one (1) future Project driveway that have been selected for evaluation in this report provide both regional and local access to the study area. The key intersections analyzed in this report are as follows:

1. Crenshaw Boulevard at 182nd Street
2. I-405 Northbound Ramps at 182nd Street
3. Crenshaw Boulevard at I-405 Southbound Ramps
4. Prairie Avenue at 190th Street
5. Crenshaw Boulevard at 190th Street
6. Van Ness Avenue at 190th Street
7. Prairie Avenue/Madrona Avenue at Del Amo Boulevard
8. Maple Avenue at Del Amo Boulevard
9. Crenshaw Boulevard at Del Amo Boulevard
10. Van Ness Avenue at Del Amo Boulevard
11. Western Avenue at Del Amo Boulevard
12. Crenshaw Boulevard at 208th Street
13. Madrona Avenue at Torrance Boulevard
14. Crenshaw Boulevard at Torrance Boulevard
15. Western Avenue at Torrance Boulevard
16. Crenshaw Boulevard at Carson Street
17. Crenshaw Boulevard at Sepulveda Boulevard
18. Crenshaw Boulevard at Project Driveway [Future]

1.2 Traffic Impact Analysis Components

The Intersection Capacity Utilization (ICU), Highway Capacity Manual (HCM) and corresponding Level of Service (LOS) calculations at the key study intersections were used to evaluate the potential traffic-related impacts associated with area growth, related projects and the Project. When necessary, this report recommends intersection improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service and/or addresses the impact of the Project.

Included in this Traffic Impact Analysis are:

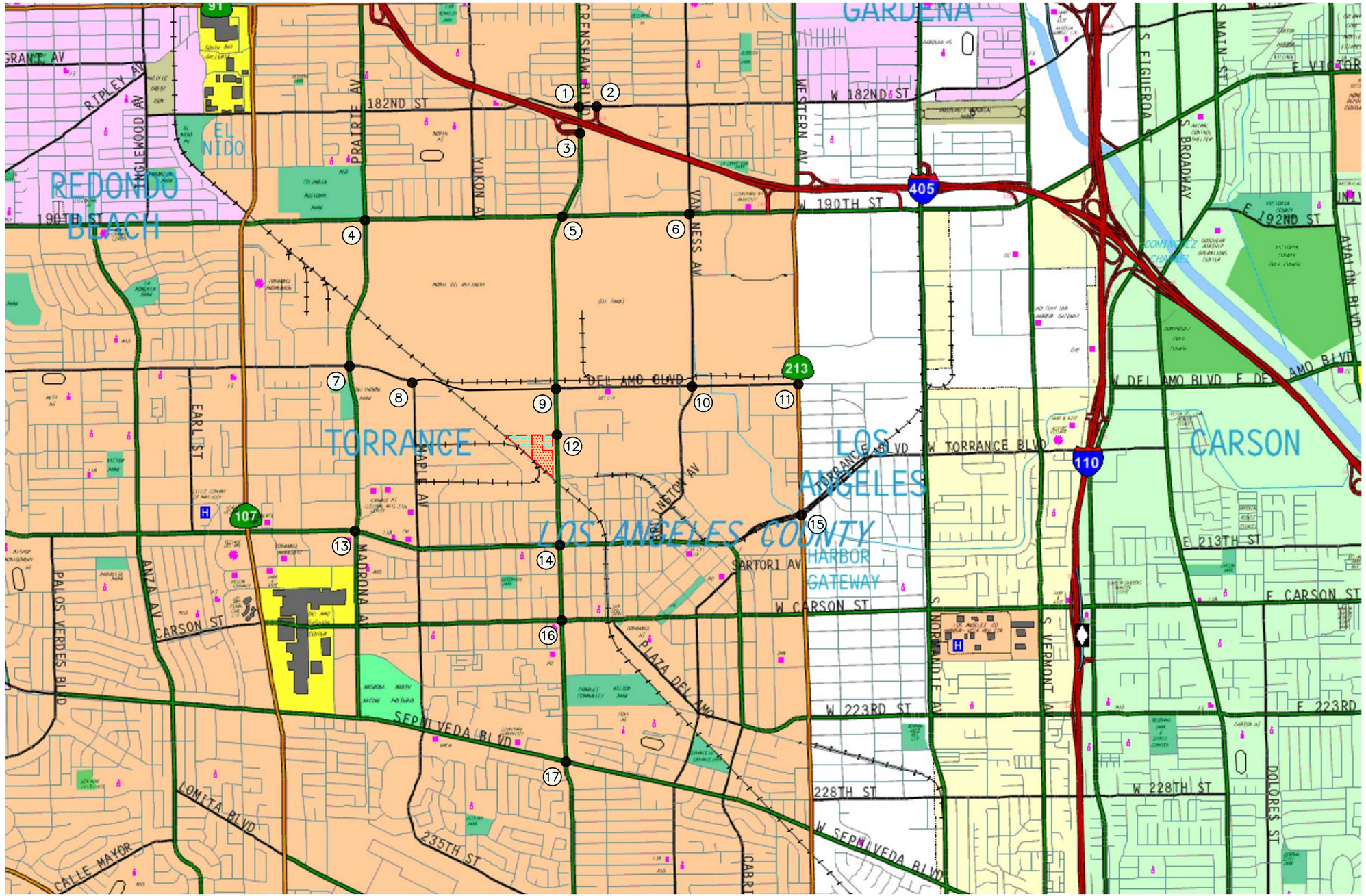
- Existing Traffic Counts,
- Estimated Project traffic generation/distribution/assignment,
- Estimated Related Projects traffic generation/distribution/assignment,
- AM and PM peak hour LOS analyses for Existing (i.e. Baseline) Conditions,
- AM and PM peak hour LOS analyses for Existing (i.e. Baseline) Conditions with Project traffic,
- AM and PM peak hour LOS analyses for Year 2015 (Near-Term) Conditions without and with Project traffic,
- Project-Specific Traffic Improvements,
- Project Fair Share Analysis, and
- Site Access and Internal Circulation Evaluation.

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the Project and depicts the study intersections and surrounding street system. ***Figure 1-2*** presents a Regional Map, which illustrates the general location of the Project, surrounding cities and the regional freeway system.

1.3 Traffic Impact Analysis Scenarios

The following scenarios are those for which ICU/Delay and corresponding LOS calculations have been performed at the key intersections for Existing and Year 2015 traffic conditions:

A. Existing (i.e. Baseline) Traffic Conditions,
B. Existing (i.e. Baseline) With Project Traffic Conditions,
C. Scenario (B) with Recommended Improvements, if any,
D. Year 2015 Without Project Traffic Conditions,
E. Year 2015 With Project Traffic Conditions, and
F. Scenario (E) With Recommended Improvements, if any.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: THOMAS GUIDE

KEY

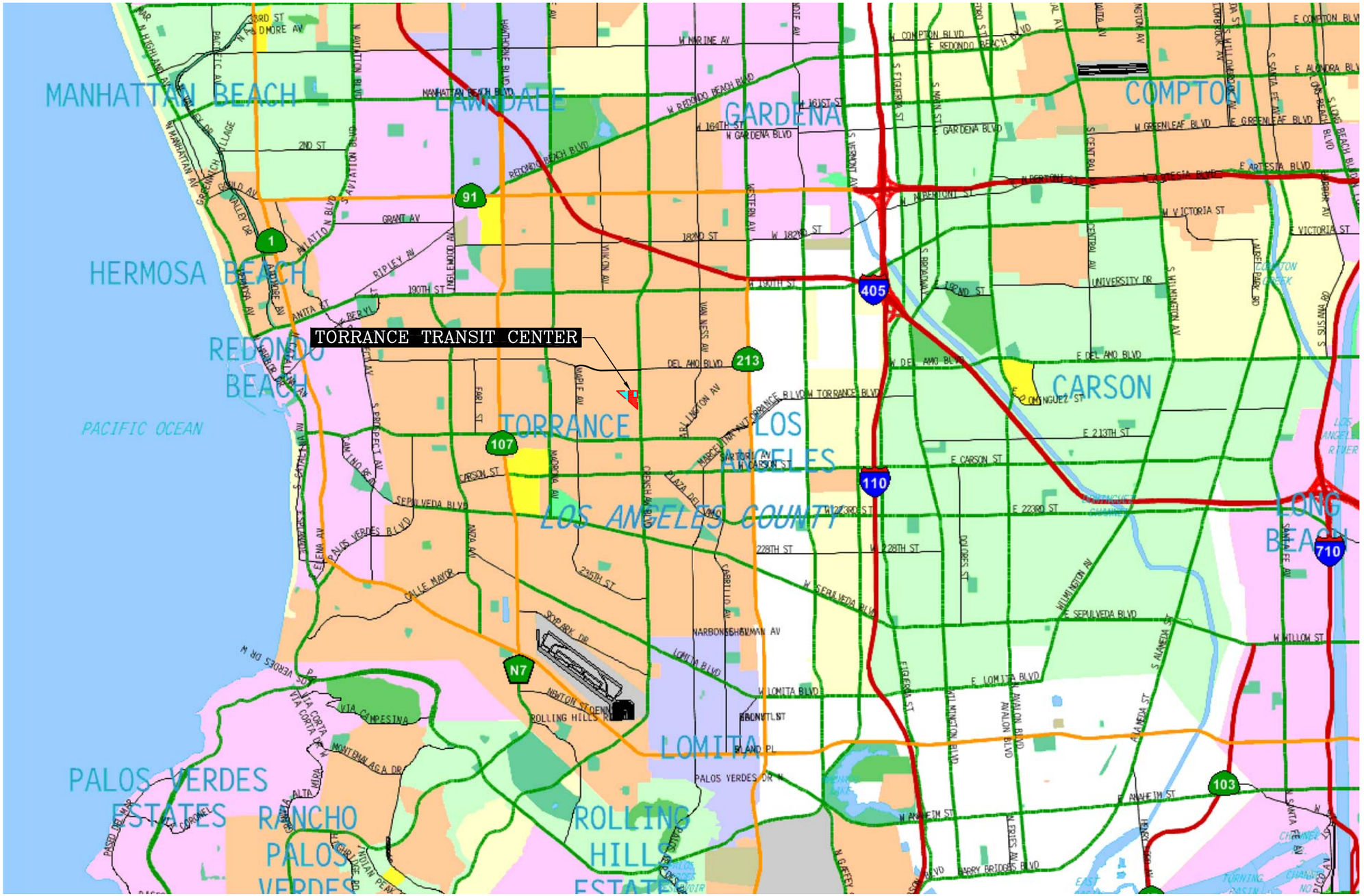
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

FIGURE 1–1

VICINITY MAP

TORRANCE TRANSIT CENTER, TORRANCE



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N NO SCALE

SOURCE: THOMAS GUIDE

KEY

= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

FIGURE 1–2

REGIONAL MAP

TORRANCE TRANSIT CENTER, TORRANCE

2.0 PROJECT DESCRIPTION AND LOCATION

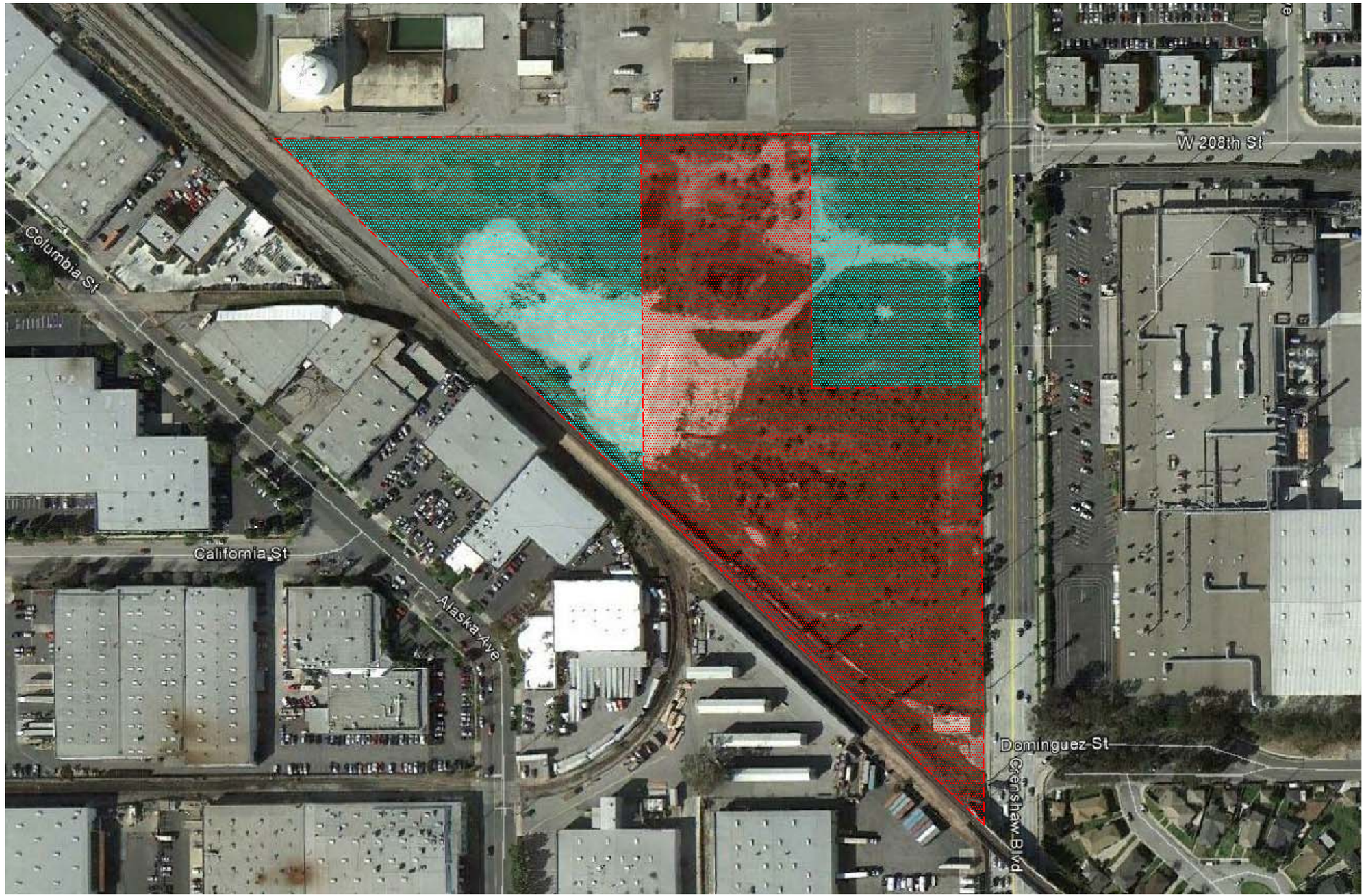
The proposed Project consists of developing a regional transit center on 5.39 acres of a 15.06-acre triangular-shaped parcel of land that the City owns. The Project site, which is currently vacant, is located west of Crenshaw Boulevard and south of the proposed westerly extension of 208th Street. Within the subject property, the City proposes to develop a 16,620 square-foot (SF) transit center, which contains approximately 3,150 SF of transit oriented commercial/retail services and 251 surface parking spaces. The remaining 13,470 SF of the transit center will provide a lay-over facility for bus drivers (lounge, kitchenette, exercise room, etc.), a central ticket office, security office, training simulation room, and flex room for meetings by various public and service organizations. The proposed Project also includes a bus terminal with eight (8) bus berths.

No development project has been identified for the remainder of the site, which after public roadway improvements (0.47 acres) and shared site roadway (0.47 acres) results in 7.81 acres of undeveloped land and a 0.92 acre expanded parking lot. It should be noted that this undeveloped land and the expanded parking lot are not part of the Project. Although no development plans are proposed, the City can accommodate a potential Metrolink Green Line Extension Station to the site and a parking structure. Specifically, the 15.06-acre triangular-shaped Project site is broken down into five basic land uses; 5.39 acres assigned to the transit site (transit center building, bus terminal, parking garage, bus access road, Kiss-N-Ride and landscaping/walks), 7.81 acres assigned to the undeveloped parcels, 0.47 acres assigned to public roadway improvements (consisting of the 208th Street expansion and Crenshaw Boulevard frontage improvements), 0.92 acres is reserved for the future garage expansion for the Metro Green Line Extension and 0.47 acres is assigned to the shared site roadways. The Project is anticipated to be completed and fully operational by Year 2015.

Figure 2-1 presents the existing site for the proposed Project. ***Figure 2-2*** presents the proposed site plan, prepared by RNL Design.

2.1 Site Access

As shown in *Figure 2-2*, vehicular access to the Project site (parking garage and Kiss-N-Ride) will be provided via a proposed signalized driveway located along Crenshaw Boulevard and bus access will be provided via a driveway along the proposed western extension of 208th Street bordering the property on the north. The proposed full access signalized driveway on Crenshaw Boulevard will require modification of the existing striping to provide a northbound left-turn with a minimum storage length of 100 feet with a 90-foot transition. The “bus only” access on the proposed western extension of 208th Street bordering the subject property includes constructing this proposed public roadway to ultimate half-section width per City of Torrance design standards for “Collector Streets” (60-foot paved with within 80-foot right-of way).



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N NO SCALE

SOURCE: GOOGLE EARTH

KEY

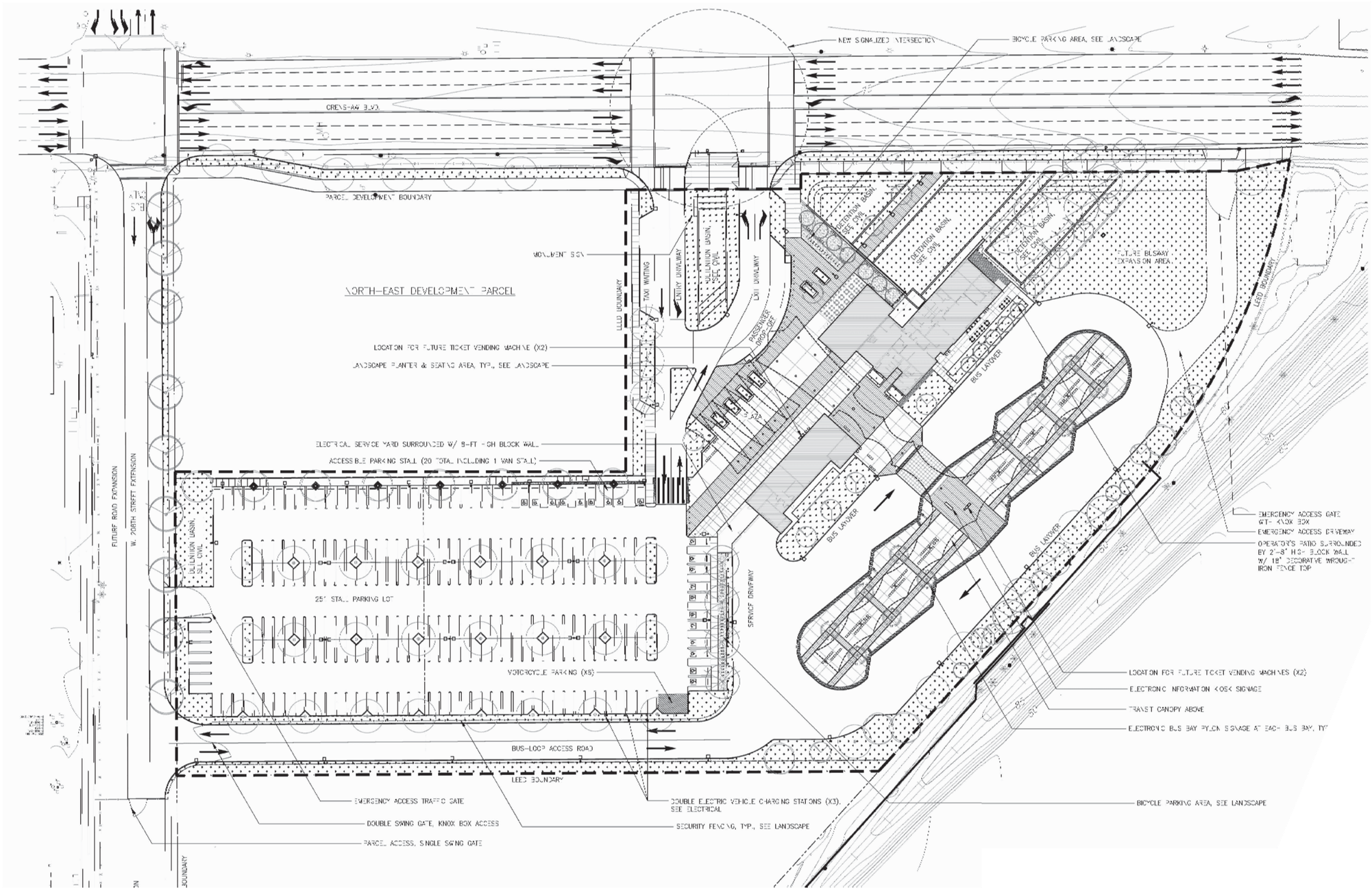
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

FIGURE 2–1

EXISTING SITE

TORRANCE TRANSIT CENTER, TORRANCE



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NO SCALE

SOURCE: RNL (SEPTEMBER 26, 2012)

FIGURE 2-2

PROPOSED SITE PLAN
TORRANCE TRANSIT CENTER, TORRANCE

3.0 ANALYSIS CONDITIONS AND METHODOLOGY

Regional access to the Project site is provided by the San Diego Freeway (I-405). The principal local network of streets serving the proposed Project are 182nd Street, 190th Street, Del Amo Boulevard, 208th Street, Torrance Boulevard, Carson Street, Sepulveda Boulevard, Prairie Avenue/Madrona Avenue, Maple Avenue, Crenshaw Boulevard and Western Avenue. The following discussion provides a brief synopsis of these key roadways. The descriptions are based on an inventory of existing roadway conditions.

3.1 Existing Street Network

182nd Street is an east-west, four-lane undivided roadway, located north of the Project site. The posted speed limit on 182nd Street is 35 miles per hour (mph). Parking is permitted on both sides of the roadway within the vicinity of the project. Traffic signals exist at the intersections of 182nd Street at Crenshaw Boulevard and I-405 Northbound Ramps.

190th Street is an east-west, six-lane divided roadway, located north of the Project site. The posted speed limit on 190th Street is 45 mph. West of Crenshaw Boulevard, parking is permitted on the north side of the roadway and prohibited on the south side of the roadway. East of Crenshaw Boulevard, parking is not permitted on either side of the roadway. Traffic signals exist at the intersections of 190th Street at Prairie Avenue, Crenshaw Boulevard and Van Ness Avenue.

Del Amo Boulevard is an east-west, four-lane divided roadway, located north of the Project site. The posted speed limit on Del Amo Boulevard is 35 mph. West of Crenshaw Boulevard, parking is not permitted on either side of the roadway. Between Crenshaw Boulevard and Van Ness Avenue, parking is permitted on both sides of the roadway. East of Van Ness Avenue, parking is permitted on the south side of the roadway and prohibited on the north side of the roadway. Traffic signals exist at the intersections of Del Amo Boulevard at Prairie Avenue/Madrona Avenue, Maple Avenue, Crenshaw Boulevard, Van Ness Avenue and Western Avenue.

208th Street is an east-west, two-lane undivided roadway located, north of the Project site. Parking is permitted on the south side of the roadway and prohibited on the north side of the roadway. A traffic signal exists at the intersection of 208th Street at Crenshaw Boulevard. Upon completion of the Project, 208th Street will be extended westward to border the Project site on the north.

Torrance Boulevard is an east-west, four-lane divided roadway, located south of the Project site. The posted speed limit on Torrance Boulevard is 35 mph. West of Crenshaw Boulevard, parking is mostly prohibited on both sides of the roadway. East of Crenshaw Boulevard, parking is permitted on both sides of the roadway. Traffic signals exist at the intersections of Torrance Boulevard at Madrona Avenue, Crenshaw Boulevard and Western Avenue.

Carson Street is an east-west, four-lane divided roadway, located south of the Project site. The posted speed limit on Carson Street is 35 mph. Parking is permitted on both sides of the roadway within the vicinity of the Project. A traffic signal exists at the intersection of Carson Street at Crenshaw Boulevard.

Sepulveda Boulevard is an east-west, six-lane divided roadway, located south of the Project site. West of Arlington Avenue, the posted speed limit is 45 miles per hour. East of Arlington Avenue, the posted speed limit is 40 mph. Parking is not permitted on either side of the roadway within the vicinity of the Project. A traffic signal exists at the intersection of Sepulveda Boulevard at Crenshaw Boulevard.

Prairie Avenue is a north-south, six-lane divided roadway, located west of the Project site. The posted speed limit on Prairie Avenue is 40 mph. Parking is not permitted on either side of the roadway within the vicinity of the Project. South of Del Amo Boulevard, Prairie Avenue becomes Madrona Avenue.

Madrona Avenue is a north-south, six-lane divided roadway, located west of the Project site. The posted speed limit on Madrona Avenue is 40 mph. Parking is not permitted on either side of the roadway within the vicinity of the Project. North of Del Amo Boulevard, Madrona Avenue becomes Prairie Avenue.

Crenshaw Boulevard is a north-south, six-lane divided roadway that borders the project on the west side. North of 190th Street, the posted speed limit on Crenshaw Boulevard is 40 mph. Between 190th Street and Del Amo Boulevard, the posted speed limit is 45 mph. South of Del Amo Boulevard, the posted speed limit is 35 mph. Parking is not permitted on either side of the roadway within the vicinity of the Project.

Western Avenue is primarily a north-south, four-lane divided roadway, located east of the Project site. North of Del Amo Boulevard, Western Avenue is a six-lane divided roadway. The posted speed limit on Western Avenue is 35 mph. North of Carson Street, parking is not permitted on either side of the roadway. South of Carson Street, parking is permitted on both sides of the roadway.

Figure 3-1 presents an inventory of the existing roadway conditions for the arterials and intersections evaluated in this report. This figure identifies the number of travel lanes for key arterials, as well as intersection configurations and controls for the key area intersections neighboring the Project site.

3.2 Existing Public Transit

The Torrance Transit operates several bus lines within the study area. In addition, the Municipal Area Express Line (MAX) also provides service near the Project site. A description of the transit services is as follows:

<u>Los Angeles County Metropolitan Transportation Authority (Metro)</u>

Route 1:

- The route extends from Carson/Hawthorne Hub to Harbor Freeway Station.
- The route traverses the study area on Torrance Boulevard.
- During the AM and PM peak hours, in the eastbound and westbound direction, Route 1 provides headways of two buses in each direction.

Route 4:

- The route extends from Carson/Hawthorne Hub to the LA Convention Center.
- The route traverses the study area on Torrance Boulevard.
- During the AM and PM peak hours, in the eastbound and westbound direction, Route 4 provides headways of two buses in each direction.

Route 10:

- The route extends from Torrance Airport to Crenshaw Station.
- The route traverses the study area on Crenshaw Boulevard.
- During the AM and PM peak hours, in the northbound and southbound direction, Route 10 provides headways of two buses in each direction.

<u>Municipal Area Express (MAX)</u>

3 (San Pedro/Torrance Line):

- The route extends from Long Beach to the El Segundo.
- The route traverses the study area on Crenshaw Boulevard.
- During the AM peak hour, this route provides headways of three buses in the northbound direction and during the PM peak hour, this route provides headways of two buses in the southbound direction.

3.3 Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes for the seventeen (17) key study intersections evaluated in this report were collected by *Pacific Traffic Data Services* in December 2012 and by *Transportation Studies, Inc.* in March 2013. ***Appendix B*** contains the existing intersection turning movement traffic count data.

Figures 3-2 and ***3-3*** present the existing AM and PM peak hour traffic volumes, respectively, for the seventeen (17) key study intersections. The existing AM and PM peak hour traffic volumes illustrated in *Figures 3-2* and *3-3* are comprised of passenger vehicles, large 2-axle trucks, 3-axle trucks, 4+ axle trucks, recreational vehicles and buses. The large trucks, recreational vehicles and buses turning movements were converted to passenger car equivalents (P.C.E.'s) using Los Angeles County's approved P.C.E. factor of 2.0.

3.4 Level Of Service (LOS) Analysis Methodologies

AM and PM peak hour operating conditions for the key study intersections were evaluated using both the *Intersection Capacity Utilization (ICU) Methodology* for signalized intersections and the methodology outlined in *Chapter 16 of the HCM 2000* for signalized intersections.

3.4.1 *Intersection Capacity Utilization (ICU) Method of Analysis (Signalized Intersections)*

In conformance with the City of Torrance and LA County CMP requirements, existing AM and PM peak hour operating conditions for the key signalized study intersections were evaluated using the *Intersection Capacity Utilization (ICU)* method of analysis. The ICU technique is intended for

signalized intersection analysis and estimates the volume to capacity (V/C) relationship for an intersection based on the individual V/C ratios for key conflicting traffic movements.

The ICU numerical value represents the percent signal (green) time and thus capacity, required by existing and/or future traffic. It should be noted that the ICU methodology assumes uniform traffic distribution per intersection approach lane and optimal signal timing. Per LA County CMP requirements, the ICU calculations use a lane capacity of 1,600 vehicles per hour (vph) for left-turn, through and right-turn lanes and dual left-turn capacity of 2,880 vph. A clearance adjustment factor of 0.10 was added to each Level of Service calculation.

The ICU value is the sum of the critical volume to capacity ratios at an intersection; it is not intended to be indicative of the LOS of each of the individual turning movements.

The ICU value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The six qualitative categories of Level of Service have been defined along with the corresponding ICU value range and are shown in ***Table 3-1***.

3.4.2 *Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)*

The City of Torrance also requires that peak hour operating conditions for signalized intersections within the City be evaluated using the *Highway Capacity Manual 2000 (HCM 2000)* signalized intersection methodology. This methodology is consistent with Caltrans requirements. Based on the HCM operations method of analysis, level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometries, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents and when there are no other vehicles on the road.

In Chapter 16 of the HCM, only the portion of total delay attributed to the control facility (study intersection) is quantified. This delay is called *control delay.* Control delay includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay. In contrast, in previous versions of the HCM (1994 and earlier), delay included only stopped delay. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle. The six qualitative categories of Level of Service that have been defined along with the corresponding HCM control delay value range for signalized intersections are shown in ***Table 3-2***.

3.5 Impact Criteria and Thresholds

The relative impact of the added Project traffic volume generated by the proposed Project during the AM and PM peak hours was evaluated based on analysis of future operating conditions at the key study intersections, without, then with, the proposed Project using the *Intersection Capacity Utilization (ICU) Methodology* and the *Highway Capacity Manual (HCM) Methodology*. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-

capacity relationships, delay and service level characteristics at each study intersection. The significance of the potential impacts of the Project at each key intersection was then evaluated using the City's LOS standards and traffic impact criteria.

According to City of Torrance criteria, LOS D is the minimum acceptable condition that should be maintained during the AM and PM peak hours.

Impacts to local and regional transportation systems are considered significant if:

- An undesirable peak hour Level of Service (LOS) (i.e. LOS E or F) at any of the key signalized intersections is projected. The City of Torrance considers LOS D (ICU = 0.801 - 0.900) to be the minimum desirable LOS for all intersections. For the City of Torrance, the current LOS, if worse than LOS D (i.e. LOS E or F), should also be maintained; and
- The Project increases traffic demand at the key signalized study intersection by 2% of capacity (ICU increase ≥ 0.020), causing or worsening LOS E or F (ICU > 0.901).
- Based on the HCM/LOS method of analysis, this report identifies a significant traffic impact when the Project causes a change from LOS D to LOS E or F, or the Project causes an increase in delay of 2% or more at an intersection operating LOS E or F.

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (ICU METHODOLOGY)[1]

Level of Service (LOS)	Intersection Capacity Utilization Value (ICU)	Level of Service Description
A	≤ 0.600	**EXCELLENT**. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 – 0.700	**VERY GOOD**. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	**GOOD**. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	**FAIR**. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.000	**POOR**. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	**FAILURE**. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Potentially very long delays with continuously increasing queue lengths.

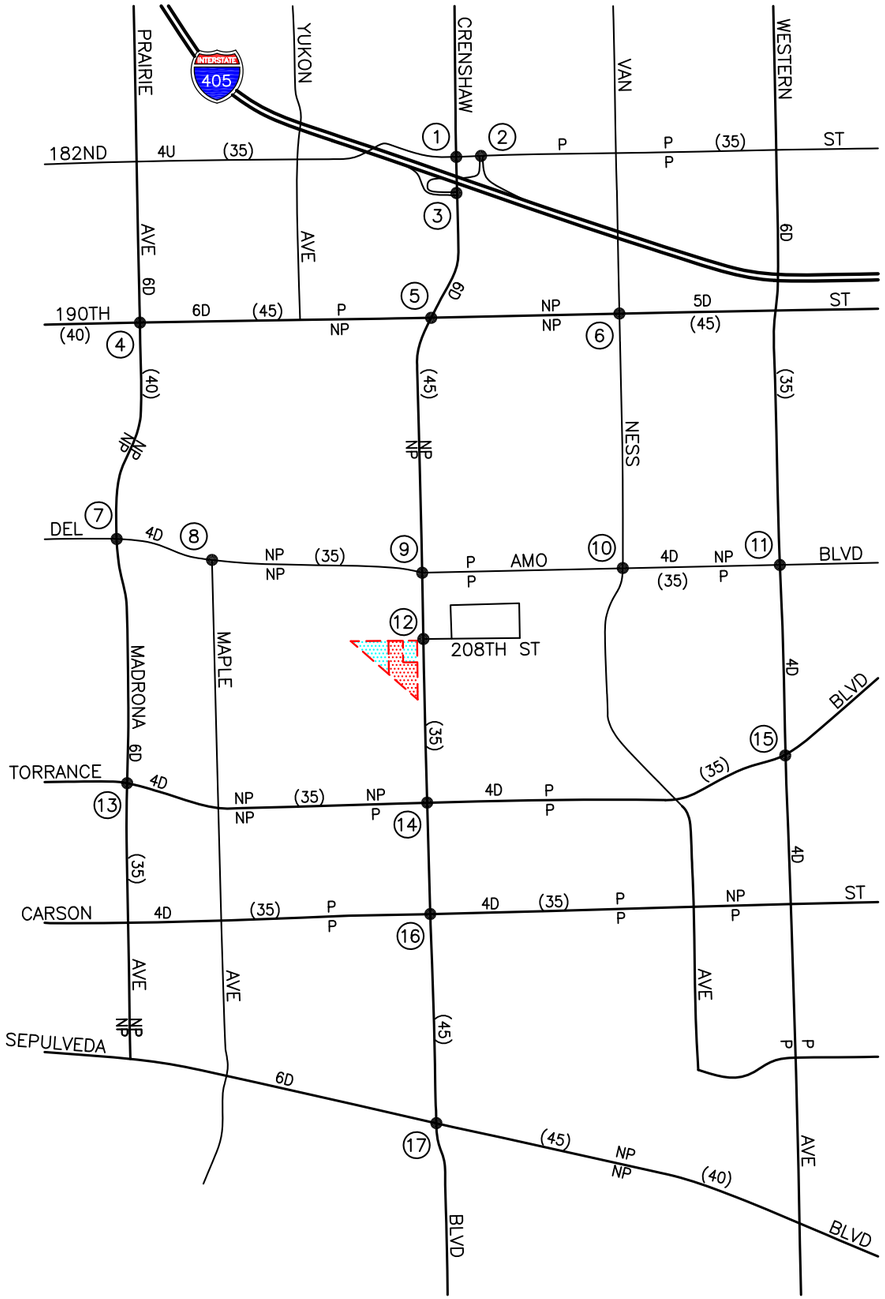
[1] Source: *Transportation Research Board Circular 212 - Interim Materials on Highway Capacity*.

TABLE 3-2

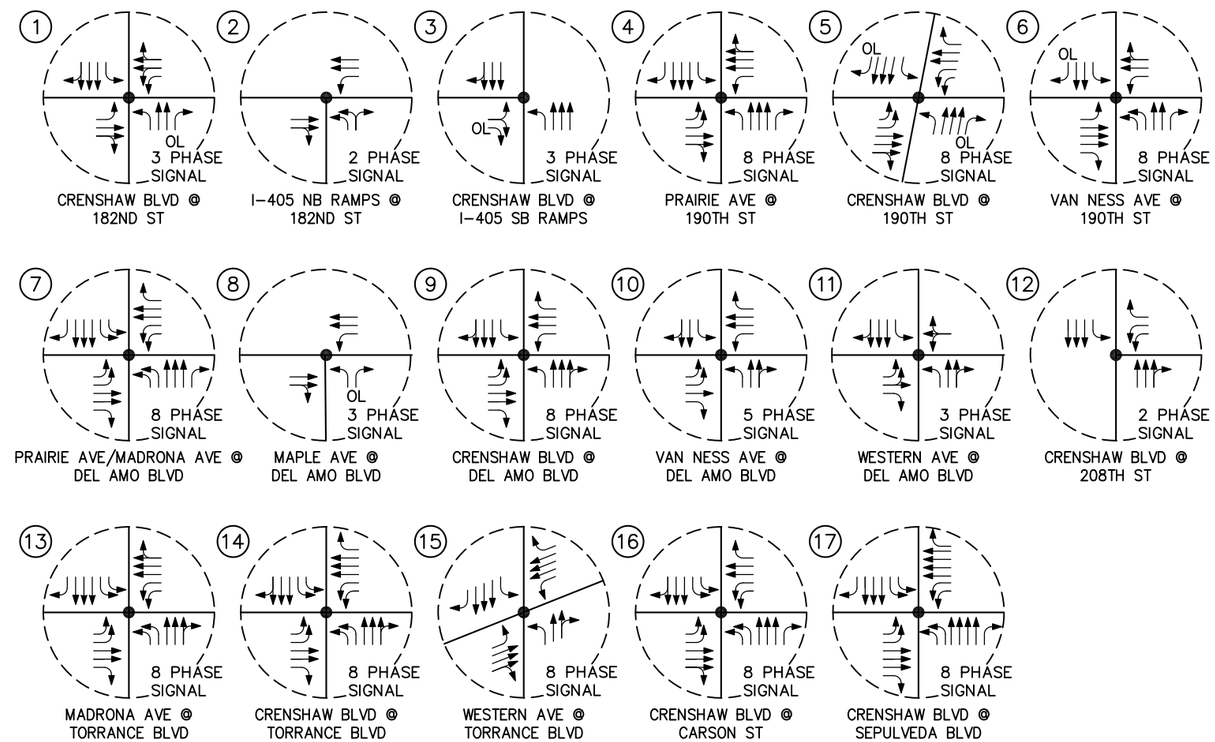
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM METHODOLOGY)[2]

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	≤ 10.0	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10.0 and ≤ 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 and ≤ 35.0	Average traffic delays. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and ≤ 55.0	Long traffic delays At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 and ≤ 80.0	Very long traffic delays This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high *v/c* ratios. Individual cycle failures are frequent occurrences.
F	≥ 80.0	Severe congestion This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

[2] Source: *Highway Capacity Manual 2000*, Chapter 16 (Signalized Intersections).



STUDY INTERSECTIONS



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N NO SCALE

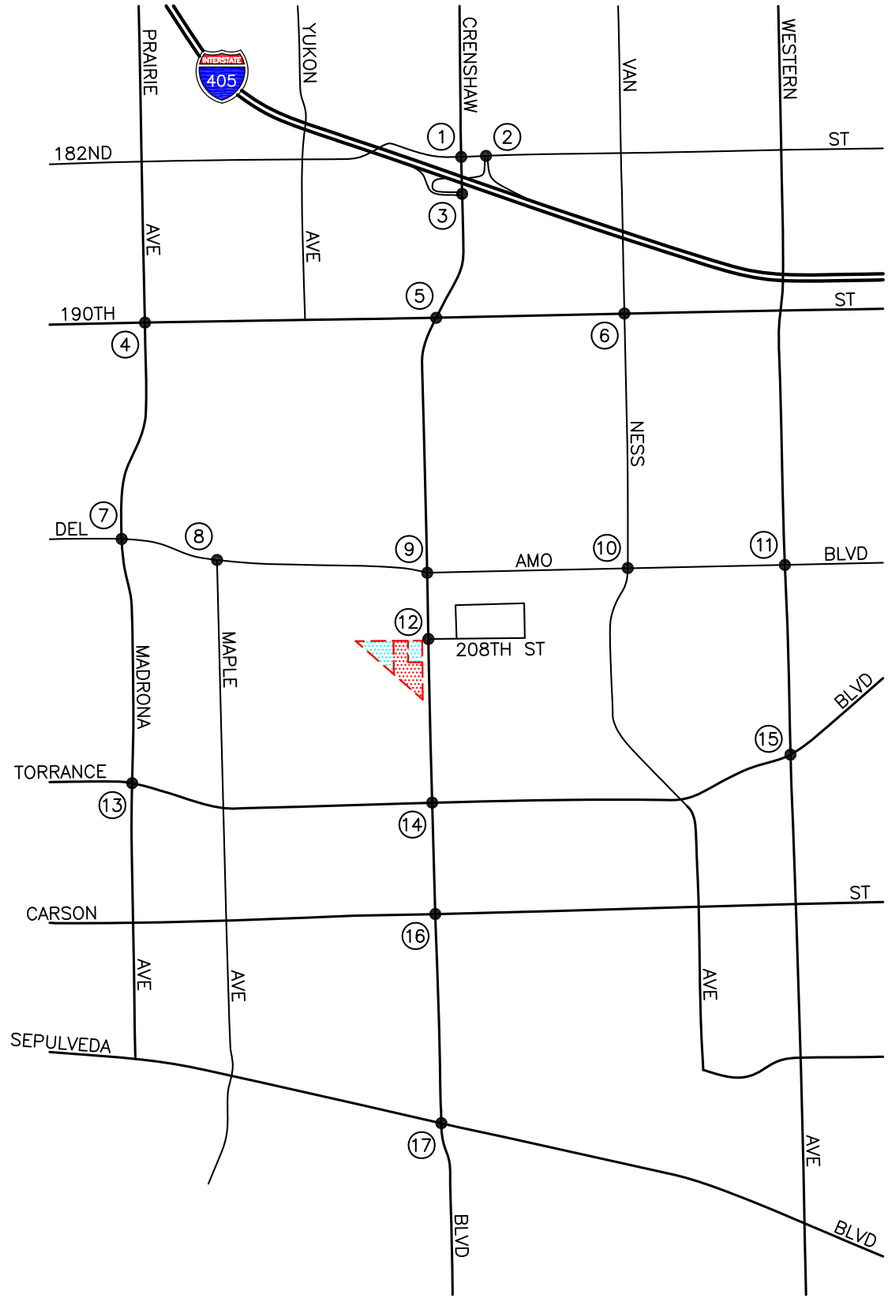
KEY

← = APPROACH LANE ASSIGNMENT
● = TRAFFIC SIGNAL
P = PARKING, NP = NO PARKING
U = UNDIVIDED, D = DIVIDED
2 = NUMBER OF TRAVEL LANES
(XX) = POSTED SPEED LIMIT (MPH)
OL = RIGHT-TURN OVERLAP
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 3-1

EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

TORRANCE TRANSIT CENTER, TORRANCE



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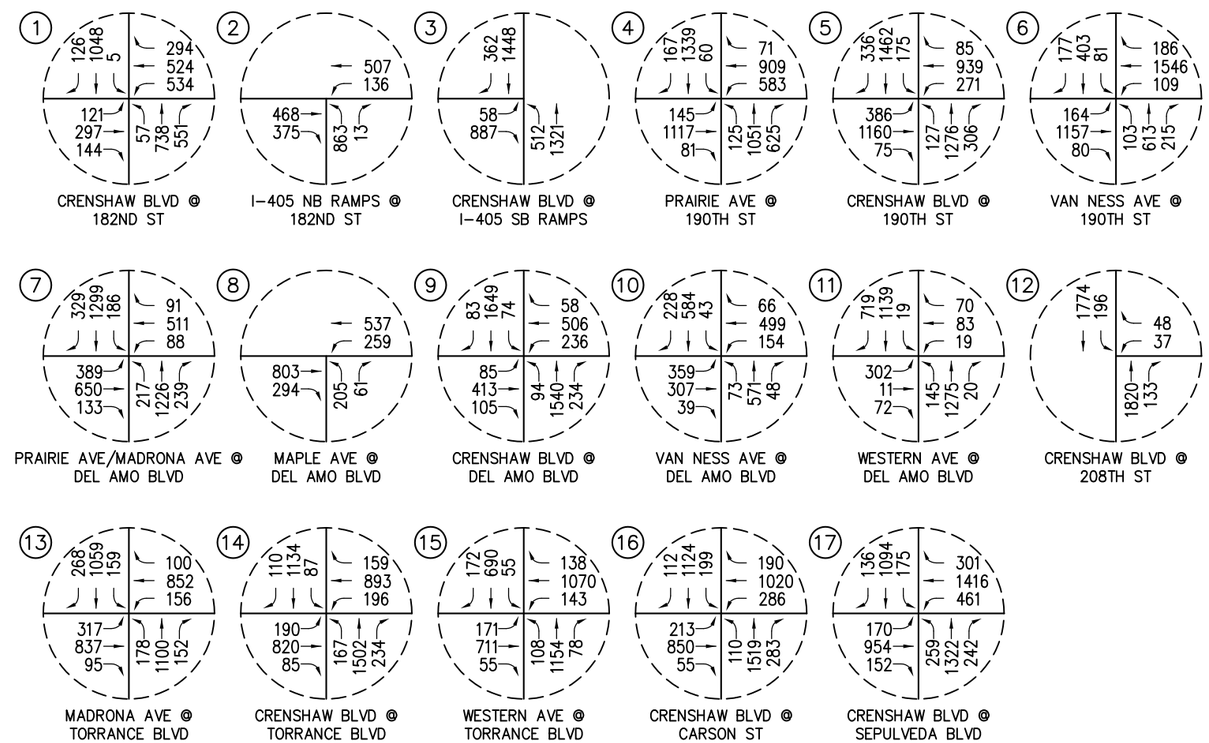

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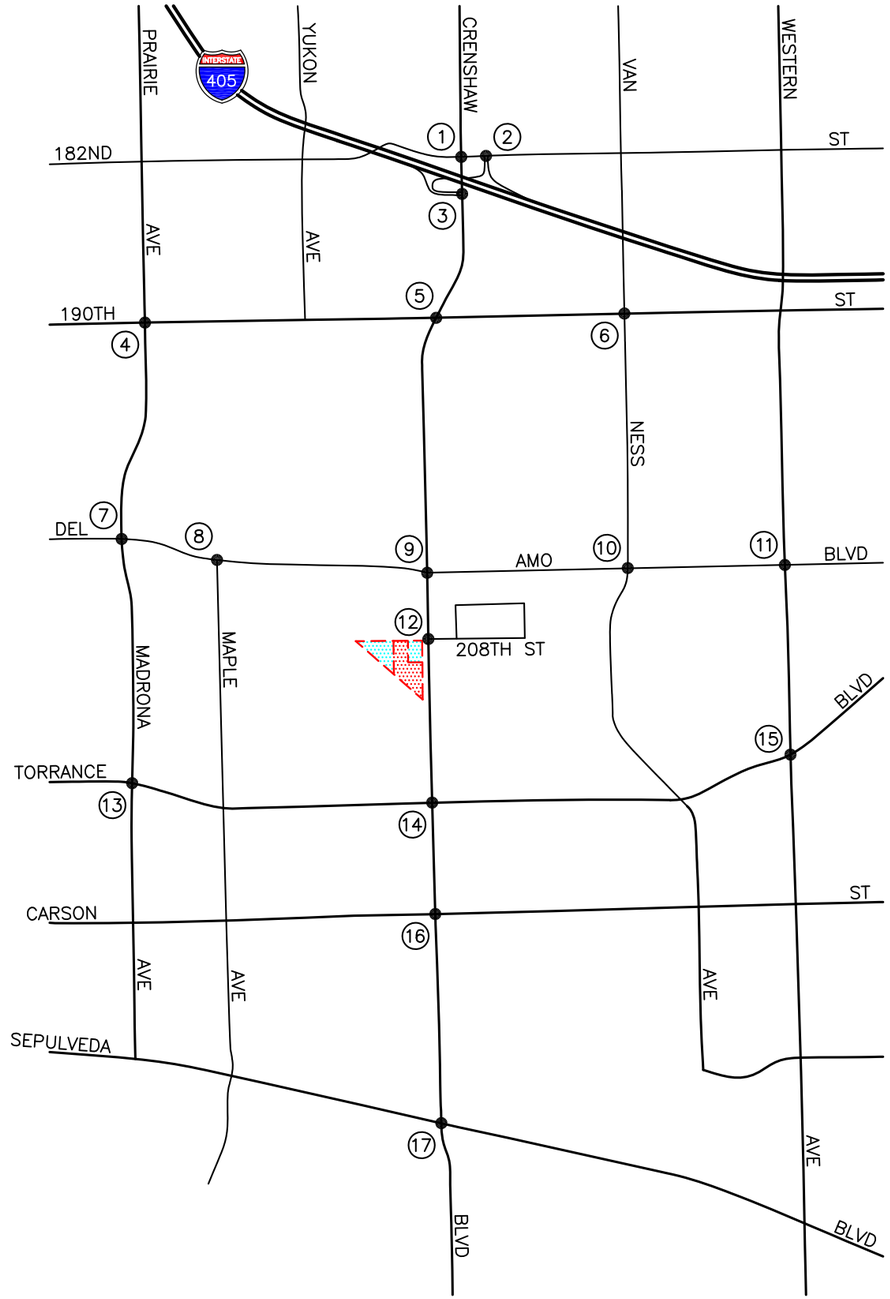
N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 3-2

EXISTING AM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



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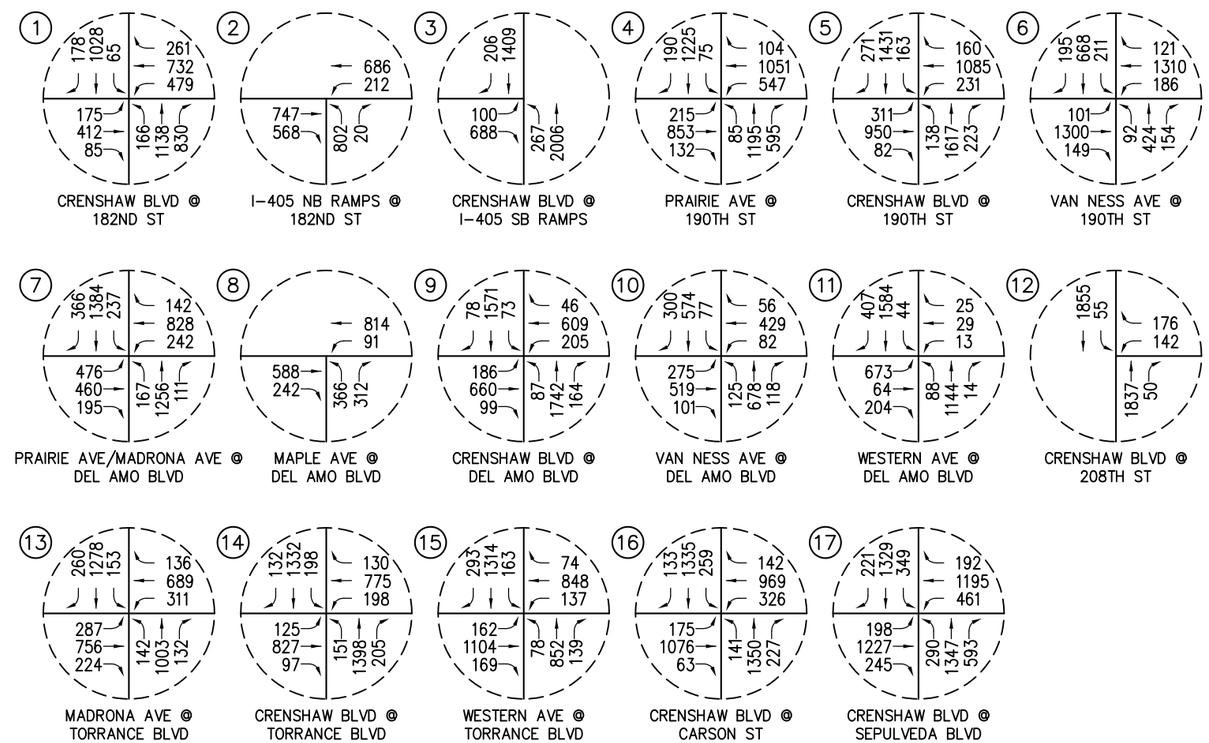

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N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 3-3

EXISTING PM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic impact characteristics of the Project, a multi-step process has been utilized. The first step is traffic generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations and/or rates to the Project development tabulation.

The second step of the forecasting process is traffic distribution, which identifies the origins and destinations of inbound and outbound Project traffic. These origins and destinations are typically based on demographics and existing/expected future travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of Project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds.

Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway segments and intersection turning movements throughout the study area.

With the forecasting process complete and Project traffic assignments developed, the impact of the Project is isolated by comparing operational (LOS) conditions at selected key intersections using expected future traffic volumes with and without forecast Project traffic. If necessary, the need for site-specific and/or cumulative local area traffic improvements can then be evaluated.

5.0 PROJECT TRAFFIC CHARACTERISTICS

5.1 Project Trip Generation Forecast

Traffic generation is generally expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the Ninth Edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE) [Washington D.C., 2012]. In addition, the trip generation potential of the proposed Project bus service was estimated based on the anticipated operational characteristics of each bus route.

The first part of ***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the 251 space parking lot component of the proposed Project and the middle part presents the forecast daily and peak hour Project traffic volumes for the 251 space parking lot component for a "typical" weekday. The trip generation potential for the 251 space parking lot component of the proposed Project was forecast using ITE Land Use Code 090: Park-and-Ride Lot with Bus Service rates. As shown in the middle part of *Table 5-1*, the 251 space parking lot component of the proposed Project is expected to generate 1,130 daily trips (one half arriving, one half departing), with 178 trips (141 inbound, 37 outbound) produced in the AM peak hour and 156 trips (37 inbound, 117 outbound) produced in the PM peak hour on a “typical” weekday.

Further, the lower part of *Table 5-1* presents the Project’s bus service component’s forecast daily and peak hour trip generation for the actual number of buses, by route that is assumed to be re-routed and enter and exit the Project site to utilize the proposed bus-layover component of the Project. Additionally, these forecasts are converted to Passenger Car Equivalent (PCE) trips. The PCE factors used to convert the trucks to PCEs are listed in *Table 5-1* as well. The PCE conversion accounts for the slower moving characteristics of larger vehicles in a traffic stream by, in essence, counting those vehicles as a greater number of “PCEs”. As shown in the lower part of *Table 5-1*, the bus service component of the proposed Project is expected to generate 1,296 daily PCE trips (one half arriving, one half departing), with 96 PCE trips (48 inbound, 48 outbound) produced in the AM peak hour and 96 PCE trips (48 inbound, 48 outbound) produced in the PM peak hour on a “typical” weekday.

Thus, the total combined trip generation for the 251 space parking lot component and the bus service component of the proposed Project, is expected to generate 2,426 daily PCE trips (one half arriving, one half departing), with 274 PCE trips (189 inbound, 85 outbound) produced in the AM peak hour and 252 PCE trips (87 inbound, 165 outbound) produced in the PM peak hour on a “typical” weekday.

5.2 Project Trip Distribution and Assignment

The directional trip distribution pattern at the key study intersections for the 251 space parking lot component of the proposed Project is presented in ***Figure 5-1***. The directional trip assignments at the key study intersections for the bus service component of the proposed Project for Torrance Route 1,

Torrance Route 4, Torrance Route 10 and Max Route 3 are presented in ***Figures 5-2*** through ***5-6***, respectively.

Project traffic volumes, both entering and exiting the site, have been distributed and assigned to the adjacent street system based on the following considerations:

- the site's proximity to major traffic carriers (i.e. Crenshaw Boulevard, etc.),
- expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals,
- the traffic-carrying capacity and travel speed available on roadways serving the Project site,
- existing intersection traffic volumes,
- ingress/egress availability at the Project site,
- input from City staff, and
- existing bus routes/service with potential re-route to the Project site.

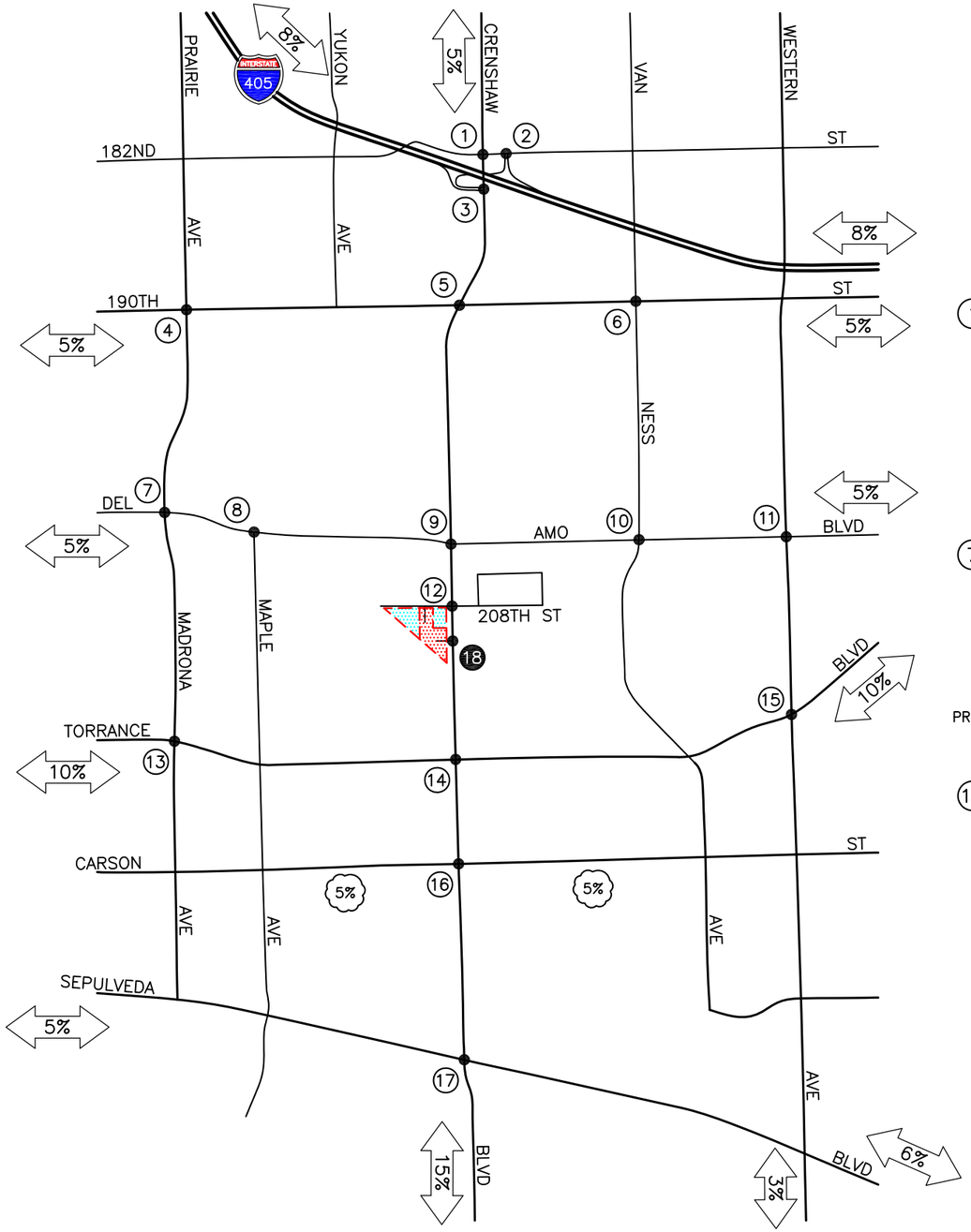
The anticipated AM and PM peak hour Project traffic volumes at the key study intersections are presented in ***Figures 5-7*** and ***5-8***, respectively.

TABLE 5-1
PROJECT TRIP GENERATION RATES AND FORECAST

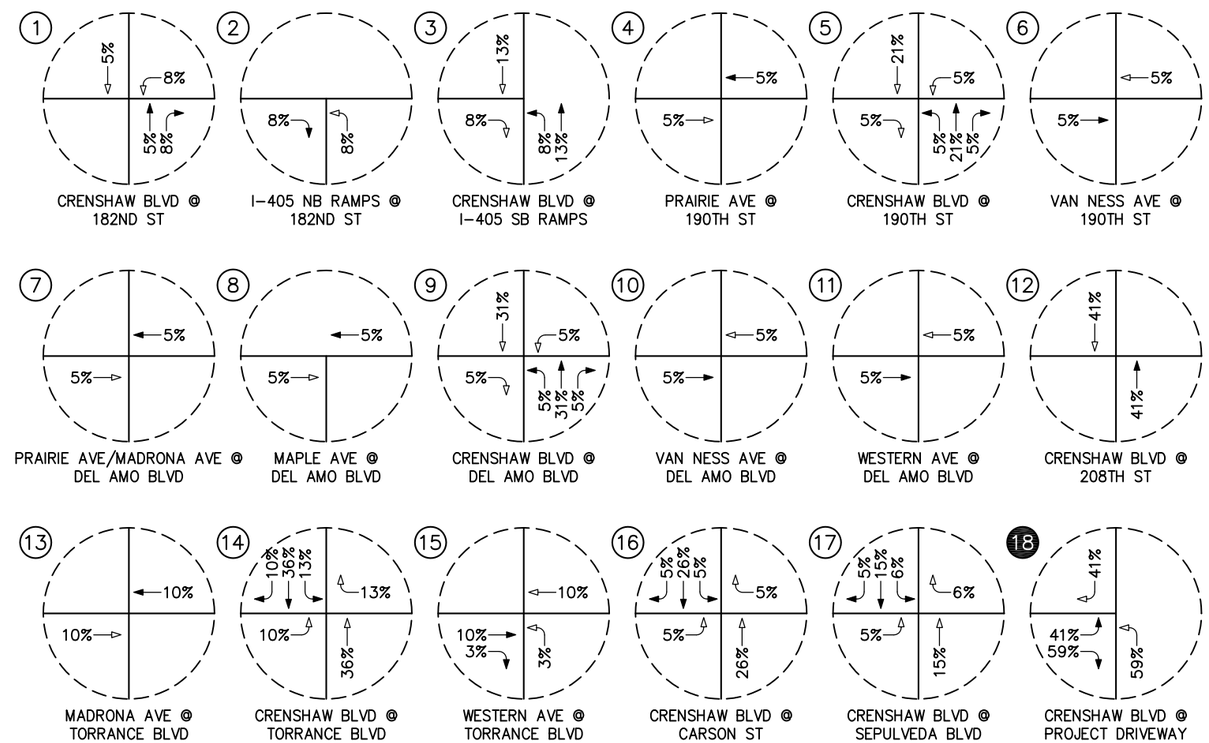
Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Factor[3]*:*							
▪ 090: Park-and-Ride Lot with Bus Service (TE/PS)	4.50	0.56	0.15	0.71	0.15	0.47	0.62
Proposed Project Trip Generation Forecast:							
Passenger Vehicles							
▪ 251 Parking Spaces	1,130	141	37	178	39	117	156
Buses							
▪ Torrance Route 1[4]	216	6	6	12	6	6	12
▪ Torrance Route 4[5]	96	6	6	12	6	6	12
▪ Torrance Route 10[6]	288	8	8	16	8	8	16
▪ Max Route 3[7]	48	4	4	8	4	4	8
Buses Subtotal (Without PCE):	*648*	*24*	*24*	*48*	*24*	*24*	*48*
PCE Factor:	2	2	2	2	2	2	2
Buses Subtotal (With PCE):	*1,296*	*48*	*48*	*96*	*48*	*48*	*96*
Proposed Project Trip Generation Forecast	**2,426**	**189**	**85**	**274**	**87**	**165**	**252**

Notes:
- TE/PS = Trip ends per Parking Space
- PCE = Passenger Car Equivalent

[3] Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012).* Average rates used.
[4] To determine daily trips, peak hour trips were multiplied by factor of 18. This is based on existing *Torrance Transit Bus Route 1*, which runs from 5:00 am to 11:00 pm (18 hours).
[5] To determine daily trips, peak hour trips were multiplied by factor of 8. This is based on existing *Torrance Transit Bus Route 4*, which runs from 5:00 am to 9:00 am and 3:00 pm to 7:00 pm (8 hours).
[6] To determine daily trips, peak hour trips were multiplied by factor of 18. This is based on existing *Torrance Transit Bus Route 10*, which runs from 5:00 am to 11:00 pm (18 hours).
[7] To determine daily trips, peak hour trips were multiplied by factor of 6. This is based on existing *Max Transit Bus Route 3*, which runs from 5:00 am to 8:00 am and 3:00 pm to 6:00 pm (6 hours).



STUDY INTERSECTIONS



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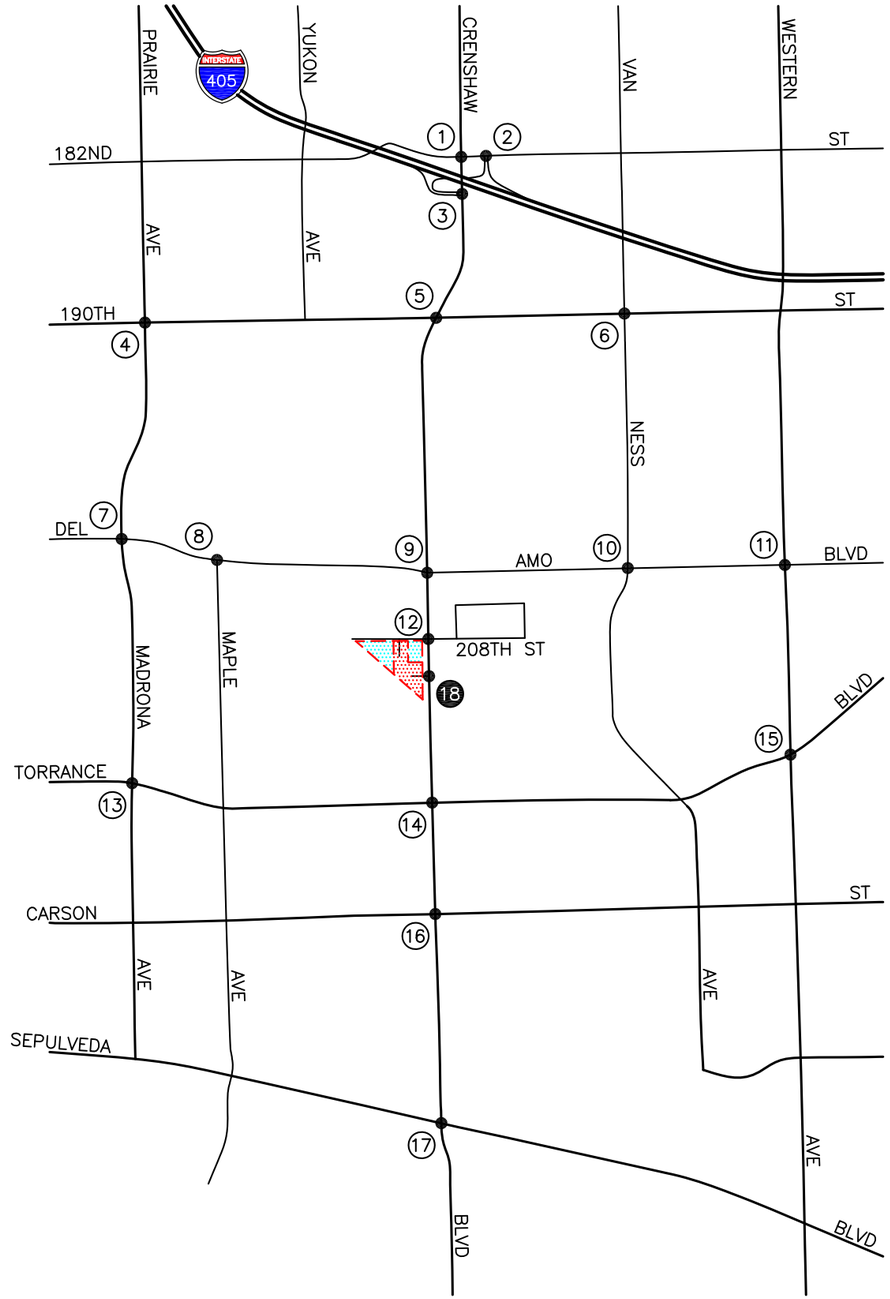
N NO SCALE

KEY
- ⇦ = INBOUND PERCENTAGE
- ⬅ = OUTBOUND PERCENTAGE
- = TORRANCE TRANSIT PROJECT
- = NOT A PART OF PROJECT

FIGURE 5–1

PROJECT TRIP DISTRIBUTION PATTERN (PARKING LOT)

TORRANCE TRANSIT CENTER, TORRANCE



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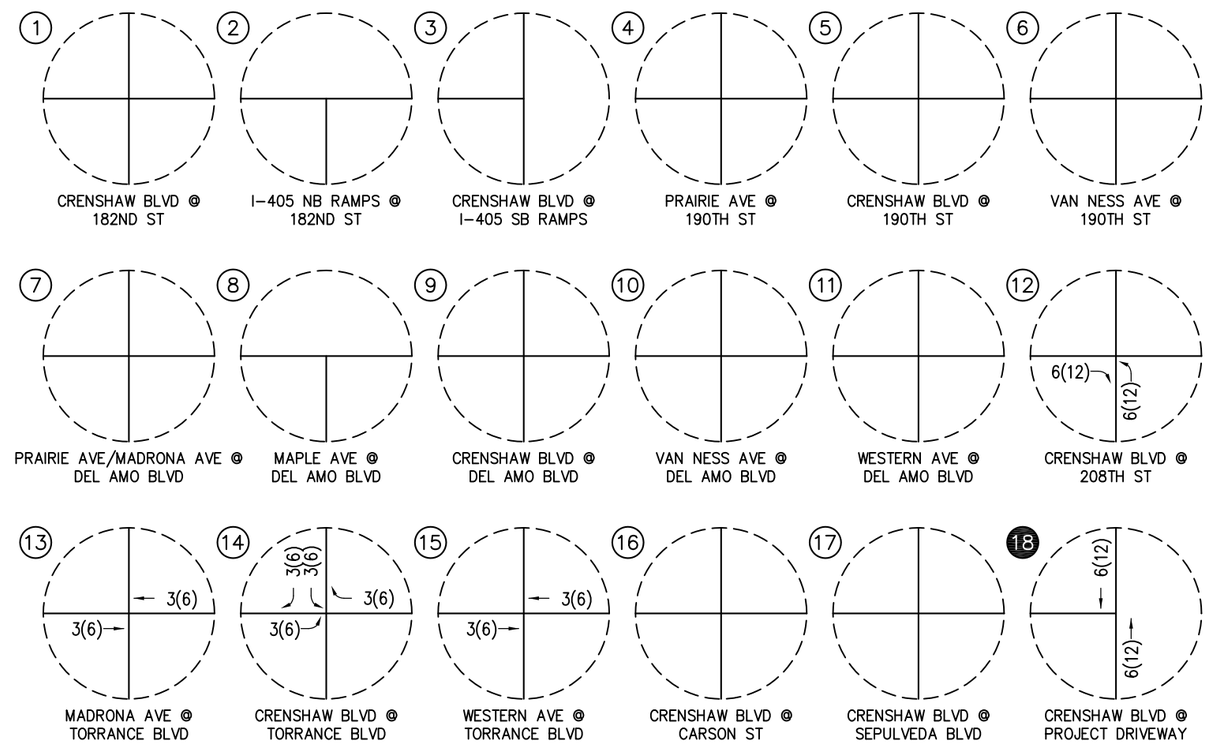

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N NO SCALE

KEY

X(Y) = BUS TRIPS (PCE TRIPS)

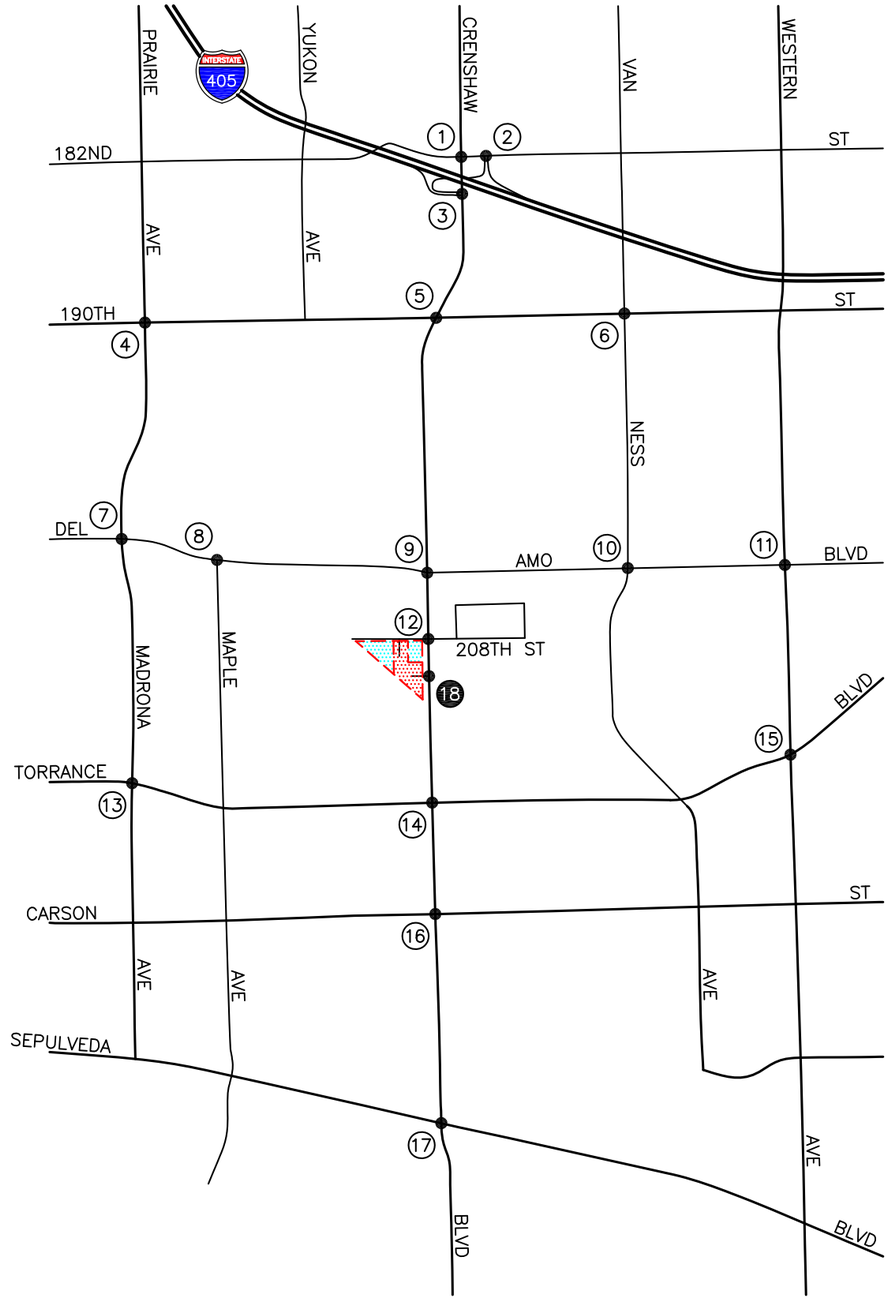
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

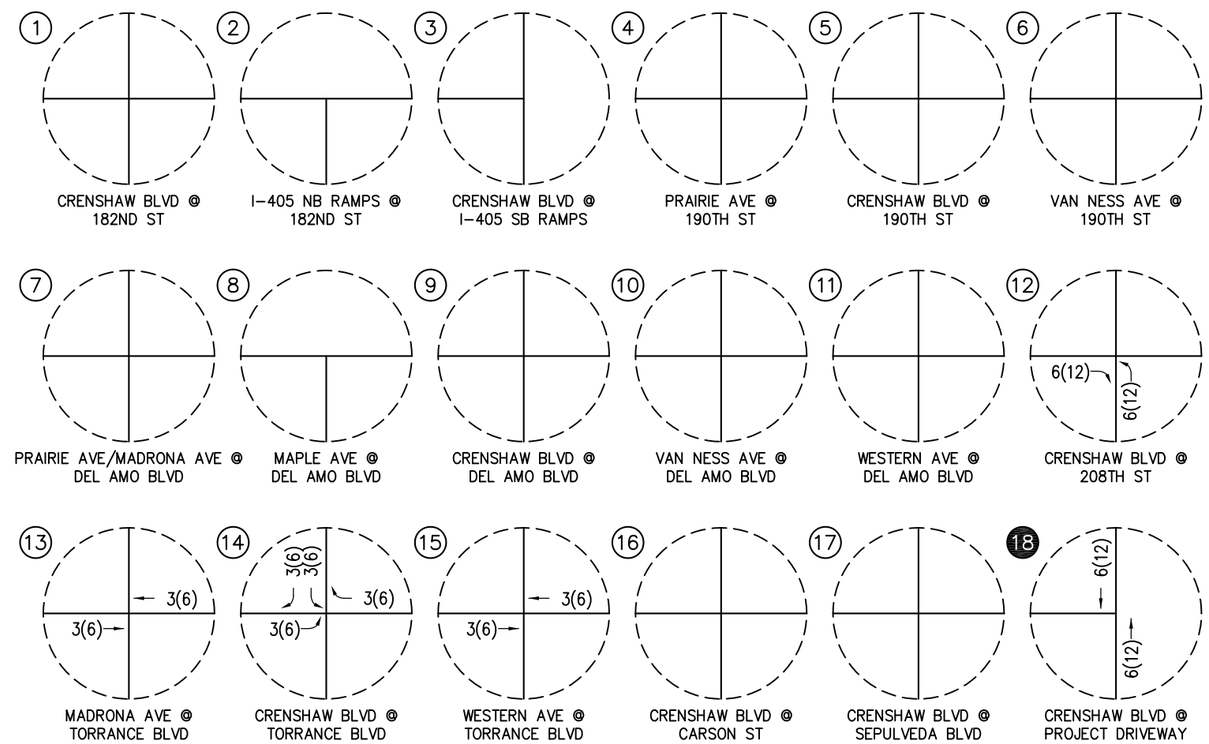
FIGURE 5–2

PROJECT TRIP ASSIGNMENT (TORRANCE ROUTE 1)

TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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N NO SCALE

KEY

X(Y) = BUS TRIPS (PCE TRIPS)

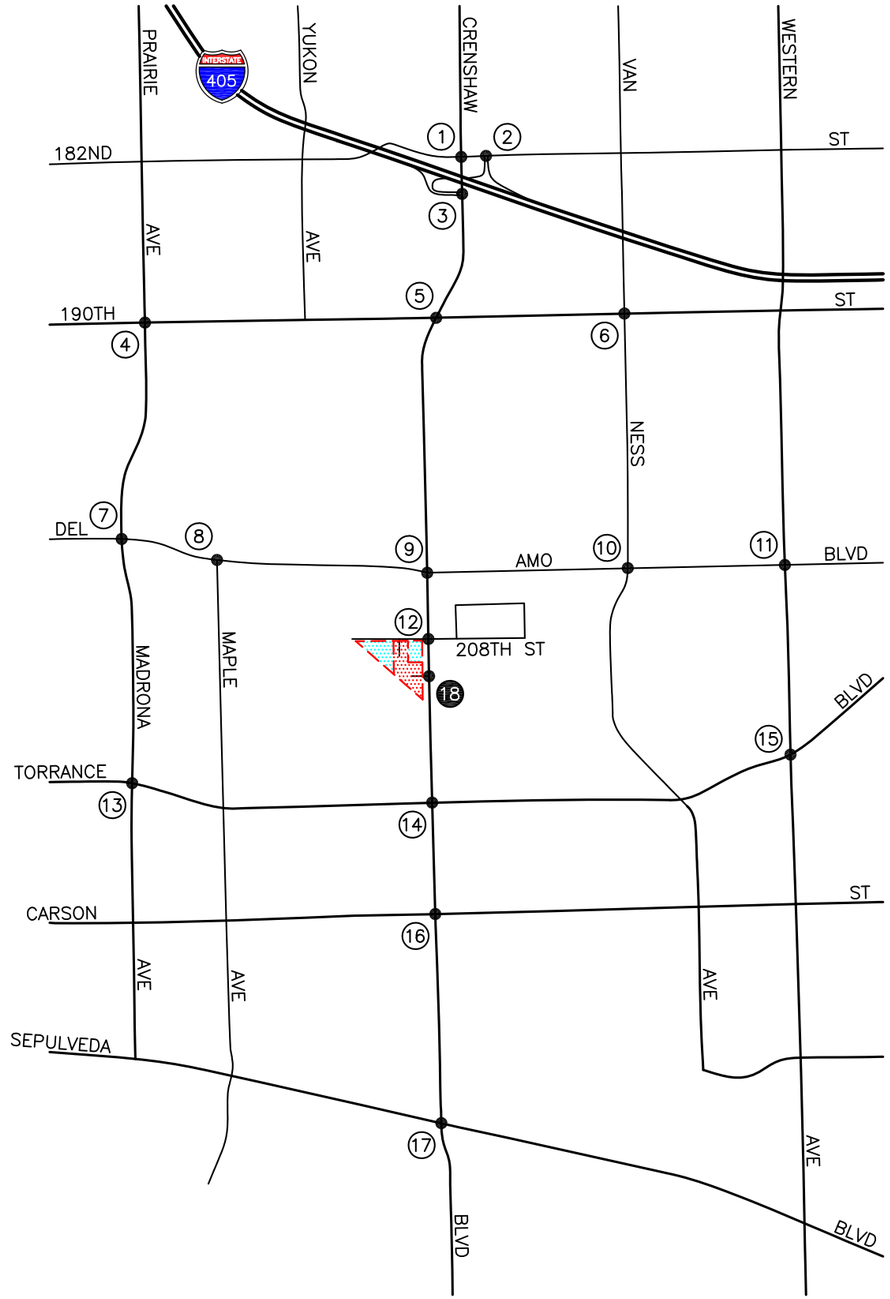
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

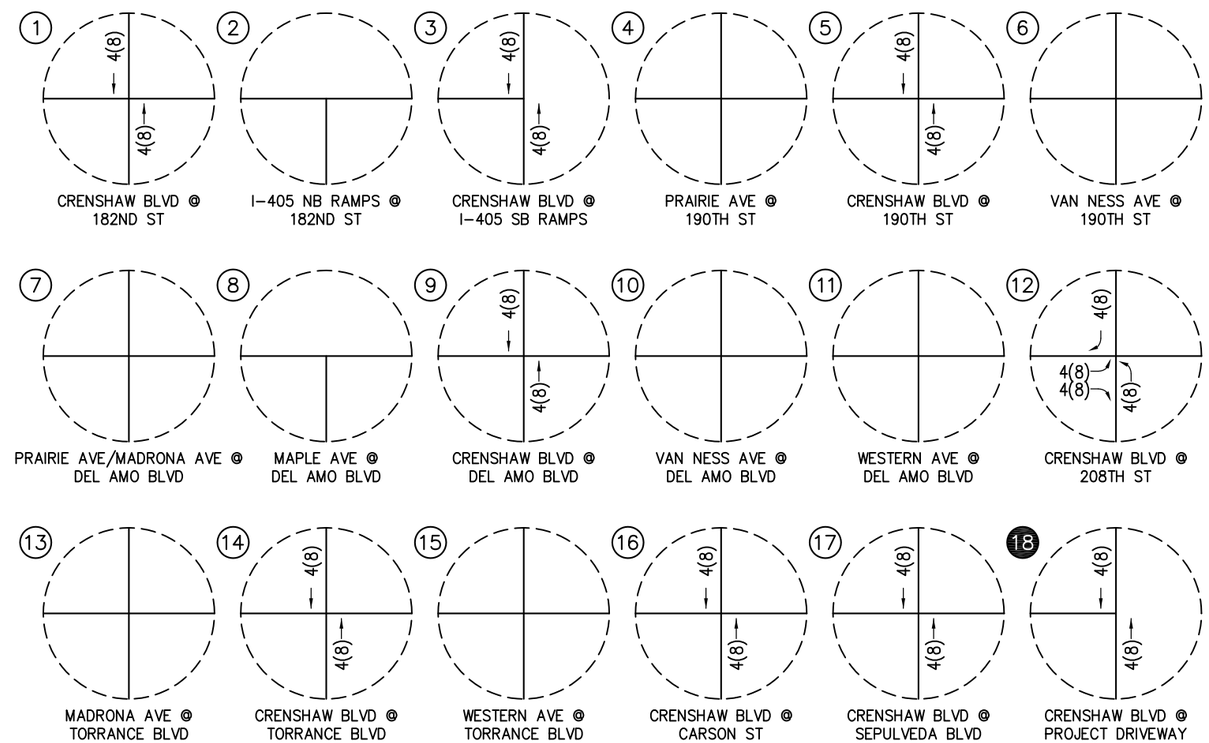
FIGURE 5-3

PROJECT TRIP ASSIGNMENT (TORRANCE ROUTE 4)

TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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N NO SCALE

KEY

X(Y) = BUS TRIPS (PCE TRIPS)

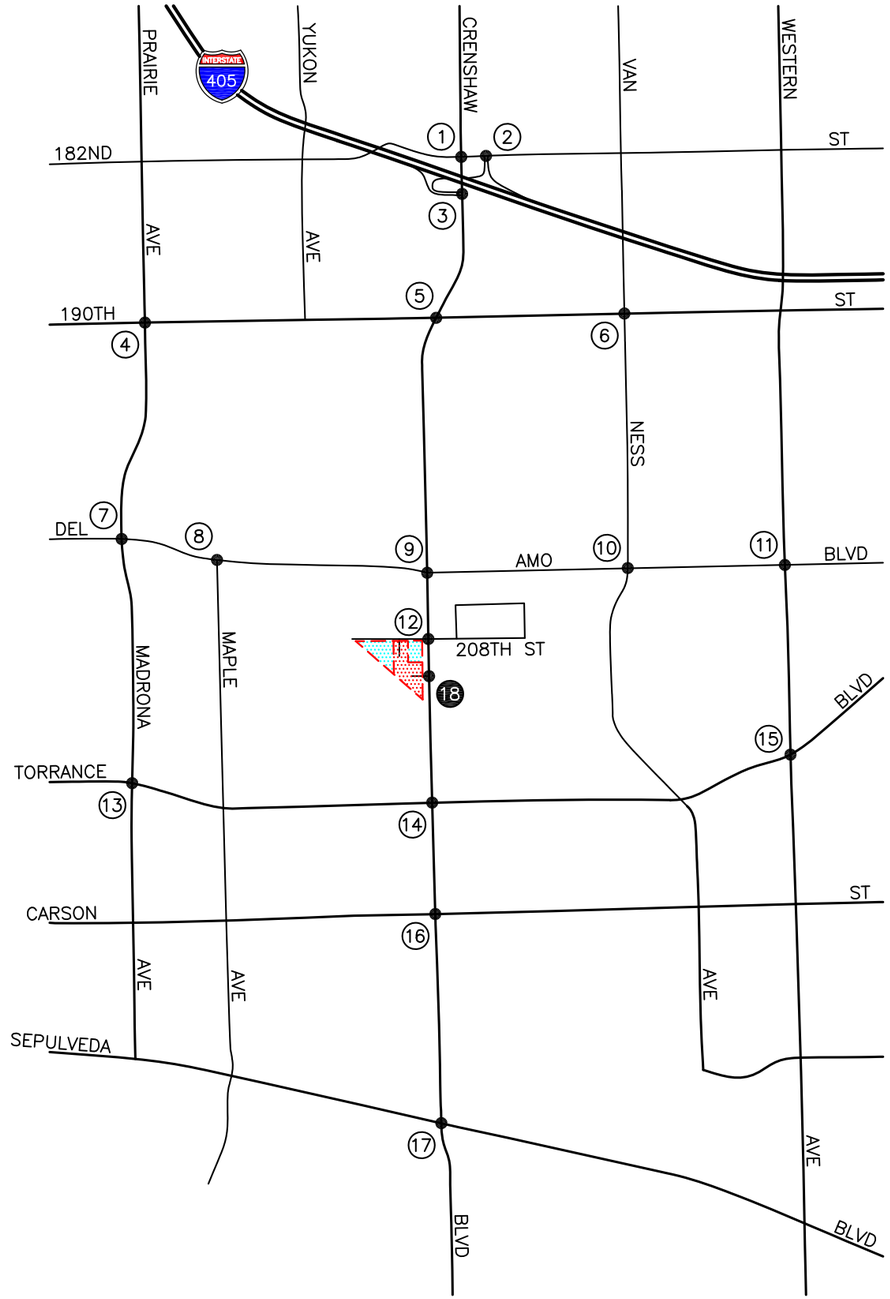
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

FIGURE 5-4

PROJECT TRIP ASSIGNMENT (TORRANCE ROUTE 10)

TORRANCE TRANSIT CENTER, TORRANCE



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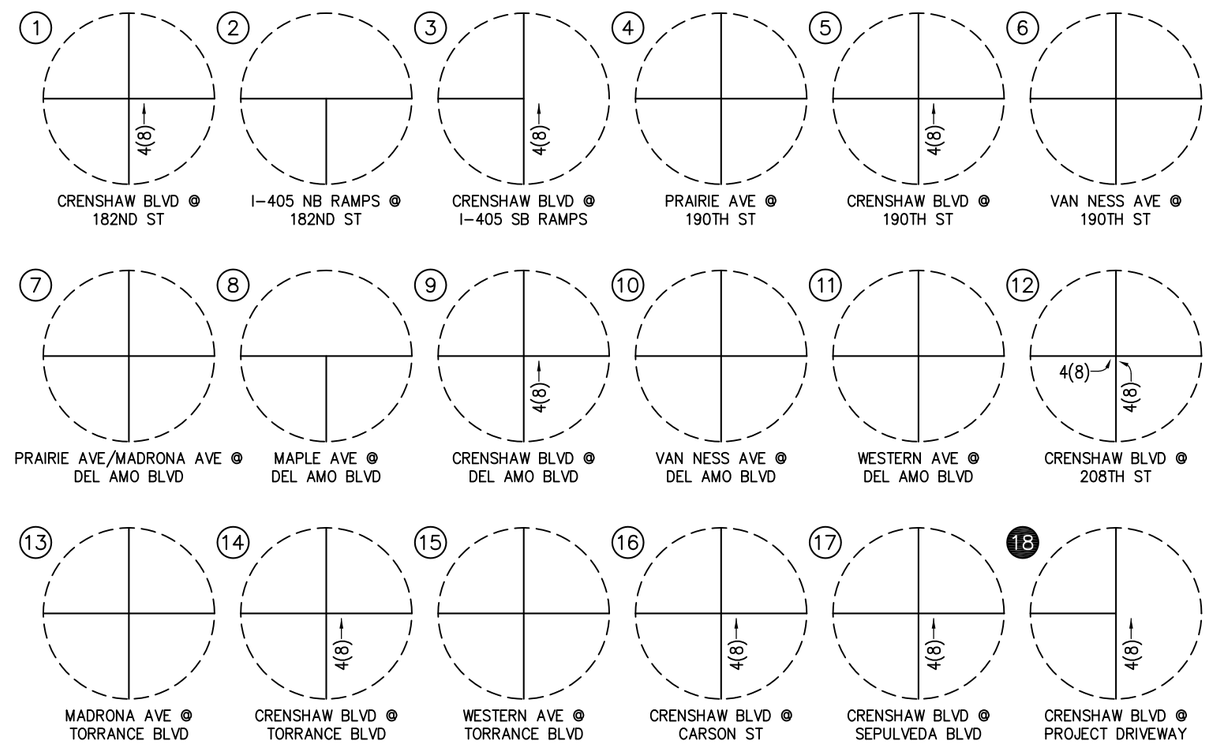

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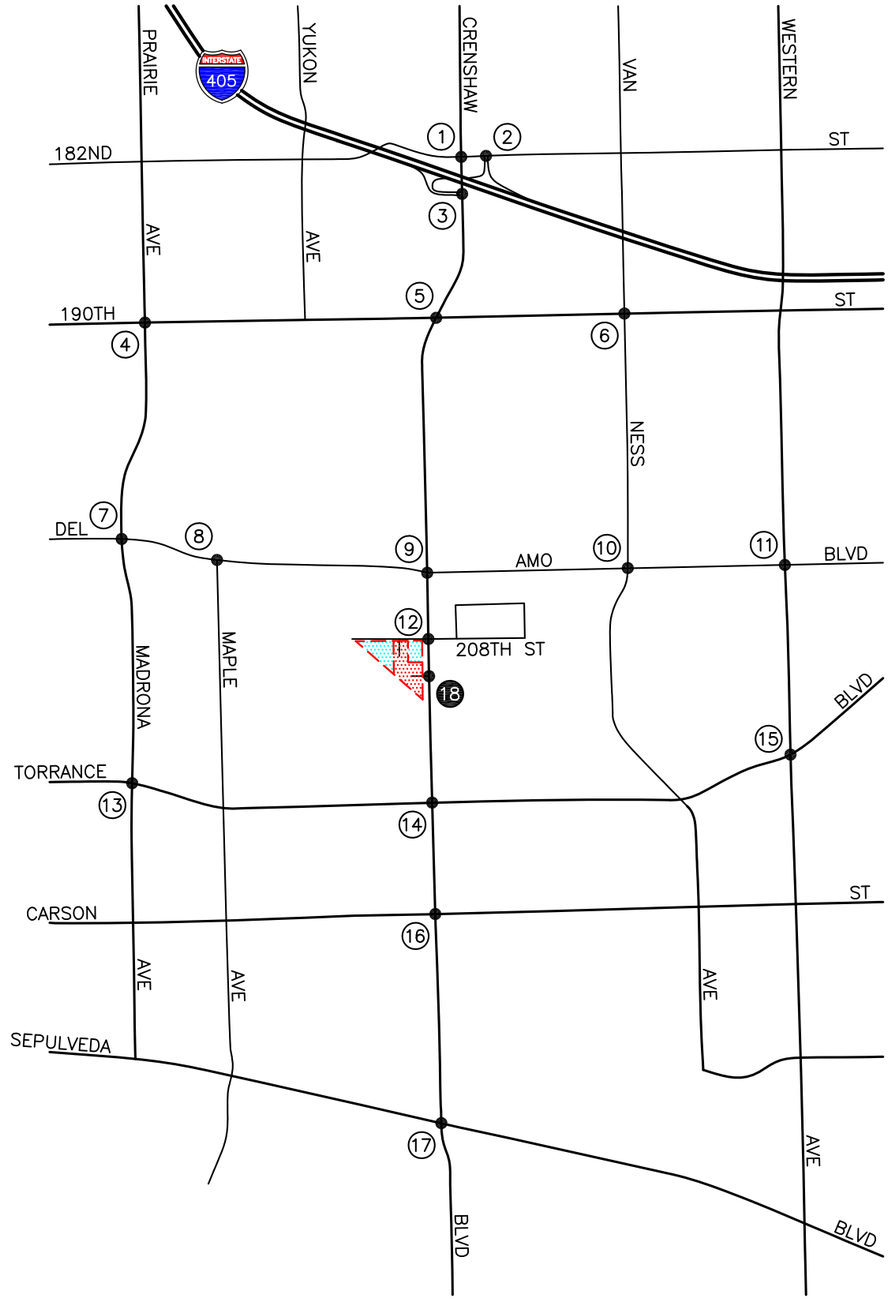
N NO SCALE

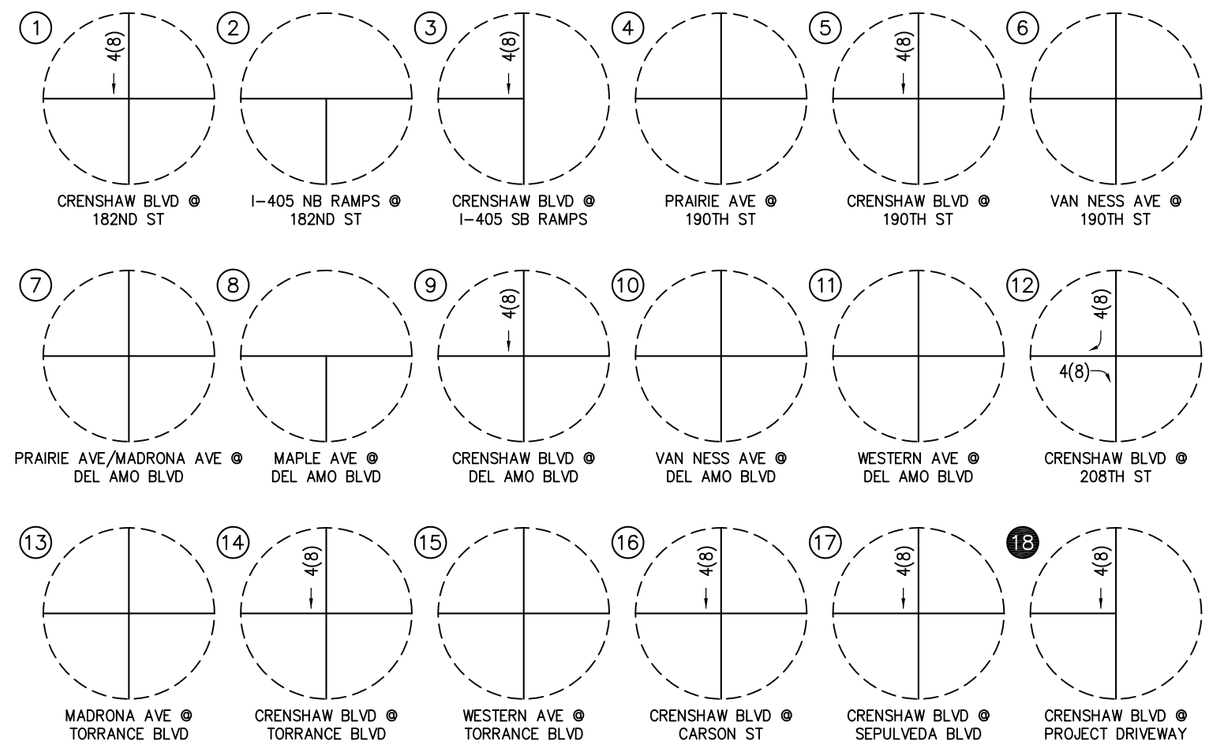
KEY
X/Y = BUS TRIPS (PCE TRIPS)
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 5–5

PROJECT TRIP ASSIGNMENT (MAX ROUTE 3 – AM PEAK HOUR)
TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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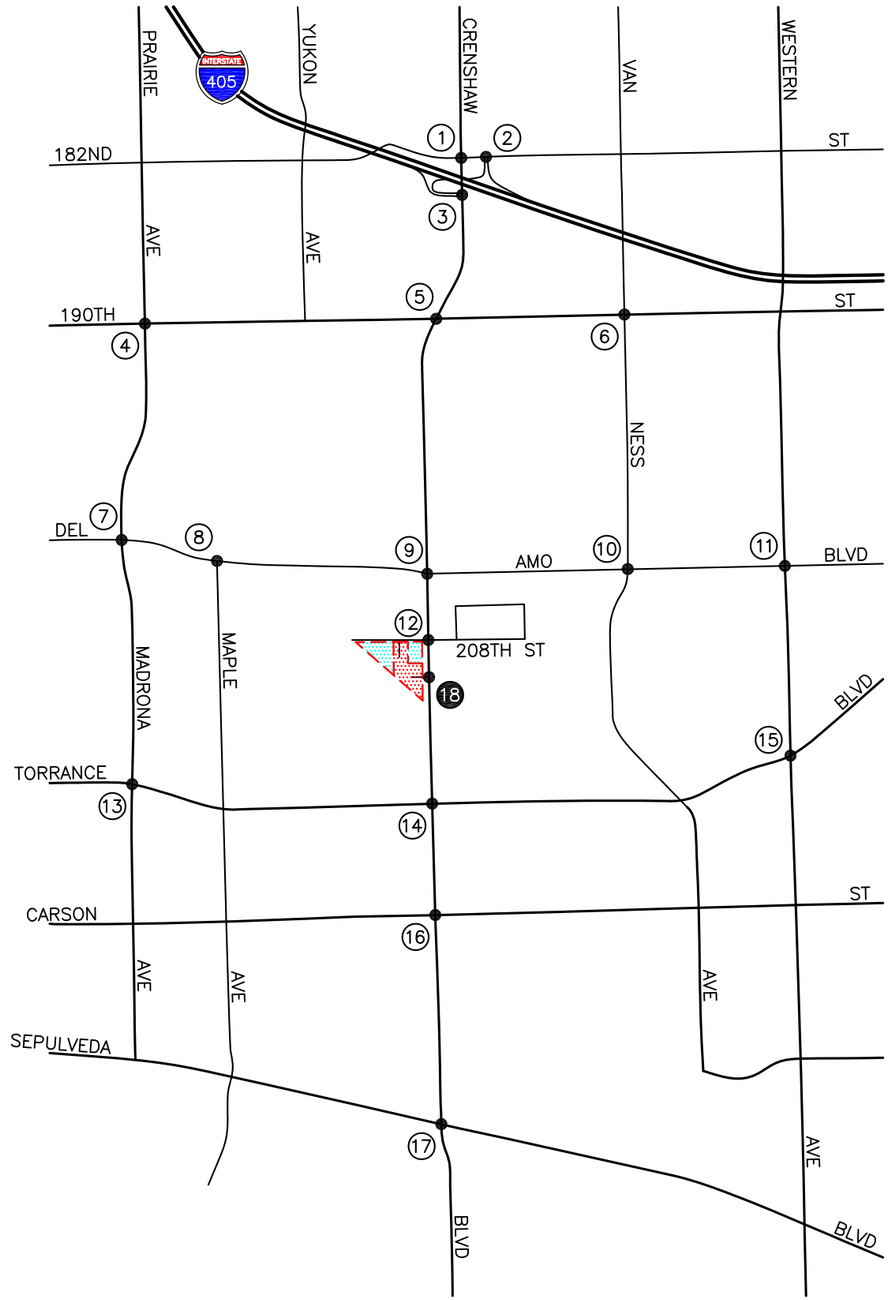
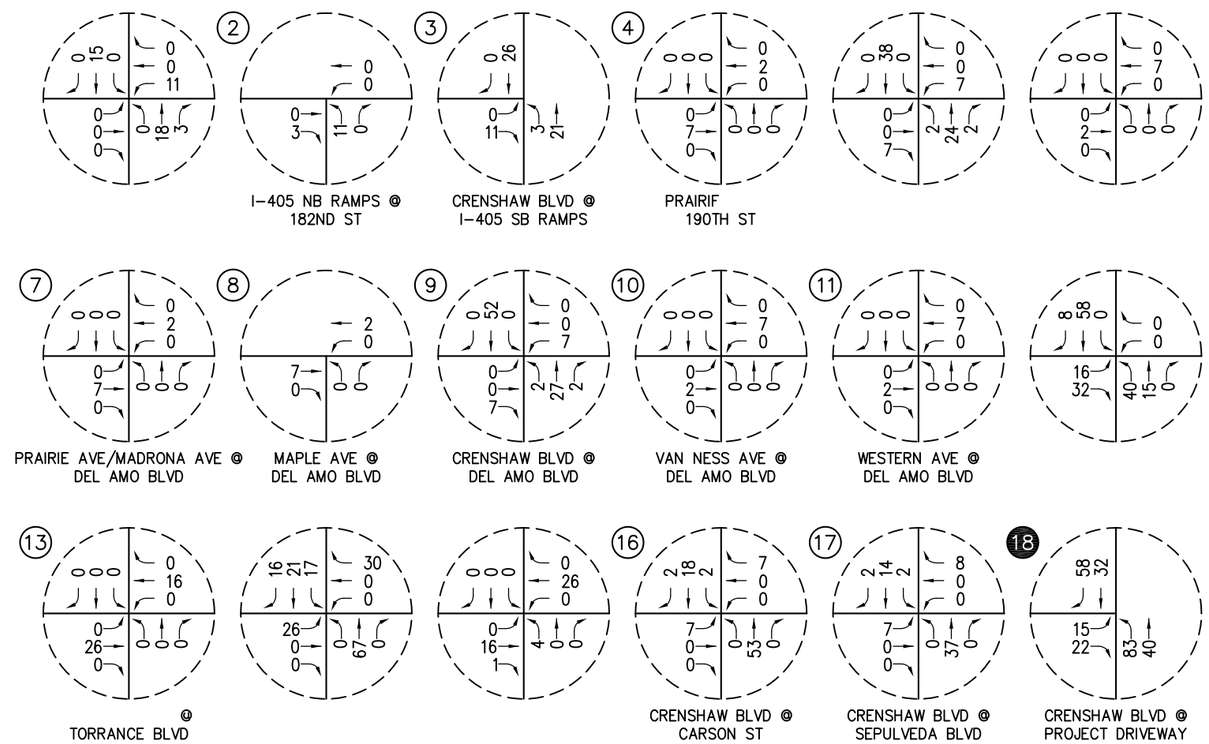
N NO SCALE

KEY
X/Y = BUS TRIPS (PCE TRIPS)
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 5-6

PROJECT TRIP ASSIGNMENT (MAX ROUTE 3 – PM PEAK HOUR)
TORRANCE TRANSIT CENTER, TORRANCE





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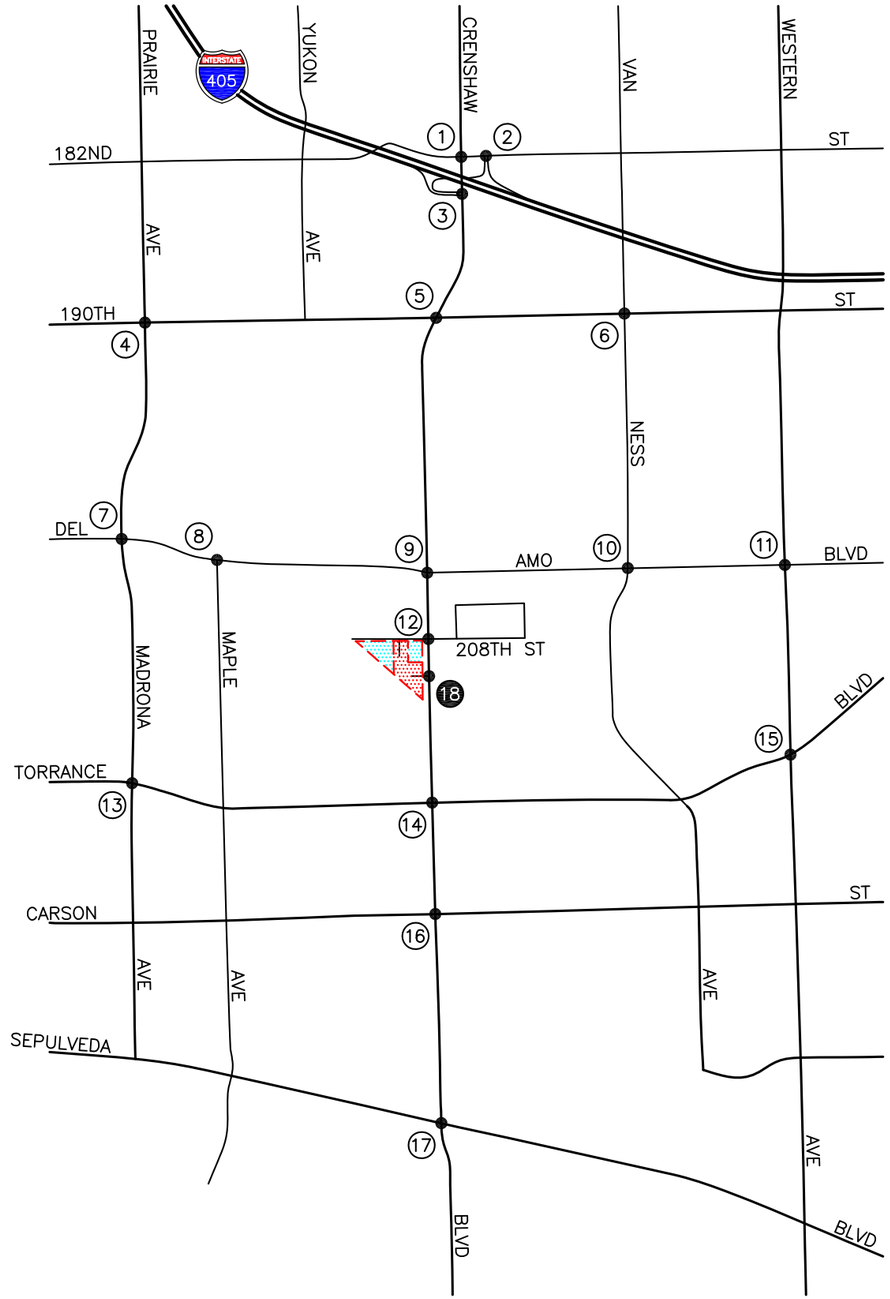
N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 5-7

AM PEAK HOUR PROJECT TRAFFIC VOLUMES

TORRANCE TRANSIT CENTER, TORRANCE



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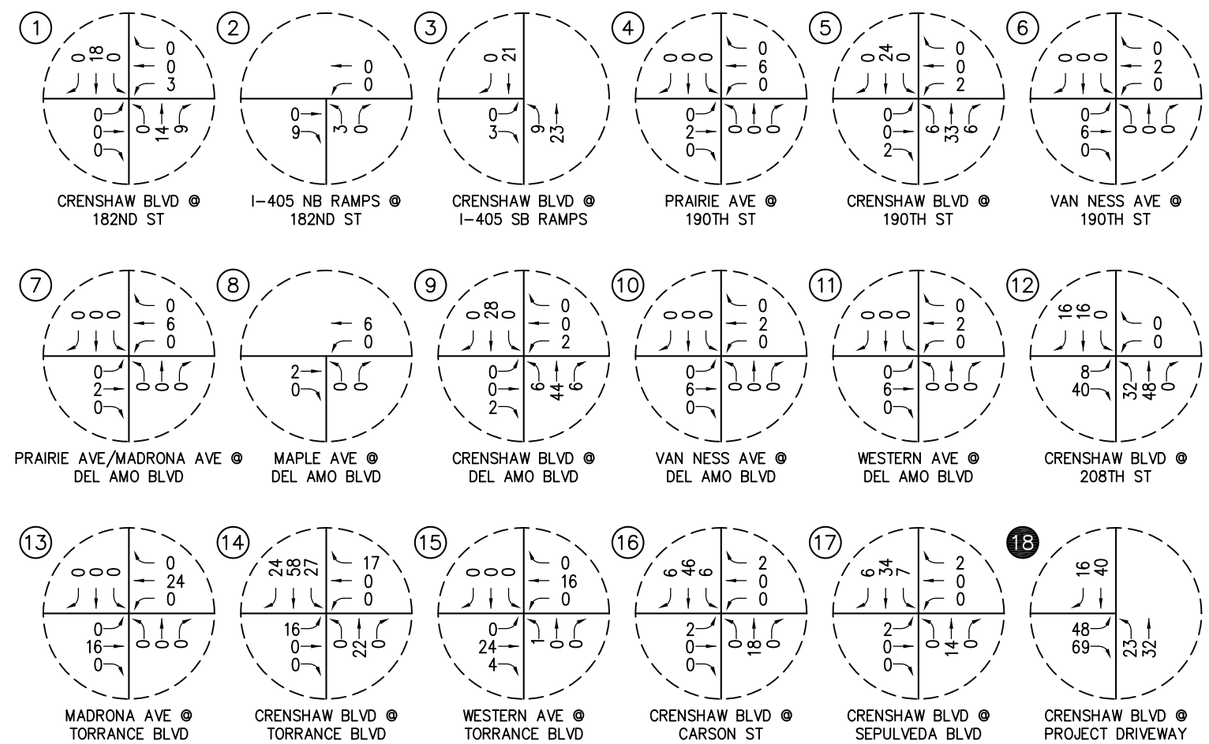

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N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 5-8

PM PEAK HOUR PROJECT TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE

6.0 FUTURE TRAFFIC CONDITIONS

6.1 Existing With Project Traffic Volumes

The estimates of Project-generated traffic volumes were added to the Existing traffic conditions to develop traffic projections for the Existing With Project traffic conditions. The anticipated Existing With Project AM and PM peak hour traffic volumes at the seventeen (17) key existing study intersections and one (1) future Project driveway are presented in ***Figures 6-1*** and ***6-2***, respectively.

6.2 Year 2015 Without Project Traffic Volumes

6.2.1 *Ambient Growth Traffic*

Near-term horizon year, traffic growth estimates have been calculated using an ambient growth factor. The ambient growth factor is intended to include unknown and future related projects in the study area, as well as account for regular growth in traffic volumes due to the development of projects outside the study area. The application of the one percent (1%) annual growth rate to baseline Year 2013 traffic volumes results in a two percent (2%) growth in existing baseline volumes at the seventeen (17) key study to horizon Year 2015.

6.2.2 *Related Projects Traffic*

The City of Torrance identified twenty-one (21) related projects within the Project study area. Related projects, as defined by Section 15355 of the CEQA Guidelines, are "closely related past, present and reasonably foreseeable probable future projects". The Traffic Impact Analysis assumes that all of these related projects will be developed and operational when the proposed Project is operational. This is the most conservative, worst-case approach, since the exact timing of each related project is uncertain. In addition, impacts for these related projects would likely be, or have been, subject to mitigation measures, which could reduce potential impacts. Under this analysis, however, those mitigation measures are not considered. The locations of the twenty-one (21) related projects are presented in ***Figure 6-3***.

Table 6-1 presents the address, jurisdiction, description and development totals of the twenty-one (21) related projects. ***Table 6-2*** presents the resultant trip generation for the twenty-one (21) related projects. As shown in *Table 6-2*, the twenty-one (21) related projects are expected to generate a combined total of 15,581 daily trips (one half arriving, one half departing) on a "typical" weekday, with 1,139 trips (796 inbound and 343 outbound) forecast during the AM peak hour and 1,146 trips (378 inbound and 768 outbound) forecast during the PM peak hour.

The anticipated AM and PM peak hour related projects traffic volumes at the seventeen (17) key existing study intersections are presented in ***Figures 6-4*** and ***6-5***, respectively.

Figures 6-6 and ***6-7*** present Year 2015 Without Project AM and PM peak hour traffic volumes at the seventeen (17) key existing study intersections, respectively. It should be noted that the Year 2015 Without Project traffic volumes include ambient traffic growth as well as the traffic from the twenty-one (21) related projects.

It should again be emphasized that because this traffic impact analysis utilizes both an ambient growth factor along with a list of related projects approach to analyze cumulative impacts, this traffic impact analysis is highly conservative and would tend to overstate cumulative traffic impacts.

6.3 Year 2015 With Project Traffic Volumes

The estimates of Project-generated traffic volumes were added to the Year 2015 Without Project traffic conditions to develop traffic projections for the Year 2015 With Project traffic conditions. The anticipated Year 2015 With Project traffic conditions AM and PM peak hour traffic volumes at the seventeen (17) key existing study intersection and one (1) future Project driveway are presented in ***Figures 6-8*** and ***6-9***, respectively.

TABLE 6-1

LOCATION AND DESCRIPTION OF RELATED PROJECTS[8]

No.	Related Project	Address	Jurisdiction	Description/Size
1.	CUP08-00022	18900 Hawthorne Boulevard	Torrance	626 SF Automobile Sales Expansion
2.	Torrance RF, LLC.	1824 182nd Street	Torrance	1,055 SF Subway, 1,800 SF Restaurant, 2,763 SF 7-Eleven, 990 SF Office
3.	Xebec Realty Partners	500 Crenshaw Boulevard	Torrance	454,800 SF Multi-Tenant Industrial Business Park
4.	El Pollo Loco	19300 Hawthorne Boulevard	Torrance	2,757 SF Pollo Loco Restaurant with Drive-Through
5.	Chevlin Geoff	2545 190th Street	Torrance	49,499 SF Church and 9,256 SF Retail
6.	CUP07-00005	3525 Maricopa Street	Torrance	12 Attached Residential Condominiums
7.	Pine Meadows, LLC.	2319 Apple Avenue	Torrance	6-Unit Residential Condominiums
8.	CUP08-00031	19701 Mariner Avenue	Torrance	Two 14,929 SF Industrial Condominiums
9.	CUP10-00013	20710 Hawthorne Boulevard	Torrance	11,352 SF New Car Dealership (AutoNation)
10.	CUP09-00023	20525 Hawthorne Boulevard	Torrance	42,397 SF Self-Storage Facility
11.	CUP12-00002	3210 Sepulveda Boulevard	Torrance	130-Bed Assisted Living and Skilled Nursing Facility
12.	CUP12-00003	20619 Amie Avenue	Torrance	10-Residential Condominiums
13.	CUP12-00004	18313 Hawthorne Boulevard	Torrance	3,823 SF Automobile Sales Expansion
14.	CUP12-00008	20790 Hawthorne Boulevard	Torrance	2,739 SF Take-Out Restaurant
15.	Robinson Honda	20340 Hawthorne Boulevard	Torrance	16,004 SF Automobile Sales Expansion
16.	CUP09-00005	4102-04 Hickman Drive	Torrance	2,500 SF Auxiliary Church Building
17.	Providence Health System	20911 Earl Street	Torrance	92,100 SF Medical Office Building
18.	CUP12-00019	2732 Sepulveda Boulevard	Torrance	1,223 SF Restaurant/Café
19.	CUP12-00005	1812 Abalone Avenue	Torrance	10,030 SF Church
20.	CUP11-00005	501 Van Ness Avenue	Torrance	27,000 SF Church
21.	CUP12-00014	1905 Abalone Avenue	Torrance	8,200 SF Auto Body and Paint Shop

Notes:

- SF = Square-Feet

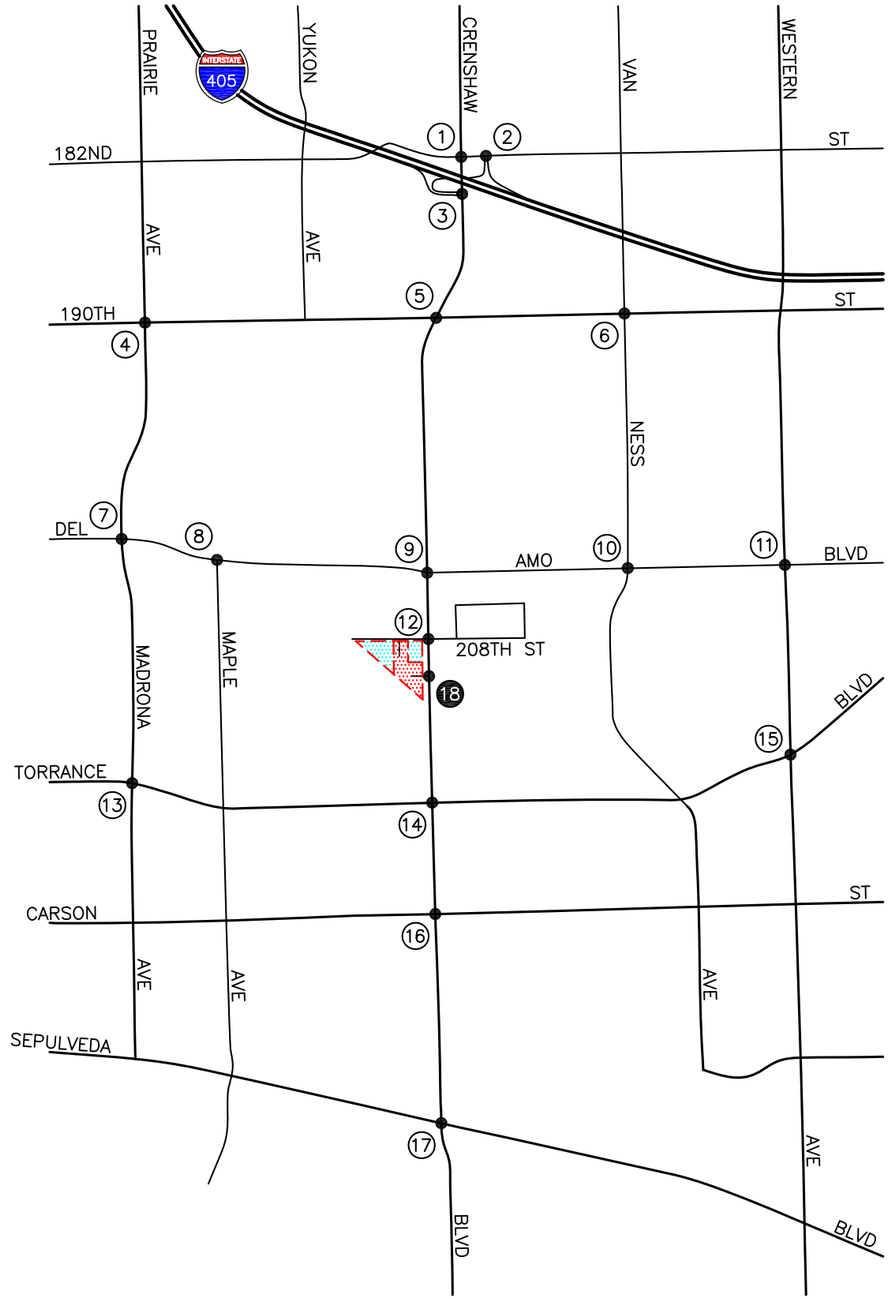
[8] Source: City of Torrance

TABLE 6-2

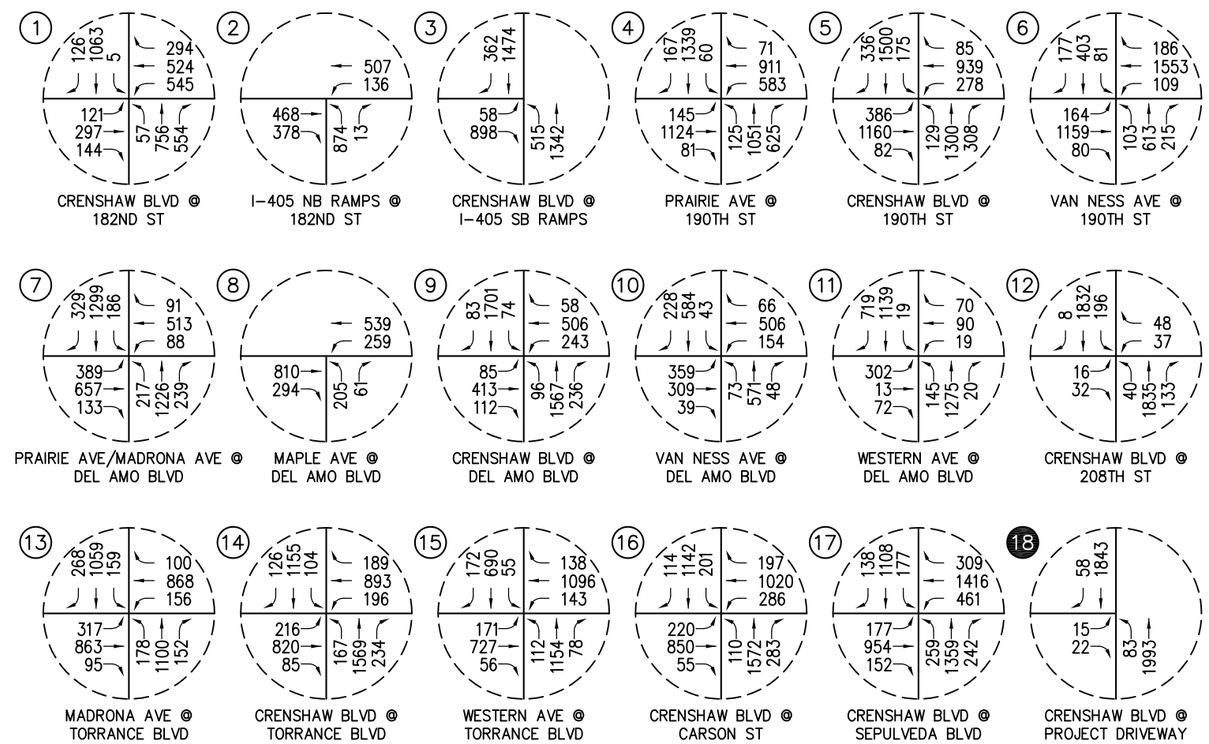
RELATED PROJECTS TRIP GENERATION FORECAST[9]

Related Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
1. CUP08-00022	20	1	0	1	1	1	2
2. Torrance RF, LLC.	3,379	123	110	233	48	47	95
3. Xebec Realty Partners	3,106	305	68	373	82	305	387
4. El Pollo Loco	1,026	33	31	64	23	21	44
5. Chevlin Geoff	806	22	14	36	24	26	50
6. CUP07-00005	70	1	4	5	4	2	6
7. Pine Meadows, LLC.	35	0	3	3	2	1	3
8. CUP08-00031	104	12	2	14	2	12	14
9. CUP10-00013	367	16	6	22	12	18	30
10. CUP09-00023	106	3	3	6	6	5	11
11. CUP12-00002	346	12	6	18	13	16	29
12. CUP12-00003	58	1	3	4	4	1	5
13. CUP12-00004	123	6	1	7	4	6	10
14. CUP12-00008	1,471	37	24	61	18	18	36
15. Robinson Honda	517	23	8	31	17	25	42
16. CUP09-00005	23	1	0	1	1	0	1
17. Providence Health System	3,328	174	46	220	92	237	329
18. CUP12-00019	99	1	0	1	3	2	5
19. CUP12-00005	91	4	2	6	3	3	6
20. CUP11-00005	246	9	6	15	7	8	15
21. CUP12-00014	260	12	6	18	12	14	26
Related Projects Trip Generation Potential	**15,581**	**796**	**343**	**1,139**	**378**	**768**	**1,146**

[9] Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012).* Where applicable, pass-by adjustments factors were utilized and are reflected in the related projects trip generation potential.



STUDY INTERSECTIONS



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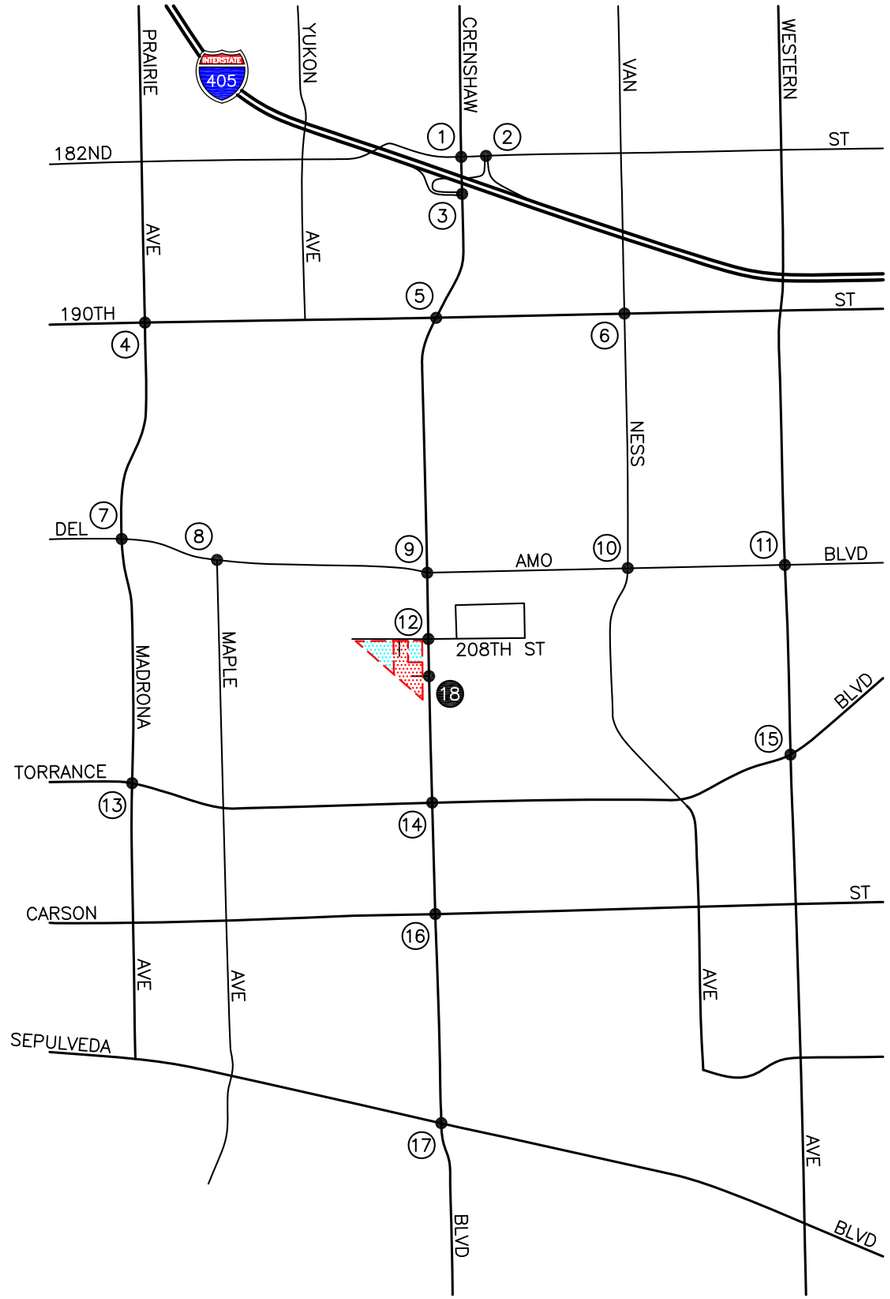
N NO SCALE

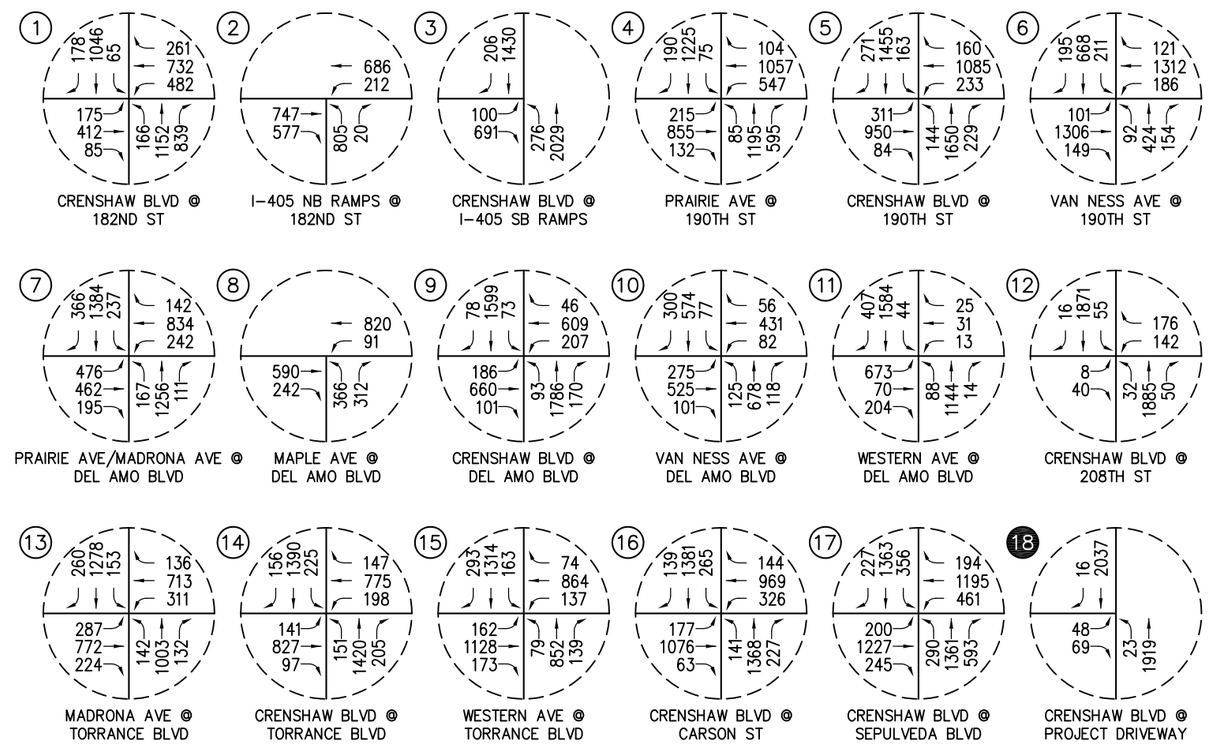
KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-1

EXISTING WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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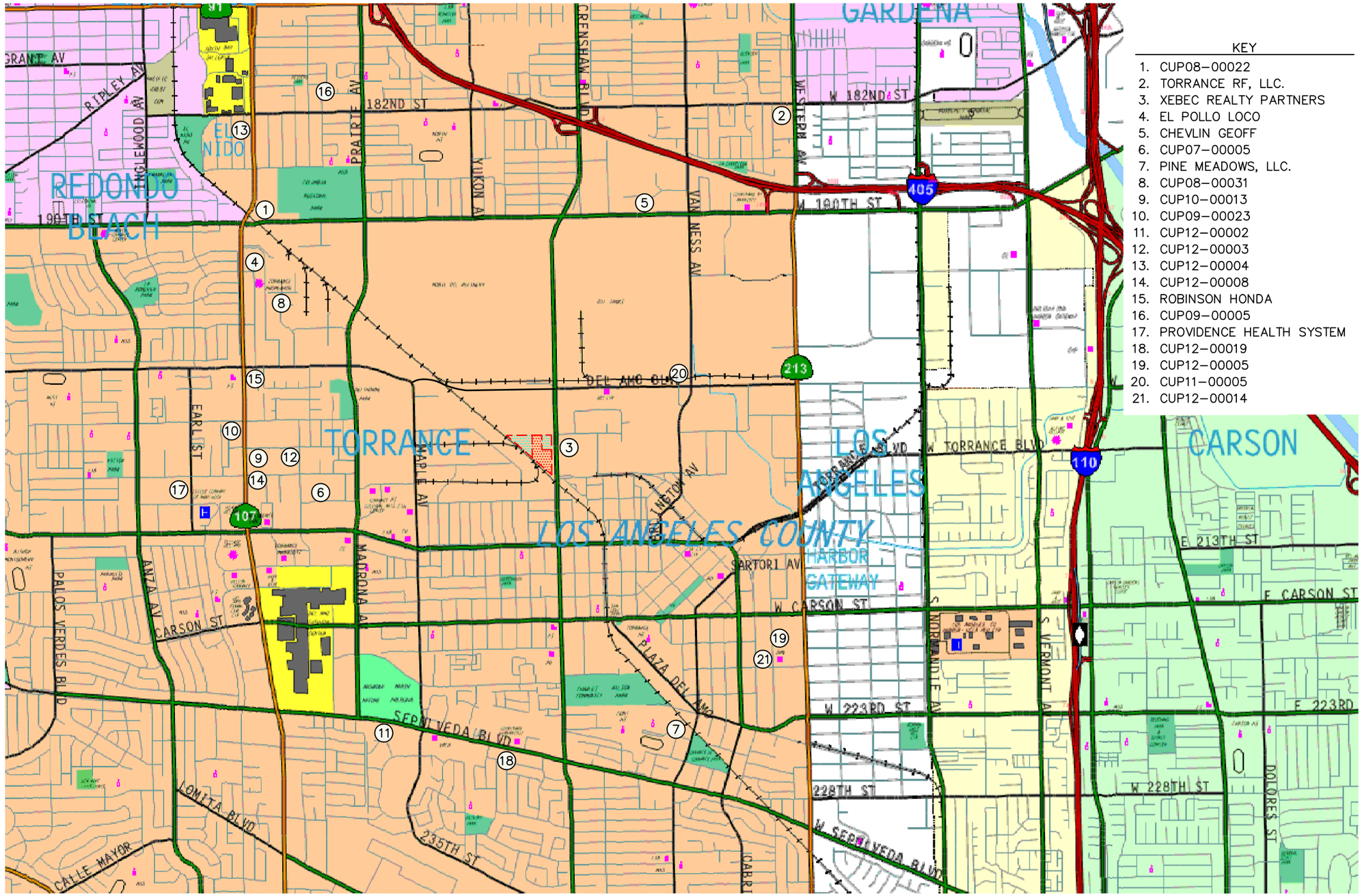
KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-2

EXISTING WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



KEY

1. CUP08–00022
2. TORRANCE RF, LLC.
3. XEBEC REALTY PARTNERS
4. EL POLLO LOCO
5. CHEVLIN GEOFF
6. CUP07–00005
7. PINE MEADOWS, LLC.
8. CUP08–00031
9. CUP10–00013
10. CUP09–00023
11. CUP12–00002
12. CUP12–00003
13. CUP12–00004
14. CUP12–00008
15. ROBINSON HONDA
16. CUP09–00005
17. PROVIDENCE HEALTH SYSTEM
18. CUP12–00019
19. CUP12–00005
20. CUP11–00005
21. CUP12–00014

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N NO SCALE

SOURCE: THOMAS BROS.

KEY

(#) = LOCATION OF RELATED PROJECT

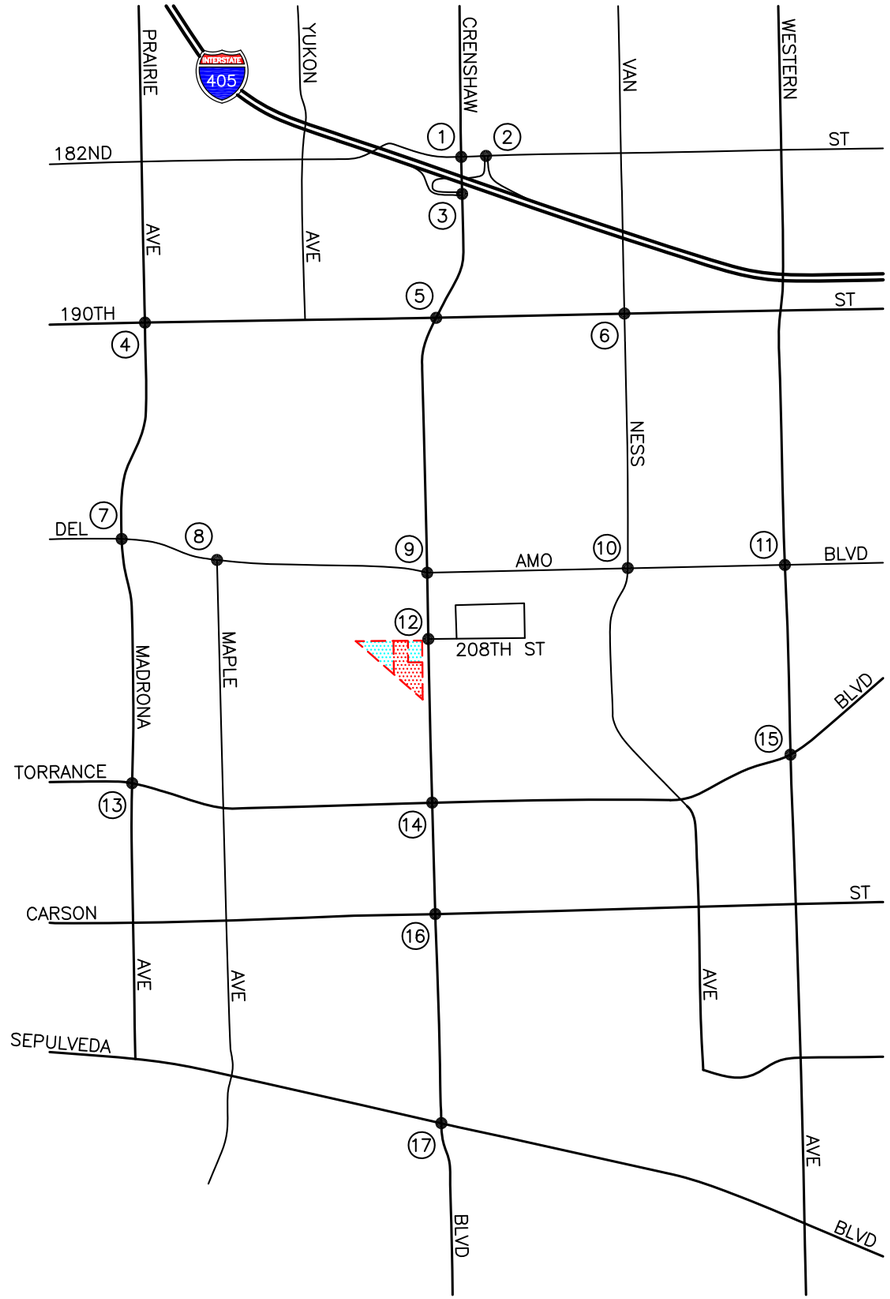
= TORRANCE TRANSIT CENTER

= NOT A PART OF PROJECT

FIGURE 6–3

RELATED PROJECTS LOCATION MAP

TORRANCE TRANSIT CENTER, TORRANCE



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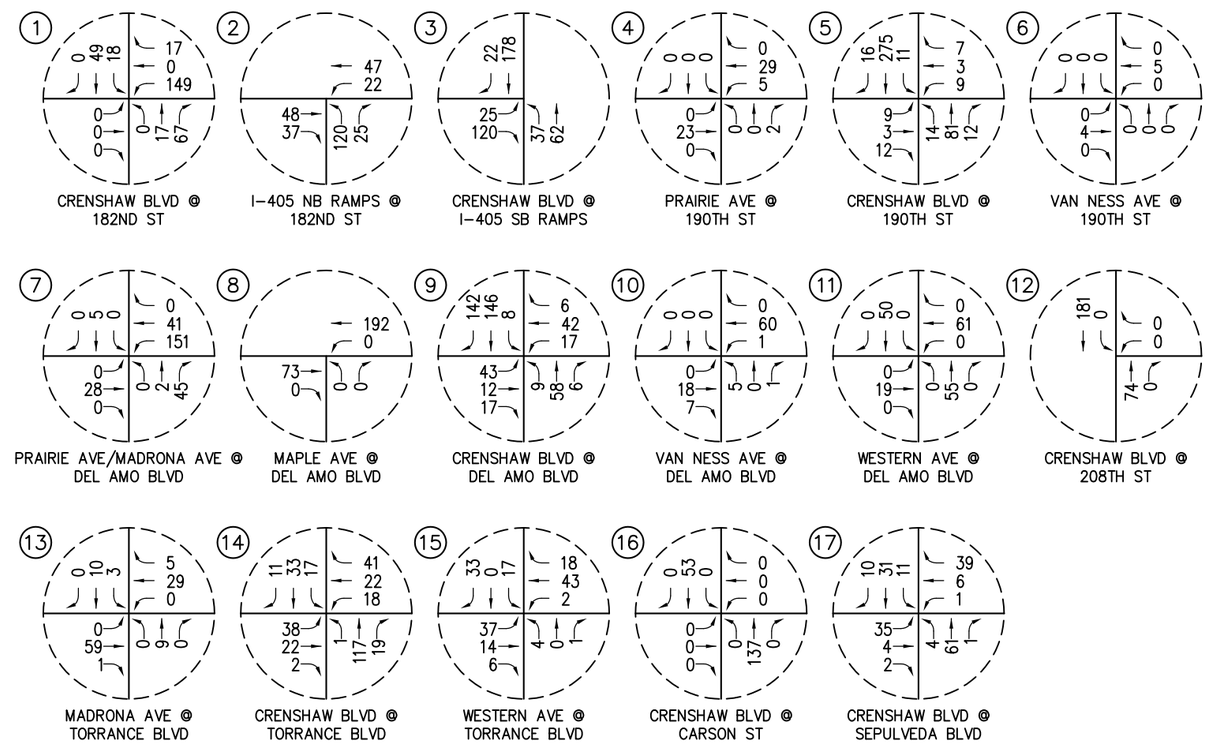

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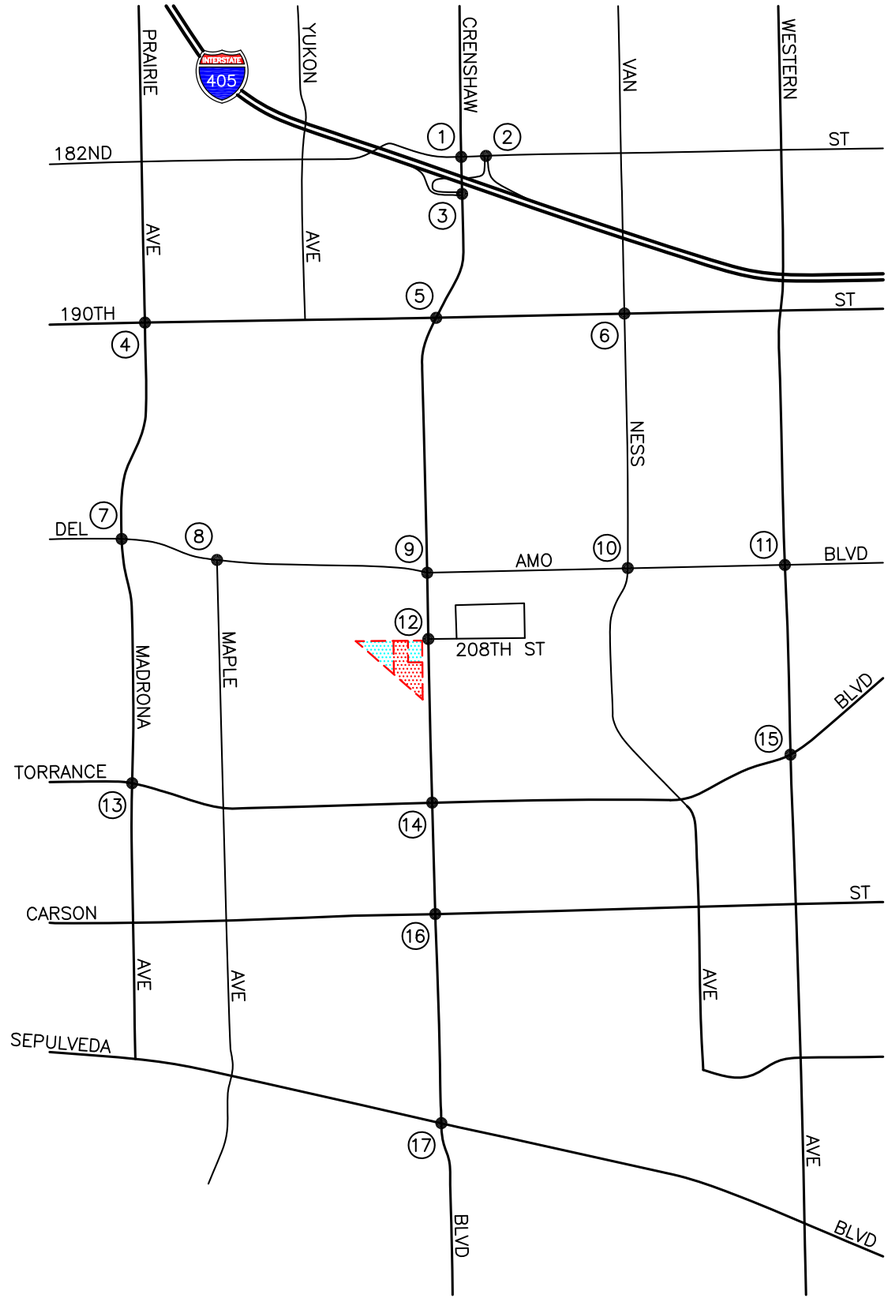
N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-4

AM PEAK HOUR RELATED PROJECTS TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



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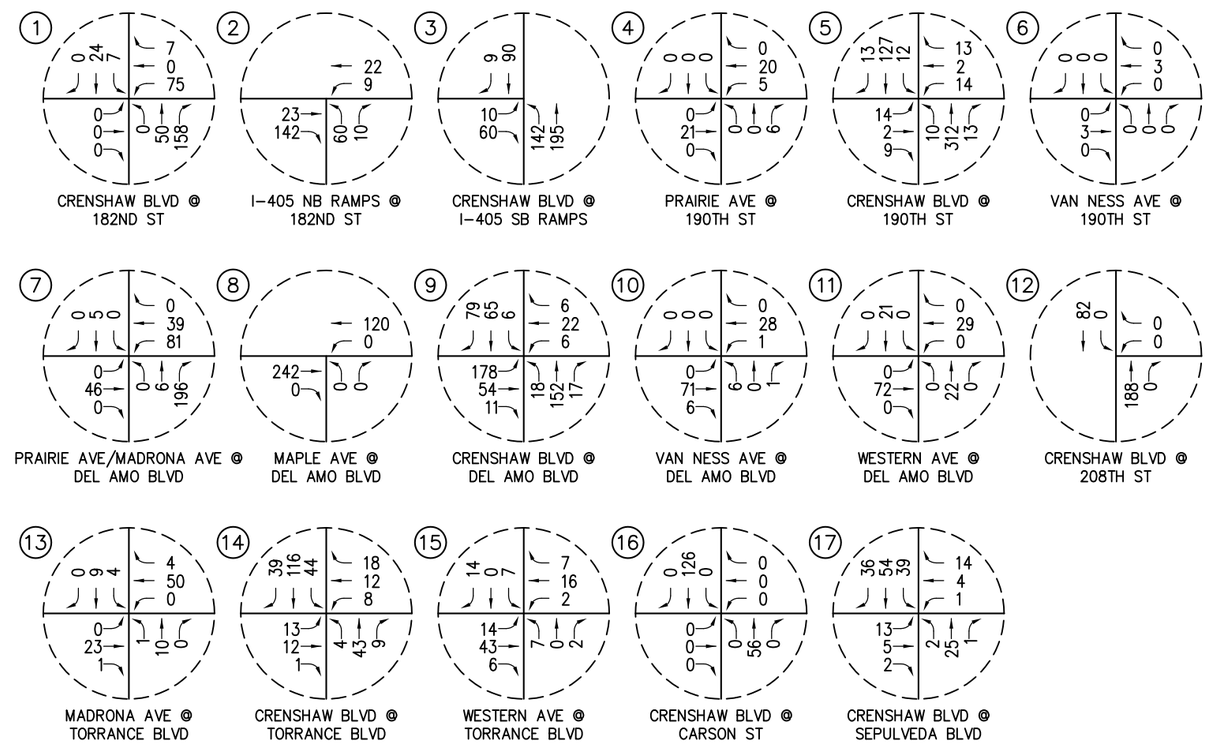

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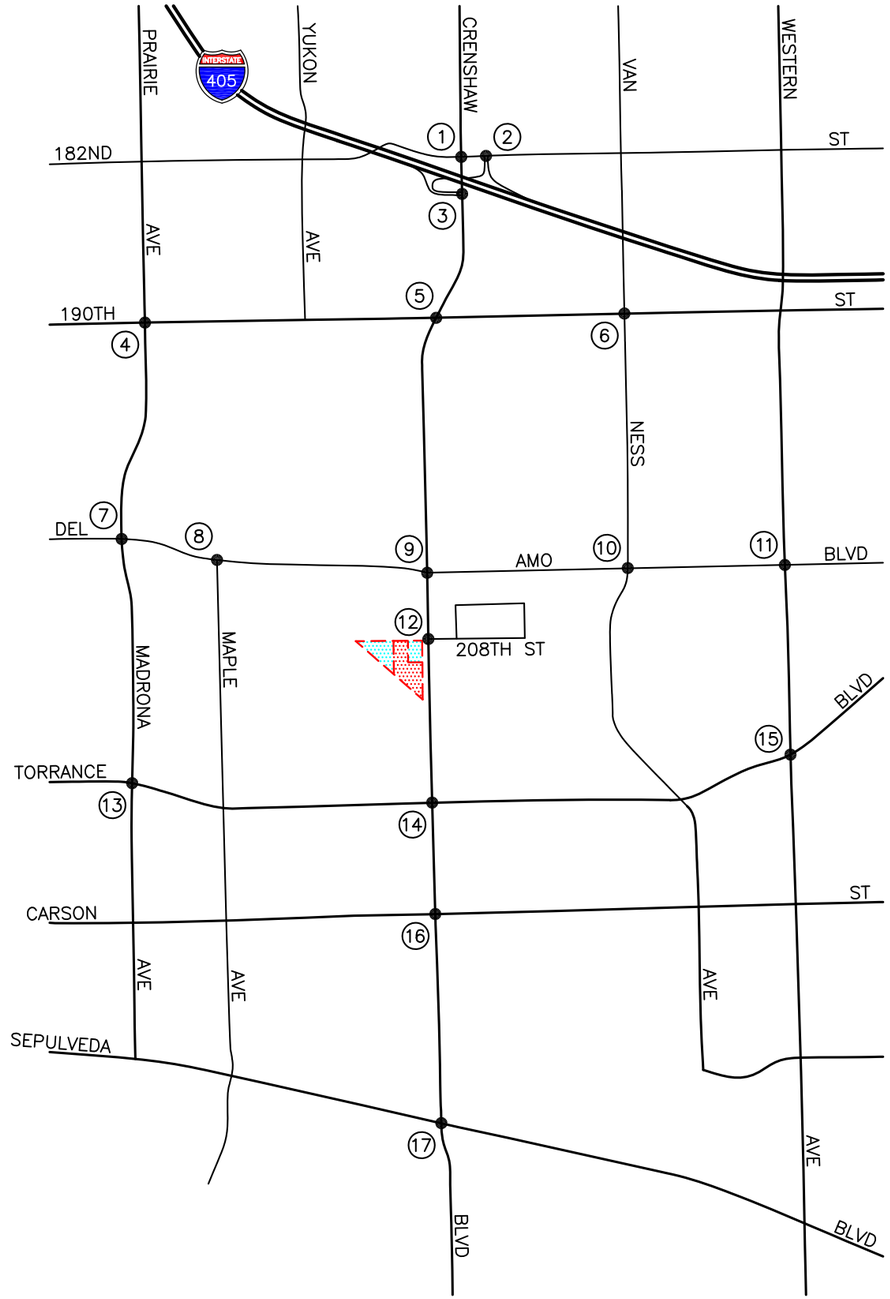
N NO SCALE

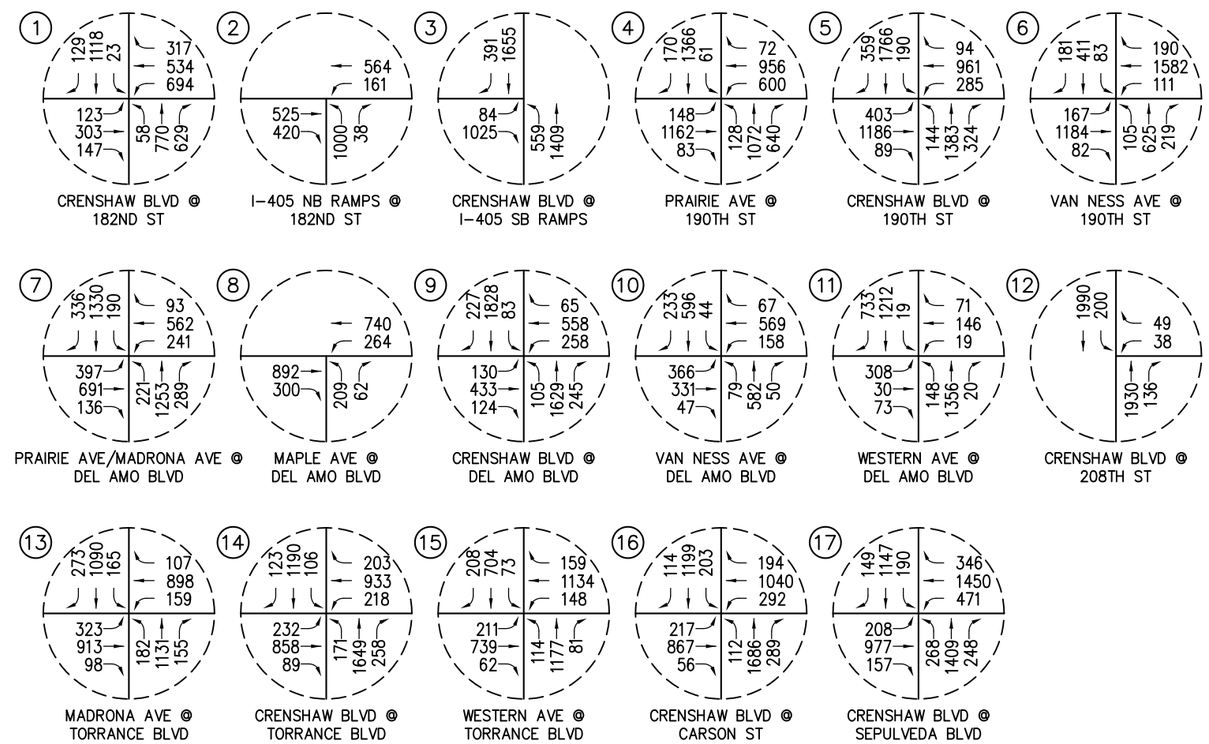
KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-5

PM PEAK HOUR RELATED PROJECTS TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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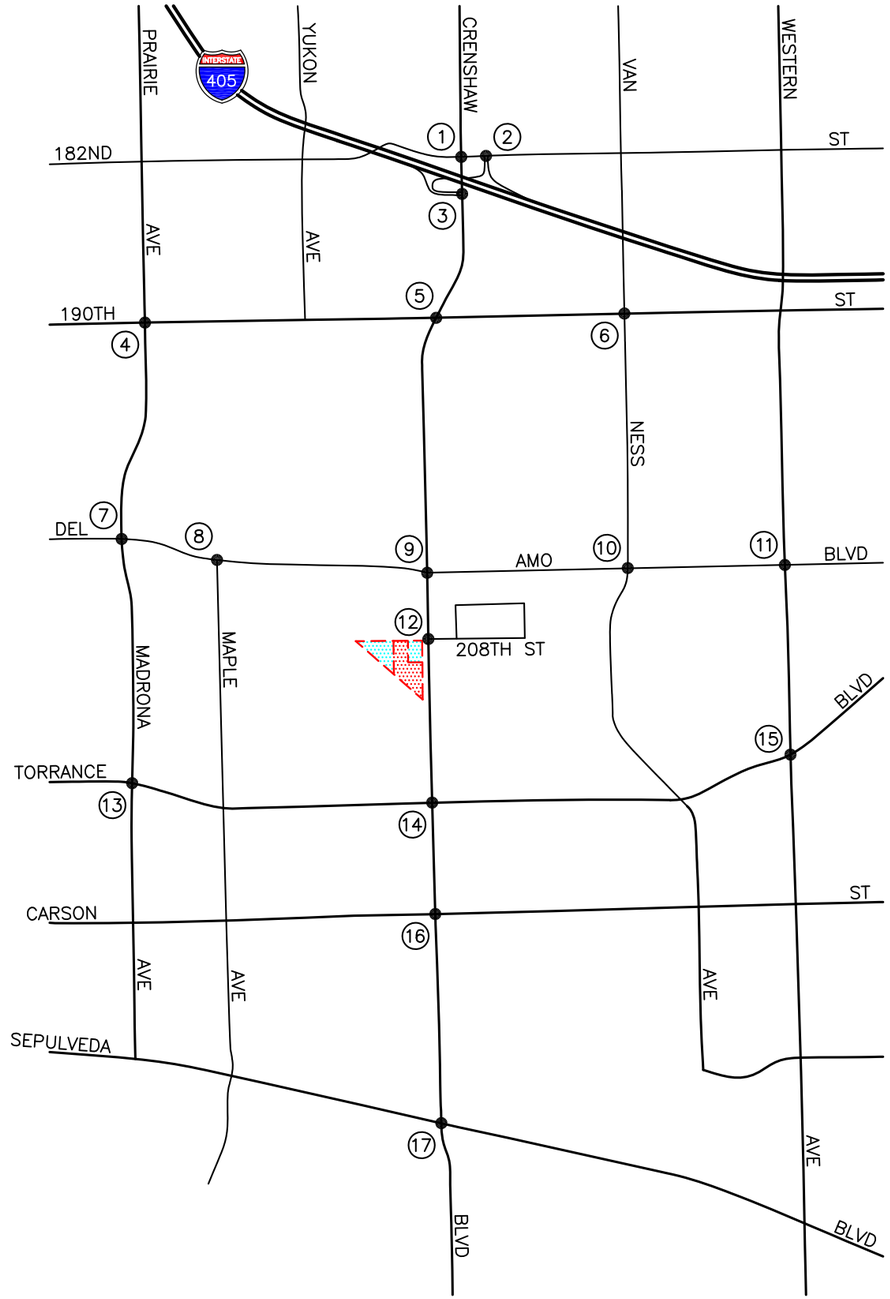
LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-6

YEAR 2015 WITHOUT PROJECT AM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



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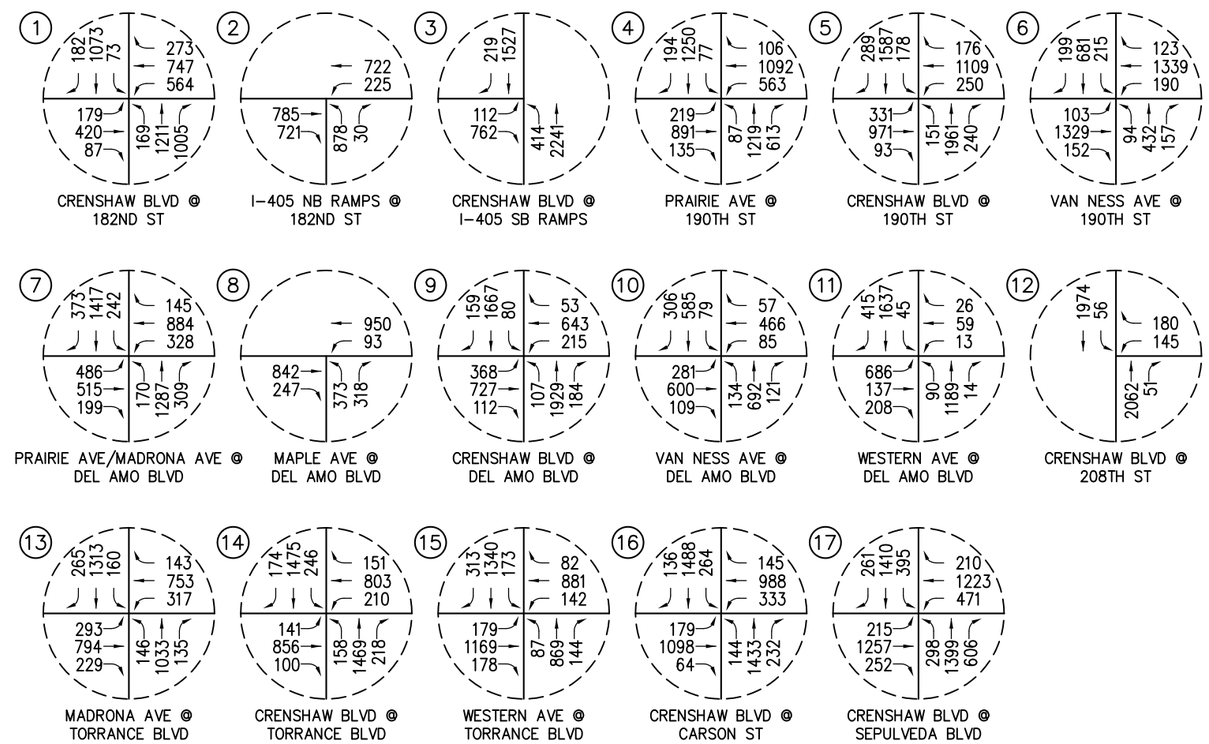

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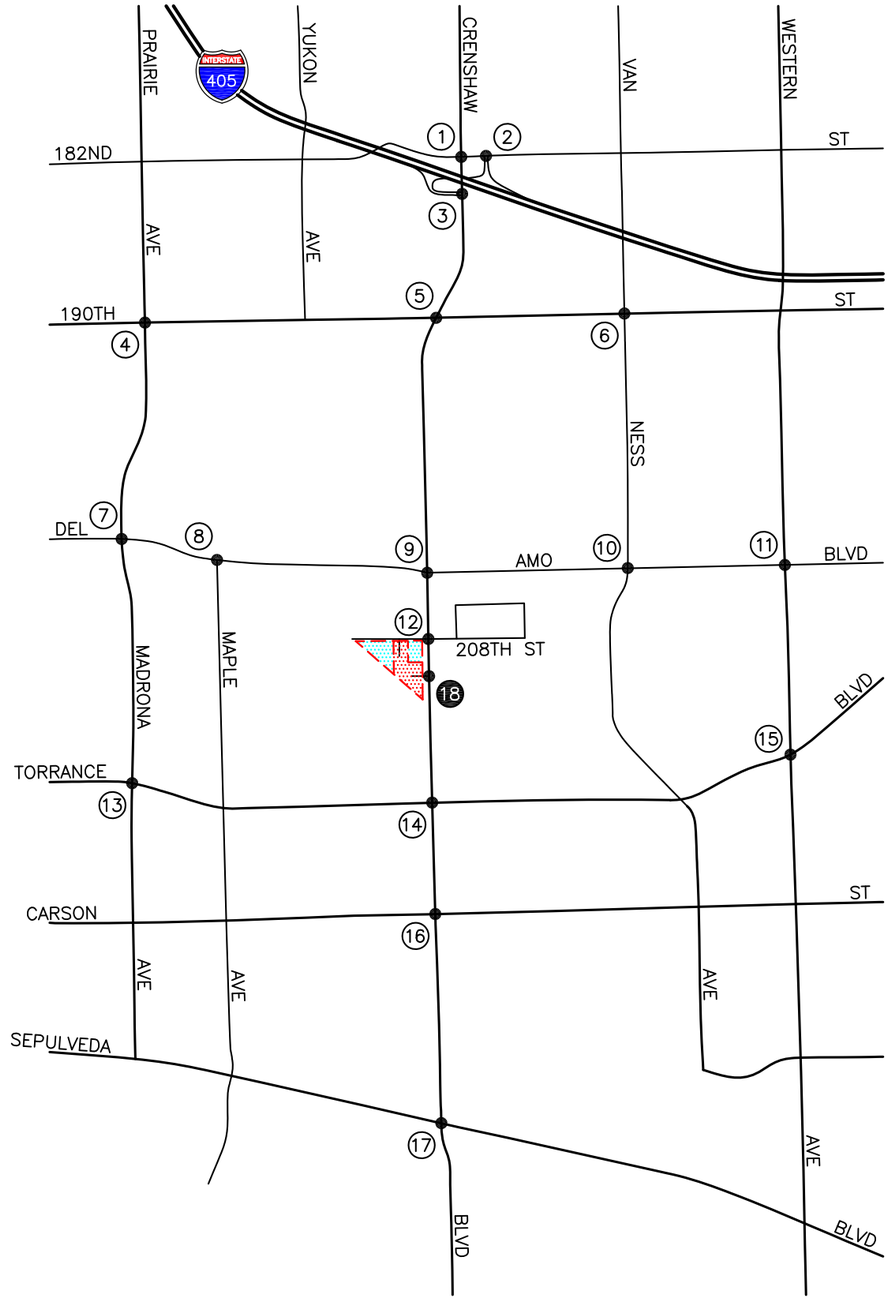
N NO SCALE

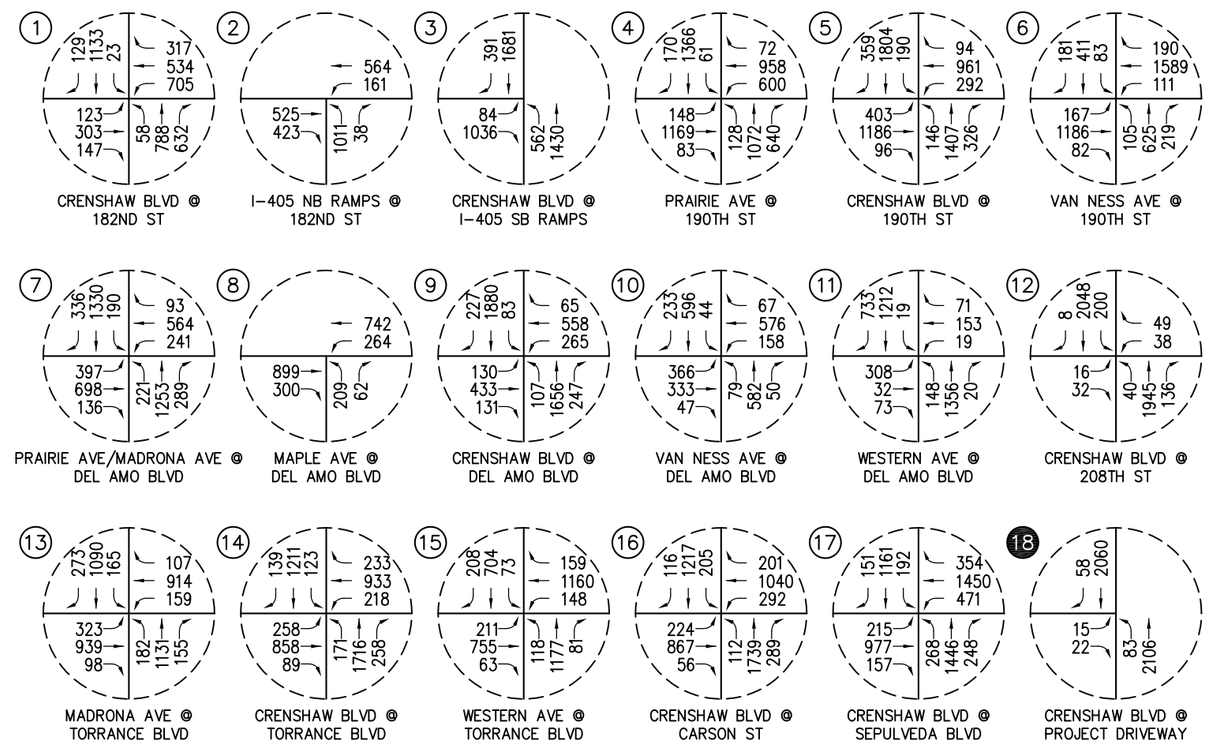
KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-7

YEAR 2015 WITHOUT PROJECT PM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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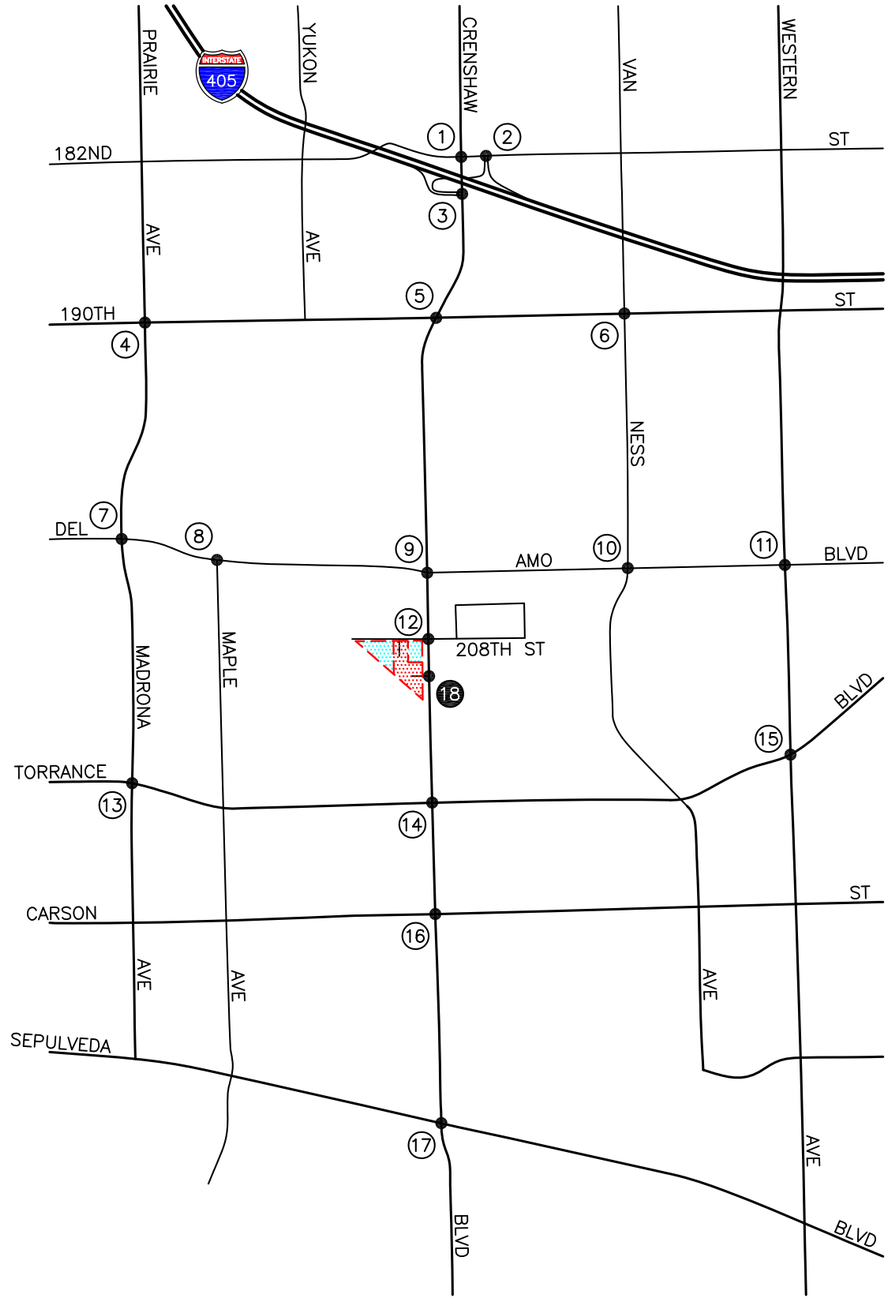
N NO SCALE

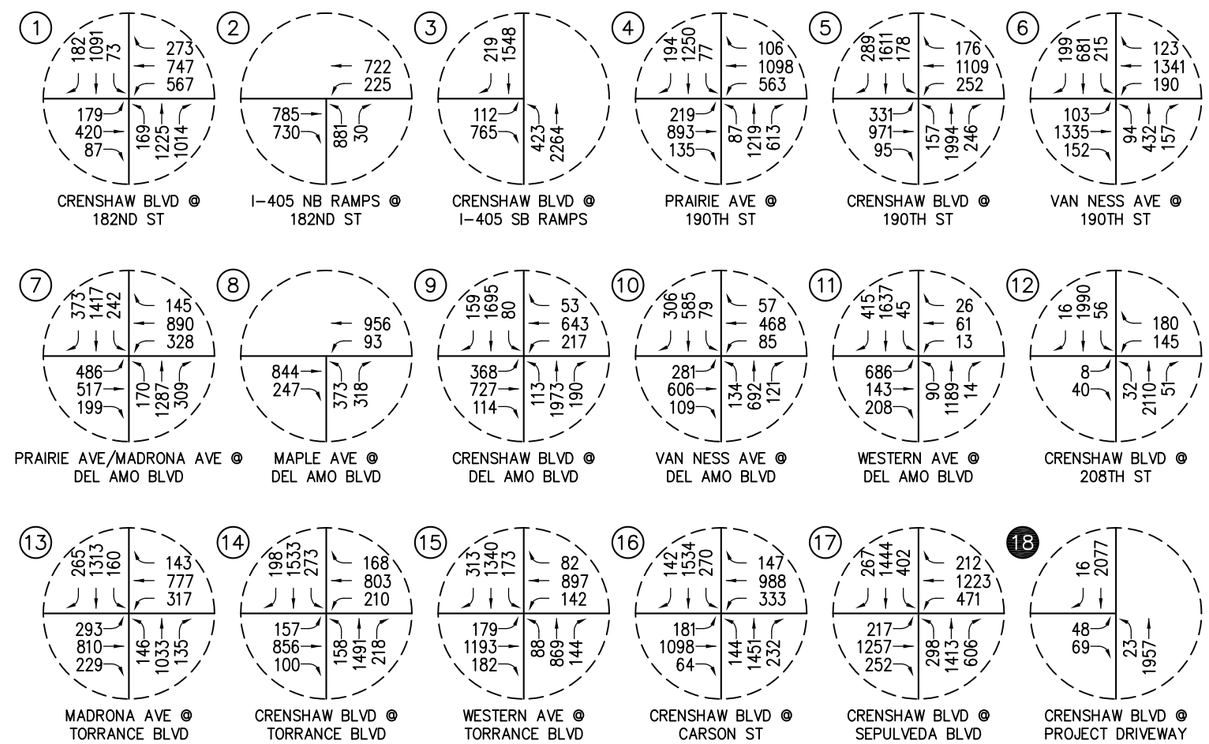
KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-8

YEAR 2015 WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE



STUDY INTERSECTIONS



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N NO SCALE

KEY
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 6-9

YEAR 2015 WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES
TORRANCE TRANSIT CENTER, TORRANCE

7.0 EXISTING CONDITIONS TRAFFIC IMPACT ANALYSIS

The existing conditions analysis establishes the basis for the future forecasts for the Project. The existing conditions analysis reflects existing traffic counts as well as existing lane configurations for all analyzed intersections.

7.1 Existing Conditions Intersection Capacity Analysis (ICU Methodology)

Table 7-1 summarizes the peak hour Level of Service results at the key study intersections for existing traffic conditions, with and without the Project, based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. The first column (1) of ICU/LOS values in *Table 7-1* presents a summary of Existing AM and PM peak hour traffic conditions. The second column (2) in *Table 7-1* presents forecast Existing With Project traffic conditions. The third column (3) of *Table 7-1* shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the LOS standards and the significance impact criteria defined in this report. The fourth column (4) of *Table 7-1* presents the Level of Service with the implementation of traffic mitigation improvements, if necessary.

7.1.1 *Existing Traffic Conditions (ICU Methodology)*

Review of column (1) of *Table 7-1* indicates that for the Existing traffic conditions, seven (7) of the seventeen (17) existing key study intersections currently operate at unacceptable level of services during the AM and/or PM peak hour when compared to the LOS standards defined in this report. The remaining ten (10) existing key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		**PM Peak Hour**	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	0.964	E
2. I-405 Northbound Ramps at 182nd Street	--	--	0.900	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.092	F	--	--
4. Prairie Avenue at 190th Street	1.267	F	1.168	F
5. Crenshaw Boulevard at 190th Street	0.903	E	0.986	E
6. Van Ness Avenue at 190th Street	0.986	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.008	F

7.1.2 *Existing With Project Traffic Conditions (ICU Methodology)*

Review of column (2) of *Table 7-1* indicates that for the Existing With Project traffic conditions, seven (7) of the seventeen (17) key study intersections are forecast to operate at unacceptable level of services during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining ten (10) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	0.967	E
2. I-405 Northbound Ramps at 182nd Street	--	--	0.904	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.103	F	--	--
4. Prairie Avenue at 190th Street	1.269	F	1.169	F
5. Crenshaw Boulevard at 190th Street	0.921	E	0.993	E
6. Van Ness Avenue at 190th Street	0.988	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.010	F

Review of column (3) of *Table 7-1* indicates that none of the seventeen (17) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

To supplement the level of service results as presented in *Table 7-1*, ***Figure 7-1*** graphically presents the comparison between Existing and Existing With Project traffic conditions level of service results for the AM and PM peak hours based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

Appendix C contains the ICU/LOS calculation worksheets for the Existing Traffic Conditions (ICU Methodology).

TABLE 7-1

EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[10]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[11]		(4) Existing With Project With Mitigation	
				ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
1.	Crenshaw Boulevard at	AM	3∅ Traffic	0.800	D	0.806	D	0.006	No	--	--
	182nd Street	PM	Signal	**0.964**	**E**	**0.967**	**E**	0.003	No	--	--
2.	I-405 Northbound Ramps at	AM	2∅ Traffic	0.722	C	0.727	C	0.005	No	--	--
	182nd Street	PM	Signal	**0.900**	**E**	**0.904**	**E**	0.004	No	--	--
3.	Crenshaw Boulevard at	AM	3∅ Traffic	**1.092**	**F**	**1.103**	**F**	0.011	No	--	--
	I-405 Southbound Ramps	PM	Signal	0.850	D	0.861	D	0.011	No	--	--
4.	Prairie Avenue at	AM	8∅ Traffic	**1.267**	**F**	**1.269**	**F**	0.002	No	--	--
	190th Street	PM	Signal	**1.168**	**F**	**1.169**	**F**	0.001	No	--	--
5.	Crenshaw Boulevard at	AM	8∅ Traffic	**0.903**	**E**	**0.921**	**E**	0.018	No	--	--
	190th Street	PM	Signal	**0.986**	**E**	**0.993**	**E**	0.007	No	--	--
6.	Van Ness Avenue at	AM	8∅ Traffic	**0.986**	**E**	**0.988**	**E**	0.002	No	--	--
	190th Street	PM	Signal	0.875	D	0.875	D	0.000	No	--	--
7.	Prairie Avenue/Madrona Ave at	AM	8∅ Traffic	0.741	C	0.741	C	0.000	No	--	--
	Del Amo Boulevard	PM	Signal	0.870	D	0.872	D	0.002	No	--	--

Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[10] *Appendix C* contains the ICU/LOS calculation worksheets for all study intersections.

[11] Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.

TABLE 7-1 (CONTINUED)

EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[12]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[13]		(4) Existing With Project With Mitigation	
				ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
8.	Maple Avenue at	AM	3∅ Traffic	0.733	C	0.735	C	0.002	No	--	--
	Del Amo Boulevard	PM	Signal	0.645	B	0.646	B	0.001	No	--	--
9.	Crenshaw Boulevard at	AM	8∅ Traffic	0.796	C	0.813	D	0.017	No	--	--
	Del Amo Boulevard	PM	Signal	0.877	D	0.889	D	0.012	No	--	--
10.	Van Ness Avenue at	AM	5∅ Traffic	0.688	B	0.689	B	0.001	No	--	--
	Del Amo Boulevard	PM	Signal	0.827	D	0.831	D	0.004	No	--	--
11.	Western Avenue at	AM	3∅ Traffic	0.845	D	0.850	D	0.005	No	--	--
	Del Amo Boulevard	PM	Signal	0.842	D	0.845	D	0.003	No	--	--
12.	Crenshaw Boulevard at	AM	2∅ Traffic	0.659	B	0.692	B	0.033	No	--	--
	208th Street	PM	Signal	0.638	B	0.678	B	0.040	No	--	--
13.	Madrona Avenue at	AM	8∅ Traffic	0.724	C	0.740	C	0.016	No	--	--
	Torrance Boulevard	PM	Signal	0.760	C	0.765	C	0.005	No	--	--
14.	Crenshaw Boulevard at	AM	8∅ Traffic	0.816	D	0.836	D	0.020	No	--	--
	Torrance Boulevard	PM	Signal	0.830	D	0.844	D	0.014	No	--	--

Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[12] *Appendix C* contains the ICU/LOS calculation worksheets for all study intersections.

[13] Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.

TABLE 7-1 (CONTINUED)

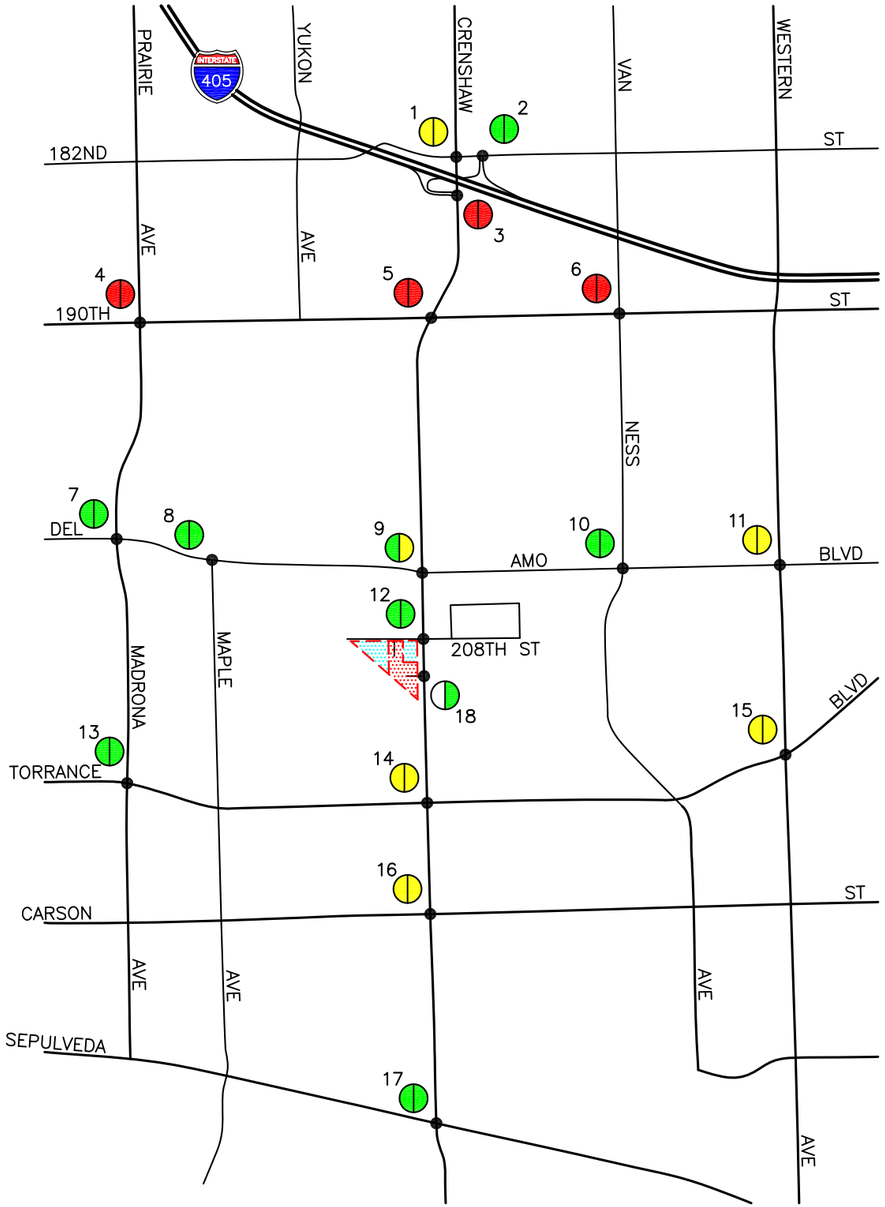
EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[14]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[15]		(4) Existing With Project With Mitigation	
				ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
15.	Western Avenue at	AM	8∅ Traffic	0.849	D	0.855	D	0.006	No	--	--
	Torrance Boulevard	PM	Signal	0.862	D	0.868	D	0.006	No	--	--
16.	Crenshaw Boulevard at	AM	8∅ Traffic	0.878	D	0.892	D	0.014	No	--	--
	Carson Street	PM	Signal	0.835	D	0.841	D	0.006	No	--	--
17.	Crenshaw Boulevard at	AM	8∅ Traffic	0.777	C	0.780	C	0.003	No	--	--
	Sepulveda Boulevard	PM	Signal	**1.008**	**F**	**1.010**	**F**	0.002	No	--	--
18.	Crenshaw Boulevard at	AM	3∅ Traffic	--	--	0.550	A	--	No	--	--
	Project Driveway[16]	PM	Signal	--	--	0.582	A	--	No	--	--

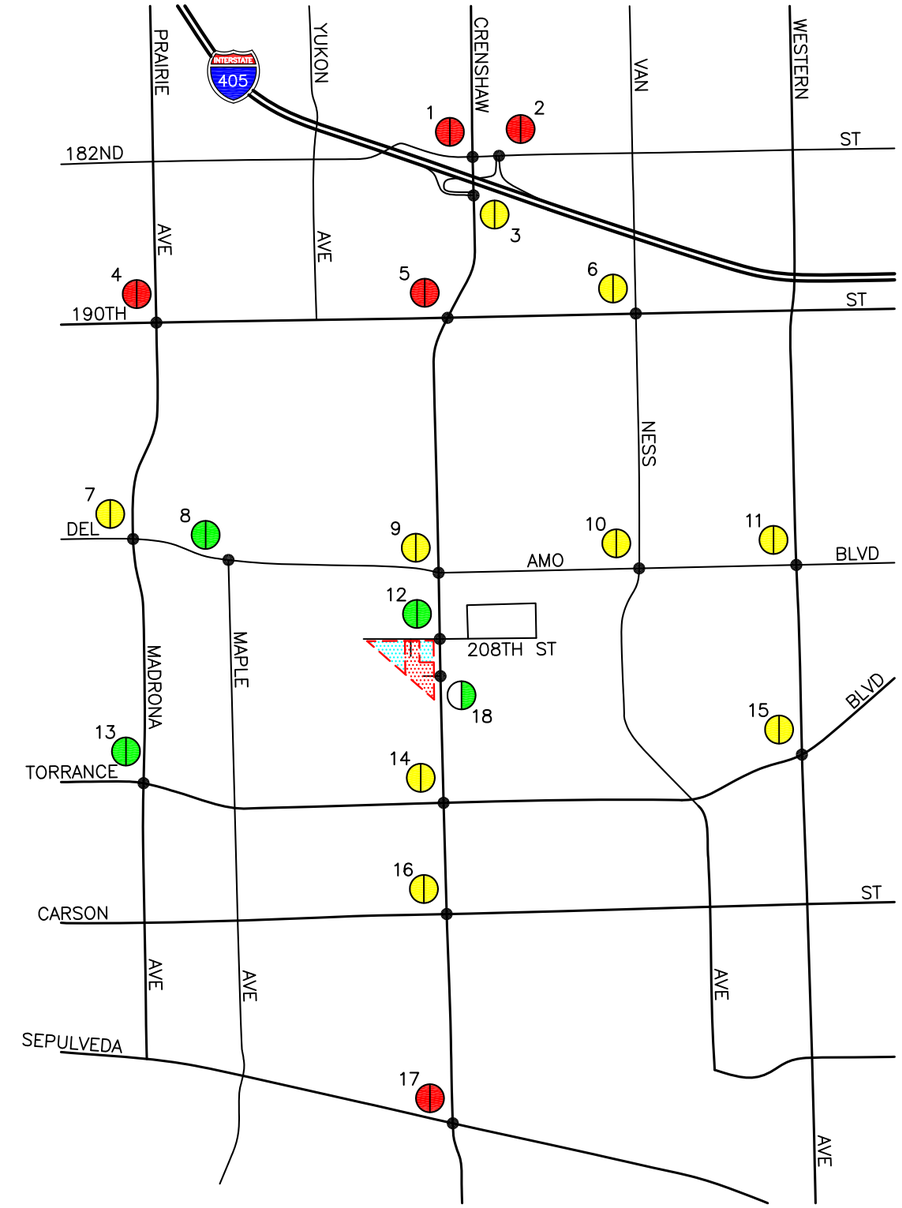
Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[14] *Appendix C* contains the ICU/LOS calculation worksheets for all study intersections.
[15] Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.
[16] Intersection analyzed under "With" Project scenarios only.



AM PEAK HOUR



PM PEAK HOUR

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N NO SCALE

EXISTING LOS RESULTS

EXISTING WITH PROJECT LOS RESULTS

KEY
- = LOS E/F (UNACCEPTABLE)
- = LOS D
- = LOS A/B/C
- = TORRANCE TRANSIT CENTER
- = NOT A PART OF PROJECT

FIGURE 7-1

EXISTING VS. EXISTING WITH PROJECT
AM AND PM PEAK HOUR LEVEL OF SERVICE
RESULTS COMPARISON (ICU METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE

7.2 Existing Conditions Intersection Capacity Analysis (HCM Methodology)

Table 7-2 summarizes the peak hour Level of Service results at the key study intersections for existing traffic conditions, with and without the Project, based on the *Highway Capacity Manual (HCM)* Method of Analysis. The first column (1) of Delay/LOS values in *Table 7-2* presents a summary of Existing AM and PM peak hour traffic conditions. The second column (2) in *Table 7-2* presents forecast Existing With Project traffic conditions. The third column (3) of *Table 7-2* shows the increase in Delay value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the LOS standards and the significance impact criteria defined in this report. The fourth column (4) of *Table 7-2* presents the Level of Service with the implementation of traffic mitigation improvements, if necessary.

7.2.1 *Existing Traffic Conditions (HCM Methodology)*

Review of column (1) of *Table 7-2* indicates that for the Existing traffic conditions, two (2) of the seventeen (17) existing key study intersections currently operate at unacceptable level of services during the AM and/or PM peak hour when compared to the LOS standards defined in this report. The remaining fifteen (15) existing key study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		**PM Peak Hour**	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
4. Prairie Avenue at 190th Street	98.5	F	74.4	E
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	70.8	E

7.2.2 *Existing With Project Traffic Conditions (HCM Methodology)*

Review of column (2) of *Table 7-2* indicates that for the Existing With Project traffic conditions, two (2) of the seventeen (17) key study intersections are forecast to operate at unacceptable level of services during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining fifteen (15) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		**PM Peak Hour**	
Key Intersection	**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
4. Prairie Avenue at 190th Street	99.0	F	74.4	E
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	71.3	E

Review of column (3) of *Table 7-2* indicates that none of the seventeen (17) key study intersections will have a significant impact under the Existing With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

To supplement the level of service results as presented in *Table 7-2*, ***Figure 7-2*** graphically presents the comparison between Existing and Existing With Project traffic conditions level of service results for the AM and PM peak hours based on the *Highway Capacity Manual (HCM)* Method of Analysis.

Appendix D contains the Delay/LOS calculation worksheets for the Existing Traffic Conditions (HCM Methodology).

TABLE 7-2

EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[17]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[18]		(4) Existing With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Delay Increase	Yes/No	Delay (s/v)	LOS
1.	Crenshaw Boulevard at	AM	3∅ Traffic	26.2	C	26.3	C	0.1	No	--	--
	182nd Street	PM	Signal	43.2	D	44.3	D	1.1	No	--	--
2.	I-405 Northbound Ramps at	AM	2∅ Traffic	17.6	B	17.7	B	0.1	No	--	--
	182nd Street	PM	Signal	27.9	C	28.5	C	0.6	No	--	--
3.	Crenshaw Boulevard at	AM	3∅ Traffic	45.6	D	47.9	D	2.3	No	--	--
	I-405 Southbound Ramps	PM	Signal	23.7	C	24.0	C	0.3	No	--	--
4.	Prairie Avenue at	AM	8∅ Traffic	**98.5**	**F**	**99.0**	**F**	0.5	No	--	--
	190th Street	PM	Signal	**74.4**	**E**	**74.4**	**E**	0.0	No	--	--
5.	Crenshaw Boulevard at	AM	8∅ Traffic	41.9	D	42.3	D	0.4	No	--	--
	190th Street	PM	Signal	44.0	D	44.7	D	0.7	No	--	--
6.	Van Ness Avenue at	AM	8∅ Traffic	45.5	D	45.8	D	0.3	No	--	--
	190th Street	PM	Signal	42.4	D	42.4	D	0.0	No	--	--
7.	Prairie Avenue/Madrona Ave at	AM	8∅ Traffic	40.3	D	40.3	D	0.0	No	--	--
	Del Amo Boulevard	PM	Signal	45.1	D	45.1	D	0.0	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[17] *Appendix D* contains the Delay/LOS calculation worksheets for all study intersections.

[18] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.

TABLE 7-2 (CONTINUED)

EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[19]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[20]		(4) Existing With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
8.	Maple Avenue at	AM	3∅ Traffic	23.7	C	23.7	C	0.0	No	--	--
	Del Amo Boulevard	PM	Signal	19.8	B	19.8	B	0.0	No	--	--
9.	Crenshaw Boulevard at	AM	8∅ Traffic	39.8	D	40.9	D	1.1	No	--	--
	Del Amo Boulevard	PM	Signal	39.2	D	39.9	D	0.7	No	--	--
10.	Van Ness Avenue at	AM	5∅ Traffic	25.8	C	25.8	C	0.0	No	--	--
	Del Amo Boulevard	PM	Signal	25.9	C	26.1	C	0.2	No	--	--
11.	Western Avenue at	AM	3∅ Traffic	45.9	D	46.8	D	0.9	No	--	--
	Del Amo Boulevard	PM	Signal	24.5	C	24.6	C	0.1	No	--	--
12.	Crenshaw Boulevard at	AM	2∅ Traffic	18.9	B	31.8	C	12.9	No	--	--
	208th Street	PM	Signal	14.3	B	26.0	C	11.7	No	--	--
13.	Madrona Avenue at	AM	8∅ Traffic	36.3	D	36.3	D	0.0	No	--	--
	Torrance Boulevard	PM	Signal	36.9	D	36.9	D	0.0	No	--	--
14.	Crenshaw Boulevard at	AM	8∅ Traffic	35.3	D	36.2	D	0.9	No	--	--
	Torrance Boulevard	PM	Signal	34.4	C	35.8	D	1.4	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[19] *Appendix D* contains the Delay/LOS calculation worksheets for all study intersections.

[20] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.

TABLE 7-2 (CONTINUED)

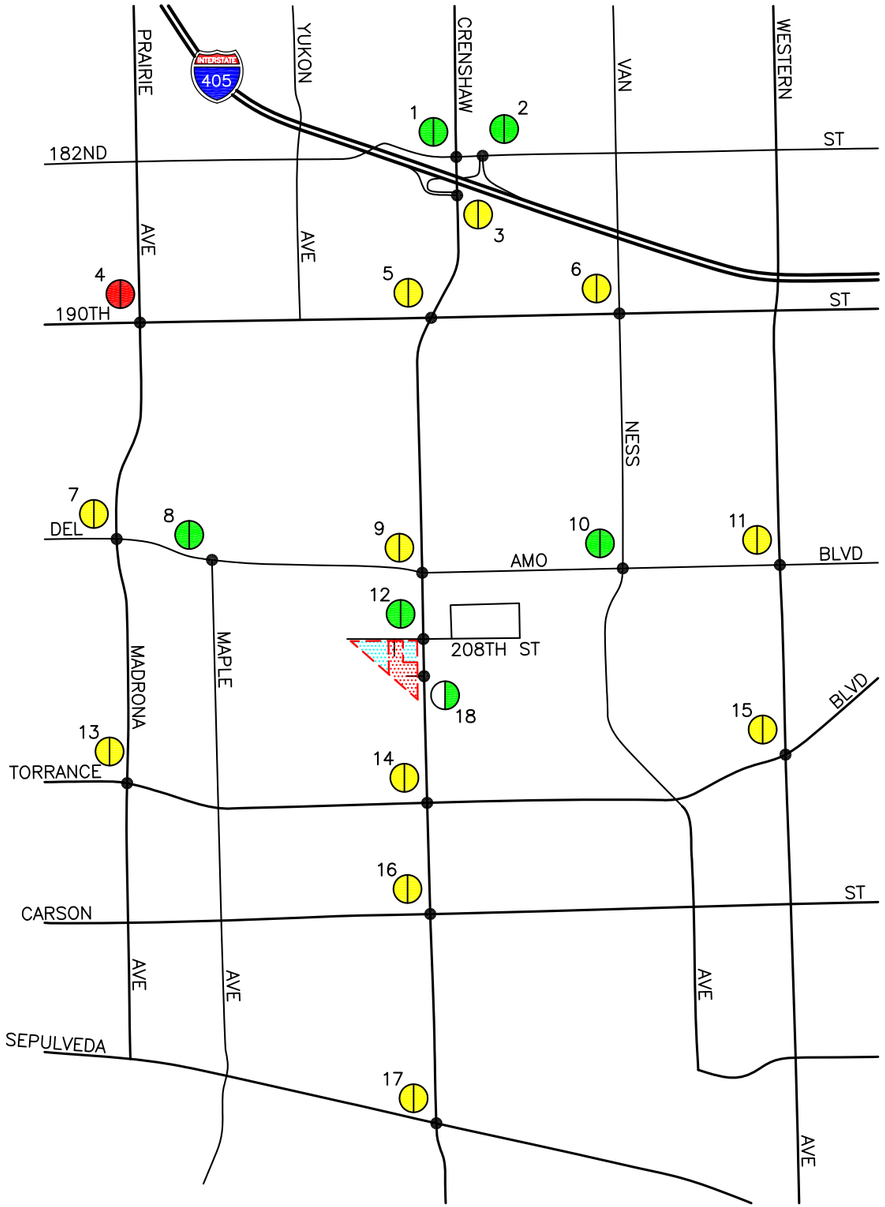
EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[21]

Key Intersection		Time Period	Control Type	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[22]		(4) Existing With Project With Mitigation	
				Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
15.	Western Avenue at	AM	8∅ Traffic	35.7	D	35.8	D	0.1	No	--	--
	Torrance Boulevard	PM	Signal	35.8	D	35.9	D	0.1	No	--	--
16.	Crenshaw Boulevard at	AM	8∅ Traffic	38.1	D	38.8	D	0.7	No	--	--
	Carson Street	PM	Signal	40.2	D	40.9	D	0.7	No	--	--
17.	Crenshaw Boulevard at	AM	8∅ Traffic	52.3	D	52.3	D	0.0	No	--	--
	Sepulveda Boulevard	PM	Signal	**70.8**	**E**	**71.3**	**E**	0.5	No	--	--
18.	Crenshaw Boulevard at	AM	3∅ Traffic	--	--	16.1	B	--	No	--	--
	Project Driveway[23]	PM	Signal	--	--	15.1	B	--	No	--	--

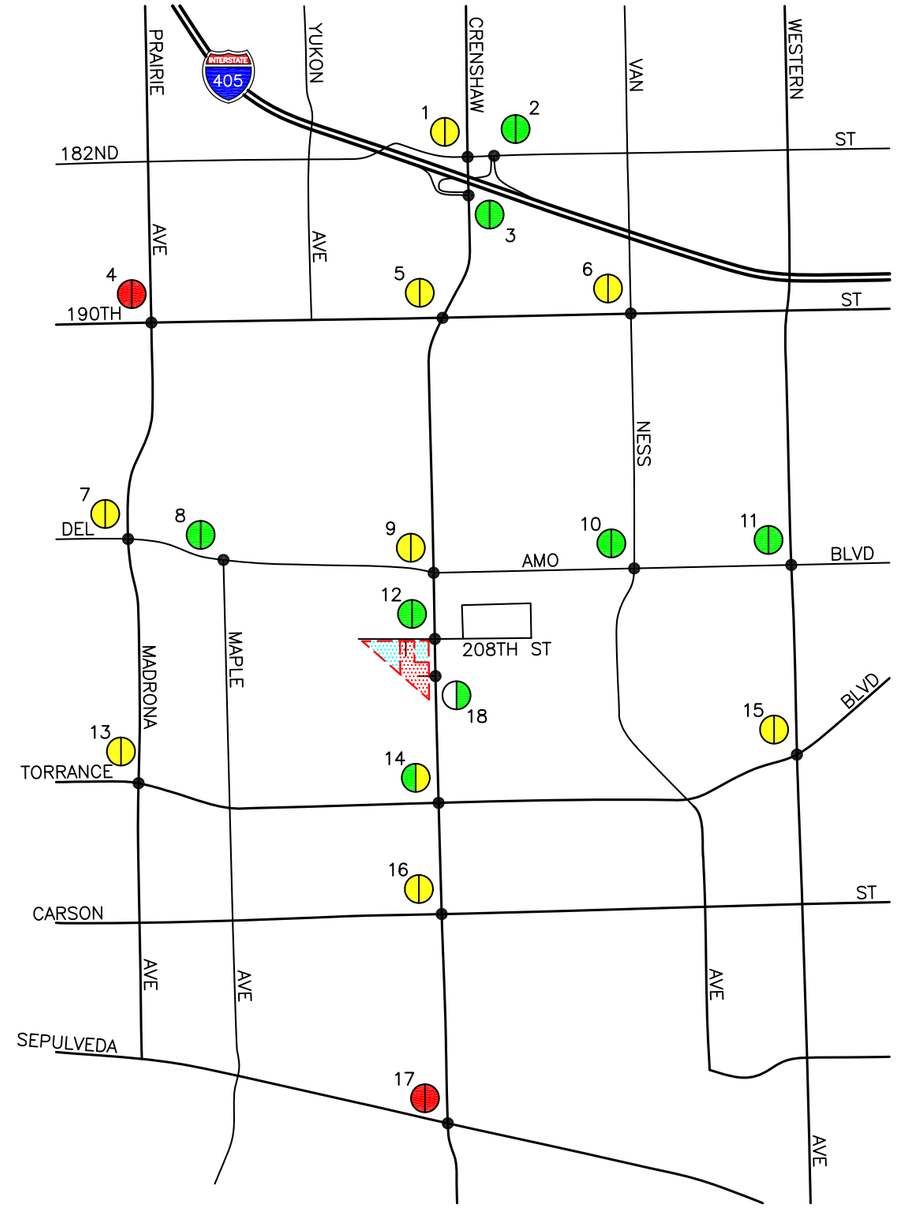
Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- ∅ = Phase
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[21] *Appendix D* contains the Delay/LOS calculation worksheets for all study intersections.
[22] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.
[23] Intersection analyzed under "With" Project scenarios only.



AM PEAK HOUR



PM PEAK HOUR

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

EXISTING LOS RESULTS

EXISTING WITH PROJECT LOS RESULTS

KEY
- = LOS E/F (UNACCEPTABLE)
- = LOS D
- = LOS A/B/C
- = TORRANCE TRANSIT CENTER
- = NOT A PART OF PROJECT

FIGURE 7–2

EXISTING VS. EXISTING WITH PROJECT AM AND PM PEAK HOUR LEVEL OF SERVICE RESULTS COMPARISON (HCM METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE

8.0 YEAR 2015 CONDITIONS TRAFFIC IMPACT ANALYSIS

The relative impacts of the added Project traffic volumes generated by proposed Project during the AM and PM peak hour traffic conditions was evaluated based on analysis of future Year 2015 operating conditions at the seventeen (17) key study intersections, with and without the proposed Project. The previously discussed capacity analysis procedures were utilized to investigate the future Delay/ICU relationships and service level characteristics at each study intersection. The significance of the potential impacts of the Project at each key intersection was then evaluated using the traffic impact criteria mentioned in this report.

8.1 Year 2015 Conditions Intersection Capacity Analysis (ICU Methodology)

Table 8-1 summarizes the AM and PM peak hour Level of Service results at the key study intersections for the Year 2015 traffic conditions, based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. The first column (1) of ICU/LOS values in *Table 8-1* presents a summary of existing AM and PM peak hour traffic conditions (which were also presented in *Table 7-1*). The second column (2) presents forecast Year 2015 Without Project traffic conditions and the third column (3) identifies forecast Year 2015 With Project traffic conditions. The fourth column (4) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the significant impact criteria mentioned in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, if needed, to achieve an acceptable level of service.

8.1.1 *Year 2015 Without Project Traffic Conditions (ICU Methodology)*

Review of column (2) of *Table 8-1* indicates that for the Year 2015 Without Project traffic conditions, eleven (11) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining six (6) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	1.013	F
2. I-405 Northbound Ramps at 182nd Street	--	--	0.995	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.222	F	0.996	E
4. Prairie Avenue at 190th Street	1.302	F	1.204	F
5. Crenshaw Boulevard at 190th Street	0.998	E	1.081	F
6. Van Ness Avenue at 190th Street	1.005	F	--	--
9. Crenshaw Boulevard at Del Amo Boulevard	--	--	0.952	E
11. Western Avenue at Del Amo Boulevard	0.904	E	0.902	E
15. Western Avenue at Torrance Boulevard	0.907	E	--	--
16. Crenshaw Boulevard at Carson Street	0.922	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.041	F

8.1.2 *Year 2015 With Project Traffic Conditions (ICU Methodology)*

Review of column (3) of *Table 8-1* indicates that for the Year 2015 With Project traffic conditions twelve (12) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining five (5) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		**PM Peak Hour**	
Key Intersection	**ICU**	**LOS**	**ICU**	**LOS**
1. Crenshaw Boulevard at 182nd Street	--	--	1.018	F
2. I-405 Northbound Ramps at 182nd Street	--	--	0.999	E
3. Crenshaw Boulevard at I-405 Southbound Ramps	1.233	F	1.007	F
4. Prairie Avenue at 190th Street	1.304	F	1.204	F
5. Crenshaw Boulevard at 190th Street	1.007	F	1.088	F
6. Van Ness Avenue at 190th Street	1.008	F	--	--
7. Prairie Ave/Madrona Ave at Del Amo Blvd	--	--	0.901	E
9. Crenshaw Boulevard at Del Amo Boulevard	0.907	E	0.963	E
11. Western Avenue at Del Amo Boulevard	0.909	E	0.905	E
15. Western Avenue at Torrance Boulevard	0.912	E	--	--
16. Crenshaw Boulevard at Carson Street	0.936	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	1.044	F

Review of column (4) of *Table 8-1* indicates that none of the seventeen (17) key study intersections will have a significant impact under the Year 2015 With Project traffic conditions when compared to the LOS criteria defined in this report. Since there are no significant impacts, no mitigation measures are required.

To supplement the level of service results as presented in *Table 8-1*, ***Figure 8-1*** graphically presents the comparison between Year 2015 Without Project and Year 2015 With Project traffic conditions level of service results for the AM and PM peak hours based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

Appendix E contains the ICU/LOS calculation worksheets for the Year 2015 Traffic Conditions (ICU Methodology).

TABLE 8-1

YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[24]

Key Intersection		Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[25]		(5) Year 2015 With Project With Mitigation	
			ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
1.	Crenshaw Boulevard at 182nd Street	AM	0.800	D	0.859	D	0.865	D	0.006	No	--	--
		PM	**0.964**	**E**	**1.013**	**F**	**1.018**	**F**	0.005	No	--	--
2.	I-405 Northbound Ramps at 182nd Street	AM	0.722	C	0.820	D	0.825	D	0.005	No	--	--
		PM	**0.900**	**E**	**0.995**	**E**	**0.999**	**E**	0.004	No	--	--
3.	Crenshaw Boulevard at I-405 Southbound Ramps	AM	**1.092**	**F**	**1.222**	**F**	**1.233**	**F**	0.011	No	--	--
		PM	0.850	D	**0.996**	**E**	**1.007**	**F**	0.011	No	--	--
4.	Prairie Avenue at 190th Street	AM	**1.267**	**F**	**1.302**	**F**	**1.304**	**F**	0.002	No	--	--
		PM	**1.168**	**F**	**1.204**	**F**	**1.204**	**F**	0.000	No	--	--
5.	Crenshaw Boulevard at 190th Street	AM	**0.903**	**E**	**0.998**	**E**	**1.007**	**F**	0.009	No	--	--
		PM	**0.986**	**E**	**1.081**	**F**	**1.088**	**F**	0.007	No	--	--
6.	Van Ness Avenue at 190th Street	AM	**0.986**	**E**	**1.005**	**F**	**1.008**	**F**	0.003	No	--	--
		PM	0.875	D	0.891	D	0.891	D	0.000	No	--	--
7.	Prairie Avenue/Madrona Ave at Del Amo Boulevard	AM	0.741	C	0.767	C	0.768	C	0.001	No	--	--
		PM	0.870	D	0.899	D	**0.901**	**E**	0.002	No	--	--

Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

24 *Appendix E* contains the ICU/LOS calculation worksheets for the key study signalized intersections.

25 Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.

TABLE 8-1 (CONTINUED)

YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[26]

Key Intersection		Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[27]		(5) Year 2015 With Project With Mitigation	
			ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
8.	Maple Avenue at	AM	0.733	C	0.768	C	0.770	C	0.002	No	--	--
	Del Amo Boulevard	PM	0.645	B	0.732	C	0.732	C	0.000	No	--	--
9.	Crenshaw Boulevard at	AM	0.796	C	0.890	D	**0.907**	**E**	0.017	No	--	--
	Del Amo Boulevard	PM	0.877	D	**0.952**	**E**	**0.963**	**E**	0.011	No	--	--
10.	Van Ness Avenue at	AM	0.688	B	0.713	C	0.716	C	0.003	No	--	--
	Del Amo Boulevard	PM	0.827	D	0.890	D	0.894	D	0.004	No	--	--
11.	Western Avenue at	AM	0.845	D	**0.904**	**E**	**0.909**	**E**	0.005	No	--	--
	Del Amo Boulevard	PM	0.842	D	**0.902**	**E**	**0.905**	**E**	0.003	No	--	--
12.	Crenshaw Boulevard at	AM	0.659	B	0.686	B	0.719	C	0.033	No	--	--
	208th Street	PM	0.638	B	0.688	B	0.728	C	0.040	No	--	--
13.	Madrona Avenue at	AM	0.724	C	0.766	C	0.774	C	0.008	No	--	--
	Torrance Boulevard	PM	0.760	C	0.782	C	0.787	C	0.005	No	--	--
14.	Crenshaw Boulevard at	AM	0.816	D	0.878	D	0.898	D	0.020	No	--	--
	Torrance Boulevard	PM	0.830	D	0.877	D	0.891	D	0.014	No	--	--

Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[26] *Appendix E* contains the ICU/LOS calculation worksheets for the key study signalized intersections.

[27] Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.

TABLE 8-1 (CONTINUED)

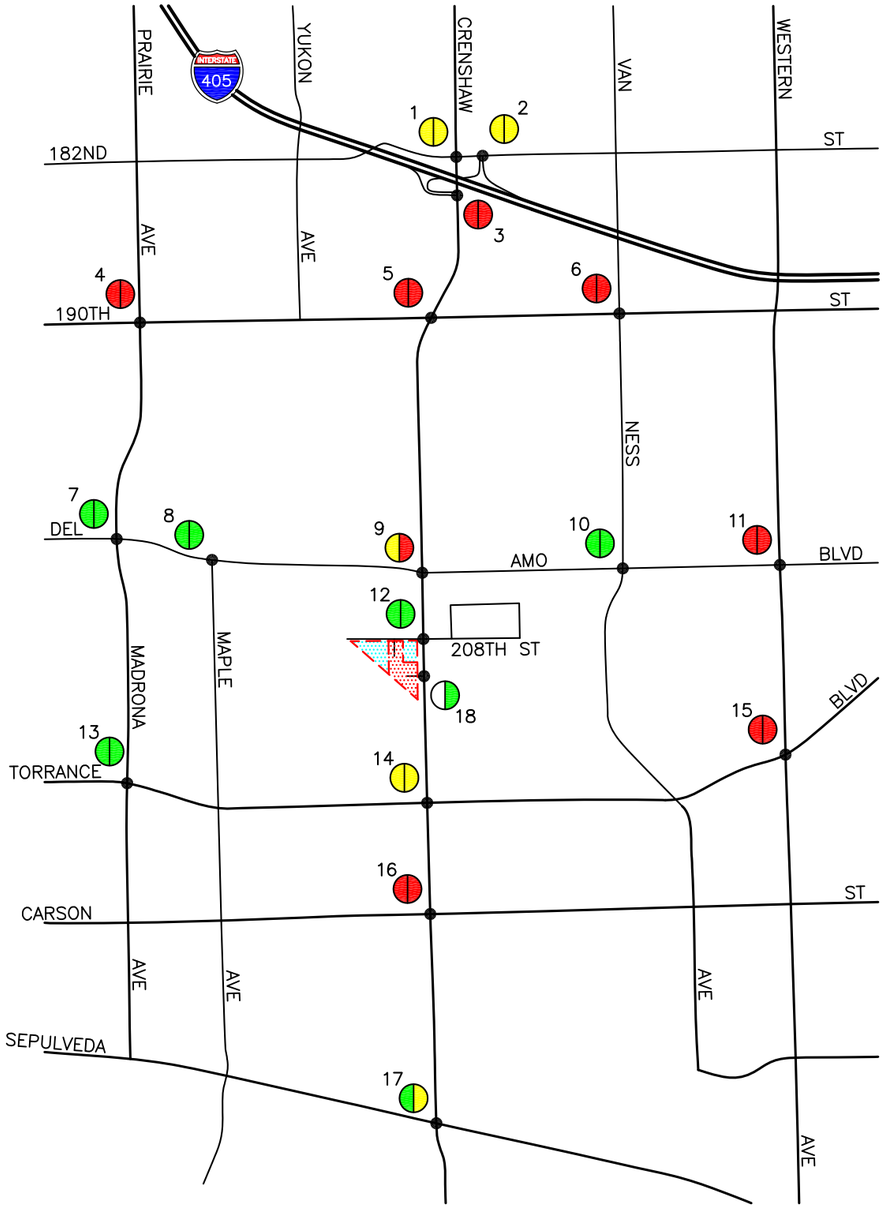
YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (ICU METHODOLOGY)[28]

Key Intersection		Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[29]		(5) Year 2015 With Project With Mitigation	
			ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
15.	Western Avenue at	AM	0.849	D	**0.907**	**E**	**0.912**	**E**	0.005	No	--	--
	Torrance Boulevard	PM	0.862	D	0.894	D	0.900	D	0.006	No	--	--
16.	Crenshaw Boulevard at	AM	0.878	D	**0.922**	**E**	**0.936**	**E**	0.014	No	--	--
	Carson Street	PM	0.835	D	0.861	D	0.871	D	0.010	No	--	--
17.	Crenshaw Boulevard at	AM	0.777	C	0.799	C	0.802	D	0.003	No	--	--
	Sepulveda Boulevard	PM	**1.008**	**F**	**1.041**	**F**	**1.044**	**F**	0.003	No	--	--
18.	Crenshaw Boulevard at	AM	--	--	--	--	0.595	A	--	No	--	--
	Project Driveway[30]	PM	--	--	--	--	0.590	A	--	No	--	--

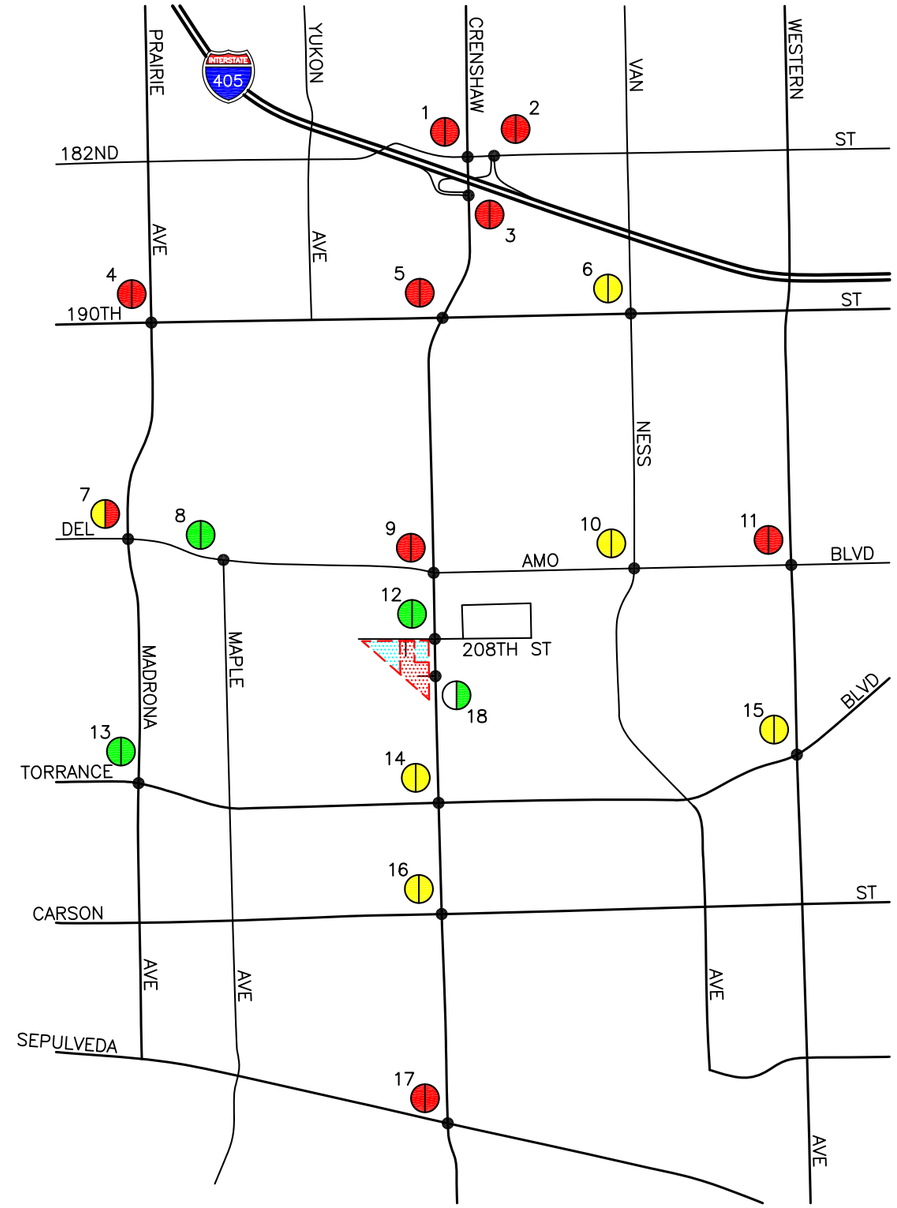
Notes:

- ICU = Intersection Capacity Utilization
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[28] *Appendix E* contains the ICU/LOS calculation worksheets for the key study signalized intersections.
[29] Significant Impact is defined as a 0.02 or greater increase in ICU value of a signalized intersection location where the final LOS is E or F.
[30] Intersection analyzed under "With" Project scenarios only.



AM PEAK HOUR



PM PEAK HOUR

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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

YEAR 2015 WITHOUT PROJECT LOS RESULTS

YEAR 2015 WITH PROJECT LOS RESULTS

KEY

= LOS E/F (UNACCEPTABLE)
= LOS D
= LOS A/B/C
= TORRANCE TRANSIT CENTER
= NOT A PART OF PROJECT

FIGURE 8–1

YEAR 2015 WITHOUT PROJECT VS. YEAR 2015 WITH PROJECT
AM AND PM PEAK HOUR LEVEL OF SERVICE
RESULTS COMPARISON (ICU METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE

8.2 Year 2015 Conditions Intersection Capacity Analysis (HCM Methodology)

Table 8-2 summarizes the AM and PM peak hour Level of Service results at the key study intersections for the Year 2015 traffic conditions, based on the *Highway Capacity Manual (HCM)* Method of Analysis. The first column (1) of Delay/LOS values in *Table 8-2* presents a summary of existing AM and PM peak hour traffic conditions (which were also presented in *Table 7-2*). The second column (2) presents forecast Year 2015 Without Project traffic conditions and the third column (3) identifies forecast Year 2015 With Project traffic conditions. The fourth column (4) shows the increase in Delay value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the significant impact criteria mentioned in this report. The fifth column (5) presents the resultant level of service with the inclusion of recommended traffic improvements, where needed, to achieve an acceptable level of service.

8.2.1 *Year 2015 Without Project Traffic Conditions (HCM Methodology)*

Review of column (2) of *Table 8-2* indicates that for the Year 2015 Without Project traffic conditions, five (5) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay**	**LOS**	**Delay**	**LOS**
3. Crenshaw Boulevard at I-405 Southbound Ramps	75.7	E	--	--
4. Prairie Avenue at 190th Street	106.3	F	79.6	E
5. Crenshaw Boulevard at 190th Street	--	--	55.8	E
11. Western Avenue at Del Amo Boulevard	62.0	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	76.6	E

8.2.2 *Year 2015 With Project Traffic Conditions (HCM Methodology)*

Review of column (3) of *Table 8-2* indicates that for the Year 2015 With Project traffic conditions five (5) of the seventeen (17) key study intersections are forecast to operate at an unacceptable level of service during the AM and/or PM peak hours when compared to the LOS standards defined in this report. The remaining twelve (12) key study intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours. The intersections operating at adverse levels of service are:

	AM Peak Hour		PM Peak Hour	
Key Intersection	**Delay**	**LOS**	**Delay**	**LOS**
3. Crenshaw Boulevard at I-405 SB Ramps	**78.4**	**E**	--	--
4. Prairie Avenue at 190th Street	106.9	F	79.7	E
5. Crenshaw Boulevard at 190th Street	--	--	56.9	E

11. Western Avenue at Del Amo Boulevard	62.4	E	--	--
17. Crenshaw Boulevard at Sepulveda Boulevard	--	--	77.1	E

Review of column (4) of *Table 8-2* indicates that one (1) of the seventeen (17) key study intersections will have a significant impact under the Year 2015 With Project traffic conditions when compared to the LOS criteria defined in this report. However, as shown in column (5) of *Table 8-2*, the implementation of recommended mitigation measures at the intersection of Crenshaw Boulevard at I-405 Southbound Ramps mitigates the impacts of the proposed Project and also offset the cumulative impacts. After implementation of the recommended mitigation measures, the impacted intersection is forecast to operate at better than the pre-Project LOS.

To supplement the level of service results as presented in *Table 8-2*, ***Figure 8-2*** graphically presents the comparison between Year 2015 Without Project and Year 2015 With Project traffic conditions level of service results for the AM and PM peak hours based on the *Highway Capacity Manual (HCM)* Method of Analysis. Additionally, ***Figure 8-3*** graphically presents the comparison between Year 2015 With Project and Year 2015 With Project With Mitigation traffic conditions level of service results for the AM and PM peak hours based on the *Highway Capacity Manual (HCM)* Method of Analysis.

Appendix F contains the Delay/LOS calculation worksheets for the Year 2015 Traffic Conditions (HCM Methodology).

TABLE 8-2

YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[31]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[32]		(5) Year 2015 With Project With Mitigation	
		Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay Increase	Yes/No	Delay (s/v)	LOS
1. Crenshaw Boulevard at 182nd Street	AM	26.2	C	27.3	C	27.4	C	0.1	No	--	--
	PM	43.2	D	51.2	D	52.7	D	1.5	No	--	--
2. I-405 Northbound Ramps at 182nd Street	AM	17.6	B	20.0	B	20.1	C	0.1	No	--	--
	PM	27.9	C	49.2	D	49.9	D	0.7	No	--	--
3. Crenshaw Boulevard at I-405 Southbound Ramps	AM	45.6	C	**75.7**	**E**	**78.4**	**E**	**2.7**	**Yes**	46.3	D
	PM	23.7	C	33.0	C	34.3	C	1.3	No	28.0	C
4. Prairie Avenue at 190th Street	AM	**98.5**	**F**	**106.3**	**F**	**106.9**	**F**	0.6	No	--	--
	PM	**74.4**	**E**	**79.6**	**E**	**79.7**	**E**	0.1	No	--	--
5. Crenshaw Boulevard at 190th Street	AM	41.9	D	47.6	D	48.4	D	0.8	No	--	--
	PM	44.0	D	**55.8**	**E**	**56.9**	**E**	1.1	No	--	--
6. Van Ness Avenue at 190th Street	AM	45.5	D	48.0	D	48.4	D	0.4	No	--	--
	PM	42.4	D	43.6	D	43.7	D	0.1	No	--	--
7. Prairie Avenue/Madrona Ave at Del Amo Boulevard	AM	40.3	D	42.2	D	42.2	D	0.0	No	--	--
	PM	45.1	D	46.8	D	46.8	D	0.0	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[31] *Appendix F* contains the Delay/LOS calculation worksheets for the key study signalized intersections.

[32] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.

TABLE 8-2 (CONTINUED)

YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[33]

Key Intersection		Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[34]		(5) Year 2015 With Project With Mitigation	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay Increase	Yes/No	Delay (s/v)	LOS
8.	Maple Avenue at	AM	23.7	C	23.6	C	23.6	C	0.0	No	--	--
	Del Amo Boulevard	PM	19.8	B	20.0	B	20.0	B	0.0	No	--	--
9.	Crenshaw Boulevard at	AM	39.8	D	48.0	D	51.1	D	3.1	No	--	--
	Del Amo Boulevard	PM	39.2	D	46.2	D	47.5	D	1.3	No	--	--
10.	Van Ness Avenue at	AM	25.8	C	26.3	C	26.3	C	0.0	No	--	--
	Del Amo Boulevard	PM	25.9	C	29.0	C	29.2	C	0.2	No	--	--
11.	Western Avenue at	AM	45.9	D	**62.0**	**E**	**62.4**	**E**	0.4	No	--	--
	Del Amo Boulevard	PM	24.5	C	26.5	C	26.6	C	0.1	No	--	--
12.	Crenshaw Boulevard at	AM	18.9	B	19.3	B	33.2	C	13.9	No	--	--
	208th Street	PM	14.3	B	14.8	B	27.0	C	12.2	No	--	--
13.	Madrona Avenue at	AM	36.3	D	36.9	D	36.9	D	0.0	No	--	--
	Torrance Boulevard	PM	36.9	D	37.4	D	37.4	D	0.0	No	--	--
14.	Crenshaw Boulevard at	AM	35.3	D	38.0	D	39.8	D	1.8	No	--	--
	Torrance Boulevard	PM	34.4	C	37.5	D	39.0	D	1.5	No	--	--

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in this report

[33] *Appendix F* contains the Delay/LOS calculation worksheets for the key study signalized intersections.

[34] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.

TABLE 8-2 (CONTINUED)

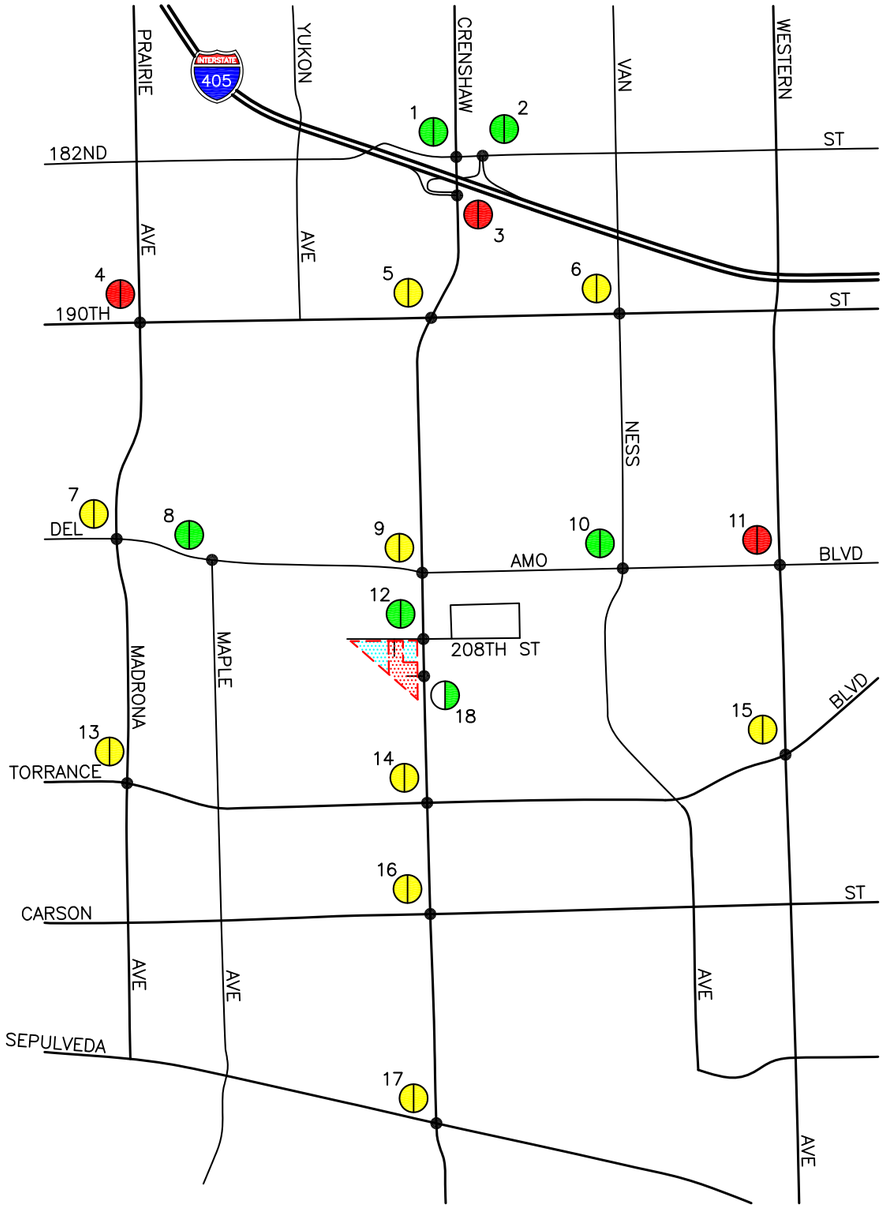
YEAR 2015 CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY (HCM METHODOLOGY)[35]

Key Intersection		Time Period	(1) Existing Traffic Conditions		(2) Year 2015 Without Project Traffic Conditions		(3) Year 2015 With Project Traffic Conditions		(4) Significant Impact[36]		(5) Year 2015 With Project With Mitigation	
			Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay Increase	Yes/No	Delay (s/v)	LOS
15.	Western Avenue at	AM	35.7	D	39.1	D	39.2	D	0.1	No	--	--
	Torrance Boulevard	PM	35.8	D	37.5	D	37.7	D	0.2	No	--	--
16.	Crenshaw Boulevard at	AM	38.1	D	40.8	D	41.6	D	0.8	No	--	--
	Carson Street	PM	40.2	D	42.0	D	42.6	D	0.6	No	--	--
17.	Crenshaw Boulevard at	AM	52.3	D	54.4	D	54.5	D	0.1	No	--	--
	Sepulveda Boulevard	PM	**70.8**	**E**	**76.6**	**E**	**77.1**	**E**	0.5	No	--	--
18.	Crenshaw Boulevard at	AM	--	--	--	--	16.8	B	--	No	--	--
	Project Driveway[37]	PM	--	--	--	--	15.3	B	--	No	--	--

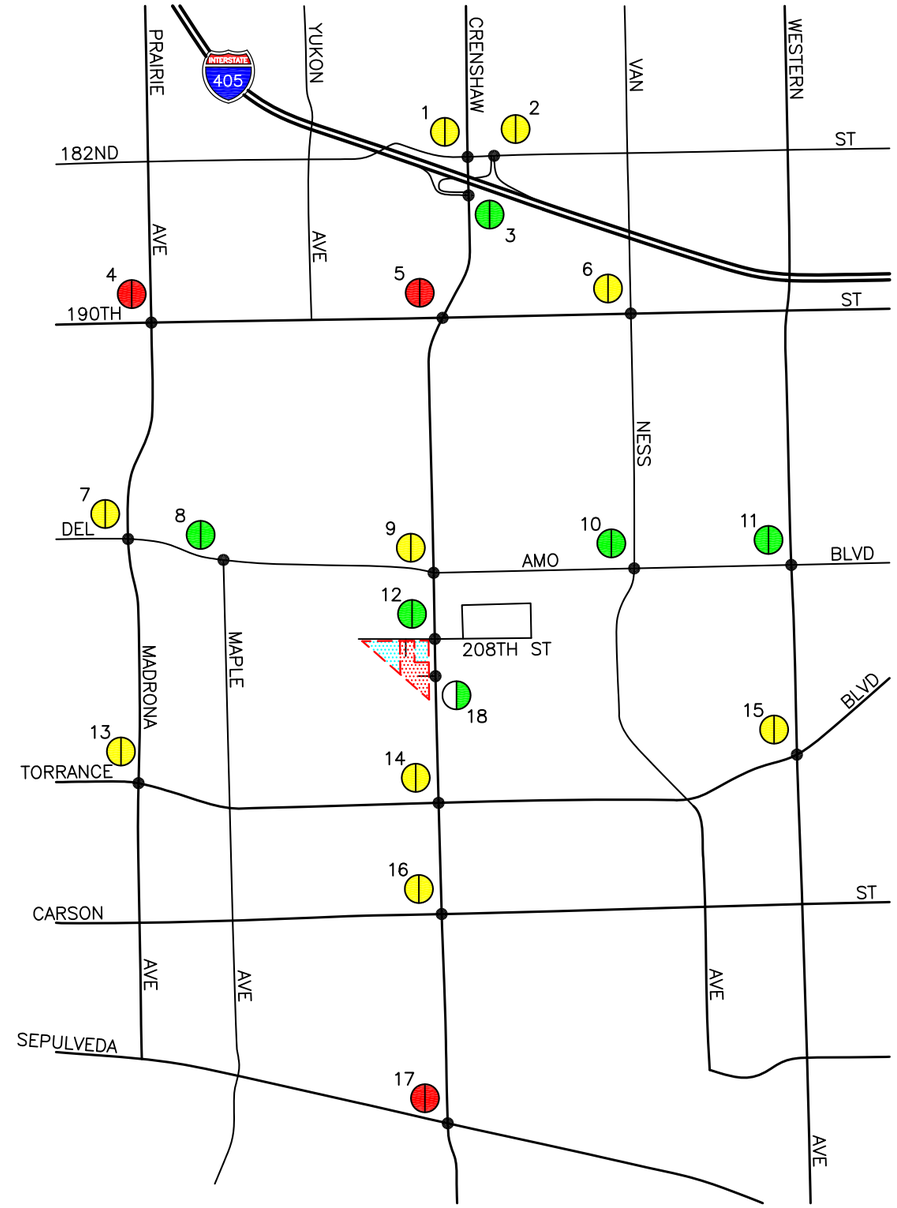
Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Table 3-2* for the LOS definitions
- **Bold Delay/LOS values** indicate adverse service levels based on the LOS standards mentioned in his report

[35] *Appendix F* contains the Delay/LOS calculation worksheets for the key study signalized intersections.
[36] Significant Impact is defined as a 2% or greater increase in delay value of a signalized intersection location where the final LOS is E or F.
[37] Intersection analyzed under "With" Project scenarios only.



AM PEAK HOUR



PM PEAK HOUR

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N NO SCALE

YEAR 2015 WITHOUT PROJECT LOS RESULTS

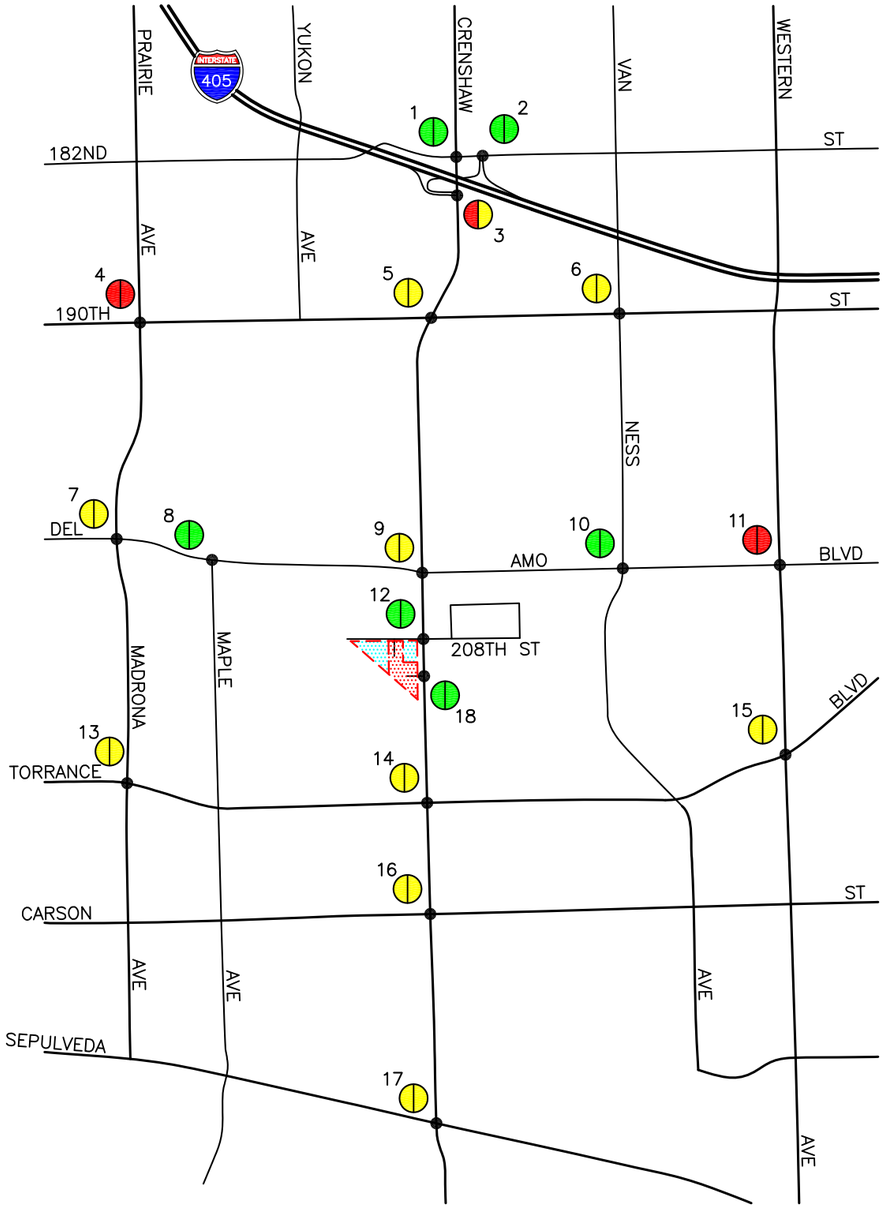
YEAR 2015 WITH PROJECT LOS RESULTS

KEY
- = LOS E/F (UNACCEPTABLE)
- = LOS D
- = LOS A/B/C
- = TORRANCE TRANSIT CENTER
- = NOT A PART OF PROJECT

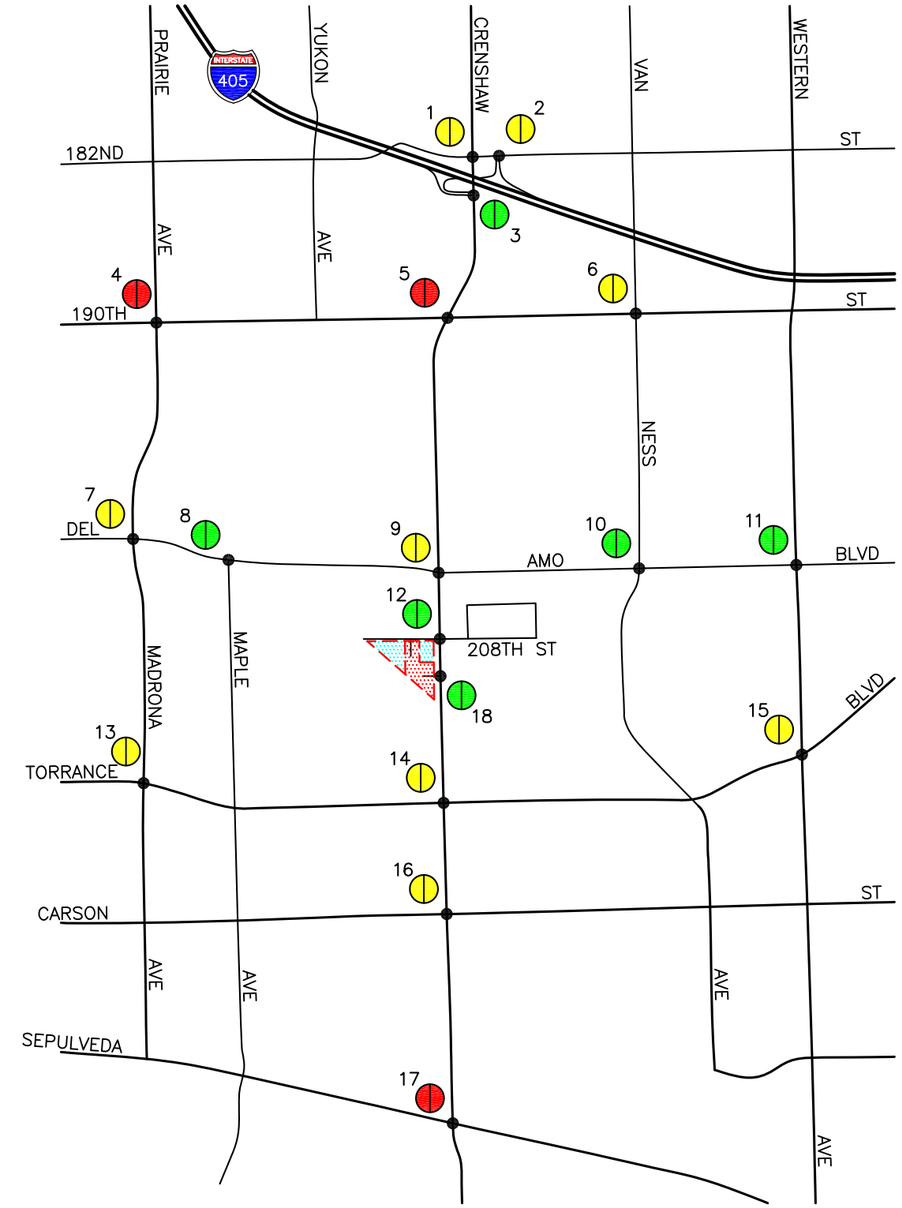
FIGURE 8–2

YEAR 2015 WITHOUT PROJECT VS. YEAR 2015 WITH PROJECT AM AND PM PEAK HOUR LEVEL OF SERVICE RESULTS COMPARISON (HCM METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE



AM PEAK HOUR



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

YEAR 2015 WITH PROJECT LOS RESULTS

YEAR 2015 WITH PROJECT WITH MITIGATION LOS RESULTS

KEY
- = LOS E/F (UNACCEPTABLE)
- = LOS D
- = LOS A/B/C
- = TORRANCE TRANSIT CENTER
- = NOT A PART OF PROJECT

FIGURE 8–3

YEAR 2015 WITH PROJECT VS. YEAR 2015 WITH PROJECT WITH MITIGATION AM AND PM PEAK HOUR LEVEL OF SERVICE RESULTS COMPARISON (HCM METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE

9.0 PROJECT-SPECIFIC TRAFFIC IMPROVEMENTS

For those intersections where projected traffic volumes are expected to result in significant impacts, this report recommends traffic improvements that change the intersection geometry to increase capacity. These capacity improvements involve roadway widening and/or re-striping to reconfigure (add lanes) roadways to specific approaches of a key intersection. The identified improvements are expected to:

- Address the impact of existing traffic, Project traffic and future non-project (ambient traffic growth and related projects) traffic, and
- Improve Levels of Service to an acceptable range and/or to pre-project conditions.

9.1 Project-Specific Planned Improvements

The Project-specific planned improvements listed below are to be completed in conjunction with the Project development and have been assumed in the Existing With Project and Year 2015 With Project traffic conditions:

- Intersection 12 – Crenshaw Boulevard at 208th Street: Construct the south side of 208th Street, west of Crenshaw Boulevard, along project frontage to ultimate half section width per the City of Torrance "Collector Street" design standards to include a 30-foot paved width and a 10-foot sidewalk/parkway. Within 30-feet of paved width, provide a 14-foot eastbound shared left/through/right turn-lane and a 16-foot westbound departure lane. Restripe the westbound approach on 208th Street to provide a left-turn lane, a shared left//through lane, and a right-turn lane. Restripe Crenshaw Boulevard to provide an exclusive northbound left-turn lane and convert the 3rd southbound through lane to a southbound shared through/right-turn lane. Provide a pedestrian crosswalk on the west of the intersection. Modify the existing traffic signal and convert from two-phase operation to six-phase operation (split phase on 208th Street).
- Intersection 18 – Crenshaw Boulevard at Project Driveway: Install a traffic signal and design for three-phase operation. Construct the west leg (Project Driveway) of this intersection to provide an exclusive eastbound left-turn lane, an exclusive eastbound right-turn lane and two westbound departure lanes. Restripe Crenshaw Boulevard to provide an exclusive northbound left-turn lane with a minimum of 100 feet storage length with a 90 feet transition. Widen and/or restripe Crenshaw Boulevard to provide an exclusive southbound right-turn lane with a minimum of 100 feet storage length with a 90 feet transition. Provide pedestrian crosswalks on the west, north and south legs of the intersection.

9.2 Existing With Project Traffic Conditions Recommended Improvements

9.2.1 *ICU Methodology*

The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the of seventeen (17) key study intersections based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

9.2.2 *HCM Methodology*

The results of the Existing With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the of seventeen (17) key study intersections based on the *Highway Capacity Manual (HCM)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

9.3 Year 2015 With Project Traffic Conditions Recommended Improvements

9.3.1 *ICU Methodology*

The results of the Year 2015 With Project traffic conditions level of service analyses indicate that the proposed Project will not significantly impact any of the seventeen (17) key study intersections based on the *Intersection Capacity Utilization (ICU)* Method of Analysis. As there are no significant impacts, no traffic mitigation measures are required or recommended for the intersections.

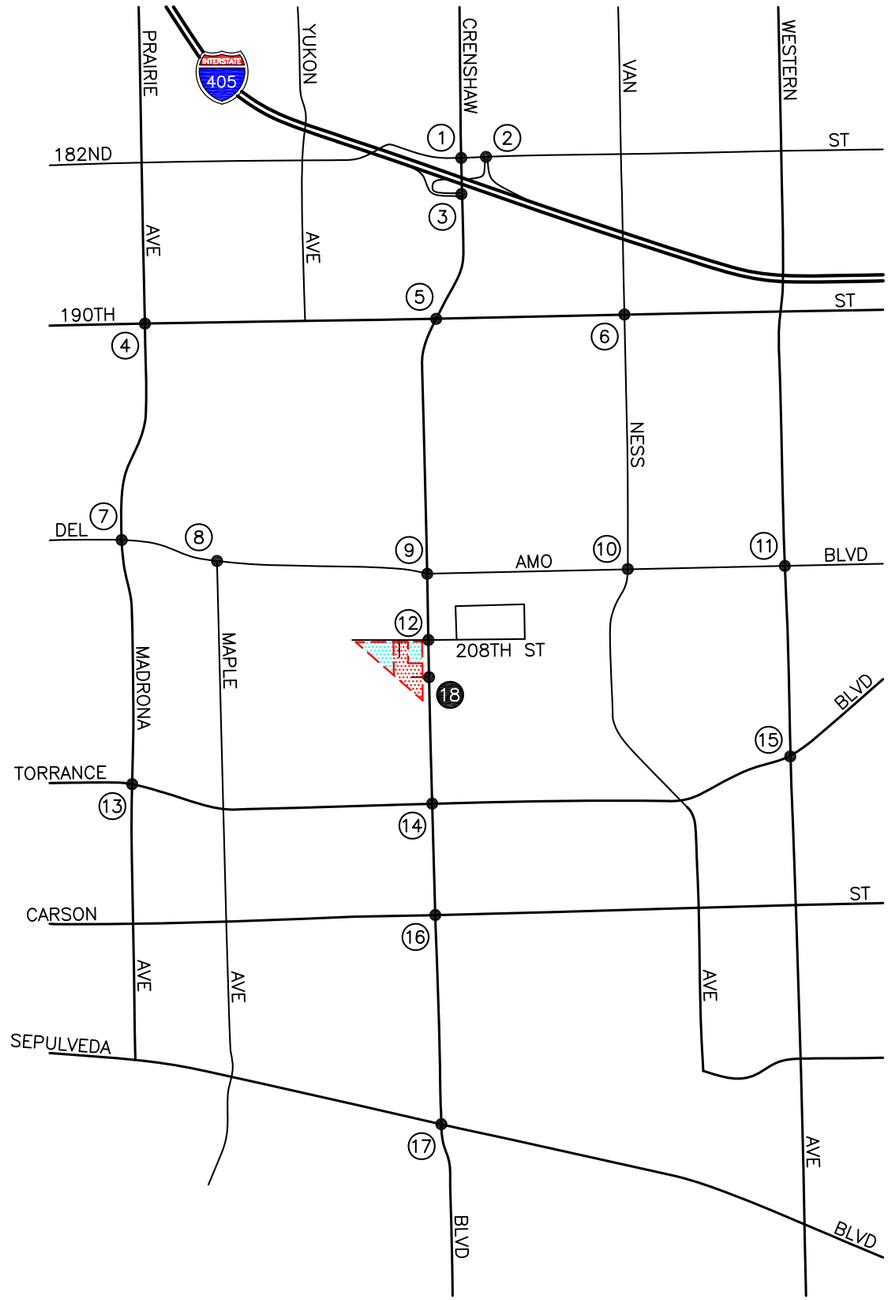
9.3.2 *HCM Methodology*

The results of the Year 2015 With Project traffic conditions level of service analyses indicate that the proposed Project will significantly impact one (1) of the of seventeen (17) key study intersections. The remaining sixteen (16) key intersections will not have a significant impact under the Year 2015 With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis. The improvements listed below have been identified to address the traffic impacts at the intersection significantly impacted by the Year 2015 With Project traffic based on the *Highway Capacity Manual (HCM)* Method of Analysis:

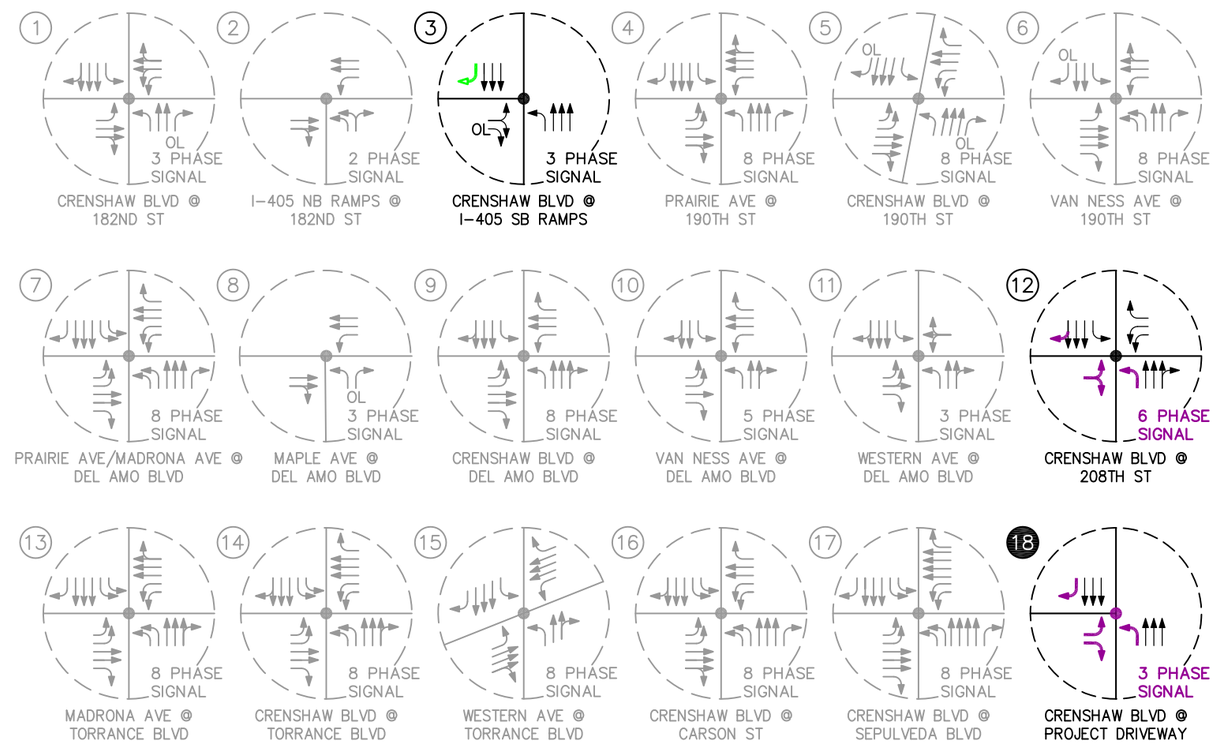
- <u>Intersection 3 – Crenshaw Boulevard at I-405 Southbound Ramps:</u> Widen and/or restripe Crenshaw Boulevard to provide an exclusive southbound right-turn lane. Modify the existing traffic signal. The implementation of this improvement is subject to review and approval of Caltrans and/or the City of Torrance. Please note that this improvement is consistent with the proposed improvements now under consideration as a part of proposed improvements to the Interstate 405/Crenshaw Boulevard Interchange[38], which also includes the construction of a new I-405 SB on-ramp from NB Crenshaw Boulevard as a part of the improvement alternatives.

Figure 9-1 presents the planned and recommended traffic improvements and intersection controls at the key study intersections for the Year 2015 With Project traffic conditions capacity analyses detailed in the previous sections based on the *Highway Capacity Manual (HCM)* Method of Analysis.

[38] Source: *1st Draft of Project Study Report-Project Development Support (PSR-PDS) to Request for Programming Capital Support (Project Approval and Environmental Document Phase) in the 2014 STIP) – Route I-405 between Western Avenue UC PM 14.4 and Crenshaw Boulevard UC PM 15.6 – Project No. 0713000238, EA 29360K.*



STUDY INTERSECTIONS



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KEY

- ← = APPROACH LANE ASSIGNMENT
- ● = TRAFFIC SIGNAL
- OL = OVERLAP
- = PROJECT-SPECIFIC PLANNED IMPROVEMENTS
- = YEAR 2015 WITH PROJECT RECOMMENDED IMPROVEMENTS
- = TORRANCE TRANSIT PROJECT
- = NOT A PART OF PROJECT

FIGURE 9-1

YEAR 2015 CONDITIONS
PLANNED AND RECOMMENDED IMPROVEMENTS
(HCM METHODOLOGY)

TORRANCE TRANSIT CENTER, TORRANCE

10.0 SITE ACCESS AND INTERNAL CIRCULATION EVALUATION

10.1 Site Access

Vehicular access to the Project site (parking garage and Kiss-N-Ride) will be provided via a proposed signalized driveway located along Crenshaw Boulevard and bus access will be provided via a driveway along the proposed western extension of 208th Street bordering the property on the north. ***Tables 7-1*** and ***7-2*** summarize the levels of service at the locations which provide access to the Project site for Existing With Project traffic conditions based on the ICU Methodology and HCM Methodology, respectively. Similarly, ***Tables 8-1*** and ***8-2*** summarize the levels of service at the locations which provide access to the Project site for Year 2015 With Project traffic conditions based on the ICU Methodology and HCM Methodology, respectively.

10.1.1 *Existing With Project Traffic Conditions (ICU Methodology)*

As shown in column (2) of *Table 7-1*, the access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Existing With Project traffic conditions based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

10.1.2 *Existing With Project Traffic Conditions (HCM Methodology)*

As shown in column (2) of *Table 7-2*, the access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Existing With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis.

10.1.3 *Year 2015 With Project Traffic Conditions (ICU Methodology)*

As shown in column (3) of *Table 8-1*, the access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2015 With Project traffic conditions based on the *Intersection Capacity Utilization (ICU)* Method of Analysis.

10.1.4 *Year 2015 With Project Traffic Conditions (HCM Methodology)*

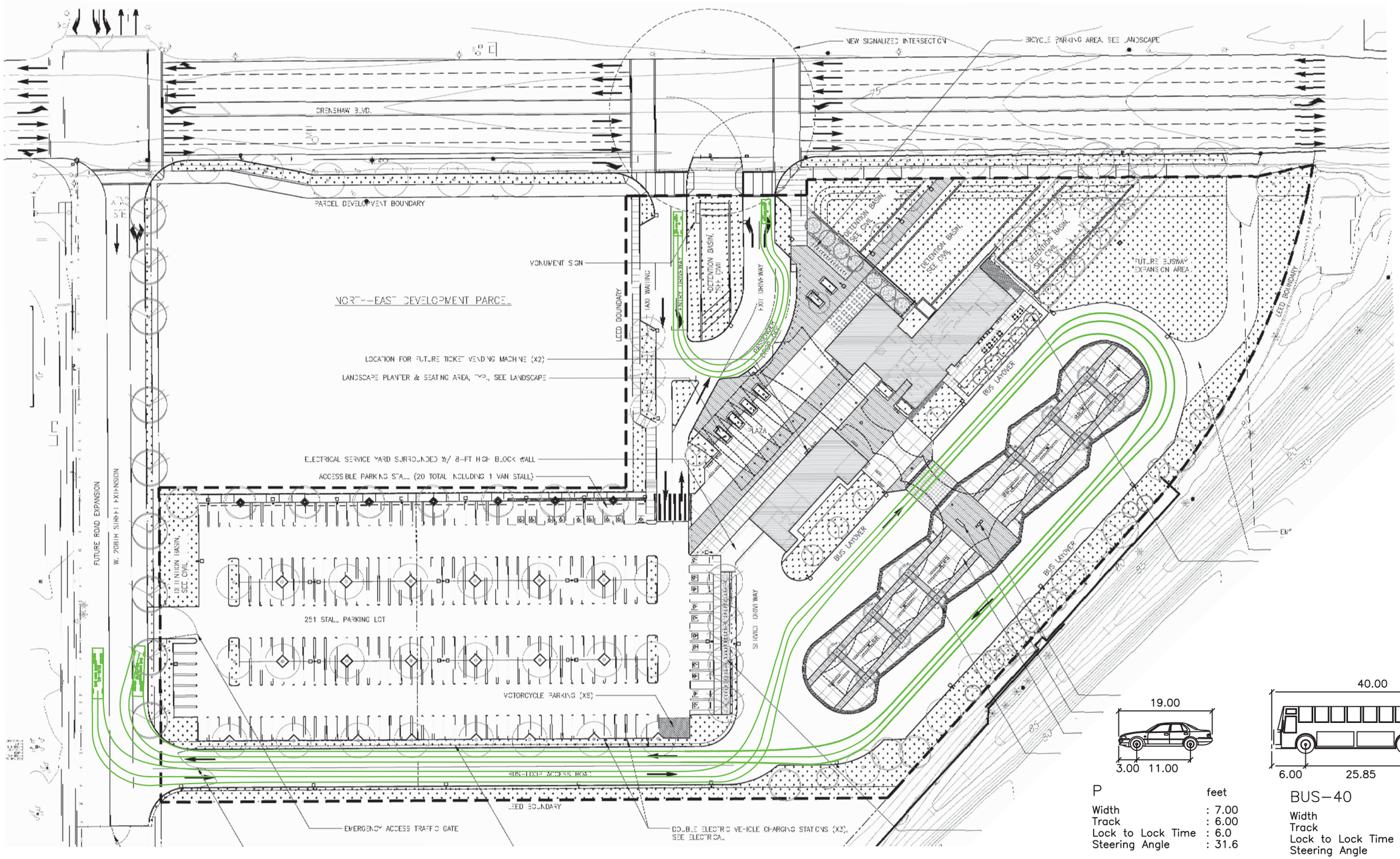
As shown in column (3) of *Table 8-2*, the access locations are forecast to operate at acceptable levels of service during the AM and PM peak hours under the Year 2015 With Project traffic conditions based on the *Highway Capacity Manual (HCM)* Method of Analysis.

10.2 Internal Circulation Evaluation

The on-site circulation was evaluated in terms of vehicle-pedestrian conflicts. Based on our review of the preliminary site plan, the overall layout does not create significant vehicle-pedestrian conflict points and the roadway throat lengths are sufficient such that access to driveways is not impacted by internal vehicle queuing/stacking. Project traffic is not anticipated to cause significant queuing/stacking at the Project access. The on-site circulation is acceptable based on our review of the proposed site plan. The alignment, spacing and throat length of the Project accesses is also deemed adequate. Turning movements into and out of the Project site at the Project accesses are anticipated to operate at an acceptable service levels. The proposed throat length at the Project accesses is sufficient for storing potential queuing vehicles. As such, motorists entering and exiting

the Project site from this driveway will be able to do so comfortably, safely, and without undue congestion.

Figure 10-1 presents the Passenger Car and Bus-40 Turning Movement Analysis for the Project access points utilizing the *Turning Vehicle Templates*, developed by Jack E. Leisch & Associates, and *AutoTURN* for *AutoCAD* computer software that simulates turning maneuvers for various types of vehicles. These "tools" were utilized to ensure that passenger cars and buses could properly access the site from Crenshaw Boulevard and 208th Street and circulate the Project site. As illustrated in *Figure 10-1* and based on our evaluation of the proposed site plan, it appears that curb return radii are adequate for passenger cars and buses. Vehicle turning templates ASSHTO P_M, and BUS-40 were utilized in this evaluation.



P	feet
Width	: 7.00
Track	: 6.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.6

BUS-40	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 39.3

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LINSCOTT LAW & GREENSPAN engineers

SCALE: 1"=80'

SOURCE: RNL (SEPTEMBER 26, 2012)

FIGURE 10-1

PASSENGER CAR AND BUS-40 TURNING MOVEMENT ANALYSIS

TORRANCE TRANSIT CENTER, TORRANCE

11.0 CONGESTION MANAGEMENT PROGRAM COMPLIANCE ASSESSMENT

The Congestion Management Program (CMP) was created statewide as a result of Proposition 111 and has been implemented locally by the Los Angeles County Metropolitan Transportation Authority (LACMTA). The CMP for Los Angeles County requires that the traffic impact of individual development Projects of potential regional significance be analyzed. A specific system of arterial roadways plus all freeways comprise the CMP system.

As required by the *Congestion Management Program for Los Angeles County*, a review has been made of designated monitoring locations on the CMP highway system for potential impact analysis. Per CMP TIA criteria, the geographic area examined in the TIA must include the following, at a minimum:

- All CMP arterial monitoring intersections, including freeway on and off-ramp intersections, where the Project will add 50 or more trips during either the AM or PM weekday peak hours.
- Mainline freeway-monitoring stations where the Project will add 150 or more trips, in either direction, during the AM or PM weekday peak hours.

11.1 Freeways

The following CMP freeway monitoring station in the Project vicinity has been identified:

CMP Station	Location
1068	I-405 Freeway north of Inglewood Avenue, at Compton Boulevard

The closest CMP freeway monitoring location in the Project vicinity is the I-405 Freeway n/o Inglewood Avenue, at Compton Boulevard (CMP Station 1068 – Post Mile 18.63). Based on the Project's trip generation and distribution pattern, the proposed Project will not add more than 150 trips (in either direction) during either the weekday AM or PM peak hour at this CMP mainline freeway-monitoring location. Therefore a CMP freeway traffic impact analysis is not required.

11.2 Intersections

The following CMP arterial monitoring stations in the Project vicinity have been identified:

CMP Station	Location
154	Western Avenue at 190th Street
155	Western Avenue at Carson Street
156	Western Avenue at Sepulveda Boulevard

As stated earlier, the CMP guidelines require that arterial monitoring stations must be examined if the proposed Project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic) at CMP monitoring intersections. A review of the Project trips previously presented in *Figures 5-7* and *5-8* indicates that the proposed Project will not add greater than 50 trips at the CMP intersections listed above during the AM and PM peak hours and therefore does not meet the minimum threshold of 50 trips. Therefore a CMP arterial monitoring stations traffic impact analysis is not required.