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TRAFFIC IMPACT ANALYSIS REPORT

ARTIC

Anaheim, California
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(Update of the April 29, 2010 Report)

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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

APPENDICES

APPENDIX

APPENDICES (CONTINUED)

APPENDIX

APPENDICES (CONTINUED)

APPENDIX

P. Year 2030 Traffic Conditions Intersection Level of Service Calculation Worksheets – *Caltrans Facilities Analysis (HCM Methodology)*

P-I Year 2030 Without Project Traffic Conditions **–** *Caltrans Intersection Analysis (HCM Methodology)*

P-II Year 2030 With Project Traffic Conditions **–** *Caltrans Intersection Analysis (HCM Methodology)*

P-III Year 2030 With Project With Mitigation Traffic Conditions **–** *Caltrans Intersection Analysis (HCM Methodology)*

Q. Year 2030 Traffic Conditions Freeway Ramp Level of Service Calculation Worksheets – *Caltrans Facilities Analysis (HCM Methodology)*

Q-I Year 2030 Without Project Traffic Conditions **–** *Caltrans Freeway Ramp Analysis (HCM Methodology)*

Q-II Year 2030 With Project Traffic Conditions **–** *Caltrans Freeway Ramp Analysis (HCM Methodology)*

Q-III Year 2030 With Project With Mitigation Traffic Conditions **–** *Caltrans Freeway Ramp Analysis (HCM Methodology)*

R. Year 2030 Traffic Conditions Freeway Segment Level of Service Calculation Worksheets – *Caltrans Facilities Analysis (HCM Methodology)*

R-I Year 2030 Without Project Traffic Conditions **–** *Caltrans Freeway Segment Analysis (HCM Methodology)*

R-II Year 2030 With Project Traffic Conditions **–** *Caltrans Freeway Segment Analysis (HCM Methodology)*

R-III Year 2030 With Project With Mitigation Traffic Conditions **–** *Caltrans Freeway Segment Analysis (HCM Methodology)*

S. Site Access and Project Driveway Level of Service Calculation Worksheets

S-I Year 2013 With Project Traffic Conditions

T. Project Related Fair-Share Calculation

T-I Intersection Fair-Share Calculation

T-II Roadway Segment Fair-Share Calculation

T-III Caltrans Ramp Fair-Share Calculation (Merge/Diverge Analysis)

T-IV Caltrans Ramp Fair-Share Calculation (Weaving Analysis)

T-V Caltrans Freeway Segment Fair-Share Calculation

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF TABLES

LIST OF TABLES (CONTINUED)

EXECUTIVE SUMMARY

- The proposed Anaheim Regional Transportation Intermodal Center (ARTIC) project is located in the City of Anaheim, California, in an area of the City referred to as the Platinum Triangle. The Project site is bounded by Katella Avenue to the north, the Orange Freeway (SR-57) to the south, the Santa Ana River to the east and Douglass Road to the west, with the Los Angeles to San Diego (LOSSAN) rail corridor bisecting the site.

  The scope of the Project is to replace and enlarge the existing Anaheim Metrolink/Amtrak station and will include a nominal amount of passenger-oriented retail uses. Construction of ARTIC is estimated to be completed in 2013. The Project would provide improvements to convert the site from a former County of Orange maintenance facility to a fully functioning regional transportation facility. Along with the Metrolink Service Expansion Program currently underway, the site would accommodate existing transit services and future services such as Bus Rapid Transit and other rubber-tired fixed route and shuttle services. The proposed ARTIC site includes the 13.58-acre Orange County Transportation Authority (OCTA) parcel and an adjacent 2.2-acre parcel owned by the City of Anaheim. The proposed Project will replace the existing Metrolink station located to the west of the Project site along the northern edge of the Anaheim Angels Stadium parking area. While there are industrial buildings on the proposed Project site, the buildings are vacant and will be demolished as part of the Project development.

  This study analyzes the relocation of the existing rail station to the ARTIC site with the facilities necessary to support existing transit services (rail and non-rail), as well as to accommodate future transit services such as the planned OCTA's Metrolink Service Expansion Program (MSEP) currently underway, OCTA's proposed Bravo service and other fixed route services. ARTIC will also include passenger-oriented retail and civic space. A total parking supply of up to 960 parking spaces will be provided within three parking lots, ARTIC North Parking Lot, ARTIC South Parking Lot and the existing Metrolink/Amtrak Parking Lot, with a parking supply of approximately 323 parking spaces, 232 parking spaces and 405 parking spaces, respectively. Access to the Project site and parking lots would be provided via driveways located along Douglass Road, Katella Avenue and at the existing Sportstown access on Katella west of the 57 Freeway.

- The proposed Project is forecast to generate 4,714 daily trips (one half arriving and one half departing), with 805 trips (642 inbound, 163 outbound) produced in the AM peak hour and 662 trips (144 inbound, 518 outbound) produced in the PM peak hour on a "typical" weekday.

- The existing Project (Metrolink Station) generates 1,015 daily trips (one half arriving and one half departing), with 183 trips (119 inbound, 64 outbound) produced in the AM peak hour

and 223 trips (86 inbound, 137 outbound) produced in the PM peak hour on a "typical" weekday.

- After taking credit for the existing Metrolink land use, the proposed Project is forecast to generate 3,699 net daily trips (one half arriving and one half departing), with 622 net trips (523 inbound, 99 outbound) produced in the AM peak hour and 439 net trips (58 inbound, 381 outbound) produced in the PM peak hour on a "typical" weekday.

- The Project study area covers twelve (12) existing key study intersections and seven (7) future Project driveways. The key study intersections and Project driveways are:

    1. Manchester Avenue/I-5 Southbound Ramps at Katella Avenue (City of Anaheim)
    2. Anaheim Way/I-5 Northbound Ramps at Katella Avenue (City of Anaheim)
    3. Lewis Street at Katella Avenue (City of Anaheim)
    4. State College Boulevard at Katella Avenue (City of Anaheim)
    5. Sportstown at Katella Avenue (City of Anaheim)
    6. Howell Avenue at Katella Avenue (City of Anaheim)
    7. SR-57 Southbound Ramps at Katella Avenue (City of Anaheim)
    8. SR-57 Northbound Ramps at Katella Avenue (City of Anaheim)
    9. Douglass Road at Katella Avenue (City of Anaheim)
    10. Struck Avenue at Katella Avenue (City of Orange)
    11. Main Street at Katella Avenue (City of Orange)
    12. Batavia Street at Katella Avenue (City of Orange)
    13. Douglass Road at Driveway 1 (Future)
    14. Douglass Road at Driveway 2 (Future)
    15. Douglass Road at Driveway 3 (Future)
    16. Douglass Road at Driveway 4 (Future)
    17. Douglass Road at Driveway 5 (Future)
    18. Douglass Road at Driveway 6 (Future)
    19. Driveway 7 at Katella Avenue (Future)

- The Project study area covers eight (8) key study roadway segments. The key roadway segments are:

    1. Katella Avenue *between* Manchester Avenue and Anaheim Way (City of Anaheim)
    2. Katella Avenue *between* Anaheim Way and Lewis Street (City of Anaheim)
    3. Katella Avenue *between* Lewis Street and State College Boulevard (City of Anaheim)
    4. Katella Avenue *between* State College Boulevard and Sportstown (City of Anaheim)

5. Katella Avenue *between* Sportstown and Howell Avenue (City of Anaheim)
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway (City of Anaheim)
7. Katella Avenue *between* SR-57 Freeway and Main Street (Cities of Anaheim/Orange)[1]
8. Katella Avenue *between* Main Street and Batavia Street (City of Orange)

Existing Conditions

- All twelve (12) key study intersections under the Existing peak hour service level calculations based on existing traffic volumes and current street geometry are currently operating at an acceptable LOS B or better.

- All eight (8) key study roadway segments under Existing service level calculations based on existing daily traffic volumes and current roadway geometry are currently operating at acceptable LOS B or better.

Existing With Project Conditions

- All twelve (12) key study intersections are forecast to operate at acceptable LOS B or better for the Existing With Project traffic conditions when compared to the LOS standards defined in this report.

- All eight (8) of the key study roadway segments are forecast to operate at acceptable LOS B on a daily basis under Existing With Project traffic conditions based on the LOS impact criteria outlined in this report.

Year 2013 With Project Conditions

- None of the key study intersections under the Year 2013 With Project traffic conditions are significantly impacted by the addition of Project traffic per the impact criteria outlined in this report.

- None of the key study roadway segments under the Year 2013 With Project traffic conditions are significantly impacted by the addition of Project traffic per the impact criteria outlined in this report.

Year 2030 With Project Conditions

- Two (2) key study intersections will be significantly impacted based on the LOS standards and the significance impact criteria defined in this report. It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

[1] The segment from the SR-57 Freeway to Santa Ana River is in the City of Anaheim and the segment from the Santa Ana River to Main Street is in the City of Orange. Since the roadway segment count was collected in the City of Anaheim, this segment has been analyzed as a City of Anaheim segment.

- One (1) study roadway segment is significantly impacted by Year 2030 With Project traffic based on the LOS impact criteria outlined in this report. The segment of Katella Avenue between Manchester Avenue and Anaheim Way will be mitigated by widening Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan. The recommended mitigation measure will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted roadway segment to an acceptable Level of Service.

Orange County Congestion Management Program (CMP) Analysis

Existing With Project

- All four (4) CMP intersections operate at acceptable LOS A for both the Existing and Existing With Project traffic conditions based on the CMP criteria which stipulates maintaining LOS E at all CMP locations.

- All eight (8) CMP roadway segments operate at acceptable LOS B or better for both the Existing and Existing With Project traffic conditions.

Year 2013 Conditions

- All four (4) CMP intersections operate at acceptable LOS B or better for both the Year 2013 Without Project and Year 2013 With Project traffic conditions.

- All eight (8) of the CMP roadway segments operate at acceptable LOS E or better for both the Year 2013 Without Project and Year 2013 With Project traffic conditions.

Year 2030 Conditions

- All four (4) CMP intersections operate at acceptable LOS D or better after the implementation of the recommended improvements for both the Year 2030 Without Project and Year 2030 With Project traffic conditions.

- One (1) CMP roadway segment is significantly impacted. The segment of Katella Avenue between Manchester Avenue and Anaheim Way will be mitigated by widening Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan. With the implementation of this planned improvement, this roadway segment is forecast to operate at acceptable LOS during the AM and PM peak hours and is consistent with the *2009 Orange County Congestion Management Program (CMP)* requirement.

Caltrans Facilities Analysis

Existing Conditions

- All Caltrans intersections are currently operating at an acceptable LOS D or better during the AM and PM peak hours.

Year 2013 With Project Conditions

- None of the four (4) Caltrans ramp intersections operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp intersections are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions.

- None of the four (4) Caltrans ramp locations (Merge/Diverge Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions.

- Three (3) of the four (4) Caltrans ramp locations (Weaving Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour		PM Peak Hour	
Key Freeway Segment	**Density (pc/mi/ln)**	**LOS**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	36.59	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	43.04	F
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	37.10	E	38.44	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

- Two (2) Caltrans freeway segments operate at adverse levels of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining two (2) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

Key Freeway Segment	AM Peak Hour Pk Hr Volume	AM Peak Hour Density (pc/mi/ln)	AM Peak Hour LOS	PM Peak Hour Pk Hr Volume	PM Peak Hour Density (pc/mi/ln)	PM Peak Hour LOS
3. SR-57 Northbound *from* Katella Avenue *to* Ball Road	--	--	--	8,380	OVRFL	F
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	--	--	--	7,603	38.4	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Year 2030 With Project Conditions

- Two (2) Caltrans study intersections will operate at adverse levels of service under the Year 2030 With Project traffic conditions when compared to the Caltrans criteria. The locations operating at an adverse LOS are listed below:

Key Intersection	AM Peak Hour Delay (s/v)	AM Peak Hour LOS	PM Peak Hour Delay (s/v)	PM Peak Hour LOS
1. Manchester Ave/I-5 SB Ramps at Katella Ave	59.0	E	70.9	E
2. Anaheim Way/I-5 NB Ramps at Katella Avenue	--	--	81.7	F

It should be noted that the recommended mitigation measures outlined in this report will offset the impacts of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

- None of the four (4) Caltrans ramp locations (Merge/Diverge Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions.

- Three (3) of the four (4) Caltrans ramp locations (Weaving Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

Key Freeway Segment	AM Peak Hour Density (pc/mi/ln)	AM Peak Hour LOS	PM Peak Hour Density (pc/mi/ln)	PM Peak Hour LOS
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	38.20	E

3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp			36.17	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	40.79	E	38.63	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

- One (1) Caltrans freeway segment operates at an adverse level of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining three (3) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	8,490	40.4	E	8,360	39.0	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Site Access & On-Site Circulation

- All the Project driveways are forecast to operate at an acceptable service level of LOS B or better during the AM and PM peak hours for Year 2013 With Project traffic conditions. As such, Project access will be adequate. Motorists entering and exiting the Project site will be able to do so comfortably, safely and without undue congestion.

- The maximum number of inbound vehicle queue calculated during the Year 2013 With Project Traffic Conditions occurs on the inbound southbound left-turn movement from Douglass Road into Driveway 3 during the AM peak hour. The queue on Douglass Road is forecast to have a maximum queue of six (6) vehicles. This vehicle queue length translates to 132 feet in queuing (assuming an average car length of 22 feet). The maximum number of outbound vehicle queue calculated during the Year 2013 With Project Traffic Conditions occurs on the outbound westbound right-turn movement from Driveway 2 onto Douglass Road during the PM peak hour. The queue on Driveway 2 is forecast to have a maximum queue of three (3) vehicles. This vehicle queue length translates to 66 feet in queuing (assuming an average car length of 22 feet). All of the other Project driveways are forecast to operate with a maximum queue of one (1) vehicle during the AM and PM peak hours.

- Based on the Driveway Stacking/Storage and Queuing Analysis, adequate vehicle storage is provided at all of the driveways and review of the proposed site plan indicates that all Project

driveways have sufficient stacking to accommodate the forecast vehicle queues. Based on the above, no changes to the proposed configuration of the Project driveways are necessary.

- 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 any unsafe vehicle-pedestrian conflict points and the driveway throating is sufficient such that access to parking spaces is not impacted by internal vehicle queuing/stacking. Curb return radii have been confirmed and are adequate for passenger cars, buses, shuttles, service/delivery trucks and trash trucks. Project traffic is not anticipated to cause significant queuing/stacking on the Project driveways. The on-site circulation is very good based on our review of the proposed site plan, whereas the alignment, spacing and throating of the Project driveways is adequate. The circulation around the buildings is adequate with sufficient sight distance along the drive aisles.

- To supplement the operations analysis for the site access evaluation, the intersection of Douglass Road at Katella Avenue has been analyzed using the *HCM 2000 Methodology* to determine the appropriate northbound approach lane geometry for the Year 2013 Project opening condition. As a result of the HCM analysis, the intersection of Douglass Road at Katella Avenue is recommended to consist of a northbound lane configuration of two NBL turn lanes, one NBTR lane and one NBR turn lane for the Year 2013 Project opening condition. The intersection of Douglass Road at Katella Avenue operates at acceptable LOS D or better based on the *HCM 2000 Methodology* and the lane configuration mentioned above.

Proposed Mitigation and Improvement Strategies

Existing With Project Intersection Improvements:

- Since there were no impacted intersections under the Existing With Project traffic conditions, no improvements have been recommended.

Existing With Project Roadway Segments Improvements:

- Since there were no impacted roadway segments under the Existing With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Intersection Improvements:

- Since there were no impacted intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended. It should be noted that the intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario as identified in the Project Description of the ARTIC EIR.

Year 2013 With Project Roadway Segments Improvements:

- Since there were no impacted roadway segments under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Intersections Improvements:

- Since there were no impacted ramp intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Locations (Merge/Diverge Analysis) Improvements:

- Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Locations (Weaving Analysis) Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2013 With Project traffic:
    - SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.
    - SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed in Year 2013.
    - SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2013 With Project Caltrans Freeway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2013 With Project traffic:
    - SR-57 Northbound *from* Katella Avenue *to* Ball Road: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed by Year 2013.
    - SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2030 With Project Intersection Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the intersections significantly impacted by the Year 2030 With Project traffic:

- Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.
- Douglass Road at Katella Avenue: Widen and/or re-stripe Douglass Road to provide two left turn lanes, two through lanes, and one right turn lane in both the northbound and southbound directions. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 4th westbound through lane. Modify existing traffic signal.

Year 2030 With Project Roadway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at this roadway segment significantly impacted by the Year 2030 With Project traffic:
  - Katella Avenue *between* Manchester Avenue to Anaheim Way: Widen Katella Avenue from six (6) to eight (8) lanes between Manchester Avenue and Anaheim Way. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan.

Year 2030 With Project Caltrans Ramp Intersections Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp intersections significantly impacted by the Year 2030 With Project traffic:
  - Manchester Avenue/I-5 Southbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to construct a pedestrian refuge island on the west leg of intersection with pedestrian buttons. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 4th westbound through lane. Modify the existing traffic signal and install eastbound right-turn overlap phase on Katella Avenue.
  - Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.

Year 2030 With Project Caltrans Ramp Locations (Merge/Diverge Analysis) Improvements:

- Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2030 With Project traffic conditions, no improvements have been recommended.

Year 2030 With Project Caltrans Ramp Locations (Weaving Analysis) Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2030 With Project traffic:
  - SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.

- SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 6th lane on this segment of SR-57 Northbound freeway.

- SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2030 With Project Caltrans Freeway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2030 With Project traffic:

    - SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

Caltrans Ramps and Freeway Improvements:

- For improvements to the Caltrans facilities, the City of Anaheim, lead agency for this project, will have to decide whether (1) changes, alterations, or mitigation measures are within the responsibility and jurisdiction of another public agency such as Caltrans and not the City of Anaheim. It must determine if such changes have been adopted by such other agency or can and should be adopted by such other agency and/or (2) whether any further mitigation to the impacted State Highway System are feasible, and if not, whether specific overriding economic, legal, social, technological, or other benefits of the project outweigh the unavoidable cumulative traffic impacts caused by the Project.

- With completion of the improvements described in the mitigation, the significant impacts associated with the proposed Project would be fully mitigated with the exception of the improvements to State highway facilities. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., City of Orange and Caltrans); there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control. Should that occur, the Project's traffic impact would remain significant. The City is committed to working with the City of Orange and Caltrans to identify the most appropriate improvement strategies for their facilities and acknowledges the fair-share cost of improvements to those facilities, however, the City of Orange and Caltrans have full jurisdiction toward implementing the identified improvements under their jurisdiction.

Unavoidable Impacts and Statement of Overriding Considerations

- Although every effort was made through site analyses and aerial imagery evaluation to ensure that all recommended improvements are physically feasible, there are improvements identified in this study that may not be feasible due to high Project cost, the inability to undertake right-of-way acquisitions as a matter of policy to preserve existing businesses, environmental constraints, or jurisdictional considerations. For these improvements, including Caltrans facilities, including freeway ramps, mainline segments, and weaving

segments, a Statement of Overriding Considerations will document why a particular improvement is infeasible as mitigation.

- With implementation of the improvements presented previously, the significant Project related or cumulative impacts associated with the proposed Project would be fully mitigated. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., Caltrans), there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control (e.g., the City of Anaheim cannot undertake or require improvements outside of Anaheim's jurisdiction or the City cannot construct improvements in the Caltrans right-of-way without Caltrans Approval). Should that occur, the Project's traffic impact would remain significant.

City of Orange Improvements

- As shown in the analysis, no intersections or roadway segments in the City of Orange are impacted by ARTIC; no improvements have been recommended.

TRAFFIC IMPACT ANALYSIS REPORT

ARTIC

Anaheim, California
July 16, 2010
(Update of the April 29, 2010 Report)

1.0 INTRODUCTION

This traffic impact study addresses the potential traffic impacts and circulation needs associated with the proposed Anaheim Regional Transportation Intermodal Center (ARTIC) project (hereinafter referred to as Project) in the City of Anaheim, California, in an area of the City referred to as the Platinum Triangle. The Project site is bounded by Katella Avenue to the north, the Orange Freeway (SR-57) to the south, the Santa Ana River to the east and Douglass Road to the west, with the Los Angeles to San Diego (LOSSAN) rail corridor bisecting the site.

The scope of the Project is to replace and enlarge the existing Anaheim Metrolink/Amtrak station and will include a nominal amount of passenger-oriented retail uses. Construction of ARTIC is estimated to be completed in 2013. The Project would provide improvements to convert the site from a former County of Orange maintenance facility to a fully functioning regional transportation facility. Along with the Metrolink Service Expansion Program currently underway, the site would accommodate existing transit services and future services such as Bus Rapid Transit and other rubber-tired fixed route and shuttle services. The proposed ARTIC site includes the 13.58-acre Orange County Transportation Authority (OCTA) parcel and an adjacent 2.2-acre parcel owned by the City of Anaheim. The proposed Project will replace the existing Metrolink station located to the west of the Project site along the northern edge of the Anaheim Angels Stadium parking area. While there are industrial buildings on the proposed Project site, the buildings are vacant and will be demolished as part of the Project development.

This study analyzes the relocation of the existing rail station to the ARTIC site with the facilities necessary to support existing transit services (rail and non-rail), as well as to accommodate future transit services such as the planned OCTA's Metrolink Service Expansion Program (MSEP) currently underway, OCTA's proposed Bravo service and other fixed route services. ARTIC will also include passenger-oriented retail and civic space. A total parking supply of up to 960 parking spaces will be provided within three parking lots, ARTIC North Parking Lot, ARTIC South Parking Lot and the existing Metrolink/Amtrak Parking Lot, with a parking supply of approximately 323 parking spaces, 232 parking spaces and 405 parking spaces, respectively. Access to the Project site and parking lots would be provided via driveways located along Douglass Road, Katella Avenue and at the existing Sportstown access on Katella west of the 57 Freeway.

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 existing operating conditions at twelve (12) key study intersections within the Project vicinity, estimates the trip generation potential of the proposed Project and forecasts future (near-term and long-term) operating conditions without and with the proposed Project. It should be noted that seven (7) Project driveways were also analyzed for the near-term "with" Project scenarios.

This traffic impact analysis report satisfies the City of Anaheim *Criteria for Preparation of Traffic Impact Studies* and is consistent with the requirements and procedures outlined in the *2009 Orange County Congestion Management Program (CMP).*

The Project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing (i.e. baseline) peak hours and daily traffic information has been collected at twelve (12) key study intersections and eight (8) key study roadway segments, respectively, on a "typical" weekday for use in the preparation of intersection and roadway segment level of service calculations. This traffic report analyzes existing (i.e. baseline) and future (near-term and long-term) weekday AM and PM peak hour and daily traffic conditions for Existing (i.e. baseline), Year 2013 and Year 2030 traffic conditions without and with the proposed Project. Peak hour and daily traffic volumes for the Existing, Year 2013 Without Project and Year 2030 With Project traffic conditions were provided by the City of Anaheim.

1.1 Study Area

The study intersections listed below are locations that could potentially be impacted by the proposed Project. Twelve (12) existing key study intersections and seven (7) future Project driveways listed below were selected based on location of Project and "51 or more peak hour trips threshold" criteria outlined in the *City of Anaheim Criteria For Preparation of Traffic Impact Studies* as well as discussions with the City of Anaheim staff. The key study intersections are:

1. Manchester Avenue/I-5 Southbound Ramps at Katella Avenue (City of Anaheim)
2. Anaheim Way/I-5 Northbound Ramps at Katella Avenue (City of Anaheim)
3. Lewis Street at Katella Avenue (City of Anaheim)
4. State College Boulevard at Katella Avenue (City of Anaheim)
5. Sportstown at Katella Avenue (City of Anaheim)
6. Howell Avenue at Katella Avenue (City of Anaheim)
7. SR-57 Southbound Ramps at Katella Avenue (City of Anaheim)
8. SR-57 Northbound Ramps at Katella Avenue (City of Anaheim)
9. Douglass Road at Katella Avenue (City of Anaheim)
10. Struck Avenue at Katella Avenue (City of Orange)
11. Main Street at Katella Avenue (City of Orange)
12. Batavia Street at Katella Avenue (City of Orange)
13. Douglass Road at Driveway 1 (Future)
14. Douglass Road at Driveway 2 (Future)

15. Douglass Road at Driveway 3 (Future)
16. Douglass Road at Driveway 4 (Future)
17. Douglass Road at Driveway 5 (Future)
18. Douglass Road at Driveway 6 (Future)
19. Driveway 7 at Katella Avenue (Future)

In addition, the study roadway segments listed below are locations that could potentially be impacted by the proposed Project. The eight (8) roadway segments listed below were selected based on the arterial network within the study area:

1. Katella Avenue *between* Manchester Avenue and Anaheim Way (City of Anaheim)
2. Katella Avenue *between* Anaheim Way and Lewis Street (City of Anaheim)
3. Katella Avenue *between* Lewis Street and State College Boulevard (City of Anaheim)
4. Katella Avenue *between* State College Boulevard and Sportstown (City of Anaheim)
5. Katella Avenue *between* Sportstown and Howell Avenue (City of Anaheim)
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway (City of Anaheim)
7. Katella Avenue *between* SR-57 Freeway and Main Street (Cities of Anaheim/Orange)[2]
8. Katella Avenue *between* Main Street and Batavia Street (City of Orange)

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the Project and depicts the study locations 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.

The ICU/HCM Delay and Level of Service (LOS) calculations at these key locations were used to evaluate the potential traffic-related impacts associated with area growth, related projects and the proposed 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 for the existing and proposed Project,
- AM and PM peak hours and Daily capacity analyses for existing (i.e. baseline) conditions,
- AM and PM peak hours and Daily capacity analyses for Existing (i.e. baseline) conditions with Project traffic,

[2] The segment from the SR-57 Freeway to Santa Ana River is in the City of Anaheim and the segment from the Santa Ana River to Main Street is in the City of Orange. Since the roadway segment count was collected in the City of Anaheim, this segment has been analyzed as a City of Anaheim segment.

- AM and PM peak hours and Daily capacity analyses for near-term (Year 2013) conditions without and with Project traffic,
- AM and PM peak hours and Daily capacity analyses for long-term (Year 2030) conditions without and with Project traffic,
- Congestion Management Program (CMP) Analysis,
- Caltrans Facilities Analysis (HCM Methodology),
- Site Access and On-Site Circulation Analysis, and
- Project-Specific Traffic Improvements.

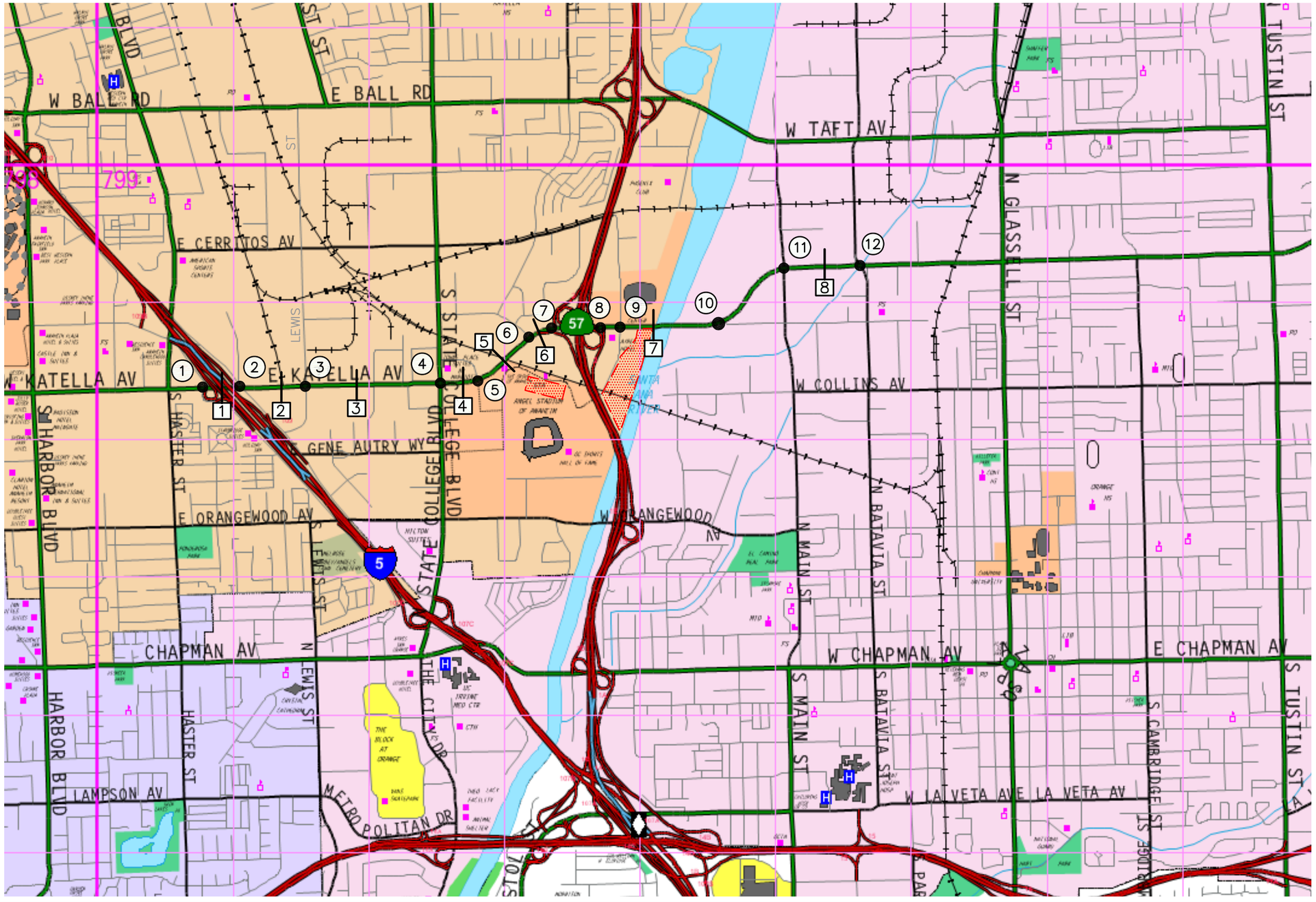
1.2 Traffic Impact Analysis Scenarios

The following scenarios are those for which ICU/HCM Delay LOS and V/C calculations have been performed at the key intersections and key roadway segments and for existing, near-term and long-term traffic conditions:

A. Existing (i.e. baseline) Traffic Conditions,
B. Existing (i.e. baseline) With Projects Traffic Conditions,
C. Scenario B with Recommended Improvements, if any,
D. Year 2013 Without Project Traffic Conditions,
E. Year 2013 With Project Traffic Conditions,
F. Scenario E With Recommended Improvements,
G. Year 2030 Without Project Traffic Conditions,
H. Year 2030 With Project Traffic Conditions, and
I. Scenario H With Recommended Improvements.

1.3 Study Area - City of Orange

The study area that could potentially be impacted by the proposed Project was selected based on location of Project and "51 or more peak hour trips threshold" criteria outlined in the *City of Anaheim Criteria For Preparation of Traffic Impact Studies*. The City of Orange uses the same methodology to determine intersections to be analyzed in Traffic Impact Studies. The City of Orange sent a letter requesting the analysis of 12 intersections within the City of Orange. In response, this traffic report analyzed all 12 requested intersections to see if they met the minimum peak hour trip threshold. Those City of Orange intersections that were forecast to receive 51 or more peak hour trips from the Project were further scrutinized to determine whether or not the Project-generated traffic created significant impacts in connection with the identified City of Orange intersections. For those City of Orange intersections that were forecast to receive less than 51 peak hour Project-generated trips, the report has determined that the Project will not create any significant impacts with respect to those identified City of Orange intersections.



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: THOMAS BROS.

KEY

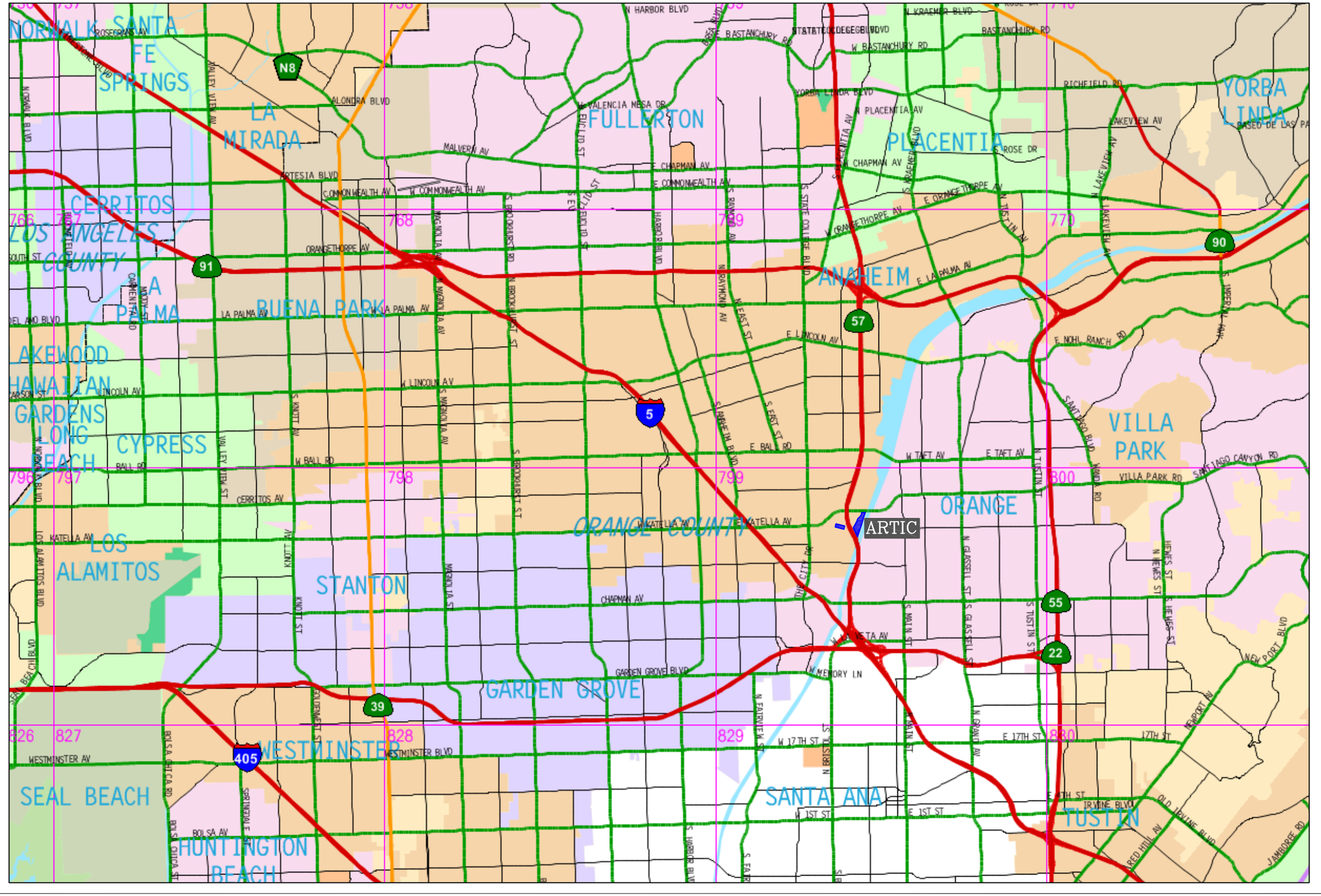
(#) = STUDY INTERSECTION

[X] = STUDY ROADWAY SEGMENT

= PROJECT SITE

FIGURE 1-1

VICINITY MAP
ARTIC, ANAHEIM



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: THOMAS BROS.

KEY

= PROJECT SITE

FIGURE 1-2

REGIONAL MAP

ARTIC, ANAHEIM

2.0 PROJECT DESCRIPTION AND LOCATION

This traffic impact study addresses the potential traffic impacts and circulation needs associated with the proposed Anaheim Regional Transportation Intermodal Center (ARTIC) project (hereinafter referred to as Project) in the City of Anaheim, California, in an area of the City referred to as the Platinum Triangle. The Project site is bounded by Katella Avenue to the north, the Orange Freeway (SR-57) to the south, the Santa Ana River to the east and Douglass Road to the west, with the Los Angeles to San Diego (LOSSAN) rail corridor bisecting the site.

The scope of the Project is to replace and enlarge the existing Anaheim Metrolink/Amtrak station, and will include a nominal amount of passenger-oriented retail uses. Construction of ARTIC is estimated to be completed in 2013. The Project would provide improvements to convert the site from a former County of Orange maintenance facility to a fully functioning regional transportation facility. Along with the Metrolink Service Expansion Program currently underway, the site would accommodate existing transit services and future services such as Bus Rapid Transit and other rubber-tired fixed route and shuttle services. The proposed ARTIC site includes the 13.58-acre OCTA parcel and an adjacent 2.2-acre parcel owned by the City of Anaheim. The proposed Project will replace the existing Metrolink station located to the west of the Project site along the northern edge of the Anaheim Angels Stadium parking area. While there are industrial buildings on the proposed Project site, the buildings are vacant and will be demolished as part of the Project development.

This study analyzes the relocation of the existing rail station to the ARTIC site with the facilities necessary to support existing transit services (rail and non-rail), as well as to accommodate future transit services such as the planned OCTA's Metrolink Service Expansion Program (MSEP) currently underway, OCTA's proposed Bravo service and other fixed route services. ARTIC will also include passenger-oriented retail and civic space. A total parking supply of up to 960 parking spaces will be provided within three parking lots, ARTIC North Parking Lot, ARTIC South Parking Lot and Metrolink/Amtrak Parking Lot, with a parking supply of approximately 323 parking spaces, 232 parking spaces and 405 parking spaces, respectively. Access to the Project site and parking lots would be provided via driveways located along Douglass Road, Katella Avenue and Sportstown.

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

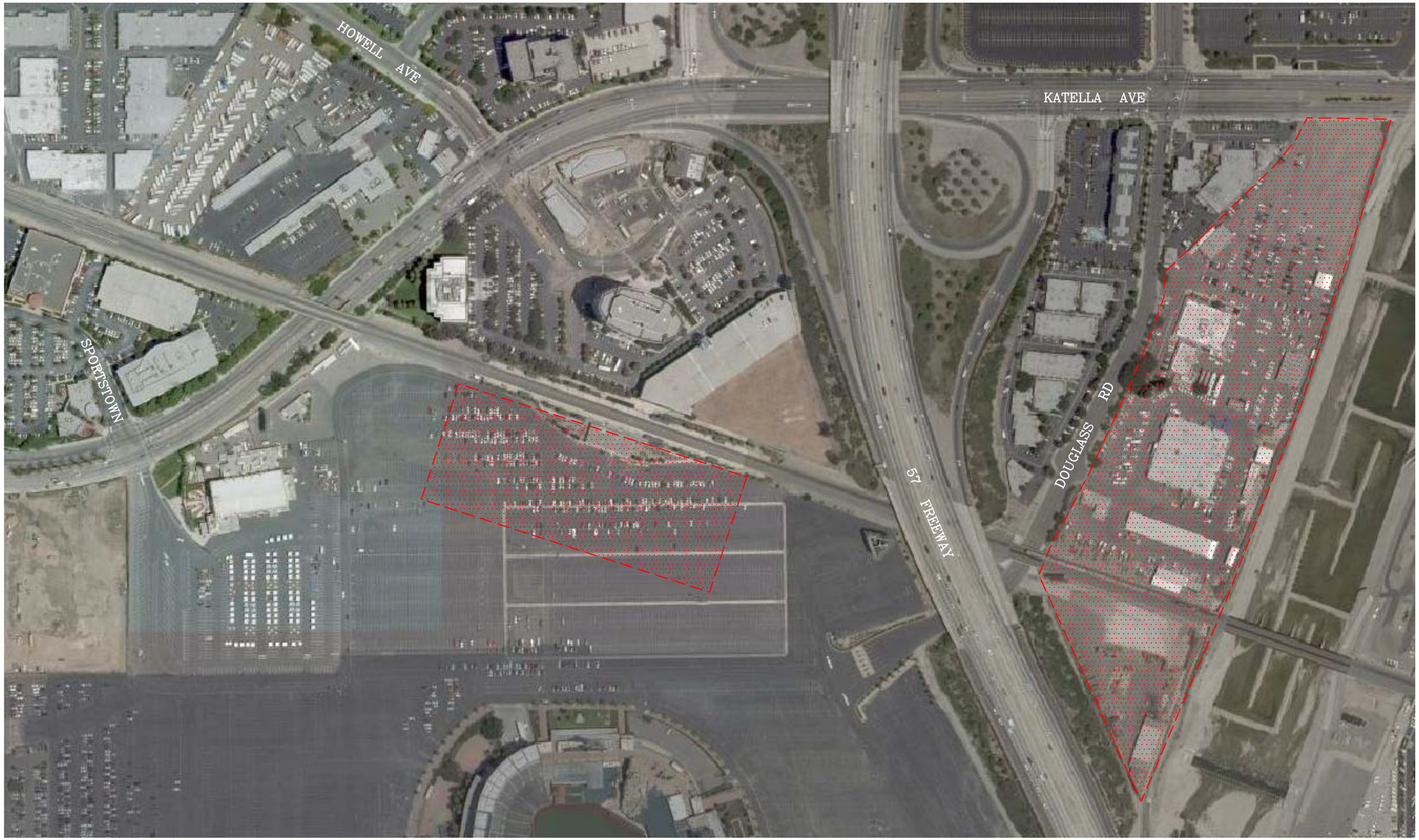
2.1 Site Access

As shown in *Figure 2-2*, vehicular access to the Project site will be provided via the existing intersection of Sportstown and Katella Avenue as well as via six (6) driveways located on Douglass Road and one (1) driveway located on Katella Avenue.

The existing intersection of Sportstown and Katella Avenue is a full-access, signalized intersection that provides access to the Metrolink/Amtrak Parking Lot. Driveway 1 along Douglass Road is a one-way stop-controlled, right-in/right-out only driveway providing access to the ARTIC North

Parking Lot. Driveway 2 along Douglass Road is a right-out only, signalized intersection providing egress from the ARTIC North Parking Lot, Kiss and Ride area and taxi stand. Driveway 3 along Douglass Road is a signalized intersection that provides inbound-only access to the ARTIC North Parking Lot, Kiss and Ride area and taxi stand. It should be noted that the proposed traffic signals at Driveway 2 and Driveway 3 will essentially operate one traffic signal with a common controller. Driveway 4 along Douglass Road is a one-way stop-controlled, right-out only driveway providing egress from the buses and shuttles area. Driveway 5 along Douglass Road is a signalized intersection that provides inbound-only access to the buses and shuttles area. Driveway 6 along Douglass Road is a one-way stop-controlled, full-access driveway providing access to the ARTIC South Parking Lot. Driveway 7 along Katella Avenue is a one-way stop-controlled driveway that provides right-in/right-out only access to the ARTIC North Parking Lot, Kiss and Ride area, taxi stand as well as to the buses and shuttles area.

It should be noted that the ARTIC patrons parking in the Sportstown parking lot would access the train platforms through the Stadium Pavilion which will be constructed on the west end of the platforms.



SOURCE: BING MAPS

KEY

= PROJECT SITE

N NO SCALE

LINSCOTT LAW & GREENSPAN engineers

FIGURE 2-1

EXISTING SITE PLAN
ARTIC, ANAHEIM

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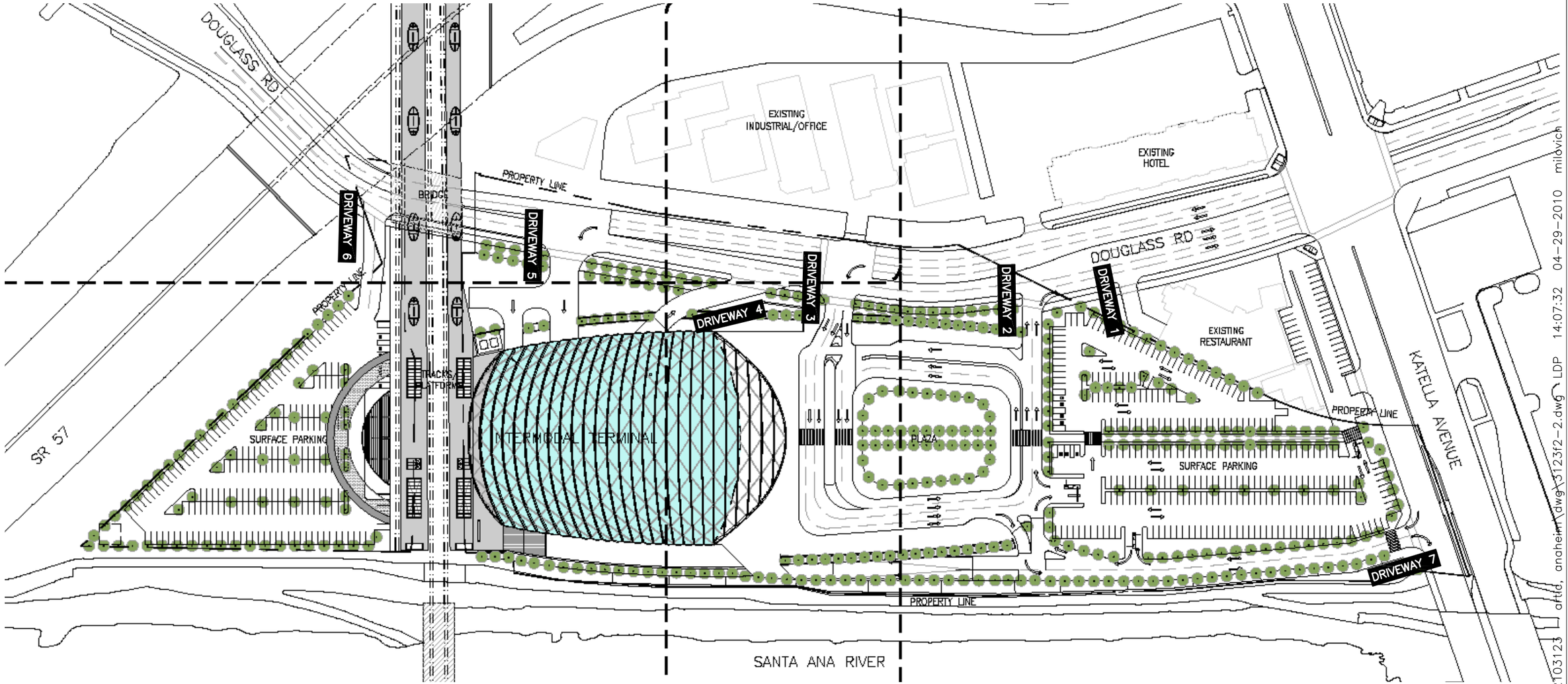

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SOURCE: PARSONS BRINCKERHOFF

LINSCOTT LAW & GREENSPAN engineers

N

NO SCALE

FIGURE 2-2

PROPOSED SITE PLAN

ARTIC, ANAHEIM

3.0 ANALYSIS METHODOLOGY

3.1 Existing Street Network

The Orange Freeway (SR-57) provides primary regional access to the proposed Project. The SR-57 Freeway bisects the Project site. The principal local network of streets serving the Project site consists of Katella Avenue, Cerritos Avenue, Struck Avenue, Collins Avenue, Orangewood Avenue, Haster Street, Manchester Avenue, Anaheim Way, Lewis Street, State College Boulevard, Howell Avenue, Douglass Road, Eckhoff Street, Main Street and Batavia Street. The following discussion provides a brief synopsis of the key area streets.

Cerritos Avenue is an east-west roadway located north of the Project site. On-street parking is not permitted on either side of the roadway within the Project vicinity. Cerritos Avenue is a four-lane roadway divided by a two-way left-turn lane. The posted speed limit is 40 miles per hour (mph).

Katella Avenue is an east-west roadway that borders the Project site on the north. On-street parking is not permitted on either side of the roadway within the Project vicinity. Katella Avenue is a six-lane roadway divided by a raised median. The posted speed limit is 40 miles per hour (mph). The intersections of Katella Avenue at Manchester Avenue/I-5 SB Ramps, Anaheim Way/I-5 NB Ramps, Lewis Street, State College Boulevard, Sportstown, Howell Avenue, SR-57 SB Ramps, SR-57 NB Ramps, Douglass Road, Struck Avenue, Main Street and Batavia Street are controlled by traffic signals.

Struck Avenue is an east-west roadway located east of the Project site. On-street parking is not permitted on the south side of the roadway, but is permitted on the north side of the roadway, within the Project vicinity. Struck Avenue is a two-lane roadway divided by a double-yellow line. The posted speed limit is 35 miles per hour (mph).

Collins Avenue is an east-west roadway located east of the Project site. West of Main Street, Collins Avenue is a four lane undivided roadway with on-street parking permitted on both sides of the roadway. East of Main Street, Collins Avenue is a four lane roadway divided by a two-way left turn lane. On-street parking is not permitted east of Main Street. The posted speed limit is 40 miles per hour (mph).

Orangewood Avenue is an east-west roadway located south of the Project site. On-street parking is generally not permitted on both sides of the roadway within the Project vicinity. Orangewood Avenue is primarily a four-lane roadway divided by a two-way left-turn lane. Between Lewis Street and State College Boulevard, Orangewood Avenue is a six-lane roadway divided by a raised median, with on-street parking restricted on both sides of the roadway. West of Eckhoff Street, the posted speed limit is 40 miles per hour (mph). East of Eckhoff Street, the posted speed limit is 35 mph.

Anaheim Boulevard/Haster Street is a north-south roadway located west of the Project site. On-street parking is not permitted on either side of the roadway within the Project vicinity. South of Katella Avenue, Haster Street is a four-lane roadway divided by a two-way left-turn lane. North of

Katella Avenue, Anaheim Boulevard is a six-lane roadway divided by a raised median. The posted speed limit is 40 miles per hour (mph).

Manchester Avenue is a one-way roadway located west of the Project site trending in a southeast direction. On-street parking is not permitted on either side of the roadway within the Project vicinity. Manchester Avenue is a three-lane undivided roadway. The posted speed limit is 35 miles per hour (mph).

Anaheim Way is a one-way roadway located west of the Project site trending in a northwest direction. On-street parking is not permitted on either side of the roadway within the Project vicinity. Anaheim Way is a three-lane undivided roadway. The posted speed limit is 35 miles per hour (mph).

Lewis Street is a north-south roadway located west of the Project site. On-street parking is generally prohibited in the study area except between Katella Avenue and Anaheim Way where on-street parking is permitted on both sides of the roadway. North of Katella Avenue, Lewis Street is a four lane roadway divided by a two-way left turn lane. South of Katella Avenue, Lewis Street is a two-lane undivided roadway. North of Anaheim Way, the posted speed limit is 35 miles per hour (mph). South of Orangewood Avenue, the posted speed limit is 45 mph.

State College Boulevard is a north-south roadway located west of the Project site. On-street parking is not permitted on either side of the roadway within the Project vicinity. State College Boulevard is primarily a six-lane divided roadway. South of Orangewood Avenue, State College Boulevard is an eight-lane divided roadway. The posted speed limit is 40 miles per hour (mph).

Howell Avenue is an east-west roadway located north-west of the Project site. On-street parking is not permitted on either side of the roadway within the Project vicinity. Howell Avenue is a two-lane roadway divided by a two-way left-turn lane.

Douglass Road is a north-south roadway that borders the Project site on the west. On-street parking is not permitted on either side of the roadway within the Project vicinity. North of Katella Avenue, Douglass Road is a four-lane roadway divided by a two-way left turn lane, and south of Katella Avenue, Douglass Road is a four-lane undivided roadway.

Eckhoff Street is a north-south roadway located south-east of the Project site. On-street parking is permitted on both sides of the roadway within the Project vicinity. South of Orangewood Avenue, Eckhoff Street is a two-lane undivided roadway with a posted speed limit of 25 miles per hour (mph). North of Orangewood Avenue, Eckhoff Street is a two-lane roadway divided by a two-way left turn lane with a posted speed limit of 40 mph.

Main Street is a north-south roadway located east of the Project site. South of Collins Street, on-street parking is not permitted on the west side of the roadway, but is permitted on the east side of the roadway, within the Project vicinity. North of Collins Avenue, on-street parking is generally permitted. Main Street is a four-lane roadway divided by a two-way left-turn lane. North of

Orangewood Avenue, the posted speed limit is 40 miles per hour (mph). South of Orangewood Avenue, the posted speed limit is 35 mph.

Batavia Street is a north-south roadway located east of the Project site. On-street parking is generally permitted on both sides of the roadway within the Project vicinity. Batavia Street is a four-lane undivided roadway. The posted speed limit is 35 miles per hour (mph).

Figure 3-1 presents an inventory of the existing roadway conditions within the study area evaluated in this report. The number of travel lanes and intersection controls for the key area study intersections are identified.

3.2 Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes for the twelve (12) key study intersections evaluated in this report, along with existing daily two-way traffic volumes for the eight (8) key roadway segments, were provided by the City of Anaheim.

Figures 3-2 and ***3-3*** present the existing AM and PM peak hour traffic volumes, respectively, for the twelve (12) key study intersections. ***Figure 3-4*** presents the existing daily traffic volumes for the eight (8) key study roadway segments. ***Appendix A*** contains the raw existing intersection turning movement and roadway segment traffic count data which was collected by Transportation Studies Inc. in Year 2008 and 2009 and was provided by the City of Anaheim. ***Appendix B*** contains the freeway segment and ramp existing traffic volumes.

3.3 Capacity Analysis Methodologies

Existing AM and PM peak hour operating conditions for the twelve (12) key study intersections were evaluated using the *Intersection Capacity Utilization (ICU) Methodology* for signalized intersections and the methodology outlined in Chapter 17 of the *Highway Capacity Manual 2000 (HCM 2000)* for unsignalized intersections. It should be noted that the methodology outlined in Chapter 16 of the *Highway Capacity Manual 2000 (HCM 2000)* for signalized intersections was utilized for Caltrans controlled intersections. Freeway mainline, ramp merge and diverge and weaving segments are also analyzed using *Chapters 22-25* of the *HCM 2000*.

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

In conformance with the City of Anaheim requirements, existing AM and PM peak hour operating conditions for the key signalized study intersections were evaluated using the Intersection Capacity Utilization (ICU) method. 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 City of Anaheim requirements, the ICU calculations use a lane capacity of 1,700 vehicles per hour (vph) for through and all turn lanes. A clearance adjustment factor of 0.05 was added to each Level of Service calculation. The analysis methodologies used by the City of Anaheim for signalized intersections are also consistent with the methodology used by the City of Orange, as are the LOS thresholds. Therefore, the same assumptions were applied for both jurisdictions.

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

3.3.2 *Highway Capacity Manual (HCM) Method of Analysis (Unsignalized Intersections)*

The 2000 HCM unsignalized methodology was utilized in the analysis of stop-controlled intersections. For all-way stop-controlled intersections, this methodology estimates the average control delay for each of the subject movements and determines the level of service for each movement. The overall average control delay measured in seconds per vehicle and level of service is then calculated for the entire intersection. The HCM control delay value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance.

For one-way and two-way stop-controlled (minor street stop-controlled) intersections, this methodology estimates the worst side street delay, measured in seconds per vehicle and determines the level of service for that approach. The HCM delay 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 HCM control delay value range, as shown in ***Table 3-2***.

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

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 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 3-3.***

3.3.4 *Volume to Capacity (V/C) Ratio Method of Analysis (Roadway Segments)*

The arterial roadway criteria for the City of Anaheim involve the use of average daily traffic (ADT) volume to capacity (V/C) ratios. LOS C (V/C not to exceed 0.80) is the performance standard that has been adopted for the study area circulation system by the City of Anaheim. The City of Orange has utilized LOS D as the performance standard for arterials.

Although the arterial segment V/C analysis provides a general assessment of overall system performance, the performance is measured on the ability to serve peak hour traffic demands. To identify deficient arterial segments, the segments that are identified as deficient under daily conditions are evaluated under peak hour conditions to evaluate the capability of serving forecast peak hour throughput. Arterial segments that operate deficiently under peak hour conditions are candidates for mitigation improvements. Note that the City of Orange does not provide provisions for peak hour segment analysis but rather uses daily V/C analysis as the basis for improvement requirements.

The City of Anaheim applies the Urban Streets analysis identified in *Chapter 15 of the Highway Capacity Manual* (HCM) to determine level of service under peak hour traffic volumes on deficient daily segments. The peak hour link analysis determines directional AM and PM peak hour V/C ratios for each link that exceeds the daily LOS threshold. The peak hour capacity is determined by using *Equation 15-7* of the HCM, multiplying the mid-block number of lanes for each direction by a lane capacity of 1,900 vehicles per hour, then multiplied by the percentage of green time at the controlling signalized intersection for that arterial segment. The percentage of green time is estimated by dividing the directional V/C ratios by the total V/C ratio at signalized intersections along the arterial segment. The highest resulting percentage is the estimated percentage of green time for that arterial segment. If the V/C ratio of the arterial segment under peak hour conditions is LOS E or F, improvements should be considered to improve the segment to an acceptable LOS.

LOS analysis of forecast daily traffic volumes was applied for the arterial segments throughout the study area. The segment analysis assumes roadway capacities for each jurisdiction as applied in the current General Plans for each City and *Orange County Highway Design Manual (September 1991)* as noted in ***Table 3-4***. The capacities reflect LOS E capacities and are consistent with those that are applied in daily V/C analysis consistent with methodologies adopted for each jurisdiction. Note that the City of Orange takes advantage of a capacity enhancement for Smart Streets as designated by the Orange County Transportation Authority. For Katella Avenue, Orange increases daily capacity by five percent to account for Smart Street related improvements that enhance throughput along these key corridors. The City of Anaheim does not currently account for capacity enhancements to Smart Streets.

3.3.5 *Freeway Mainline and Ramp Merge/Diverge Points*

The freeway mainline and freeway ramp criteria are based on peak hour *HCM 2000* density analysis. The capacities are based on information contained in the *HCM 2000* and the Caltrans Ramp Meter Design Manual. Existing traffic count data was provided by Caltrans.

Ramp merge and diverge analysis was carried out by applying *Highway Capacity Software (HCS)*, the electronic version of the *HCM 2000* for freeway-to-arterial interchanges. According to *HCM 2000* methodology, the ramp merge and diverge areas focus on an influential area of 1,500 feet, including the acceleration or deceleration lane and adjacent freeway lanes. The methodology incorporates three fundamental steps:

- Determination of the traffic entering the freeway lanes upstream of the merge or at the beginning of the deceleration lane at diverge;
- Determination of the capacity for the segment; and
- Determination of the density of traffic flow within the ramp influence area and its level of service.

The level of service (LOS) for freeway ramps is determined by traffic density based on criteria outlined in the *HCM 2000*. Freeway mainline levels of service are similarly determined from segment density. ***Table 3-5*** presents the correlation between LOS and density in terms of passenger cars per mile per lane (pc/mi/ln) for both freeway ramps and basic freeway segments.

3.3.6 *Freeway Weaving Analysis*

Freeway weaving is defined as the crossing of two streams of traffic traveling in the same direction along a significant length of highway without the aid of traffic control devices. Typically, weaving segments are formed when merge areas are followed by diverge areas within 2,500 feet of the merge area. Auxiliary lanes do not need to be present to be defined a weaving area.

Weaving analysis uses the most current version of the *HCM 2000* and provides a density for the weaving area within the freeway segment and corresponding LOS. Freeway weaving analysis was carried out by applying *HCS* software to weaving areas. According to *HCM 2000*, the weaving analysis supersedes ramp merge/diverge analysis and therefore were not analyzed for identified weaving segments. ***Table 3-6*** specifies the LOS for associated freeway weaving densities.

3.4 Impact Criteria and Thresholds

For intersections and arterial segments, significant impacts are determined using the *City of Anaheim Criteria for Preparation of Traffic Impact Studies*. Under the General Plan Build-out scenarios, these locations are governed by the City's Growth Management Element. All State owned facilities are analyzed consistent with the Caltrans Guide for the Preparation of Traffic Impact Studies for all scenarios.

3.4.1 *Intersections*

According to the City's Circulation Element and stated in the *City of Anaheim Criteria for Preparation of Traffic Impact Studies*, LOS D is the minimum acceptable condition that should be maintained during the morning and evening peak commute hours on all City intersections. The City of Orange has utilized LOS D as the performance standard for intersections.

The relative impact of the added Project traffic volumes 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. The previously discussed capacity analysis procedures were utilized to investigate the future delay or volume-to-capacity relationships and service level characteristics at each study intersection. The significance of the potential impacts of the Project at each key intersection is determined based on the sliding scale criteria presented in ***Table 3-7***. As mentioned previously, LOS D [> 0.81 and ≤ 0.90 (signalized) & > 25.0 s/v and ≤ 35.0 s/v (unsignalized)] is an established level of service standard for intersections in the City of Anaheim.

As indicated in *Table 3-7*, the Project-related increase in ICU value that defines a significant impact at signalized intersections varies with LOS. Per the City's guidelines, a change in ICU value, within LOS C, equal to or greater than 0.05 is an impact and within LOS D, a change in ICU equal to or greater than 0.03 is also an impact. With LOS E or F, a change in ICU equal to or greater than 0.01 is considered an impact. For the unsignalized intersections, this report defines a significant impact as a decrease in LOS by one level or more for those locations operating at LOS D, E, or F (LOS delay values shown in *Table 3-2*).

For General Plan Build-out analysis, consistent with the City's Growth Management Element, a project is deemed to have a significant impact if the project results in deterioration of the LOS to an unacceptable LOS or an increase in the ICU value of 0.01 if the intersection currently operates at LOS E or F under without project conditions. Mitigation measures, discussed later in the report are required to bring deficient intersections and roadway segments to an acceptable LOS.

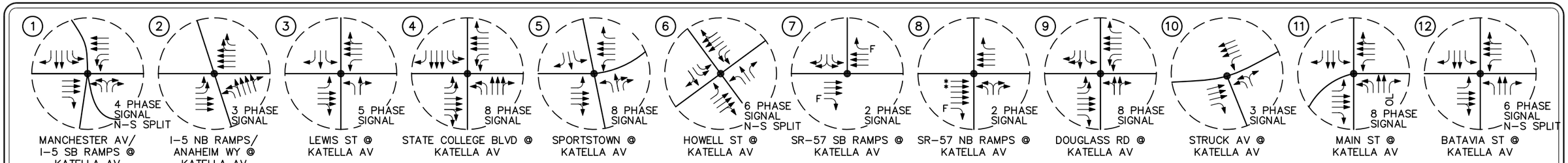
3.4.2 *Arterial Segments*

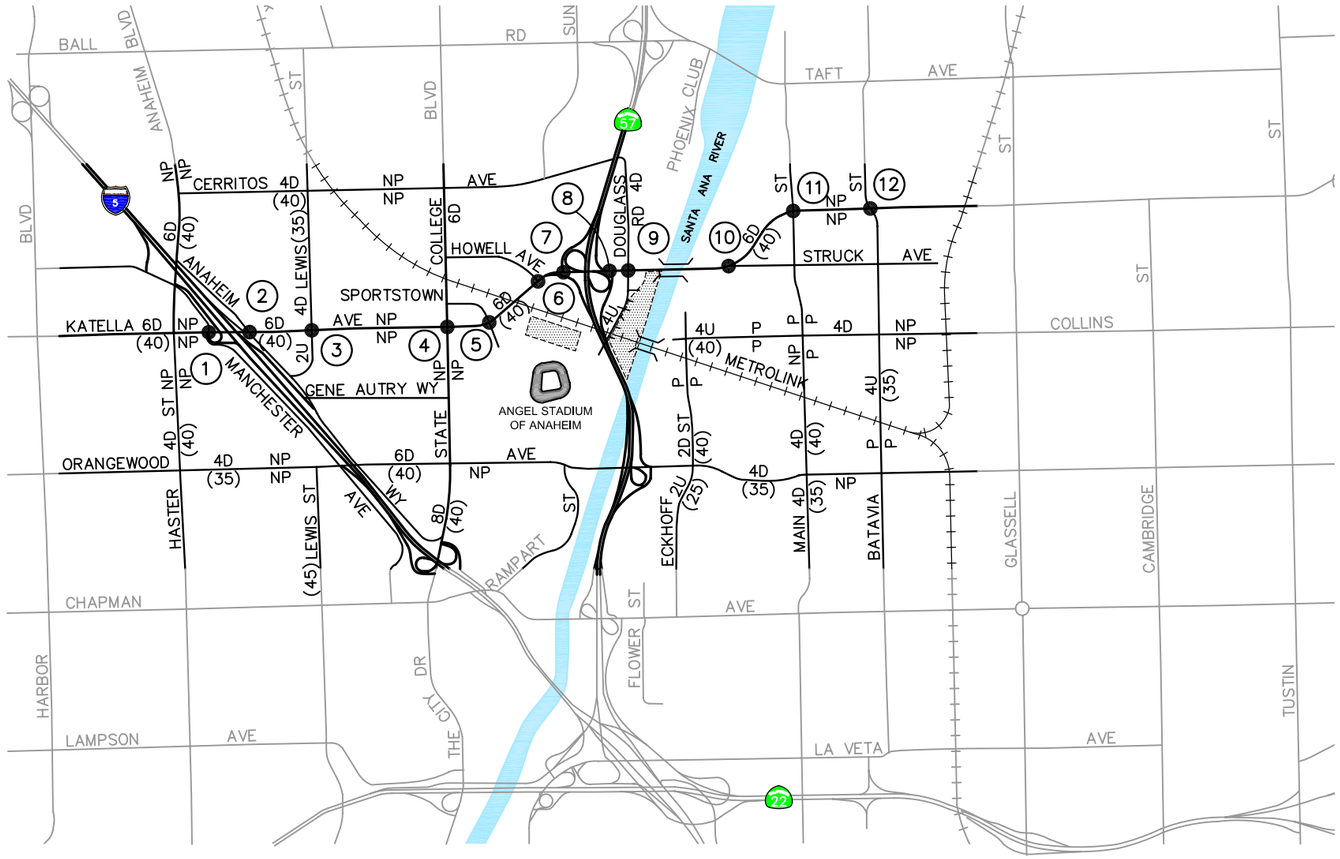
In addition, the relative impact of the added Project traffic volumes generated by the proposed Project on a daily basis was evaluated based on analysis of future operating conditions at the key roadway segments. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each roadway segment. For City of Anaheim segments, a project is deemed to have a significant impact if the project results in deterioration of the daily LOS to an unacceptable LOS (LOS D, E, or F) coupled with a continued deficiency under peak hour conditions. A significant impact is also determined by an increase in the daily ICU value of 0.01 if the segment currently operates at LOS E or F under daily without project conditions and the segment is found to be deficient under peak hour conditions. For City of Orange segments, a project is deemed to have a significant impact if the project results in deterioration of the daily LOS to an unacceptable LOS (LOS E or F) or causes an

increase in the daily ICU value of 0.01 if the segment currently operates at LOS E or F under daily without project conditions.

3.4.3 *Caltrans Facilities*

Caltrans District 12 has established that LOS D is the operating standard for all Caltrans facilities. Caltrans has determined that all state owned facilities that operate below LOS D should be identified and improved to an acceptable LOS although specific criteria to identify project related impacts is not specified in the *Caltrans Traffic Impact Study Guidelines*. Analysis of Caltrans facilities is conducted in ***Sections 11.0*** and ***12.0*** of this report.





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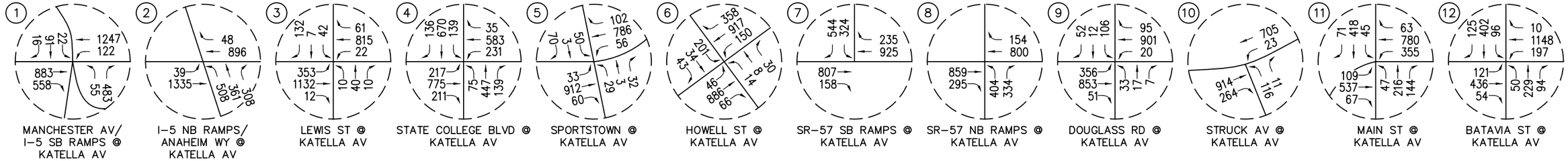
N NO SCALE

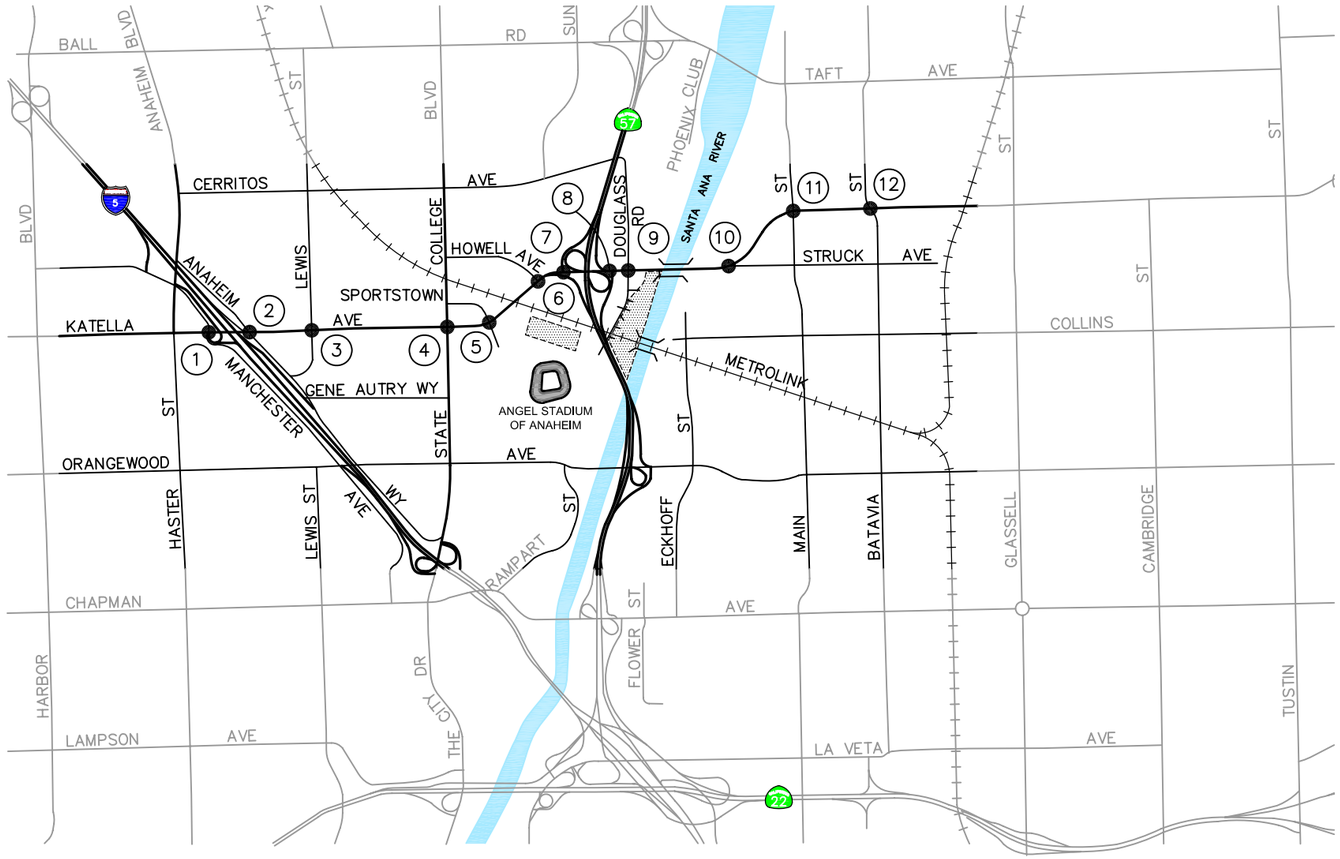
KEY

- ← = APPROACH LANE ASSIGNMENT
- ● = TRAFFIC SIGNAL
- P = PARKING, NP = NO PARKING
- U = UNDIVIDED, D = DIVIDED
- * = LEFT-TURN LANES FOR THE INTERSECTION OF DOUGLASS RD AND KATELLA AVE
- 2 = NUMBER OF TRAVEL LANES
- (XX)= POSTED SPEED LIMIT (MPH)
- F = FREE RIGHT
- OL = OVERLAP
- = PROJECT SITE

FIGURE 3-1

EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS
ARTIC, ANAHEIM





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N NO SCALE

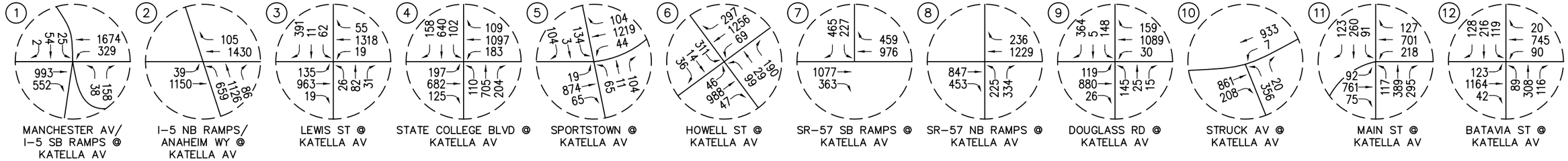
KEY

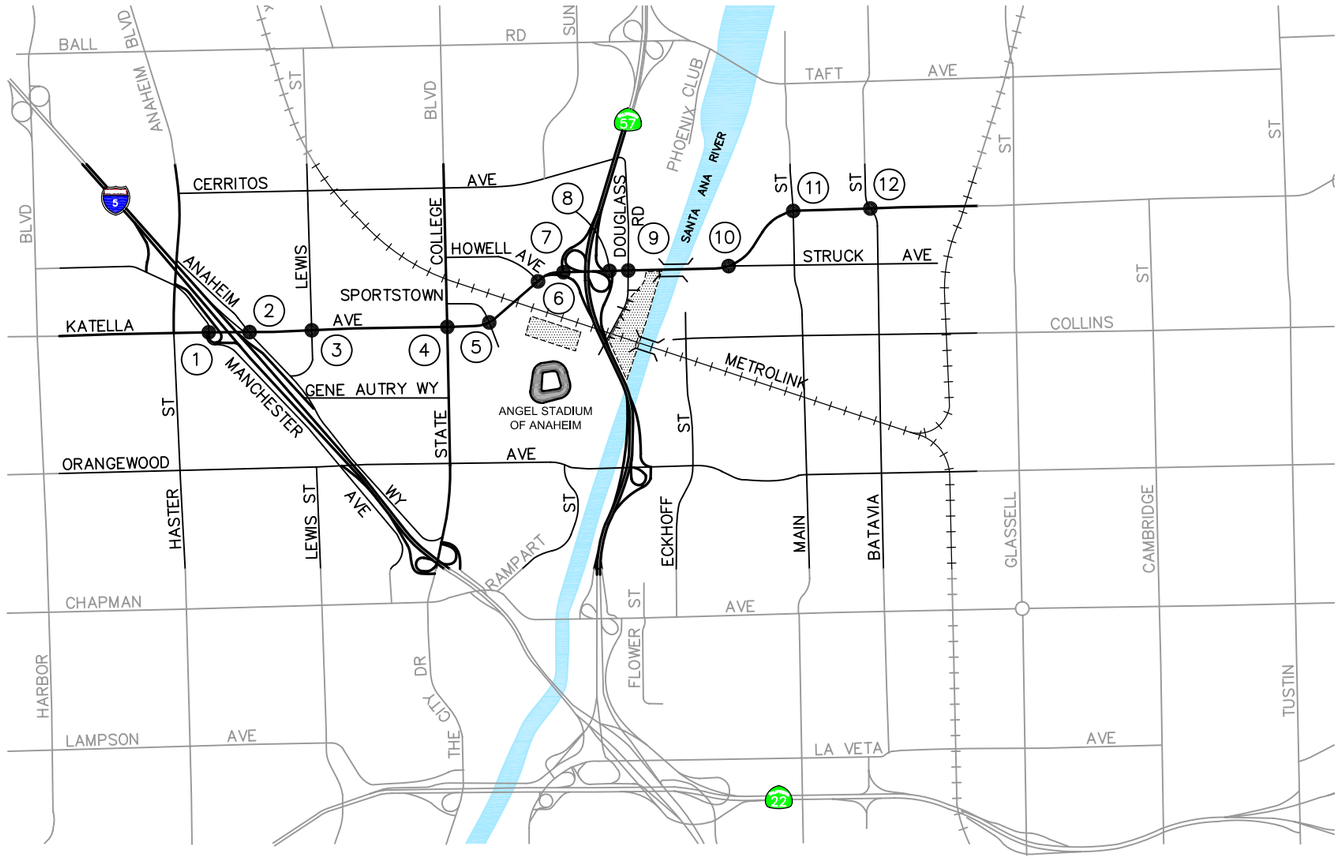
(#) = STUDY INTERSECTION

▭ = PROJECT SITE

FIGURE 3-2

EXISTING AM PEAK HOUR TRAFFIC VOLUMES
ARTIC, ANAHEIM





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N NO SCALE

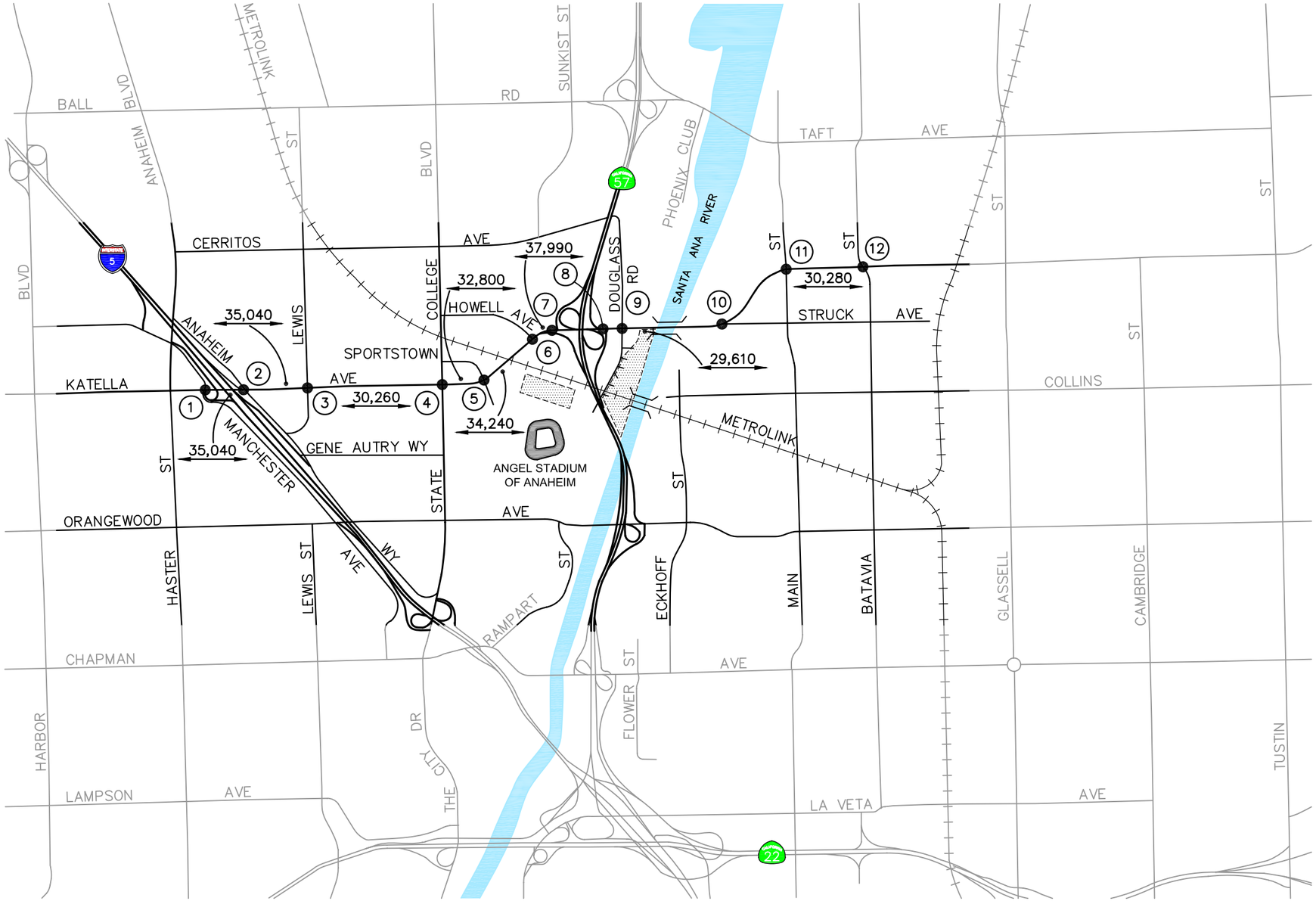
KEY

(#) = STUDY INTERSECTION

▭ = PROJECT SITE

FIGURE 3-3

EXISTING PM PEAK HOUR TRAFFIC VOLUMES
ARTIC, ANAHEIM



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N NO SCALE

KEY

XX,XXX = DAILY TRAFFIC VOLUMES

(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 3-4

EXISTING DAILY TRAFFIC VOLUMES

ARTIC, ANAHEIM

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (ICU METHODOLOGY)[3]

Level of Service (LOS)	Intersection Capacity Utilization Value (V/C)	Level of Service Description
A	≤ 0.60	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.61 – 0.70	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.71 – 0.80	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.81 – 0.90	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.91 – 1.00	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.00	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.

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

TABLE 3-2

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM) [4]

Level of Service (LOS)	Highway Capacity Manual (HCM) Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

[4] Source: *Highway Capacity Manual 2000,* Chapter 17 (Unsignalized Intersections).

TABLE 3-3

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM)[5]

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	$\leq$ 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 $\leq$ 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 $\leq$ 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 $\leq$ 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 $\leq$ 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	$\geq$ 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.

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

TABLE 3-4

DAILY ROADWAY SEGMENT CAPACITIES[6]

Type of Arterial	Lane Configuration	LOS E Capacity (VPD)
Major	6-Lanes Divided	56,300
Major	8-Lanes Divided	75,000

Notes:

- VPD = Vehicles per day

[6] Source: *Orange County Highway Design Manual, September 1991*.

TABLE 3-5

CALTRANS FREEWAY MAINLINE AND RAMP LEVEL OF SERVICE CRITERIA (HCM)[7]

LOS	Freeway Ramp Density (pc/mi/ln)	Basic Freeway Segment Density (pc/mi/ln)
A	≤ 10.0	0-11.0
B	> 10.0 and ≤ 20.0	11.0 – 18.0
C	> 20.0 and ≤ 28.0	18.0 – 26.0
D	> 28.0 and ≤ 35.0	26.0 – 35.0
E	> 35.0	35.0 – 45.0
F	Exceeds Capacity	>45.0

[7] Source: *HCM 2000, Exhibits 23-2 and 25-4*.

TABLE 3-6

CALTRANS FREEWAY WEAVING LEVEL OF SERVICE CRITERIA (HCM)[8]

LOS	Freeway Weaving Area Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	≤ 43.0
F	>43.0

[8] Source: *HCM 2000 Exhibit 25-7*.

TABLE 3-7

SIGNIFICANT IMPACT CRITERIA[9]

Level of Service (LOS)	Final V/C Ratio	Project-Related Increase in V/C
C	> 0.700 – 0.800	Equal to or greater than 0.05
D	> 0.800 – 0.900	Equal to or greater than 0.03
E, F	> 0.900	Equal to or greater than 0.01

[9] Source: *City of Anaheim Criteria for Preparation of Traffic Impact Studies.*

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 Traffic Generation Forecast

The daily trip generation rate for the Project was developed based on the estimation of the numbers of originating passengers at ARTIC and the necessary infrastructure required to meet that demand. The needs for ARTIC were first analyzed in the *Anaheim Regional Transportation Intermodal Center Transit and Parking Facility Description Report* (Carter and Burgess, October 2007). The *Needs Assessment Update and Validation Technical Memorandum* (Cordoba Corporation, August 2009) updated the analysis with updated information from the various providers of service at ARTIC. Originating passenger information was provided by the various service providers that will utilize ARTIC (Metrolink, Amtrak, OCTA, etc).

The analysis conducted for these reports considered all originating passengers for each service provider at ARTIC. The mode of access for each originating passenger was then determined from the planned service levels for each provider – some arrive by car (driver or passenger), others transferring from another transit mode, others walking or bicycling to ARTIC. The daily vehicle trips were then compiled by adding the parking vehicles, drop off vehicles, taxis, buses and shuttles. The number of parking spaces were calculated based on the total number of parking vehicles for each service provider. The daily trip generation rate was then calculated by taking these total vehicle trips and dividing by the number of parking spaces, as calculated in the *Needs Assessment Update and Validation Technical Memorandum.*

Trip Generation for the AM and PM peak hours was derived using the factors provided in the Institute of Transportation Engineers' *Trip Generation,* 7th Edition, Land Use codes 090 and 093. The trip rate includes buses, taxis and shuttles. ***Table 5-1*** summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project and presents the forecast daily and peak hour Project traffic volumes for a "typical" weekday.

Review of *row **(A)*** of *Table 5-1* shows that the development of the proposed Project is forecast to generate 4,714 daily trips (one half arriving and one half departing), with 805 trips (642 inbound, 163 outbound) produced in the AM peak hour and 662 trips (144 inbound, 518 outbound) produced in the PM peak hour on a "typical" weekday.

Review of *row **(B)*** of *Table 5-1* shows that the existing Project generates 1,015 daily trips (one half arriving and one half departing), with 183 trips (119 inbound, 64 outbound) produced in the AM peak hour and 223 trips (86 inbound, 137 outbound) produced in the PM peak hour on a "typical" weekday.

As shown in *row **(C)*** of *Table 5-1*, the Project upon completion is forecast to generate 3,699 net daily trips (one half arriving and one half departing), with 622 net trips (523 inbound, 99 outbound) produced in the AM peak hour and 439 net trips (58 inbound, 381 outbound) produced in the PM peak hour on a "typical" weekday.

It should be noted that the anticipated increase in ridership at this station based on the Orange County Transportation Authority's (OCTA) Metrolink Service Expansion Project (MSEP) report was accounted for in the Needs Assessment report and that document was the basis for the trip generation.

TABLE 5-1

PROJECT TRAFFIC TRIP GENERATION RATES AND FORECAST

Project Description	Daily Trips	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Trip Generation Factors[10]:							
ARTIC (TE/PS)	4.91	0.67	0.17	0.84	0.15	0.54	0.69
Proposed Project Trip Generation Forecast:							
ARTIC North Parking Lot - (323 Spaces)	1,586	216	55	271	48	174	222
ARTIC South Parking Lot - (232 Spaces)	1,139	155	39	194	35	125	160
Metrolink/Amtrak Parking Lot - (405 Spaces)	1,989	271	69	340	61	219	280
Proposed Project Trip Generation Forecast (A):	***4,714***	***642***	***163***	***805***	***144***	***518***	***662***
Existing Project Trip Generation[10]:							
Metrolink/Amtrak Parking Lot	1,015	119	64	183	86	137	223
Existing Project Trip Generation (B):	***1,015***	***119***	***64***	***183***	***86***	***137***	***223***
Net Project Traffic Generation Forecast (C) = (A) - (B)	**3,699**	**523**	**99**	**622**	**58**	**381**	**439**

Notes:

- TE/PS = Trip ends per Parking Space.

[10] Source: *City of Anaheim*.

5.2 Project Traffic Distribution and Assignment

The directional traffic distribution patterns at the key study intersections, for the existing Project and proposed Project are presented in ***Figures 5-1*** and ***5-2***, respectively. Traffic volumes, both entering and exiting the site, have been distributed and assigned to the adjacent street system based on the following considerations:

- Anaheim Metrolink Station Trip Access Distribution Survey,
- the site's proximity to major traffic carriers (i.e. SR-57 Freeway, Katella Avenue, 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 and
- input from City of Anaheim staff.

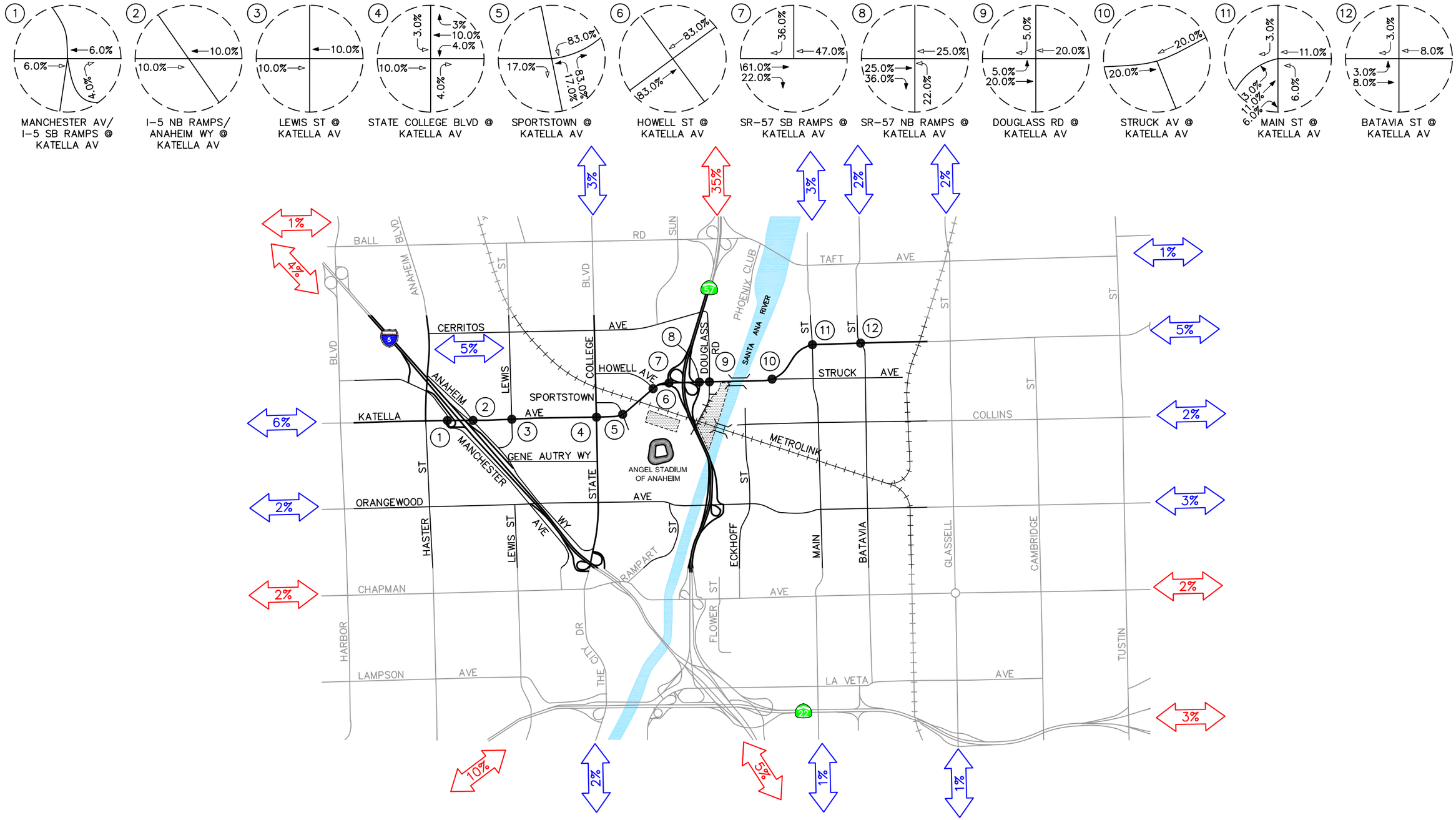
The Project trip distribution pattern was submitted to the City staff for their review and approval prior to proceeding with further analyses.

5.2.1 *Existing Project Traffic Volumes*

The directional traffic distribution pattern for the existing Project is presented in *Figure 5-1*. The anticipated AM and PM peak hour existing Project trips at the key study intersections are presented in ***Figures 5-3*** and ***5-4***, respectively. In addition, ***Figure 5-5*** presents the Daily existing Project trips at the key study roadway segments. The existing Project trips assignment presented in the above mentioned figures reflect the traffic distribution characteristics shown in *Figure 5-1* and the existing Project trips forecast presented in the *row (B)* portion of *Table 5-1*.

5.2.2 *Proposed Project Traffic Volumes*

The directional traffic distribution pattern for the proposed Project is presented in *Figure 5-2*. The anticipated AM and PM peak hour proposed Project trips at the key study intersections and future Project driveways are presented in ***Figures 5-6*** and ***5-7***, respectively. In addition, ***Figure 5-8*** presents the Daily proposed Project trips at the key study roadway segments. The proposed Project trips assignment presented in the above mentioned figures reflect the traffic distribution characteristics shown in *Figure 5-2* and the proposed Project trips forecast presented in the *row (A)* portion of *Table 5-1*. Consequently, the net ARTIC Project trips, as shown in *row (C)* are reflected in the future traffic conditions.



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NO SCALE

KEY

(#) = STUDY INTERSECTION

◁— = INBOUND PERCENTAGE

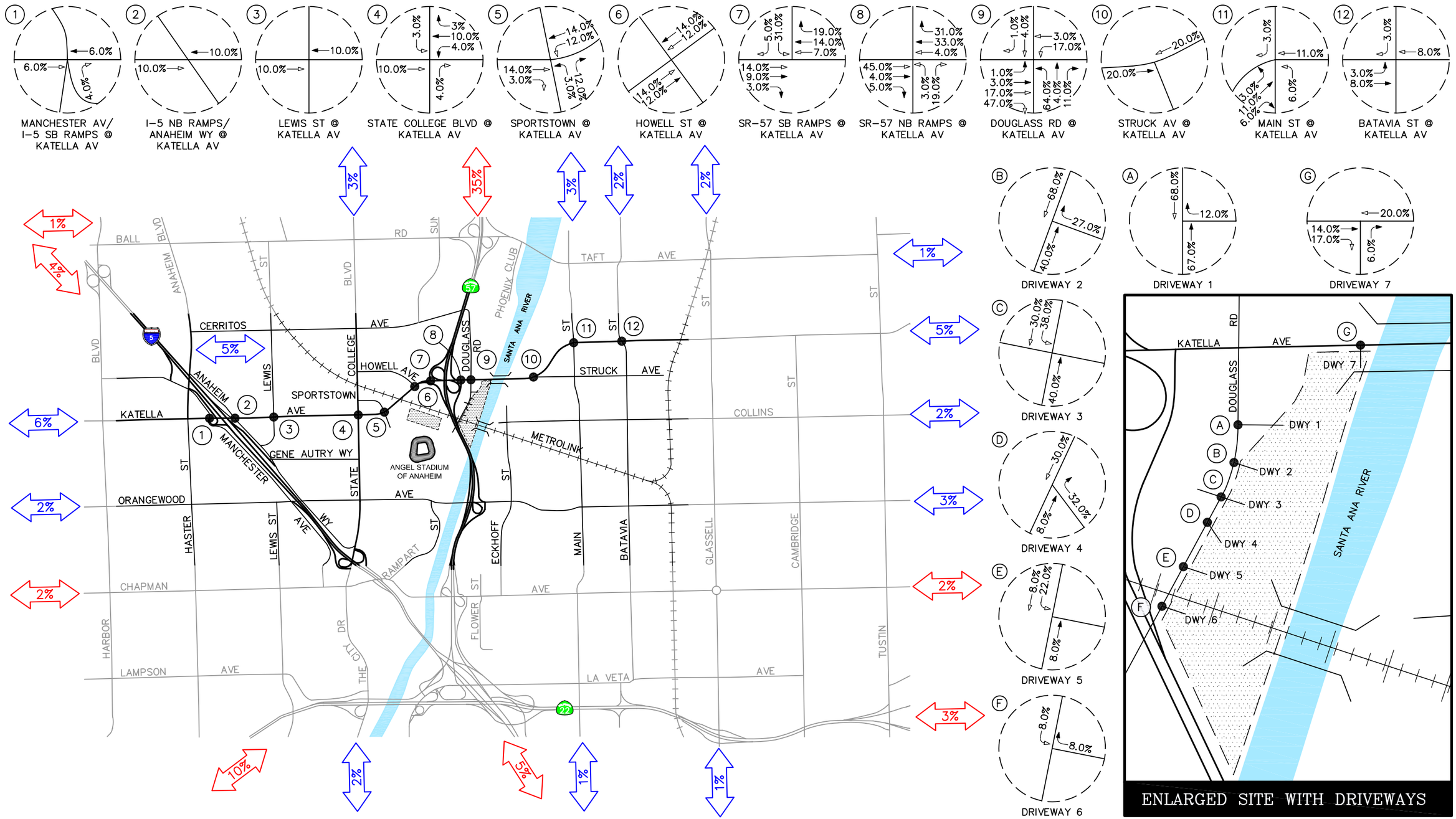
—◀ = OUTBOUND PERCENTAGE

▭ = PROJECT SITE

FIGURE 5-1

EXISTING PROJECT TRIP DISTRIBUTION PATTERN

ARTIC, ANAHEIM



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N NO SCALE

KEY

(#) = STUDY INTERSECTION

= INBOUND PERCENTAGE

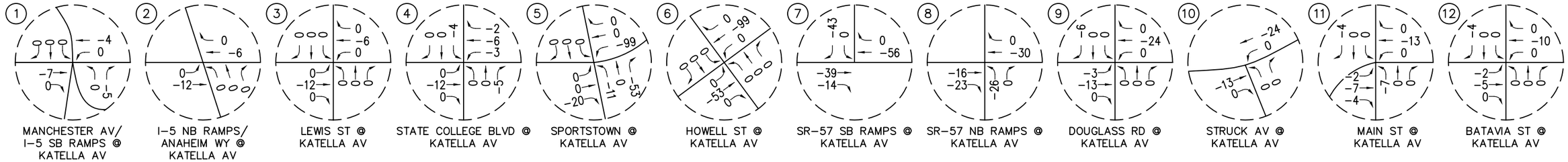
= OUTBOUND PERCENTAGE

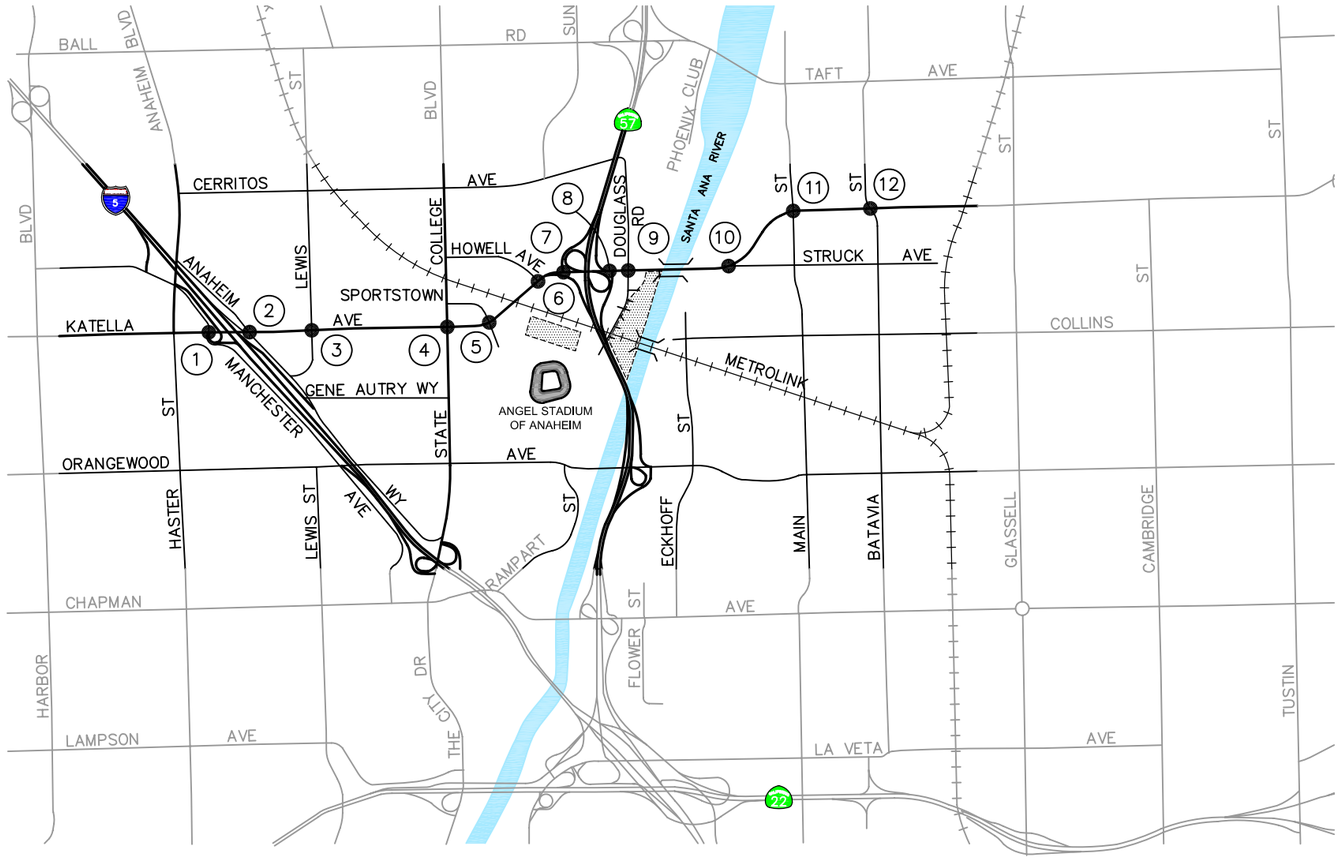
= PROJECT SITE

FIGURE 5-2

PROPOSED PROJECT TRIP DISTRIBUTION PATTERN

ARTIC, ANAHEIM





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N NO SCALE

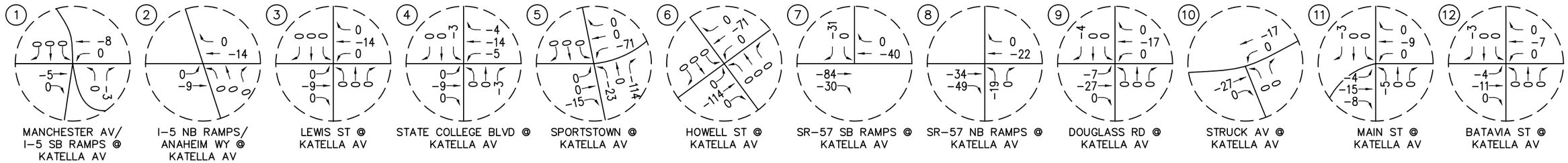
KEY

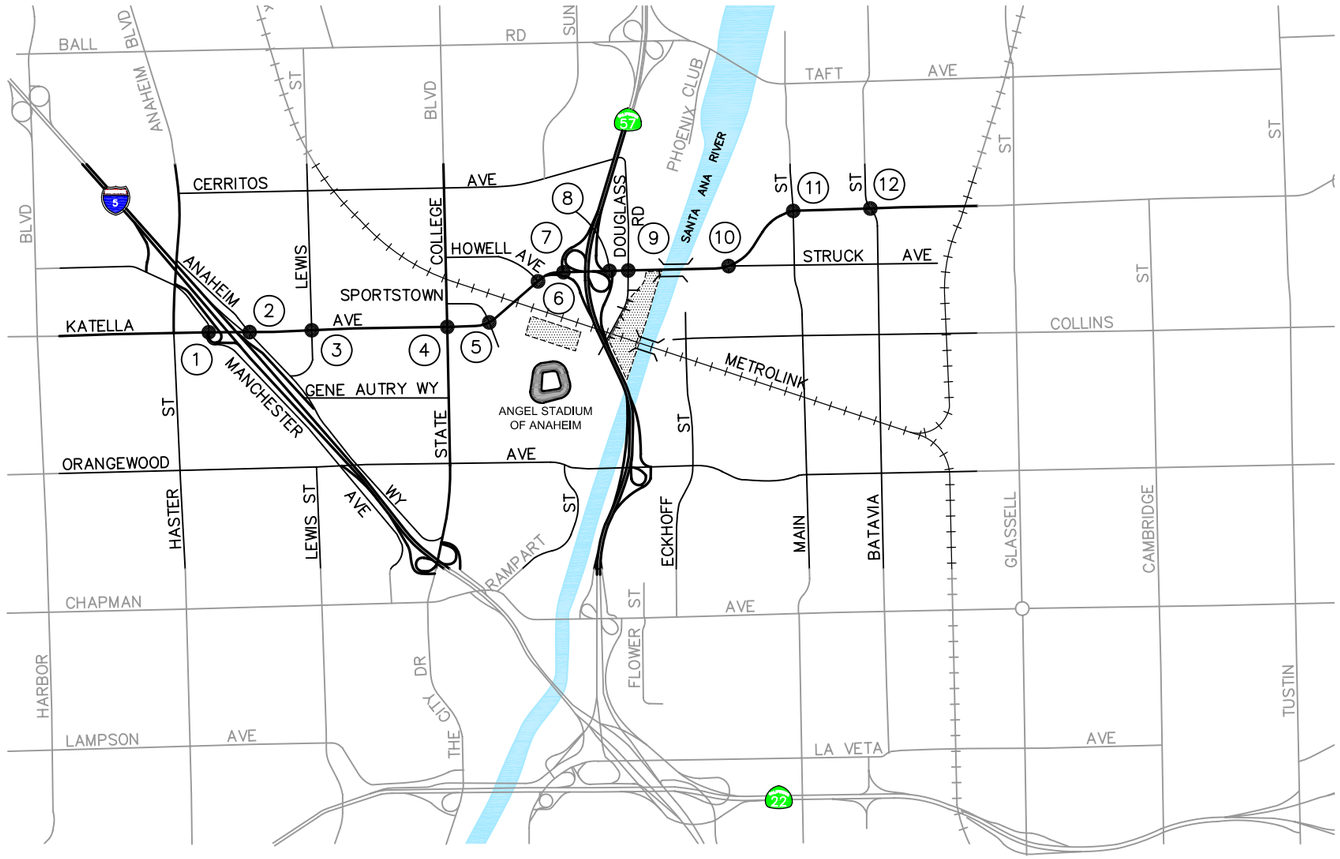
(#) = STUDY INTERSECTION

▭ = PROJECT SITE

FIGURE 5-3

AM PEAK HOUR EXISTING PROJECT TRAFFIC VOLUMES
ARTIC, ANAHEIM





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N NO SCALE

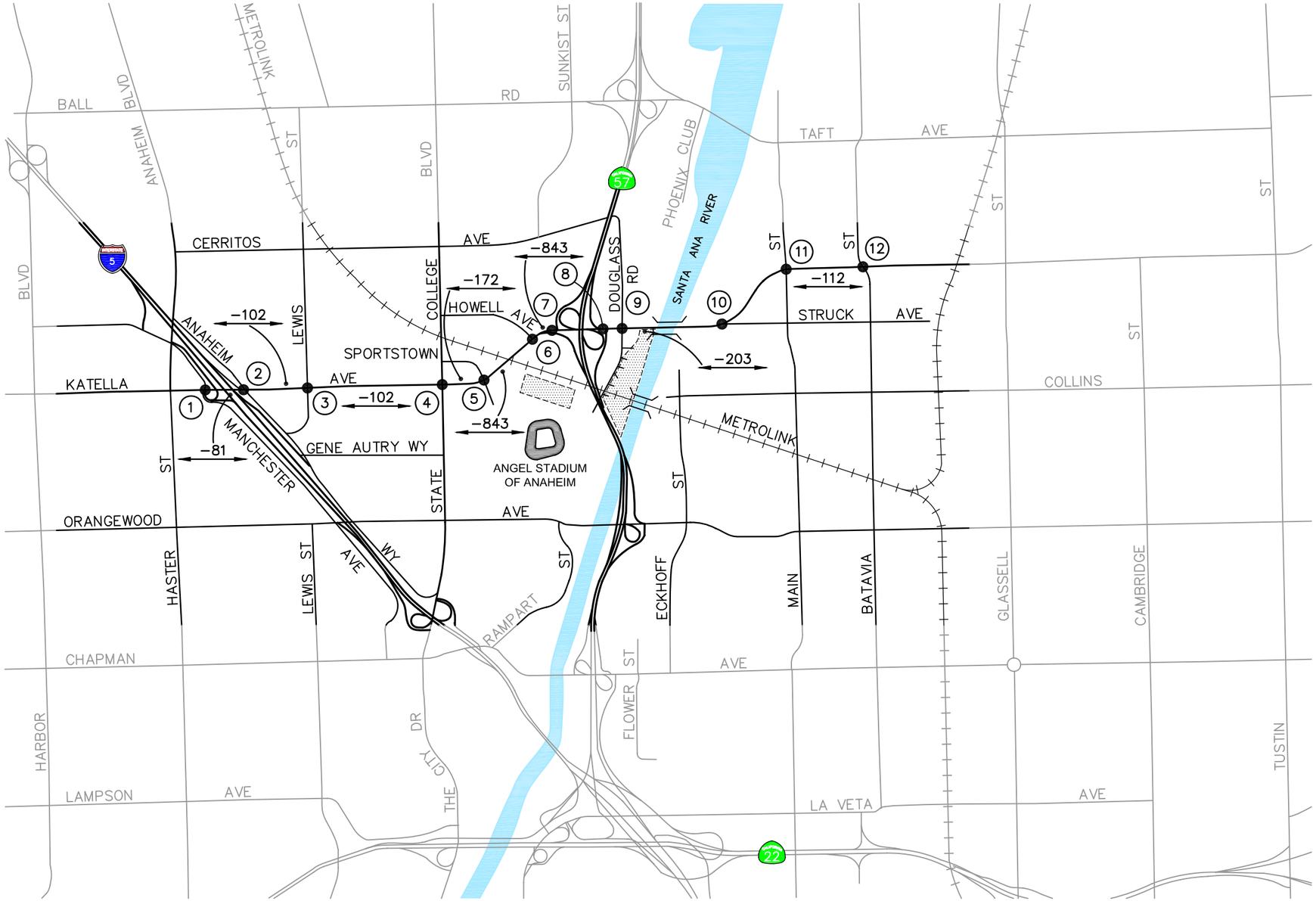
KEY

(#) = STUDY INTERSECTION

▭ = PROJECT SITE

FIGURE 5-4

PM PEAK HOUR EXISTING PROJECT TRAFFIC VOLUMES
ARTIC, ANAHEIM



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N NO SCALE

KEY

XXX = DAILY TRAFFIC VOLUMES

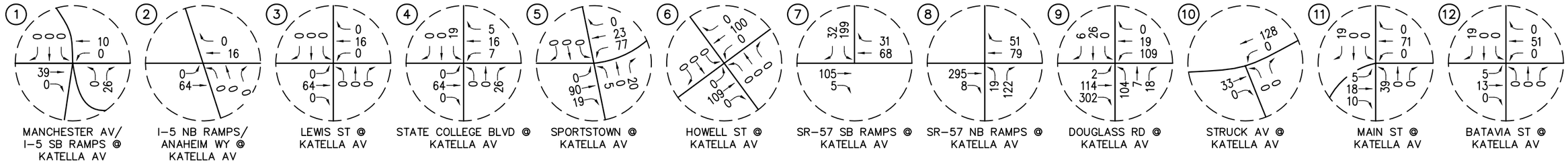
(#) = STUDY INTERSECTION

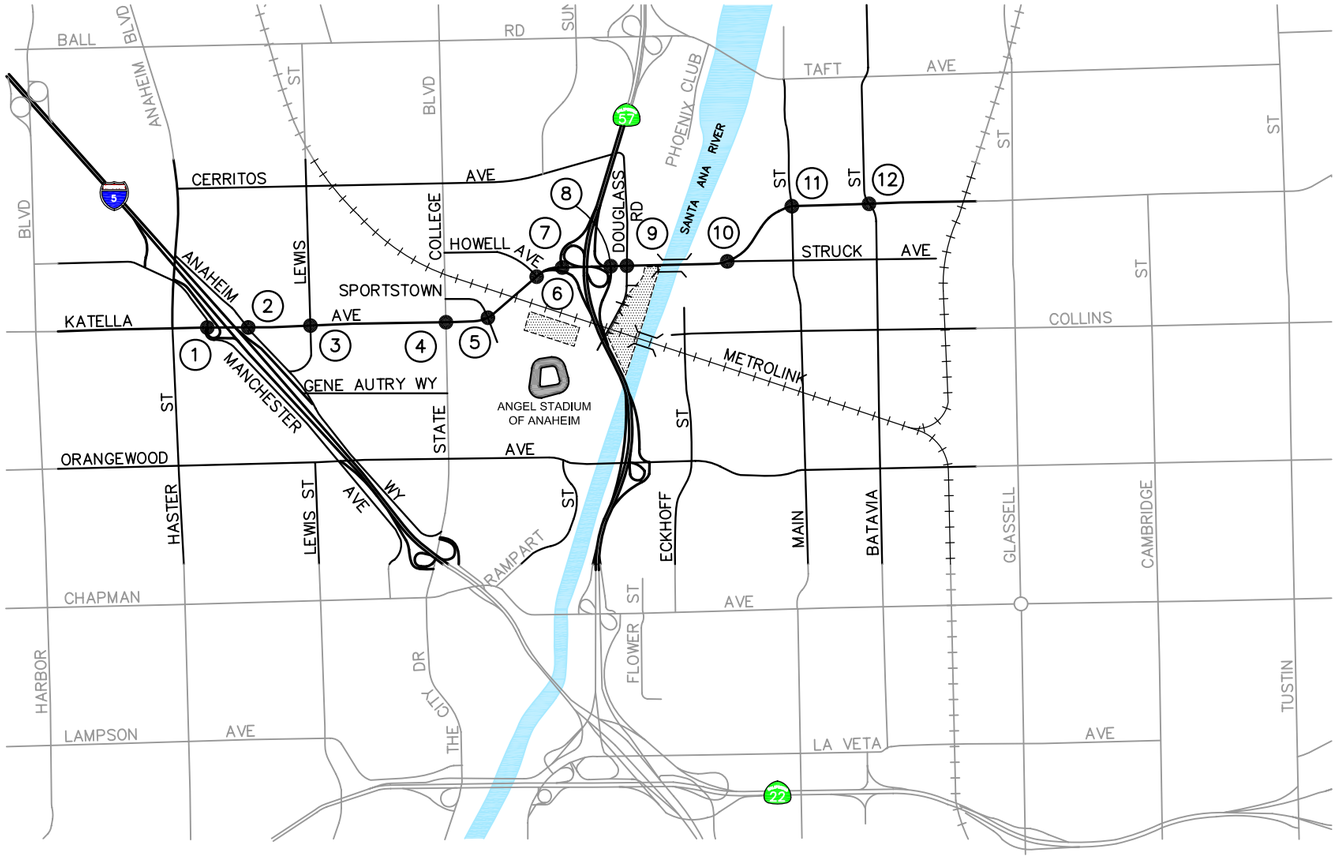
= PROJECT SITE

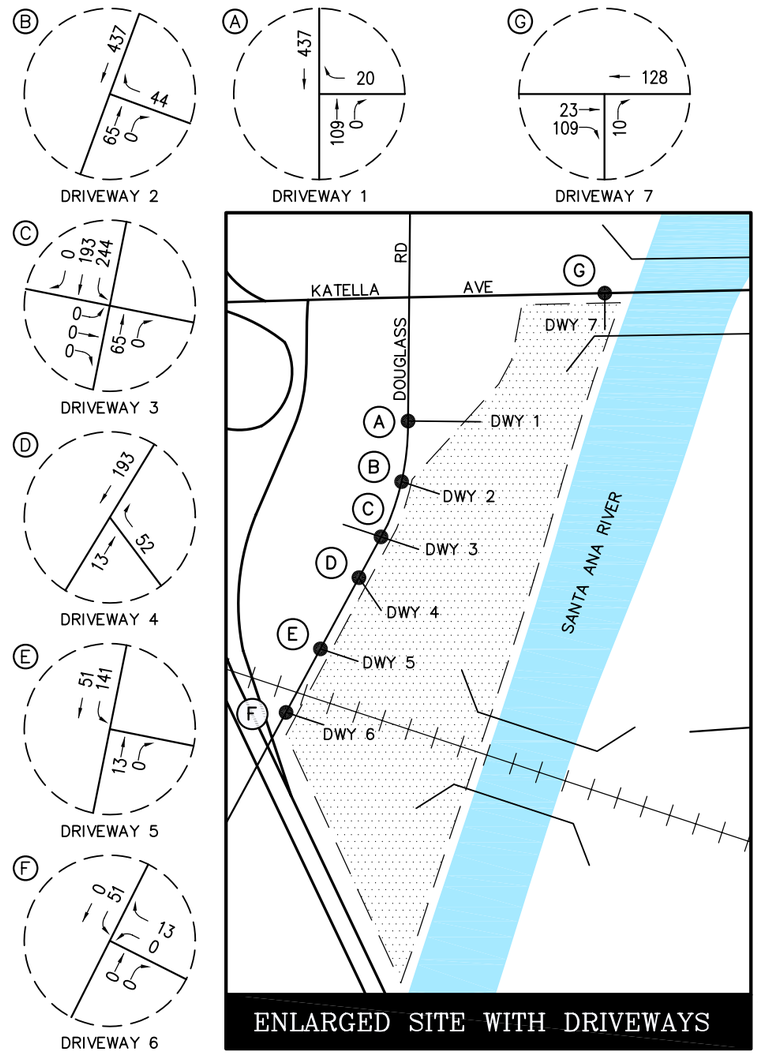
FIGURE 5-5

DAILY EXISTING PROJECT TRAFFIC VOLUMES

ARTIC, ANAHEIM







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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

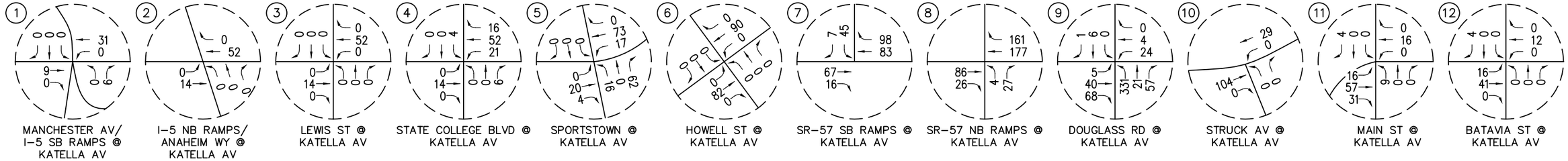
(#) = STUDY INTERSECTION

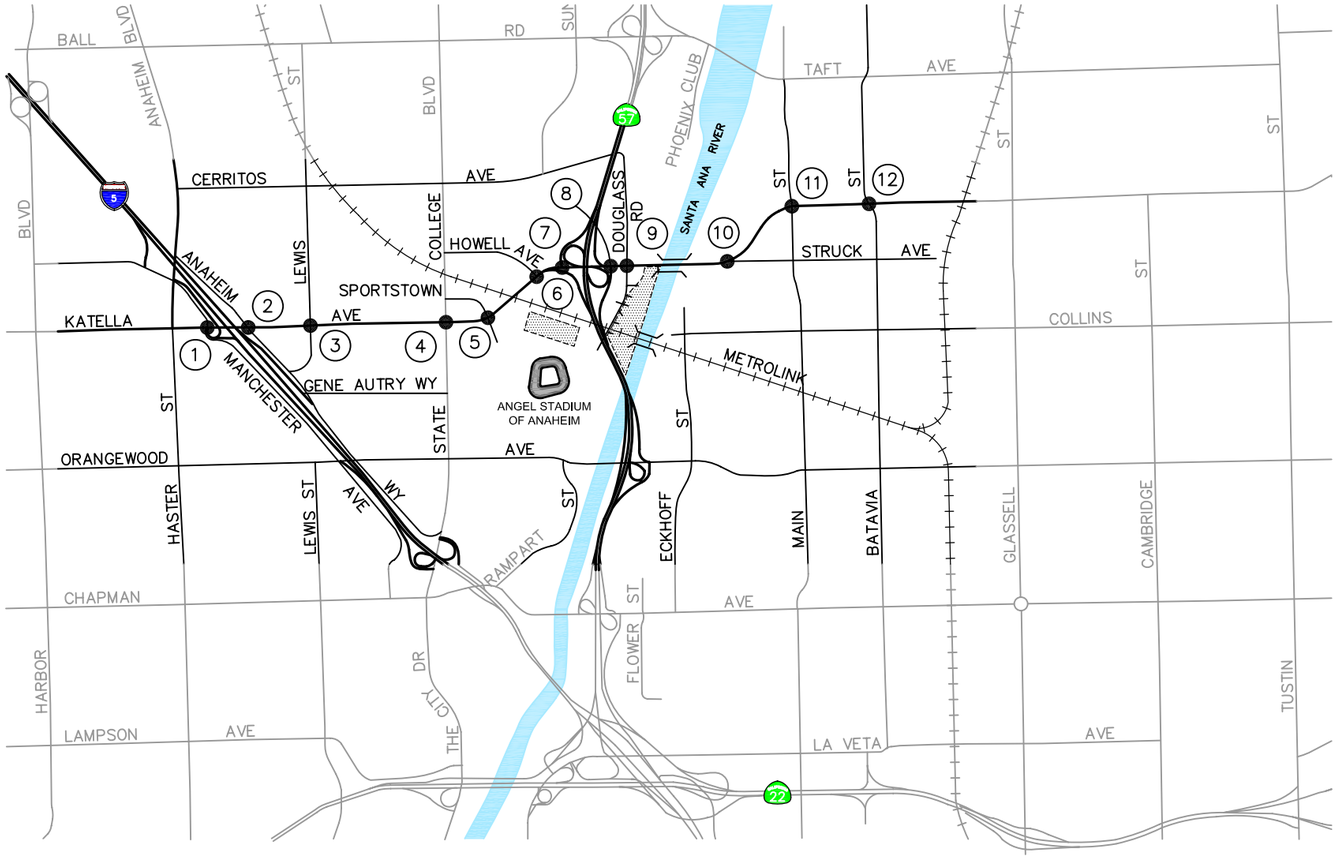
= PROJECT SITE

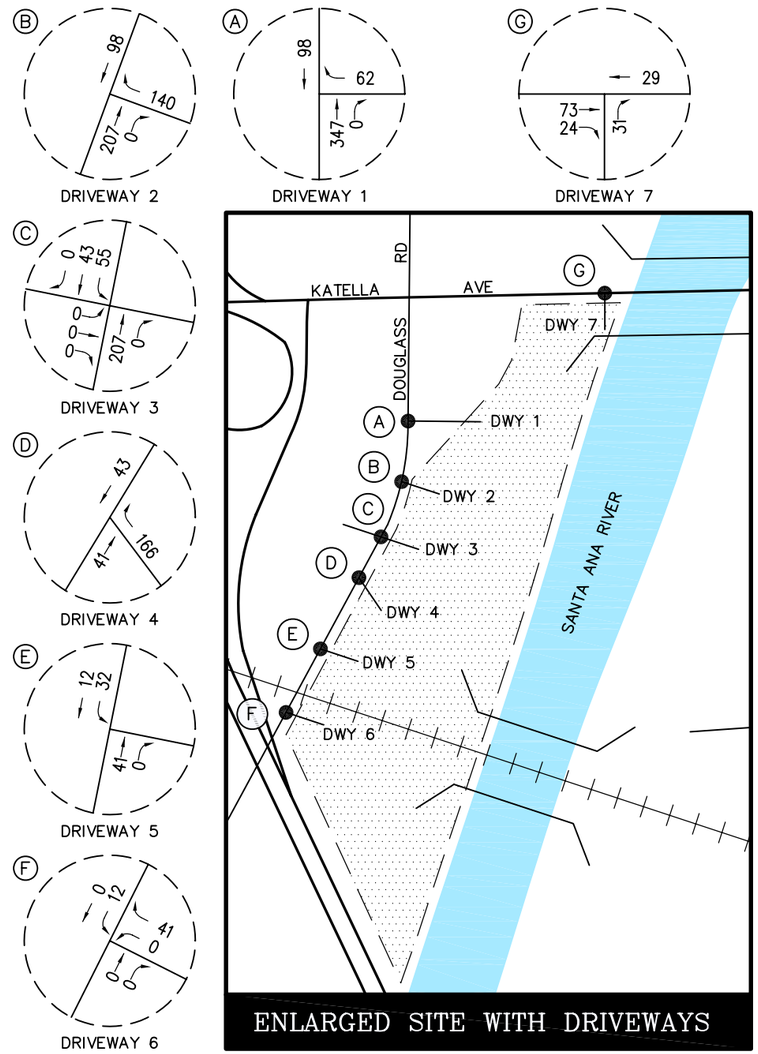
FIGURE 5-6

AM PEAK HOUR PROPOSED PROJECT TRAFFIC VOLUMES

ARTIC, ANAHEIM







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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

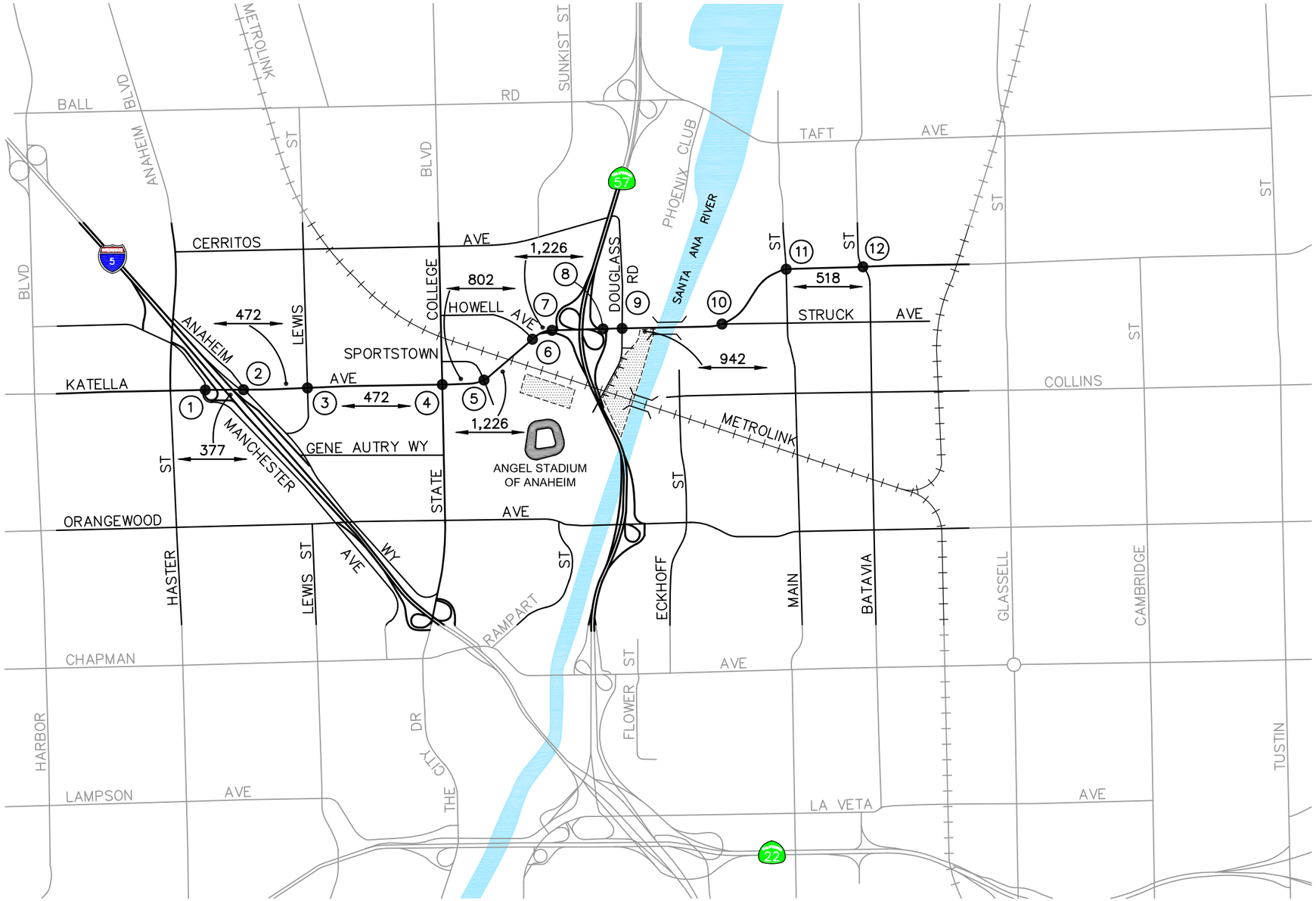
(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 5-7

PM PEAK HOUR PROPOSED PROJECT TRAFFIC VOLUMES

ARTIC, ANAHEIM



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

X,XXX = DAILY TRAFFIC VOLUMES

(#) = STUDY INTERSECTION

= PROJECT SITE

FIGURE 5-8

DAILY PROPOSED PROJECT TRAFFIC VOLUMES

ARTIC, ANAHEIM

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 traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections and seven (7) Project driveways are presented in ***Figures 6-1*** and ***6-2***, respectively. In addition, ***Figure 6-3*** presents the Daily Existing With Project traffic volumes at the eight (8) key study roadway segments.

The traffic volumes presented in the above mentioned figures were provided by City of Anaheim. ***Appendix C*** contains the detailed Existing With Project traffic volume data.

6.2 Year 2013 Without Project Traffic Volumes

In order to make a realistic estimate of future on-street conditions prior to implementation of the proposed Project, anticipated Year 2013 traffic volumes are calculated by interpolation of model growth. Background ambient traffic growth estimates have been calculated by interpolating between the existing volumes and the Year 2030 With Project volumes.

The status of other known development projects (related projects) in the area has been researched at the City of Anaheim, and have been included as part of the cumulative background settings for the near-term (Year 2013) traffic conditions. Based on information provided by the City of Anaheim, there are twenty-five (25) related projects located in the City of Anaheim that have either been built, but not yet fully occupied, or are being processed for approval. These twenty-five (25) related projects have been included as part of the cumulative background settings.

Table 6-1 provides a brief description for each of the twenty-five (25) related projects. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the key study intersections and roadway links.

The anticipated Year 2013 Without Project traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections are presented in ***Figures 6-4*** and ***6-5,*** respectively. In addition, ***Figure 6-6*** presents the Daily Year 2013 Without Project traffic volumes at the eight (8) key study roadway segments. The traffic volumes presented in the above mentioned figures were provided by the City of Anaheim. ***Appendix D*** contains the detailed Year 2013 Without Project traffic volume data.

6.3 Year 2013 With Project Traffic Volumes

The estimates of Project-generated traffic volumes were added to the Year 2013 Without Project traffic conditions to develop traffic projections for the Year 2013 With Project traffic conditions. The anticipated Year 2013 With Project traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections and seven (7) Project driveways are presented in ***Figures 6-7***

and ***6-8***, respectively. In addition, ***Figure 6-9*** presents the Daily Year 2013 With Project traffic volumes at the eight (8) key study roadway segments.

6.4 Year 2030 Without Project Traffic Volumes

The Year 2030 traffic volume forecasts were obtained from the Anaheim Traffic Analysis Model (ATAM). ATAM is the traffic forecasting tool for the City of Anaheim and has been certified by the Orange County Transportation Authority to be consistent with the Orange County Transportation Analysis Model (OCTAM). ATAM relies upon OCTAM for the regional traffic component. OCTAM is based on and is consistent with the Southern California Association of Government's (SCAG's) regional transportation model, incorporating adopted regional growth projections. In addition, the General Plan Buildout highway network is assumed in the Cities of Anaheim and Orange for Year 2030 analysis and all other facilities are consistent with the Master Plan of Arterial Highways (MPAH) buildout.

As a subarea model, ATAM incorporates the City of Anaheim General Plan within the City limits. As General Plan Amendments are processed, ATAM is updated to reflect any changes to the General Plan. Therefore ATAM contains every adopted project within the City's limits. There are also a number of projects which are currently under various stages of analysis, and have been incorporated into ATAM for the purposes of this project. The following projects listed below are some of the projects relevant to ARTIC but are separate, distinct, and independent from ARTIC in terms of funding, lead agency status, purpose and need and regulatory requirements. A complete list of all projects included in ATAM is included in the ***ARTIC EIR Section 6.2***. Each relevant project listed below has undergone or is currently undergoing their own separate project clearance process, including but not limited to CEQA and NEPA and are included in the long-term cumulative analysis of this study. These projects are:

- Anaheim Rapid Connection
- California High-Speed Rail
- California-Nevada Super Speed Train (CNSST)
- Desert Express
- Revised Platinum Triangle Expansion
- Amendment to the Anaheim Resort Specific Plan
- City of Orange General Plan Update
- Orange Center Specific Plan

It should be noted that the Revised Platinum Triangle Expansion includes ARTIC. As a result, the Year 2030 forecast volumes from ATAM are considered the Year 2030 With Project volumes. Therefore, to obtain the without Project volumes, the Project trips were subtracted from the "with" Project volumes.

The anticipated Year 2030 Without Project traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections are presented in ***Figures 6-10*** and ***6-11,*** respectively. In

addition, ***Figure 6-12*** presents the Daily Year 2030 Without Project traffic volumes at the eight (8) key study roadway segments. The traffic volumes presented in the above mentioned figures were provided by the City of Anaheim.

6.5 Year 2030 With Project Traffic Volumes

The anticipated Year 2030 With Project traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections were generated from the Anaheim Transportation Analysis Model (ATAM) for the City of Anaheim General Plan Buildout and includes related projects that are listed in ***Section 6.4*** of this report. The anticipated Year 2030 With Project traffic conditions AM and PM peak hour traffic volumes at the twelve (12) key study intersections and seven (7) Project driveways are presented in ***Figures 6-13*** and ***6-14***, respectively. In addition, ***Figure 6-15*** presents the Daily Year 2030 With Project traffic volumes at the eight (8) key study roadway segments. The traffic volumes presented in the above mentioned figures were provided by the City of Anaheim. ***Appendix E*** contains the detailed Year 2030 With Project traffic volume data.

TABLE 6-1

RELATED PROJECTS SUMMARY[11]

Related Project	Description	Units/Square Footage
City of Anaheim		
1. Trendwest Resorts Timeshare	Timeshare	275 Rooms
2. Anaheim GardenWalk	Retail, Restaurants, Entertainment Hotel	569,750 SF 1,628 Rooms
3. Grand Californian Hotel Expansion	Hotel	280 Rooms
4. Springhill Suites	Hotel	120 Rooms
5. Manchester/Orangewood	Affordable Apartments	68 DU
6. Walnut Manor	Retirement Community Skilled Nursing Facility	156 DU 99 Beds
7. Avalon Bay "2100 at Platinum Triangle"	Apartments Commercial	251 DU 11,807 SF
8. The Hanover Company "Element"	Apartments	265 DU
9. Integral Partners "Anavia"	Apartments	250 DU
10. "Archstone Gateway"	Apartments	884 DU
11. Platinum Triangle Condominiums	Condominiums Commercial	336 DU 1,248 SF
12. BRE Properties "Stadium Park" & "Stadium Club"	Apartments Condominiums	320 DU 534 DU
13. Lennar "A-Town Metro"	Residential Commercial	2,681 SF 229,800 SF
14. Platinum Tower	Office Commercial	590,000 SF 10,000 SF
15. Orangewood Condominiums	Condominiums	341 DU
16. Lennar "A-Town Stadium"	Condominiums	878 DU
17. Platinum Vista/Mr. Stox	Condominiums Quality Restaurant	315 DU 9,500 SF

Notes

- DU = Dwelling Units
- SF = Square-Feet

[11] *Source*: City of Anaheim, Public Works/Traffic Engineering Department.

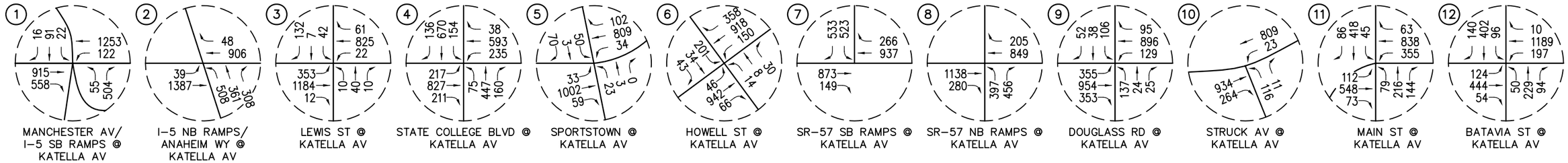
TABLE 6-1 (CONTINUED)
RELATED PROJECTS SUMMARY[12]

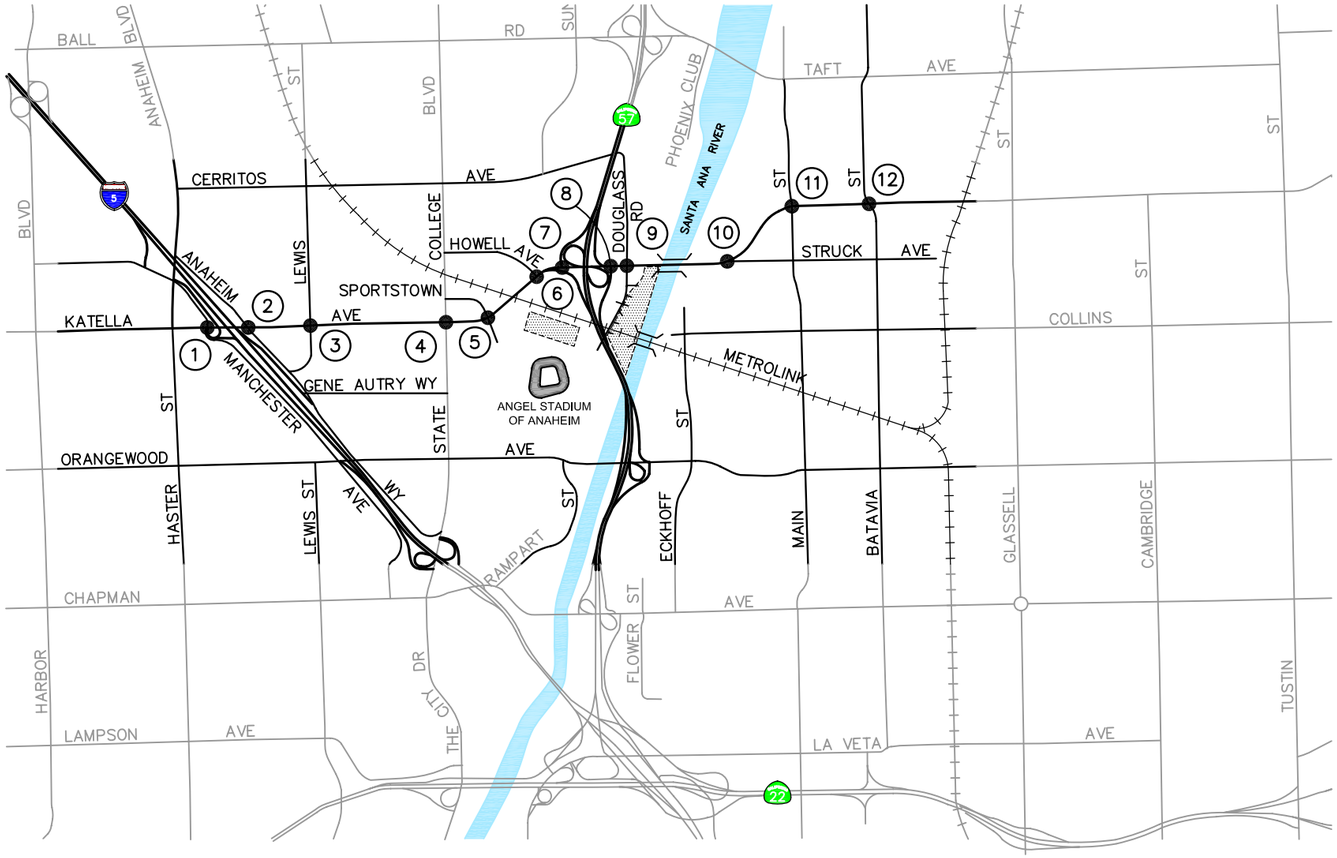
Related Project	Description	Units/Square Footage
18. "Gene Autry Experience"	Condominiums Office Commercial	1,208 DU 100,000 SF 50,000 SF
19. "Alexan Orangewood"	Apartments	690 DU
20. "Platinum Gateway"	Apartments Office Hotel	328 DU 207,275 SF 138 Rooms
21. Convention Center	Hotel Convention Space Retail	795 Rooms 200,000 SF 20,000 SF
22. Stadium Lofts	Mixed Use Development	--
23. D.R. Horton Mixed Use	Apartments Retail Restaurant	261 DU 2,740 SF 10,000 SF
24. Integral Partners Apartments 1818 S. State College Boulevard	Apartments	266 DU
25. Integral Partners Apartments 2045 S. State College Boulevard	Apartments	265 DU

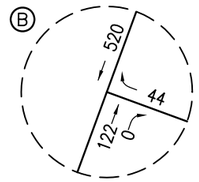
Notes

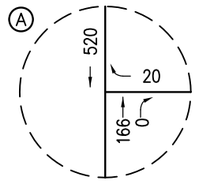
- DU = Dwelling Units
- SF = Square-Feet

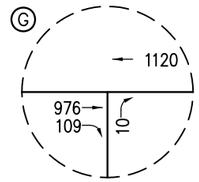
[12] *Source*: City of Anaheim, Public Works/Traffic Engineering Department.

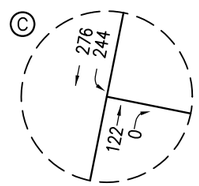


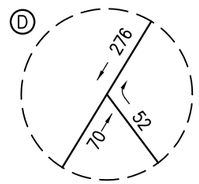


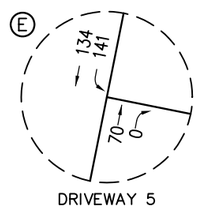


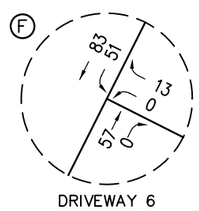


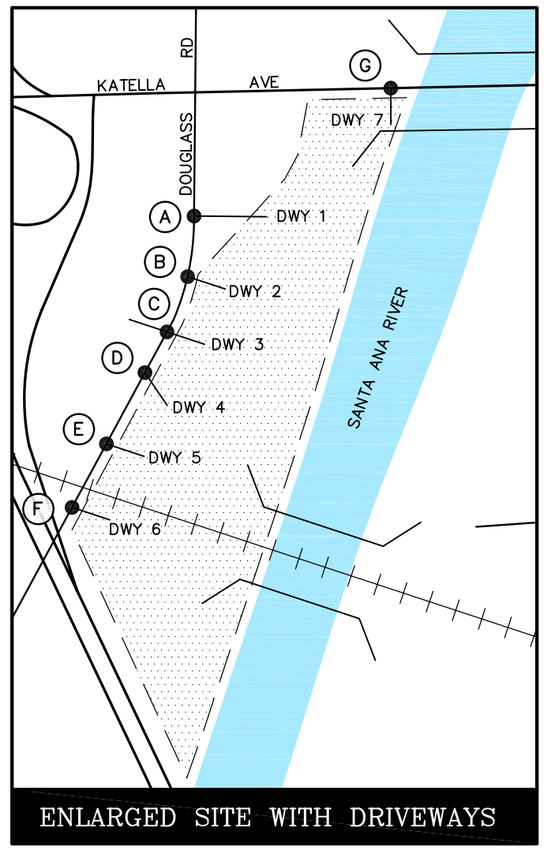












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(#) = STUDY INTERSECTION

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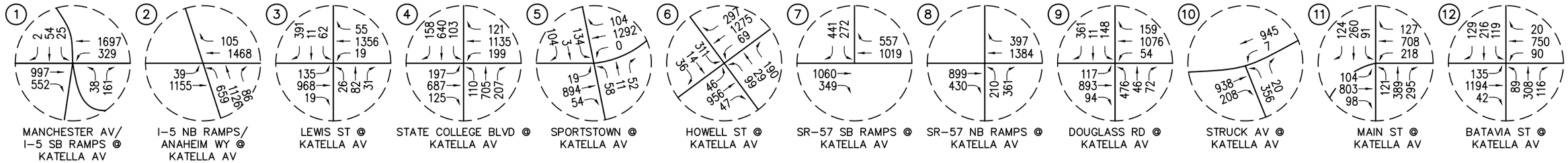
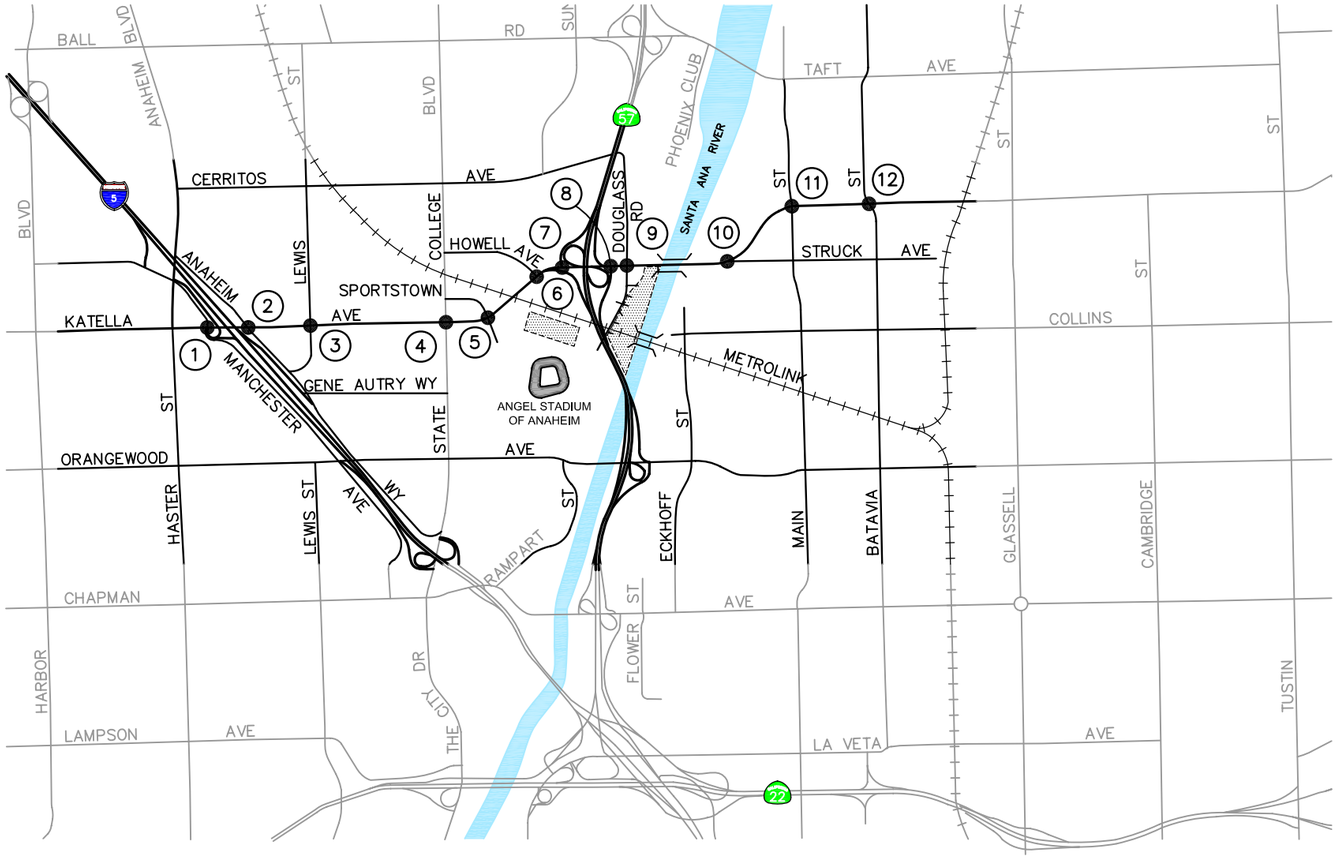
FIGURE 6-1

EXISTING WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM





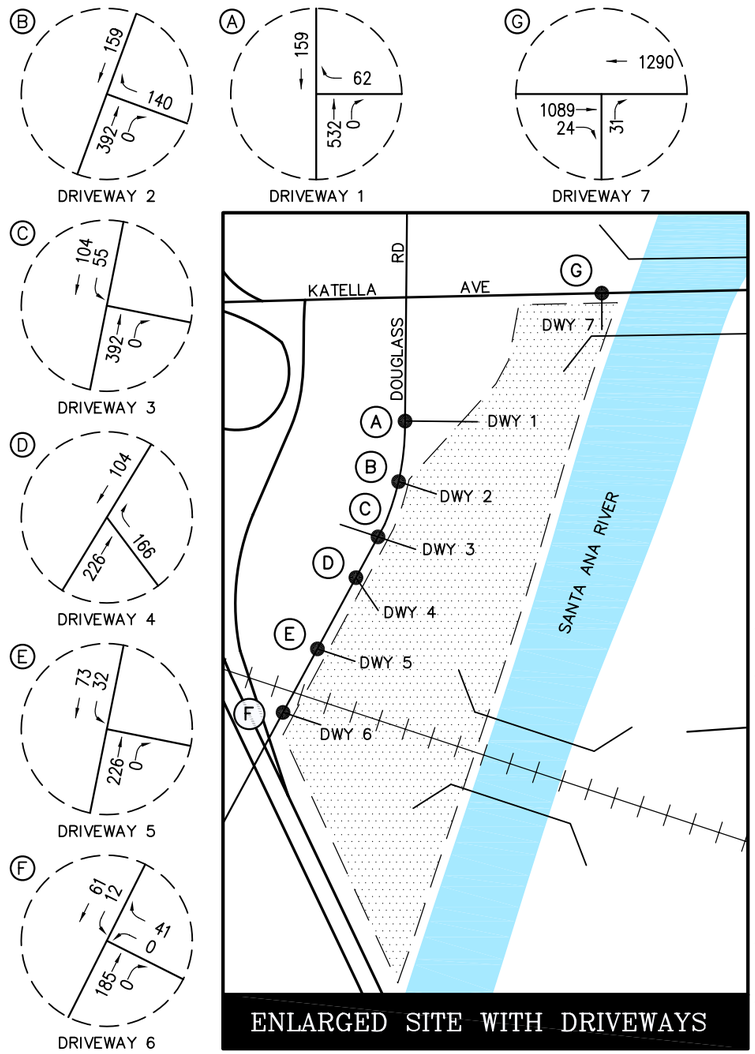


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FIGURE 6-2

EXISTING WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES

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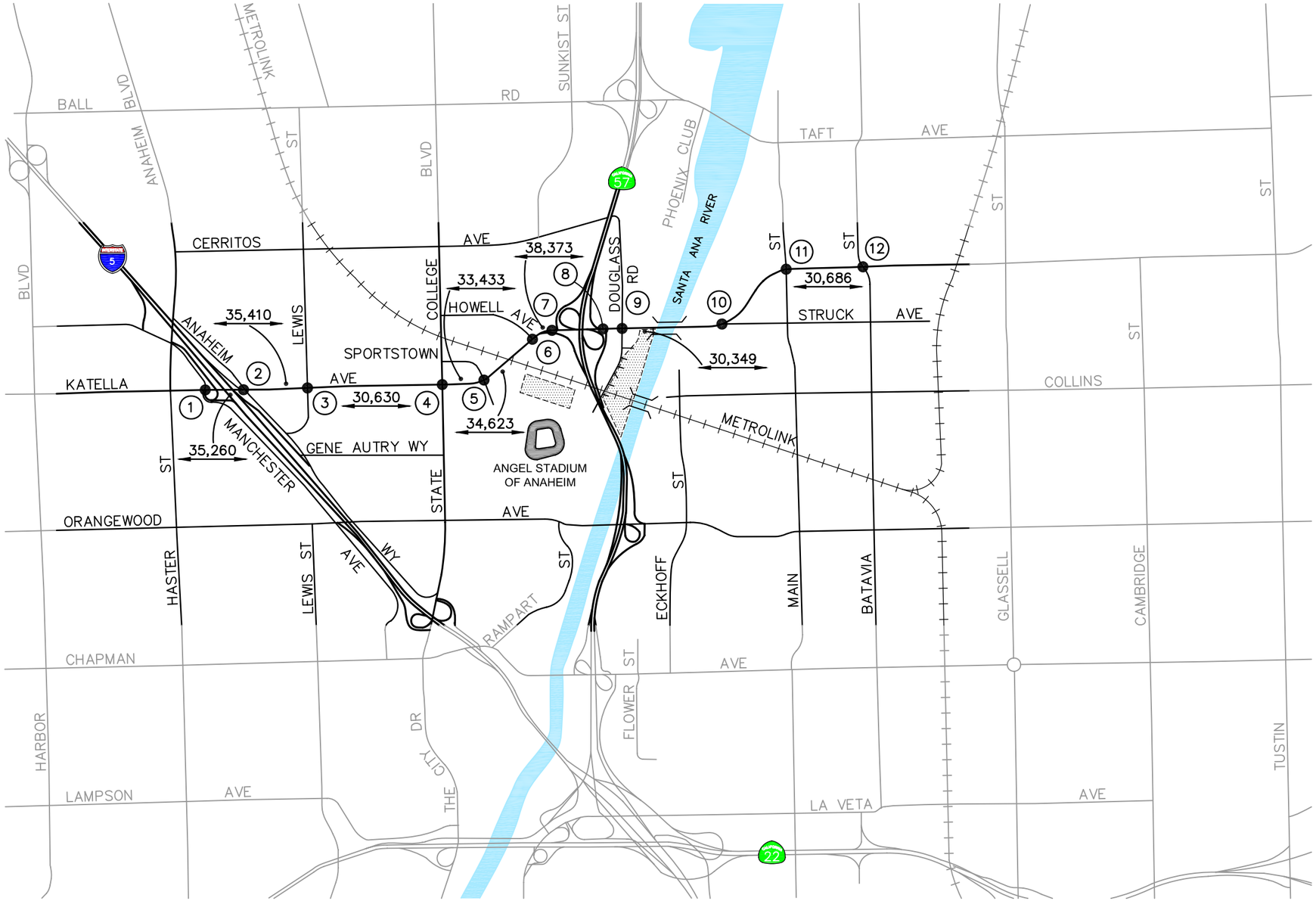

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XX,XXX = DAILY TRAFFIC VOLUMES

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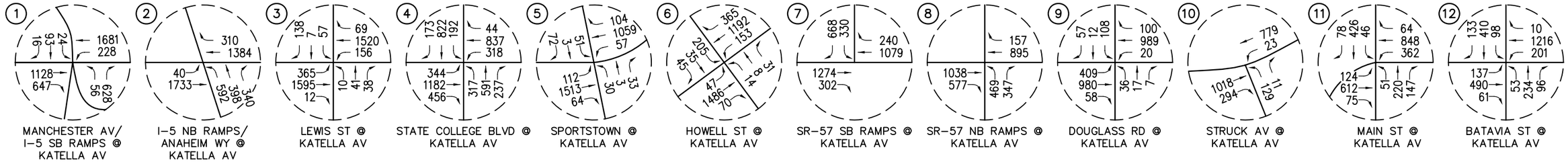
FIGURE 6-3

EXISTING WITH PROJECT DAILY TRAFFIC VOLUMES

ARTIC, ANAHEIM



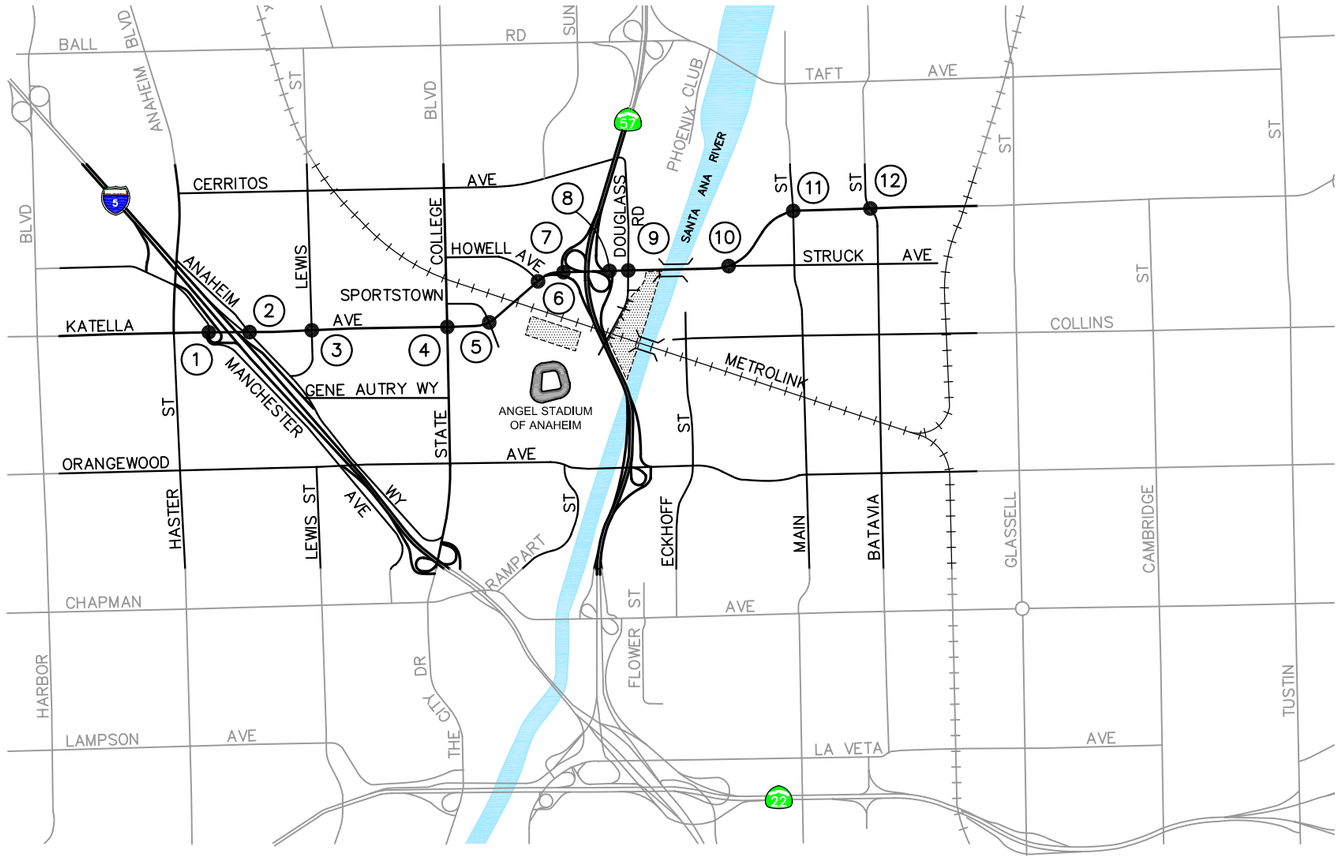


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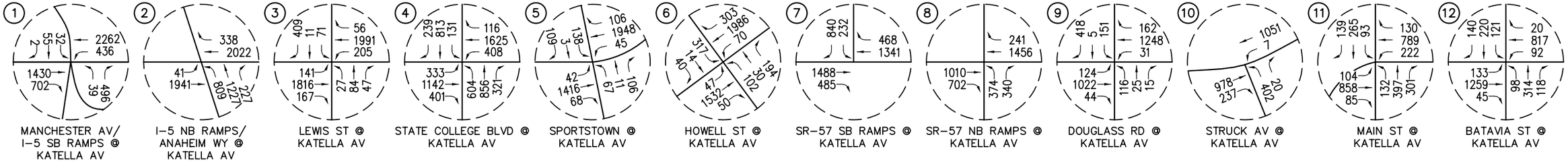
FIGURE 6-4

YEAR 2013 WITHOUT PROJECT AM PEAK HOUR TRAFFIC VOLUMES
ARTIC, ANAHEIM



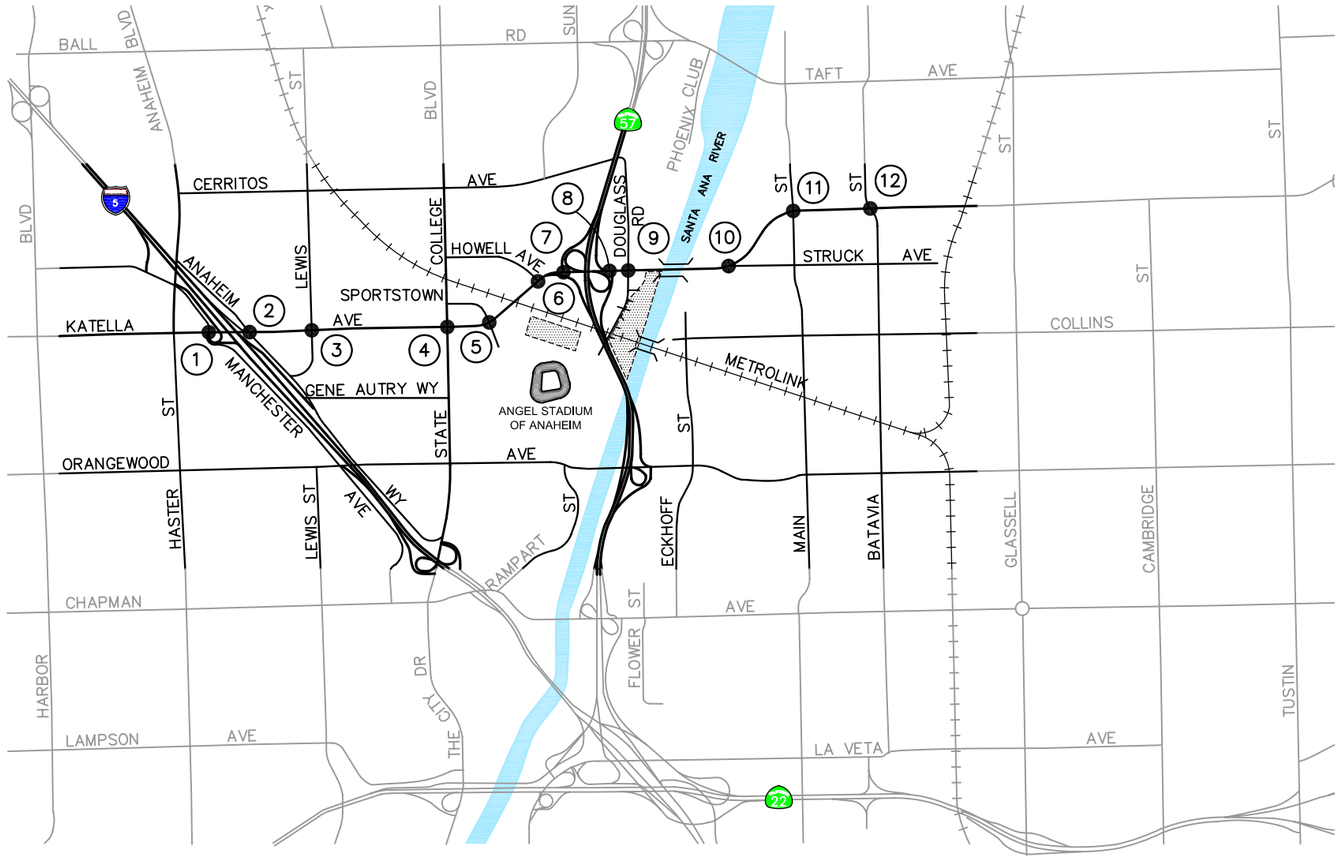


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FIGURE 6-5

YEAR 2013 WITHOUT PROJECT PM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM

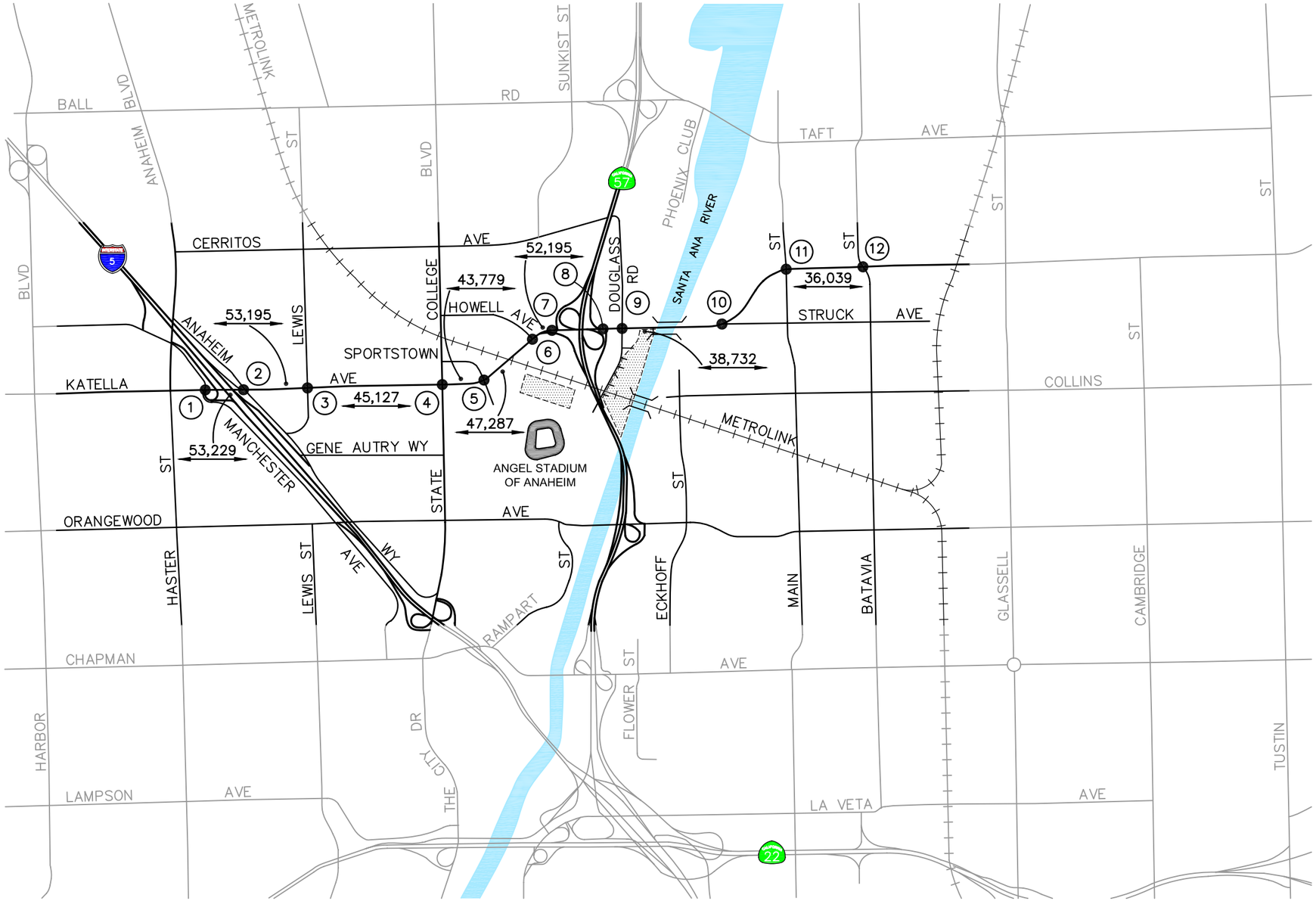

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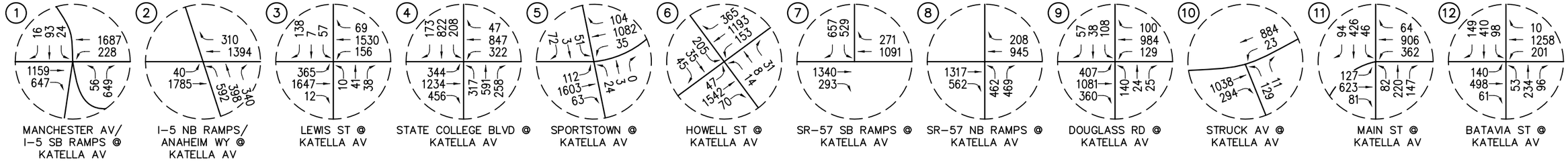
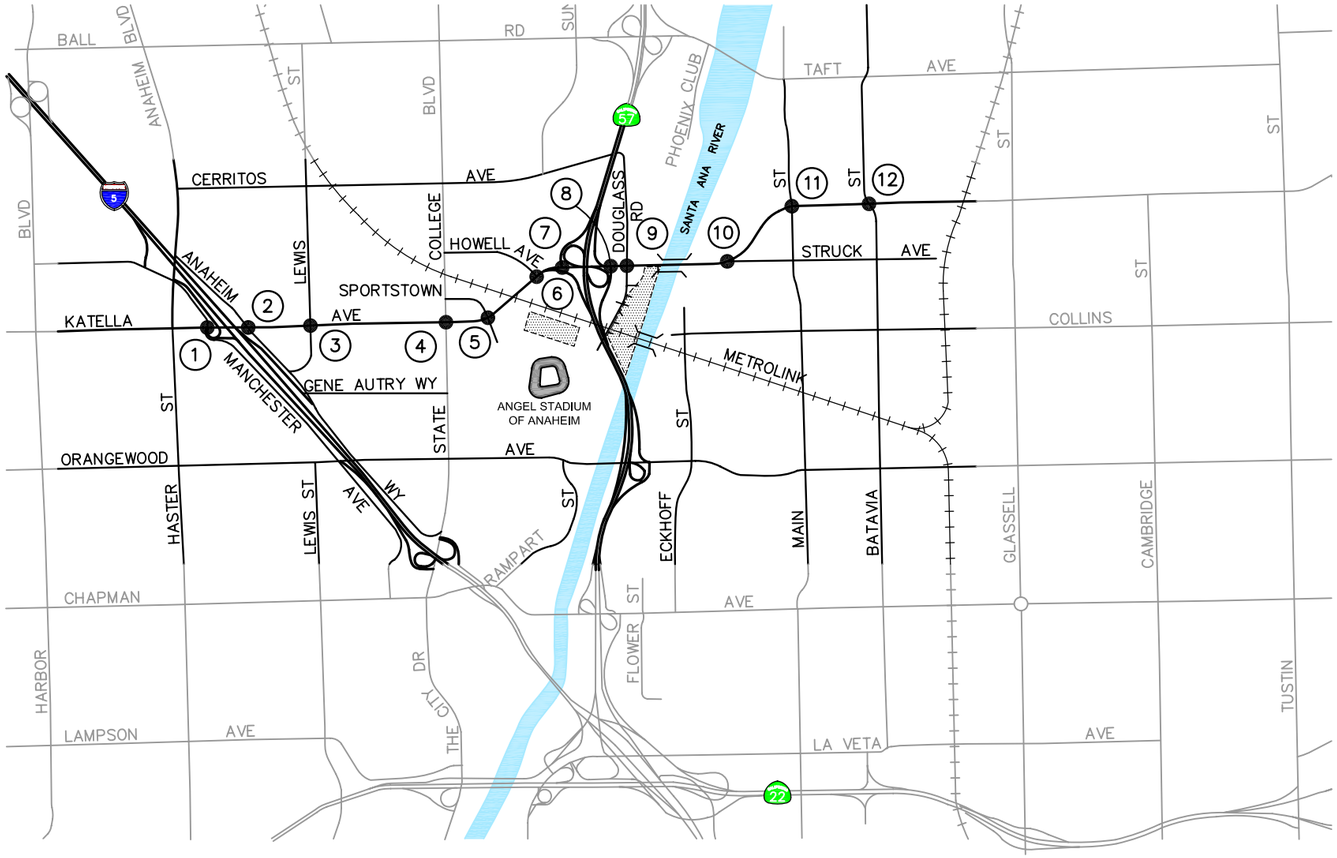
FIGURE 6-6

YEAR 2013 WITHOUT PROJECT DAILY TRAFFIC VOLUMES

ARTIC, ANAHEIM





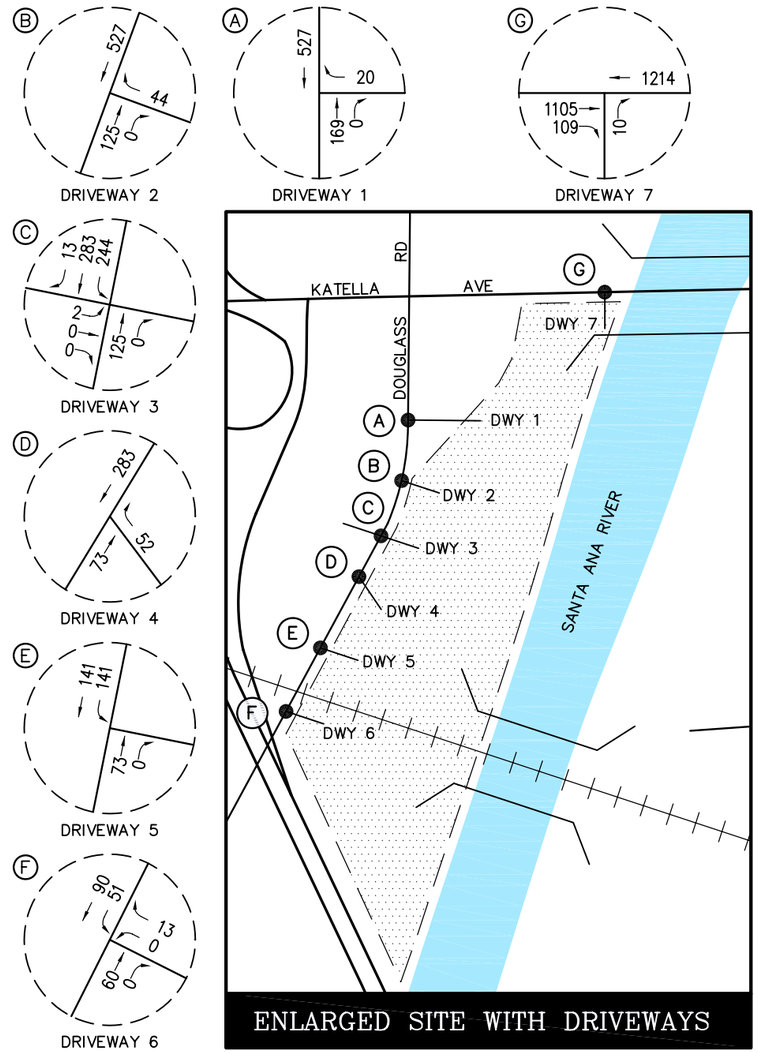


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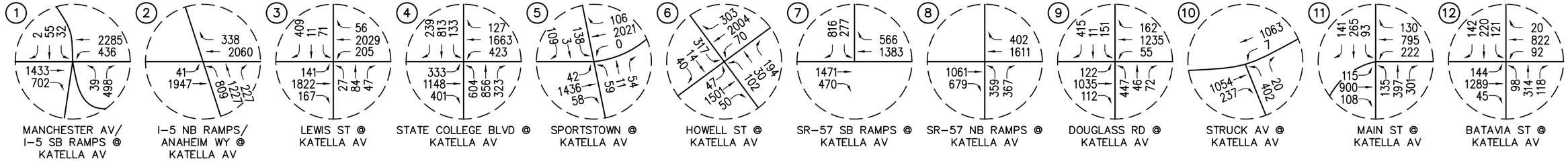
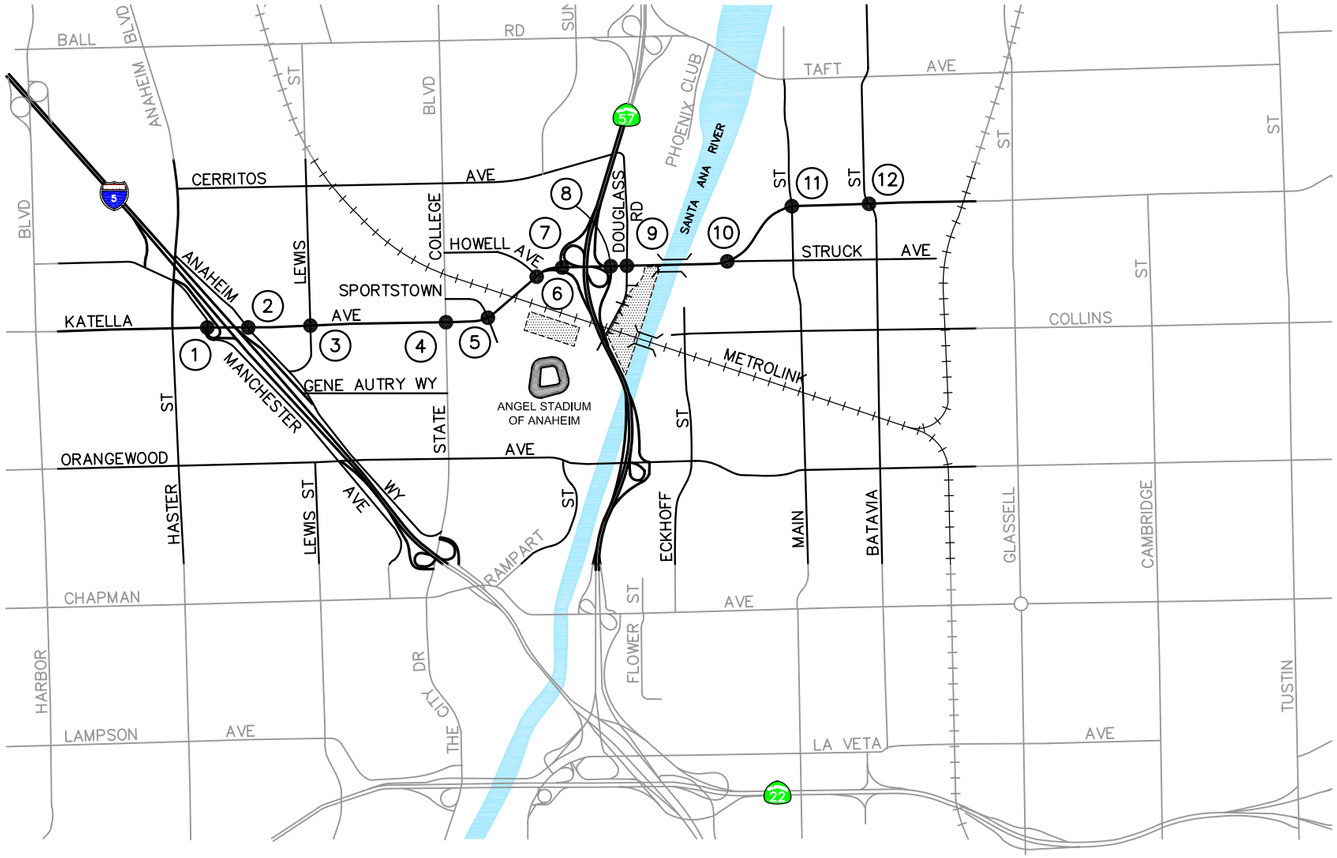
FIGURE 6-7

YEAR 2013 WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM





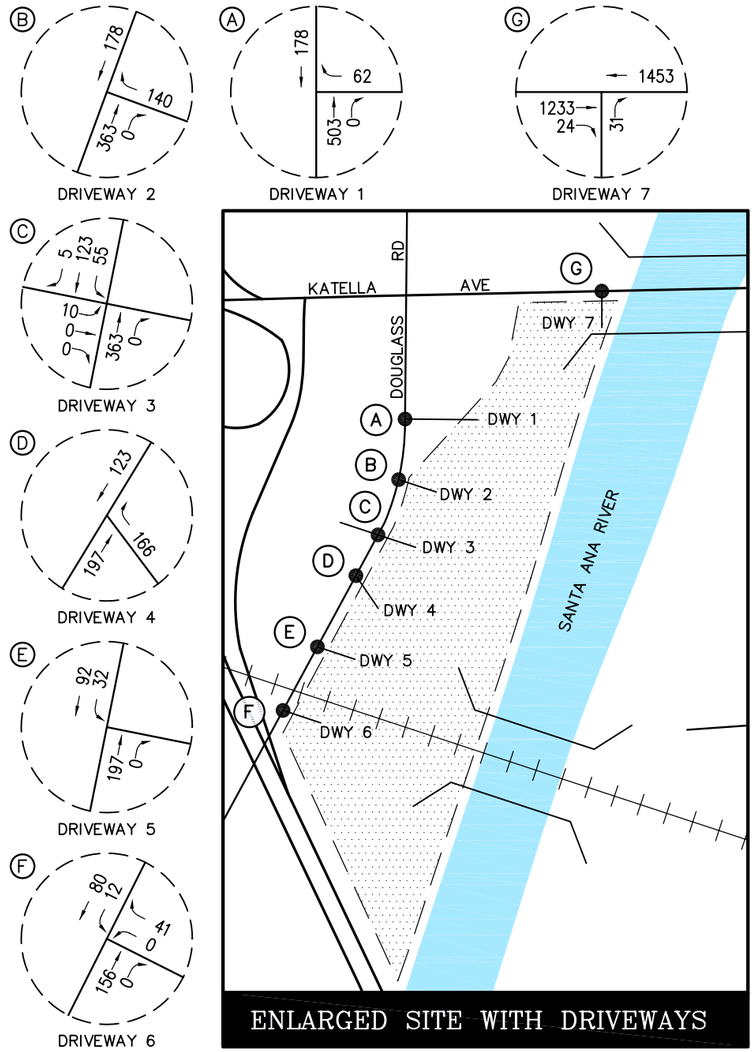


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FIGURE 6-8

YEAR 2013 WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES

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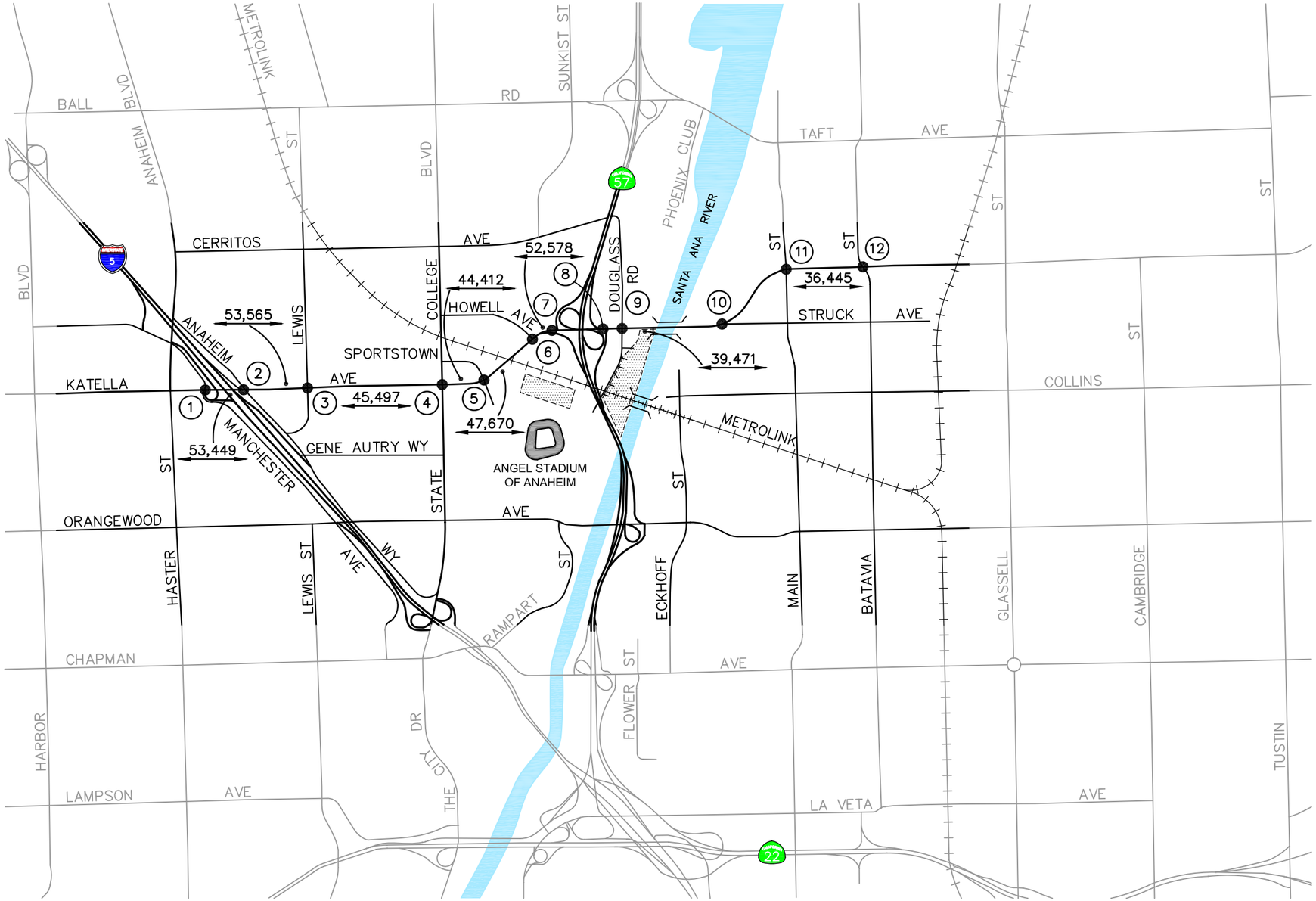

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FIGURE 6-9

YEAR 2013 WITH PROJECT DAILY TRAFFIC VOLUMES
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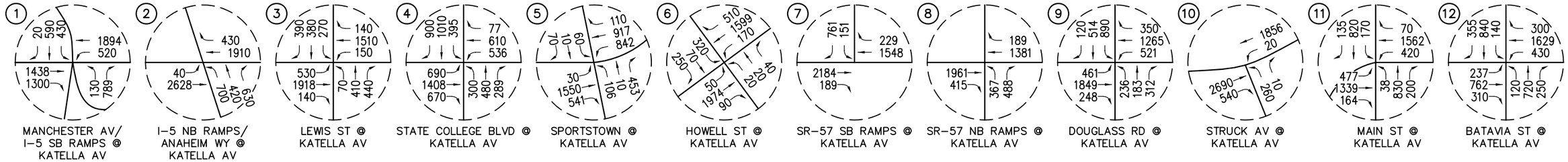

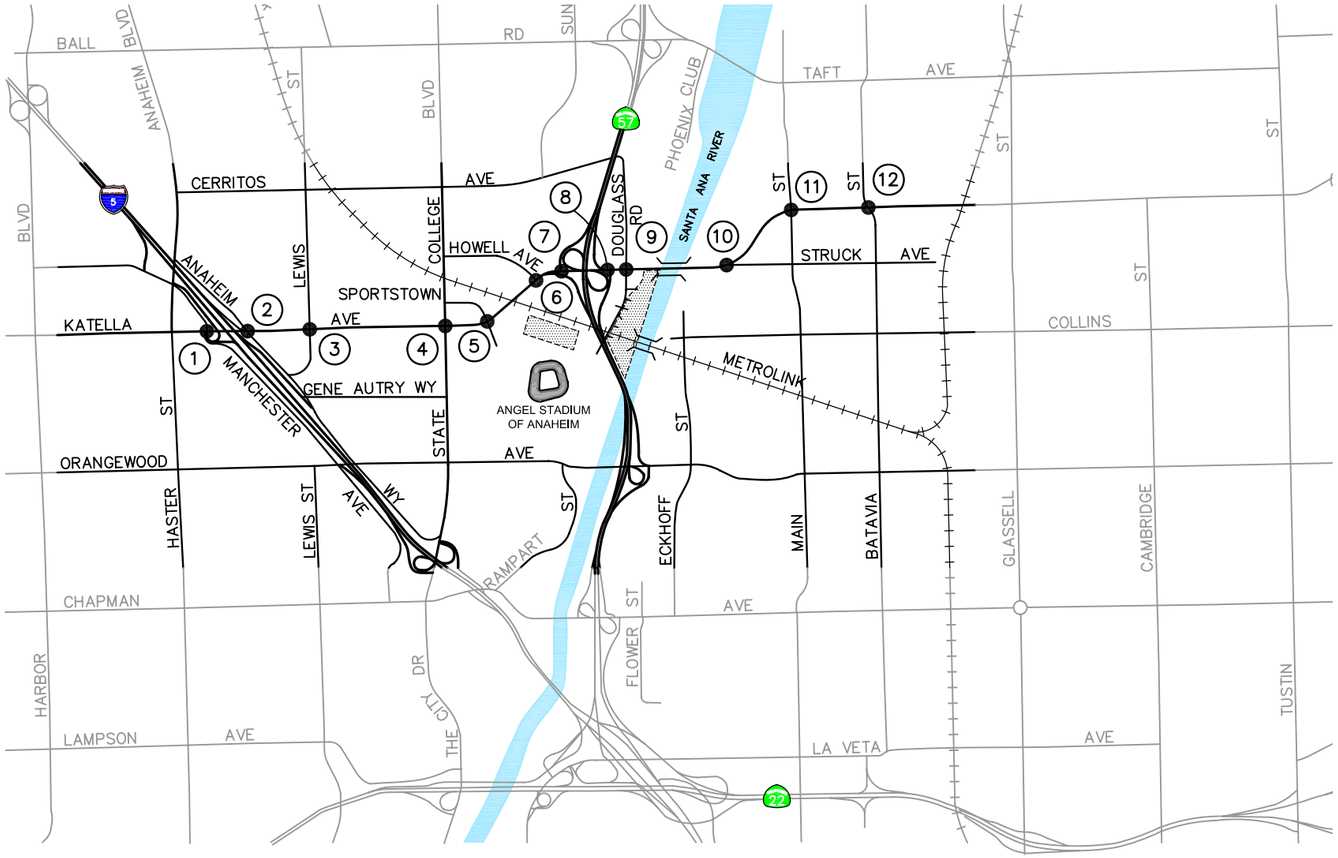

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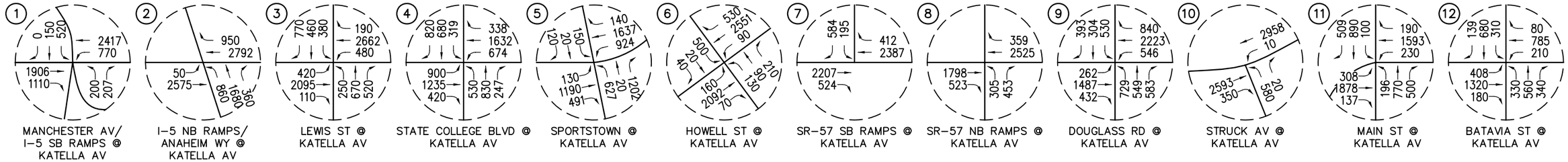
FIGURE 6-10

YEAR 2030 WITHOUT PROJECT AM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM



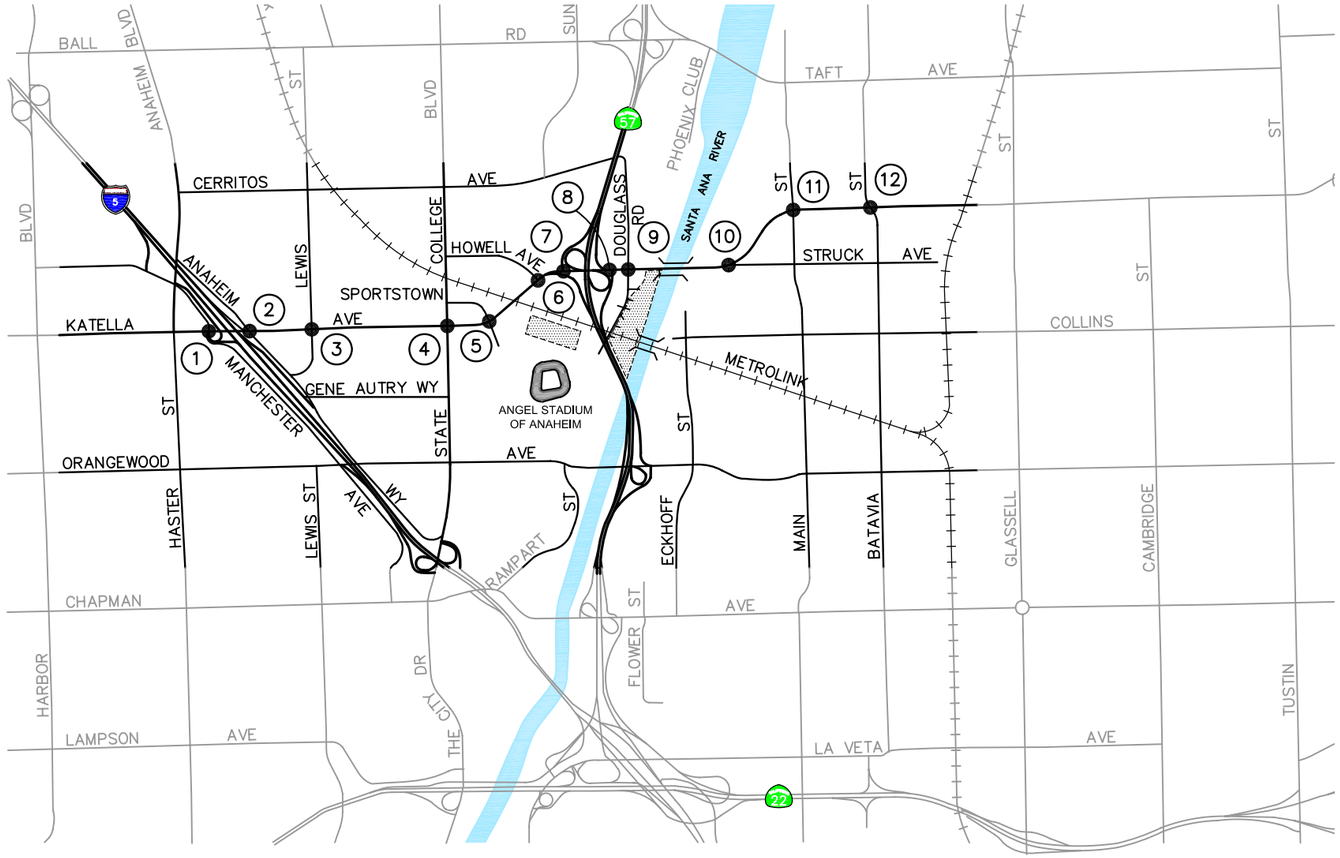


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FIGURE 6-11

YEAR 2030 WITHOUT PROJECT PM PEAK HOUR TRAFFIC VOLUMES

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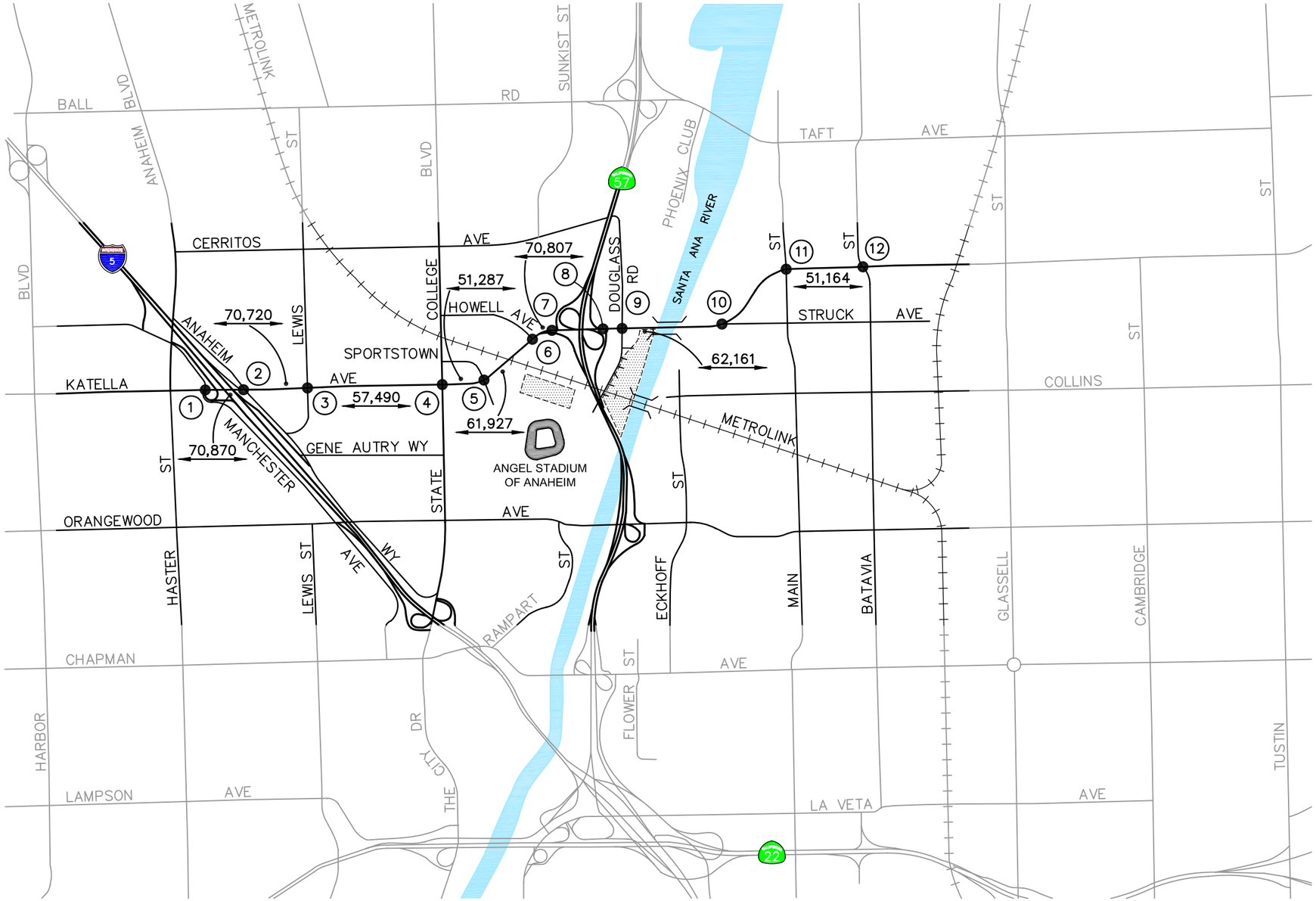

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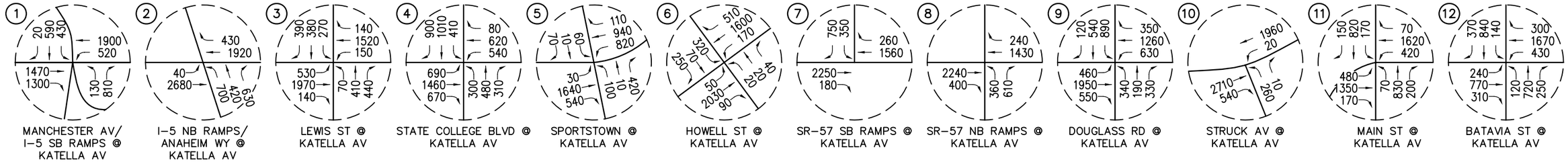
FIGURE 6-12

YEAR 2030 WITHOUT PROJECT DAILY TRAFFIC VOLUMES

ARTIC, ANAHEIM



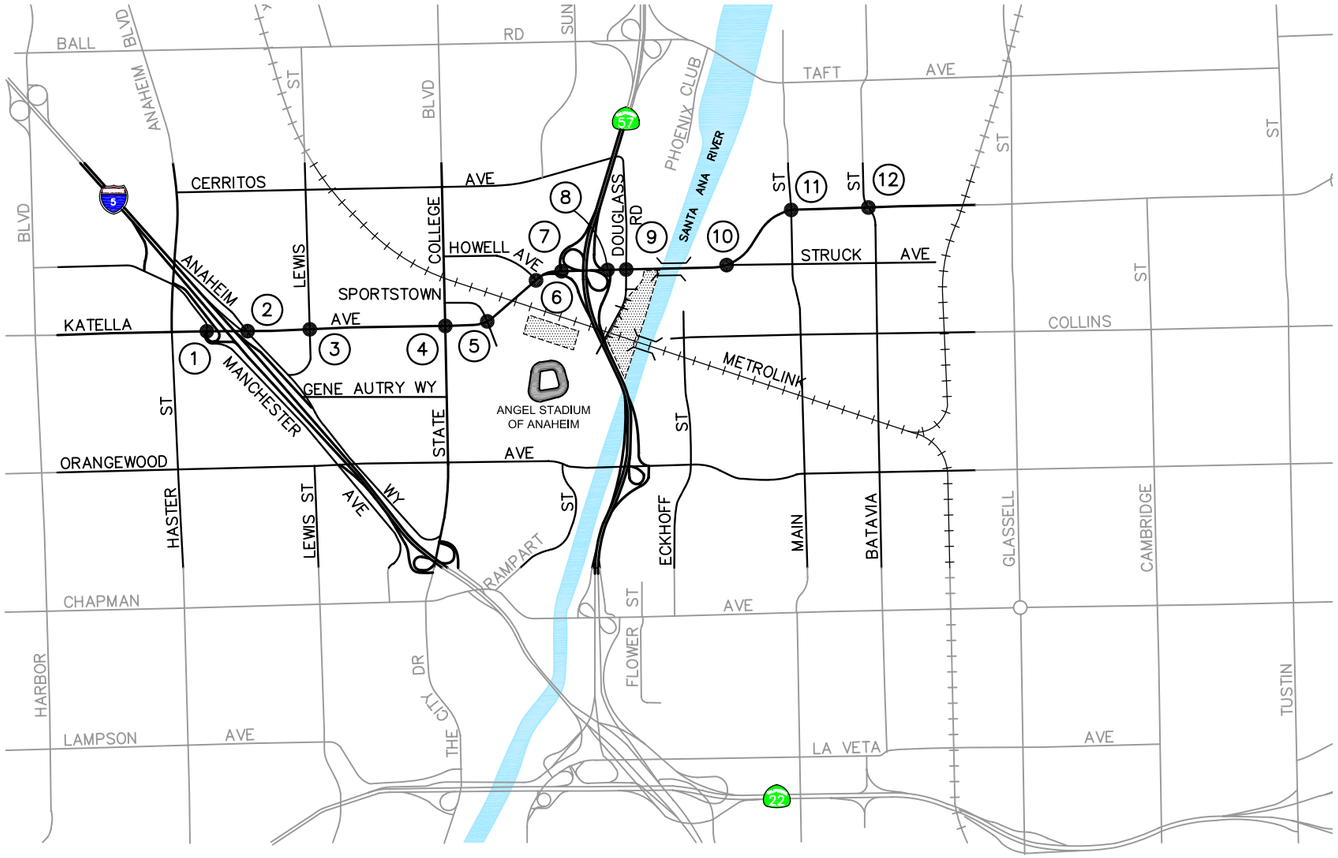


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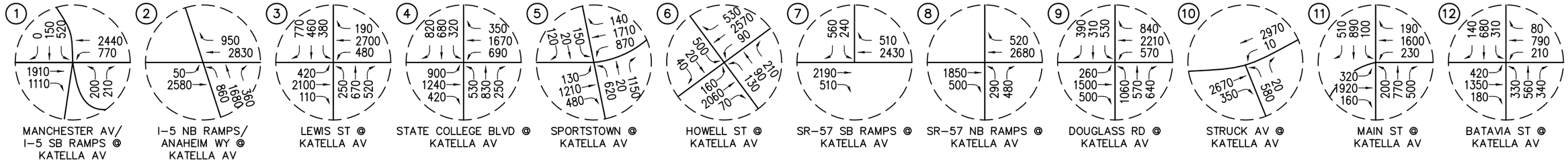
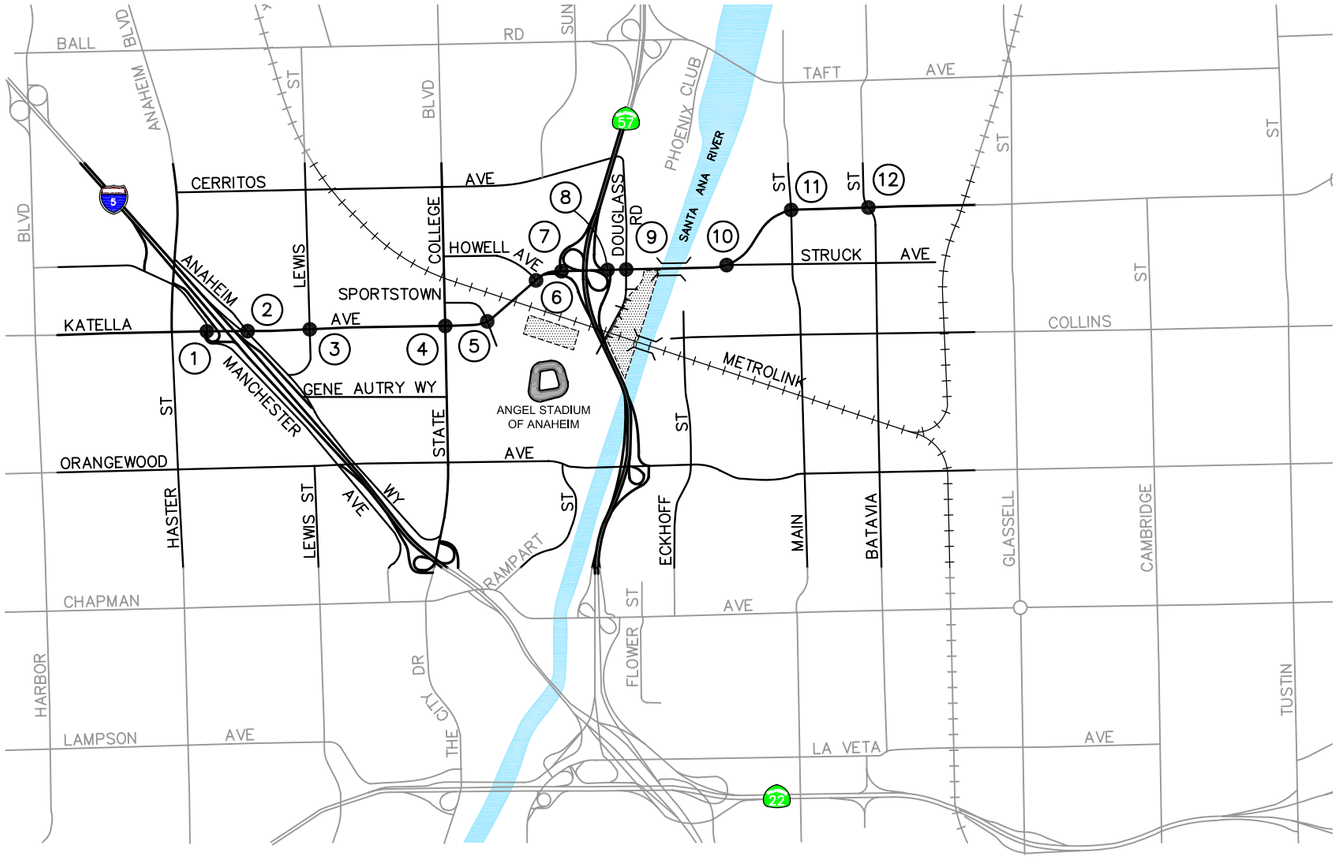
FIGURE 6-13

YEAR 2030 WITH PROJECT AM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM





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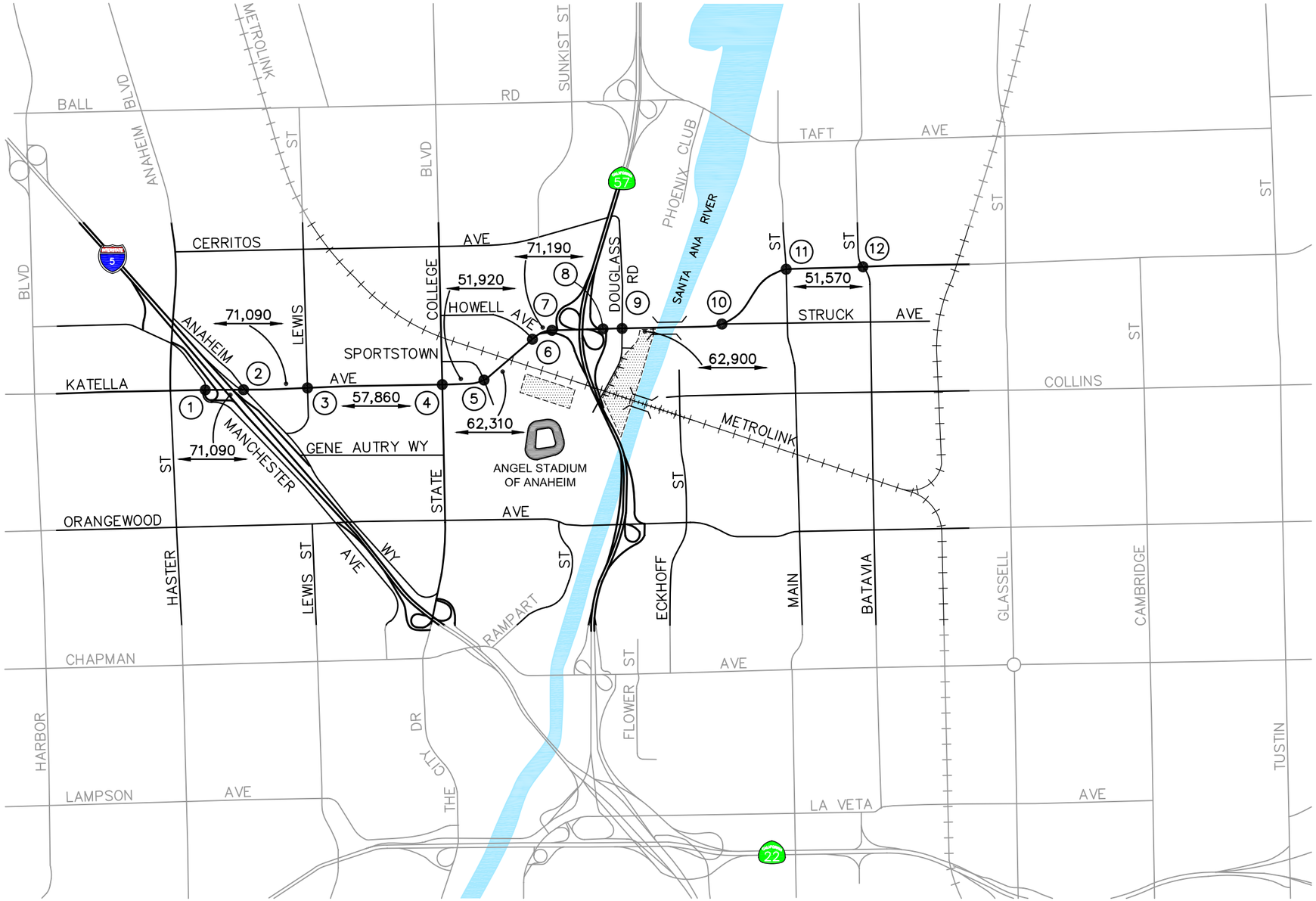
▨ = PROJECT SITE

FIGURE 6-14

YEAR 2030 WITH PROJECT PM PEAK HOUR TRAFFIC VOLUMES

ARTIC, ANAHEIM



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LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

= PROJECT SITE

FIGURE 6-15

YEAR 2030 WITH PROJECT DAILY TRAFFIC VOLUMES
ARTIC, ANAHEIM

7.0 EXISTING CONDITIONS TRAFFIC IMPACT ANALYSIS

The existing conditions analysis establishes the basis for the future forecasts for the Project. This analysis was based on existing intersection and roadway segment counts collected in Year 2008 and provided by the City of Anaheim. The existing conditions analysis reflects these counts as well as existing lane configurations for all analyzed intersections and roadway segments.

7.1 Existing Conditions Intersection Capacity Analysis

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. 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 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*

Review of Column (1) of *Table 7-1* indicates that all of the twelve (12) key study intersections are forecast to operate at acceptable LOS B or better for the Existing traffic conditions.

Appendix F presents the ICU/LOS calculation worksheets for the key study intersections for the Existing Traffic Conditions.

7.1.2 *Existing With Project Traffic Conditions*

Review of column (2) of *Table 7-1* indicates that all of the twelve (12) key study intersections are forecast to operate at acceptable LOS B or better for the Existing With Project traffic conditions when compared to the LOS standards defined in this report.

To supplement the level of service results as presented in *Table 7-1*, ***Figure 7-1*** graphically represents the comparison between Existing and Existing With Project traffic conditions level of service results for the AM and PM peak hours.

Appendix G contains the ICU/LOS level of service calculation worksheets for the Existing With Project Traffic Conditions.

TABLE 7-1

EXISTING CONDITIONS PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[13]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[14]		(4) Existing With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.583	A	0.584	A	0.001	No	--	--
Katella Avenue	PM	0.524	A	0.528	A	0.004	No	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.493	A	0.503	A	0.010	No	--	--
Katella Avenue	PM	0.496	A	0.497	A	0.001	No	--	--
3. Lewis Street at	AM	0.484	A	0.485	A	0.001	No	--	--
Katella Avenue	PM	0.646	B	0.653	B	0.007	No	--	--
4. State College Boulevard at	AM	0.426	A	0.446	A	0.020	No	--	--
Katella Avenue	PM	0.531	A	0.540	A	0.009	No	--	--
5. Sportstown at	AM	0.333	A	0.329	A	-0.004	No	--	--
Katella Avenue	PM	0.461	A	0.460	A	-0.001	No	--	--
6. Howell Avenue at	AM	0.377	A	0.378	A	0.001	No	--	--
Katella Avenue	PM	0.551	A	0.555	A	0.004	No	--	--
7. SR-57 Southbound Ramps at	AM	0.402	A	0.441	A	0.039	No	--	--
Katella Avenue	PM	0.407	A	0.429	A	0.022	No	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[13] *Appendices F* and *G* contain ICU/LOS calculation worksheets for all study intersections.
[14] See *Table 3-7* for significant impact criteria.

TABLE 7-1 (CONTINUED)

EXISTING CONDITIONS INTERSECTION CAPACITY ANALYSIS SUMMARY[15]

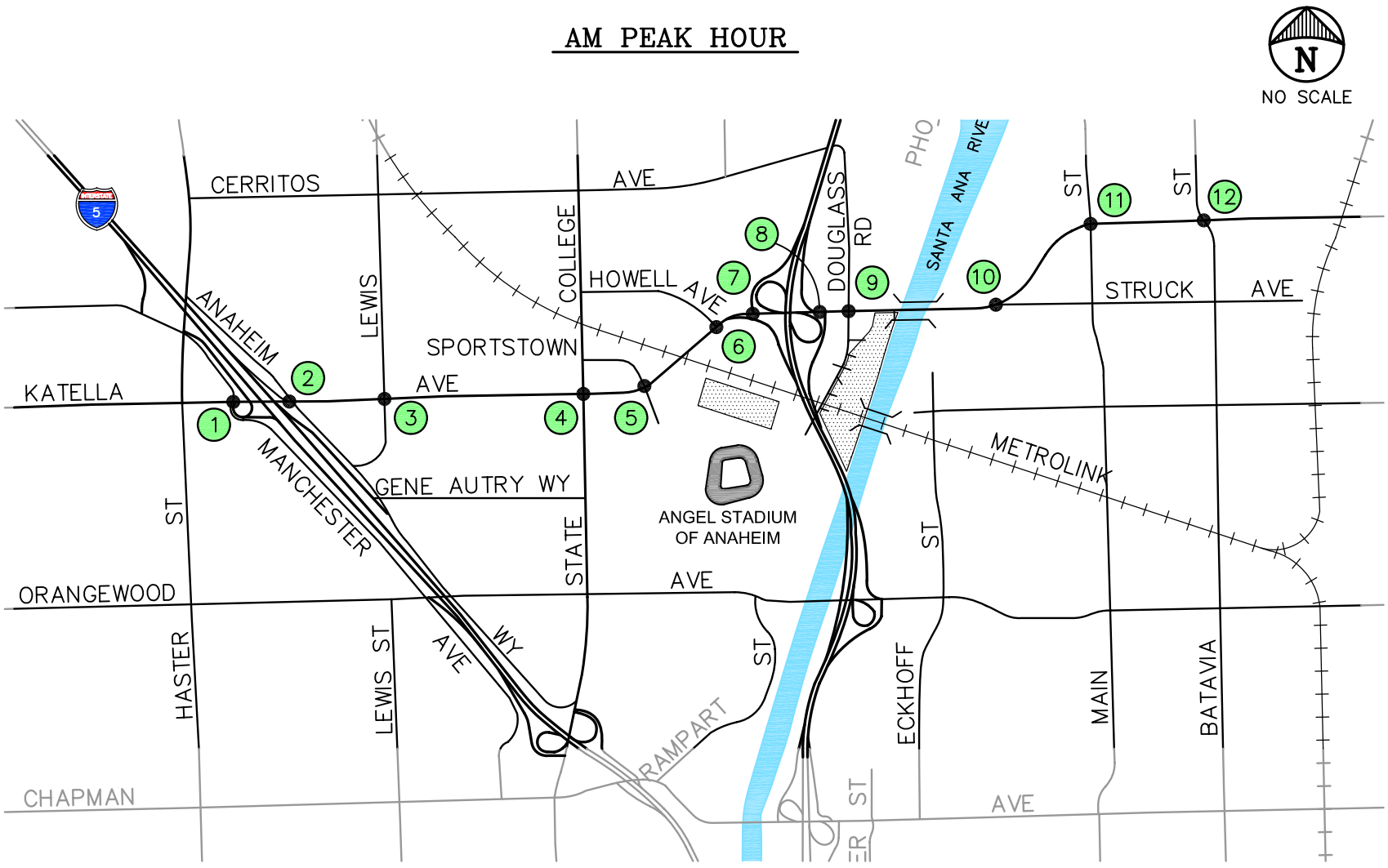
Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Significant Impact[16]		(4) Existing With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
8. SR-57 Northbound Ramps at	AM	0.363	A	0.440	A	0.077	No	--	--
Katella Avenue	PM	0.401	A	0.433	A	0.032	No	--	--
9. Douglass Road at	AM	0.408	A	0.437	A	0.029	No	--	--
Katella Avenue[17]	PM	0.492	A	0.685	B	0.193	No	--	--
10. Struck Avenue at	AM	0.280	A	0.284	A	0.004	No	--	--
Katella Avenue	PM	0.344	A	0.349	A	0.005	No	--	--
11. Main Street at	AM	0.501	A	0.512	A	0.011	No	--	--
Katella Avenue	PM	0.495	A	0.504	A	0.009	No	--	--
12. Batavia Street at	AM	0.534	A	0.544	A	0.010	No	--	--
Katella Avenue	PM	0.500	A	0.506	A	0.006	No	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[15] *Appendices F* and *G* contain ICU/LOS calculation worksheets for all study intersections.
[16] See *Table 3-7* for significant impact criteria.
[17] The intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario.

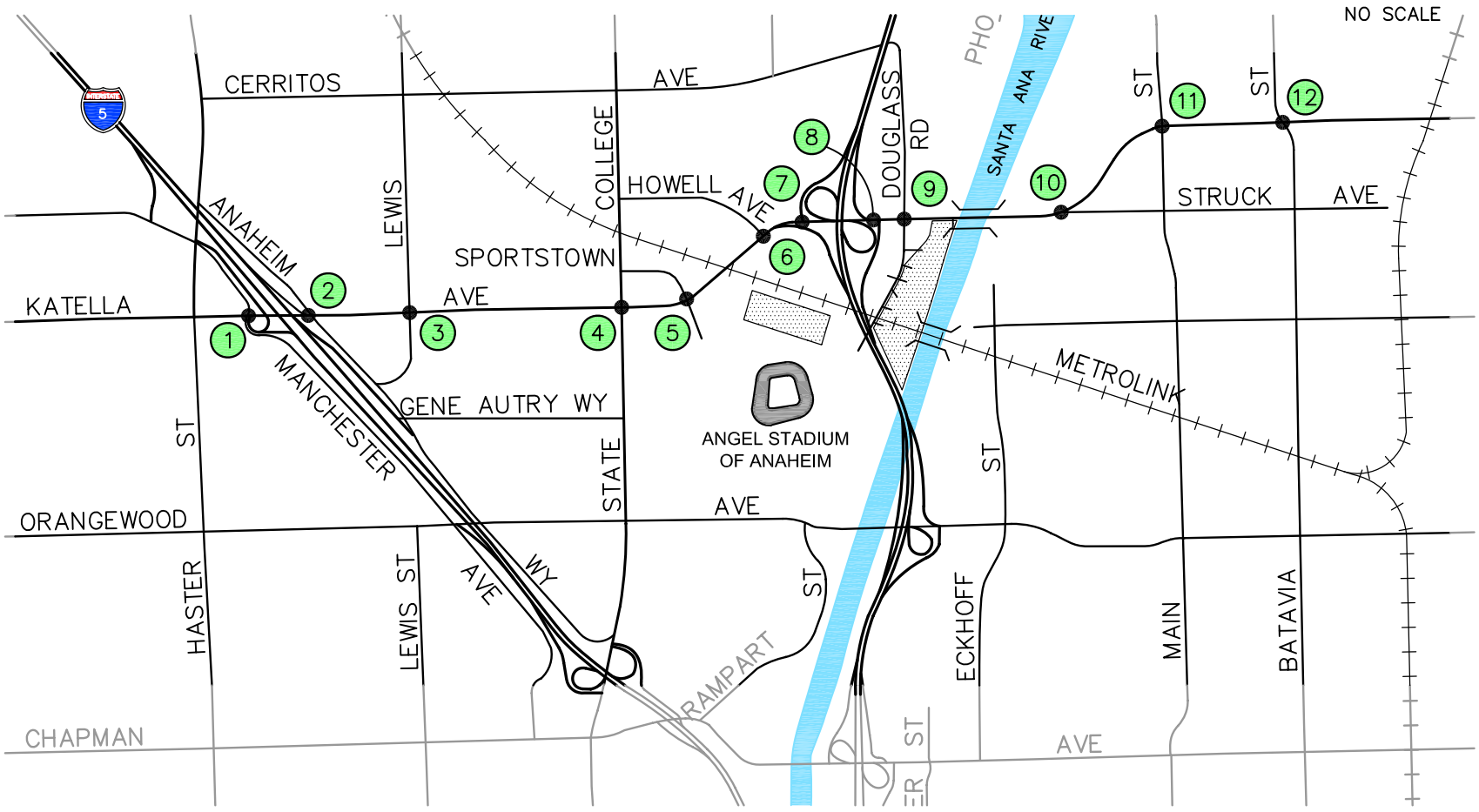
AM PEAK HOUR



EXISTING TRAFFIC CONDITIONS LOS RESULTS

EXISTING WITH PROJECT TRAFFIC CONDITIONS LOS RESULTS

PM PEAK HOUR



EXISTING TRAFFIC CONDITIONS LOS RESULTS

EXISTING WITH PROJECT TRAFFIC CONDITIONS LOS RESULTS

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LINSCOTT LAW & GREENSPAN engineers

KEY

- = LOS E OR F
- = LOS D
- = LOS A, B, OR C
- (#) = STUDY INTERSECTION
- = PROJECT SITE

FIGURE 7-1

EXISTING VS. EXISTING WITH PROJECT PEAK HOURS LEVEL OF SERVICE COMPARISON

ARTIC, ANAHEIM

7.2 Existing Conditions Roadway Segment Capacity Analysis

Table 7-2 summarizes the Daily level of service results at the key eight (8) study roadway segments during a "typical" weekday for the existing traffic conditions with and without the Project. The first column (1) of LOS E Capacity values in *Table 7-2* presents the daily roadway segment capacities from the *Orange County Highway Design Manual (September 1991)*. The second column (2) lists the number of travel lanes and the third column (3) indicates the Existing Daily traffic volumes, volume to capacity ratio (V/C) and LOS. The fourth column (4) in *Table 7-2* forecasts the Existing With Project traffic conditions.

7.2.1 *Existing Traffic Conditions*

Review of column (3) of *Table 7-2* shows that all eight (8) of the key study roadway segments are forecast to operate at acceptable LOS A or B on a daily basis under Existing traffic conditions based on the LOS impact criteria outlined in this report.

7.2.2 *Existing With Project Traffic Conditions*

Review of column (4) of *Table 7-2* shows that all eight (8) of the key study roadway segments are forecast to operate at acceptable LOS A or B on a daily basis under Existing With Project traffic conditions based on the LOS impact criteria outlined in this report.

TABLE 7-2

EXISTING CONDITIONS ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Existing With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	35,040	0.622	B	35,260	0.626	B
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	56,300	6D	35,040	0.622	B	35,410	0.629	B
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	56,300	6D	30,260	0.537	A	30,630	0.544	A
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	56,300	6D	32,800	0.583	A	33,433	0.594	A
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	34,240	0.608	B	34,623	0.615	B

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

TABLE 7-2 (CONTINUED)

EXISTING CONDITIONS ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Existing With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	37,990	0.675	B	38,373	0.682	B
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	29,610	0.526	A	30,349	0.539	A
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[18]	6D	30,280	0.512	A	30,686	0.519	A

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[18] *City of Orange* uses 5% capacity increase for Smart Streets.

8.0 YEAR 2013 TRAFFIC IMPACT ANALYSIS

In order to make a realistic estimate of future on-street conditions prior to implementation of the proposed Project, anticipated Year 2013 traffic volumes are calculated by interpolation of model growth. Background ambient traffic growth estimates have been calculated by interpolating between the existing volumes and the Year 2030 With Project volumes.

8.1 Year 2013 Intersection Capacity Analysis

Table 8-1 summarizes the peak hour Level of Service results at the key study intersections for Year 2013 traffic conditions. 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) lists Year 2013 Without Project traffic conditions. The third column (3) in *Table 8-1* presents forecast Year 2013 With Project traffic conditions. The fourth column (4) of *Table 8-1* shows 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 fifth column (5) of *Table 8-1* presents the Level of Service with the implementation of improvements, if necessary.

8.1.1 *Year 2013 Without Project Traffic Conditions*

Review of column (2) of *Table 8-1* indicates that all of the twelve (12) key study intersections are forecast to operate at acceptable LOS D or better for the Year 2013 Without Project traffic conditions.

8.1.2 *Year 2013 With Project Traffic Conditions*

Review of column (3) of *Table 8-1* indicates that all of the twelve (12) key study intersections are forecast to operate at acceptable LOS D or better for the Year 2013 With Project traffic conditions, when compared to the LOS standards defined in this report.

To supplement the level of service results as presented in *Table 8-1*, ***Figure 8-1*** graphically represents the comparison between Year 2013 Without Project and Year 2013 With Project traffic conditions level of service results for the AM and PM peak hours.

Appendix H contains the ICU/LOS level of service calculation worksheets for the Year 2013 Traffic Conditions.

TABLE 8-1

YEAR 2013 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[19]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2013 Without Project Traffic Conditions		(3) Year 2013 With Project Traffic Conditions		(4) Significant Impact[20]		(5) Year 2013 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.583	A	0.684	B	0.685	B	0.001	No	--	--
Katella Avenue	PM	0.524	A	0.660	B	0.664	B	0.004	No	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.493	A	0.590	A	0.600	A	0.010	No	--	--
Katella Avenue	PM	0.496	A	0.697	B	0.698	B	0.001	No	--	--
3. Lewis Street at	AM	0.484	A	0.656	B	0.658	B	0.002	No	--	--
Katella Avenue	PM	0.646	B	0.829	D	0.831	D	0.002	No	--	--
4. State College Boulevard at	AM	0.426	A	0.639	B	0.648	B	0.009	No	--	--
Katella Avenue	PM	0.531	A	0.804	D	0.811	D	0.007	No	--	--
5. Sportstown at	AM	0.333	A	0.433	A	0.429	A	-0.004	No	--	--
Katella Avenue	PM	0.461	A	0.610	B	0.609	B	-0.001	No	--	--
6. Howell Avenue at	AM	0.377	A	0.465	A	0.476	A	0.011	No	--	--
Katella Avenue	PM	0.551	A	0.699	B	0.703	C	0.004	No	--	--
7. SR-57 Southbound Ramps at	AM	0.402	A	0.496	A	0.545	A	0.049	No	--	--
Katella Avenue	PM	0.407	A	0.589	A	0.627	B	0.038	No	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[19] *Appendices F* and *H* contain ICU/LOS calculation worksheets for all study intersections.
[20] Please refer to *Table 3-7* for significant impact criteria.

TABLE 8-1 (CONTINUED)

YEAR 2013 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[21]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2013 Without Project Traffic Conditions		(3) Year 2013 With Project Traffic Conditions		(4) Significant Impact[22]		(5) Year 2013 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
8. SR-57 Northbound Ramps at	AM	0.363	A	0.414	A	0.491	A	0.077	No	--	--
Katella Avenue	PM	0.401	A	0.475	A	0.508	A	0.033	No	--	--
9. Douglass Road at	AM	0.408	A	0.442	A	0.441	A	-0.001	No	--	--
Katella Avenue[23]	PM	0.492	A	0.524	A	0.585	A	0.061	No	--	--
10. Struck Avenue at	AM	0.280	A	0.304	A	0.308	A	0.004	No	--	--
Katella Avenue	PM	0.344	A	0.380	A	0.385	A	0.005	No	--	--
11. Main Street at	AM	0.501	A	0.523	A	0.535	A	0.012	No	--	--
Katella Avenue	PM	0.495	A	0.520	A	0.529	A	0.009	No	--	--
12. Batavia Street at	AM	0.534	A	0.560	A	0.570	A	0.010	No	--	--
Katella Avenue	PM	0.500	A	0.523	A	0.529	A	0.006	No	--	--

Notes:

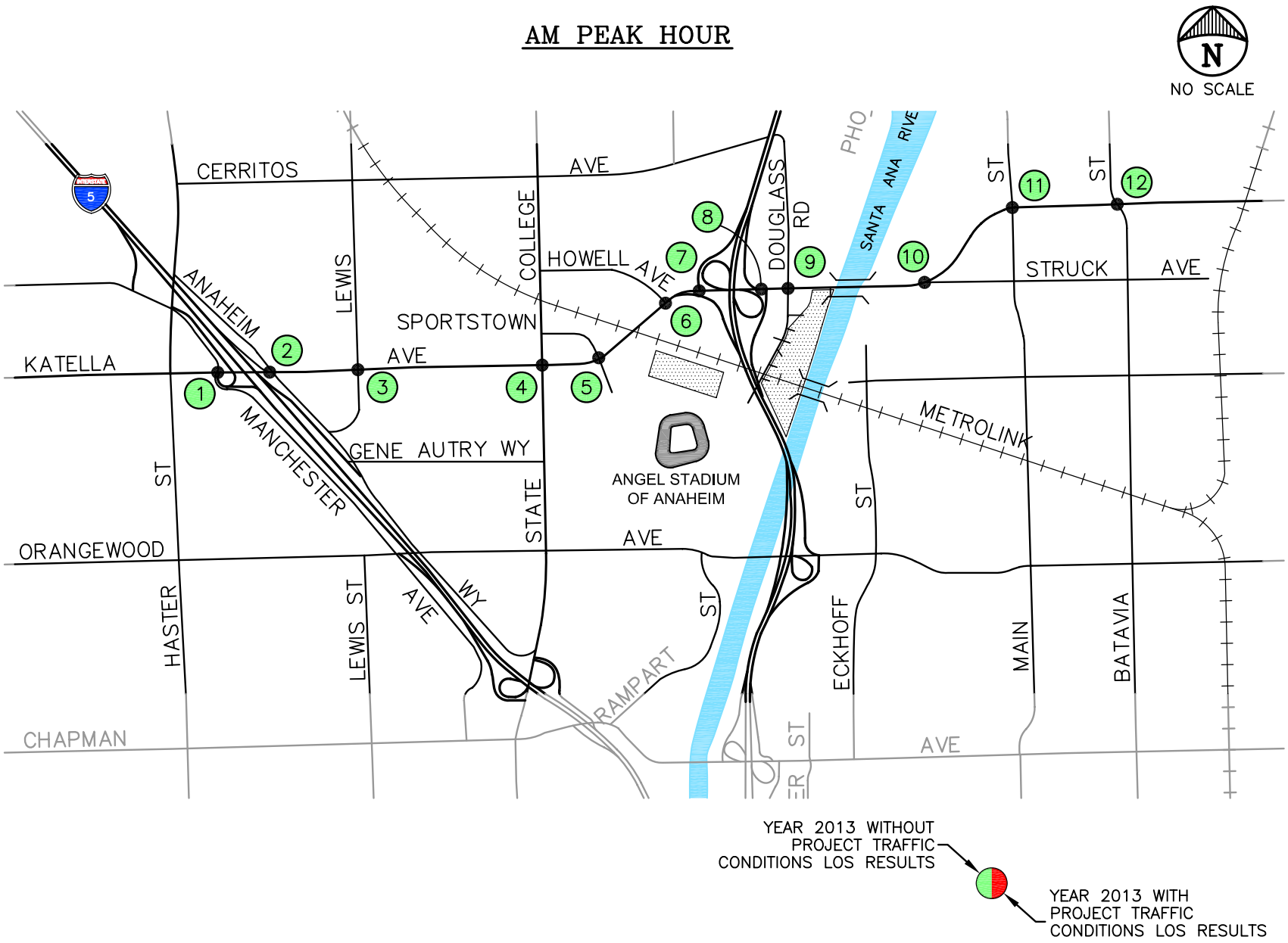
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[21] *Appendices F* and *H* contain ICU/LOS calculation worksheets for all study intersections.

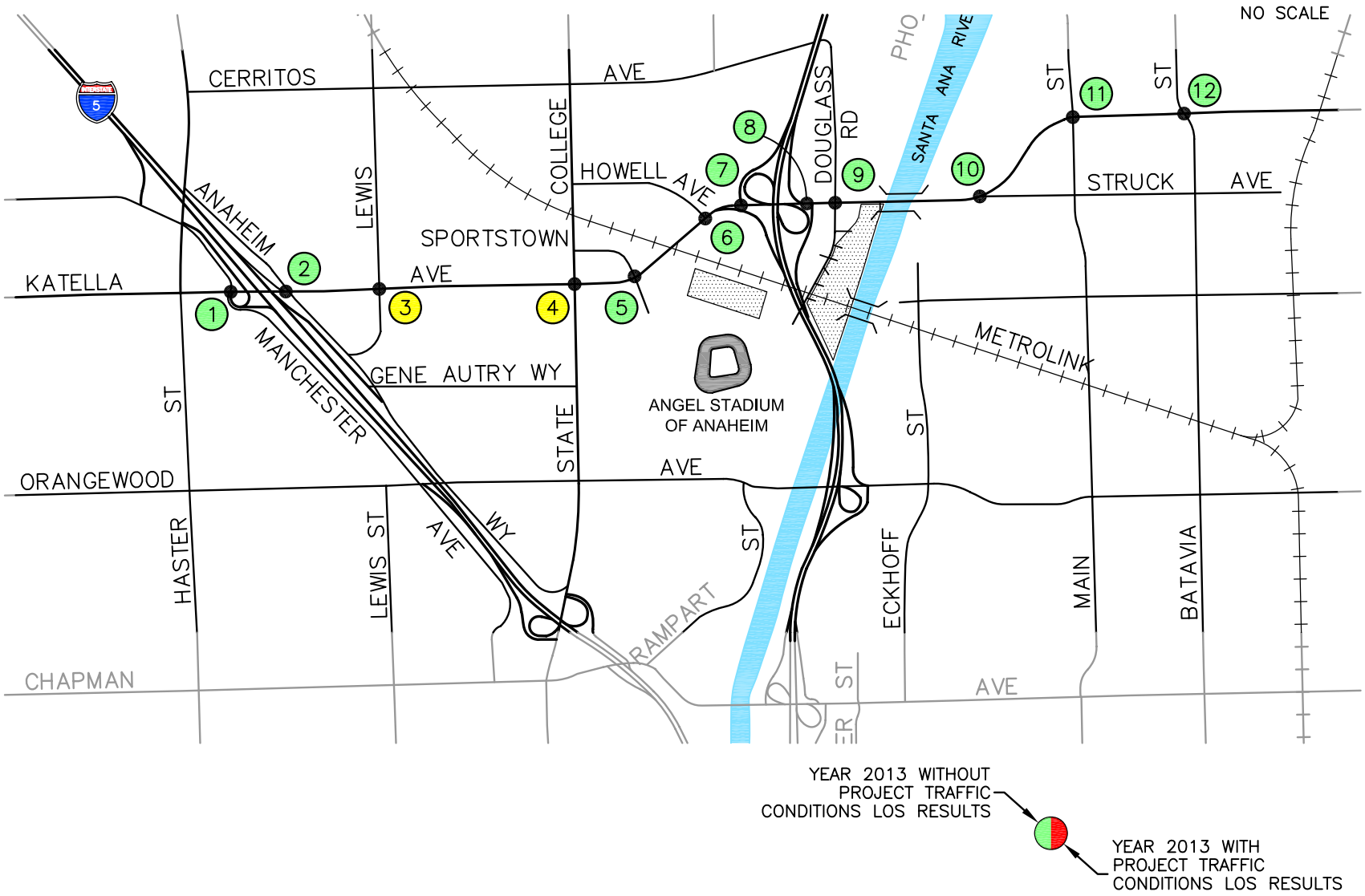
[22] Please refer to *Table 3-7* for significant impact criteria.

[23] The intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario.

AM PEAK HOUR



PM PEAK HOUR



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LINSCOTT LAW & GREENSPAN engineers

KEY
- = LOS E OR F
- = LOS D
- = LOS A, B, OR C
- (#) = STUDY INTERSECTION
- = PROJECT SITE

FIGURE 8-1

YEAR 2013 WITHOUT PROJECT
VS. YEAR 2013 WITH PROJECT
PEAK HOURS LEVEL OF SERVICE COMPARISON

ARTIC, ANAHEIM

8.2 Year 2013 Roadway Segment Capacity Analysis

Table 8-2 summarizes the Daily level of service results at the key eight (8) study roadway segments during a "typical" weekday for the Year 2013 traffic conditions. The first column (1) of LOS E Capacity values in *Table 8-2* presents the daily roadway segment capacities from the *Orange County Highway Design Manual (September 1991)*. The second column (2) lists the number of travel lanes and the third column (3) indicates the Existing Daily traffic volumes, volume to capacity ratio (V/C) and LOS. The fourth column (4) forecasts Year 2013 Without Project traffic conditions. The fifth column (5) in *Table 8-2* forecasts the Year 2013 With Project traffic conditions.

8.2.1 *Year 2013 Without Project Traffic Conditions*

Review of column (4) of *Table 8-2* shows that five (5) of the key study roadway segments are forecast to operate at adverse LOS on a daily basis under Year 2013 Without Project traffic conditions based on the LOS impact criteria outlined in this report.

8.2.2 *Year 2013 With Project Traffic Conditions*

Review of column (5) of *Table 8-2* shows that the same five (5) key study roadway segments are forecast to continue to operate at adverse worse on a daily basis under Year 2013 With Project traffic conditions based on the LOS impact criteria outlined in this report. To determine if the project creates a significant impact, these segments are analyzed under peak hour conditions to determine if there are any peak hour deficiencies. As presented in ***Table 8-3***, these study roadway segments are forecast to operate at LOS C or better during the AM and PM peak hours. As a result, the study roadway segments are not significantly impacted by Year 2013 With Project traffic and therefore no improvements are required.

TABLE 8-2

YEAR 2013 ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Year 2013 Without Project Traffic Conditions			(5) Year 2013 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	35,040	0.622	B	**53,229**	**0.945**	**E**	**53,449**	**0.949**	**E**
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	56,300	6D	35,040	0.622	B	**53,195**	**0.945**	**E**	**53,565**	**0.951**	**E**
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	56,300	6D	30,260	0.537	A	**45,127**	**0.802**	**D**	**45,497**	**0.808**	**D**
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	56,300	6D	32,800	0.583	A	43,779	0.778	C	44,412	0.789	C
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	34,240	0.608	B	**47,287**	**0.840**	**D**	**47,670**	**0.847**	**D**

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

TABLE 8-2 (CONTINUED)

YEAR 2013 ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Year 2013 Without Project Traffic Conditions			(5) Year 2013 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	37,990	0.675	B	**52,195**	**0.927**	**E**	**52,578**	**0.934**	**E**
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	29,610	0.526	A	38,732	0.688	B	39,471	0.701	C
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[24]	6D	30,280	0.512	A	36,039	0.610	B	36,445	0.617	B

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[24] *City of Orange* uses 5% capacity increase for Smart Streets.

TABLE 8-3

YEAR 2013 ROADWAY SEGMENT PEAK HOUR LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	Time Period	(1) Approach	(2) Lanes	(3) Total Link Capacity (VPH)	(4) Year 2013 With Project Traffic Conditions		
						Peak Hour Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	AM	EB	3	3,192	1,691	0.530	A
			WB	3	2,736	1,680	0.614	B
		PM	EB	3	3,249	1,732	0.533	A
			WB	3	3,363	2,453	0.729	C
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	AM	EB	3	3,192	2,022	0.633	B
			WB	3	2,964	1,274	0.430	A
		PM	EB	3	3,249	1,711	0.527	A
			WB	3	3,192	2,200	0.689	B
3. Katella Avenue *between* Lewis Street and State College Blvd	Major	AM	EB	3	3,705	1,524	0.411	A
			WB	3	2,679	1,105	0.412	A
		PM	EB	3	2,679	1,498	0.559	A
			WB	3	2,964	1,842	0.621	B

Notes:

- VPH = Vehicles Per Hour
- V/C = Volume to Capacity Ratio

TABLE 8-3 (CONTINUED)

YEAR 2013 ROADWAY SEGMENT PEAK HOUR LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	Time Period	(1) Approach	(2) Lanes	(3) Total Link Capacity (VPH)	(4) Year 2013 With Project Traffic Conditions		
						Peak Hour Volume	V/C Ratio	LOS
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	AM	EB	3	3,876	1,264	0.326	A
			WB	3	4,218	1,178	0.279	A
		PM	EB	3	3,762	1,430	0.380	A
			WB	3	3,648	1,698	0.465	A
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	AM	EB	3	3,876	1,415	0.365	A
			WB	3	4,218	1,660	0.394	A
		PM	EB	3	3,933	1,780	0.453	A
			WB	3	3,933	1,978	0.503	A

Notes:

- VPH = Vehicles Per Hour
- V/C = Volume to Capacity Ratio

9.0 YEAR 2030 TRAFFIC IMPACT ANALYSIS

This analysis was performed with the application of the Anaheim Traffic Analysis Model (ATAM) to obtain Year 2030 traffic volumes. Future trip activity is estimated and assigned throughout the study area.

9.1 Year 2030 Intersection Capacity Analysis

Table 9-1 summarizes the peak hour Level of Service results at the key study intersections for Year 2030 traffic conditions. The first column (1) of ICU/LOS values in *Table 9-1* presents a summary of existing AM and PM peak hour traffic conditions (which were also presented in *Table 7-1*). The second column (2) lists Year 2030 Without Project traffic conditions. The third column (3) in *Table 9-1* presents forecast Year 2030 With Project traffic conditions. The fourth column (4) of *Table 9-1* shows 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 fifth column (5) of *Table 9-1* presents the Level of Service with the implementation of improvements, if necessary.

9.1.1 *Year 2030 Without Project Traffic Conditions*

Review of column (2) of *Table 9-1* indicates that six (6) of the key study intersections are forecast to operate at adverse LOS E or worse for the Year 2030 Without Project traffic conditions. The locations operating at an adverse LOS are listed below:

		AM Peak Hour		PM Peak Hour	
Key Intersection		**ICU**	**LOS**	**ICU**	**LOS**
2.	Anaheim Way/I-5 NB Ramps at Katella Avenue	0.936	E	--	--
3.	Lewis Street at Katella Avenue	--	--	1.269	F
4.	State College Boulevard at Katella Avenue	0.928	E	0.978	E
5.	Sportstown at Katella Avenue	--	--	1.003	F
6.	Howell Avenue at Katella Avenue	--	--	0.945	E
9.	Douglass Road at Katella Avenue	0.973	E	1.052	F

9.1.2 *Year 2030 With Project Traffic Conditions*

Review of column (3) of *Table 9-1* indicates that the same six (6) key study intersections are forecast to operate at adverse LOS E or worse for the Year 2030 With Project traffic conditions, when compared to the LOS standards defined in this report.

The locations operating at adverse LOS are listed below:

		AM Peak Hour		PM Peak Hour	
Key Intersection		**ICU**	**LOS**	**ICU**	**LOS**
2.	***Anaheim Way/I-5 NB Ramps at Katella Avenue***	***0.946***	***E***	--	--
3.	Lewis Street at Katella Avenue	--	--	1.275	F
4.	State College Boulevard at Katella Avenue	0.937	E	0.985	E
5.	Sportstown at Katella Avenue	--	--	0.975	E

6.	Howell Avenue at Katella Avenue	--	--	0.949	E
9.	***Douglass Road at Katella Avenue***	***1.035***	***F***	***1.077***	***F***

Out of the six (6) key study intersections operating at adverse LOS listed above, only two (2) key study intersections (shown in bold and italic above) will be significantly impacted based on the LOS standards and the significance impact criteria defined in this report. Three of the remaining four intersections have cumulative impacts due to the increase in the ICU values. The intersection of Sportstown/Katella Avenue has improved level of service with the project. Mitigation measures will be identified for all six intersections. It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

To supplement the level of service results as presented in *Table 9-1*, ***Figure 9-1*** graphically represents the comparison between Year 2030 Without Project and Year 2030 With Project traffic conditions level of service results for the AM and PM peak hours.

Appendix I contains the ICU/LOS level of service calculation worksheets for the Year 2030 Traffic Conditions.

TABLE 9-1

YEAR 2030 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[25]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2030 Without Project Traffic Conditions		(3) Year 2030 With Project Traffic Conditions		(4) Significant Impact[26]		(5) Year 2030 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.583	A	0.761	C	0.768	C	0.007	No	--	--
Katella Avenue	PM	0.524	A	0.803	D	0.804	D	0.001	No	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.493	A	**0.936**	**E**	**0.946**	**E**	**0.010**	**Yes**	0.815	D
Katella Avenue	PM	0.496	A	0.896	D	0.897	D	0.001	No	0.776	C
3. Lewis Street at	AM	0.484	A	0.849	D	0.850	D	0.001	No	0.699	B
Katella Avenue	PM	0.646	B	**1.269**	**F**	**1.275**	**F**	0.006	No	0.831	D
4. State College Boulevard at	AM	0.426	A	**0.928**	**E**	**0.937**	**E**	0.009	No	0.900	D
Katella Avenue	PM	0.531	A	**0.978**	**E**	**0.985**	**E**	0.007	No	0.852	D
5. Sportstown at	AM	0.333	A	0.773	C	0.775	C	0.002	No	0.654	B
Katella Avenue	PM	0.461	A	**1.003**	**F**	**0.975**	**E**	-0.028	No	0.737	C
6. Howell Avenue at	AM	0.377	A	0.611	B	0.622	B	0.011	No	0.622	B
Katella Avenue	PM	0.551	A	**0.945**	**E**	**0.949**	**E**	0.004	No	0.845	D
7. SR-57 Southbound Ramps at	AM	0.402	A	0.702	C	0.712	C	0.010	No	--	--
Katella Avenue	PM	0.407	A	0.690	B	0.691	B	0.001	No	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[25] *Appendices F* and *I* contain ICU/LOS calculation worksheets for all study intersections.

[26] Please refer to *Table 3-7* for significant impact criteria.

TABLE 9-1 (CONTINUED)

YEAR 2030 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[27]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2030 Without Project Traffic Conditions		(3) Year 2030 With Project Traffic Conditions		(4) Significant Impact[28]		(5) Year 2030 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS	ICU Increase	Yes/No	ICU	LOS
8. SR-57 Northbound Ramps at	AM	0.363	A	0.602	B	0.679	B	0.077	No	--	--
Katella Avenue	PM	0.401	A	0.694	B	0.726	C	0.032	No	--	--
9. Douglass Road at	AM	0.408	A	**0.973**	**E**	**1.035**	**F**	**0.062**	**Yes**	0.840	D
Katella Avenue[29]	PM	0.492	A	**1.052**	**F**	**1.077**	**F**	**0.025**	**Yes**	0.868	D
10. Struck Avenue at	AM	0.28	A	0.669	B	0.673	B	0.004	No	--	--
Katella Avenue	PM	0.344	A	0.806	D	0.809	D	0.003	No	--	--
11. Main Street at	AM	0.501	A	0.791	C	0.803	D	0.012	No	--	--
Katella Avenue	PM	0.495	A	0.805	D	0.815	D	0.010	No	--	--
12. Batavia Street at	AM	0.534	A	0.757	C	0.766	C	0.009	No	--	--
Katella Avenue	PM	0.5	A	0.765	C	0.771	C	0.006	No	--	--

Notes:

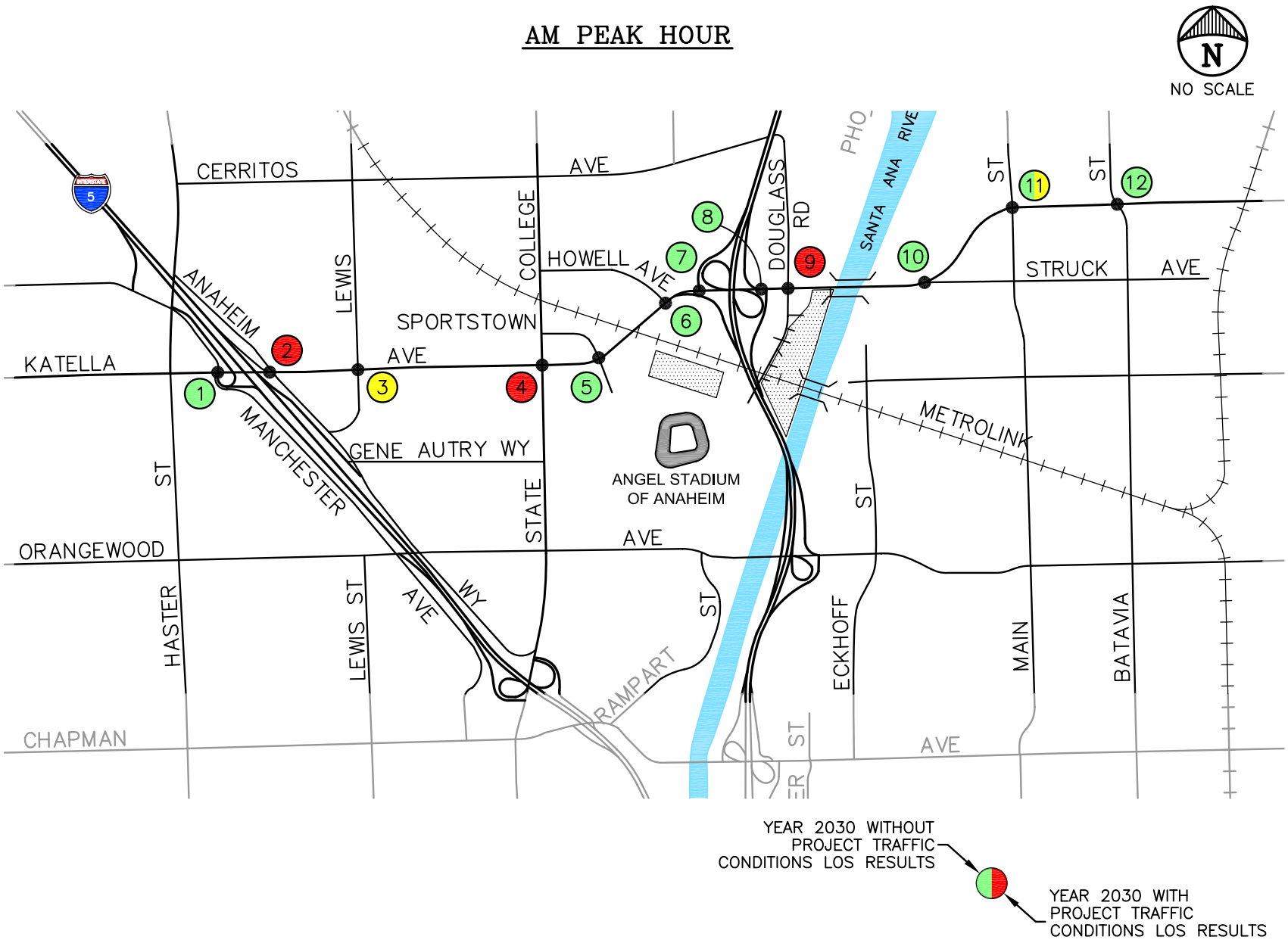
- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[27] *Appendices F* and *I* contain ICU/LOS calculation worksheets for all study intersections.

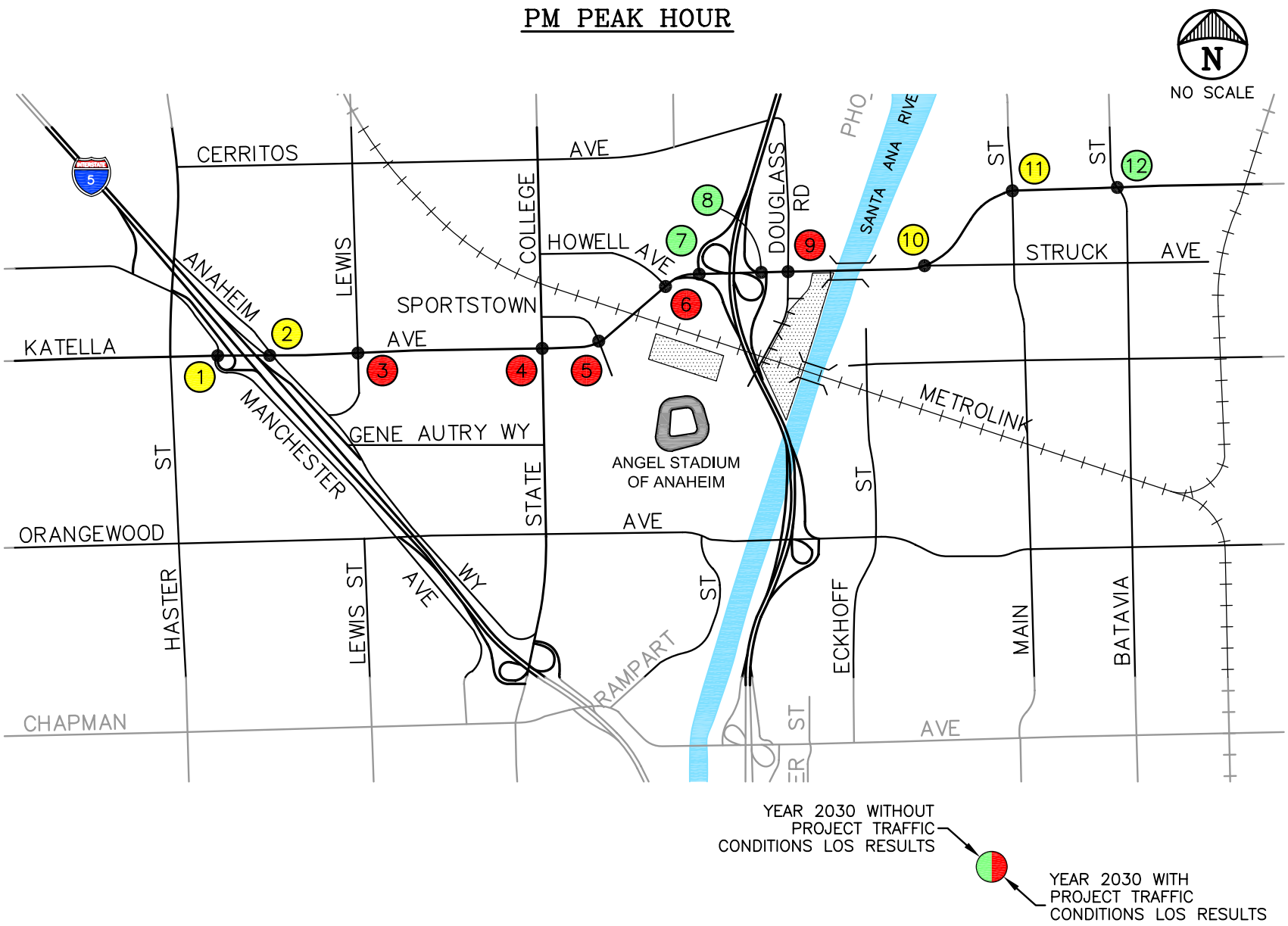
[28] Please refer to *Table 3-7* for significant impact criteria.

[29] The intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario.

AM PEAK HOUR



PM PEAK HOUR



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LINSCOTT LAW & GREENSPAN engineers

KEY
- = LOS E OR F
- = LOS D
- = LOS A, B, OR C
- (#) = STUDY INTERSECTION
- = PROJECT SITE

FIGURE 9-1

YEAR 2030 WITHOUT PROJECT
VS. YEAR 2030 WITH PROJECT
PEAK HOURS LEVEL OF SERVICE COMPARISON

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9.2 Year 2030 Roadway Segment Capacity Analysis

Table 9-2 summarizes the Daily level of service results at the key eight (8) study roadway segments during a "typical" weekday for the Year 2030 traffic conditions. The first column (1) of LOS E Capacity values in *Table 9-2* presents the daily roadway segment capacities from the *Orange County Highway Design Manual (September 1991)*. The second column (2) lists the number of travel lanes and the third column (3) indicates the Existing Daily traffic volumes, volume to capacity ratio (V/C) and LOS. The fourth column (4) forecasts Year 2030 Without Project traffic conditions. The fifth column (5) in *Table 9-2* forecasts the Year 2030 With Project traffic conditions.

9.2.1 *Year 2030 Without Project Traffic Conditions*

Review of column (4) of *Table 9-2* shows that five (5) of the key study roadway segments are forecast to operate at adverse LOS on a daily basis under Year 2030 Without Project traffic conditions based on the LOS impact criteria outlined in this report.

9.2.2 *Year 2030 With Project Traffic Conditions*

Review of column (5) of *Table 9-2* shows that the same five (5) key study roadway segments are forecast to continue to operate at adverse LOS on a daily basis under Year 2030 With Project traffic conditions based on the LOS impact criteria outlined in this report. However, as presented in ***Table 9-3***, these study roadway segments are forecast to operate at LOS D or better during the AM and PM peak hours, except for the following one (1) roadway segment as listed below:

- Katella Avenue *between* Manchester Avenue to Anaheim Way

As a result, one (1) of the five (5) adversely operating study roadway segments is significantly impacted by Year 2030 With Project traffic based on the LOS impact criteria outlined in this report. The segment of Katella Avenue between Manchester Avenue and Anaheim Way will be mitigated by widening Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan. The recommended mitigation measure will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted roadway segment to an acceptable Level of Service.

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TABLE 9-2

YEAR 2030 ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Year 2030 Without Project Traffic Conditions			(5) Year 2030 With Project Traffic Conditions		
				Daily Volume	V/C Ratio[30]	LOS	Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	35,040	0.622	B	**70,870**	**1.259**	**F**	**71,090**	**1.263**	**F**
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	75,000	8D	35,040	0.622	B	**70,720**	**0.943**	**E**	**71,090**	**0.948**	**E**
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	75,000	8D	30,260	0.537	A	57,490	0.767	C	57,860	0.771	C
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	75,000	8D	32,800	0.583	A	51,287	0.684	B	51,920	0.692	B
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	34,240	0.608	B	**61,927**	**1.100**	**F**	**62,310**	**1.107**	**F**

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[30] V/C ratio based on existing number of lanes and LOS E capacity.

TABLE 9-2 (CONTINUED)

YEAR 2030 ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Year 2030 Without Project Traffic Conditions			(5) Year 2030 With Project Traffic Conditions		
				Daily Volume	V/C Ratio[31]	LOS	Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	37,990	0.675	B	**70,807**	**1.258**	**F**	**71,190**	**1.264**	**F**
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	29,610	0.526	A	**62,161**	**1.104**	**F**	**62,900**	**1.117**	**F**
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[32]	6D	30,280	0.512	A	51,164	0.865	D	51,570	0.872	D

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[31] V/C ratio based on existing number of lanes and LOS E capacity.

[32] *City of Orange* uses 5% capacity increase for Smart Streets.

TABLE 9-3

YEAR 2030 ROADWAY SEGMENT PEAK HOUR LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	Time Period	(1) Approach	(2) Lanes	(3) Total Link Capacity (VPH)	(4) Year 2030 With Project Traffic Conditions		
						Peak Hour Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	AM	EB	3	3,192	2,720	0.852	D
			WB	3	2,736	2,620	0.958	**E**
		PM	EB	3	3,249	3,580	1.102	**F**
			WB	3	3,363	3,690	1.097	**F**
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	AM	EB	4	4,256	3,310	0.778	C
			WB	4	3,952	2,350	0.595	A
		PM	EB	4	4,332	3,730	0.861	D
			WB	4	4,256	3,780	0.888	D
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	AM	EB	3	3,876	2,170	0.560	A
			WB	3	4,218	1,870	0.443	A
		PM	EB	3	3,762	2,510	0.667	B
			WB	3	3,648	2,740	0.751	C
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	AM	EB	3	3,876	2,430	0.627	B
			WB	3	4,218	2,310	0.548	A
		PM	EB	3	3,933	2,770	0.704	C
			WB	3	3,933	3,190	0.811	D

Notes:

- VPH = Vehicles Per Hour
- V/C = Volume to Capacity Ratio

TABLE 9-3 (CONTINUED)

YEAR 2030 ROADWAY SEGMENT PEAK HOUR LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	Time Period	(1) Approach	(2) Lanes	(3) Total Link Capacity (VPH)	(4) Year 2030 With Project Traffic Conditions		
						Peak Hour Volume	V/C Ratio	LOS
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	AM	EB	3	3,705	2,960	0.799	C
			WB	3	3,705	2,240	0.605	B
		PM	EB	3	4,161	2,260	0.543	A
			WB	3	4,161	3,620	0.870	D

Notes:

- VPH = Vehicles Per Hour
- V/C = Volume to Capacity Ratio

10.0 CONGESTION MANAGEMENT PROGRAM (CMP) ANALYSIS

The goals of *2009 Orange County Congestion Management Program (CMP)* are to support regional mobility and air quality objectives by reducing traffic congestion; provide a mechanism for coordinating land use and development decisions that support the regional economy; and determine gas tax fund eligibility. To meet these goals, the CMP contains a number of policies designed to monitor and address system performance issues. OCTA developed the policies that makeup Orange County's CMP with local jurisdictions, the California Department of Transportation, and the South Coast Air Quality Management District.

As Orange County's Congestion Management Agency (CMA), Orange County Transportation Agency (OCTA) is responsible for the administration of the CMP, as well as providing data and models that are consistent with the Southern California Association of Governments (SCAG) region, and developing the deficiency plan processes.

The *2009 Orange County Congestion Management Program (CMP)* stipulates the requirements for maintaining LOS E at CMP intersections and roadway segments. The following four (4) Congestion Management Program (CMP) intersections are located within the study area:

1. Manchester Avenue/I-5 Southbound Ramps at Katella Avenue
2. Anaheim Way/I-5 Northbound Ramps at Katella Avenue
7. SR-57 Southbound Ramps at Katella Avenue
8. SR-57 Northbound Ramps at Katella Avenue

The following eight (8) study area arterial segments are included in the CMP network

1. Katella Avenue *between* Manchester Avenue and Anaheim Way
2. Katella Avenue *between* I-5 Freeway and Lewis Street
3. Katella Avenue *between* Lewis Street and State College Boulevard
4. Katella Avenue *between* State College Boulevard and Sportstown
5. Katella Avenue *between* Sportstown and Howell Avenue
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway
7. Katella Avenue *between* SR-57 Freeway and Main Street
8. Katella Avenue *between* Main Street and Batavia Street

10.1 Existing With Project CMP Intersection Peak Hour Capacity Analysis

Table 10-1 provides a comparison between the ICU values and the corresponding LOS for the Existing traffic conditions and Existing With Project traffic conditions. As presented in *Table 10-1*, none of the CMP intersections are impacted by the addition of the Project traffic based on the CMP criteria which stipulates maintaining LOS E at all CMP locations. All four (4) CMP intersections operate at acceptable LOS A for both the Existing and Existing With Project traffic conditions.

10.2 Existing With Project CMP Roadway Segment Daily Capacity Analysis

Table 10-2 provides a comparison between the V/C values and the corresponding LOS for the Existing traffic conditions and Existing With Project traffic conditions. As presented in *Table 10-2*, all eight (8) CMP roadway segments operate at acceptable LOS B or better for both the Existing and Existing With Project traffic conditions.

TABLE 10-1

EXISTING WITH PROJECT PEAK HOUR CMP INTERSECTION CAPACITY ANALYSIS SUMMARY[33]

Key Intersection	Time Period	(1) Existing Traffic Conditions		(2) Existing With Project Traffic Conditions		(3) Existing With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.583	A	0.584	A	--	--
Katella Avenue	PM	0.524	A	0.528	A	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.493	A	0.503	A	--	--
Katella Avenue	PM	0.496	A	0.497	A	--	--
7. SR-57 Southbound Ramps at	AM	0.402	A	0.441	A	--	--
Katella Avenue	PM	0.407	A	0.429	A	--	--
8. SR-57 Northbound Ramps at	AM	0.363	A	0.440	A	--	--
Katella Avenue	PM	0.401	A	0.433	A	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[33] *Appendix G* contains ICU/LOS calculation worksheets for all study intersections.

TABLE 10-2

EXISTING WITH PROJECT CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Existing With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	35,040	0.622	B	35,260	0.626	B
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	56,300	6D	35,040	0.622	B	35,410	0.629	B
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	56,300	6D	30,260	0.537	A	30,630	0.544	A
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	56,300	6D	32,800	0.583	A	33,433	0.594	A
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	34,240	0.608	B	34,623	0.615	B

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

TABLE 10-2 (CONTINUED)

EXISTING WITH PROJECT CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Existing Traffic Conditions			(4) Existing With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	37,990	0.675	B	38,373	0.682	B
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	29,610	0.526	A	30,349	0.539	A
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[34]	6D	30,280	0.512	A	30,686	0.519	A

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[34] *City of Orange* uses 5% capacity increase for Smart Streets.

10.3 Year 2013 With Project CMP Intersection Peak Hour Capacity Analysis

Table 10-3 provides a comparison between the ICU values and the corresponding LOS for the Year 2013 Without Project traffic conditions and Year 2013 With Project traffic conditions. As presented in *Table 10-3*, none of the CMP intersections are impacted by the addition of the Project traffic based on the CMP criteria which stipulates maintaining LOS E at all CMP locations. All four (4) CMP intersections operate at acceptable LOS B or better for both the Year 2013 Without Project and Year 2013 With Project traffic conditions.

10.4 Year 2013 With Project CMP Roadway Segment Daily Capacity Analysis

Table 10-4 provides a comparison between the V/C values and the corresponding LOS for the Year 2013 Without Project traffic conditions and Year 2013 With Project traffic conditions. As presented in *Table 10-4*, all eight (8) of the CMP roadway segments operate at acceptable LOS E or better for both the Year 2013 Without Project and Year 2013 With Project traffic conditions.

TABLE 10-3

YEAR 2013 PEAK HOUR CMP INTERSECTION CAPACITY ANALYSIS SUMMARY[35]

Key Intersection	Time Period	(1) Year 2013 Without Project Traffic Conditions		(2) Year 2013 With Project Traffic Conditions		(3) Year 2013 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.684	B	0.685	B	--	--
Katella Avenue	PM	0.660	B	0.664	B	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.590	A	0.600	A	--	--
Katella Avenue	PM	0.697	B	0.698	B	--	--
7. SR-57 Southbound Ramps at	AM	0.496	A	0.545	A	--	--
Katella Avenue	PM	0.589	A	0.627	B	--	--
8. SR-57 Northbound Ramps at	AM	0.414	A	0.491	A	--	--
Katella Avenue	PM	0.475	A	0.508	A	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[35] *Appendix H* contains ICU/LOS calculation sheets for all study intersections.

TABLE 10-4

YEAR 2013 CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Year 2013 Without Project Traffic Conditions			(4) Year 2013 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	53,229	0.945	E	53,449	0.949	E
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	56,300	6D	53,195	0.945	E	53,565	0.951	E
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	56,300	6D	45,127	0.802	D	45,497	0.808	D
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	56,300	6D	43,779	0.778	C	44,412	0.789	C
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	47,287	0.840	D	47,670	0.847	D

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

TABLE 10-4 (CONTINUED)

YEAR 2013 CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Year 2013 Without Project Traffic Conditions			(4) Year 2013 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	52,195	0.927	E	52,578	0.934	E
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	38,732	0.688	B	39,471	0.701	C
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[36]	6D	36,039	0.610	B	36,445	0.617	B

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[36] *City of Orange* uses 5% capacity increase for Smart Streets.

10.5 Year 2030 With Project CMP Intersection Peak Hour Capacity Analysis

Table 10-5 provides a comparison between the ICU values and the corresponding LOS for the Year 2030 Without Project traffic conditions and Year 2030 With Project traffic conditions. As presented in *Table 10-5*, none of the CMP intersections are impacted by the addition of the Project traffic based on the CMP criteria which stipulates maintaining LOS E at all CMP locations. All four (4) CMP intersections operate at acceptable LOS D or better after the implementation of the recommended improvements for both the Year 2030 Without Project and Year 2030 With Project traffic conditions.

10.6 Year 2030 With Project CMP Roadway Segment Daily Capacity Analysis

Table 10-6 provides a comparison between the V/C values and the corresponding LOS for the Year 2030 Without Project traffic conditions and Year 2030 With Project traffic conditions. As presented in *Table 10-6*, four (4) CMP roadway segments operate at LOS F for both the Year 2030 Without Project and Year 2030 With Project traffic conditions.

These four segments were analyzed under peak hour conditions to determine if there are any capacity deficiencies on these segments. As presented in ***Table 10-7***, three (3) of the CMP roadway segments are forecast to operate at LOS E or better during the AM and PM peak hours. As a result, these three (3) study roadway segments are not significantly impacted by Year 2030 With Project traffic and therefore no improvements are required at these locations.

The one (1) significantly impacted CMP roadway segment, the segment of Katella Avenue between Manchester Avenue and Anaheim Way will be mitigated by widening Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan. The recommended mitigation measure will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted roadway segment to an acceptable Level of Service and is consistent with the *2009 Orange County Congestion Management Program (CMP)* requirement.

TABLE 10-5

YEAR 2030 PEAK HOUR CMP INTERSECTION CAPACITY ANALYSIS SUMMARY[37]

Key Intersection	Time Period	(1) Year 2030 Without Project Traffic Conditions		(2) Year 2030 With Project Traffic Conditions		(3) Year 2030 With Project With Improvements	
		ICU	LOS	ICU	LOS	ICU	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	0.761	C	0.768	C	--	--
Katella Avenue	PM	0.803	D	0.804	D	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	0.936	E	0.946	E	0.815	D
Katella Avenue	PM	0.896	D	0.897	D	0.776	C
7. SR-57 Southbound Ramps at	AM	0.702	C	0.712	C	--	--
Katella Avenue	PM	0.690	B	0.691	B	--	--
8. SR-57 Northbound Ramps at	AM	0.602	B	0.679	B	--	--
Katella Avenue	PM	0.694	B	0.726	C	--	--

Notes:

- LOS = Level of Service, please refer to *Table 3-1* for the LOS definitions.

[37] *Appendix I* contains ICU/LOS calculation sheets for all study intersections.

TABLE 10-6

YEAR 2030 CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Year 2030 Without Project Traffic Conditions			(4) Year 2030 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	56,300	6D	**70,870**	**1.259**	**F**	**71,090**	**1.263**	**F**
2. Katella Avenue *between* I-5 Freeway and Lewis Street	Major	75,000	8D	70,720	0.943	E	71,090	0.948	E
3. Katella Avenue *between* Lewis Street and State College Boulevard	Major	75,000	8D	57,490	0.767	C	57,860	0.771	C
4. Katella Avenue *between* State College Boulevard and Sportstown	Major	75,000	8D	51,287	0.684	B	51,920	0.692	B
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	56,300	6D	**61,927**	**1.100**	**F**	**62,310**	**1.107**	**F**

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

TABLE 10-6 (CONTINUED)

YEAR 2030 CMP ROADWAY SEGMENT DAILY LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	(1) LOS E Capacity (VPD)	(2) Lanes	(3) Year 2030 Without Project Traffic Conditions			(4) Year 2030 With Project Traffic Conditions		
				Daily Volume	V/C Ratio	LOS	Daily Volume	V/C Ratio	LOS
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	56,300	6D	**70,807**	**1.258**	**F**	**71,190**	**1.264**	**F**
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	56,300	6D	**62,161**	**1.104**	**F**	**62,900**	**1.117**	**F**
8. Katella Avenue *between* Main Street and Batavia Street	Major	59,115[38]	6D	51,164	0.865	D	51,570	0.872	D

Notes:

- VPD = Vehicles Per Day
- V/C = Volume to Capacity Ratio
- D = Divided

[38] *City of Orange* uses 5% capacity increase for Smart Streets.

TABLE 10-7

YEAR 2030 CMP ROADWAY SEGMENT PEAK HOUR LEVELS OF SERVICE SUMMARY

Key Roadway Segment	Type of Arterial	Time Period	(1) Approach	(2) Lanes	(3) Total Link Capacity (VPH)	(4) Year 2030 With Project Traffic Conditions		
						Peak Hour Volume	V/C Ratio	LOS
1. Katella Avenue *between* Manchester Avenue and Anaheim Way	Major	AM	EB	3	3,192	2,720	0.852	D
			WB	3	2,736	2,620	0.958	E
		PM	EB	3	3,249	**3,580**	**1.102**	**F**
			WB	3	3,363	**3,690**	**1.097**	**F**
5. Katella Avenue *between* Sportstown and Howell Avenue	Major	AM	EB	3	3,876	2,170	0.560	A
			WB	3	4,218	1,870	0.443	A
		PM	EB	3	3,762	2,510	0.667	B
			WB	3	3,648	2,740	0.751	C
6. Katella Avenue *between* Howell Avenue and SR-57 Freeway	Major	AM	EB	3	3,876	2,430	0.627	B
			WB	3	4,218	2,310	0.548	A
		PM	EB	3	3,933	2,770	0.704	C
			WB	3	3,933	3,190	0.811	D
7. Katella Avenue *between* SR-57 Freeway and Main Street	Major	AM	EB	3	3,705	2,960	0.799	C
			WB	3	3,705	2,240	0.605	B
		PM	EB	3	4,161	2,260	0.543	A
			WB	3	4,161	3,620	0.870	D

Notes:

- VPH = Vehicles Per Hour
- V/C = Volume to Capacity Ratio

11.0 YEAR 2013 CALTRANS FACILITIES ANALYSIS (HCM METHODOLOGY)

While the City of Anaheim requires the use of the Intersection Capacity Utilization (ICU) Methodology for analyzing Project impacts, Caltrans requires the use of methods provided in the *Highway Capacity Manual 2000 (HCM 2000)* for the analysis of signalized ramp intersections, freeway ramps and freeway segments. The four (4) intersections listed below are Caltrans' ramp intersections and have been analyzed using the *Highway Capacity Manual 2000 (HCM) Methodology*:

1. Manchester Avenue/I-5 Southbound Ramps at Katella Avenue
2. Anaheim Way/I-5 Northbound Ramps at Katella Avenue
7. SR-57 Southbound Ramps at Katella Avenue
8. SR-57 Northbound Ramps at Katella Avenue

It is expected that the results obtained from using the ICU methodology and the HCM methodology will be compatible and lead to similar conclusions. However, the two methods measure and analyze different travel flow characteristics, which leads to results that are not identical. The minimum required level of service to be maintained at Caltrans ramp intersections is LOS D as identified by Caltrans District 12 staff.

In addition, Freeway Ramp Analysis for merge/diverge/weaving was also conducted using the methods provided in the *Highway Capacity Manual 2000 (HCM 2000)* for the following eight (8) Caltrans ramps:

Merge/Diverge Analysis

1. I-5 Northbound On-Ramp from Katella Avenue
2. I-5 Southbound Off-Ramp to Katella Avenue/Orangewood Avenue
3. SR-57 Northbound On-Ramp from Eastbound Katella Avenue
4. SR-57 Southbound On-Ramp from Westbound Katella Avenue

Weaving Analysis

1. SR-57 Northbound *between* Orangewood Avenue On-Ramp and Katella Ave Off-Ramp
2. SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Ave Off-Ramp
3. SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp
4. SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp

Similarly, Freeway Segment Analysis was also conducted using the methods provided in the *Highway Capacity Manual 2000 (HCM 2000)* for the following four (4) Caltrans freeway segments:

1. SR-57 Northbound *from* Orangewood Avenue *to* Katella Avenue
2. SR-57 Southbound *from* Katella Avenue *to* Orangewood Avenue

3. SR-57 Northbound *from* Katella Avenue *to* Ball Road

4. SR-57 Southbound *from* Ball Road *to* Katella Avenue

Caltrans currently does not have any additional improvements identified or planned for the identified impacted and deficient segments. Outside of the additional northbound lane which will be constructed on the Northbound SR-57 freeway in the next few years, there are not planned or programmed improvements to the surrounding freeways. In addition, the City does not have jurisdiction over the State Highway System and, therefore, cannot directly implement mitigation measures associated with project related impacts on mainline segments. ***Section 14.0*** will discuss State Highway System impacts and mitigation strategies in further detail, including the potential for inclusion in the Statement of Overriding Considerations.

Since freeway merge, diverge and weaving segment operations are dependent upon mainline and ramp capacities, reducing congestion on these facilities contributes to higher speeds and could lead to an improved LOS. Improving merge, diverge and weaving facilities through the addition of auxiliary lanes within the area could provide additional capacity and reduce the segment density. Operational improvements through improved signage or other ITS measures may also be developed in consultation with Caltrans in order to improve the LOS.

11.1 Year 2013 Intersection Capacity Analysis

Table 11-1 summarizes the peak hour Level of Service results at the four (4) Caltrans study intersections for Year 2013 traffic conditions. The first column (1) of HCM Delay/LOS values in *Table 11-1* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists Year 2013 Without Project traffic conditions based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2013 Without Project traffic conditions with the addition of Project traffic. The fourth column (4) of *Table 11-1* shows 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 fifth column (5) of *Table 11-1* presents the Level of Service with the implementation of improvements, if necessary.

11.1.1 *Existing Traffic Conditions*

Review of column (1) indicates that all Caltrans intersections are currently operating at an acceptable LOS D or better during the AM and PM peak hours.

11.1.2 *Year 2013 Without Project Traffic Conditions*

Review of column (2) indicates that all Caltrans study intersections are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 Without Project traffic conditions.

11.1.3 *Year 2013 With Project Traffic Conditions*

Review of column (3) of *Table 11-1* shows that all Caltrans study intersections are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours with addition of the Project traffic, when compared to the Caltrans criteria.

Appendices J and ***M*** contain the HCM Delay/LOS calculation worksheets for Existing and Year 2013 Traffic Conditions.

TABLE 11-1

YEAR 2013 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[39] (CALTRANS FACILITIES ANALYSIS)

Key Ramp Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2013 Without Project Traffic Conditions		(3) Year 2013 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2013 With Project With Improvements	
		Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Yes/No	Delay (s/v)	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	16.6	B	22.1	C	21.5	C	No	--	--
Katella Avenue	PM	15.2	B	19.9	B	19.5	B	No	--	--
2. Anaheim Way/I-5 NB Ramps at	AM	14.4	B	14.4	B	13.0	B	No	--	--
Katella Avenue	PM	17.8	B	24.2	C	25.4	C	No	--	--
7. SR-57 Southbound Ramps at	AM	10.2	B	11.6	B	13.1	B	No	--	--
Katella Avenue	PM	8.1	A	16.0	B	15.5	B	No	--	--
8. SR-57 Northbound Ramps at	AM	9.5	A	13.9	B	15.5	B	No	--	--
Katella Avenue	PM	10.4	B	11.2	B	12.1	B	No	--	--

Notes:

- s/v = seconds per vehicle (delay).
- LOS = Level of Service, please refer to *Table 3-3* for the LOS definitions.
- **Bold HCM Delay values** indicate adverse service levels based on the Caltrans LOS Criteria.

[39] *Appendices J* and *M* contain HCM Delay/LOS calculation worksheets for all study intersections.

11.2 Year 2013 Freeway Ramp Analysis (Merge/Diverge Analysis)

Table 11-2 summarizes the peak hour Level of Service results at the four (4) Caltrans ramp locations for the merge/diverge analysis for the Year 2013 traffic conditions. The first column (1) of *Table 11-2* indentifies the type of analysis, i.e., merge or diverge. The second column (2) lists time period. The third column (3) lists Existing traffic conditions. The fourth column (4) lists Year 2013 Without Project traffic conditions and the fifth column (5) presents forecast Year 2013 Without Project traffic conditions with the addition of Project traffic. The sixth column (6) of *Table 11-2* shows 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.

11.2.1 *Existing Traffic Conditions*

Review of column (3) indicates that none of the four (4) Caltrans ramp locations are forecast to operate at an adverse service level under the Existing traffic conditions. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Existing traffic conditions.

11.2.2 *Year 2013 Without Project Traffic Conditions*

Review of column (4) indicates that none of the four (4) Caltrans ramp locations are forecast to operate at an adverse service level under the Year 2013 Without Project traffic conditions. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 Without Project traffic conditions.

11.2.3 *Year 2013 With Project Traffic Conditions*

Review of column (5) of *Table 11-2* shows that none of the four (4) Caltrans ramp locations operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions.

Appendices K and ***N*** contain the Merge and Diverge Analysis Calculation worksheets for all ramp locations for the Existing and Year 2013 traffic conditions.

TABLE 11-2

YEAR 2013 PEAK HOUR FREEWAY RAMP ANALYSIS SUMMARY – MERGE/DIVERGE ANALYSIS[40] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Ramp	(1) Analysis Type	(2) Time Period	(3) Existing Traffic Conditions				(4) Year 2013 Without Project Traffic Conditions				(5) Year 2013 With Project Traffic Conditions				(6) Significant Impact
			Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Yes/No
1. I-5 Northbound On-Ramp from	*Merge Analysis*	AM	4,710	200	18.9	B	4,828	213	19.3	B	4,828	217	19.3	B	No
Katella Avenue		PM	7,230	280	26.8	C	7,471	306	27.5	C	7,471	321	27.4	C	No
2. I-5 Off-Ramp Southbound to	*Diverge Analysis*	AM	5,590	540	1.7	A	5,735	626	2.6	A	5,735	647	2.8	A	No
Katella Avenue/Orangewood Avenue		PM	6,930	200	1.2	A	7,121	247	2.0	A	7,121	250	2.0	A	No
3. SR-57 Northbound On-Ramp from	*Merge Analysis*	AM	4,010	300	17.3	B	4,087	326	17.6	B	4,087	311	17.5	B	No
Eastbound Katella Avenue		PM	7,230	450	27.0	C	7,498	467	27.7	C	7,498	444	27.8	C	No
4. SR-57 Southbound On-Ramp from	*Merge Analysis*	AM	5,490	240	21.7	C	5,922	237	23.1	C	5,922	268	23.1	C	No
Westbound Katella Avenue		PM	6,690	460	25.4	C	6,890	449	26.0	C	6,890	547	25.9	C	No

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.

[40] *Appendices K* and *N* contain the merge/diverge and calculation worksheets for all ramp locations.

11.3 Year 2013 Freeway Ramp Analysis (Weaving Analysis)

Table 11-3 summarizes the peak hour Level of Service results at the four (4) Caltrans ramp locations for the weaving analysis for the Year 2013 traffic conditions. The first column (1) of *Table 11-3* lists time period. The second column (2) lists Existing traffic conditions. The third column (3) lists Year 2013 Without Project traffic conditions and the fourth column (4) presents forecast Year 2013 Without Project traffic conditions with the addition of Project traffic. The fifth column (5) of *Table 11-3* shows 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 sixth column (6) of *Table 11-3* presents the Level of Service with the implementation of improvements, if necessary.

11.3.1 *Existing Traffic Conditions*

Review of column (2) indicates that two (2) of the four (4) Caltrans ramp locations are forecast to operate at adverse service levels under the Existing traffic conditions. The remaining two (2) Caltrans ramp locations are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Existing traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour						PM Peak Hour					
Key Freeway Segment	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	--	--	--	--	7,050	10	660	230	39.28	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	--	--	--	--	--	--	6,190	30	660	500	37.03	E

11.3.2 *Year 2013 Without Project Traffic Conditions*

Review of column (3) indicates that three (3) of the four (4) Caltrans ramp locations are forecast to operate at adverse service levels under the Year 2013 Without Project traffic conditions. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 Without Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour						PM Peak Hour					
Key Freeway Segment	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	--	--	--	--	6,923	22	753	353	35.83	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	--	--	--	--	7,350	15	726	258	41.72	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	5,313	30	850	609	35.32	E	6,376	30	680	511	38.26	E

11.3.3 *Year 2013 With Project Traffic Conditions*

Review of column (4) of *Table 11-2* shows that three (3) of the four (4) Caltrans ramp locations operate at adverse levels of service with the addition of the Project traffic, when compared to the

Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour						PM Peak Hour					
Key Freeway Segment	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	--	--	--	--	6,923	22	753	437	36.59	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	--	--	--	--	7,350	15	726	396	43.04	F
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	5,313	30	1,038	609	37.10	E	6,376	30	701	511	38.44	E

It should be noted that the recommended mitigation measures outlined in ***Chapter 14.0*** of this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

Appendices K and *N* contain the Weaving Analysis Calculation worksheets for all ramp locations for the Existing and Year 2013 traffic conditions.

TABLE 11-3

YEAR 2013 PEAK HOUR FREEWAY RAMP ANALYSIS SUMMARY – WEAVING ANALYSIS[41] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Ramp	(1) Time Period	(2) Existing Traffic Conditions						(3) Year 2013 Without Project Traffic Conditions						(4) Year 2013 With Project Traffic Conditions						(5) Significant Impact	(6) Year 2013 With Project With Improvements Traffic Conditions					
		Weaving Movement Volume				Density (pc/mi/ln)	LOS	Weaving Movement Volume				Density (pc/mi/ln)	LOS	Weaving Movement Volume				Density (pc/mi/ln)	LOS		Weaving Movement Volume				Density (pc/mi/ln)	LOS
		A-C	B-D	A-D	B-C			A-C	B-D	A-D	B-C			A-C	B-D	A-D	B-C			Yes/No	A-C	B-D	A-D	B-C		
1. SR-57 Northbound *between* Orangewood Ave	AM	3,860	10	730	150	18.66	B	3,899	12	754	189	19.24	B	3,899	12	869	189	20.02	C	No	--	--	--	--	--	--
On-Ramp and Katella Ave Off-Ramp	PM	6,960	10	550	270	30.62	D	7,140	15	590	359	32.33	D	7,140	15	602	359	32.42	D	No	--	--	--	--	--	--
2. SR-57 Southbound *between* Katella Ave	AM	5,490	10	700	150	26.59	C	5,820	10	736	150	28.44	D	5,820	10	736	172	28.62	D	No	4,850	8	613	143	22.93	C
On-Ramp and Orangewood Ave Off-Ramp[42]	PM	6,680	20	710	340	34.09	D	**6,923**	**22**	**753**	**353**	**35.83**	**E**	**6,923**	**22**	**753**	**437**	**36.59**	**E**	**Yes**	5,769	18	628	364	29.09	D
3. SR-57 Northbound *between* Katella Ave	AM	3,600	10	840	140	22.80	C	3,691	10	854	152	23.46	C	3,691	10	854	188	23.76	C	No	3,691	10	854	188	18.50	B
On-Ramp and Ball Rd Off-Ramp	PM	**7,050**	**10**	**660**	**230**	**39.28**	**E**	**7,350**	**15**	**726**	**258**	**41.72**	**E**	**7,350**	**15**	**726**	**396**	**43.04**	**F**	**Yes**	7,350	15	726	396	33.42	D
4. SR-57 Southbound *between* Ball Rd	AM	4,890	30	840	600	32.99	D	**5,313**	**30**	**850**	**609**	**35.32**	**E**	**5,313**	**30**	**1,038**	**609**	**37.10**	**E**	**Yes**	5,313	30	1,038	609	28.65	D
On-Ramp and Katella Ave Off-Ramp	PM	**6,190**	**30**	**660**	**500**	**37.03**	**E**	**6,376**	**30**	**680**	**511**	**38.26**	**E**	**6,376**	**30**	**701**	**511**	**38.44**	**E**	**Yes**	6,376	30	701	511	29.88	D

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.

[41] *Appendices K* and *N* contain the weaving analysis calculation worksheets for all ramp locations.

[42] HCM software allows a maximum input of 5 lanes. The volumes have been manually adjusted to account for 6 lanes with the recommended improvements. The Year 2013 With Project traffic volumes have been multiplied by a factor of 5/6 to obtain the Year 2013 With Project With Improvements traffic volumes.

11.4 Year 2013 Freeway Segment Analysis

Table 11-4 summarizes the peak hour Level of Service results at the four (4) Caltrans freeway segments for the Year 2013 traffic conditions. The first column (1) lists time period. The second column (2) lists Existing traffic conditions. The third column (3) lists Year 2013 Without Project traffic conditions and the fourth column (4) presents forecast Year 2013 Without Project traffic conditions with the addition of Project traffic. The fifth column (5) of *Table 11-4* shows 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 sixth column (6) of *Table 11-4* presents the Level of Service with the implementation of improvements, if necessary.

11.4.1 *Existing Traffic Conditions*

Review of column (2) indicates that two (2) Caltrans freeway segments are forecast to operate at an adverse service level under the Existing traffic conditions. The remaining two (2) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Existing traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
3. SR-57 Northbound *from* Katella Avenue *to* Ball Road	--	--	--	7,950	42.7	E
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	--	--	--	7,380	36.1	E

11.4.2 *Year 2013 Without Project Traffic Conditions*

Review of column (3) indicates that two (2) Caltrans freeway segments are forecast to operate at an adverse service level under the Year 2013 Without Project traffic conditions. The remaining two (2) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 Without Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
3. SR-57 Northbound *from* Katella Avenue *to* Ball Road	--	--	--	8,243	OVRFL	F
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	--	--	--	7,582	38.2	E

11.4.3 *Year 2013 With Project Traffic Conditions*

Review of column (4) of *Table 11-4* shows that two (2) Caltrans freeway segments operate at adverse levels of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining two (2) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

Key Freeway Segment	AM Peak Hour Pk Hr Volume	AM Peak Hour Density (pc/mi/ln)	AM Peak Hour LOS	PM Peak Hour Pk Hr Volume	PM Peak Hour Density (pc/mi/ln)	PM Peak Hour LOS
3. SR-57 Northbound *from* Katella Avenue *to* Ball Road	--	--	--	8,380	OVRFL	F
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	--	--	--	7,603	38.4	E

It should be noted that the recommended mitigation measures outlined in ***Chapter 14.0*** of this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Appendices L and ***O*** contain the Basic Freeway Segment Analysis Calculation worksheets for all freeway segments for the Existing and Year 2013 traffic conditions.

TABLE 11-4

YEAR 2013 PEAK HOUR FREEWAY SEGMENT CAPACITY ANALYSIS SUMMARY[43] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Segment	(1) Time Period	(2) Existing Traffic Conditions			(3) Year 2013 Without Project Traffic Conditions			(4) Year 2013 With Project Traffic Conditions			(5) Significant Impact	(6) Year 2013 With Project With Improvements		
		Peak Hour Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Density (pc/mi/ln)	LOS	Yes/No	Peak Hour Volume	Density (pc/mi/ln)	LOS
1. SR-57 Northbound *from*	AM	4,750	16.1	B	4,765	16.1	B	4,880	16.5	B	No	--	--	--
Orangewood Avenue *to* Katella Avenue	PM	7,790	27.4	D	8,093	28.9	D	8,106	29.0	D	No	--	--	--
2. SR-57 Southbound *from*	AM	6,350	21.5	C	6,698	22.8	C	6,720	22.9	C	No	--	--	--
Katella Avenue *to* Orangewood Avenue	PM	7,750	27.2	D	7,986	28.4	D	8,070	28.8	D	No	--	--	--
3. SR-57 Northbound *from*	AM	4,590	19.4	C	4,679	19.8	C	4,715	20.0	C	No	4,715	15.9	B
Katella Avenue *to* Ball Road	PM	**7,950**	**42.7**	**E**	**8,243**	**OVRFL**	**F**	**8,380**	**OVRFL**	**F**	**Yes**	8,380	30.5	D
4. SR-57 Southbound *from*	AM	6,360	28.2	D	6,656	30.1	D	6,844	31.5	D	No	6,844	23.4	C
Ball Road *to* Katella Avenue	PM	**7,380**	**36.1**	**E**	**7,582**	**38.2**	**E**	**7,603**	**38.4**	**E**	**Yes**	7,603	26.5	D

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.
- OVRFL = Exceeds analysis model capabilities (Overflow conditions).

[43] *Appendices L* and *O* contain the HCM Density/LOS calculation worksheets for all study freeway segments.

12.0 YEAR 2030 CALTRANS FACILITIES ANALYSIS (HCM METHODOLOGY)

12.1 Year 2030 Intersection Capacity Analysis

Table 12-1 summarizes the peak hour Level of Service results at the four (4) Caltrans study intersections for Year 2030 traffic conditions. The first column (1) of HCM Delay/LOS values in *Table 12-1* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists Year 2030 Without Project traffic conditions. The third column (3) presents forecast Year 2030 Without Project traffic conditions with the addition of Project traffic. The fourth column (4) of *Table 12-1* shows 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 fifth column (5) of *Table 12-1* presents the Level of Service with the implementation of improvements, if necessary.

12.1.1 *Year 2030 Without Project Traffic Conditions*

Review of column (2) indicates that two (2) Caltrans study intersections are forecast to operate at adverse service levels under the Year 2030 Without Project traffic conditions. The remaining two (2) Caltrans study intersections are forecast to operate at an acceptable LOS B or better during the AM and PM peak hours under the Year 2030 Without Project traffic conditions. The locations operating at an adverse LOS are listed below:

		AM Peak Hour		PM Peak Hour	
Key Intersection		**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
1.	Manchester Ave/I-5 SB Ramps at Katella Ave	55.4	E	71.1	E
2.	Anaheim Way/I-5 NB Ramps at Katella Avenue	--	--	79.6	E

12.1.2 *Year 2030 With Project Traffic Conditions*

Review of column (3) of *Table 12-1* shows that the same two (2) Caltrans study intersections will continue to operate at adverse levels of service with addition of the Project traffic, when compared to the Caltrans criteria. The locations operating at an adverse LOS are listed below:

		AM Peak Hour		PM Peak Hour	
Key Intersection		**Delay (s/v)**	**LOS**	**Delay (s/v)**	**LOS**
1.	Manchester Ave/I-5 SB Ramps at Katella Ave	59.0	E	70.9	E
2.	Anaheim Way/I-5 NB Ramps at Katella Avenue	--	--	81.7	F

It should be noted that the recommended mitigation measures outlined in ***Chapter 14.0*** of this report will offset the impacts of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

Appendix P contains the HCM Delay/LOS calculation worksheets for Year 2030 Traffic Conditions.

TABLE 12-1

YEAR 2030 PEAK HOUR INTERSECTION CAPACITY ANALYSIS SUMMARY[44] (CALTRANS FACILITIES ANALYSIS)

Key Ramp Intersection	Time Period	(1) Existing Traffic Conditions		(2) Year 2030 Without Project Traffic Conditions		(3) Year 2030 With Project Traffic Conditions		(4) Significant Impact	(5) Year 2030 With Project With Improvements	
		Delay (s/v)	LOS	Delay (s/v)	Yes/No	Delay (s/v)	Yes/No	Yes/No	Delay (s/v)	LOS
1. Manchester Ave/I-5 SB Ramps at	AM	16.6	B	**55.4**	**E**	**59.0**	**E**	**Yes**	33.7	C
Katella Avenue	PM	15.2	B	**71.1**	**E**	**70.9**	**E**	**Yes**	22.6	C
2. Anaheim Way/I-5 NB Ramps at	AM	14.4	B	19.0	B	19.2	B	No	16.4	B
Katella Avenue	PM	17.8	B	**79.6**	**E**	**81.7**	**F**	**Yes**	54.0	D
7. SR-57 Southbound Ramps at	AM	10.2	B	16.6	B	17.6	B	No	--	--
Katella Avenue	PM	8.1	A	12.0	B	12.3	B	No	--	--
8. SR-57 Northbound Ramps at	AM	9.5	A	12.0	B	15.4	B	No	--	--
Katella Avenue	PM	10.4	B	14.2	B	15.6	B	No	--	--

Notes:

- s/v = seconds per vehicle (delay).
- LOS = Level of Service, please refer to *Table 3-3* for the LOS definitions.
- **Bold HCM Delay values** indicate adverse service levels based on the Caltrans LOS Criteria.

[44] *Appendices J* and *P* contain HCM Delay/LOS calculation worksheets for all study intersections.

12.2 Year 2030 Freeway Ramp Analysis (Merge/Diverge Analysis)

Table 12-2 summarizes the peak hour Level of Service results at the four (4) Caltrans ramp locations for the merge/diverge analysis for the Year 2030 traffic conditions. The first column (1) of *Table 12-2* indentifies the type of analysis, i.e., merge or diverge. The second column (2) lists time period. The third column (3) lists Existing traffic conditions. The fourth column (4) lists Year 2030 Without Project traffic conditions and the fifth column (5) presents forecast Year 2030 Without Project traffic conditions with the addition of Project traffic. The sixth column (6) of *Table 11-2* shows 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.

12.2.1 *Year 2030 Without Project Traffic Conditions*

Review of column (4) indicates that none of the four (4) Caltrans ramp locations are forecast to operate at an adverse service level under the Year 2030 Without Project traffic conditions. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 Without Project traffic conditions.

12.2.2 *Year 2030 With Project Traffic Conditions*

Review of column (5) of *Table 12-2* shows that none of the four (4) Caltrans ramp locations operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions.

Appendix Q contains the Merge and Diverge Analysis Calculation worksheets for all ramp locations for the Year 2030 traffic conditions.

TABLE 12-2

YEAR 2030 PEAK HOUR FREEWAY RAMP ANALYSIS SUMMARY – MERGE/DIVERGE ANALYSIS[45] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Ramp	(1) Analysis Type	(2) Time Period	(3) Existing Traffic Conditions				(4) Year 2030 Without Project Traffic Conditions				(5) Year 2030 With Project Traffic Conditions				(6) Significant Impact
			Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Ramp Volume	Density (pc/mi/ln)	LOS	Yes/No
1. I-5 Northbound On-Ramp from	*Merge Analysis*	AM	4,710	200	18.9	B	5,230	256	19.8	B	5,230	260	19.8	B	No
Katella Avenue		PM	7,230	280	26.8	C	8,290	395	28.5	D	8,290	410	28.5	D	No
2. I-5 Off-Ramp Southbound to	*Diverge Analysis*	AM	5,590	540	1.7	A	6,230	919	4.8	A	6,230	940	5.0	A	No
Katella Avenue/Orangewood Avenue		PM	6,930	200	1.2	A	7,770	407	3.5	A	7,770	410	3.5	A	No
3. SR-57 Northbound On-Ramp from	*Merge Analysis*	AM	4,010	300	17.3	B	4,350	415	14.8	B	4,350	400	14.8	B	No
Eastbound Katella Avenue		PM	7,230	450	27.0	C	8,410	523	22.3	C	8,410	500	22.3	C	No
4. SR-57 Southbound On-Ramp from	*Merge Analysis*	AM	5,490	240	21.7	C	7,390	229	25.8	C	7,390	260	25.8	C	No
Westbound Katella Avenue		PM	6,690	460	25.4	C	7,570	412	26.2	C	7,570	510	26.1	C	No

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.

[45] *Appendices K* and *Q* contain the merge/diverge and calculation worksheets for all ramp locations.

12.3 Year 2030 Freeway Ramp Analysis (Weaving Analysis)

Table 12-3 summarizes the peak hour Level of Service results at the four (4) Caltrans ramp locations for the weaving analysis for the Year 2030 traffic conditions. The first column (1) of *Table 12-3* lists time period. The second column (2) lists Existing traffic conditions. The third column (3) lists Year 2030 Without Project traffic conditions and the fourth column (4) presents forecast Year 2030 Without Project traffic conditions with the addition of Project traffic. The fifth column (5) of *Table 12-3* shows 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 sixth column (6) of *Table 12-3* presents the Level of Service with the implementation of improvements, if necessary.

12.3.1 *Year 2030 Without Project Traffic Conditions*

Review of column (3) indicates that three (3) of the four (4) Caltrans ramp locations are forecast to operate at adverse service levels under the Year 2030 Without Project traffic conditions. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 Without Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour						PM Peak Hour					
Key Freeway Segment	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	--	--	--	--	7,750	30	900	396	37.49	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	--	--	--	--	8,370	30	950	352	35.25	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	6,750	30	882	640	39.13	E	7,010	30	749	550	38.46	E

12.3.2 *Year 2030 With Project Traffic Conditions*

Review of column (4) of *Table 12-3* shows that three (3) of the four (4) Caltrans ramp locations operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour						PM Peak Hour					
Key Freeway Segment	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**	**A-C**	**B-D**	**A-D**	**B-C**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	--	--	--	--	7,750	30	900	480	38.20	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	--	--	--	--	8,370	30	950	490	36.17	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	6,750	30	1,070	640	40.79	E	7,010	30	770	550	38.63	E

It should be noted that the recommended mitigation measures outlined in ***Chapter 14.0*** of this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

Appendix Q contains the Weaving Analysis Calculation worksheets for all ramp locations for the Year 2030 traffic conditions.

TABLE 12-3

YEAR 2030 PEAK HOUR FREEWAY RAMP ANALYSIS SUMMARY – WEAVING ANALYSIS[46] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Ramp	(1) Time Period	(2) Existing Traffic Conditions						(3) Year 2030 Without Project Traffic Conditions						(4) Year 2030 With Project Traffic Conditions						(5) Significant Impact	(6) Year 2030 With Project With Improvements Traffic Conditions					
		Weaving Movement Volume				Density (pc/mi/ln)	LOS	Weaving Movement Volume				Density (pc/mi/ln)	LOS	Weaving Movement Volume				Density (pc/mi/ln)	LOS		Weaving Movement Volume				Density (pc/mi/ln)	LOS
		A-C	B-D	A-D	B-C			A-C	B-D	A-D	B-C			A-C	B-D	A-D	B-C			Yes/No	A-C	B-D	A-D	B-C		
1. SR-57 Northbound *between* Orangewood Ave	AM	3,860	10	730	150	18.66	B	4,030	20	835	320	19.22	B	4,030	20	950	320	19.95	B	No	--	--	--	--	--	--
On-Ramp and Katella Ave Off-Ramp	PM	6,960	10	550	270	30.62	D	7,750	30	728	660	34.71	D	7,750	30	740	660	34.79	D	No	--	--	--	--	--	--
2. SR-57 Southbound *between* Katella Ave	AM	5,490	10	700	150	26.59	C	6,940	10	860	148	31.33	D	6,940	10	860	170	31.50	D	No	5,783	8	717	142	25.19	C
On-Ramp and Orangewood Ave Off-Ramp[47]	PM	6,680	20	710	340	34.09	D	**7,750**	**30**	**900**	**396**	**37.49**	**E**	**7,750**	**30**	**900**	**480**	**38.20**	**E**	**Yes**	6,458	25	750	400	30.33	D
3. SR-57 Northbound *between* Katella Ave	AM	3,600	10	840	140	22.80	C	4,000	10	900	194	18.14	B	4,000	10	900	230	18.34	B	No	3,333	8	750	192	15.00	B
On-Ramp and Ball Rd Off-Ramp[47]	PM	**7,050**	**10**	**660**	**230**	**39.28**	**E**	**8,370**	**30**	**950**	**352**	**35.25**	**E**	**8,370**	**30**	**950**	**490**	**36.17**	**E**	**Yes**	6,975	25	792	408	29.44	D
4. SR-57 Southbound *between* Ball Rd	AM	4,890	30	840	600	32.99	D	**6,750**	**30**	**882**	**640**	**39.13**	**E**	**6,750**	**30**	**1,070**	**640**	**40.79**	**E**	**Yes**	6,750	30	1,070	640	31.54	D
On-Ramp and Katella Ave Off-Ramp	PM	**6,190**	**30**	**660**	**500**	**37.03**	**E**	**7,010**	**30**	**749**	**550**	**38.46**	**E**	**7,010**	**30**	**770**	**550**	**38.63**	**E**	**Yes**	7,010	30	770	550	30.02	D

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.

[46] *Appendices K* and *Q* contain the weaving analysis calculation worksheets for all ramp locations.

[47] HCM software allows a maximum input of 5 lanes. The volumes have been manually adjusted to account for 6 lanes with the recommended improvements. The Year 2030 With Project traffic volumes have been multiplied by a factor of 5/6 to obtain the Year 2030 With Project With Improvements traffic volumes.

12.4 Year 2030 Freeway Segment Analysis

Table 12-4 summarizes the peak hour Level of Service results at the four (4) Caltrans freeway segments for the Year 2030 traffic conditions. The first column (1) lists time period. The second column (2) lists Existing traffic conditions. The third column (3) lists Year 2030 Without Project traffic conditions and the fourth column (4) presents forecast Year 2030 Without Project traffic conditions with the addition of Project traffic. The fifth column (5) of *Table 12-4* shows 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 sixth column (6) of *Table 12-4* presents the Level of Service with the implementation of improvements, if necessary.

12.4.1 *Year 2030 Without Project Traffic Conditions*

Review of column (3) indicates that one (1) Caltrans freeway segment is forecast to operate at an adverse service level under the Year 2030 Without Project traffic conditions. The remaining three (3) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 Without Project traffic conditions. The location operating at adverse LOS is listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	8,302	38.4	E	8,339	38.8	E

12.4.2 *Year 2030 With Project Traffic Conditions*

Review of column (4) of *Table 12-4* shows that one (1) Caltrans freeway segment operates at an adverse level of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining three (3) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	8,490	40.4	E	8,360	39.0	E

It should be noted that the recommended mitigation measures outlined in ***Chapter 14.0*** of this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Appendix R contains the Basic Freeway Segment Analysis Calculation worksheets for all freeway segments for the Year 2030 traffic conditions.

TABLE 12-4

YEAR 2030 PEAK HOUR FREEWAY SEGMENT CAPACITY ANALYSIS SUMMARY[48] (CALTRANS FACILITIES ANALYSIS)

Key Freeway Segment	(1) Time Period	(2) Existing Traffic Conditions			(3) Year 2030 Without Project Traffic Conditions			(4) Year 2030 With Project Traffic Conditions			(5) Significant Impact	(6) Year 2030 With Project With Improvements		
		Peak Hour Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Density (pc/mi/ln)	LOS	Peak Hour Volume	Density (pc/mi/ln)	LOS	Yes/No	Peak Hour Volume	Density (pc/mi/ln)	LOS
1. SR-57 Northbound *from*	AM	4,750	16.1	B	5,205	16.1	B	5,320	16.5	B	No	--	--	--
Orangewood Avenue *to* Katella Avenue	PM	7,790	27.4	D	9,167	30.5	D	9,180	30.6	D	No	--	--	--
2. SR-57 Southbound *from*	AM	6,350	21.5	C	7,958	25.2	C	7,980	25.2	C	No	--	--	--
Katella Avenue *to* Orangewood Avenue	PM	7,750	27.2	D	9,076	30.1	D	9,160	30.5	D	No	--	--	--
3. SR-57 Northbound *from*	AM	4,590	19.4	C	5,104	15.8	B	5,140	15.9	B	No	--	--	--
Katella Avenue *to* Ball Road	PM	**7,950**	**42.7**	**E**	9,703	33.6	D	9,840	34.5	D	No	--	--	--
4. SR-57 Southbound *from*	AM	6,360	28.2	D	**8,302**	**38.4**	**E**	**8,490**	**40.4**	**E**	**Yes**	8,490	27.3	D
Ball Road *to* Katella Avenue	PM	**7,380**	**36.1**	**E**	**8,339**	**38.8**	**E**	**8,360**	**39.0**	**E**	**Yes**	8,360	26.8	D

Notes:

- pc/mi/ln = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Volume/Density/LOS values** indicate adverse service levels based on the Caltrans LOS Criteria.

[48] *Appendices L* and *R* contain the HCM Density/LOS calculation worksheets for all study freeway segments.

13.0 SITE ACCESS AND INTERNAL CIRCULATION ANALYSIS

13.1 Site Access Evaluation

As shown in ***Figure 13-1,*** vehicular access to the Project site will be provided via the intersection of Katella Avenue at Sportstown as well as via six (6) driveways located on Douglass Road and one (1) driveway located on Katella Avenue.

The existing intersection of Sportstown and Katella Avenue is a full-access, signalized intersection that provides access to the Metrolink/Amtrak Parking Lot. Driveway 1 along Douglass Road is a one-way stop-controlled, right-in/right-out only driveway providing access to the ARTIC North Parking Lot. Driveway 2 along Douglass Road is a right-out only, signalized intersection providing egress from the ARTIC North Parking Lot, Kiss and Ride area and taxi stand. Driveway 3 along Douglass Road is a signalized intersection that provides inbound-only access to the ARTIC North Parking Lot, Kiss and Ride area and taxi stand. It should be noted that the proposed traffic signals at Driveway 2 and Driveway 3 will essentially operate one traffic signal with a common controller. Driveway 4 along Douglass Road is a one-way stop-controlled, right-out only driveway providing egress from the buses and shuttles area. Driveway 5 along Douglass Road is a signalized intersection that provides inbound-only access to the buses and shuttles area. Driveway 6 along Douglass Road is a one-way stop-controlled, full-access driveway providing access to the ARTIC South Parking Lot. Driveway 7 along Katella Avenue is a one-way stop-controlled driveway that provides right-in/right-out only access to the ARTIC North Parking Lot, Kiss and Ride area, taxi stand as well as to the buses and shuttles area.

13.1.1 *Year 2013 With Project Traffic Conditions*

Table 13-1 summarizes the intersection operations at the seven (7) Project driveways for Year 2013 With Project traffic conditions for the proposed Project. The operations analysis for the Project driveways is based on the *Highway Capacity Manual 2000* (HCM 2000) methodology for signalized and unsignalized intersections.

Review of *Table 13-1* shows that all the Project driveways are forecast to operate at an acceptable service level of LOS B or better during the AM and PM peak hours for Year 2013 With Project traffic conditions. As such, Project access will be adequate. Motorists entering and exiting the Project site will be able to do so comfortably, safely and without undue congestion.

Appendix S presents the Year 2013 With Project Delay/LOS calculation worksheets for the seven (7) Project driveways.

A driveway analysis was not performed for Year 2030. Between Year 2013 and Year 2030, several new services will be provided at ARTIC, as stated in ***Section 6.4***. The access and parking requirements for these services have not been defined. It is uncertain how many of these services will use the proposed ARTIC access points, and if the parking lot will be expanded or modified to serve the future uses at ARTIC. As stated in *Section 6.4*, the projects that will utilize ARTIC will be

undergoing their own environmental analyses and these projects will do their own site access evaluation based on their project proposals.

13.2 Driveway Stacking/Storage and Queuing Analysis

A stacking/storage analysis was performed at all seven (7) Project driveways. The queuing evaluation was conducted based on projected Year 2013 With Project peak hour driveway traffic volumes and the *Highway Capacity Manual 2000* (HCM) signalized and unsignalized methodology.

13.2.1 *Year 2013 With Project Traffic Conditions*

Based on the HCM service level calculations, which calculates a critical (95th percentile) queue value in number of vehicles per lane, the maximum number of inbound vehicle queue calculated during the Year 2013 With Project Traffic Conditions occurs on the inbound southbound left-turn movement from Douglass Road into Driveway 3 during the AM peak hour. The queue on Douglass Road is forecast to have a maximum queue of six (6) vehicles. This vehicle queue length translates to 132 feet in queuing (assuming an average car length of 22 feet).

The maximum number of outbound vehicle queue calculated during the Year 2013 With Project Traffic Conditions occurs on the outbound westbound right-turn movement from Driveway 2 onto Douglass Road during the PM peak hour. The queue on Driveway 2 is forecast to have a maximum queue of three (3) vehicles. This vehicle queue length translates to 66 feet in queuing (assuming an average car length of 22 feet).

All of the other Project driveways are forecast to operate with a maximum queue of one (1) vehicle during the AM and PM peak hours.

Based on the analysis, adequate vehicle storage is provided at all of the driveways and review of the proposed site plan indicates that all Project driveways have sufficient stacking to accommodate the forecast vehicle queues. Based on the above, no changes to the proposed configuration of the Project driveways are necessary.

13.3 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 any unsafe vehicle-pedestrian conflict points and the driveway throating is sufficient such that access to parking spaces is not impacted by internal vehicle queuing/stacking. Curb return radii have been confirmed and are adequate for passenger cars, buses, shuttles, service/delivery trucks and trash trucks. Project traffic is not anticipated to cause significant queuing/stacking on the Project driveways. The on-site circulation is very good based on our review of the proposed site plan, whereas the alignment, spacing and throating of the Project driveways is adequate. The circulation around the buildings is adequate with sufficient sight distance along the drive aisles.

13.4 Intersection of Douglass Road and Katella Avenue Operations Analysis (HCM Methodology)

To supplement the operations analysis for the site access evaluation, the intersection of Douglass Road at Katella Avenue has been analyzed using the *HCM 2000 Methodology* to determine the appropriate northbound approach lane geometry for the Year 2013 Project opening condition without requiring the need for any roadway improvements to Douglass Road on the north side of the intersection. As a result of the HCM analysis, the intersection of Douglass Road at Katella Avenue is recommended to consist of a northbound lane configuration of two NBL turn lanes, one NBTR lane and one NBR lane for the Year 2013 Project opening condition. As presented in *Table 13-1*, the intersection of Douglass Road at Katella Avenue operates at acceptable LOS D or better based on the *HCM 2000 Methodology* and the lane configuration mentioned above.

TABLE 13-1

DRIVEWAY PEAK HOUR LEVELS OF SERVICE SUMMARY[49]

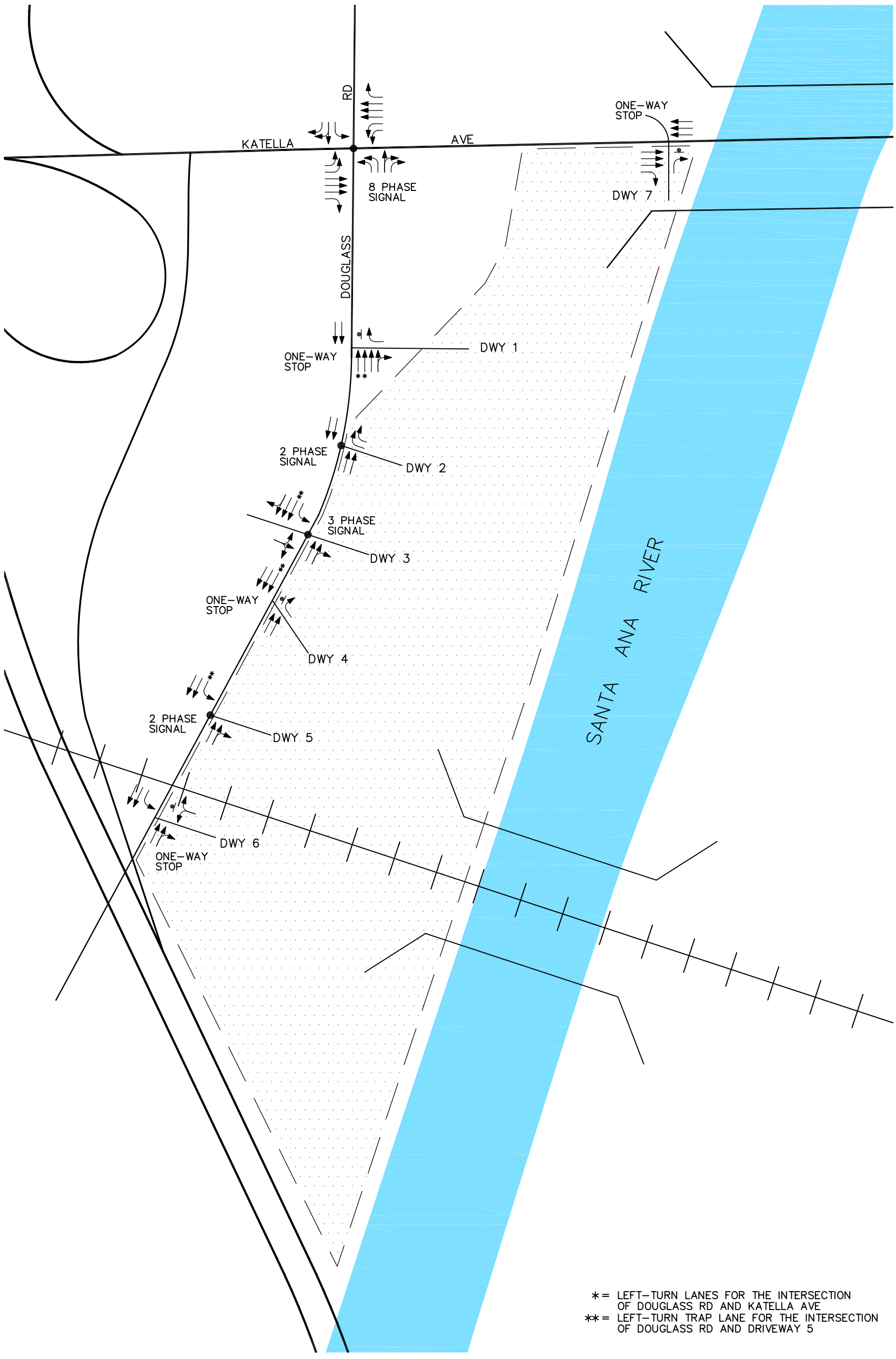
Key Driveway		Control Type	Time Period	Year 2013 With Project Traffic Conditions	
				Delay (s/v)	LOS
A.	Douglass Road at Driveway 1	One-Way Stop	AM	8.6	A
			PM	9.3	A
B.	Douglass Road at Driveway 2	2∅ Traffic Signal	AM	4.0	A
			PM	10.7	A
C.	Douglass Road at Driveway 3	3∅ Traffic Signal	AM	9.7	A
			PM	9.1	A
D.	Douglass Road at Driveway 4	One-Way Stop	AM	8.7	A
			PM	9.6	A
E.	Douglass Road at Driveway 5	2∅ Traffic Signal	AM	7.9	A
			PM	5.7	A
F.	Douglass Road at Driveway 6	One-Way Stop	AM	8.5	A
			PM	8.9	A
G.	Driveway 7 at Katella Avenue	One-Way Stop	AM	10.8	B
			PM	11.4	B
9.	*Douglass Road at Katella Avenue*[50]	*8 ∅ Traffic Signal*	*AM*	*34.6*	*C*
			PM	*36.7*	*D*

Notes:

- s/v = seconds per vehicle (delay)
- LOS = Level of Service, please refer to *Tables 3-2* and *3-3* for the LOS definitions.
- **Bold LOS values** indicate adverse service levels based on City of Anaheim LOS standards.

[49] *Appendix S* contains the Delay/LOS calculation worksheets for all Project Driveways and the intersection of Douglass Road at Katella Avenue.

[50] The intersection of Douglass Road at Katella Avenue has been analyzed using the *HCM 2000 Methodology* to supplement the operations analysis for the site access evaluation. The intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL turn lanes, one NBTR lane and one NBR turn lane for the operations analysis for the Year 2013 Project opening condition.



LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY
= APPROACH LANE ASSIGNMENT
= TRAFFIC SIGNAL, STOP SIGN
= PROJECT SITE

FIGURE 13-1

PROJECT DRIVEWAY LANE CONFIGURATIONS

ARTIC, ANAHEIM

14.0 PROPOSED MITIGATION AND IMPROVEMENT STRATEGIES

14.1 Traffic Fee Program

The City of Anaheim has historically utilized a variety of strategies to provide improvements to the citywide circulation system. The City currently has a traffic fee program in place to fund General Plan improvements required under 2030 No Project and With Project conditions. The City has a long-standing policy that as development occurs throughout the City, traffic studies are prepared to demonstrate the need for implementation of the improvements identified in the General Plan and developer fees and other local dedicated taxes will contribute to those improvements as needed. The fee, initially developed in 1993 and updated periodically provides a proper nexus between increased development in the City and associated traffic impacts to the citywide circulation system. Developers contribute fees to the City, which uses the fund to implement circulation improvements in the City or as the City of Anaheim's local match for leveraging funding from OCTA and Caltrans for circulation system improvements. Hence, the improvements assumed in the build-out of the General Plan, prior to the approval of the Proposed Project are expected to be paid for and implemented through the City's existing traffic impact fee program. Additionally, the City of Anaheim currently has a Community Facilities District (CFD) in place associated with development in the Platinum Triangle. The CFD is expected to contribute funds to all infrastructure needs in the Platinum Triangle including transportation.

The City has proposed improvement strategies that return all intersections to an acceptable LOS under the 2030 With Project scenario. The fair-share calculations, presented later on in the report, identify the proposed Project's fair-share percentage based on Project trips to study area intersections. The proposed Project would be expected to contribute that percentage toward the costs of the recommended improvements.

Intersection and arterial segment improvements in the City of Orange, in addition to State Highway System facility improvements throughout the study area will have fees contributed to them by the proposed Project, commensurate with the fair-share analysis. Although these improvements will be overridden in the EIR as Anaheim does not have jurisdiction over the facilities, the project will be responsible for contributions for the appropriate fair-share toward the recommended improvements. Those specific improvements and fair-shares for facilities in the City of Orange and Caltrans facilities are discussed later in this chapter.

14.2 Steps for Mitigation Measures

As a general rule, mitigation measures for intersections or arterials begin with identification of any measures that might have been recommended as part of other traffic studies in the area, particularly those contained in the traffic study prepared for the Revised Platinum Triangle Expansion Project (DSEIR No. 339). These mitigation measures are then applied to determine whether they result in intersection or roadway segment operation within acceptable thresholds.

If mitigation measures were not previously identified either as part of a traffic study or planned future improvements, mitigation is achieved by identifying new improvements that will provide

adequate capacity for the critical movement for an intersection or for arterial segments. Critical movements are conflicting intersection turning movements that are identified to have the highest ICU for opposing movements; i.e. each of the approaches at a four-legged intersection will contain a critical movement that conflicts with an opposing movement. Since the combination of the ICU values for each critical movement defines the ICU, providing additional through lanes or turning lanes is dependent upon whether the critical movement is a through or turn (left or right) movement. The decision of whether additional lanes should be auxiliary lanes that just add capacity to the intersection without widening the street segment or extended to adjacent intersections is dependent upon the performance, proximity and improvement needs of adjacent intersections.

Mitigation measures are further analyzed for feasibility. A preliminary feasibility assessment is reliant upon potential cost-effectiveness and right-of-way acquisition. Right-of-way acquisitions are least preferred as they incur relocation and compensation cost for displaced residences and businesses which are additional burdens to the community, hence wherever feasible additional capacity for through movements or turn movements are facilitated through re-striping or widening, provided the intersection has sufficient receiving lanes as vehicles pass through the intersection.

For those intersections, roadway segments, freeway ramps and freeway segments where projected traffic volumes are expected to result in unacceptable operating conditions, this report recommends traffic mitigation improvements that change the intersection and/or roadway 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.

14.3 Existing With Project Improvements

14.3.1 *Intersections Improvements*

Since there were no impacted intersections under the Existing With Project traffic conditions, no improvements have been recommended.

14.3.2 *Roadway Segments Improvements*

Since there were no impacted roadway segments under the Existing With Project traffic conditions, no improvements have been recommended.

14.4 Year 2013 With Project Improvements

Table 14-1 presents a summary of the Year 2013 With Project improvements with the resulting levels of service. In addition, it also lists the Project related fair-share percentages for the impacted locations for the worse impacted time period. ***Appendix T*** contains the Project Related Fair-Share Calculation Tables for all the intersections, roadway segments, Caltrans ramp locations and Caltrans freeway segments analyzed in this report.

14.4.1 *Intersections Improvements*

Since there were no impacted intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended. It should be noted that the intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario as identified in the Project Description of the ARTIC EIR.

14.4.2 *Roadway Segments Improvements*

Since there were no impacted roadway segments under the Year 2013 With Project traffic conditions, no improvements have been recommended.

14.4.3 *Caltrans Ramp Intersections Improvements*

Since there were no impacted ramp intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended.

14.4.4 *Caltrans Ramp Locations Improvements (Merge/Diverge Analysis)*

Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2013 With Project traffic conditions, no improvements have been recommended.

14.4.5 *Caltrans Ramp Locations Improvements (Weaving Analysis)*

The results of the Year 2013 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact three (3) of the of the four (4) key study Caltrans ramp locations based on the weaving analysis. The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2013 With Project traffic:

- SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.
- SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed by Year 2013.
- SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

14.4.6 *Caltrans Freeway Segments Improvements*

The results of the Year 2013 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact two (2) of the of the four (4) key study Caltrans freeway segments. The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2013 With Project traffic:

- SR-57 Northbound *from* Katella Avenue *to* Ball Road: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed by Year 2013.

- SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

TABLE 14-1

YEAR 2013 WITH PROJECT PEAK HOUR INTERSECTION CAPACITY ANALYSIS, IMPROVEMENTS AND PROJECT RELATED FAIR-SHARE PERCENTAGE SUMMARY

Key Impacted Location	Type of Location	Time Period	(1) Year 2013 With Project Traffic Conditions		(2)	(3) Year 2013 With Project With Improvements		(4)
			Delay / Density	LOS	Year 2013 With Project Recommend Improvement	Delay / Density	LOS	Project Fair-Share Percentage
W-2. SR-57 SB *between* Katella On-Ramp	Weaving	AM	28.62 p/m/l	D	Add a 6th lane.	22.93 p/m/l	C	6.47%
and Orangewood Off-Ramp	Segment	PM	**36.59 p/m/l**	**E**		29.09 p/m/l	D	
W-3. SR-57 NB *between* Katella Ave	Weaving	AM	23.76 p/m/l	C	Add a 5th lane.	18.50 p/m/l	B	8.34%
On-Ramp and Ball Rd Off-Ramp	Segment	PM	**43.04 p/m/l**	**F**		33.42 p/m/l	D	
W-4. SR-57 SB *between* Ball Rd	Weaving	AM	**37.10 p/m/l**	**E**	Add a 5th lane.	28.65 p/m/l	D	9.31%
On-Ramp and Katella Ave Off-Ramp	Segment	PM	**38.44 p/m/l**	**E**		29.88 p/m/l	D	
F-3. SR-57 Northbound *from*	Freeway	AM	20.0 p/m/l	C	Add a 5th lane.	15.9 p/m/l	B	8.28%
Katella Avenue *to* Ball Road	Segment	PM	**OVRFL**	**F**		30.5 p/m/l	D	
F-4. SR-57 Southbound *from*	Freeway	AM	31.5 p/m/l	D	Add a 5th lane.	23.4 p/m/l	C	3.38%
Ball Road *to* Katella Avenue	Segment	PM	**38.4 p/m/l**	**E**		26.5 p/m/l	D	

Notes:

- s/v = seconds per vehicle (delay).
- p/m/l = Passenger cars per mile per lane (density).
- LOS = Level of Service.
- **Bold Delay/Density values** indicate adverse service levels based on the LOS Criteria outlined in this report.
- OVRFL = Exceeds analysis model capabilities (Overflow conditions).

14.5 Year 2030 With Project Improvements

Table 14-2 presents a summary of the Year 2030 With Project improvements with the resulting levels of service. In addition, it also lists the Project related fair-share percentages for the impacted locations for the worse impacted time period. *Appendix T* contains the Project Related Fair-Share Calculation Tables for all the intersections, roadway segments, Caltrans ramp locations and Caltrans freeway segments analyzed in this report

14.5.1 *Intersections Improvements*

The results of the Year 2030 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact two (2) of the of the twelve (12) key study intersections. While mitigation measures required for Project related significant impacts, the Project will also contribute fair share costs for cumulative impacts under buildout conditions. The improvements listed below have been identified to mitigate the traffic impacts at the intersections significantly impacted by the Year 2030 With Project traffic:

- Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.
- Douglass Road at Katella Avenue: Widen and/or re-stripe Douglass Road to provide two left turn lanes, two through lanes, and one right turn lane in both the northbound and southbound directions. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 4th westbound through lane. Modify existing traffic signal.

14.5.2 *Roadway Segments Improvements*

The results of the Year 2030 With Project traffic conditions level of service analysis indicates that one (1) roadway segment will be significantly impacted based on the LOS impact criteria outlined in this report. The improvements listed below have been identified to mitigate the traffic impacts at this roadway segment significantly impacted by the Year 2030 With Project traffic:

- Katella Avenue *between* Manchester Avenue to Anaheim Way: Widen Katella Avenue from six (6) to eight (8) lanes between Manchester Avenue and Anaheim Way. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan.

14.5.3 *Caltrans Ramp Intersections Improvements*

The results of the Year 2030 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact two (2) of the of the four (4) key study Caltrans ramp intersections. The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp intersections significantly impacted by the Year 2030 With Project traffic:

- Manchester Avenue/I-5 Southbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to construct a pedestrian refuge island on the west leg of intersection with pedestrian buttons. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound

through lane and a 4th westbound through lane. Modify the existing traffic signal and install eastbound right-turn overlap phase on Katella Avenue.

- Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.

It should be noted that the additional eastbound and westbound through lanes for both intersections are included as part of the roadway segment improvement to widen Katella Avenue between Manchester Avenue and Anaheim Way and that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan.

14.5.4 *Caltrans Ramp Locations Improvements (Merge/Diverge Analysis)*

Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2030 With Project traffic conditions, no improvements have been recommended.

14.5.5 *Caltrans Ramp Locations Improvements (Weaving Analysis)*

The results of the Year 2030 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact three (3) of the of the four (4) key study Caltrans ramp locations based on the weaving analysis. The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2030 With Project traffic:

- SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.
- SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 6th lane on this segment of SR-57 Northbound freeway.
- SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

14.5.6 *Caltrans Freeway Segments Improvements*

The results of the Year 2030 With Project traffic conditions level of service analysis indicate that the proposed Project will significantly impact one (1) of the of the four (4) key study Caltrans freeway segments. The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2030 With Project traffic:

- SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

TABLE 14-2

YEAR 2030 WITH PROJECT PEAK HOUR INTERSECTION CAPACITY ANALYSIS, IMPROVEMENTS AND PROJECT RELATED FAIR-SHARE PERCENTAGE SUMMARY

Key Impacted Location		Type of Location		Time Period	(1) Year 2030 With Project Traffic Conditions		(2)	(3) Year 2030 With Project With Improvements		(4)
					ICU/Delay/ V/C/Density	LOS	Year 2030 With Project Recommend Improvement	ICU/Delay/ V/C/Density	LOS	Project Fair-Share Percentage
I-2.	Anaheim Way/I-5 NB Ramps at Katella Avenue	Intersection		AM	**0.946**	**E**	Provide a 4th EBT and 5th WBT. Modify signal.	0.815	D	2.93%
				PM	0.897	D		0.776	C	
				AM	19.2 s/v	B		16.4 s/v	B	
				PM	**81.7 s/v**	**F**		54.0 s/v	D	
I-9.	Douglass Road at Katella Avenue	Intersection		AM	**1.035**	**F**	Widen/Restripe to provide 2NBL, 2NBT, 1 NBR, 2SBL, 2 SBT, and 1 SBR; Provide 4th EBT and 4th WBT. Modify signal.	0.840	D	13.57%
				PM	**1.077**	**F**		0.868	D	
RS-1.	Katella Avenue *between* Manchester Avenue and Anaheim Way	Roadway Segment	EB	AM	0.852	D	Widen Katella Avenue from six (6) to eight (8) lanes.	0.639	B	0.95%
			WB	PM	**0.958**	**E**		0.718	C	
			EB	AM	**1.102**	**F**		0.826	D	
			WB	PM	**1.097**	**F**		0.823	D	
I-1.	Manchester Ave/I-5 SB Ramps at Katella Avenue	Ramp Intersection		AM	**59.0 s/v**	**E**	Construct a pedestrian island with buttons on the west leg. Provide a 4th EBT and 4th WBT. Modify signal and install EB right-turn overlap phase.	33.7 s/v	C	2.14%
				PM	**70.9 s/v**	**E**		22.6 s/v	C	
W-2.	SR-57 SB *between* Katella On-Ramp and Orangewood Off-Ramp	Weaving Segment		AM	31.50 p/m/l	D	Add a 6th lane.	25.19 p/m/l	C	6.47%
				PM	**38.20 p/m/l**	**E**		30.33 p/m/l	D	
W-3.	SR-57 NB *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	Weaving Segment		AM	18.34 p/m/l	B	Add a 6th lane.	15.00 p/m/l	B	8.34%
				PM	**36.17 p/m/l**	**E**		29.44 p/m/l	D	
W-4.	SR-57 SB *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	Weaving Segment		AM	**40.79 p/m/l**	**E**	Add a 5th lane.	31.54 p/m/l	D	9.31%
				PM	**38.63 p/m/l**	**E**		30.02 p/m/l	D	
F-4.	SR-57 Southbound *from* Ball Road *to* Katella Avenue	Freeway Segment		AM	**40.4 p/m/l**	**E**	Add a 5th lane.	27.3 p/m/l	D	9.31%
				PM	**39.0 p/m/l**	**E**		26.8 p/m/l	D	

Notes:

- s/v = seconds per vehicle (delay).
- LOS = Level of Service.
- p/m/l = Passenger cars per mile per lane (density).
- Bold Delay/Density values indicate adverse service levels based on the LOS Criteria outlined in this report.

14.6 Caltrans Ramps and Freeway Improvements

As identified in the Year 2013 With Project traffic conditions, there are three (3) freeway ramp locations (weaving segments) and two (2) freeway mainline segment deficiencies. For the Year 2030 With Project traffic conditions, there are three (3) freeway ramp locations (weaving segments) and one (1) freeway mainline segment deficiencies. For the Year 2030 With Project traffic conditions, the traffic volume on all freeway segments within the study area increases when compared with Existing traffic conditions. The proposed Project forecast volumes are generally consistent with the No Project scenario forecast volumes, with some segments and ramps experiencing a slight increase in the peak hour. Improvements beyond the planned system improvements will be required to maintain an acceptable LOS for the State Highway System. Potential improvement measures would include the addition of one lane to freeway mainline segments. However, capacity improvements to the freeway mainline are not feasible improvement options. The rationale is that Caltrans has not identified any further improvements through a Corridor Study beyond those already assumed in the build-out analysis for SR-57 and the City has no control over State facilities. Additional capacity improvements are infeasible due to physical, right-of-way, and other environmental constraints.

For example, the expansion of the identified freeway segments would involve significant right-of-way acquisition, which would involve either the acquisition of residences and/or businesses, or this would involve bringing the freeway facilities close to such residences and businesses. It is not a legal prerogative or policy of the City to support further freeway widening when such widening would have negative impacts on adjacent businesses and residences. State facilities located within the City have been significantly expanded over the past several years and City businesses and areas which were subject to an acquisition or which were located near acquisitions have not fully recovered from the acquisition activities. As an example, remnant residential and commercial parcels exist along I-5 at the Euclid Street exit. Other examples also exist. In addition, bringing State facilities closer to residences and businesses is also not a social or legal prerogative of the City. The City does not desire to further exacerbate these land use and air quality incompatibility issues by encouraging the expansion of freeway facilities adjacent to suburban-style tract houses. As a result of these policy prerogatives and identified constraints, the Project is not expected to mitigate the freeway mainline segments to an acceptable LOS. As part of the proposed Project approval and certification of the Environmental Impact Report (EIR), the City will develop a Statement of Overriding Considerations for the capacity improvements of freeway weaving, ramp merge and diverge, and mainline facilities.

Impacts to freeway ramp facilities are the result of high forecast volumes on the ramps themselves coupled with high forecast volumes on the freeway mainline adjacent to the ramp facilities. The utilization of Intelligent Transportation Systems (ITS) and signage improvements could potentially improve the flow and operational capacity of Caltrans facilities, but would not reduce the impacts to less than significant levels. Thus, the impact will remain significant and unavoidable.

Since the major freeway facilities within the study area, I-5 and SR-57 have reached their design capacity or will have reached it by Year 2030 and the required physical improvements are largely the result of background regional traffic, consultation between the City of Anaheim and Caltrans will be

necessary to reach consensus on any potential operational improvement measures. The improvement measures could consist of ITS improvements, enhanced signage, or other operational improvements. The City of Anaheim has no jurisdiction to implement the physical improvements on the Caltrans facilities and a statement of overriding considerations will be discussed in the EIR identifying the potential operational improvements to Caltrans facilities.

Pursuant to Caltrans' *Guide for the Preparation of Traffic Impact Studies (December 2002),* consultation between the City of Anaheim and Caltrans will be necessary to reach consensus on any potential operational improvement measures that can be implemented in the study area to assist in mitigation of traffic increases related to implementation of the proposed Project.

14.6.1 *Caltrans Freeway Segments*

State highway facilities within the study area are not within the jurisdiction of the City of Anaheim. Rather, those improvements are planned, funded, and constructed by the State of California through a legislative and political process involving the State Legislature; the California Transportation Commission (CTC); the California Business, Transportation and Housing Agency; the California Department of Transportation (Caltrans); and OCTA.

In California, most State Highway System improvements are programmed through two documents, the State Transportation Improvement Program (STIP) or the State Highway Operation and Protection Program (SHOPP). State and federal fuel taxes generate most of the funds used to pay for these improvements. Funds expected to be available for transportation improvements are identified through a Fund Estimate prepared by Caltrans and adopted by the CTC. These funds, along with other fund sources, are deposited in the State Highway Account to be programmed and allocated to specific project improvements in both the STIP and SHOPP by the CTC.

The STIP is developed from Regional Transportation Improvement Programs (RTIPs) proposed by Regional Transportation Planning Agencies (RTPAs/MPOs) throughout California and the Interregional Transportation Improvement Program (ITIP) proposed by Caltrans. Of the funds made available by the CTC for the STIP, 25 percent is made available for Caltrans to propose expansion and capacity-enhancing improvements on the statutorily designated Interregional Road System while 75 percent of the funds are made available to the RTPAs/MPOs to propose all types of improvements on all other State Highway System Roads, other non-State highway roads eligible to use federal funds, and on the Interregional Road System. Transportation funds generally come from a variety of sources including National Highway System funds; State fuel taxes; federal fuel taxes; sales taxes on fuel; truck weight fees; roadway and bridge tolls; user fares; local sales tax measures; development fees, where applicable; bond revenues; and State and local general and matching funds.

Improvements to State Highway Systems are deemed to be matters of federal, State, regional, and local concern. On the federal level, the City, through its Congressional delegation, has aggressively sought federal monies for regional roadway improvements. Within the study area, relatively recent projects have provided improvements to the freeway facilities. Interstate 5 within the study area was

widened in the late 1990's under the OCTA Measure M. Additionally, the I-5 and SR-57 interchange to the south of the study area was recently upgraded to improve flow on all facilities.

The State Highway System I-5 freeway and ramps that are cumulatively deficient under 2030 conditions are at their recommended build-out, according to the Route Concept Report (RCR) for the Interstate 5 facility approved by Caltrans in Year 2000.

On I-5, the RCR identifies a concept facility of eight general-purpose lanes and two high occupancy vehicle (HOV) lanes for the segment between the SR-22/57 interchange, south of the Study Area, to SR-91, north of the Study Area. On SR-57, the RCR identifies an eight-lane existing facility with two HOV lanes for the segment between the I-5/SR-22 interchange, south of the study area to SR-91, north of the study area. For the 2030 analysis, the concept build-out facility of five general-purpose lanes and two HOV lanes was assumed, although there is still ongoing study for the funding and timeline for implementation of these improvements. State and local funding sources, including Renewed Measure M funding through OCTA, is currently assessing improvements on SR-57. In an attempt to further increase capacity and reduce congestion on SR-57, a feasibility study was conducted by OCTA to examine alternatives for adding an additional lane in each direction between the Los Angeles County line and the I-5/SR-22/SR-57 interchange. This study concluded that due of extensive right-of-way impacts and expanded traffic at the I-5/SR-22/SR-57 interchange, any consideration of capacity improvements should be deferred until the SR-57 is extended southward to the I-405 freeway. The following improvements are currently in the design and environmental stages with dedicated funding from OCTA through the Measure M Program.

- SR-57 Northbound *between* Orangethorpe Avenue to Lambert Road: Addition of one general-purpose freeway lane from north of the SR-91 near Orangethorpe Avenue in Placentia to Lambert Road in Brea (The project is currently in the design phase and construction is scheduled to begin in fall Year 2010).

- SR-57 Northbound *between* Katella Avenue Off-Ramp to Lincoln Avenue Off-Ramp: Addition of auxiliary lane capacity (entered the environmental phase in Year 2008 and construction is scheduled to follow approximately one year after the Orangethorpe Avenue to Lambert Road segment begins construction in late Year 2010 if project is approved) (Source: *OCTA*).

For improvements to the Caltrans facilities, the City of Anaheim, lead agency for this project, will have to decide whether (1) changes, alterations, or mitigation measures are within the responsibility and jurisdiction of another public agency such as Caltrans and not the City of Anaheim. It must determine if such changes have been adopted by such other agency or can and should be adopted by such other agency and/or (2) whether any further mitigation to the impacted State Highway System are feasible, and if not, whether specific overriding economic, legal, social, technological, or other benefits of the project outweigh the unavoidable cumulative traffic impacts caused by the Project.

The City of Anaheim has already taken steps to alleviate most of the impacts of increased development of the Platinum Triangle. The Gene Autry Extension Project and recent capacity

improvements to State College Boulevard and Katella Avenue are just some of the examples of the City of Anaheim's commitment to an effective circulation system within the Platinum Triangle. The City of Anaheim has an existing CFD program that outlines its strategy toward implementing many of the improvements necessitated by increased development in the Platinum Triangle, including ARTIC.

With completion of the improvements described in the mitigation, the significant impacts associated with the proposed Project would be fully mitigated with the exception of the improvements to State highway facilities. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., City of Orange and Caltrans); there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control. Should that occur, the Project's traffic impact would remain significant. The City is committed to working with the City of Orange and Caltrans to identify the most appropriate improvement strategies for their facilities and acknowledges the fair-share cost of improvements to those facilities, however, the City of Orange and Caltrans have full jurisdiction toward implementing the identified improvements under their jurisdiction.

14.6.2 *Caltrans Freeway Ramps and Weaving Segments*

Neither the State or any other agency, such as OCTA, currently has a program in place for construction of the mainline, ramp, and weaving segment improvements at the Year 2030 time horizon to satisfy baseline congested conditions; nor is there currently any mechanism in place that would ensure that funds contributed to Caltrans or to the State to ameliorate impacts on freeway mainlines will be used for their intended purpose. In addition, because the I-5 and SR-57 are exclusively controlled by the State, there is no mechanism by which the City can construct or guarantee the construction of any improvements to I-5 or SR-57. Thus, a Statement of Overriding Considerations will be developed for the deficient Caltrans facilities in the Environmental Documentation.

Proposed Project fair-share percentages have been computed for all the Caltrans Facilities under Year 2030 With Project conditions. The fair-share percentages have been computed per the methodology outlined in the *Caltrans Guide for the Preparation of Traffic Impact Studies*. *Appendix "B"* of the guidelines directs users to use a formula to calculate equitable share responsibility for the traffic impacts of proposed Project. The guidelines are not intended to establish a legal standard for determining equitable responsibility, but rather to provide a starting point for discussions with Caltrans to address the traffic mitigation and fair-share responsibilities.

The traffic on the State Highway System is regional in nature and the deficiencies are the result of expected regional growth. Caltrans has not entered into an agreement with the City and Caltrans has not adopted a program by which Caltrans can ensure that developer fair-share will assist in the funding of potential capacity or operational improvements on the study area State Highway System. Because I-5 is at its Conceptual Buildout, and OCTA and State funding is committed to the planned

widening of SR-57, there is no guarantee that impact fees from the proposed Project will be dedicated to the improvements of the study area State Highway System.

Standard capacity improvements, through the addition of one or more lanes on the freeway ramps, will not necessarily result in acceptable ramp operations for ramps that are forecast to operate deficiently. The density of the ramps is influenced by both the mainline and ramp volume, therefore, the traffic on the mainline must be reduced or the capacity of the mainline facility must be enhanced through the addition of an auxiliary lane to improve freeway ramp performance.

The weaving analysis revealed that several weaving areas operate at deficient levels of service under Year 2030 With Project traffic conditions as a result of high mainline forecast volumes and cumulative growth. Potential improvements include the implementation of an auxiliary lane within the weaving area to improve operations although this does not satisfy the capacity needs of the corresponding and adjacent mainline segment.

14.7 Other Mitigation Measures

In order to address the proposed measures in the previous sections, a series of mitigation measures will be drafted and incorporated into the EIR. These mitigation measures, once finalized, will apply to any owner or developer of real property within the boundaries of the ARTIC. This section will generally describe the mitigation measures that will be developed for the EIR in regards to transportation and traffic.

14.7.1 *Project Level Impact Analysis*

The payment of transportation impact fees is required per the Anaheim Municipal Code. These fees go towards the funding of the implementation of improvements addressed by the City of Anaheim Circulation Element. As set forth below, the City shall sufficiently fund required Project related improvements.

- Prior to the approval of the final subdivision map or issuance of a Building Permit, whichever occurs first, the property owner/developer shall pay the identified fair-share responsibility identified in the traffic analysis for this project as determined by the City.
- Prior to approval of the first final subdivision map or issuance of the first building permit, whichever occurs first, the property owner/developer shall irrevocably offer for dedication (with subordination of easements), including necessary construction easements, the ultimate arterial highway right(s)-of-way adjacent to their property as shown in the Circulation Element of the Anaheim General Plan.

14.7.2 *Transportation Fee Program*

The payment of transportation impact fees is required per the Anaheim Municipal Code. These fees go towards the funding of the implementation of improvements addressed by the City of Anaheim Circulation Element. As set forth below, the City shall sufficiently fund required Project related improvements.

- Prior to issuance of the first building permit for each building, the property owner/developer shall pay the appropriate Transportation Impact and Improvement Fees to the City of Anaheim in amounts determined by the City Council Resolution in effect at the time of issuance of the building permit with credit given for City-authorized improvements provided by the property owner/developer. The property owner shall also participate in all applicable reimbursement or benefit districts, which have been established.

14.8 Unavoidable Impacts and Statement of Overriding Considerations

Although every effort was made through site analyses and aerial imagery evaluation to ensure that all recommended improvements are physically feasible, there are improvements identified in this study that may not be feasible due to high Project cost, the inability to undertake right-of-way acquisitions as a matter of policy to preserve existing businesses, environmental constraints, or jurisdictional considerations. For these improvements, including Caltrans facilities, including freeway ramps, mainline segments, and weaving segments, a Statement of Overriding Considerations will document why a particular improvement is infeasible as mitigation.

With implementation of the improvements presented previously, the significant Project related or cumulative impacts associated with the proposed Project would be fully mitigated. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., Caltrans), there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control (e.g., the City of Anaheim cannot undertake or require improvements outside of Anaheim's jurisdiction or the City cannot construct improvements in the Caltrans right-of-way without Caltrans Approval). Should that occur, the Project's traffic impact would remain significant.

14.9 City of Orange Improvements

14.9.1 *Intersections Improvements*

As shown in the analysis, no intersections in the City of Orange are impacted by ARTIC; no improvements have been recommended.

14.9.2 *Roadway Segments Improvements*

As shown in the analysis, no roadway segments in the City of Orange are impacted by ARTIC; no improvements have been recommended.

15.0 SUMMARY OF CONCLUSIONS

- The proposed Anaheim Regional Transportation Intermodal Center (ARTIC) project is located in the City of Anaheim, California. The Project will be integrated into the Platinum Triangle, a joint mixed-use development in the City of Anaheim, California. The Project site is bounded by Katella Avenue to the north, the Orange Freeway (SR-57) to the south, the Santa Ana River to the east and Douglass Road to the west, with the Los Angeles to San Diego (LOSSAN) rail corridor bisecting the site.

- The Project is to replace and enlarge the existing Anaheim Metrolink/Amtrak station and will include a nominal amount of commercial/mixed use development to serve visitors of the transit facility. Construction of ARTIC is estimated to be completed in 2013. The Project would provide improvements to convert the site from a former County of Orange maintenance facility to a fully functioning regional transportation facility. Along with the Metrolink Service Expansion Program currently underway, the site would accommodate existing transit services and future services such as Bus Rapid Transit and other rubber-tired fixed route and shuttle services. The proposed ARTIC site includes the 13.58-acre Orange County Transportation Authority (OCTA) parcel and an adjacent 2.2-acre parcel owned by the City of Anaheim. The proposed Project will replace the existing Metrolink station located to the west of the Project site along the northern edge of the Anaheim Angels Stadium parking area. While there are industrial buildings on the proposed Project site, the buildings are vacant and will be demolished as part of the Project development.

- After taking credit for the existing Metrolink land use, the proposed Project is forecast to generate 3,699 net daily trips (one half arriving and one half departing), with 622 net trips (523 inbound, 99 outbound) produced in the AM peak hour and 439 net trips (58 inbound, 381 outbound) produced in the PM peak hour on a "typical" weekday.

Existing Conditions

- All twelve (12) key study intersections under the Existing peak hour service level calculations based on existing traffic volumes and current street geometry are currently operating at an acceptable LOS B or better.

- All eight (8) key study roadway segments under Existing service level calculations based on existing daily traffic volumes and current roadway geometry are currently operating at acceptable LOS B or better.

Existing With Project Conditions

- All of the twelve (12) key study intersections are forecast to operate at acceptable LOS B or better for the Existing With Project traffic conditions when compared to the LOS standards defined in this report.

- All eight (8) of the key study roadway segments are forecast to operate at acceptable LOS B on a daily basis under Existing With Project traffic conditions based on the LOS impact criteria outlined in this report.

Year 2013 With Project Conditions

- None of the key study intersections under the Year 2013 With Project traffic conditions are significantly impacted by the addition of Project traffic per the impact criteria outlined in this report.

- None of the key study roadway segments under the Year 2013 With Project traffic conditions are significantly impacted by the addition of Project traffic per the impact criteria outlined in this report.

Year 2030 With Project Conditions

- Two (2) key study intersections will be significantly impacted based on the LOS standards and the significance impact criteria defined in this report. It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

- One (1) study roadway segment is significantly impacted by Year 2030 With Project traffic based on the LOS impact criteria outlined in this report. The segment of Katella Avenue between Manchester Avenue and Anaheim Way will be mitigated by widening Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan. The recommended mitigation measure will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted roadway segment to an acceptable Level of Service.

Caltrans Facilities Analysis

Existing Conditions

- All Caltrans intersections are currently operating at an acceptable LOS D or better during the AM and PM peak hours.

Year 2013 With Project Conditions

- None of the four (4) Caltrans ramp intersections operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp intersections are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions.

- None of the four (4) Caltrans ramp locations (Merge/Diverge Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans

criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS C or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions.

- Three (3) of the four (4) Caltrans ramp locations (Weaving Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour		PM Peak Hour	
Key Freeway Segment	**Density (pc/mi/ln)**	**LOS**	**Density (pc/mi/ln)**	**LOS**
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	36.59	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp	--	--	43.04	F
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	37.10	E	38.44	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

- Two (2) Caltrans freeway segments operate at adverse levels of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining two (2) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2013 With Project traffic conditions. The locations operating at adverse LOS are listed below:

	AM Peak Hour			PM Peak Hour		
Key Freeway Segment	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**	**Pk Hr Volume**	**Density (pc/mi/ln)**	**LOS**
3. SR-57 Northbound *from* Katella Avenue *to* Ball Road	--	--	--	8,380	OVRFL	F
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	--	--	--	7,603	38.4	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2013 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Year 2030 With Project Conditions

- Two (2) Caltrans study intersections will operate at adverse levels of service under the Year 2030 With Project traffic conditions when compared to the Caltrans criteria. The locations operating at an adverse LOS are listed below:

Key Intersection	AM Peak Hour Delay (s/v)	AM Peak Hour LOS	PM Peak Hour Delay (s/v)	PM Peak Hour LOS
1. Manchester Ave/I-5 SB Ramps at Katella Ave	59.0	E	70.9	E
2. Anaheim Way/I-5 NB Ramps at Katella Avenue	--	--	81.7	F

It should be noted that the recommended mitigation measures outlined in this report will offset the impacts of the Year 2030 With Project traffic conditions and bring the significantly impacted intersections to acceptable Level of Service.

- None of the four (4) Caltrans ramp locations (Merge/Diverge Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. All four (4) Caltrans ramp locations are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions.

- Three (3) of the four (4) Caltrans ramp locations (Weaving Analysis) operate at adverse levels of service with the addition of the Project traffic, when compared to the Caltrans criteria. The remaining one (1) Caltrans ramp location is forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

Key Freeway Segment	AM Peak Hour Density (pc/mi/ln)	AM Peak Hour LOS	PM Peak Hour Density (pc/mi/ln)	PM Peak Hour LOS
2. SR-57 Southbound *between* Katella Ave On-Ramp and Orangewood Ave Off-Ramp	--	--	38.20	E
3. SR-57 Northbound *between* Katella Ave On-Ramp and Ball Rd Off-Ramp			36.17	E
4. SR-57 Southbound *between* Ball Rd On-Ramp and Katella Ave Off-Ramp	40.79	E	38.63	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted ramp locations to acceptable Level of Service.

- One (1) Caltrans freeway segment operates at an adverse level of service with addition of the Project traffic, when compared to the Caltrans criteria. The remaining three (3) Caltrans freeway segments are forecast to operate at an acceptable LOS D or better during the AM and PM peak hours under the Year 2030 With Project traffic conditions. The locations operating at adverse LOS are listed below:

Key Freeway Segment	AM Peak Hour Pk Hr Volume	AM Peak Hour Density (pc/mi/ln)	AM Peak Hour LOS	PM Peak Hour Pk Hr Volume	PM Peak Hour Density (pc/mi/ln)	PM Peak Hour LOS
4. SR-57 Southbound *from* Ball Road *to* Katella Avenue	8,490	40.4	E	8,360	39.0	E

It should be noted that the recommended mitigation measures outlined in this report will offset the impact of the Year 2030 With Project traffic conditions and bring the significantly impacted freeway segments to acceptable Level of Service.

Proposed Mitigation and Improvement Strategies

Existing With Project Intersection Improvements:

- Since there were no impacted intersections under the Existing With Project traffic conditions, no improvements have been recommended.

Existing With Project Roadway Segments Improvements:

- Since there were no impacted roadway segments under the Existing With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Intersection Improvements:

- Since there were no impacted intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended. It should be noted that the intersection of Douglass Road at Katella Avenue assumes a northbound lane configuration of two NBL, one NBTR and one NBR for the "with" Project scenario since it is a planned and funded improvement and will be built to Project description standards.

Year 2013 With Project Roadway Segments Improvements:

- Since there were no impacted roadway segments under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Intersections Improvements:

- Since there were no impacted ramp intersections under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Locations (Merge/Diverge Analysis) Improvements:

- Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2013 With Project traffic conditions, no improvements have been recommended.

Year 2013 With Project Caltrans Ramp Locations (Weaving Analysis) Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2013 With Project traffic:

- SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.
- SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed in Year 2013.
- SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2013 With Project Caltrans Freeway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2013 With Project traffic:
  - SR-57 Northbound *from* Katella Avenue *to* Ball Road: Add a 5th lane on this segment of SR-57 Northbound freeway. This improvement is funded by Measure M and is estimated to be completed in Year 2013.
  - SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2030 With Project Intersection Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the intersections significantly impacted by the Year 2030 With Project traffic:
  - Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.
  - Douglass Road at Katella Avenue: Widen and/or re-stripe Douglass Road to provide two left turn lanes, two through lanes, and one right turn lane in both the northbound and southbound directions. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 4th westbound through lane. Modify existing traffic signal.

Year 2030 With Project Roadway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at this roadway segment significantly impacted by the Year 2030 With Project traffic:
  - Katella Avenue *between* Manchester Avenue to Anaheim Way: Widen Katella Avenue from six (6) to eight (8) lanes. It should be noted that this improvement has been determined to be feasible through the Platinum Triangle Implementation Plan.

Year 2030 With Project Caltrans Ramp Intersections Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp intersections significantly impacted by the Year 2030 With Project traffic:
    - Manchester Avenue/I-5 Southbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to construct a pedestrian refuge island on the west leg of intersection with pedestrian buttons. Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 4th westbound through lane. Modify the existing traffic signal and install eastbound right-turn overlap phase on Katella Avenue.
    - Anaheim Way/I-5 Northbound Ramps at Katella Avenue: Widen and/or re-stripe Katella Avenue to provide a 4th eastbound through lane and a 5th westbound through lane. Modify existing traffic signal.

Year 2030 With Project Caltrans Ramp Locations (Merge/Diverge Analysis) Improvements:

- Since there were no impacted ramp locations based on the merge/diverge analysis under the Year 2030 With Project traffic conditions, no improvements have been recommended.

Year 2030 With Project Caltrans Ramp Locations (Weaving Analysis) Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans ramp locations significantly impacted by the Year 2030 With Project traffic:
    - SR-57 Southbound *between* Katella Avenue On-Ramp and Orangewood Avenue Off-Ramp: Add a 6th lane on this segment of SR-57 Southbound freeway.
    - SR-57 Northbound *between* Katella Avenue On-Ramp and Ball Road Off-Ramp: Add a 6th lane on this segment of SR-57 Northbound freeway.
    - SR-57 Southbound *between* Ball Road On-Ramp and Katella Avenue Off-Ramp: Add a 5th lane on this segment of SR-57 Southbound freeway.

Year 2030 With Project Caltrans Freeway Segments Improvements:

- The improvements listed below have been identified to mitigate the traffic impacts at the Caltrans freeway segments significantly impacted by the Year 2030 With Project traffic:
    - SR-57 Southbound *from* Ball Road *to* Katella Avenue: Add a 5th lane on this segment of SR-57 Southbound freeway.

Caltrans Ramps and Freeway Improvements:

- For improvements to the Caltrans facilities, the City of Anaheim, lead agency for this project, will have to decide whether (1) changes, alterations, or mitigation measures are within the responsibility and jurisdiction of another public agency such as Caltrans and not the City of

Anaheim. It must determine if such changes have been adopted by such other agency or can and should be adopted by such other agency and/or (2) whether any further mitigation to the impacted State Highway System are feasible, and if not, whether specific overriding economic, legal, social, technological, or other benefits of the project outweigh the unavoidable cumulative traffic impacts caused by the Project.

- With completion of the improvements described in the mitigation, the significant impacts associated with the proposed Project would be fully mitigated with the exception of the improvements to State highway facilities. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., City of Orange and Caltrans); there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control. Should that occur, the Project's traffic impact would remain significant. The City is committed to working with the City of Orange and Caltrans to identify the most appropriate improvement strategies for their facilities and acknowledges the fair-share cost of improvements to those facilities, however, the City of Orange and Caltrans have full jurisdiction toward implementing the identified improvements under their jurisdiction.

Unavoidable Impacts and Statement of Overriding Considerations

- Although every effort was made through site analyses and aerial imagery evaluation to ensure that all recommended improvements are physically feasible, there are improvements identified in this study that may not be feasible due to high Project cost, the inability to undertake right-of-way acquisitions as a matter of policy to preserve existing businesses, environmental constraints, or jurisdictional considerations. For these improvements, including Caltrans facilities, including freeway ramps, mainline segments, and weaving segments, a Statement of Overriding Considerations will document why a particular improvement is infeasible as mitigation.

- With implementation of the improvements presented previously, the significant Project related or cumulative impacts associated with the proposed Project would be fully mitigated. However, inasmuch as the primary responsibility for approving and/or completing certain improvements located outside of Anaheim lies with agencies other than the City of Anaheim (i.e., Caltrans), there is the potential that significant impacts may not be fully mitigated if such improvements are not completed for reasons beyond the City of Anaheim's control (e.g., the City of Anaheim cannot undertake or require improvements outside of Anaheim's jurisdiction or the City cannot construct improvements in the Caltrans right-of-way without Caltrans Approval). Should that occur, the Project's traffic impact would remain significant.

City of Orange Improvements

- As shown in the analysis, no intersections or roadway segments in the City of Orange are impacted by ARTIC; no improvements have been recommended.