Appendix C

Traffic Impact Analysis

LINSCOTT LAW & GREENSPAN engineers

TRAFFIC IMPACT ANALYSIS REPORT
PACIFIC COAST HIGHWAY/DEL PRADO AVENUE
PHASE I STREET IMPROVEMENT PROJECT

Dana Point, California
August 17, 2010

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EXECUTIVE SUMMARY

- ***Project Description*** – The proposed Project is located along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street in the City of Dana Point, California. Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street currently form a one-way "couplet" to accommodate east-west vehicular travel through the urban core of the City known as Dana Point Town Center. Implementation of the proposed Project will re-establish two-way circulation for both Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street.

  The design concepts of the plan call for rebalancing through-movement with public access, "calming" traffic, enhancing the pedestrian environment, maintaining/enhancing access for bicycle circulation, and making the Town Center more readily accessible and navigable to residents and visitors to the area. Beyond the circulation and streetscape concept proposed by the City of Dana Point, the plan also includes improvements that are intended to enhance the use of existing businesses, strengthen the economic viability of the Town Center and identify the Town Center as the hub of the community, consistent with the recommendations previously approved in the Town Center Plan. This will create a more vital and vibrant atmosphere in the Town Center.

  Implementation of the proposed Project is anticipated to begin as early as 2012 and extend through 2013. However, implementation is dependent on several factors, including the availability of project funding and prevailing economic conditions. Therefore, to account for unexpected project delays due to availability of project funding and unforeseen economic conditions, a Year 2015 horizon year was utilized to provide a conservative analysis.

  Chapter 2.0 provides a more detailed description of the Pacific Coast Highway/Del Prado Avenue Phase I Street Improvement Project.

- ***Study Scope*** – The City of Dana Point Public Works Department staff has identified the following twelve (12) key study intersections for evaluation under Existing (Year 2010) Traffic Conditions, Year 2015 Without Project Traffic Conditions (One-Way Operations), Year 2015 With Project Traffic Conditions (Two-Way Operations), Year 2035 Without Project Traffic Conditions (One-Way Operations) and Year 2035 With Project Traffic Conditions (Two-Way Operations):

1. Street of the Blue Lantern at Pacific Coast Highway	7. Crystal Lantern Street at Pacific Coast Highway
2. Ruby Lantern Street at Pacific Coast Highway	8. Ruby Lantern Street at Del Prado Avenue
3. Amber Lantern Street at Pacific Coast Highway	9. Amber Lantern Street at Del Prado Avenue
4. Violet Lantern Street at Pacific Coast Highway	10. Violet Lantern Street at Del Prado Avenue
5. Street of the Golden Lantern at Pacific Coast Highway	11. Street of the Golden Lantern at Del Prado Avenue
6. Copper Lantern Street at Pacific Coast Highway	12. Del Prado Avenue (West) at Pacific Coast Highway

The Volume-Capacity (V/C) and Level of Service (LOS) investigations at these key locations were used to evaluate the potential traffic-related impacts associated with area growth and related projects traffic and the benefits/impacts associated with the implementation of the proposed Project.

- ***Level of Service Criteria*** – According to the *City of Dana Point General Plan Circulation Element (1995)*, LOS "C" is the minimum acceptable condition that should be maintained during the peak commute hours for primary arterials, secondary arterials and local streets. LOS "D" is the minimum acceptable condition that should be maintained during the peak commute hours for major arterials and state highways. LOS "E" is the minimum acceptable condition that should be maintained during the peak commute hours for CMP designated roadways. Based on the City's requirements, the following summarizes the LOS required for each key study intersection:

LOS "C" Requirements

1. Street of the Blue Lantern at Pacific Coast Highway
2. Ruby Lantern Street at Pacific Coast Highway
3. Amber Lantern Street at Pacific Coast Highway
4. Violet Lantern Street at Pacific Coast Highway
5. Street of the Golden Lantern at Pacific Coast Highway
8. Ruby Lantern Street at Del Prado Avenue
9. Amber Lantern Street at Del Prado Avenue
10. Violet Lantern Street at Del Prado Avenue
11. Street of the Golden Lantern at Del Prado Avenue
12. Del Prado Avenue (West) at Pacific Coast Highway

LOS "D" Requirements

6. Copper Lantern Street at Pacific Coast Highway
7. Crystal Lantern Street at Pacific Coast Highway

- ***Existing Traffic Conditions*** – All twelve (12) key study intersections currently operate at an acceptable LOS during the AM and PM peak hours.

- ***Related Projects Trip Generation*** – Three (3) related projects were considered in the cumulative traffic setting (i.e. the Headlands Specific Plan, the Dana Point Harbor Revitalization and the Dana Point Town Center Plan). On a typical weekday, the three (3) related projects are expected to generate 21,327 daily trips, with 972 trips (560 inbound, 412 outbound) anticipated during the AM peak hour and 1,658 trips (792 inbound, 866 outbound) produced during the PM peak hour.

- ***Year 2015 Traffic Conditions With Proposed Project (Two-Way Operations)*** – All twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). In addition, based on the HCM methodology, all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the proposed Project (two-way operations).

- ***Year 2035 Traffic Conditions With Proposed Project (Two-Way Operations)*** – All twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). In addition, based on the HCM methodology, all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the proposed Project (two-way operations).

- ***Year 2015 Queuing Analysis Results (Proposed Project)*** – For the Year 2015, all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersection of Street of the Blue Lantern/Pacific Coast Highway. The turn pockets at the aforementioned intersection not expected to provide adequate storage in the Year 2015 are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL

A close inspection of the plans for the Pacific Coast Highway/Del Prado Avenue Phase I Street Improvement Project indicate that all deficient turn pockets can be modified to accommodate the Year 2015 95th percentile queues. The northbound left turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 100 feet of storage to accommodate Year 2015 traffic volumes. City of Dana Point staff indicates that this will be done by adding two-way left-turn lane striping to this location, thus increasing the available stacking/storage length.

- ***Year 2035 Queuing Analysis Results (Proposed Project)*** – For the Year 2035, all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersection of Street of the Blue Lantern/Pacific Coast Highway. The turn pockets at the aforementioned intersection not expected to provide adequate storage in the Year 2035 are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL

A close inspection of the plans for the PCH/Del Prado Ave Phase I Street Improvement Project indicate that all deficient turn pockets can be modified to accommodate the Year 2035 95th percentile queues. The northbound left turn lane at the intersection of Blue Lantern/Pacific Coast Highway will need to be restriped to provide 105 feet of storage to accommodate Year 2035 traffic volumes. City of Dana Point staff indicates that this will be done by adding two-way left-turn lane striping to this location, thus increasing the available stacking/storage length.

- ***Year 2015 Traffic Conditions With Alternative No. 1 Project (Two-Way Operations)*** – All twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the Alternative No. 1 Project (two-way operations). In addition, based on the HCM methodology, all twelve (12) key study

intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the Alternative No. 1 Project (two-way operations).

- ***Year 2035 Traffic Conditions With Alternative No. 1 Project (Two-Way Operations)*** – All twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the Alternative No. 1 Project (two-way operations). In addition, based on the HCM methodology, all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the Alternative No. 1 Project (two-way operations).

- ***Year 2015 Queuing Analysis Results (Alternative No. 1 Project)*** – For the Year 2015, all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersections of Street of the Blue Lantern/Pacific Coast Highway and Ruby Lantern Street/Pacific Coast Highway. The turn pockets at the aforementioned intersections not expected to provide adequate storage in the Year 2015 for the Alternative No. 1 Project are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL / NBR
2. Ruby Lantern Street at Pacific Coast Highway	Shared NBL / NBT / NBR	Shared NBL / NBT / NBR

A close inspection of the plans for the Alternative No. 1 Project indicate that all deficient turn pockets can be modified to accommodate the Year 2015 95th percentile queues except for the shared northbound left/through/right lane at the intersection of Ruby Lantern Street/Pacific Coast Highway. The available storage for this location cannot be increased and therefore vehicles will queue back onto Del Prado Avenue and as a result, makes this alternative less desirable than the proposed Project.

The northbound left turn lane and the northbound right turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 100 feet and 80 feet of storage, respectively to accommodate Year 2015 Alternative No. 1 Project traffic volumes. City of Dana Point staff indicates that this can be accomplished through minor restriping modifications along Street of the Blue Lantern.

- ***Year 2035 Queuing Analysis Results (Alternative No. 1 Project)*** – For the Year 2035, all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersections of Street of the Blue Lantern/Pacific Coast Highway and Ruby Lantern Street/Pacific Coast Highway. The turn pockets at the aforementioned intersections not expected to provide adequate storage in the Year 2035 for the Alternative No. 1 Project are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL / NBR
2. Ruby Lantern Street at Pacific Coast Highway	Shared NBL / NBT / NBR	Shared NBL / NBT / NBR

A close inspection of the plans for the Alternative No. 1 Project indicate that all deficient turn pockets can be modified to accommodate the Year 2035 95th percentile queues except for the shared northbound left/through/right lane at the intersection of Ruby Lantern Street/Pacific Coast Highway. The available storage for this location cannot be increased and therefore vehicles will queue back onto Del Prado Avenue and as a result, makes this alternative less desirable than the proposed Project.

The northbound left turn lane and the northbound right turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 105 feet and 85 feet of storage, respectively to accommodate Year 2035 Alternative No. 1 Project traffic volumes. City of Dana Point staff indicates that this can be accomplished through minor restriping modifications along Street of the Blue Lantern

- ***Alley Analysis*** – All five (5) alley intersections are forecast to operate at acceptable LOS A in the Year 2015 and Year 2035 during the AM and PM peak hours with implementation of either the proposed Project or Alternative No. 1 Project. All four (4) alley roadway segments are forecast to operate at acceptable LOS A in the Year 2015 and Year 2035 with implementation of either the proposed Project or Alternative No. 1 Project.

- ***Conclusion*** – Re-establishing two-way circulation for both Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street, as proposed by the City of Dana Point, will provide an overall improvement in congestion management. Implementation of the proposed Project will result in acceptable levels of service (i.e. LOS C or better operations) at the twelve (12) key study intersections and five (5) key alley intersections in the Year 2015 and the Year 2035. Further, with implementation of the proposed Project, all exclusive left-turn lanes and/or exclusive right-turn lanes will provide adequate storage/stacking with minor feasible striping modifications.

TRAFFIC IMPACT ANALYSIS

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT

Dana Point, California
August 17, 2010

1.0 INTRODUCTION

This Traffic Impact Analysis report addresses the potential traffic impacts/benefits and circulation needs associated with the proposed Pacific Coast Highway/Del Prado Avenue Phase I Street Improvement Project (hereinafter referred to as Project). The proposed Project will re-establish two-way circulation for both Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street in the City of Dana Point, California.

This report documents the findings and recommendations of a traffic impact analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential benefits/impacts associated with the proposed Project. The traffic analysis evaluates existing, future near-term (Year 2015) and future long-term (Year 2035) operating conditions at twelve (12) key study intersections without and with the proposed Project.

This traffic report satisfies the traffic impact requirements of the City of Dana Point as detailed in the *City of Dana Point General Plan Circulation Element (1995)* and is consistent with the most current *Congestion Management Program (CMP) for Orange County.* The Scope of Work for this traffic impact study was developed in conjunction with City of Dana Point Public Works Department staff.

The project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing peak hour traffic count information for the twelve (12) key study intersections has been obtained from the *City of Dana Point Town Center Plan Draft Traffic Impact Analysis,* prepared by Kimley-Horn and Associates, for use in the preparation of intersection level of service calculations. Information concerning cumulative projects (planned and/or approved) in the vicinity of the proposed Project has been researched at the City of Dana Point and includes the projected growth in land uses as provided in the Dana Point Town Center Plan. Based on our research, there are three (3) significant related projects located in the City of Dana Point, which consist of the Headlands Specific Plan, the Dana Point Harbor Revitalization and the Dana Point Town Center Plan. These three (3) related projects were considered in the cumulative traffic analysis for this project.

This traffic report analyzes existing, future near-term (Year 2015) and future long-term (Year 2035) AM peak hour and PM peak hour traffic conditions without and with the proposed Project. Peak hour traffic forecasts for the Year 2015 and Year 2035 horizon years have been projected by

increasing existing traffic volumes by an annual growth rate of 0.50% per year and adding traffic volumes generated by three (3) related projects.

1.1 Study Area

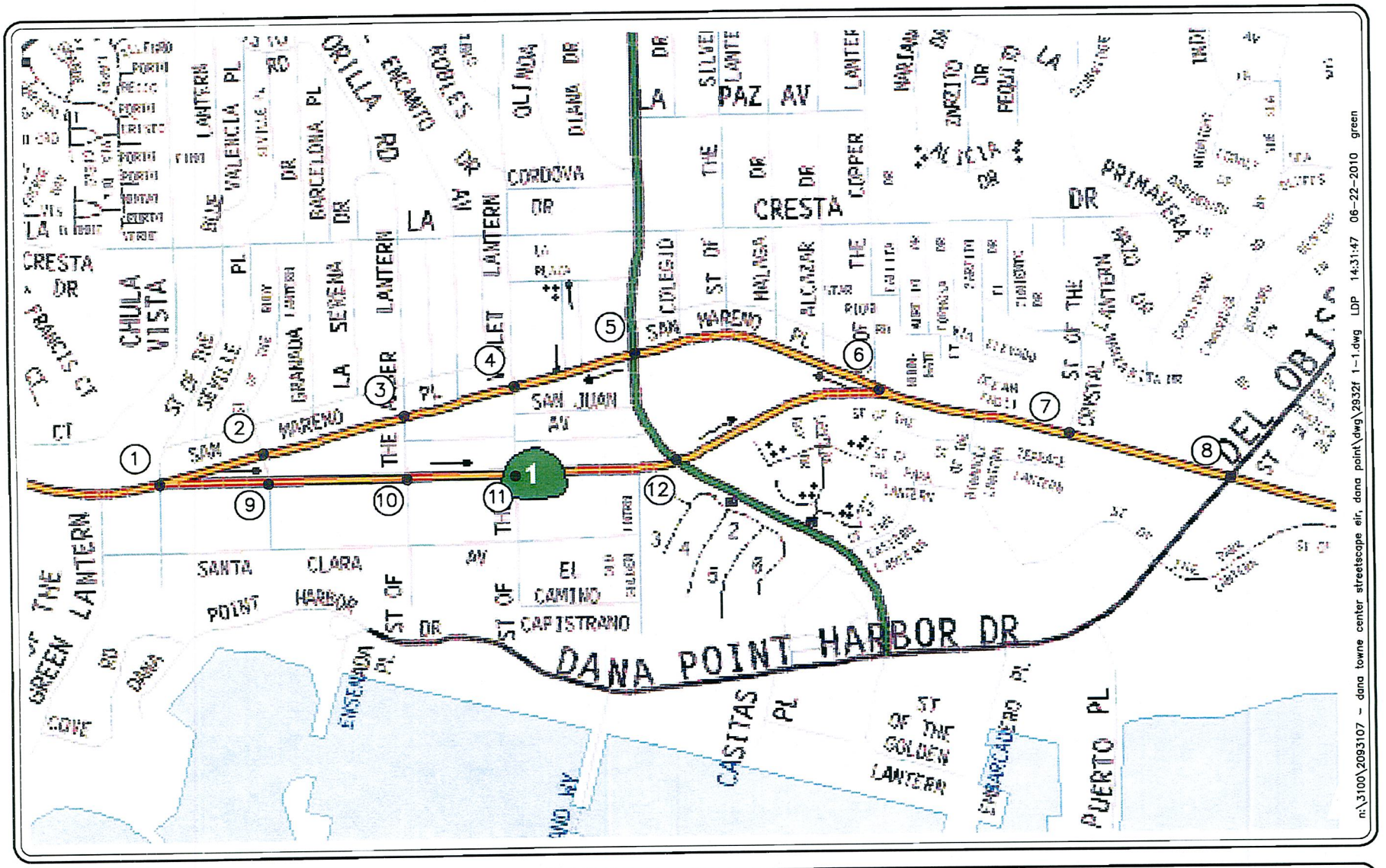
For this analysis, the City of Dana Point Public Works Department staff has identified twelve (12) key study intersections for evaluation. The twelve (12) key study intersections listed below provide local access to the study area and define the extent of the boundaries for this traffic impact investigation. It should be noted that one of the key study intersections, intersection No. 12, currently does not exist and will only be analyzed with the proposed Project.

1. Street of the Blue Lantern at Pacific Coast Highway
2. Ruby Lantern Street at Pacific Coast Highway
3. Amber Lantern Street at Pacific Coast Highway
4. Violet Lantern Street at Pacific Coast Highway
5. Street of the Golden Lantern at Pacific Coast Highway
6. Copper Lantern Street at Pacific Coast Highway
7. Crystal Lantern Street at Pacific Coast Highway
8. Ruby Lantern Street at Del Prado Avenue
9. Amber Lantern Street at Del Prado Avenue
10. Violet Lantern Street at Del Prado Avenue
11. Street of the Golden Lantern at Del Prado Avenue
12. Del Prado Avenue (West) at Pacific Coast Highway

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the project and depicts the study locations and surrounding street system. The Volume-Capacity (V/C) and Level of Service (LOS) investigations at these key locations were used to evaluate the potential traffic-related impacts associated with area growth and related projects traffic and the benefits/impacts associated with the implementation of the proposed Project. When necessary, this report recommends additional intersection and/or roadway improvements beyond those which are proposed as a part of the Project that may be required to accommodate future traffic volumes and restore/maintain an acceptable level of service per City of Dana Point LOS standards.

Included in this Traffic Impact Analysis are:

- Existing traffic counts,
- AM and PM peak hour capacity analyses for existing conditions,
- Estimated cumulative project traffic generation/distribution/assignment,
- AM and PM peak hour capacity analyses for future Year 2015 and future Year 2035 conditions without and with the proposed Project,
- AM and PM peak hour operations analyses for future Year 2015 and future Year 2035 conditions without and with the proposed Project,
- Alternative Analysis, and
- Alley Analysis.



SOURCE: THOMAS BROS.

KEY

(#) = STUDY INTERSECTION

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 1–1

VICINITY MAP

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

n:\3100\2093107 - dana towne center streetscape eir, dana point\dwg\2932f 1-1.dwg LDP 14:31:47 06-22-2010 green

2.0 PROJECT DESCRIPTION

The proposed Project is located along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street in the City of Dana Point, California. ***Figure 2-1*** presents the overall project study area. Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street currently form a one-way "couplet" to accommodate east-west vehicular travel through the urban core of the City known as Dana Point Town Center. Implementation of the proposed Project will re-establish two-way circulation for both Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street.

The design concepts of the plan call for rebalancing through-movement with public access, "calming" traffic, enhancing the pedestrian environment, and making the Town Center more readily accessible and navigable to residents and visitors to the area. Beyond the circulation and streetscape concept proposed by the City of Dana Point, the plan also includes improvements that are intended to enhance the use of existing businesses, strengthen the economic viability of the Town Center and identify the Town Center as the hub of the community, consistent with the recommendations previously approved in the Town Center Plan. This will create a more vital and vibrant atmosphere in the Town Center for existing and future development in the area.

Figures 2-2, 2-3 and ***2-4*** present the Preliminary Phase I Improvement Plan for the proposed Project. *Figure 2-2* shows the section of Pacific Coast Highway/Del Prado Avenue between Street of the Blue Lantern and Amber Lantern Street. *Figure 2-3* shows the section of Pacific Coast Highway/Del Prado Avenue between Amber Lantern Street and Street of the Golden Lantern. *Figure 2-4* shows the section of Pacific Coast Highway/Del Prado Avenue between Street of the Golden Lantern and Copper Lantern Street. The following sections describe in detail each component of the proposed Project.

Pacific Coast Highway

In addition to the return to two-way operations, the proposed improvements along Pacific Coast Highway include traffic signal improvements/modifications, signing and striping modifications, improved transit stops, and initial traffic and beautification related modifications to the "gateways" at Street of the Blue Lantern and Copper Lantern Street. The traffic signal improvements/ modifications include new traffic signals at Ruby Lantern Street and at a new intersection located between Street of the Blue Lantern and Ruby Lantern Street (i.e. key study intersection No. 12). In addition, modifications are also proposed at other traffic signals within the project area to accommodate the two-way travel proposed for the two arterials. Other improvements include the incorporation of landscaped medians, street improvements as needed to accommodate bus turnouts and u-turns at designated locations, the modification of certain vehicular access points, the relocation of some on-street parking, and the provision of on-street bike lanes on the north side of Pacific Coast Highway, between Street of the Blue Lantern and Copper Lantern Street for westbound bicycle traffic.

The curb and gutter of Pacific Coast Highway will generally remain in the existing location with the exception of locations where bus turnouts and parking cut outs are planned. The curb line at several intersections also needs to be moved back to accommodate u-turn movements. A two-lane left-turn pocket will be included on southbound Golden Lantern at Pacific Coast Highway (i.e. dual southbound left-turn lanes), along with other key signing and striping adjustments to accommodate the change to two way traffic and the associated traffic volumes.

Del Prado Avenue

The improvements proposed for Del Prado Avenue also include the return of two-way operations, along with additional on-street parking, streetscape beautification and "gateway" improvements, as well as the provision of on-street bike lanes on both sides of Del Prado Avenue between Pacific Coast Highway and Copper Lantern Street. Other general improvements include the incorporation of water quality and air quality enhancements with significant additional landscaped pervious areas, reduced lighting energy consumption, reduced long-term noise levels with reduced traffic speeds, landscaped medians, parkway landscaping, installation of new trees, protection of existing trees where possible, street light improvements, signage and banner poles, drainage improvements, sidewalk enhancements, wall and retaining wall construction, pavement resurfacing, new curb and gutter, the modification of certain vehicular access points including relocation or closure of certain drive entries and other miscellaneous improvements. One existing two-way stop controlled intersection (i.e. Ruby Lantern/Del Prado) and two existing traffic signal controlled intersections (i.e. Amber Lantern/Del Prado and Violet Lantern/Del Prado) will be replaced with all-way stop controlled intersections. The design is intended to enhance the pedestrian experience by widening sidewalks while improving on-street parking between Street of the Blue Lantern and Street of the Golden Lantern.

2.1 Proposed Project Phasing

Implementation of the proposed Project is anticipated to begin as early as 2012 and extend through 2013. However, implementation is dependent on several factors, including the availability of project funding and prevailing economic conditions. Therefore, to account for unexpected project delays due to availability of project funding and unforeseen economic conditions, a Year 2015 horizon year was utilized to provide a conservative analysis.

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FIGURE 2–1

PROJECT STUDY AREA

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

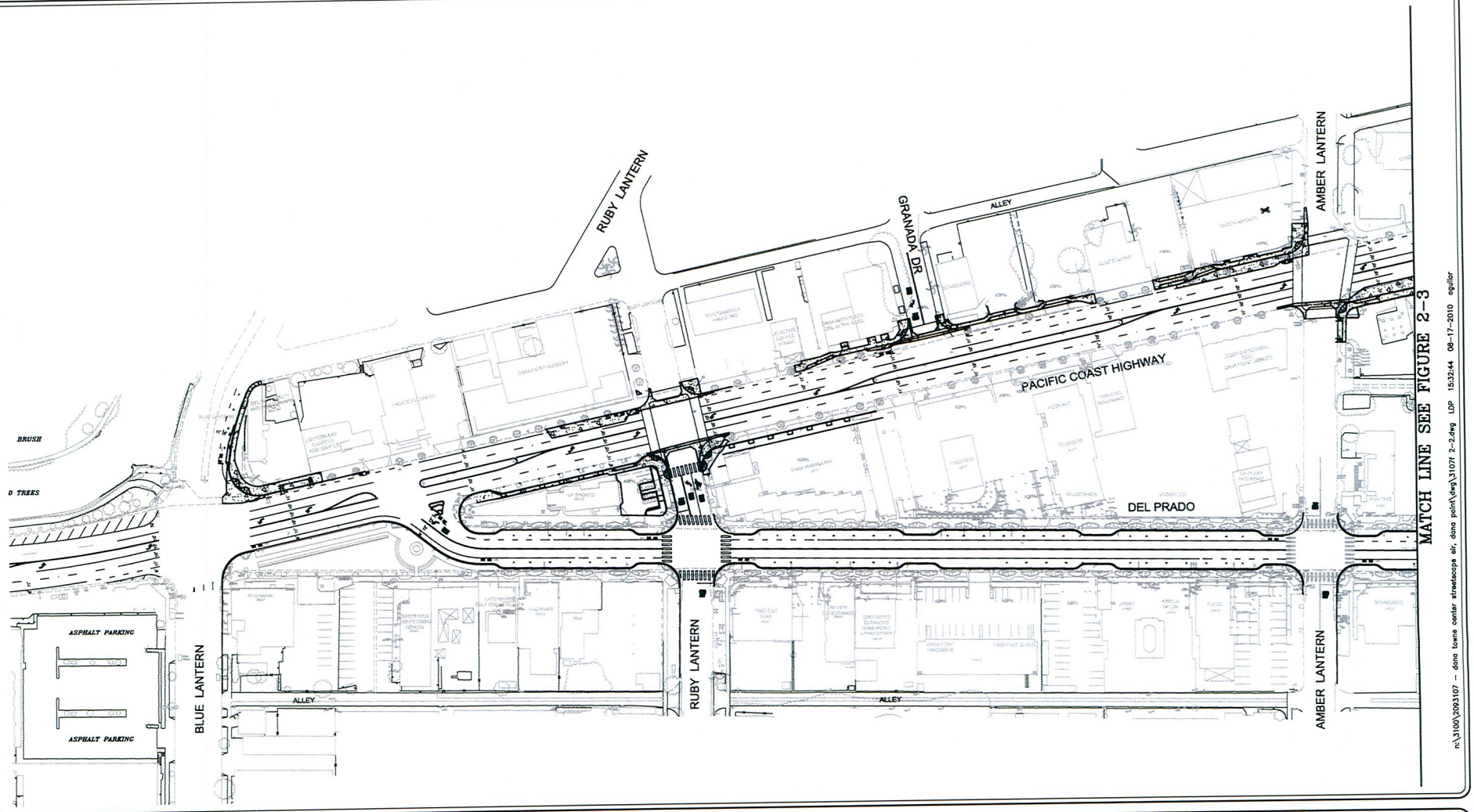

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FIGURE 2-2

PRELIMINARY PHASE I IMPROVEMENT PLAN BETWEEN BLUE LANTERN AND AMBER LANTERN

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

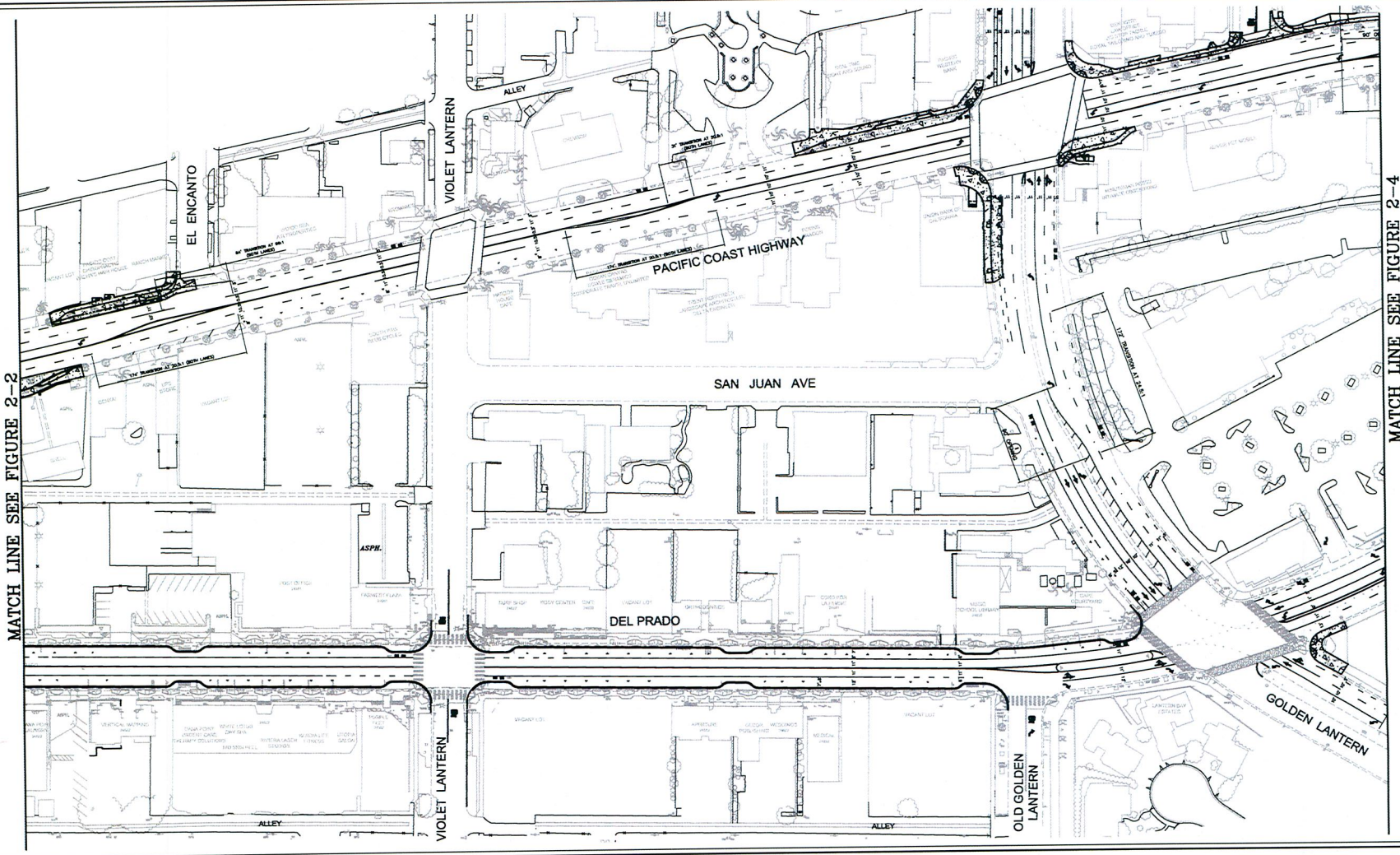

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FIGURE 2-3

PRELIMINARY PHASE I IMPROVEMENT PLAN BETWEEN AMBER LANTERN AND GOLDEN LANTERN

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

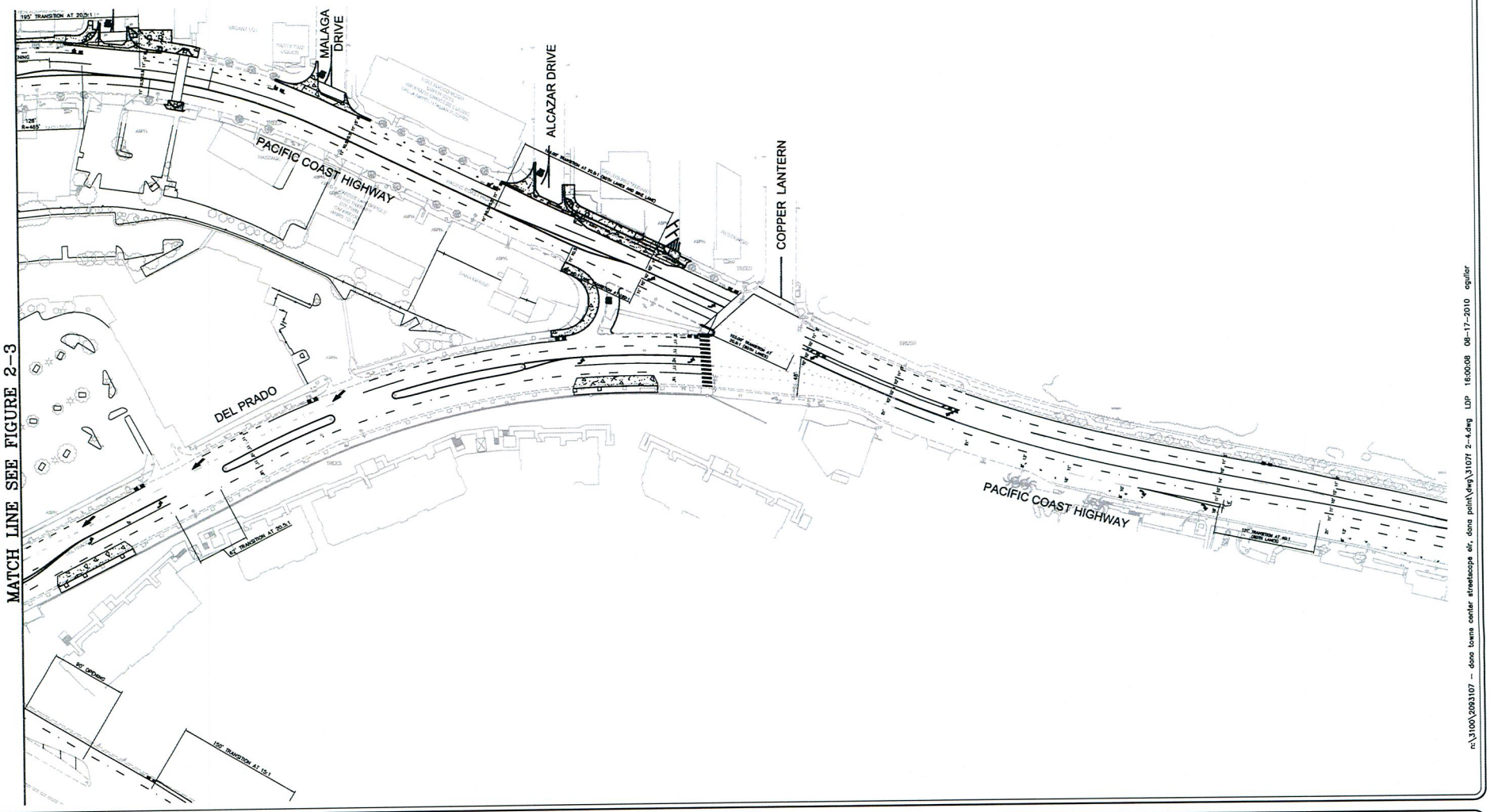

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FIGURE 2-4

PRELIMINARY PHASE I IMPROVEMENT PLAN BETWEEN GOLDEN LANTERN AND COPPER LANTERN

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

3.0 EXISTING CONDITIONS

3.1 Existing Street System

The principal local network of streets serving the proposed Project includes Pacific Coast Highway and Del Prado Avenue. The following discussion provides a brief synopsis of these key area streets. The descriptions are based on an inventory of existing roadway conditions.

Pacific Coast Highway within the project study area is currently a three lane, undivided roadway between Street of the Blue Lantern and Copper Lantern Street, oriented in the east-west direction. On-street bike lanes are provided along the north side of this section of Pacific Coast highway for westbound bicycle traffic. Pacific Coast Highway between Street of the Blue Lantern and Copper Lantern Street currently provides only one-way travel in the westbound direction. Parking is generally permitted on Pacific Coast Highway within the project vicinity. The posted speed limit on Pacific Coast Highway is 35 miles per hour (mph) between Street of the Blue Lantern and Copper Lantern Street. Traffic signals currently control the study intersections of Pacific Coast Highway at Street of the Blue Lantern, Amber Lantern Street, Violet Lantern Street, Street of the Golden Lantern, Copper Lantern Street and Crystal Lantern Street. Pacific Coast Highway is classified as a Primary Arterial in the City's Circulation Element.

Del Prado Avenue within the project study area is a three lane, undivided roadway between Street of the Blue Lantern and Copper Lantern Street, oriented in the east-west direction. Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street currently provides only one-way travel in the eastbound direction. On-street bike lanes are provided along the south side of this section of Del Prado Avenue for eastbound bicycle traffic. Parking is generally permitted on Del Prado Avenue within the project vicinity. The posted speed limit on Del Prado Avenue is 35 mph between Street of the Blue Lantern and Copper Lantern Street. Traffic signals currently control the study intersections of Del Prado Avenue at Street of the Blue Lantern, Amber Lantern Street, Violet Lantern Street, Street of the Golden Lantern and Copper Lantern Street. Del Prado Avenue is classified as a Primary Arterial in the City's Circulation Element.

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

3.2 Existing Traffic Volumes

Existing AM peak hour and PM peak hour traffic volumes for the twelve (12) key study intersections were obtained from the *City of Dana Point Town Center Plan Draft Traffic Impact Analysis,* prepared by Kimley-Horn and Associates, dated August 2006. The traffic counts contained within the aforementioned document were performed in July 2004. As stated in the Kimley-Horn traffic study, summer weekday traffic counts were utilized to reflect Dana Point's peak seasonal traffic conditions. To reflect existing Year 2010 traffic conditions, the Year 2004 peak hour traffic counts

were increased using a 0.50% per year ambient growth factor.[1] Applied to the Year 2004 traffic volumes, this results in a three percent (3.0%) growth in volumes to existing Year 2010.

Figures 3-2 and ***3-3*** depict the Year 2010 existing AM peak hour and PM peak hour traffic volumes at the twelve (12) key study intersections, respectively.

3.3 Existing Intersection Conditions

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 the signalized intersections and the *Highway Capacity Manual 2000* (HCM2000) methodology for the unsignalized intersections. The aforementioned level of service methodologies are consistent with City of Dana Point requirements.

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

In conformance with City of Dana Point and Orange County CMP requirements, existing AM and PM peak hour operating conditions for the key signalized study intersections were evaluated using the Intersection Capacity Utilization (ICU) method. 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.

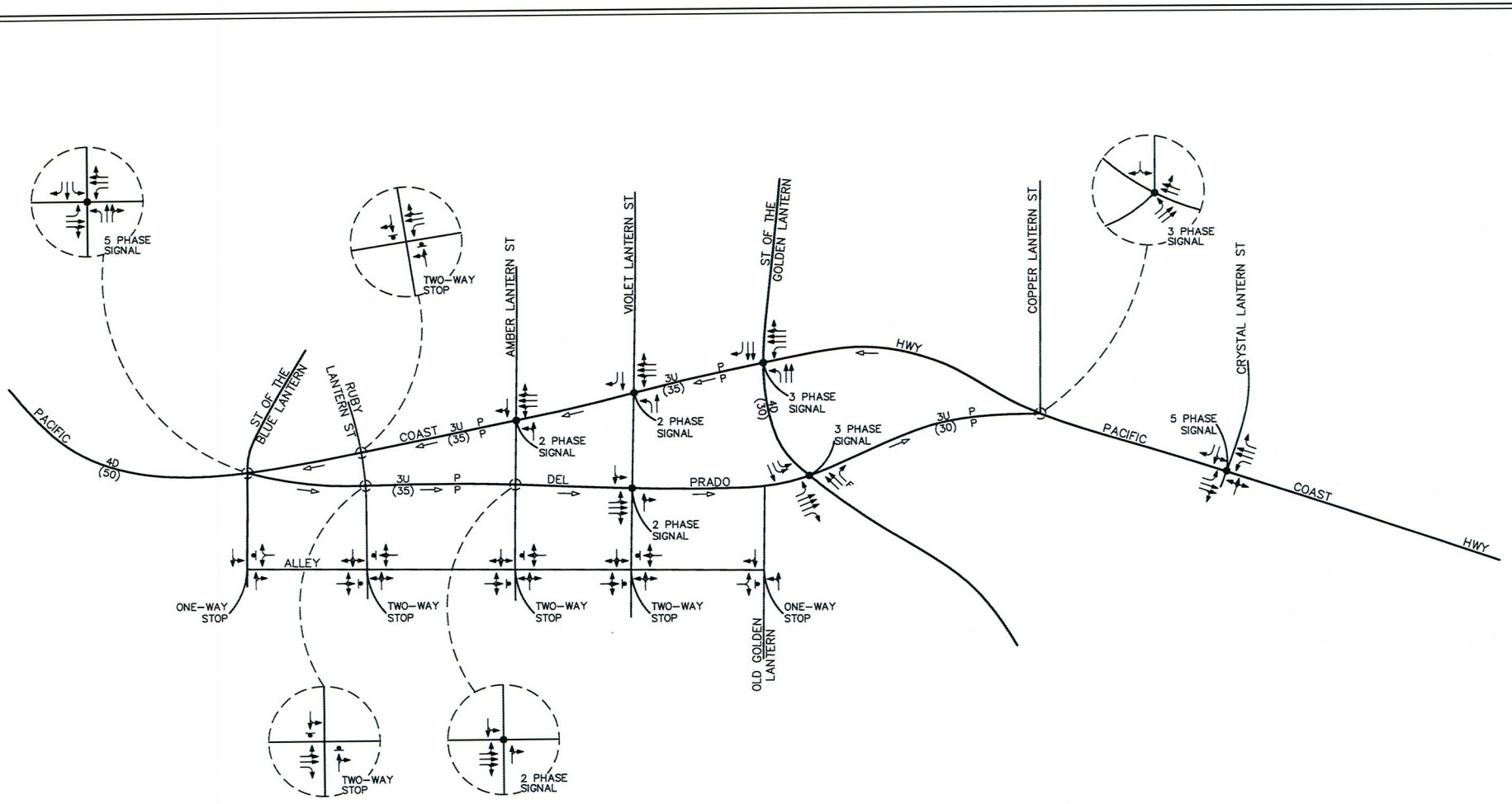
Per Orange County CMP requirements, the ICU calculations utilize a lane capacity of 1,700 vehicles per hour (vph) for left-turn, through, and right-turn lanes, and dual left turn capacity of 3,400 vph. A clearance adjustment factor of 0.05 (5%) was added to each level of service calculation.

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 for stop-controlled intersections was utilized for the analysis of the unsignalized intersections. This methodology estimates the average control delay for each of the subject movements and determines the level of service for each movement. For all-way stop controlled intersections, the overall average control delay measured in seconds per vehicle and level of service is then calculated for the entire intersection. For one-way and two-way 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 respective HCM control delay

[1] Source: Comparison of Year 1992 and Year 2005 City of Dana Point ADT'S along PCH between Selva Road and Doheny Park Road.



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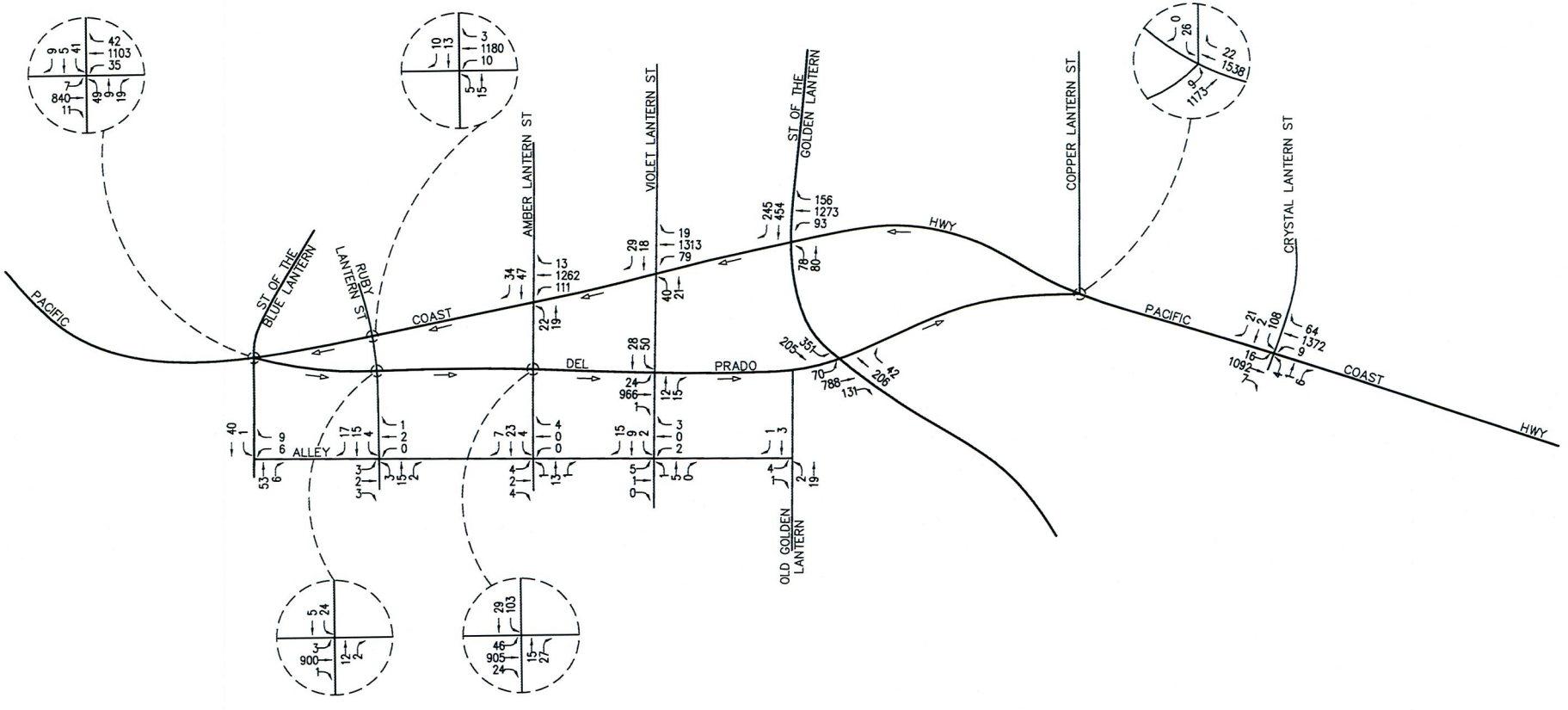
KEY

- ← = APPROACH LANE ASSIGNMENT
- ⇦ = ONE-WAY TRAVEL ONLY
- ● = TRAFFIC SIGNAL, ▼ = STOP SIGN
- P = PARKING, NP = NO PARKING
- U = UNDIVIDED, D = DIVIDED
- 2 = NUMBER OF TRAVEL LANES
- (XX) = POSTED SPEED LIMIT (MPH)
- OL = OVERLAP F = FREE RIGHT

FIGURE 3-1

EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



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⟵ = ONE-WAY TRAVEL ONLY

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FIGURE 3-2

YEAR 2010 EXISTING AM PEAK HOUR TRAFFIC VOLUMES

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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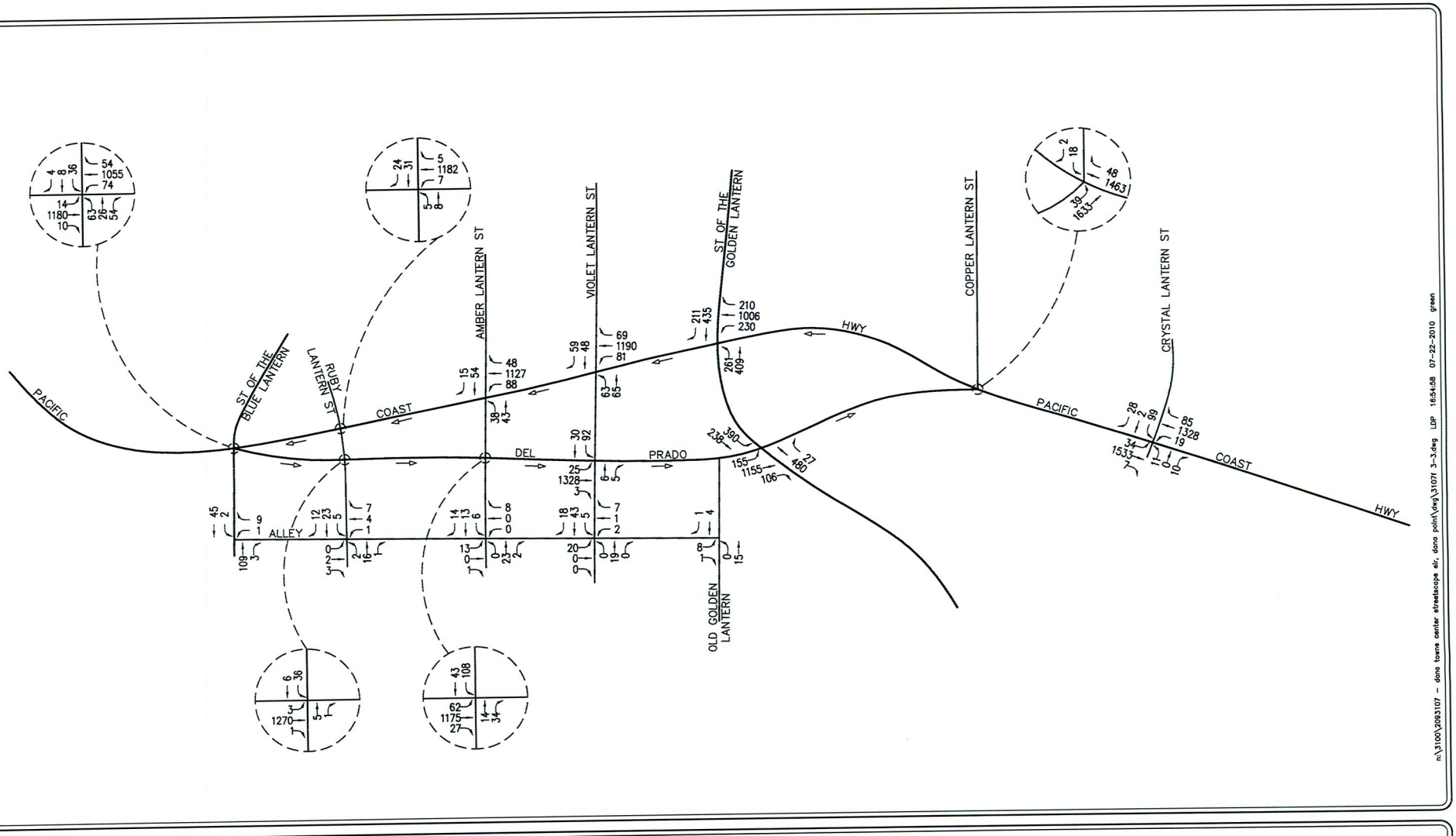

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FIGURE 3–3

YEAR 2010 EXISTING PM PEAK HOUR TRAFFIC VOLUMES

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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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 *Level of Service Criteria*

According to the *City of Dana Point General Plan Circulation Element (1995)*, LOS "C" is the minimum acceptable condition that should be maintained during the peak commute hours for primary arterials, secondary arterials and local streets. LOS "D" is the minimum acceptable condition that should be maintained during the peak commute hours for major arterials and state highways. LOS "E" is the minimum acceptable condition that should be maintained during the peak commute hours for CMP designated roadways. Based on the City's requirements, the following summarizes the LOS required for each key study intersection:

LOS "C" Requirements

1. Street of the Blue Lantern at Pacific Coast Highway
2. Ruby Lantern Street at Pacific Coast Highway
3. Amber Lantern Street at Pacific Coast Highway
4. Violet Lantern Street at Pacific Coast Highway
5. Street of the Golden Lantern at Pacific Coast Highway

LOS "D" Requirements

6. Copper Lantern Street at Pacific Coast Highway
7. Crystal Lantern Street at Pacific Coast Highway
8. Ruby Lantern Street at Del Prado Avenue
9. Amber Lantern Street at Del Prado Avenue
10. Violet Lantern Street at Del Prado Avenue
11. Street of the Golden Lantern at Del Prado Avenue
12. Del Prado Avenue (West) at Pacific Coast Highway

3.4 Existing Intersection Level of Service Results

Table 3-3 summarizes the existing peak hour service level calculations for the twelve (12) key study intersections based on existing traffic volumes and current street geometry. Review of *Table 3-3* indicates that all twelve (12) key study intersections currently operate at an acceptable LOS during the AM and PM peak hours.

Appendix A contains the ICU/LOS and HCM/LOS calculation worksheets for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (ICU METHODOLOGY)

Level of Service (LOS)	Intersection Capacity Utilization Value (V/C)	Level of Service Description
A	0.00 – 0.60	Free Flow; Very low delay, less than 10.0 seconds per vehicle.
B	0.61 – 0.70	Rural Design; Delay in the range of 10.1 to 20.0 seconds per vehicle.
C	0.71 – 0.80	Urban Design; Delay in the range of 20.1 to 35.0 seconds per vehicle.
D	0.81 – 0.90	Maximum Urban Design; Delay ranges from 35.1 to 55.0 seconds per vehicle.
E	0.91 – 1.00	Capacity; Delay ranges from 55.1 to 80.0 seconds per vehicle.
F	≥ 1.01	Forced Flow; Delay in excess of 80.0 Seconds per vehicle.

TABLE 3-2

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

Level of Service (LOS)	Highway Capacity Manual 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

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

TABLE 3-3
YEAR 2010 EXISTING PEAK HOUR LEVELS OF SERVICE

Key Intersection	Time Period	Minimum Acceptable LOS	Control Type	Year 2010 Existing Traffic Conditions	
				ICU/HCM[3]	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	5Ø Traffic Signal	0.426	A
	PM			0.497	A
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	Two-Way Stop	23.9 s/v	C
	PM			22.8 s/v	C
3. Amber Lantern Street at Pacific Coast Highway	AM	C	2Ø Traffic Signal	0.382	A
	PM			0.361	A
4. Violet Lantern Street at Pacific Coast Highway	AM	C	2Ø Traffic Signal	0.367	A
	PM			0.378	A
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	3Ø Traffic Signal	0.520	A
	PM			0.570	A
6. Copper Lantern Street at Pacific Coast Highway	AM	D	3Ø Traffic Signal	0.529	A
	PM			0.542	A
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	5Ø Traffic Signal	0.533	A
	PM			0.585	A
8. Ruby Lantern Street at Del Prado Avenue	AM	C	Two-Way Stop	17.6 s/v	C
	PM			24.8 s/v	C
9. Amber Lantern Street at Del Prado Avenue	AM	C	2Ø Traffic Signal	0.327	A
	PM			0.390	A
10. Violet Lantern Street at Del Prado Avenue	AM	C	2Ø Traffic Signal	0.290	A
	PM			0.387	A
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	3Ø Traffic Signal	0.368	A
	PM			0.532	A
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---[4]	---	---
	PM			---	---

[3] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

[4] Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

4.0 FUTURE TRAFFIC CONDITIONS

4.1 Ambient Traffic Growth

Horizon year, background traffic growth estimates have been calculated using an ambient traffic growth factor. The ambient traffic growth factor is intended to include unknown and future related projects in the study area, as well as account for regular growth in traffic volumes due to the development of projects outside the study area.

To determine an appropriate ambient traffic growth factor, a review of the City's average daily traffic volumes was performed. Specifically, a comparison of Year 1992 and Year 2005 City of Dana Point Average Daily Traffic volumes along Pacific Coast Highway between Selva Road and Doheny Park Road was conducted. The comparison revealed an average ambient growth factor of 0.50% per year. Applied to the Year 2010 existing traffic volumes, this results in a 2.5% growth in existing volumes to horizon year 2015 and a 12.5% growth in existing volumes to horizon year 2035.

4.2 Related Projects Traffic Characteristics

In order to make a realistic estimate of future on-street conditions prior to implementation of the proposed Project, the status of other known development projects (cumulative projects) in the area has been researched and considered. With this information, the potential impact of the proposed Project can be evaluated within the context of the cumulative impact of all ongoing development, including the projected growth in land use as a part of the Dana Point Town Center Plan.

Based on our research, there are three (3) related projects located in the City of Dana Point, which consist of the Headlands Specific Plan, the Dana Point Harbor Revitalization and the Dana Point Town Center Plan. These three (3) related projects have been included as part of the cumulative background setting for the Year 2015 and Year 2035.

Table 4-1 provides a brief description for each of the three (3) related projects. ***Figure 4-1*** illustrates the location of the three (3) related projects. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the key study intersections.

Table 4-2 summarizes the trip generation potential for all three (3) related projects on a daily and peak hour basis for a "typical" weekday. As shown, on a typical weekday, the related projects are expected to generate 21,327 daily trips, with 972 trips (560 inbound, 412 outbound) anticipated during the AM peak hour and 1,658 trips (792 inbound, 866 outbound) produced during the PM peak hour.

TABLE 4-1

LOCATION AND DESCRIPTION OF RELATED PROJECTS[5]

No.	Cumulative Project	Location/Address	Description
1.	Headlands Specific Plan	Pacific Coast Highway between Selva Road and Street of the Golden Lantern	118 DU single family detached residential dwelling units, a 65 room Seaside Inn that includes meeting/function space, restaurant and lounge, related amenities amounting to 13,000 SF of visitor/recreation commercial uses, park and recreation areas, visitor recreation (community) facilities, recreation/open space and visitor/recreation commercial area of up to 40,000 SF.
2.	Dana Point Harbor Revitalization	Dana Point Harbor	Establish a Commercial Core and replace/remodel all existing retail and restaurant buildings.
3.	Dana Point Town Center Plan	Pacific Coast Highway between Street of the Blue Lantern and Street of the Golden Lantern	A combination of land use regulatory and zoning changes to allow mixed-use and transportation capital improvements. Potential (net) development consists of 192,165 SF of retail/restaurant floor area, 31,224 SF of office space, 237 DU condominiums/townhomes, and 50,000 SF of institutional space (City Hall).

[5] Source: City of Dana Point.

TABLE 4-2

RELATED PROJECTS TRAFFIC GENERATION FORECAST

Cumulative Project Description	Daily Two Way	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
1. Headlands Specific Plan[6]	4,599	100	114	214	219	178	397
2. Dana Point Harbor Revitalization[7]	4,980	154	118	272	199	190	389
3. Dana Point Town Center Plan[8]	11,748	306	180	486	374	498	872
Total Cumulative Projects Trip Generation Potential	**21,327**	**560**	**412**	**972**	**792**	**866**	**1,658**

6 Source: *Headlands Traffic Study* prepared RK Engineering Group, Inc., July 2001.

7 Source: *Dana Point Harbor Revitalization Traffic and Parking Analysis* prepared by RBF Consulting, September 2005.

8 Source: *City of Dana Point Town Center Plan Traffic Impact Analysis* prepared by Kimley-Horn and Associates, August 2006.

4.3 Year 2015 Traffic Volumes

4.3.1 *One-Way Operations*

Figures 4-2 and ***4-3*** present Year 2015 AM and PM peak hour traffic volumes without the proposed Project at the twelve (12) key study intersections. Please note that the aforementioned traffic volumes represent the accumulation of existing traffic, ambient growth traffic to the Year 2015, related projects traffic and "one-way operations" along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street.

4.3.2 *Two-Way Operations*

Figures 4-4 and ***4-5*** present Year 2015 AM and PM peak hour traffic volumes with the proposed Project at the twelve (12) key study intersections. Please note that the aforementioned traffic volumes represent the accumulation of existing traffic, ambient growth traffic to the Year 2015, related projects traffic and "two-way operations" along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street. Peak hour traffic volumes along Pacific Coast Highway and Del Prado Avenue were redistributed/re-routed to represent "two-way operations".

4.4 Year 2035 Traffic Volumes

4.4.1 *One-Way Operations*

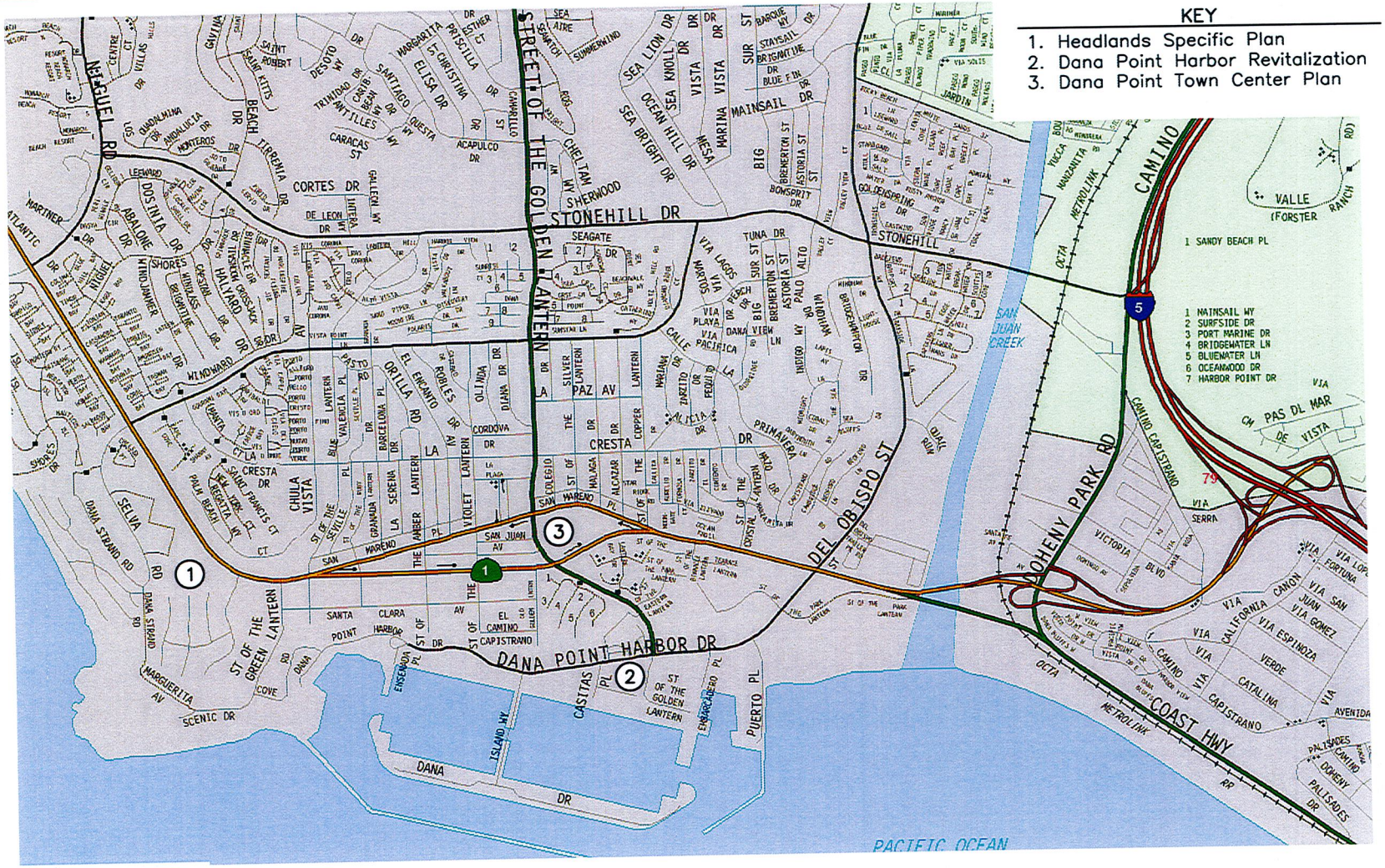
Figures 4-6 and ***4-7*** present Year 2035 AM and PM peak hour traffic volumes without the proposed Project at the twelve (12) key study intersections. Please note that the aforementioned traffic volumes represent the accumulation of existing traffic, ambient growth traffic to the Year 2035, related projects traffic and "one-way operations" along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street.

4.4.2 *Two-Way Operations*

Figures 4-8 and ***4-9*** present Year 2035 AM and PM peak hour traffic volumes with the proposed Project at the twelve (12) key study intersections. Please note that the aforementioned traffic volumes represent the accumulation of existing traffic, ambient growth traffic to the Year 2035, related projects traffic and "two-way operations" along Pacific Coast Highway and Del Prado Avenue between Street of the Blue Lantern and Copper Lantern Street. Peak hour traffic volumes along Pacific Coast Highway and Del Prado Avenue were redistributed/re-routed to represent "two-way operations".

4.5 Year 2015/Year 2035 Roadway Conditions and Intersection Controls

Figure 4-10 presents the Year 2015 and Year 2035 "two-way operations" roadway conditions and intersection controls for the twelve (12) key study intersections. The lane assignments and intersection controls shown in this figure will be utilized for the Year 2015 and Year 2035 "two-way operations" level of service analysis.



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SOURCE: THOMAS BROS.

KEY

(#) = RELATED PROJECT

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FIGURE 4-1

RELATED PROJECTS LOCATION MAP

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

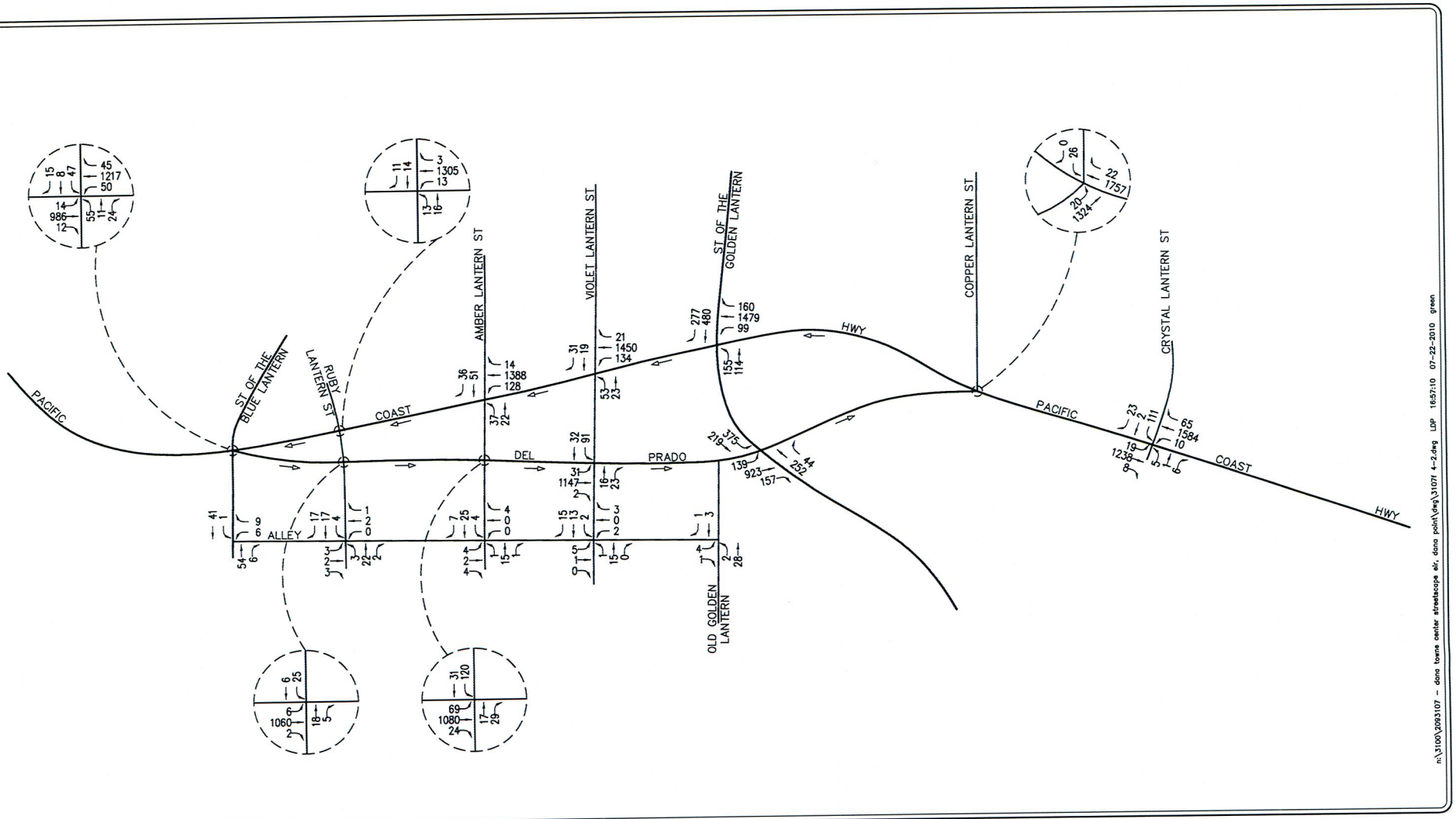

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FIGURE 4-2

YEAR 2015 AM PEAK HOUR TRAFFIC VOLUMES WITHOUT PROJECT (ONE-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

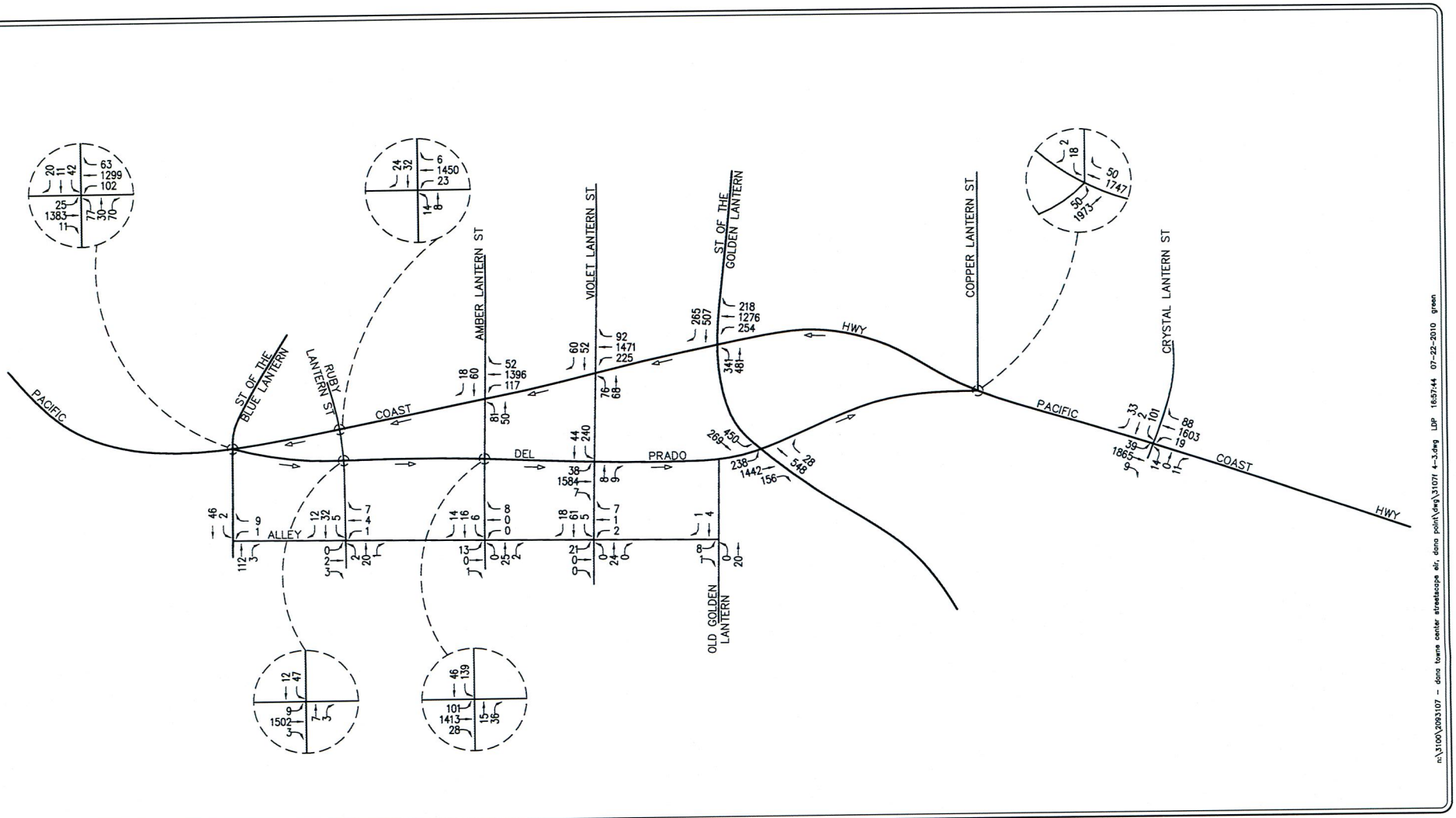

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FIGURE 4-3

YEAR 2015 PM PEAK HOUR TRAFFIC VOLUMES WITHOUT PROJECT (ONE-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

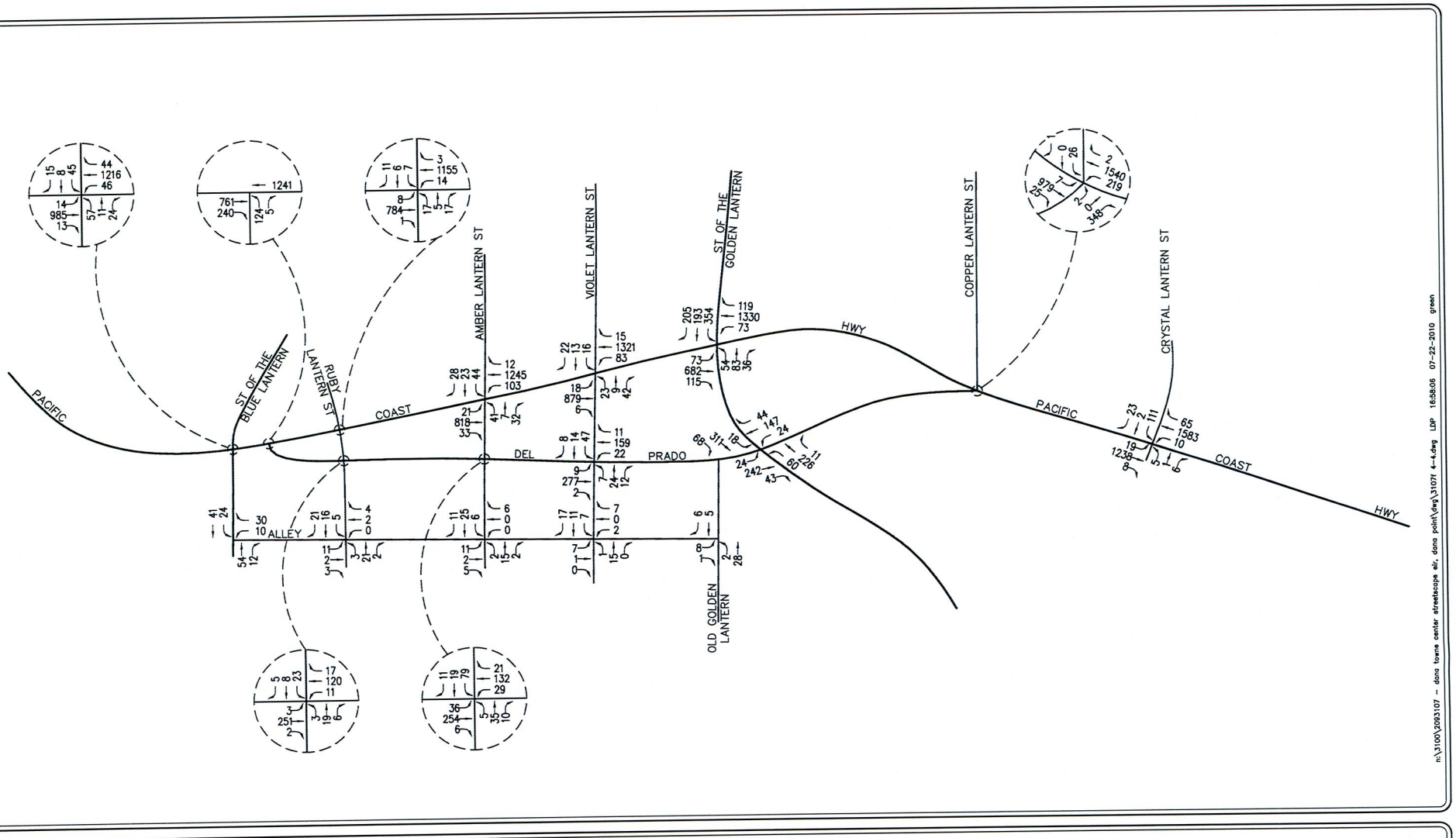

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FIGURE 4-4

YEAR 2015 AM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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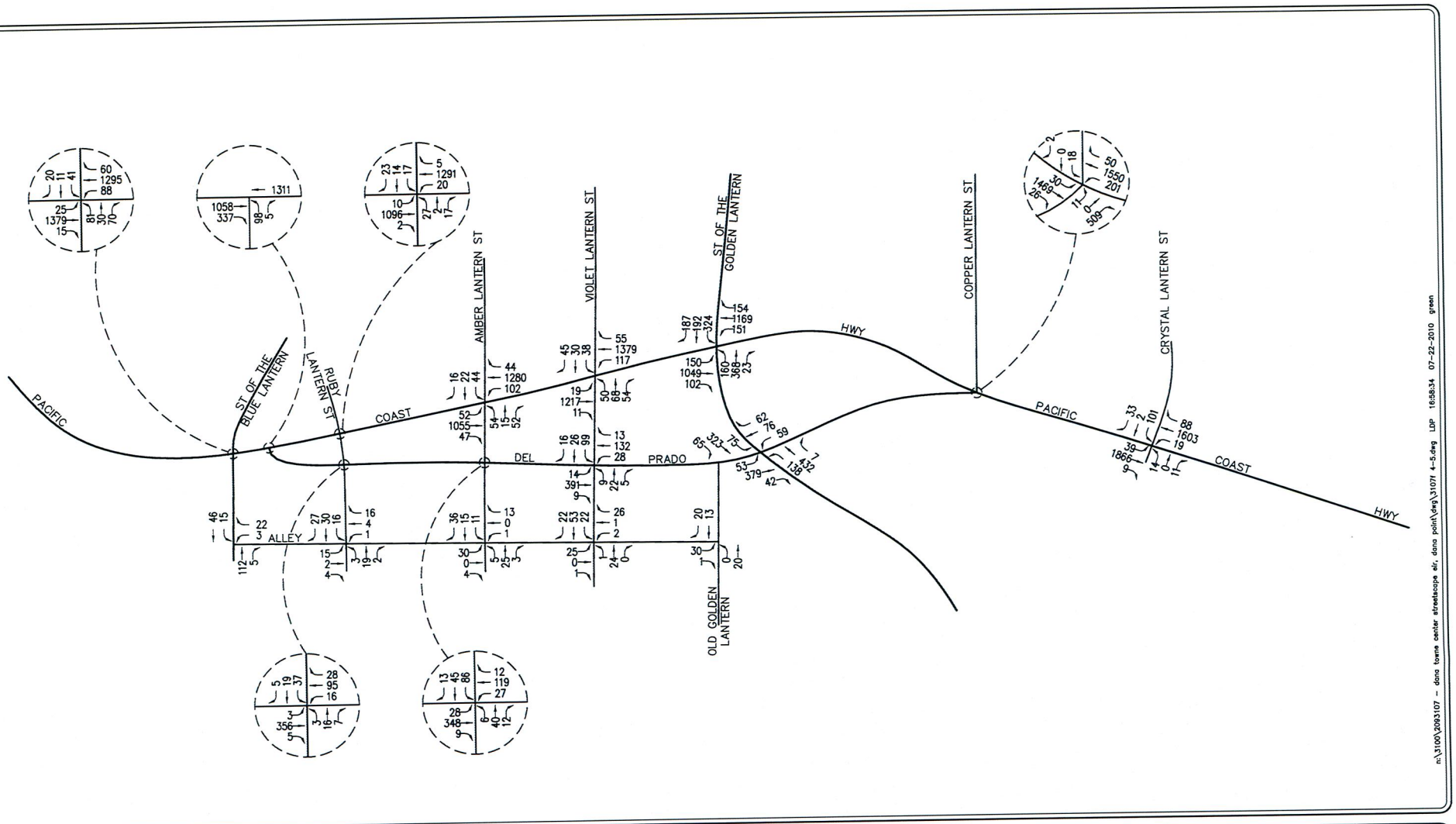

FIGURE 4–5

YEAR 2015 PM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO–WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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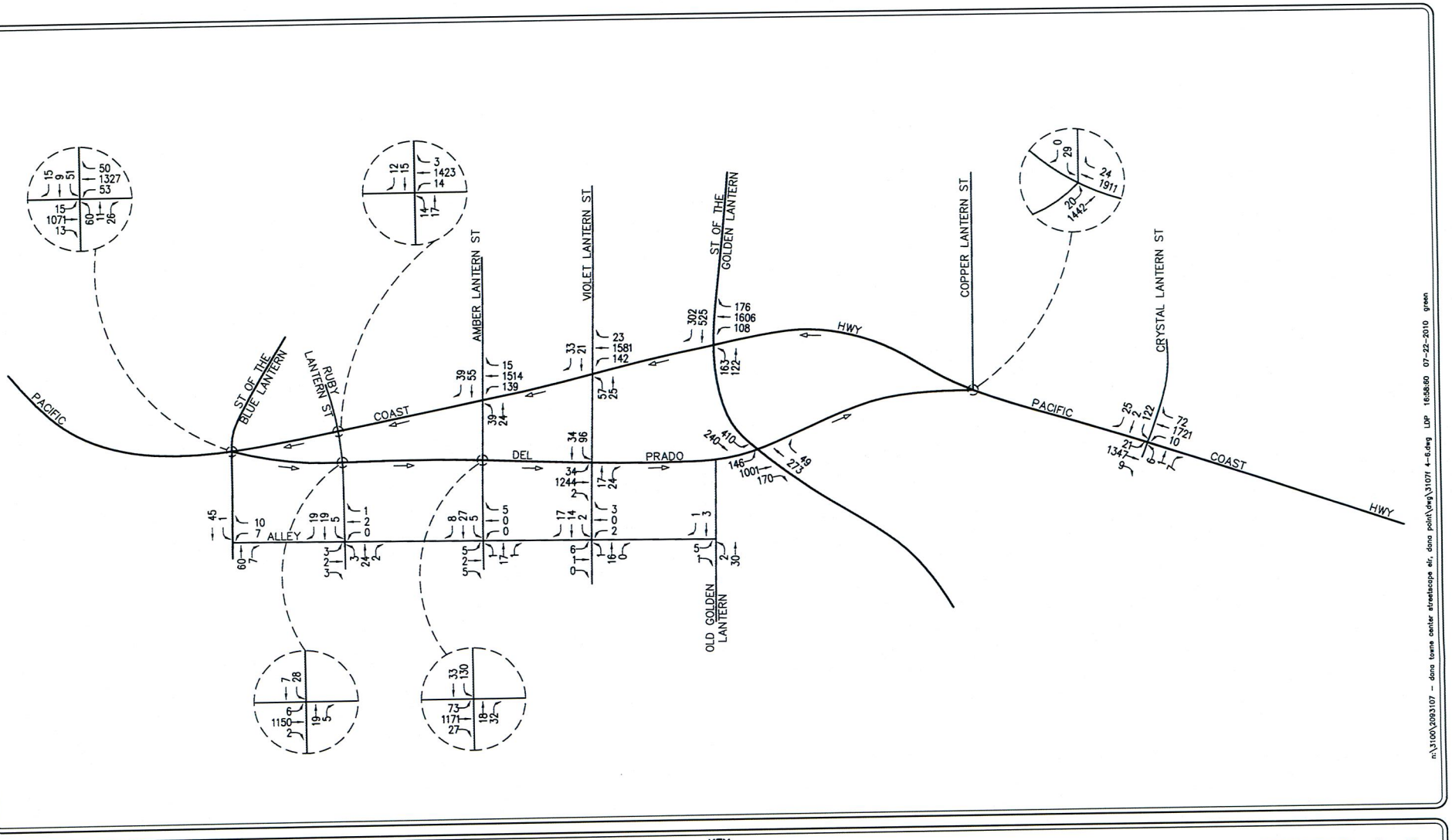

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⟵ = ONE-WAY TRAVEL ONLY

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FIGURE 4-6

YEAR 2035 AM PEAK HOUR TRAFFIC VOLUMES WITHOUT PROJECT (ONE-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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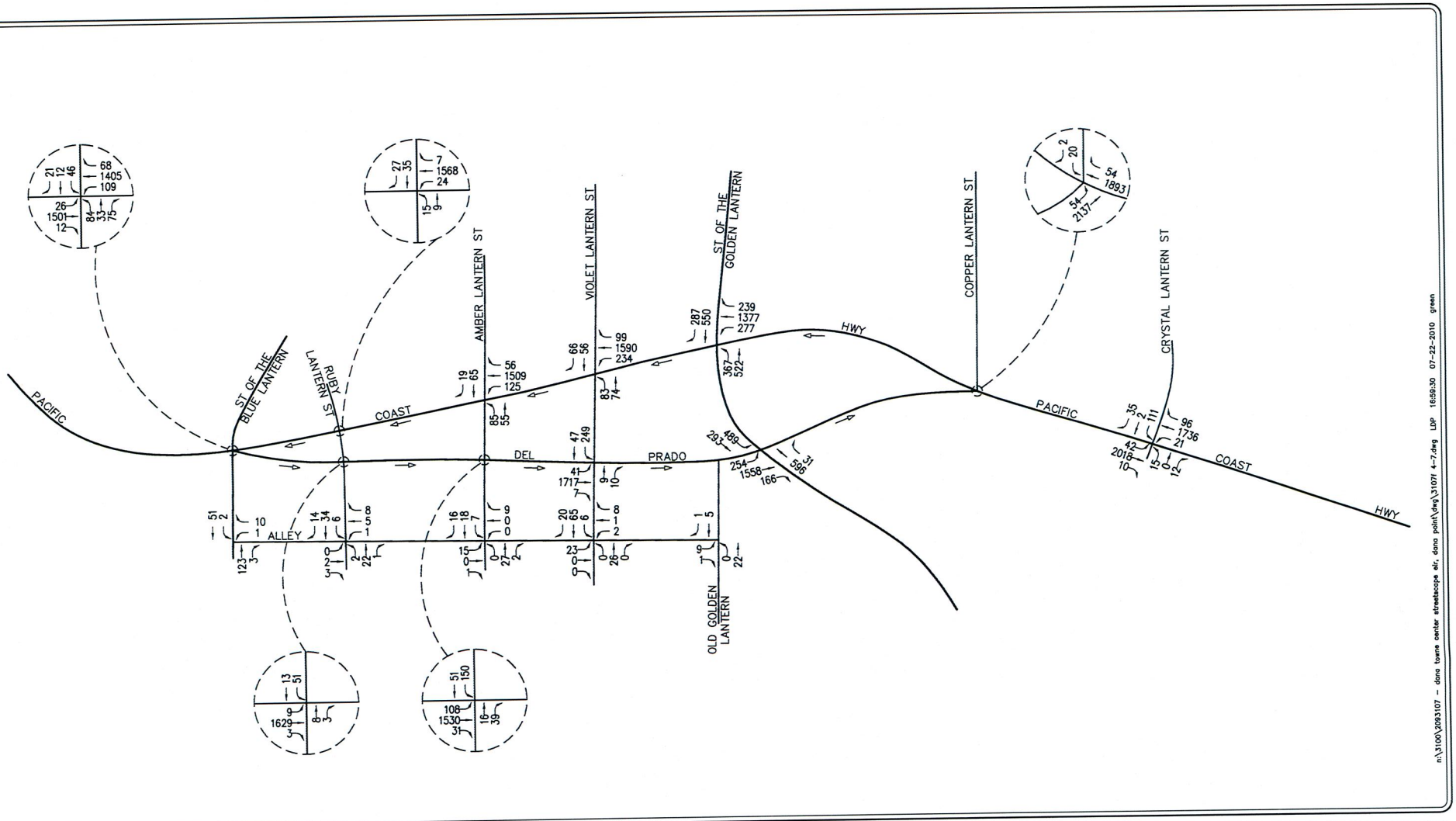


KEY

⟵ = ONE-WAY TRAVEL ONLY

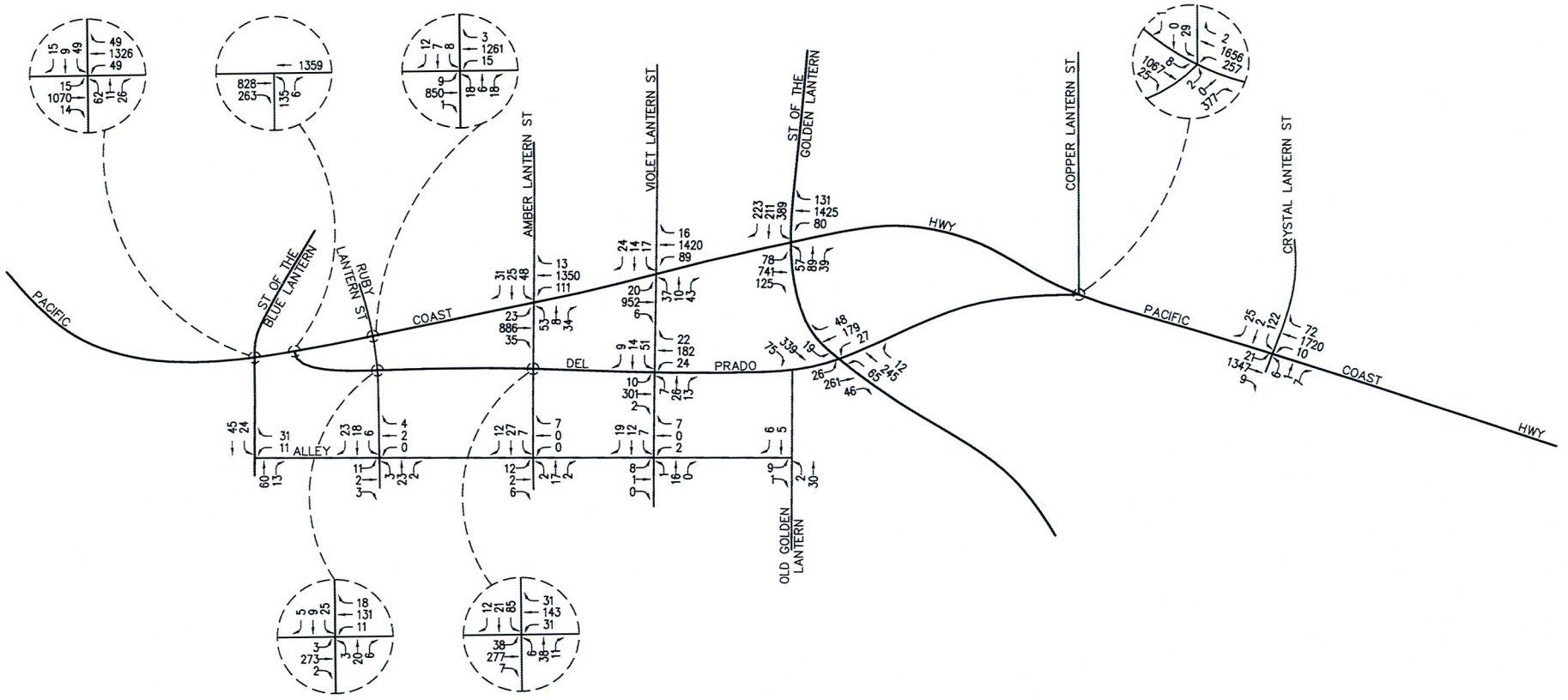
LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 4-7

YEAR 2035 PM PEAK HOUR TRAFFIC VOLUMES WITHOUT PROJECT (ONE-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 4-8

YEAR 2035 AM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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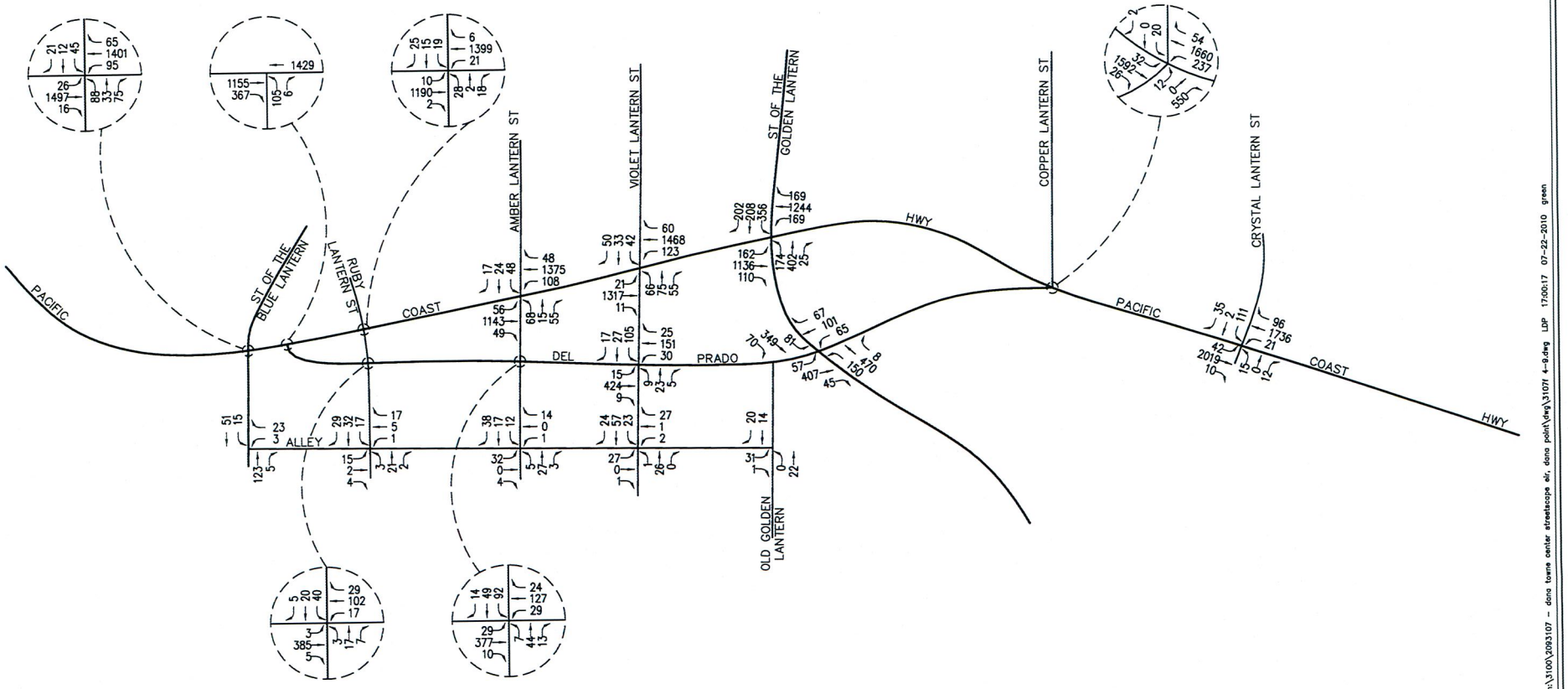


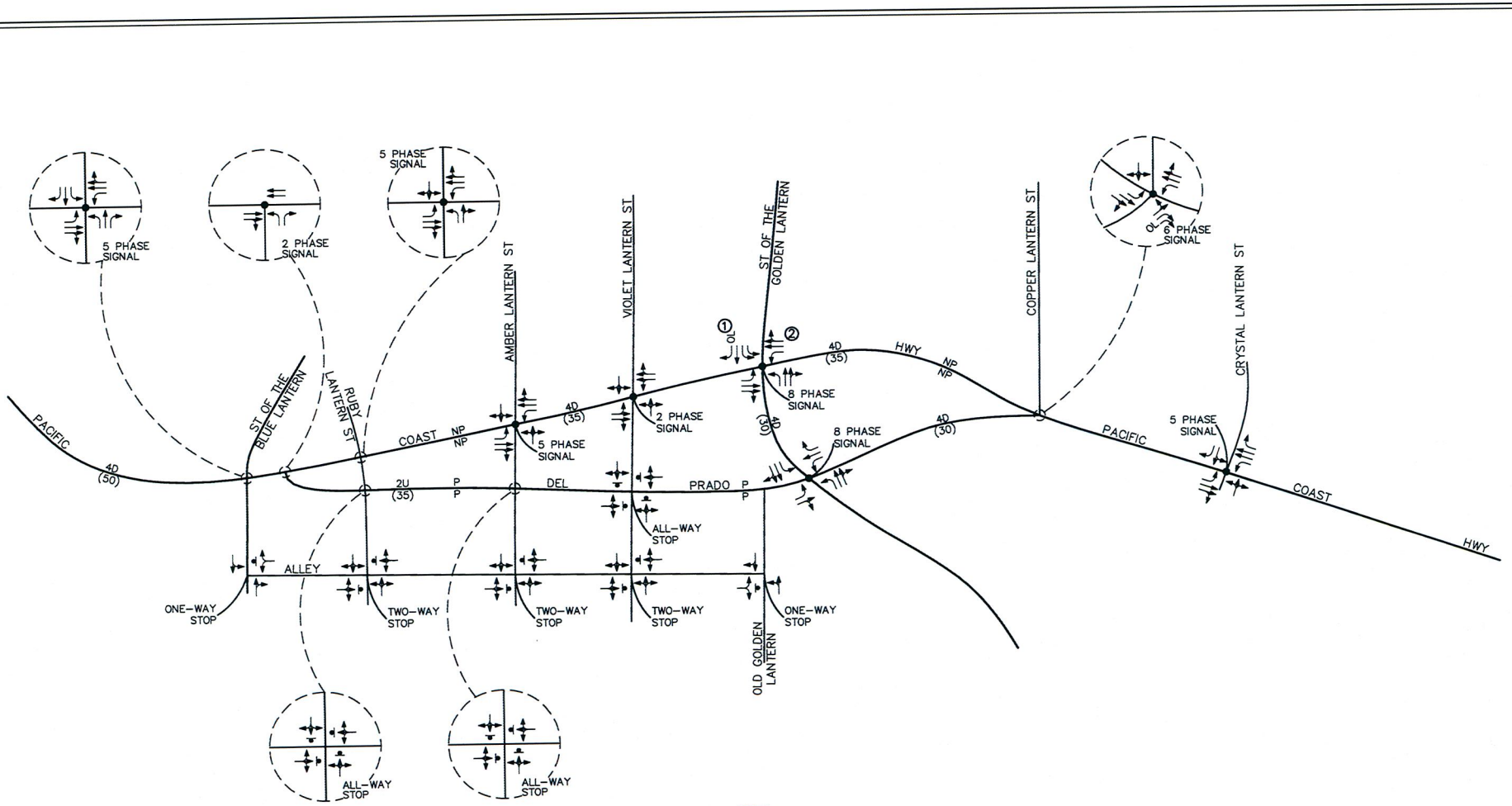
LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 4-9

YEAR 2035 PM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



NOTE:

① OVERLAP PHASE WILL BE IMPLEMENTED DURING THE PM PEAK HOURS FROM 4–6 PM FOR YEAR 2035 TRAFFIC CONDITIONS ONLY.

② PARKING WILL BE PROHIBITED DURING THE PM PEAK HOURS FROM 4–6 PM TO PROVIDE A DEFACTO RIGHT TURN LANE FOR YEAR 2035 TRAFFIC CONDITIONS ONLY.

n:\3100\2093107 – dana towne center streetscape eir, dana point\dwg\31071 4–10.dwg LDP 09:42:08 07–23–2010 aguitar

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY

← = APPROACH LANE ASSIGNMENT
● = TRAFFIC SIGNAL, ▼ = STOP SIGN
P = PARKING, NP = NO PARKING
U = UNDIVIDED, D = DIVIDED
2 = NUMBER OF TRAVEL LANES
(XX)= POSTED SPEED LIMIT (MPH)
OL = OVERLAP

FIGURE 4–10

YEAR 2015 AND YEAR 2035 ROADWAY CONDITIONS AND INTERSECTION CONTROLS (TWO–WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

5.0 TRAFFIC IMPACT ANALYSIS METHODOLOGY

The relative traffic impact/benefit of the proposed Project during the AM and PM peak hours was evaluated based on analysis of twelve (12) key study intersections. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics (i.e. the ICU methodology for signalized intersections and the HCM methodology for unsignalized intersections). The significance of the potential impacts/benefits of the Project was then evaluated using the following traffic impact criteria.

5.1 Level of Service Criteria

According to the *City of Dana Point General Plan Circulation Element (1995)*, LOS "C" is the minimum acceptable condition that should be maintained during the peak commute hours for primary arterials, secondary arterials and local streets. LOS "D" is the minimum acceptable condition that should be maintained during the peak commute hours for major arterials and state highways. LOS "E" is the minimum acceptable condition that should be maintained during the peak commute hours for CMP designated roadways. Based on the City's requirements, the following summarizes the LOS required for each key study intersection:

LOS "C" Requirements

1. Street of the Blue Lantern at Pacific Coast Highway
2. Ruby Lantern Street at Pacific Coast Highway
3. Amber Lantern Street at Pacific Coast Highway
4. Violet Lantern Street at Pacific Coast Highway
5. Street of the Golden Lantern at Pacific Coast Highway

LOS "D" Requirements

6. Copper Lantern Street at Pacific Coast Highway
7. Crystal Lantern Street at Pacific Coast Highway
8. Ruby Lantern Street at Del Prado Avenue
9. Amber Lantern Street at Del Prado Avenue
10. Violet Lantern Street at Del Prado Avenue
11. Street of the Golden Lantern at Del Prado Avenue
12. Del Prado Avenue (West) at Pacific Coast Highway

5.2 Traffic Impact Analysis Scenarios

The following scenarios are those for which LOS calculations have been performed:

A. Existing Traffic Conditions
B. Year 2015 Without Project Traffic Conditions (One-Way Operations)
C. Year 2015 With Project Traffic Conditions (Two-Way Operations);
D. Scenario (C) with Improvements, if necessary
E. Year 2035 Without Project Traffic Conditions (One-Way Operations)
F. Year 2035 With Project Traffic Conditions (Two-Way Operations);
G. Scenario (F) with Improvements, if necessary

6.0 YEAR 2015 PLUS PROJECT ANALYSIS

6.1 Peak Hour Intersection Capacity Analysis

Table 6-1 presents a summary of the projected levels of service at the twelve (12) key study intersections for Year 2015 traffic conditions (existing traffic plus ambient growth traffic plus related projects traffic). The first column (1) of ICU/LOS or HCM/LOS values in *Table 6-1* present Year 2015 traffic conditions without the proposed Project (i.e. one-way operations). The second column (2) lists Year 2015 traffic conditions with the proposed Project (i.e. two-way operations). The third column (3) presents the impact/benefit of the proposed Project. The fourth column (4) lists Year 2015 traffic conditions with the proposed Project (i.e. two-way operations) with additional improvements.

6.1.1 *Year 2015 Traffic Conditions Without Proposed Project (One-Way Operations)*

An analysis of Year 2015 traffic conditions without the proposed Project (one-way operations) indicates that the addition of ambient growth traffic and related projects traffic to existing traffic will result in unacceptable service levels at two of the twelve (12) key study intersections under the current "one-way couplet" configuration. The locations projected to operate at an unacceptable LOS in the Year 2015 (one-way operations), when compared to the City's LOS standards, are as follows:

		AM Peak Hour		PM Peak Hour	
Key Intersection		ICU/HCM	LOS	ICU/HCM	LOS
2.	Ruby Lantern St at Pacific Coast Highway	---	---	26.3 s/v	D
8.	Ruby Lantern St at Del Prado Ave	---	---	32.5 s/v	D

The primary reason for the unacceptable LOS in this scenario is due to the side street delay (i.e. delay on Ruby Lantern Street), not main street congestion. The remaining ten (10) key study intersections are forecast to operate at an acceptable LOS based on City of Dana Point level of service criteria.

6.1.2 *Year 2015 Traffic Conditions With Proposed Project (Two-Way Operations)*

Review of Columns 2 and 3 of *Table 6-1* indicates that all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). The two intersections forecasted to operate at unacceptable LOS D during the PM peak hour without the proposed Project are now forecast to operate at acceptable LOS A during the PM peak hour with implementation of the proposed Project. The proposed Project shows a net overall improvement in congestion management.

Appendix B presents the Year 2015 ICU/LOS and HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

TABLE 6-1

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS[9]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	0.464	A	0.462	A	-0.002	---	---
	PM		0.572	A	0.566	A	-0.006	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	21.6 s/v	C	0.420	A	---	---	---
	PM		**26.3 s/v**	**D***	0.484	A	---	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	0.423	A	0.505	A	+0.082	---	---
	PM		0.450	A	0.567	A	+0.117	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	0.414	A	0.531	A	+0.117	---	---
	PM		0.481	A	0.641	B	+0.160	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	0.626	B	0.672	B	+0.046	---	---
	PM		0.700	B	0.738	C	+0.038	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	0.600	A	0.525	A	-0.075	---	---
	PM		0.642	B	0.651	B	+0.009	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

9 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 6-1 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS[10]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	0.600	A	0.599	A	-0.001	---	---
	PM		0.686	B	0.687	B	+0.001	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	21.6 s/v	C	8.8 s/v	A	-12.8 s/v	---	---
	PM		**32.5 s/v**	**D***	9.9 s/v	A	-22.6 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	0.378	A	9.8 s/v	A	---	---	---
	PM		0.464	A	11.2 s/v	B	---	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	0.358	A	9.5 s/v	A	---	---	---
	PM		0.536	A	11.6 s/v	B	---	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	0.415	A	0.378	A	-0.037	---	---
	PM		0.626	B	0.527	A	-0.099	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[11]	0.488	A	+0.488	---	---
	PM		---	---	0.518	A	+0.518	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

10 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

11 Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

7.0 YEAR 2035 PLUS PROJECT ANALYSIS

7.1 Peak Hour Intersection Capacity Analysis

Table 7-1 presents a summary of the projected levels of service at the twelve (12) key study intersections for Year 2035 traffic conditions (existing traffic plus ambient growth traffic plus related projects traffic). The first column (1) of ICU/LOS or HCM/LOS values in *Table 7-1* present Year 2035 traffic conditions without the proposed Project (i.e. one-way operations). The second column (2) lists Year 2035 traffic conditions with the proposed Project (i.e. two-way operations). The third column (3) presents the impact/benefit of the proposed Project. The fourth column (4) lists Year 2035 traffic conditions with the proposed Project (i.e. two-way operations) with additional improvements.

7.1.1 *Year 2035 Traffic Conditions Without Proposed Project (One-Way Operations)*

An analysis of Year 2035 traffic conditions without the proposed Project (one-way operations) indicates that the addition of ambient growth traffic and related projects traffic to existing traffic will result in unacceptable service levels at two of the twelve (12) key study intersections under the current "one-way couplet" configuration. The locations projected to operate at an unacceptable LOS in the Year 2035 (one-way operations), when compared to the City's LOS standards, are as follows:

		AM Peak Hour		PM Peak Hour	
Key Intersection		ICU/HCM	LOS	ICU/HCM	LOS
2.	Ruby Lantern St at Pacific Coast Highway	---	---	30.2 s/v	D
8.	Ruby Lantern St at Del Prado Ave	---	---	39.2 s/v	E

The primary reason for the unacceptable LOS in this scenario is due to the side street delay (i.e. delay on Ruby Lantern Street), not main street congestion. The remaining ten (10) key study intersections are forecast to operate at an acceptable LOS based on City of Dana Point level of service criteria.

7.1.2 *Year 2035 Traffic Conditions With Proposed Project (Two-Way Operations)*

Review of Columns 2 and 3 of *Table 7-1* indicates that all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). It should be noted that the two intersections forecasted to operate at unacceptable LOS D and/or LOS E during the PM peak hour without the proposed Project are now forecast to operate at an acceptable LOS during the PM peak hour with implementation of the proposed Project. The proposed Project shows a net overall improvement in congestion management.

Appendix C presents the Year 2035 ICU/LOS and HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

TABLE 7-1

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS[12]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	0.504	A	0.505	A	+0.001	---	---
	PM		0.630	B	0.621	B	-0.009	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	23.6 s/v	C	0.454	A	---	---	---
	PM		**30.2 s/v**	**D***	0.521	A	---	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	0.456	A	0.556	A	+0.100	---	---
	PM		0.481	A	0.611	B	+0.130	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	0.446	A	0.573	A	+0.127	---	---
	PM		0.514	A	0.688	B	+0.174	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	0.673	B	0.719	C	+0.046	---	---
	PM		0.751	C	0.742	C	-0.009	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	0.648	B	0.562	A	-0.086	---	---
	PM		0.691	B	0.700	B	+0.009	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

12 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 7-1 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS[13]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	0.648	B	0.648	B	0.000	---	---
	PM		0.740	C	0.740	C	0.000	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	24.2 s/v	C	9.0 s/v	A	-15.2 s/v	---	---
	PM		**39.2 s/v**	**E***	10.4 s/v	B	-28.8 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	0.405	A	10.3 s/v	B	---	---	---
	PM		0.498	A	12.1 s/v	B	---	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	0.382	A	9.9 s/v	A	---	---	---
	PM		0.570	A	12.7 s/v	B	---	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	0.447	A	0.406	A	-0.041	---	---
	PM		0.675	B	0.566	A	-0.109	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[14]	0.529	A	+0.529	---	---
	PM		---	---	0.559	A	+0.559	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

[13] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

[14] Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

8.0 YEAR 2015 AND YEAR 2035 OPERATIONS ANALYSIS

This section of the report focuses on an assessment of the operating conditions of the twelve (12) key study intersections located along Pacific Coast Highway and Del Prado Avenue using Synchro 7.0 software and the *Highway Capacity Manual 2000* (HCM 2000) methodology. AM peak hour and PM peak hour queuing calculations were also conducted for each key study intersection to validate left-turn and right-turn stacking/storage requirements.

8.1 Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)

The key signalized study intersections were evaluated using the 2000 HCM signalized methodology. 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 8-1***.

For the unsignalized intersections, refer to *Table 3-2* presented previously in Section 3.3 for the six qualitative categories of Level of Service that have been defined along with the corresponding HCM control delay value range.

8.2 Year 2015 Operations Analysis

Table 8-2 presents a summary of the projected levels of service at the twelve (12) key study intersections for Year 2015 traffic conditions (existing traffic plus ambient growth traffic plus related projects traffic) based on the HCM methodology. The first column (1) of HCM/LOS values in *Table 8-2* present Year 2015 traffic conditions without the proposed Project (i.e. one-way operations). The second column (2) lists Year 2015 traffic conditions with the proposed Project (i.e. two-way operations). The third column (3) presents the impact/benefit of the proposed Project. The fourth column (4) lists Year 2015 traffic conditions with the proposed Project (i.e. two-way operations) with additional improvements.

TABLE 8-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM METHODOLOGY)[15]

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

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

TABLE 8-2

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY)[16]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	10.2 s/v	B	9.0 s/v	A	-1.2 s/v	---	---
	PM		15.4 s/v	B	14.2 s/v	B	-1.2 s/v	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	21.6 s/v	C	4.0 s/v	A	-17.6 s/v	---	---
	PM		**26.3 s/v**	**D***	4.1 s/v	A	-22.2 s/v	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	4.0 s/v	A	9.6 s/v	A	+5.6 s/v	---	---
	PM		5.0 s/v	A	11.1 s/v	B	+6.1 s/v	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	5.0 s/v	A	4.7 s/v	A	-0.3 s/v	---	---
	PM		6.7 s/v	A	18.9 s/v	B	+12.2 s/v	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	**35.3 s/v**	**D**	26.4 s/v	C	-8.9 s/v	---	---
	PM		**39.5 s/v**	**D**	32.8 s/v	C	-6.7 s/v	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	19.4 s/v[17]	B	13.5 s/v	B	-5.9 s/v	---	---
	PM		21.6 s/v	C	14.3 s/v	B	-7.3 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

16 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

17 Please note that the delay reported for this key study intersection is based on the Synchro delay methodology. The delay reported using the HCM methodology results in an unrealistic delay value due to the intersections unique signal phase sequence.

TABLE 8-2 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY)[18]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	LOS	HCM
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	8.9 s/v	A	7.4 s/v	A	-1.5 s/v	---	---
	PM		11.6 s/v	B	7.1 s/v	A	-4.5 s/v	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	21.6 s/v	C	8.8 s/v	A	-12.8 s/v	---	---
	PM		**32.5 s/v**	**D***	9.9 s/v	A	-22.6 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	11.5 s/v	B	9.8 s/v	A	-1.7 s/v	---	---
	PM		12.7 s/v	B	11.2 s/v	B	-1.5 s/v	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	5.4 s/v	A	9.5 s/v	A	+4.1 s/v	---	---
	PM		10.4 s/v	B	11.6 s/v	B	+1.2 s/v	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	25.7 s/v	C	19.1 s/v	B	-6.6 s/v	---	---
	PM		23.5 s/v	C	28.1 s/v	C	+4.6 s/v	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[19]	4.3 s/v	A	+4.3 s/v	---	---
	PM		---	---	3.5 s/v	A	+3.5 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

18 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

19 Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

8.2.1 *Year 2015 Traffic Conditions Without Proposed Project (One-Way Operations)*

An analysis of Year 2015 traffic conditions without the proposed Project (one-way operations) indicates that the addition of ambient growth traffic and related projects traffic to existing traffic will result in unacceptable service levels at three of the twelve (12) key study intersections under the current "one-way couplet" configuration. The locations projected to operate at an unacceptable LOS in the Year 2015, if one-way operations were to be maintained, are as follows:

		AM Peak Hour		PM Peak Hour	
Key Intersection		HCM	LOS	HCM	LOS
2.	Ruby Lantern St at Pacific Coast Highway	---	---	26.3 s/v	D
5.	St of the Golden Lantern at Pacific Coast Highway	35.3 s/v	D	39.5 s/v	D
8.	Ruby Lantern St at Del Prado Ave	---	---	32.5 s/v	D

The remaining nine (9) key study intersections are forecast to operate at an acceptable LOS based on City of Dana Point level of service criteria.

8.2.2 *Year 2015 Traffic Conditions With Proposed Project (Two-Way Operations)*

Review of Columns 2 and 3 of *Table 8-2* indicates that based on the HCM methodology, all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). It should be noted that the three intersections forecasted to operate at unacceptable LOS D during the AM and/or PM peak hour without the proposed Project are now forecast to operate at an acceptable LOS with implementation of the proposed Project. The proposed Project shows a net overall improvement in congestion management.

Appendix D presents the Year 2015 HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

8.3 Year 2035 Operations Analysis

Table 8-3 presents a summary of the projected levels of service at the twelve (12) key study intersections for Year 2035 traffic conditions (existing traffic plus ambient growth traffic plus related projects traffic) based on the HCM methodology. The first column (1) of HCM/LOS values in *Table 8-3* present Year 2035 traffic conditions without the proposed Project (i.e. one-way operations). The second column (2) lists Year 2035 traffic conditions with the proposed Project (i.e. two-way operations). The third column (3) presents the impact/benefit of the proposed Project. The fourth column (4) lists Year 2035 traffic conditions with the proposed Project (i.e. two-way operations) with additional improvements.

TABLE 8-3

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY)[20]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	10.5 s/v	B	9.6 s/v	A	-0.9 s/v	---	---
	PM		17.3 s/v	B	14.2 s/v	B	-3.1 s/v	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	23.6 s/v	C	4.2 s/v	A	-19.4 s/v	---	---
	PM		**30.2 s/v**	**D***	6.2 s/v	A	-24.0 s/v	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	4.1 s/v	A	10.3 s/v	B	+6.2 s/v	---	---
	PM		5.3 s/v	A	12.2 s/v	B	+6.9 s/v	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	5.0 s/v	A	5.7 s/v	A	+0.7 s/v	---	---
	PM		7.0 s/v	A	32.2 s/v	C	+25.2 s/v	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	**37.0 s/v**	**D**	26.8 s/v	C	-10.2 s/v	---	---
	PM		**41.7 s/v**	**D**	34.9 s/v	C	-6.8 s/v	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	20.6 s/v[21]	C	11.6 s/v	B	-9.0 s/v	---	---
	PM		23.2 s/v	C	14.4 s/v	B	-8.8 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

20 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

21 Please note that the delay reported for this key study intersection is based on the Synchro delay methodology. The delay reported using the HCM methodology results in an unrealistic delay value due to the intersections unique signal phase sequence.

TABLE 8-3 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY)[22]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	LOS	HCM
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	9.8 s/v	A	8.3 s/v	A	-1.5 s/v	---	---
	PM		16.4 s/v	B	9.2 s/v	A	-7.2 s/v	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	24.2 s/v	C	9.0 s/v	A	-15.2 s/v	---	---
	PM		**39.2** s/v	**E***	10.4 s/v	B	-28.8 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	12.6 s/v	B	10.3 s/v	B	-2.3 s/v	---	---
	PM		13.7 s/v	B	12.1 s/v	B	-1.6 s/v	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	5.5 s/v	A	9.9 s/v	A	+4.4 s/v	---	---
	PM		9.4 s/v	A	12.7 s/v	B	+3.3 s/v	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	25.3 s/v	C	19.6 s/v	B	-5.7 s/v	---	---
	PM		25.1 s/v	C	29.3 s/v	C	+4.2 s/v	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[23]	4.8 s/v	A	+4.8 s/v	---	---
	PM		---	---	3.5 s/v	A	+3.5 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

22 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

23 Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

8.3.1 Year 2035 Traffic Conditions Without Proposed Project (One-Way Operations)

An analysis of Year 2035 traffic conditions without the proposed Project (one-way operations) indicates that the addition of ambient growth traffic and related projects traffic to existing traffic will result in unacceptable service levels at three of the twelve (12) key study intersections under the current "one-way couplet" configuration. The locations projected to operate at an unacceptable LOS in the Year 2035, if one-way operations were to be maintained, are as follows:

		AM Peak Hour		PM Peak Hour	
Key Intersection		HCM	LOS	HCM	LOS
2.	Ruby Lantern St at Pacific Coast Highway	---	---	30.2 s/v	D
5.	St of the Golden Lantern at Pacific Coast Highway	37.0 s/v	D	41.7 s/v	D
8.	Ruby Lantern St at Del Prado Ave	---	---	39.2 s/v	E

The remaining nine (9) key study intersections are forecast to operate at an acceptable LOS based on City of Dana Point level of service criteria.

8.3.2 Year 2035 Traffic Conditions With Proposed Project (Two-Way Operations)

Review of Columns 2 and 3 of *Table 8-3* indicates that based on the HCM methodology, all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2035 during the AM and PM peak hours with implementation of the proposed Project (two-way operations). It should be noted that the three intersections forecasted to operate at unacceptable LOS D and/or LOS E during the AM and/or PM peak hour without the proposed Project are now forecast to operate at an acceptable LOS with implementation of the proposed Project. The proposed Project shows a net overall improvement in congestion management

Appendix E presents the Year 2035 HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

8.4 Year 2015 and Year 2035 Queuing Analysis

This section of the report evaluates the stacking/storage requirements of the proposed Project for the exclusive left-turn lanes and exclusive right-turn lanes at the key study intersections. The queuing evaluation was conducted using Synchro 7.0 software, which reports the 95th percentile queue length in feet and is based on projected Year 2015 and Year 2030 traffic volumes (i.e. two-way operations for Pacific Coast Highway and Del Prado Avenue).

8.4.1 *Year 2015 Queuing Analysis Results*

Table 8-4 presents the Year 2015 AM peak hour and PM peak hour queuing analysis results for the key study intersections. Review of *Table 8-4* shows that all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersection of Street of the Blue Lantern/Pacific Coast Highway. The turn pockets at the aforementioned intersection not expected to provide adequate storage in the Year 2015 are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL

A close inspection of the plans for the Pacific Coast Highway/Del Prado Avenue Phase I Street Improvement Project indicate that all deficient turn pockets can be modified to accommodate the Year 2015 95th percentile queues. The northbound left turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 100 feet of storage to accommodate Year 2015 traffic volumes. City of Dana Point staff indicates that this will be done by adding two-way left-turn lane striping to this location, thus increasing the available stacking/storage length.

8.4.2 *Year 2035 Queuing Analysis Results*

Table 8-5 presents the Year 2035 AM peak hour and PM peak hour queuing analysis results for the key study intersections. Review of *Table 8-5* shows that all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersection of Street of the Blue Lantern/Pacific Coast Highway. The turn pockets at the aforementioned intersection not expected to provide adequate storage in the Year 2035 are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. Street of the Blue Lantern at Pacific Coast Highway	NBL	NBL

A close inspection of the plans for the Pacific Coast Highway/Del Prado Avenue Phase I Street Improvement Project indicate that all deficient turn pockets can be modified to accommodate the Year 2035 95th percentile queues. The northbound left turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 105 feet of storage to accommodate Year 2035 traffic volumes. City of Dana Point staff indicates that this will be done by adding two-way left-turn lane striping to this location, thus increasing the available stacking/storage length.

TABLE 8-4

YEAR 2015 PEAK HOUR INTERSECTION QUEUING ANALYSIS[24]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
1. Street of the Blue Lantern at Pacific Coast Highway					
Northbound Left-Turn	60	**73**	**No***	**97**	**No***
Northbound Right-Turn	60	22	Yes	38	Yes
Southbound Left-Turn	80	60	Yes	56	Yes
Southbound Right-Turn	80	18	Yes	21	Yes
Eastbound Left-Turn	150	34	Yes	49	Yes
Westbound Left-Turn	150	74	Yes	120	Yes
2. Ruby Lantern Street at Pacific Coast Highway					
Northbound Left-Turn	50	31	Yes	43	Yes
Eastbound Left-Turn	100	17	Yes	17	Yes
Westbound Left-Turn	150	22	Yes	28	Yes
3. Amber Lantern Street at Pacific Coast Highway					
Eastbound Left-Turn	150	44	Yes	84	Yes
Westbound Left-Turn	150	128	Yes	89	Yes
5. Street of the Golden Lantern at Pacific Coast Highway					
Northbound Left-Turn	250	79	Yes	194	Yes
Southbound Left-Turn	--	226	Yes	200	Yes
Southbound Right-Turn	300	105	Yes	61	Yes
Eastbound Left-Turn	300	143	Yes	225	Yes
Westbound Left-Turn	300	97	Yes	212	Yes

Note:
* = can be mitigated with proposed striping modifications along Street of the Blue Lantern

[24] Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

TABLE 8-4 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION QUEUING ANALYSIS[25]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
6. Copper Lantern Street at Pacific Coast Highway					
Northbound Right-Turn	--	25	Yes	32	Yes
Eastbound Left-Turn	100	10	Yes	31	Yes
Westbound Left-Turn	200+[26]	225	Yes	287	Yes
7. Crystal Lantern Street at Pacific Coast Highway					
Southbound Right-Turn	35	21	Yes	26	Yes
Eastbound Left-Turn	120	34	Yes	50	Yes
Westbound Left-Turn	100	14	Yes	21	Yes
Westbound Right-Turn	--	0	Yes	0	Yes
11. Street of the Golden Lantern at Del Prado					
Northbound Left-Turn	200	75	Yes	162	Yes
Southbound Left-Turn	180	33	Yes	102	Yes
Eastbound Left-Turn	130	37	Yes	67	Yes
Westbound Left-Turn	140	40	Yes	87	Yes
Westbound Right-Turn	--	25	Yes	35	Yes
12. Del Prado Avenue (West) at Pacific Coast Highway					
Northbound Left-Turn	--	150	Yes	126	Yes
Northbound Right-Turn	22	13	Yes	14	Yes

25 Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

26 The available storage for this location is longer than 200' because it transitions into a two-way-left-turn-lane.

TABLE 8-5

YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS[27]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
1. Street of the Blue Lantern at Pacific Coast Highway					
Northbound Left-Turn	60	**78**	**No***	**105**	**No***
Northbound Right-Turn	60	24	Yes	39	Yes
Southbound Left-Turn	80	65	Yes	61	Yes
Southbound Right-Turn	80	18	Yes	21	Yes
Eastbound Left-Turn	150	35	Yes	51	Yes
Westbound Left-Turn	150	75	Yes	129	Yes
2. Ruby Lantern Street at Pacific Coast Highway					
Northbound Left-Turn	50	32	Yes	44	Yes
Eastbound Left-Turn	100	18	Yes	15	Yes
Westbound Left-Turn	150	21	Yes	26	Yes
3. Amber Lantern Street at Pacific Coast Highway					
Eastbound Left-Turn	150	45	Yes	82	Yes
Westbound Left-Turn	150	111	Yes	80	Yes
5. Street of the Golden Lantern at Pacific Coast Highway					
Northbound Left-Turn	250	83	Yes	233	Yes
Southbound Left-Turn	--	251	Yes	223	Yes
Southbound Right-Turn	300	125	Yes	139	Yes
Eastbound Left-Turn	300	153	Yes	247	Yes
Westbound Left-Turn	300	98	Yes	240	Yes

Note:
* = can be mitigated with proposed striping modifications along Street of the Blue Lantern

[27] Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

TABLE 8-5 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS[28]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
6. Copper Lantern Street at Pacific Coast Highway					
Northbound Right-Turn	--	26	Yes	42	Yes
Eastbound Left-Turn	100	10	Yes	29	Yes
Westbound Left-Turn	200+[29]	313	Yes	341	Yes
7. Crystal Lantern Street at Pacific Coast Highway					
Southbound Right-Turn	35	22	Yes	26	Yes
Eastbound Left-Turn	120	36	Yes	47	Yes
Westbound Left-Turn	100	13	Yes	22	Yes
Westbound Right-Turn	--	0	Yes	0	Yes
11. Street of the Golden Lantern at Del Prado					
Northbound Left-Turn	200	79	Yes	179	Yes
Southbound Left-Turn	180	34	Yes	111	Yes
Eastbound Left-Turn	130	38	Yes	72	Yes
Westbound Left-Turn	140	44	Yes	97	Yes
Westbound Right-Turn	--	26	Yes	37	Yes
12. Del Prado Avenue (West) at Pacific Coast Highway					
Northbound Left-Turn	--	161	Yes	132	Yes
Northbound Right-Turn	22	15	Yes	14	Yes

28 Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

29 The available storage for this location is longer than 200' because it transitions into a two-way-left-turn-lane.

9.0 ALTERNATIVE ANALYSIS

This section of the report evaluates a proposed project alternative identified by the City of Dana Point and Keeton Kreitzer Consulting. The alternative, referred to as Alternative No. 1 is similar to the proposed Project as it will provide two-way operations along Pacific Coast Highway and Del Prado Avenue. However, a small section along Del Prado Avenue immediately east of Street of the Blue Lantern to Ruby Lantern Street will provide one-way operation [i.e. between Street of the Blue Lantern and Del Prado Avenue west (key study intersection number twelve)]. The proposed traffic signal for key study intersection number twelve (i.e. at Del Prado Avenue and Pacific Coast Highway) will be eliminated and the intersection will be controlled by a one-way stop as part of Alternative No. 1. In addition, northbound movements at key study intersection number twelve will also be restricted to right-turn movements only at Pacific Coast Highway.

Figure 9-1 present the Improvement Plan for the proposed Alternative No. 1 Project.

9.1 Alternative No. 1 Year 2015 and Year 2035 Traffic Volumes

Figures 9-2 and ***9-3*** present Alternative No. 1 Year 2015 AM and PM peak hour traffic volumes at the twelve (12) key study intersections.

Figures 9-4 and ***9-5*** present Alternative No. 1 Year 2035 AM and PM peak hour traffic volumes at the twelve (12) key study intersections.

9.2 Alternative No.1 Year 2015/Year 2035 Roadway Conditions and Intersection Controls

Figure 9-6 presents the Alternative No.1 Project roadway conditions and intersection controls for the twelve (12) key study intersections. The lane assignments and intersection controls shown in this figure will be utilized for the Alternative No. 1 Project Year 2015 and Year 2035 level of service analysis.

9.3 Year 2015 and Year 2035 Plus Alternative No. 1 Project Analysis

9.3.1 *Peak Hour Intersection Capacity Analysis*

Tables 9-1 and ***9-2*** present a summary of Alternative No. 1 Project forecast levels of service at the twelve (12) key study intersections for Year 2015 and Year 2035 traffic conditions, respectively. The structure of these tables are similar to the capacity analysis summaries presented in *Tables 6-1* and *6-2*.

Review of Columns 2 and 3 of *Tables 9-1* and *9-2* indicate that all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 and Year 2035 during the AM and PM peak hours with implementation of Alternative No. 1 Project. It should be noted that these results are consistent with those identified for the proposed Project presented previously in Section 6.0.

Appendix F presents Alternative No. 1 Project Year 2015 and Year 2035 ICU/LOS and HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

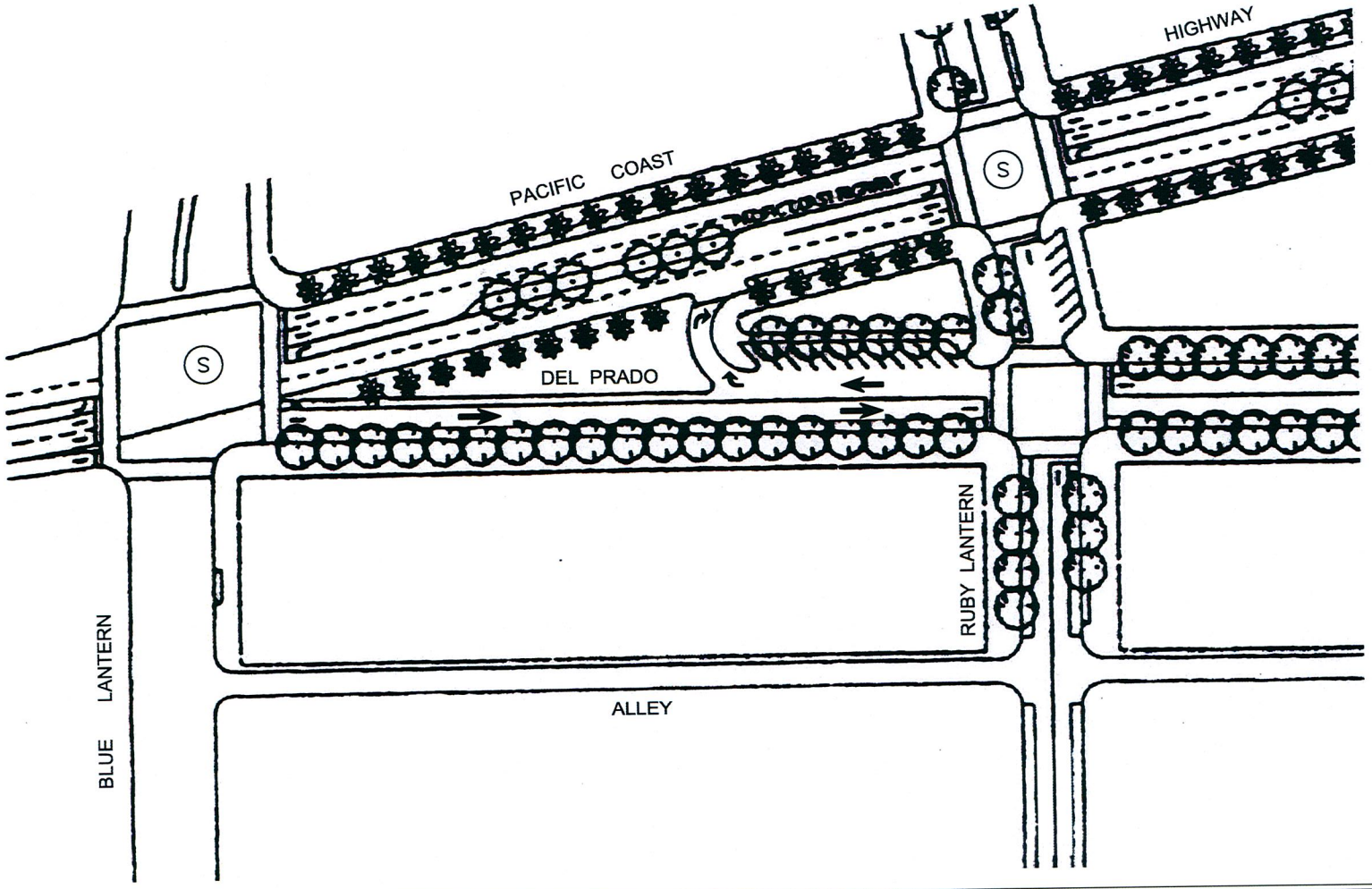


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FIGURE 9–1

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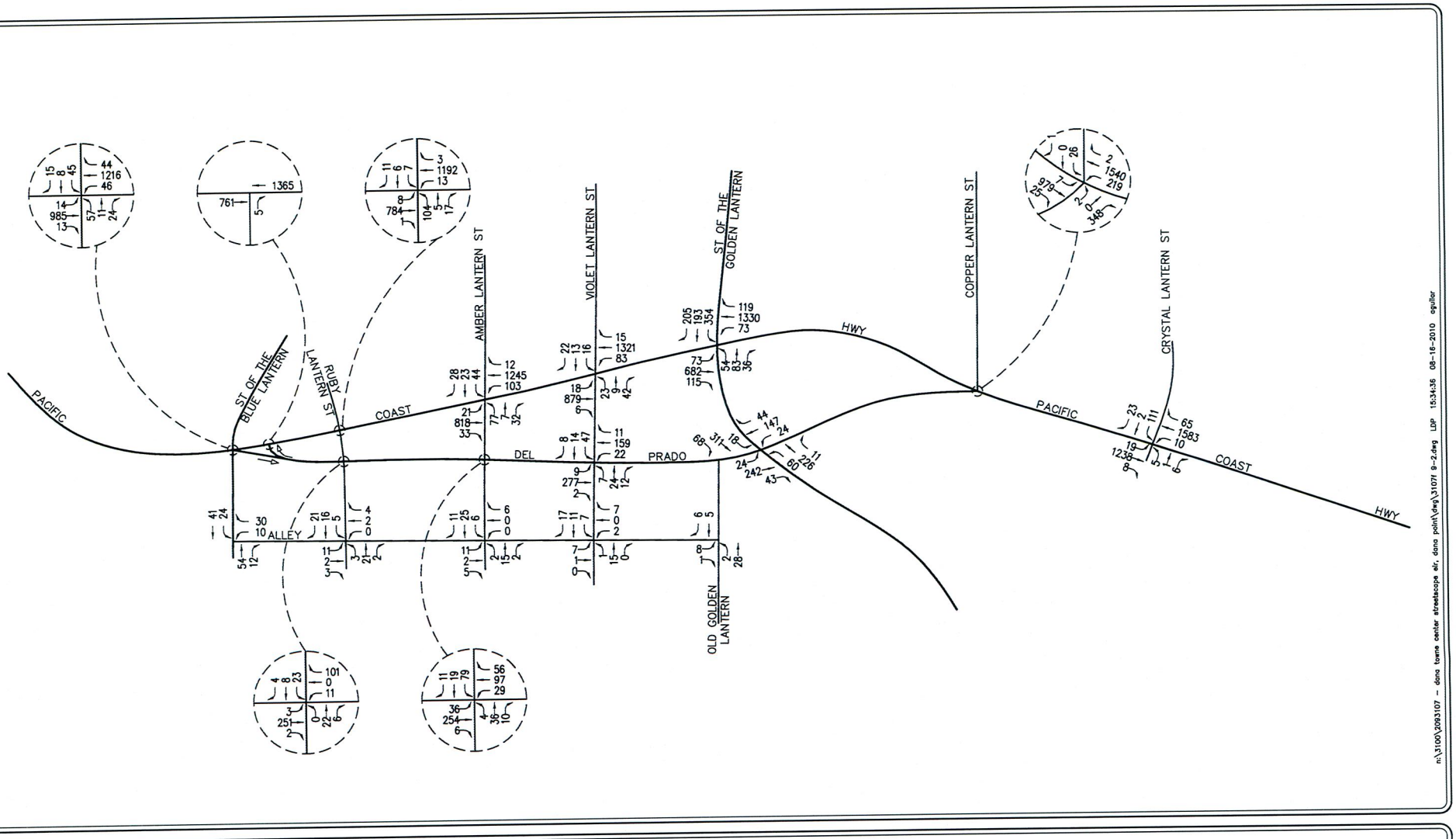
IMPROVEMENT PLAN – ALTERNATIVE NO. 1 PROJECT

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



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N NO SCALE

KEY
⇦ = ONE-WAY TRAVEL ONLY

FIGURE 9-2

ALTERNATIVE NO. 1 – YEAR 2015 AM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

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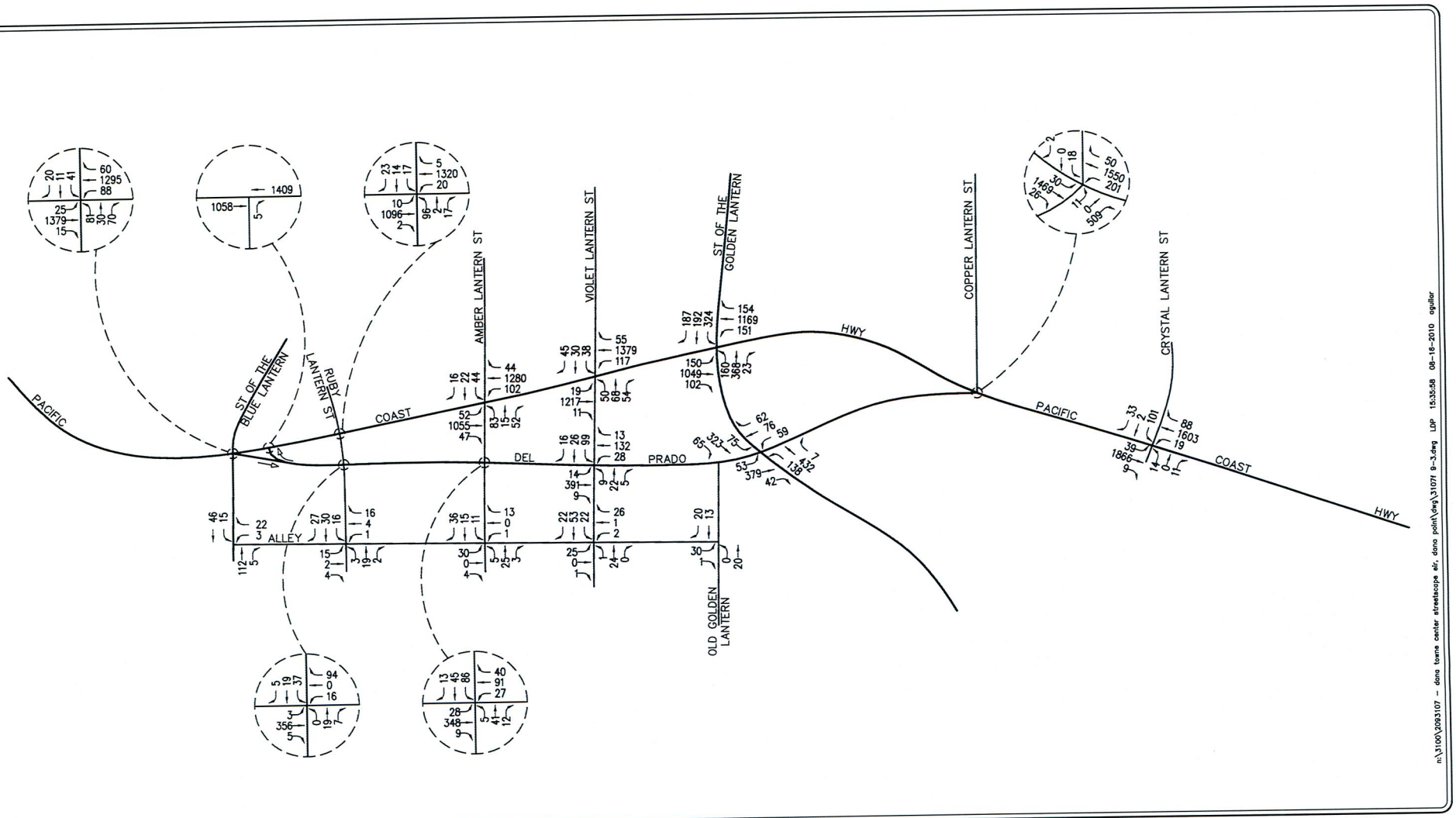

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KEY
⟵ = ONE-WAY TRAVEL ONLY

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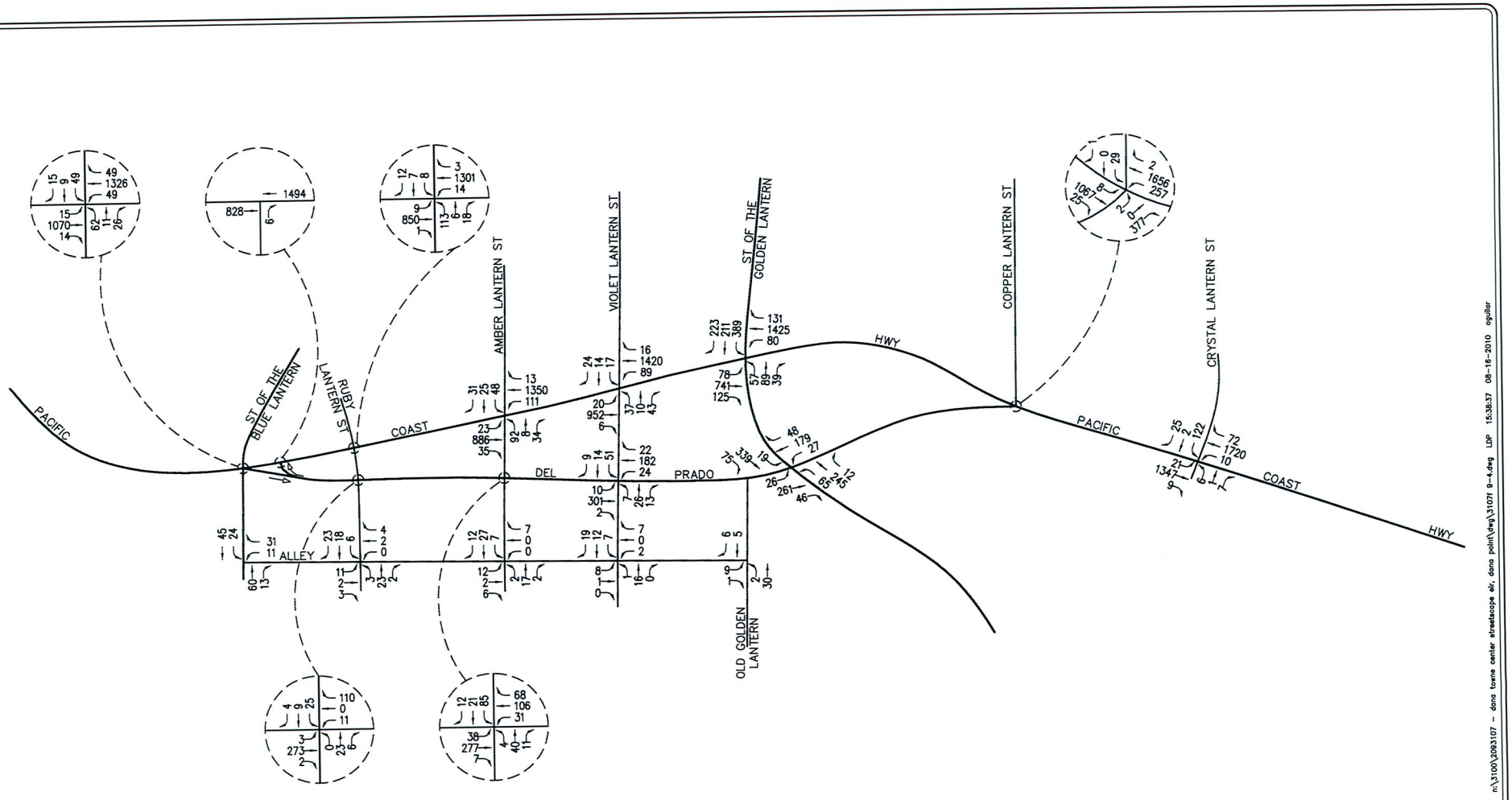
N NO SCALE

FIGURE 9-3

ALTERNATIVE NO. 1 – YEAR 2015 PM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



KEY
⟵ = ONE-WAY TRAVEL ONLY

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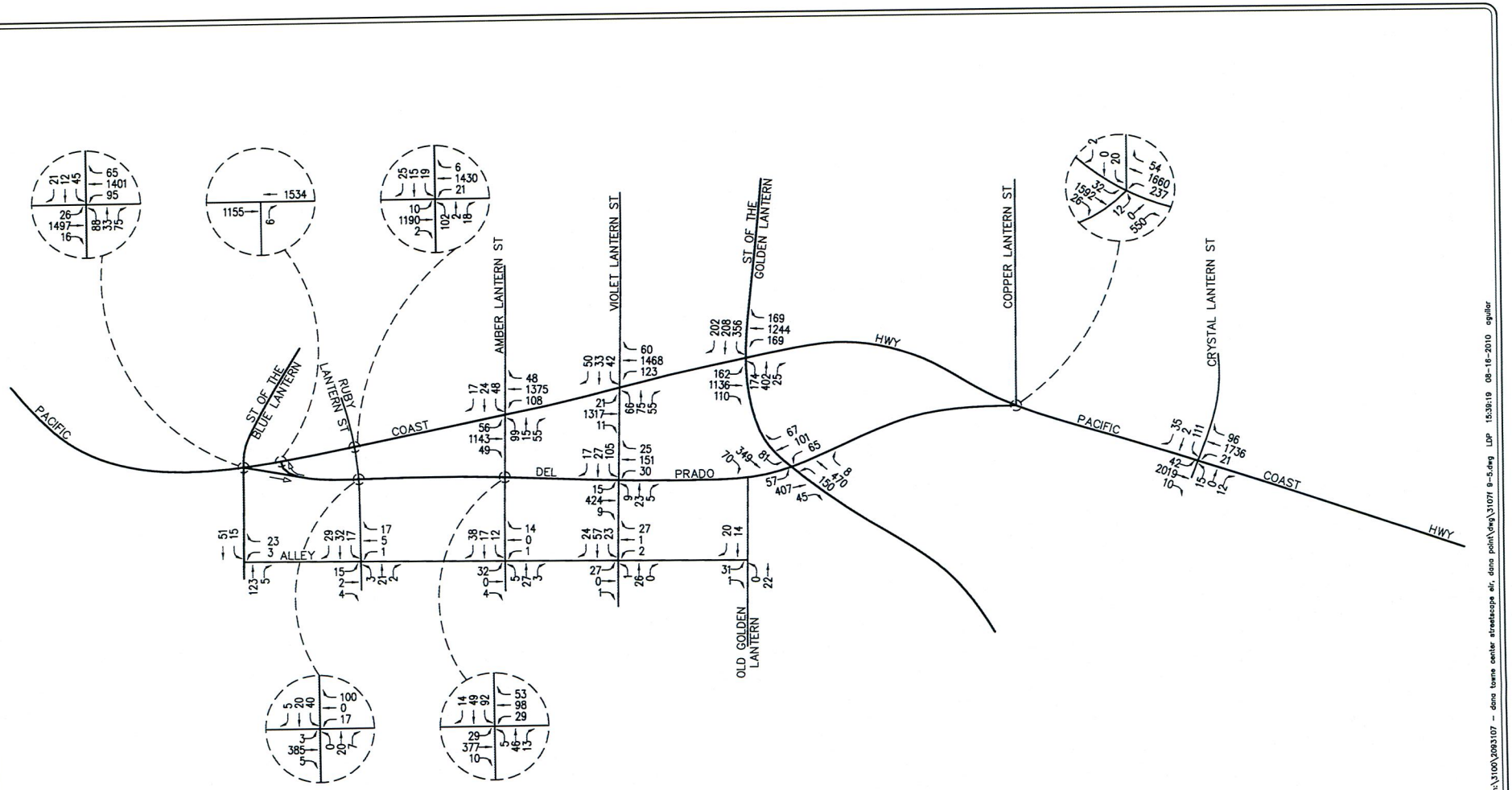
N NO SCALE

FIGURE 9-4

ALTERNATIVE NO. 1 – YEAR 2035 AM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



KEY
⟵ = ONE-WAY TRAVEL ONLY

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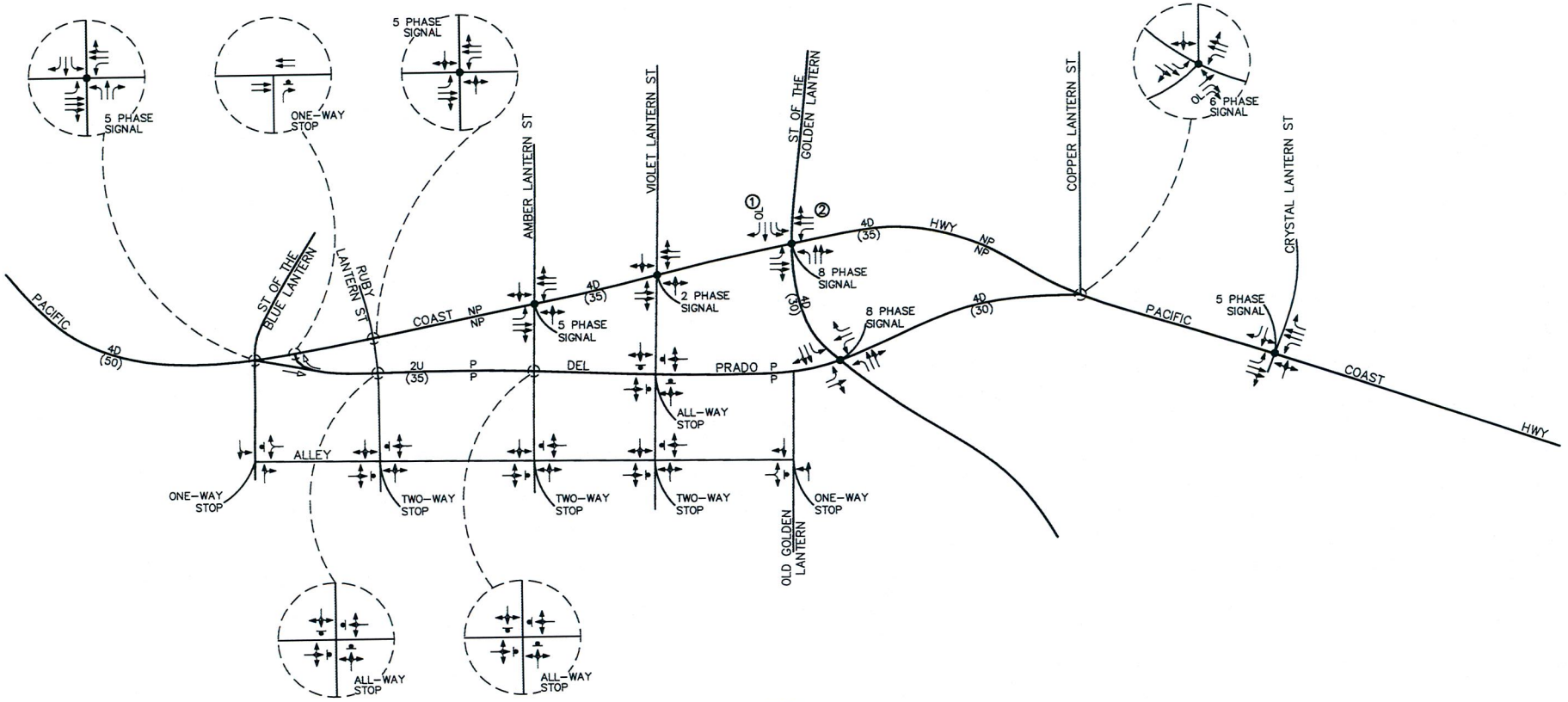
N NO SCALE

FIGURE 9-5

ALTERNATIVE NO. 1 – YEAR 2035 PM PEAK HOUR TRAFFIC VOLUMES WITH PROJECT (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT



NOTE:

① OVERLAP PHASE WILL BE IMPLEMENTED DURING THE PM PEAK HOURS FROM 4–6 PM FOR YEAR 2035 TRAFFIC CONDITIONS ONLY.

② PARKING WILL BE PROHIBITED DURING THE PM PEAK HOURS FROM 4–6 PM TO PROVIDE A DEFACTO RIGHT TURN LANE FOR YEAR 2035 TRAFFIC CONDITIONS ONLY.

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N NO SCALE

KEY

← = APPROACH LANE ASSIGNMENT
⇐ = ONE-WAY TRAVEL ONLY
● = TRAFFIC SIGNAL, ⊤ = STOP SIGN
P = PARKING, NP = NO PARKING
U = UNDIVIDED, D = DIVIDED
2 = NUMBER OF TRAVEL LANES
(XX)= POSTED SPEED LIMIT (MPH)
OL= OVERLAP

FIGURE 9–6

ALTERNATIVE NO. 1 – YEAR 2015 AND YEAR 2035 ROADWAY CONDITIONS AND INTERSECTION CONTROLS (TWO-WAY OPERATIONS)

PACIFIC COAST HIGHWAY/DEL PRADO AVENUE PHASE I STREET IMPROVEMENT PROJECT, DANA POINT

9.3.2 *Operations Analysis*

Tables 9-3 and ***9-4*** present a summary of Alternative No. 1 Project forecast levels of service at the twelve (12) key study intersections for Year 2015 and Year 2035 traffic conditions, respectively. The structure of these tables are similar to the capacity analysis summaries presented in *Tables 7-1* and *7-2*.

Review of Columns 2 and 3 of *Tables 9-3* and *9-4* indicate that all twelve (12) key study intersections are forecast to operate at an acceptable level of service in the Year 2015 and Year 2035 during the AM and PM peak hours with implementation of Alternative No. 1 Project. It should be noted that these results are consistent with those identified for the proposed Project presented previously in Section 7.0.

Appendix G presents Alternative No. 1 Project Year 2015 and Year 2035 HCM/LOS calculations for the twelve (12) key study intersections for the AM peak hour and PM peak hour.

9.4 Alternative No. 1 Project Year 2015 and Year 2035 Queuing Analysis

9.4.1 *Year 2015 Queuing Analysis*

Table 9-5 presents the Alternative No. 1 Project Year 2015 AM peak hour and PM peak hour queuing analysis results for the key study intersections. Review of *Table 9-5* shows that all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersections of Street of the Blue Lantern/Pacific Coast Highway and Ruby Lantern Street/Pacific Coast Highway. The turn pockets at the aforementioned intersections not expected to provide adequate storage in the Year 2015 for the Alternative No. 1 Project are as follows:

		AM Peak Hour	PM Peak Hour
	Key Intersection	Turn Pocket	Turn Pocket
1.	St of the Blue Lantern at Pacific Coast Highway	NBL	NBL / NBR
2.	Ruby Lantern Street at Pacific Coast Highway	Shared NBL / NBT / NBR	Shared NBL / NBT / NBR

A close inspection of the plans for the Alternative No. 1 Project indicate that all deficient turn pockets can be modified to accommodate Year 2015 95th percentile queues except for the shared northbound left/through/right lane at the intersection of Ruby Lantern St/Pacific Coast Highway. The available storage for this location can't be increased and therefore vehicles will queue back onto Del Prado Avenue and as a result, makes this alternative less desirable than the proposed Project.

The northbound left turn lane and the northbound right turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 100 feet and 80 feet of storage, respectively to accommodate Year 2015 Alternative No. 1 Project traffic volumes. City of Dana Point staff indicates that this can be accomplished through minor striping modifications along Street of the Blue Lantern.

TABLE 9-1

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ALTERNATIVE NO. 1[30]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	0.464	A	0.462	A	-0.002	---	---
	PM		0.572	A	0.518	A	-0.054	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	21.6 s/v	C	0.485	A	--	---	---
	PM		**26.3 s/v**	**D***	0.534	A	--	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	0.423	A	0.533	A	+0.110	---	---
	PM		0.450	A	0.584	A	+0.134	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	0.414	A	0.531	A	+0.117	---	---
	PM		0.481	A	0.641	B	+0.160	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	0.626	B	0.672	B	+0.046	---	---
	PM		0.700	B	0.738	C	+0.038	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	0.600	B	0.525	A	-0.075	---	---
	PM		0.642	B	0.651	B	+0.009	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

30 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 9-1 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ALTERNATIVE NO. 1[31]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	0.600	A	0.599	A	-0.001	---	---
	PM		0.686	B	0.687	B	+0.001	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	21.6 s/v	C	8.5 s/v	A	-13.1 s/v	---	---
	PM		**32.5 s/v**	**D***	9.7 s/v	A	-22.8 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	0.378	A	9.7 s/v	A	--	---	---
	PM		0.464	A	11.1 s/v	B	--	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	0.358	A	9.5 s/v	A	--	---	---
	PM		0.536	A	11.6 s/v	B	--	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	0.415	A	0.378	A	-0.037	---	---
	PM		0.626	B	0.527	A	-0.099	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[32]	9.6 s/v	A	+9.6 s/v	---	---
	PM		---	---	9.3 s/v	A	+9.3 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

31 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

32 Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

TABLE 9-2

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ALTERNATIVE NO. 1[33]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	0.504	A	0.505	A	+0.001	---	---
	PM		0.630	B	0.567	A	-0.063	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	23.6 s/v	C	0.521	A	--	---	---
	PM		**30.2 s/v**	**D***	0.573	A	--	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	0.456	A	0.579	A	+0.123	---	---
	PM		0.481	A	0.630	B	+0.149	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	0.446	A	0.573	A	+0.127	---	---
	PM		0.514	A	0.688	B	+0.174	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	0.673	B	0.719	C	+0.046	---	---
	PM		0.751	C	0.742	C	-0.009	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	0.648	B	0.562	A	-0.086	---	---
	PM		0.691	B	0.700	C	+0.009	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

[33] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 9-2 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS – ALTERNATIVE NO. 1[34]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM Change	ICU/HCM	LOS
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	0.648	B	0.648	B	0.000	---	---
	PM		0.740	C	0.740	C	0.000	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	24.2 s/v	C	8.7 s/v	A	-15.5 s/v	---	---
	PM		**39.2 s/v**	**E***	10.2 s/v	B	-29.0 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	0.405	A	10.2 s/v	B	--	---	---
	PM		0.498	A	12.0 s/v	B	--	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	0.382	A	9.9 s/v	A	--	---	---
	PM		0.570	A	12.7 s/v	B	--	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	0.447	A	0.406	A	-0.041	---	---
	PM		0.675	B	0.566	A	-0.109	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[35]	9.7 s/v	A	+9.7 s/v	---	---
	PM		---	---	9.2 s/v	A	+9.2 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

[34] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

[35] Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

TABLE 9-3

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY) – ALTERNATIVE NO. 1[36]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	10.2 s/v	B	9.2 s/v	A	-1.0 s/v	---	---
	PM		15.4 s/v	B	13.4 s/v	B	-2.0 s/v	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	21.6 s/v	C	6.6 s/v	A	-15.0 s/v	---	---
	PM		**26.3 s/v**	**D***	6.4 s/v	A	-19.9 s/v	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	4.0 s/v	A	10.7 s/v	B	+6.7 s/v	---	---
	PM		5.0 s/v	A	11.6 s/v	B	+6.6 s/v	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	5.0 s/v	A	4.6 s/v	A	-0.4 s/v	---	---
	PM		6.7 s/v	A	18.6 s/v	B	+11.9 s/v	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	**35.3 s/v**	**D**	27.4 s/v	C	-7.9 s/v	---	---
	PM		**39.5 s/v**	**D**	31.0 s/v	C	-8.5 s/v	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	19.4 s/v[37]	B	12.5 s/v	B	-6.9 s/v	---	---
	PM		21.6 s/v	C	13.2 s/v	B	-8.4 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

36 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

37 Please note that the delay reported for this key study intersection is based on the Synchro delay methodology. The delay reported using the HCM methodology results in an unrealistic delay value due to the intersections unique signal phase sequence.

TABLE 9-3 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY) – ALTERNATIVE NO. 1[38]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2015 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	LOS	HCM
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	8.9 s/v	A	7.2 s/v	A	-1.7 s/v	---	---
	PM		11.6 s/v	B	7.6 s/v	A	-4.0 s/v	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	21.6 s/v	C	8.5 s/v	A	-13.1 s/v	---	---
	PM		**32.5 s/v**	**D***	9.7 s/v	A	-22.8 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	11.5 s/v	B	9.7 s/v	A	-1.8 s/v	---	---
	PM		12.7 s/v	B	11.1 s/v	B	-1.6 s/v	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	5.4 s/v	A	9.5 s/v	A	+4.1 s/v	---	---
	PM		10.4 s/v	B	11.6 s/v	B	+1.2 s/v	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	25.7 s/v	C	18.8 s/v	B	-6.9 s/v	---	---
	PM		23.5 s/v	C	28.0 s/v	C	+4.5 s/v	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[39]	9.6 s/v	A	+9.6 s/v	---	---
	PM		---	---	9.3 s/v	A	+9.3 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

38 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

39 Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

TABLE 9-4

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY) – ALTERNATIVE NO. 1[40]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	HCM	LOS
1. Street of the Blue Lantern at Pacific Coast Highway	AM	C	10.5 s/v	B	9.1 s/v	A	-1.4 s/v	---	---
	PM		17.3 s/v	B	13.6 s/v	B	-3.7 s/v	---	---
2. Ruby Lantern Street at Pacific Coast Highway	AM	C	23.6 s/v	C	7.1 s/v	A	-16.5 s/v	---	---
	PM		**30.2 s/v**	**D***	7.2 s/v	A	-23.0 s/v	---	---
3. Amber Lantern Street at Pacific Coast Highway	AM	C	4.1 s/v	A	11.9 s/v	B	+7.8 s/v	---	---
	PM		5.3 s/v	A	13.4 s/v	B	+8.1 s/v	---	---
4. Violet Lantern Street at Pacific Coast Highway	AM	C	5.0 s/v	A	6.1 s/v	A	+1.1 s/v	---	---
	PM		7.0 s/v	A	34.9 s/v	C	+27.9 s/v	---	---
5. Street of the Golden Lantern at Pacific Coast Highway	AM	C	**37.0 s/v**	**D**	27.8 s/v	C	-9.2 s/v	---	---
	PM		**41.7 s/v**	**D**	34.9 s/v	C	-6.8 s/v	---	---
6. Copper Lantern Street at Pacific Coast Highway	AM	D	20.6 s/v[41]	C	10.8 s/v	B	-9.8 s/v	---	---
	PM		23.2 s/v	C	14.2 s/v	B	-9.0 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

40 Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

41 Please note that the delay reported for this key study intersection is based on the Synchro delay methodology. The delay reported using the HCM methodology results in an unrealistic delay value due to the intersections unique signal phase sequence.

TABLE 9-4 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION CAPACITY ANALYSIS (HCM METHODOLOGY) – ALTERNATIVE NO. 1[42]

Key Intersection	Time Period	Minimum Acceptable LOS	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		(3) Project Impact/Benefit	(4) Year 2035 With Additional Improvements "Two-Way Operations"	
			HCM	LOS	HCM	LOS	HCM Change	LOS	HCM
7. Crystal Lantern Street at Pacific Coast Highway	AM	D	9.8 s/v	A	8.3 s/v	A	-1.5 s/v	---	---
	PM		16.4 s/v	B	9.5 s/v	A	-6.9 s/v	---	---
8. Ruby Lantern Street at Del Prado Avenue	AM	C	24.2 s/v	C	8.7 s/v	A	-15.5 s/v	---	---
	PM		**39.2** s/v	E*	10.2 s/v	B	-29.0 s/v	---	---
9. Amber Lantern Street at Del Prado Avenue	AM	C	12.6 s/v	B	10.2 s/v	B	-2.4 s/v	---	---
	PM		13.7 s/v	B	12.0 s/v	B	-1.7 s/v	---	---
10. Violet Lantern Street at Del Prado Avenue	AM	C	5.5 s/v	A	9.9 s/v	A	+4.4 s/v	---	---
	PM		9.4 s/v	A	12.7 s/v	B	+3.3 s/v	---	---
11. Street of the Golden Lantern at Del Prado Avenue	AM	C	25.3 s/v	C	19.3 s/v	B	-6.0 s/v	---	---
	PM		25.1 s/v	C	29.2 s/v	C	+4.1 s/v	---	---
12. Del Prado Avenue (West) at Pacific Coast Highway	AM	C	---	---[43]	9.7 s/v	A	+9.7 s/v	---	---
	PM		---	---	9.2 s/v	A	+9.2 s/v	---	---

Note:
* = the unacceptable delay reported for this location is the worst side street delay (i.e. Ruby Lantern Street)

[42] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

[43] Please note that this key study intersection currently does not exist and will only be analyzed with the proposed Project (i.e. two-way operations).

TABLE 9-5

YEAR 2015 PEAK HOUR INTERSECTION QUEUING ANALYSIS – ALTERNATIVE NO. 1[44]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
1. Street of the Blue Lantern at Pacific Coast Highway					
Northbound Left-Turn	60	**73**	**No***	**97**	**No***
Northbound Right-Turn	60	34	Yes	**76**	**No***
Southbound Left-Turn	80	60	Yes	56	Yes
Southbound Right-Turn	80	18	Yes	21	Yes
Eastbound Left-Turn	150	33	Yes	49	Yes
Westbound Left-Turn	150	70	Yes	113	Yes
2. Ruby Lantern Street at Pacific Coast Highway					
Northbound Shared Left/Thru/Right	50	**142**	**No**	**130**	**No**
Eastbound Left-Turn	100	21	Yes	19	Yes
Westbound Left-Turn	150	20	Yes	26	Yes
3. Amber Lantern Street at Pacific Coast Highway					
Eastbound Left-Turn	150	43	Yes	87	Yes
Westbound Left-Turn	150	128	Yes	90	Yes
5. Street of the Golden Lantern at Pacific Coast Highway					
Northbound Left-Turn	250	77	Yes	196	Yes
Southbound Left-Turn	--	226	Yes	202	Yes
Southbound Right-Turn	300	106	Yes	129	Yes
Eastbound Left-Turn	300	140	Yes	224	Yes
Westbound Left-Turn	300	98	Yes	216	Yes

Note:
* = can be mitigated with proposed striping modifications along Street of the Blue Lantern

[44] Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

TABLE 9-5 (CONTINUED)

YEAR 2015 PEAK HOUR INTERSECTION QUEUING ANALYSIS – ALTERNATIVE NO. 1[45]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
6. Copper Lantern Street at Pacific Coast Highway					
Northbound Right-Turn	--	25	Yes	32	Yes
Eastbound Left-Turn	100	11	Yes	31	Yes
Westbound Left-Turn	200+[46]	209	Yes	258	Yes
7. Crystal Lantern Street at Pacific Coast Highway					
Southbound Right-Turn	35	21	Yes	26	Yes
Eastbound Left-Turn	120	35	Yes	48	Yes
Westbound Left-Turn	100	14	Yes	21	Yes
Westbound Right-Turn	--	0	Yes	0	Yes
11. Street of the Golden Lantern at Del Prado					
Northbound Left-Turn	200	75	Yes	162	Yes
Southbound Left-Turn	180	33	Yes	102	Yes
Eastbound Left-Turn	130	40	Yes	67	Yes
Westbound Left-Turn	140	40	Yes	87	Yes
Westbound Right-Turn	--	22	Yes	35	Yes

45 Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

46 The available storage for this location is longer than 200' because it transitions into a two-way-left-turn-lane.

9.4.2 *Year 2035 Queuing Analysis*

Table 9-6 presents the Alternative No. 1 Project Year 2035 AM peak hour and PM peak hour queuing analysis results for the key study intersections. Review of *Table 9-6* shows that all key study intersections will provide adequate storage for their respective exclusive left-turn lanes and exclusive right-turn lanes except for the intersections of Street of the Blue Lantern/Pacific Coast Highway and Ruby Lantern Street/Pacific Coast Highway. The turn pockets at the aforementioned intersections not expected to provide adequate storage in the Year 2035 for the Alternative No. 1 Project are as follows:

Key Intersection	AM Peak Hour Turn Pocket	PM Peak Hour Turn Pocket
1. St of the Blue Lantern at Pacific Coast Highway	NBL	NBL / NBR
2. Ruby Lantern Street at Pacific Coast Highway	Shared NBL / NBT / NBR	Shared NBL / NBT / NBR

A close inspection of the plans for the Alternative No. 1 Project indicate that all deficient turn pockets can be modified to accommodate the Year 2035 95th percentile queues except for the shared northbound left/through/right lane at the intersection of Ruby Lantern Street/Pacific Coast Highway. The available storage for this location cannot be increased and therefore vehicles will queue back onto Del Prado Avenue and as a result, makes this alternative less desirable than the proposed Project.

The northbound left turn lane and the northbound right turn lane at the intersection of Street of the Blue Lantern/Pacific Coast Highway will need to be restriped to provide 105 feet and 85 feet of storage, respectively to accommodate Year 2035 Alternative No. 1 Project traffic volumes. City of Dana Point staff indicates that this can be accomplished through minor striping modifications along Street of the Blue Lantern.

TABLE 9-6

YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS – ALTERNATIVE NO. 1[47]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
1. Street of the Blue Lantern at Pacific Coast Highway					
Northbound Left-Turn	60	**78**	**No***	**104**	**No***
Northbound Right-Turn	60	36	Yes	**81**	**No***
Southbound Left-Turn	80	64	Yes	60	Yes
Southbound Right-Turn	80	18	Yes	21	Yes
Eastbound Left-Turn	150	35	Yes	51	Yes
Westbound Left-Turn	150	72	Yes	119	Yes
2. Ruby Lantern Street at Pacific Coast Highway					
Northbound Shared Left/Thru/Right	50	**154**	**No**	**138**	**No**
Eastbound Left-Turn	100	22	Yes	17	Yes
Westbound Left-Turn	150	20	Yes	26	Yes
3. Amber Lantern Street at Pacific Coast Highway					
Eastbound Left-Turn	150	46	Yes	89	Yes
Westbound Left-Turn	150	122	Yes	77	Yes
5. Street of the Golden Lantern at Pacific Coast Highway					
Northbound Left-Turn	250	83	Yes	241	Yes
Southbound Left-Turn	--	253	Yes	232	Yes
Southbound Right-Turn	300	124	Yes	146	Yes
Eastbound Left-Turn	300	151	Yes	231	Yes
Westbound Left-Turn	300	100	Yes	257	Yes

Note:
* = can be mitigated with proposed striping modifications along Street of the Blue Lantern

[47] Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

TABLE 9-6 (CONTINUED)

YEAR 2035 PEAK HOUR INTERSECTION QUEUING ANALYSIS – ALTERNATIVE NO. 1[48]

Key Intersections	Storage Provided (ft.)	AM Peak Hour		PM Peak Hour	
		Max. Queue (ft.)	Adequate Storage Yes / No	Max. Queue (ft.)	Adequate Storage Yes / No
6. Copper Lantern Street at Pacific Coast Highway					
Northbound Right-Turn	--	25	Yes	48	Yes
Eastbound Left-Turn	100	11	Yes	28	Yes
Westbound Left-Turn	200+[49]	245	Yes	328	Yes
7. Crystal Lantern Street at Pacific Coast Highway					
Southbound Right-Turn	35	22	Yes	26	Yes
Eastbound Left-Turn	120	35	Yes	46	Yes
Westbound Left-Turn	100	13	Yes	21	Yes
Westbound Right-Turn	--	0	Yes	0	Yes
11. Street of the Golden Lantern at Del Prado					
Northbound Left-Turn	200	80	Yes	180	Yes
Southbound Left-Turn	180	34	Yes	113	Yes
Eastbound Left-Turn	130	42	Yes	88	Yes
Westbound Left-Turn	140	44	Yes	96	Yes
Westbound Right-Turn	--	23	Yes	28	Yes

48 Source: Synchro 7.0 software, which reports the 95th percentile queue length in feet.

49 The available storage for this location is longer than 200' because it transitions into a two-way-left-turn-lane.

10.0 ALLEY EVALUATION

As part of the proposed Project, several driveways currently providing Del Prado access to various properties within the Town Center are proposed to be closed with both the proposed Project and Alternative Project. The table below lists the parcel number, site address and business name of the properties that are currently proposed to lose direct access from Del Prado Avenue.

Parcel Number	Site Address	Business Name
682-231-01	34105 PCH	UP Sport
682-232-01	34111 PCH	Dana Marina Inn
682-233-01	34091 PCH	Bella Bazaar
682-233-02	24292 Del Prado	Broderick Montessori School
682-233-04	24302 Del Prado	Enterprise/ Salt Creek Realty
682-233-06	24322 Del Prado	Residential/ Parking Lot (Adjacent to Ruby Lantern)
682-234-03	24402 Del Prado	DP Foreign Auto/ DP Upholstery/ Gregory's Cushions
682-234-05	24462 Del Prado	Jack's Restaurant Parking Lot
682-234-07	24470 Del Prado	Pulse Beyond Fitness
682-191-03	24532 Del Prado	Vertical Mapping
682-191-02	24522 Del Prado	Dana Point Laundry

With the exception of UP Sport and the Dana Marina Inn, these properties will have to be accessed via the existing alley located immediately south of Del Prado Avenue between Street of the Blue Lantern and Old Golden Lantern Street or from north-south streets for corner lots at intersections. This section of the report evaluates the Year 2015 and Year 2035 operations of the alley with the re-route of existing/future daily and peak hour trips due to the closure of the aforementioned driveways. This section of the report also evaluates the adequacy of the alley to provide vehicular access for the various properties restricted to alley/corner access only with the proposed Project.

10.1 Alley Study Area

The following five (5) alley intersections and four (4) alley roadway segments were evaluated.

Alley Intersections

13. Street of the Blue Lantern at Alley
14. Ruby Lantern Street at Alley
15. Amber Lantern Street at Alley
16. Violet Lantern Street at Alley
17. Old Golden Lantern St at Alley

Alley Roadway Segments

A. Alley between Street of the Blue Lantern and Ruby Lantern Street

B. Alley between Ruby Lantern Street and Amber Lantern Street

C. Alley between Amber Lantern Street and Violet Lantern Street

D. Alley between Violet Lantern Street and Old Golden Lantern Street

10.2 Year 2015 and Year 2035 Alley Intersection LOS Analysis

10.2.1 *Proposed Project*

Tables 10-1 and ***10-2*** present a summary of the projected levels of service at the five (5) alley intersections for Year 2015 and Year 2035 traffic conditions, respectively. The first column (1) of HCM/LOS values in *Tables 10-1* and *10-2* present Year 2015 and Year 2035 traffic conditions without the proposed Project (i.e. one-way operations), respectively. The second column (2) of HCM/LOS values in *Tables 10-1* and *10-2* list Year 2015 and Year 2035 traffic conditions with the proposed Project (i.e. two-way operations), respectively. As mentioned previously, the LOS values presented in these tables include the re-route of existing and future traffic to the alley due to various driveway closures on Del Prado Avenue.

As shown in *Tables 10-1* and *10-2*, all five (5) alley intersections are forecast to operate at acceptable LOS A in the Year 2015 and Year 2035 during the AM and PM peak hours with implementation of the proposed Project. ***Appendix H*** presents Year 2015 and Year 2035 HCM/LOS calculations for the five (5) alley intersections for the AM peak hour and PM peak hour.

10.2.2 *Alternative No. 1 Project*

Tables 10-3 and ***10-4*** present a summary of Alternative No. 1 Project forecast levels of service at the five alley intersections for Year 2015 and Year 2035 traffic conditions, respectively. The structure of these tables are similar to the capacity analysis summaries presented in *Tables 10-1* and *10-2*.

As shown in *Tables 10-3* and *10-4*, all five (5) alley intersections are forecast to operate at acceptable LOS A in the Year 2015 and Year 2035 during the AM and PM peak hours with implementation of Alternative No. 1 Project. ***Appendix I*** presents Alternative No. 1 Project Year 2015 and Year 2035 HCM/LOS calculations for the five (5) alley intersections for the AM peak hour and PM peak hour.

10.3 Alley Roadway Segment Analysis

The performance of roadway segments is evaluated based on the volume-to-capacity (v/c) ratio, which is translated into a level of service (LOS), similar to peak-hour intersection analysis. The LOS "E" capacity of a roadway segment is typically utilized in determining the level of service of a roadway segment. Based on discussions with City staff, the City does not have guidelines regarding daily LOS "E" capacities for alleys. The lowest LOS "E" capacity the City utilizes is for a local arterial, which results in a LOS "E" capacity of 12,500 vehicles per day (vpd). Based on the level of traffic expected in each alley segment (i.e. no more than 1,000 vpd), this capacity is too large and would not be considered appropriate for the alley roadway segment analysis. In order to determine an appropriate LOS "E" capacity for an alley, LLG researched requirements for other cities. Based on our research, the City of Glendale has a LOS "E" capacity of 2,500 vpd for a local street[50]. Given that the alley south of Del Prado Avenue experiences similar traffic volumes to that of a local street, a LOS "E" capacity of 2,500 vehicles per day will be utilized to evaluate the alley roadway segments. Based upon this, LOS C capacity for the alley would equate to 2,000 vehicles per day.

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[50] Source: *Circulation and Scenic Highway Element of the General Plan, August 1998, City of Glendale, Planning and Public Works Divisions.*

TABLE 10-1

YEAR 2015 PEAK HOUR LEVELS OF SERVICE FOR ALLEY INTERSECTIONS[51]

Key Intersection	Time Period	Control Type	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"	
			HCM	LOS	HCM	LOS
13. Street of the Blue Lantern at	AM	One-Way	8.8 s/v	A	8.9 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.0 s/v	A
14. Ruby Lantern Street at	AM	Two-Way	9.1 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.3 s/v	A
15. Amber Lantern Street at	AM	Two-Way	8.8 s/v	A	8.9 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.3 s/v	A
16. Violet Lantern Street at	AM	Two-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.3 s/v	A	9.8 s/v	A
17. Old Golden Lantern Street at	AM	One-Way	8.6 s/v	A	8.7 s/v	A
Alley (south of Del Prado)	PM	Stop	8.6 s/v	A	8.8 s/v	A

[51] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 10-2

YEAR 2035 PEAK HOUR LEVELS OF SERVICE FOR ALLEY INTERSECTIONS[52]

Key Intersection	Time Period	Control Type	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"	
			HCM	LOS	HCM	LOS
13. Street of the Blue Lantern at	AM	One-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.1 s/v	A
14. Ruby Lantern Street at	AM	Two-Way	9.1 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.4 s/v	A
15. Amber Lantern Street at	AM	Two-Way	8.8 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.3 s/v	A
16. Violet Lantern Street at	AM	Two-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.4 s/v	A	9.9 s/v	A
17. Old Golden Lantern Street at	AM	One-Way	8.7 s/v	A	8.7 s/v	A
Alley (south of Del Prado)	PM	Stop	8.7 s/v	A	8.9 s/v	A

[52] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 10-3

YEAR 2015 PEAK HOUR LEVELS OF SERVICE FOR ALLEY INTERSECTIONS – ALTERNATIVE NO. 1[53]

Key Intersection	Time Period	Control Type	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"	
			HCM	LOS	HCM	LOS
13. Street of the Blue Lantern at	AM	One-Way	8.8 s/v	A	8.9 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.0 s/v	A
14. Ruby Lantern Street at	AM	Two-Way	9.1 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.3 s/v	A
15. Amber Lantern Street at	AM	Two-Way	8.8 s/v	A	8.9 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.3 s/v	A
16. Violet Lantern Street at	AM	Two-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.3 s/v	A	9.8 s/v	A
17. Old Golden Lantern Street at	AM	One-Way	8.6 s/v	A	8.7 s/v	A
Alley (south of Del Prado)	PM	Stop	8.6 s/v	A	8.8 s/v	A

[53] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

TABLE 10-4

YEAR 2035 PEAK HOUR LEVELS OF SERVICE FOR ALLEY INTERSECTIONS – ALTERNATIVE NO. 1[54]

Key Intersection	Time Period	Control Type	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"		(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"	
			HCM	LOS	HCM	LOS
13. Street of the Blue Lantern at	AM	One-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.1 s/v	A
14. Ruby Lantern Street at	AM	Two-Way	9.1 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	8.9 s/v	A	9.4 s/v	A
15. Amber Lantern Street at	AM	Two-Way	8.8 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.0 s/v	A	9.3 s/v	A
16. Violet Lantern Street at	AM	Two-Way	8.9 s/v	A	9.0 s/v	A
Alley (south of Del Prado)	PM	Stop	9.4 s/v	A	9.9 s/v	A
17. Old Golden Lantern Street at	AM	One-Way	8.7 s/v	A	8.7 s/v	A
Alley (south of Del Prado)	PM	Stop	8.7 s/v	A	8.9 s/v	A

[54] Please note that per the HCM unsignalized methodology that the delay reported for all-way stop controlled intersections is for the entire intersection, while the delay reported for one-way stop/two-way stop controlled intersections is for the worst side street.

10.3.1 *Year 2015 and Year 2035 Alley Roadway Segment LOS Analysis*

Tables 10-5 and ***10-6*** summarize the results of the Year 2015 and Year 2035 daily analysis for the four (4) alley roadway segments, respectively. The first column (1) of values in *Tables 10-5* and *10-6* present Year 2015 and Year 2035 traffic conditions without the proposed Project (i.e. one-way operations), respectively. The second column (2) of values in *Tables 10-5* and *10-6* list Year 2015 and Year 2035 traffic conditions with the proposed Project (i.e. two-way operations), respectively.

As shown in *Tables 10-5* and *10-6*, all four (4) alley roadway segments are forecast to operate at acceptable LOS A in the Year 2015 and Year 2035 with implementation of the proposed Project.

Although not shown, it should be noted that with the Alternative No. 1 Project, the four (4) alley roadway segments would also operate at acceptable LOS A in the Year 2015 and Year 2035. The Year 2015 and Year 2035 ADT volumes for the Alternative No. 1 Project are exactly the same as the ADT volumes for the proposed Project.

TABLE 10-5

YEAR 2015 DAILY LEVELS OF SERVICE – ALLEY ROADWAY SEGMENTS

Key Intersection	Segment Capacity	(1) Year 2015 Without Project Traffic Conditions "One-Way Operations"			(2) Year 2015 With Project Traffic Conditions "Two-Way Operations"		
		ADT	V/C	LOS	ADT	V/C	LOS
A. Alley (south of Del Prado Avenue) between Street of the Blue Lantern and Ruby Lantern Street	2,500	360	0.144	A	912	0.365	A
B. Alley (south of Del Prado Avenue) between Ruby Lantern Street and Amber Lantern Street	2,500	336	0.134	A	900	0.360	A
C. Alley (south of Del Prado Avenue) between Amber Lantern Street and Violet Lantern Street	2,500	480	0.192	A	600	0.240	A
D. Alley (south of Del Prado Avenue) between Violet Lantern Street and Old Golden Lantern Street	2,500	180	0.072	A	612	0.245	A

TABLE 10-6

YEAR 2035 DAILY LEVELS OF SERVICE – ALLEY ROADWAY SEGMENTS

Key Intersection	Segment Capacity	(1) Year 2035 Without Project Traffic Conditions "One-Way Operations"			(2) Year 2035 With Project Traffic Conditions "Two-Way Operations"		
		ADT	V/C	LOS	ADT	V/C	LOS
A. Alley (south of Del Prado Avenue) between Street of the Blue Lantern and Ruby Lantern Street	2,500	384	0.154	A	948	0.379	A
B. Alley (south of Del Prado Avenue) between Ruby Lantern Street and Amber Lantern Street	2,500	384	0.154	A	948	0.379	A
C. Alley (south of Del Prado Avenue) between Amber Lantern Street and Violet Lantern Street	2,500	528	0.211	A	648	0.259	A
D. Alley (south of Del Prado Avenue) between Violet Lantern Street and Old Golden Lantern Street	2,500	204	0.082	A	624	0.250	A