

**Appendix G:
Traffic Analysis**

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REVISED TRAFFIC IMPACT ANALYSIS REPORT

**COSTA MESA MOTOR INN
RESIDENTIAL PROJECT**

Costa Mesa, California
August 31, 2015 (Original June 8, 2015)

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TRAFFIC IMPACT ANALYSIS REPORT
COSTA MESA MOTOR INN RESIDENTIAL PROJECT

Costa Mesa, California
August 31, 2015

1.0 INTRODUCTION

This traffic impact analysis addresses the potential traffic impacts associated with the proposed Costa Mesa Motor Inn Residential Project (hereinafter referred to as “Project”) in the City of Costa Mesa, California. The Project site is located at 2277 Harbor Boulevard, west of Harbor Boulevard and north of Wilson Street in the City of Costa Mesa, California. The property is currently developed with a 236-room motel. Please note that during the collection of existing traffic counts in March 2015, 159 rooms of the motel were occupied and 77 rooms were vacant. The proposed Project includes the construction of a 224-unit apartment complex, which includes the development of one-bedroom units, two-bedroom units and a multi-level parking structure, in place of the existing 236-room motel.

This report documents the findings and recommendations of a traffic impact analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential impacts associated with the proposed Project. The traffic analysis evaluates the existing operating conditions at two (2) key study intersections within the project vicinity, estimates the trip generation potential of the Project, and forecasts future operating conditions without and with the proposed Project. Where necessary, intersection improvements/mitigation measures are identified.

This traffic report satisfies the *City of Costa Mesa Traffic Impact Analysis Methodology* (dated February 2009) and is consistent with the requirements and procedures outlined in the most current *Congestion Management Program (CMP) for Orange County*. The Scope of Work for this traffic study was developed in conjunction with City of Costa Mesa Transportation Services Division staff.

A project site visit and an inventory of adjacent area roadways and intersections were performed. Existing peak hour traffic data were collected at the two (2) key study intersections for use in the preparation of level of service calculations. Information concerning cumulative development projects (planned and/or approved) in the vicinity of the project were obtained from the City, and, based on our research, twelve (12) related development projects are located within City limits.

This traffic report analyzes existing and future weekday AM peak hour and PM peak hour traffic conditions for a near-term (Year 2018) traffic setting, corresponding to the anticipated completion of the Project. Near-term (Year 2018) cumulative peak hour traffic forecasts were projected by applying a one percent (1.0%) annual growth rate to existing traffic volumes, plus the addition of trips generated by other/related development projects in the City.

1.1 Study Area

The two (2) key study intersections evaluated in this report provide both regional and local access to the study area. They consist of the following:

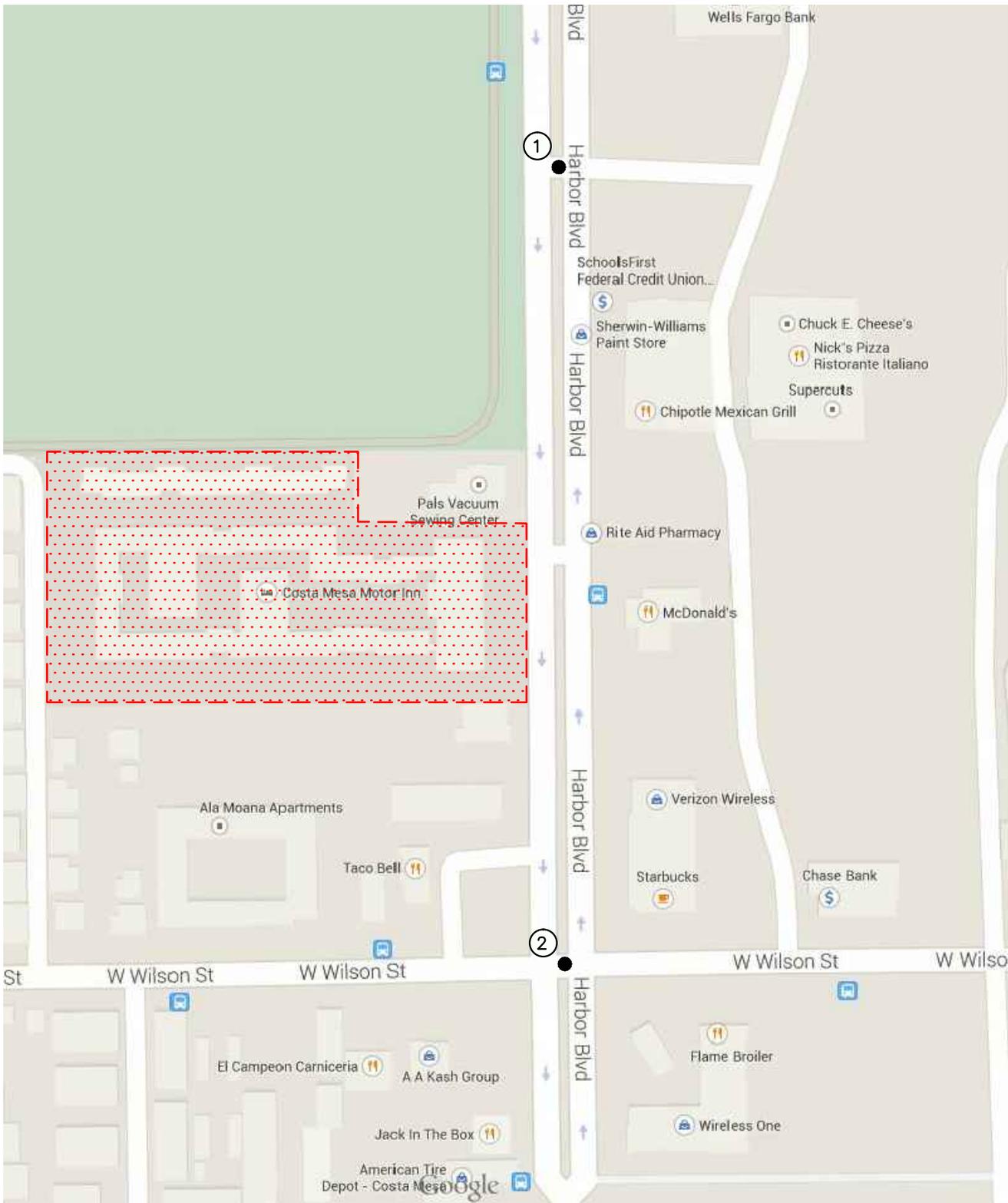
Study Intersections

1. Harbor Boulevard at Harbor Center
2. Harbor Boulevard at Wilson Street

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 Level of Service (LOS) analyses for these key locations provide the basis to identify whether development of the proposed Project could result in significant traffic impacts (based on the application of the City's significant traffic impact criteria). If the Project is expected to result in a significant traffic impact, potential intersection improvements are identified to mitigate the impact of the Project to a level of insignificance.

Included in this Traffic Impact Analysis are:

- Existing traffic counts,
- Estimated project traffic generation/distribution/assignment,
- AM and PM peak hour capacity analyses for existing conditions,
- AM and PM peak hour capacity analyses for existing plus project conditions,
- AM and PM peak hour capacity analyses for future near-term (Year 2018) traffic conditions without and with the proposed Project,
- Site Access and Internal Circulation,
- Synchro operations assessment along Harbor Boulevard, and
- Congestion Management Program Compliance Assessment.



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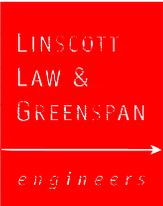
KEY

- # = STUDY INTERSECTION
- [Red Dotted Box] = PROJECT SITE

FIGURE 1-1

VICINITY MAP

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



NO SCALE

2.0 PROJECT DESCRIPTION

The Project site is located at 2277 Harbor Boulevard, west of Harbor Boulevard and north of Wilson Street in the City of Costa Mesa, California. The property is currently developed with a 236-room motel. Vehicular access to the site from Harbor Boulevard is currently provided via a full-access driveway on the north, and a limited-access driveway (i.e., restricted to right-turn in and right-turn out movements) on the south. **Figure 2-1** presents an aerial depiction of the existing site.

As proposed, the Project would convert the 236-room motel property into a 224-unit apartment complex. The apartment complex would include the development of 124 one-bedroom units, 16 one-bedroom units with a den, 76 two-bedroom units, 8 two-bedroom units with a den, and a 503-space multi-level parking structure. **Table 2-1** summarizes the Project components. **Figure 2-2** presents the proposed site plan prepared by GMPA Architects.

The Project is expected to be constructed over the next year or so, but is dependent on several factors, including project funding and market conditions. To provide a conservative assessment, Year 2018 was selected as the Project's opening year (with full buildout and occupancy) in analyzing potential Project-related impacts in a near-term cumulative traffic setting.

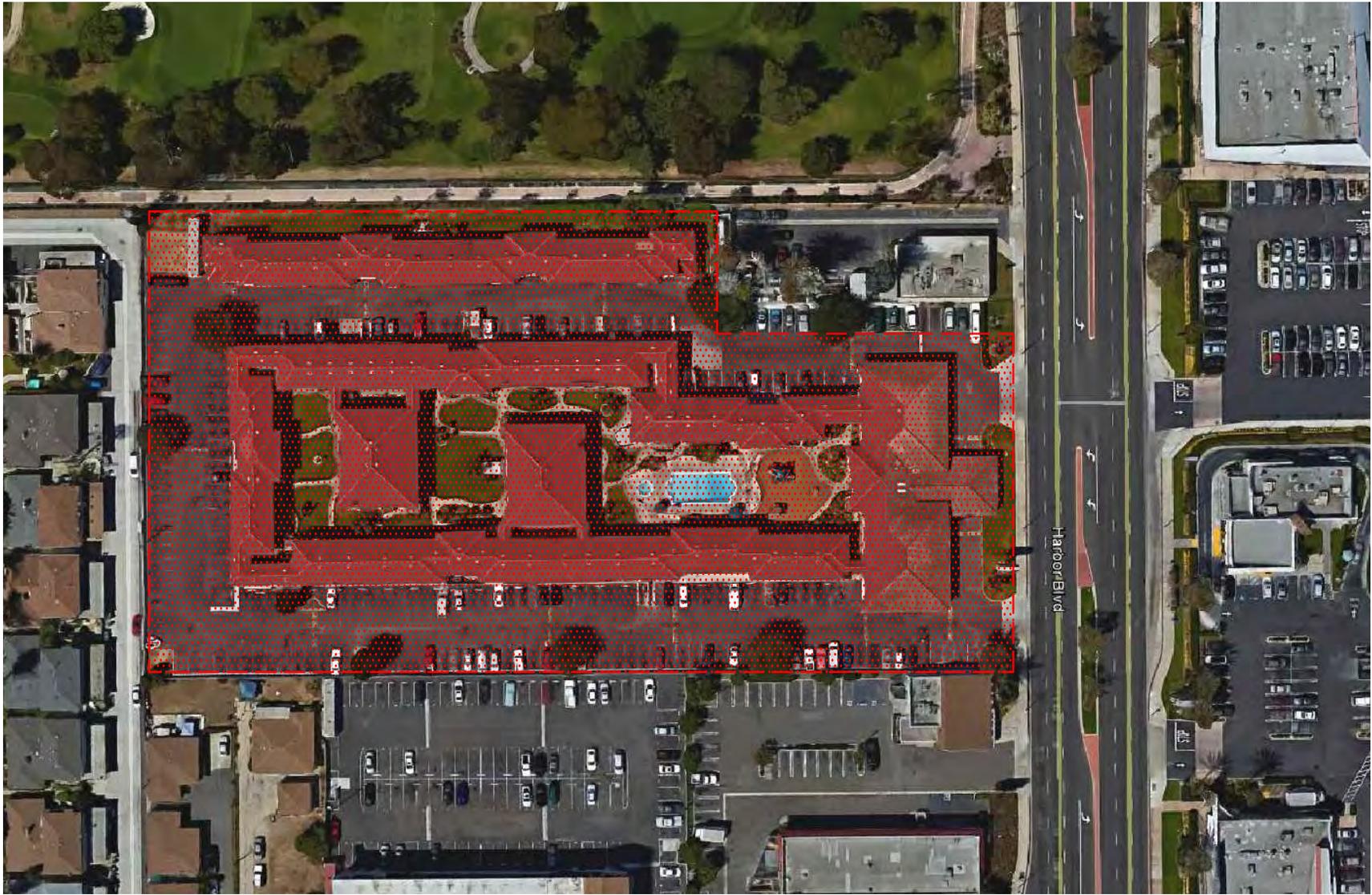
2.1 Site Access

As shown in **Figure 2-2**, vehicular access to the site from Harbor Boulevard is proposed to be provided via a right-turn in/right-turn out only driveway on the north (herein referred to as "Project Driveway A"), and a right-turn in/right-turn out only driveway on the south (herein referred to as "Project Driveway B").

Based on conversations with City staff, due to the location of Project Driveway A, left-turn ingress at the midblock of Harbor Boulevard, between Wilson Street and Harbor Center, will be restricted. To facilitate ingress to the site median modifications are proposed as project design features. The access design features that will be constructed as part of the Project (and which are not mitigation measures intended to address Project-significant traffic impacts) include the following:

- Median modifications midblock to restrict northbound left-turn/U-turn movements from Harbor Boulevard
- Median modifications at Harbor Boulevard and Harbor Center to provide a "U-turn" only lane in the northbound direction along with signal modifications to provide proper signal phasing

These recommended improvements will be subject to the review and final approval of the City of Costa Mesa Transportation Services Division. Please note that based on these Project access design features, an adjustment to background traffic patterns is expected, and these have been accounted for under future traffic conditions with development of the Project. **Figure 2-3** presents the conceptual access improvements along Harbor Boulevard.



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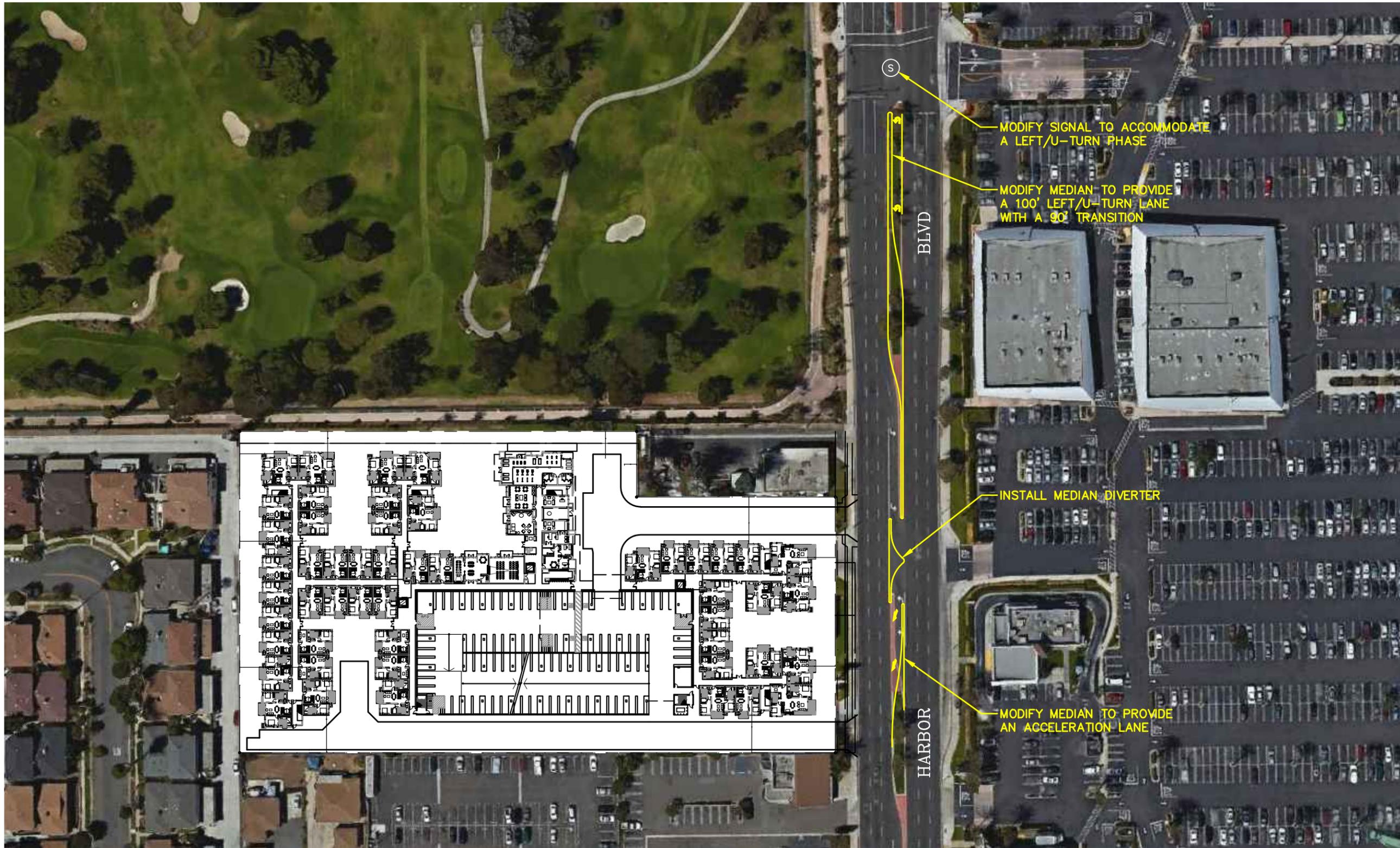
KEY

 = PROJECT SITE

FIGURE 2-1

EXISTING SITE AERIAL

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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FIGURE 2-3

CONCEPT IMPROVEMENT PLAN FOR HARBOR BOULEVARD
COSTA MESA MOTOR INN, COSTA MESA

TABLE 2-1
PROJECT DEVELOPMENT SUMMARY¹

Land Use / Project Description	Proposed Development Totals
<i><u>Costa Mesa Motor Inn Residential Project</u></i>	
▪ One-bedroom	124 Units
▪ One-bedroom with Den	16 Units
▪ Two-bedroom	76 Units
▪ Two-bedroom with Den	<u>8 Units</u>
<i>Total Units:</i>	<i>224 Units</i>
▪ Parking Supply (parking structure)	503 Spaces

¹ Source: GMPA Architects.

3.0 EXISTING CONDITIONS

3.1 Existing Street System

The principal local network of streets serving the project site includes Harbor Boulevard and Wilson Street. The following discussion provides a brief synopsis of these key area streets. The descriptions are based on an inventory of existing roadway conditions.

Harbor Boulevard is a six-lane, divided roadway, oriented in the north-south direction. The posted speed limit on Harbor Boulevard is 40 mph. On-street parking is prohibited on both sides of the roadway. A traffic signal controls the intersection of Harbor Boulevard and Harbor Center, as well as Harbor Boulevard at Wilson Street.

Wilson Street is a two-lane, divided roadway, oriented in the east-west direction. The posted speed limit on Wilson Street is 35 mph. On-street parking is prohibited on both sides of the roadway. A traffic signal controls the intersection of Harbor Boulevard at Wilson Street.

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

3.2 Existing Traffic Volumes

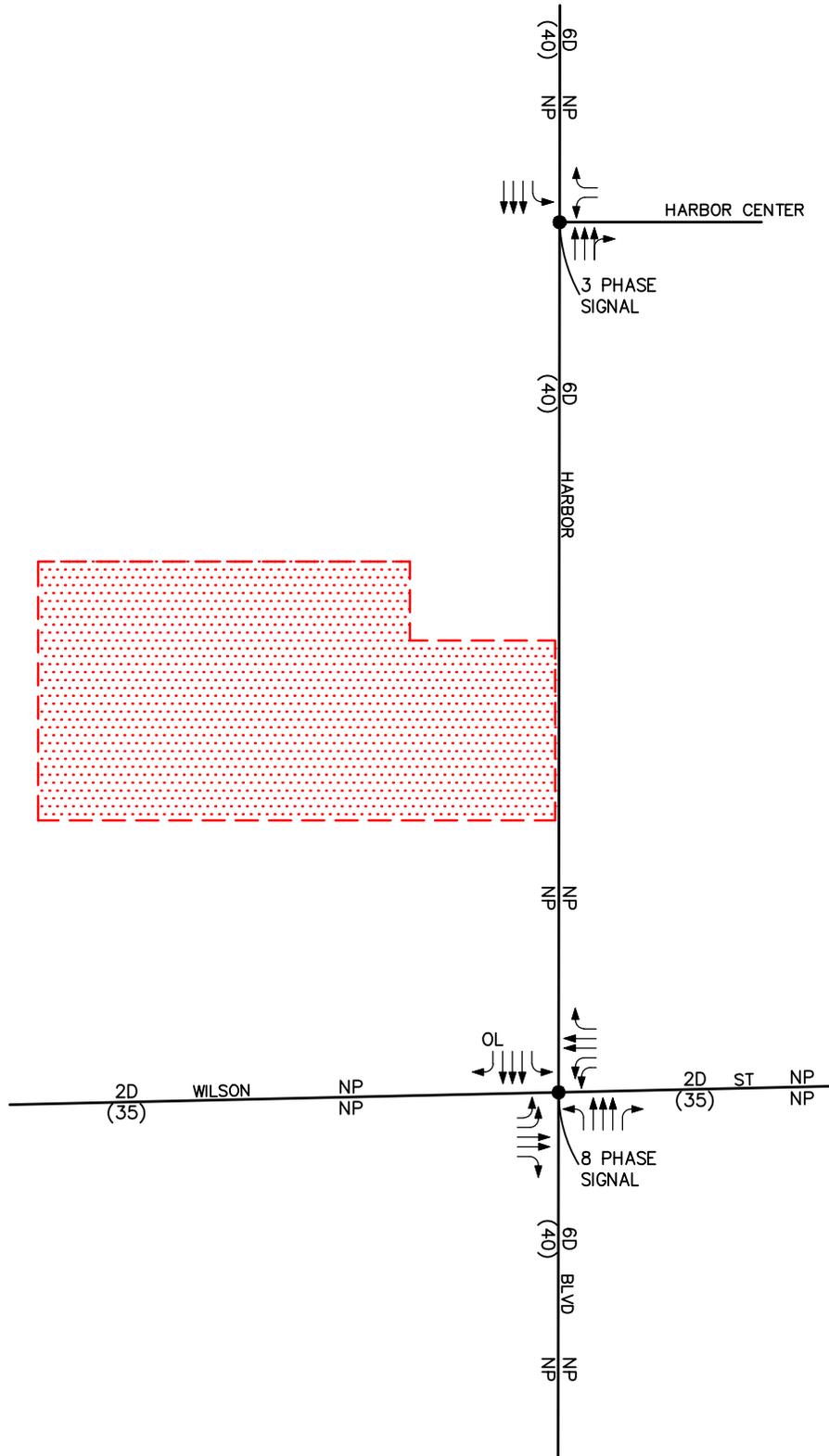
Two (2) key study intersections have been identified as the locations at which to evaluate existing and future traffic operating conditions. Some portion of potential project-related traffic will pass through each of these intersections, and their analysis will reveal the expected relative impacts of the project. These key locations were selected for evaluation based on discussions with City of Costa Mesa staff and in consideration of Orange County CMP requirements.

Existing AM peak hour and PM peak hour traffic volumes for the two (2) key study intersections were obtained from manual turning movement counts conducted by National Data and Surveying Services in March 2015. Please note that during the time that traffic counts were collected, the existing motel was not fully occupied (159 rooms were occupied). Therefore, the existing counts were adjusted to reflect a “baseline” condition with the motel fully booked.

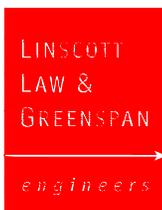
Figures 3-2 and *3-3* illustrate the existing AM and PM peak hour traffic volumes at the two (2) key study intersections evaluated in this report, respectively. *Appendix B* contains the detailed peak hour traffic count sheets for the key intersections evaluated in this report.

3.3 Existing Traffic Conditions

Existing AM and PM peak hour operating conditions for the two (2) key study intersections were evaluated using the *Intersection Capacity Utilization (ICU)* methodology for signalized intersections and the methodology outlined in Chapter 17 of the *Highway Capacity Manual 2000 (HCM 2000)* for unsignalized intersections.



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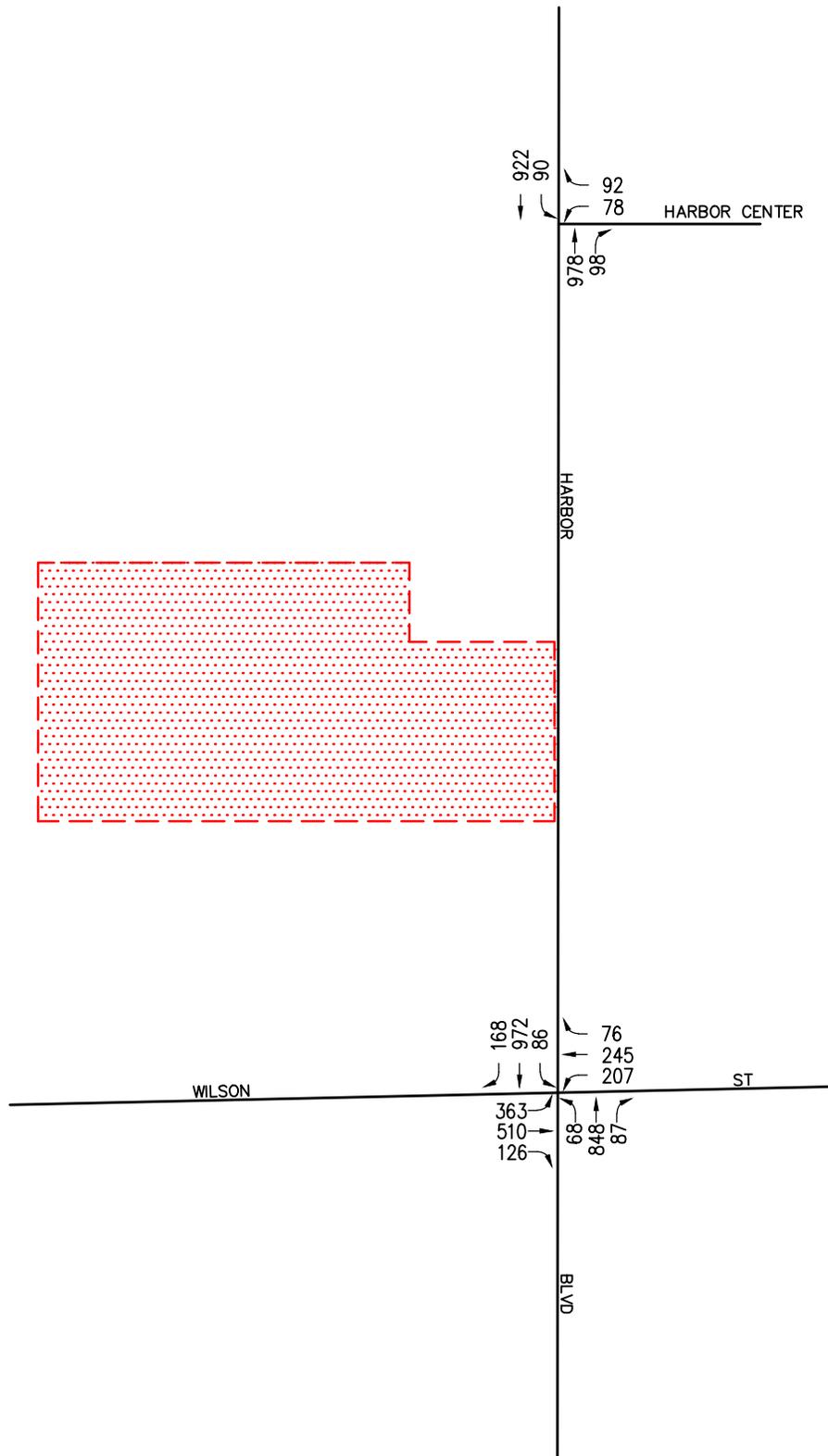


- KEY**
- ← = APPROACH LANE ASSIGNMENT
 - = TRAFFIC SIGNAL
 - P = PARKING, NP = NO PARKING
 - U = UNDIVIDED, D = DIVIDED
 - 2 = NUMBER OF TRAVEL LANES
 - (XX) = POSTED SPEED LIMIT (MPH)
 - OL = OVERLAP
 - = PROJECT SITE

FIGURE 3-1

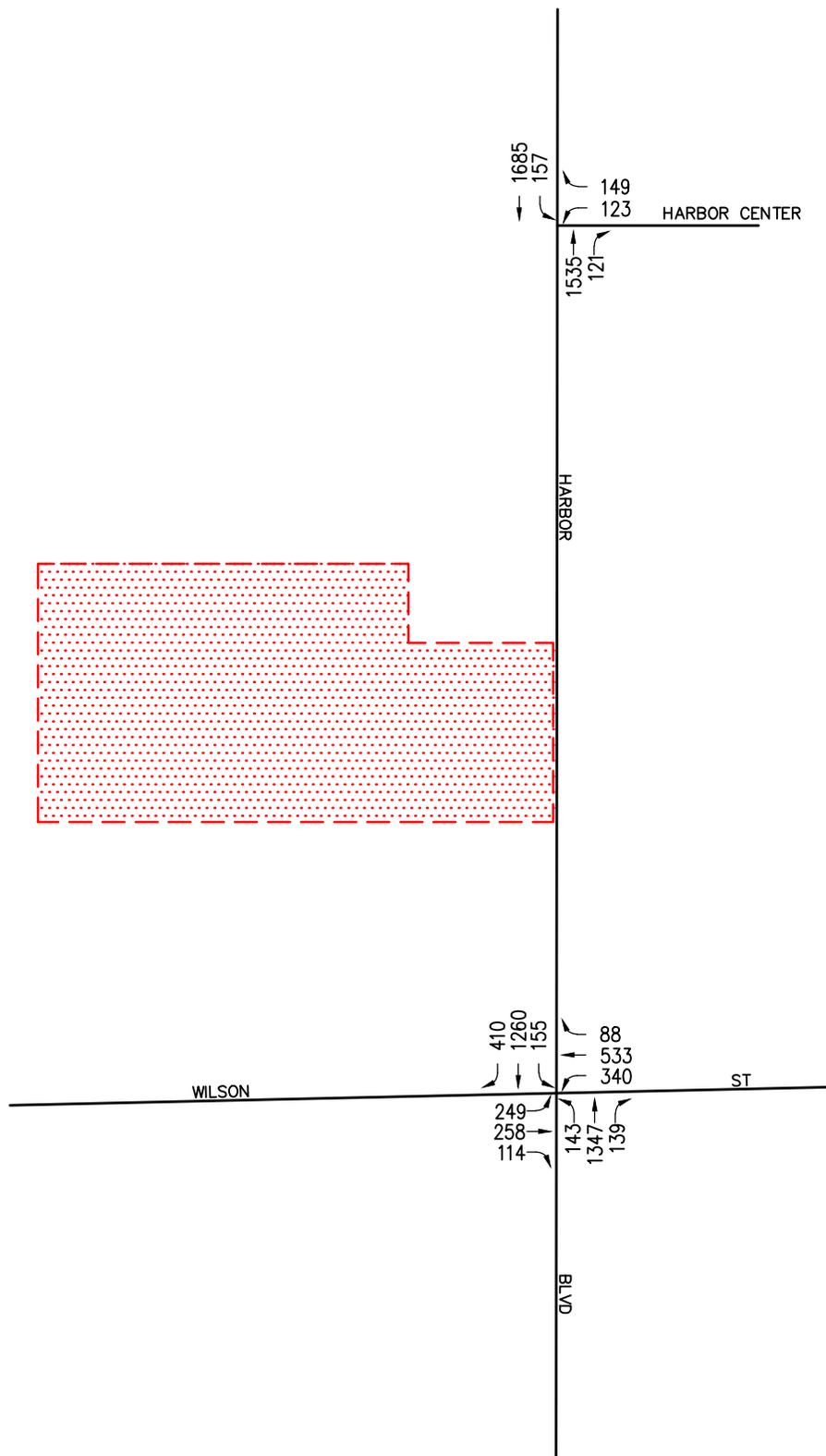
EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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3.3.1 Intersection Capacity Utilization (ICU) Method of Analysis

In conformance with City of Costa Mesa 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 City of Costa Mesa requirements, the ICU calculations use a lane capacity of 1,600 vph for left-turn lanes, through lanes and right-turn lanes. No adjustments for clearance intervals are made since the assumed lane capacity reflects the effect of lost time.

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*

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. According to City of Costa Mesa criteria, LOS D (ICU = 0.801 – 0.900) is the minimum acceptable condition that should be maintained during the morning and evening peak commute hours.

TABLE 3-1
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

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

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 (minor street stop-controlled) intersections, this methodology estimates the worst side street delay, measured in seconds per vehicle and determines the level of service for that approach. The HCM control delay value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The six qualitative categories of Level of Service have been defined along with the corresponding HCM control delay value range, as shown in *Table 3-2*.

3.4 Existing Intersection Peak Hour Levels of Service

Table 3-3 summarizes the existing peak hour service level calculations for the two (2) key study intersections based on existing traffic volumes and current street geometrics. Review of *Table 3-3* indicates that the key study intersections currently operate at acceptable service levels (LOS B or better) during the AM and PM peak hour.

Appendix C presents the ICU/LOS calculation worksheets for the two (2) key study intersections for the AM peak hour and PM peak hour.

TABLE 3-2
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS²

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
EXISTING
INTERSECTION PEAK HOUR LOS**

Key Intersection		Time Period	Control Type	ICU³	LOS
1.	Harbor Boulevard at	AM	3Ø Traffic	0.338	A
	Harbor Center	PM	Signal	0.536	A
2.	Harbor Boulevard at	AM	8Ø Traffic	0.469	A
	Wilson Street	PM	Signal	0.622	B

³ The existing volumes have been adjusted to account for the fully operational Costa Mesa Motor Inn motel.

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to evaluate the potential traffic impacts of the Project, the amount of traffic that could be generated by the Project (i.e., Project traffic generation), and future traffic volumes on the surrounding street system (i.e., Cumulative Base forecasts), need to be estimated. The Cumulative Base scenario (representing future conditions without the proposed Project) could then be compared against the Cumulative Plus Project scenario (representing future conditions with the Project).

A multi-step process was utilized to develop Project and Cumulative Base traffic forecasts. The first step is traffic generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations or rates to the project development tabulation.

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

The third step is traffic assignment, which involves the allocation of project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway links and intersection turning movements throughout the study area.

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

5.0 PROJECT TRAFFIC FORECASTS

5.1 Project Traffic Generation

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the 9th Edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE) [Washington D.C., 2012]. For the existing motel, daily counts were conducted in March 2015 at the existing driveways to derive daily, AM, and PM peak hour trip rates.

The upper half of **Table 5-1** summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project land Use, while the lower half provides a summary of the Project's daily, AM and PM peak hour trip generation potential as well as the existing motel's trip generation "budget" assuming full occupancy of the site.

A review of **Table 5-1** shows the trip generation forecast for the Project. As shown, the proposed Project is forecast to generate 1,490 daily trips, with 114 trips (23 inbound, 91 outbound) produced in the AM peak hour and 139 trips (90 inbound, 49 outbound) produced in the PM peak hour. The existing motel assuming full occupancy is forecast to generate 1,258 daily trips, with 66 trips (26 inbound, 40 outbound) produced in the AM peak hour and 118 trips (61 inbound, 57 outbound) produced in the PM peak hour.

When the proposed Project is compared to the existing fully occupied motel, the Project is forecast to result in 232 additional daily trips, 48 net AM peak hour trips and 21 net PM peak hour trips. The potential impacts of these added trips are assessed in this report.

Appendix B contains the project driveways count worksheet, detailing the traffic volumes which were used for the existing trip generation in this report.

TABLE 5-1
PROJECT TRAFFIC GENERATION FORECAST⁴

ITE Land Use Code / Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Generation Rates:							
▪ ITE 220: Apartment (TE/DU)	6.65	0.10	0.41	0.51	0.40	0.22	0.62
▪ Empirical Rate: Motel (TE/Room) ⁵	5.33	0.11	0.17	0.28	0.26	0.24	0.50
Generation Forecasts:							
<u>Proposed Project</u>							
▪ Apartments (224 DU)	1,490	23	91	114	90	49	139
<u>Existing Occupied Floor Area</u>							
▪ Existing Fully Occupied Motel	1,258	26	40	66	61	57	118
▪ (236 Rooms) ⁶							
Total "Net" Project Trip Generation: Proposed Project Minus Existing Motel	232	-3	51	48	29	-8	21

Notes:
TE/DU = Trip end per dwelling unit
TE/Room = Trip ends per room

⁴ Source: *Trip Generation, 9th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2012)].

⁵ Trip rates for the existing motel are based on driveway counts conducted at the existing site on Thursday, March 5, 2015. Please note that during the counts the existing motel had an occupancy of 159 rooms.

⁶ Trip ends for the existing motel were calculated using the empirically derived rate applied to the full occupancy (236 rooms).

5.2 Project Traffic Distribution and Assignment

Figure 5-1 presents the traffic distribution patterns for the proposed Project. Project traffic volumes both entering and exiting the site have been distributed and assigned to the adjacent street system based on the following considerations:

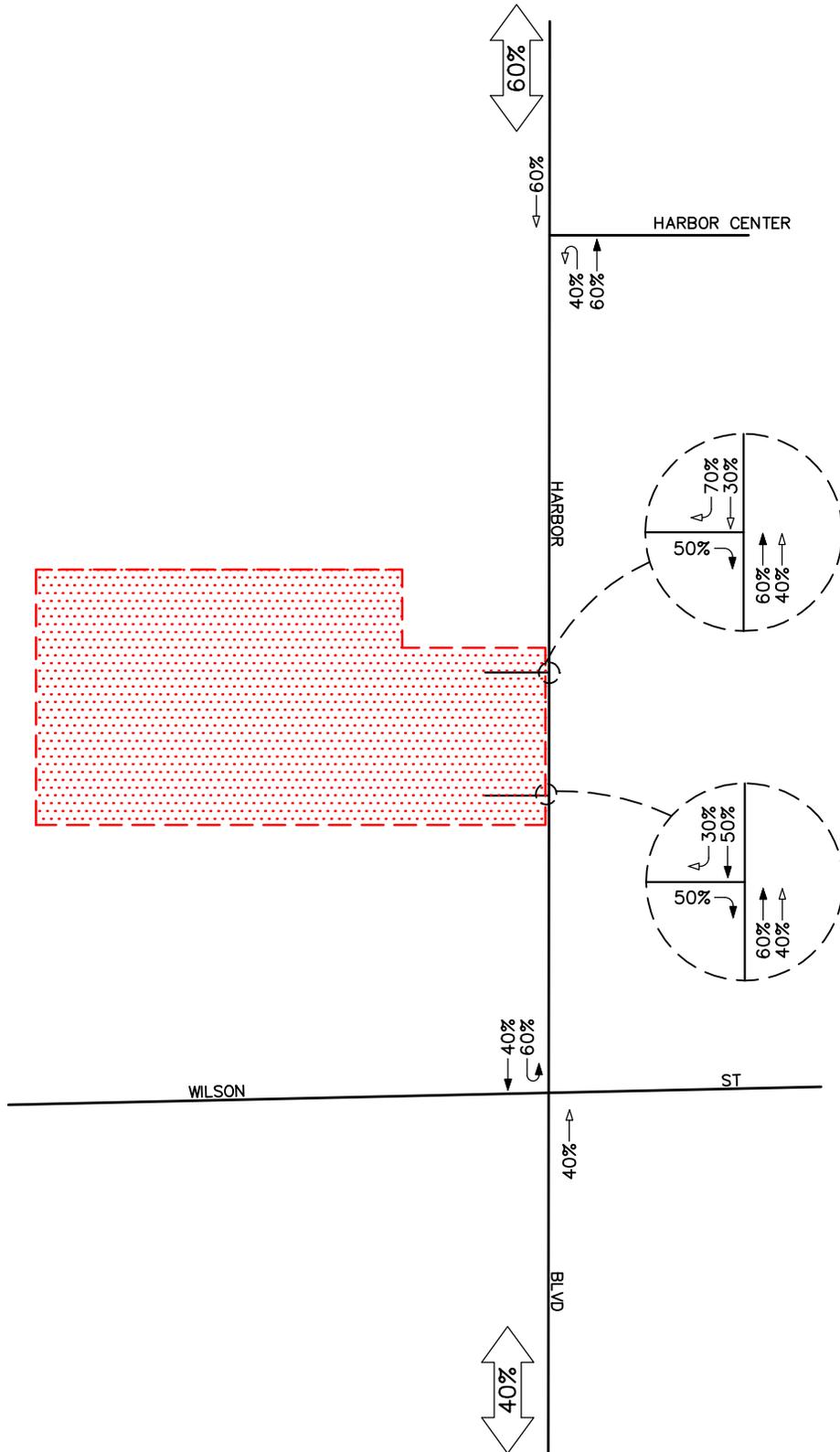
- the site's proximity to major traffic carriers (i.e. Harbor Boulevard),
- expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals,
- existing intersection traffic volumes, and
- ingress/egress availability at the project site.

The anticipated AM and PM peak hour traffic volumes associated with the proposed Project are presented in *Figures 5-2* and *5-3*, respectively. The traffic volume assignments presented in *Figures 5-2* and *5-3* reflect the traffic distribution characteristics shown in *Figure 5-1* and the traffic generation forecast presented in *Table 5-1*. As noted earlier, due to the median and signal improvements along Harbor Boulevard shifts in traffic patterns are expected and have been accounted for within *Figures 5-2* and *5-3*. Specific details about trip credit and rerouting of vehicles are presented within *Appendix A*.

5.3 Existing Plus Project Traffic Volumes

The existing plus project traffic volumes were forecasted by adding Project-generated traffic volumes to existing traffic volumes. These forecasts have been prepared pursuant to the California Environmental Quality Act (CEQA) guidelines, which require that the potential impacts of a project be evaluated upon the circulation system as it currently exists. This traffic volume scenario and the corresponding LOS analyses will identify the roadway improvements necessary to mitigate the direct traffic impacts of the Project, if any.

Figures 5-4 and *5-5* present projected AM and PM peak hour traffic volumes at the two (2) key study intersections with the “net” addition of the trips generated by the proposed Project to existing traffic volumes, respectively (i.e. Existing Traffic minus Existing Motel Traffic plus Reroutes plus Project Traffic).



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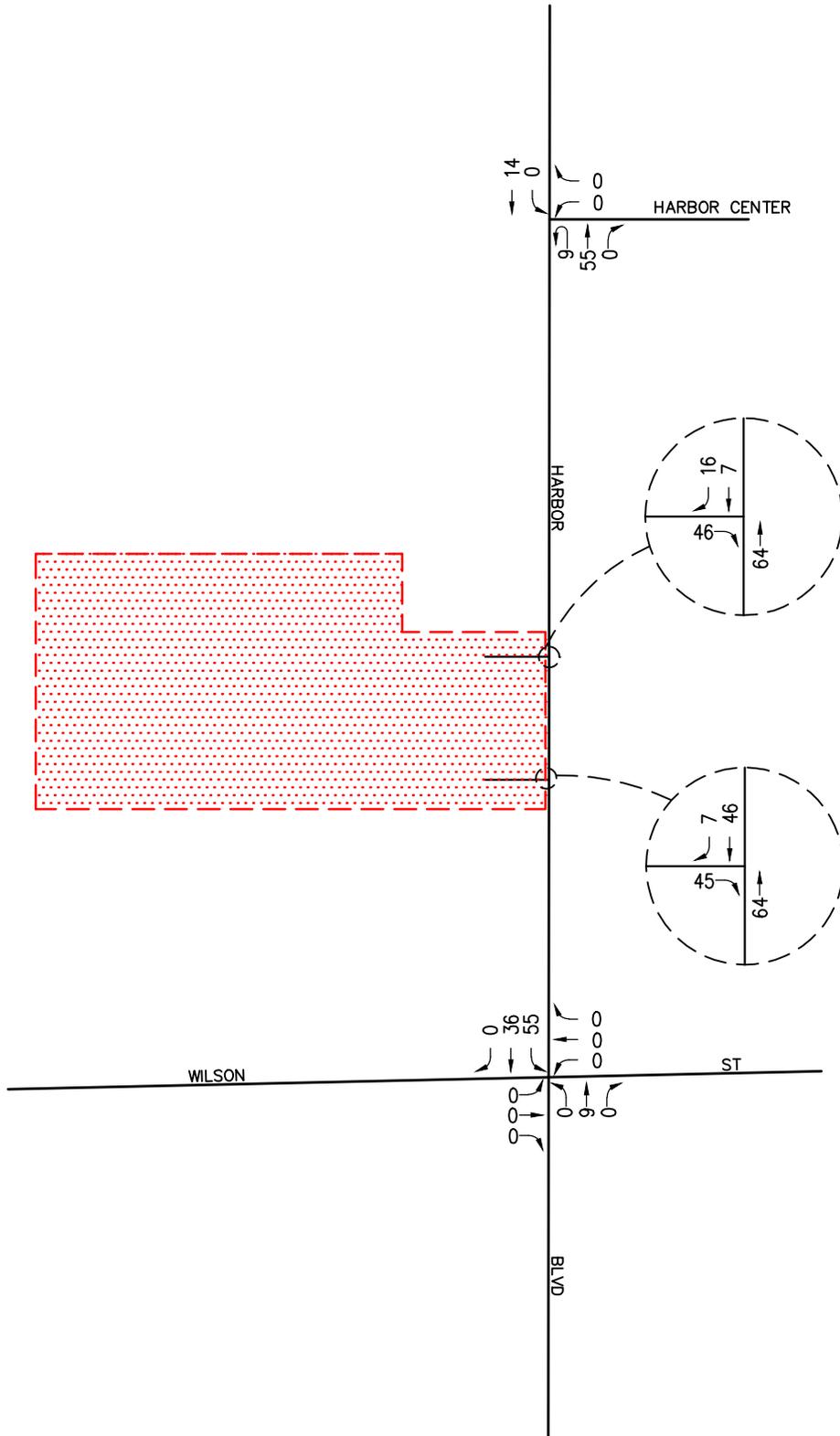


NO SCALE

- KEY
- ← = INBOUND PERCENTAGE
 - = OUTBOUND PERCENTAGE
 - ▨ = PROJECT SITE

FIGURE 5-1

PROJECT DISTRIBUTION PATTERN
COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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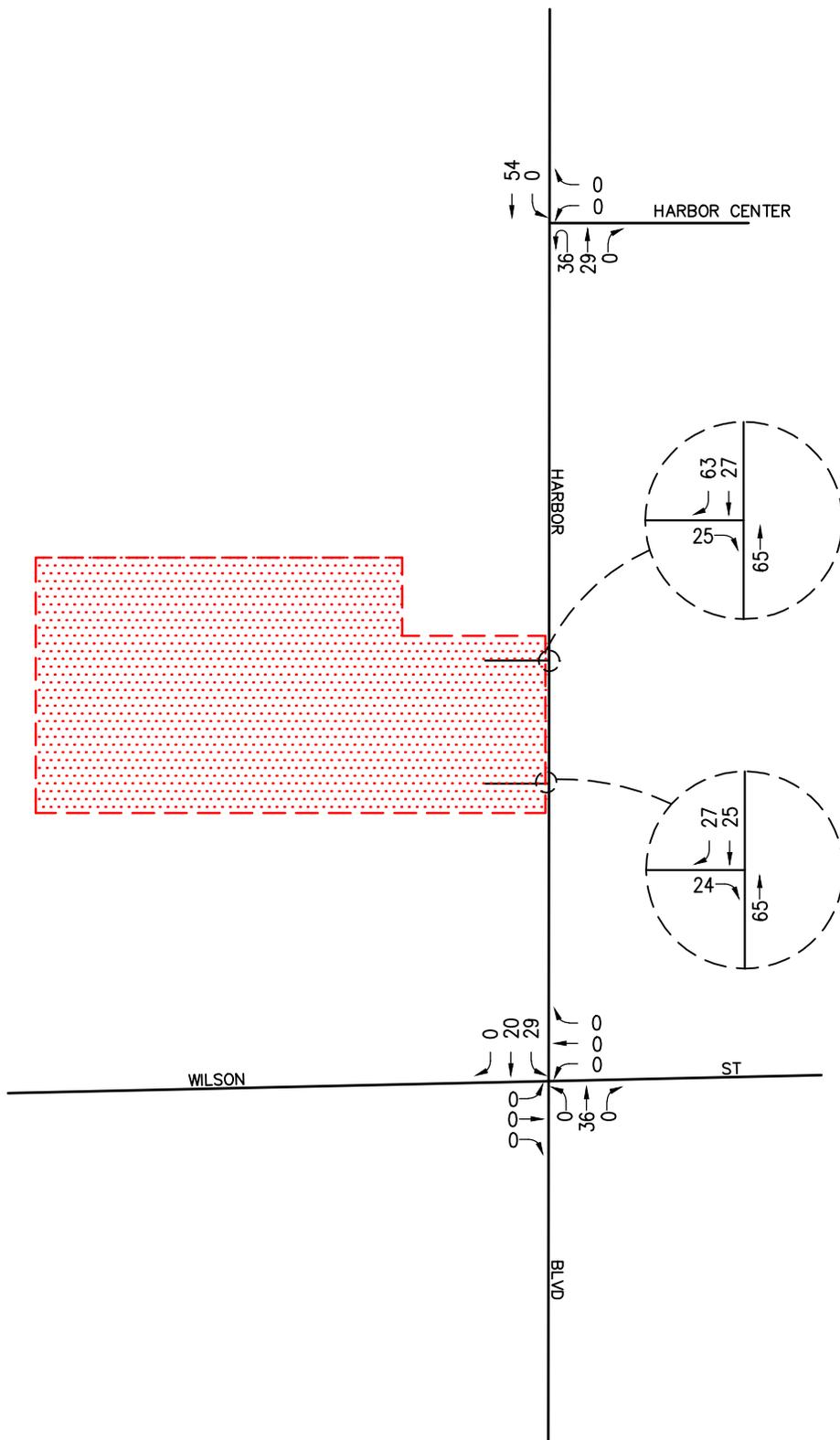
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KEY
 = PROJECT SITE

FIGURE 5-2

AM PEAK HOUR PROJECT TRAFFIC VOLUMES

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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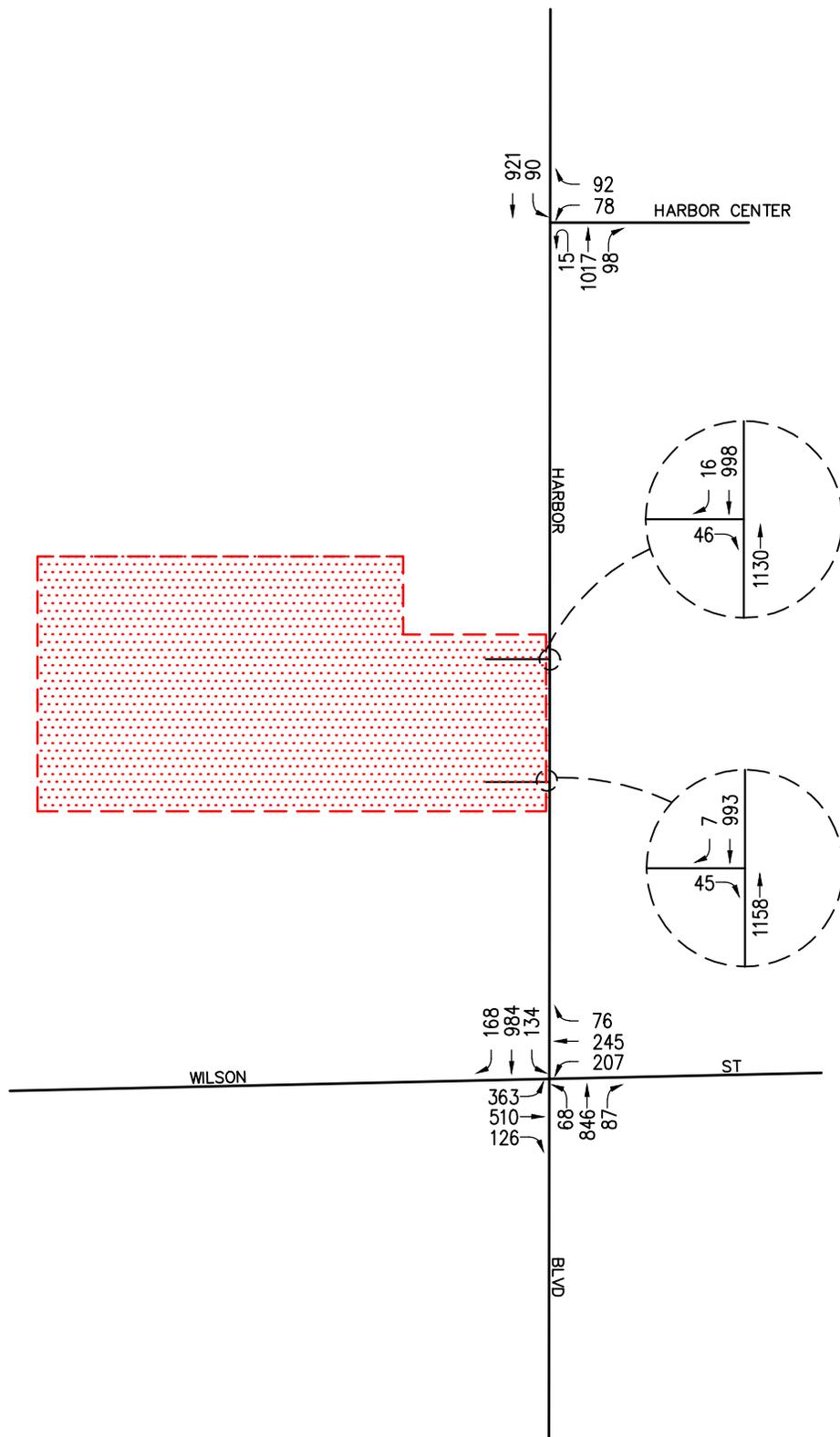
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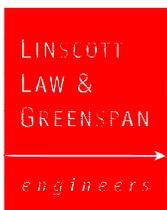
FIGURE 5-3

PM PEAK HOUR PROJECT TRAFFIC VOLUMES

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



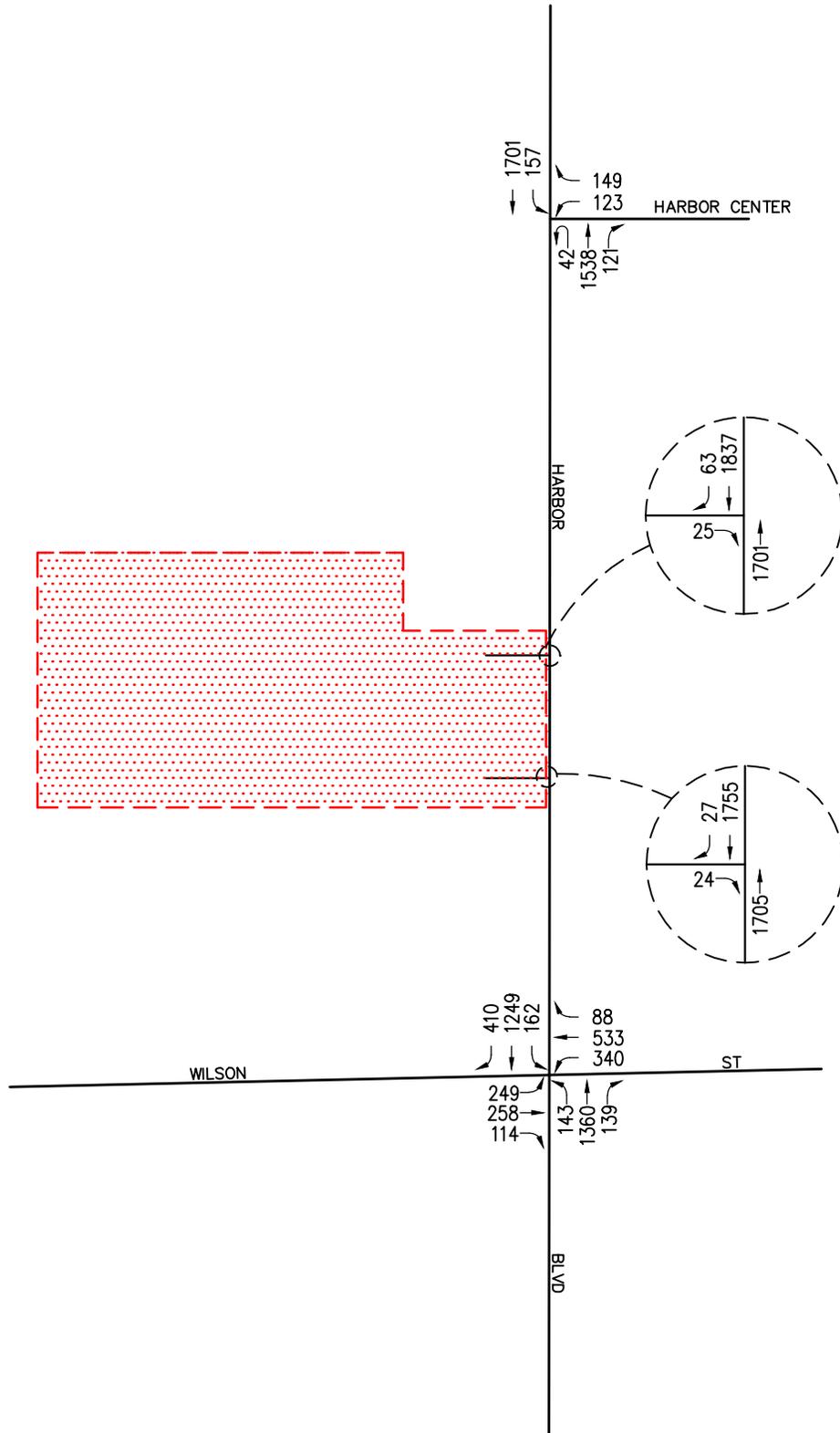
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KEY
 = PROJECT SITE

FIGURE 5-4

EXISTING PLUS PROJECT
 AM PEAK HOUR TRAFFIC VOLUMES
 COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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KEY
 = PROJECT SITE

FIGURE 5-5

EXISTING PLUS PROJECT
 PM PEAK HOUR TRAFFIC VOLUMES
 COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA

6.0 CUMULATIVE TRAFFIC FORECASTS

The Cumulative Base or “background” traffic projections account for existing traffic volumes, and include two growth elements over existing traffic volumes: (1) increase in the existing traffic volumes due to overall regional growth; and, (2) traffic generated by specific developments expected to be constructed in the vicinity of the Project study area. The following sections describe these two growth elements in existing traffic volumes.

6.1 Ambient Traffic Growth

Background traffic in the study area has been estimated to increase at a historical rate of approximately 1% per year. Future increases in background traffic due to regional development are expected to continue at the same rate. Applying the 1% annual growth rate to the Year 2015 (existing) traffic volumes corresponds to a 3% overall growth to the near-term horizon of Year 2018.

6.2 Related Project Traffic Volumes

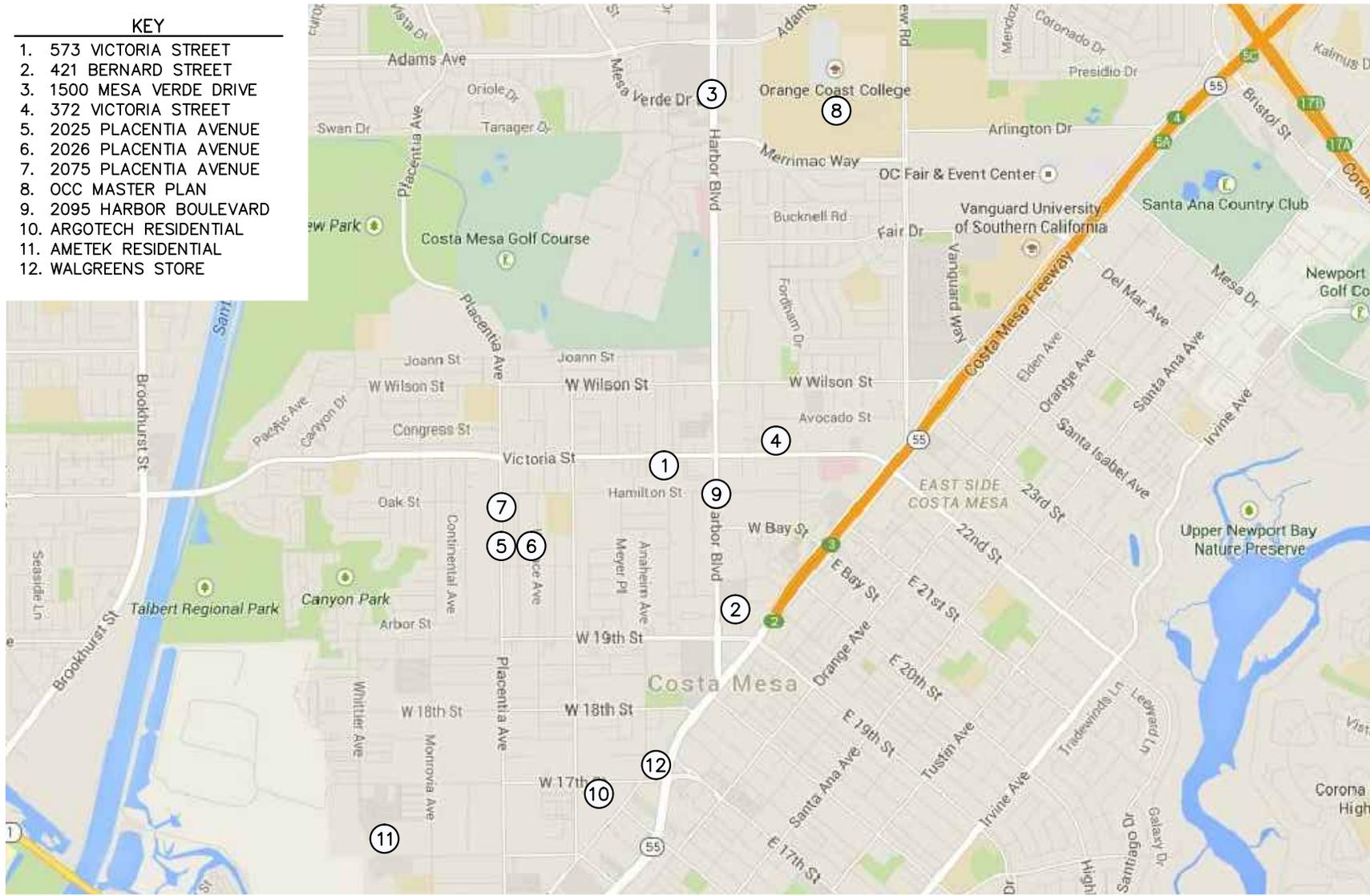
The traffic expected to be generated by future projects that are either under construction or proposed within the study area accounts for the second traffic growth element in existing traffic volumes.

The City of Costa Mesa identified twelve (12) related projects within the Project study area. Related projects, as defined by Section 15355 of the CEQA Guidelines, are “closely related past, present and reasonably foreseeable probable future projects.” The Traffic Impact Analysis assumes that all of these related projects will be developed within the same timeframe as the proposed Project. This is the most conservative, worst-case approach, since the exact timing of each related project is uncertain. In addition, impacts for these related projects would likely be, or have been, subject to mitigation measures, which could reduce potential impacts. Under this analysis, however, those mitigation measures are not considered. The locations of the twelve (12) related projects are presented in *Figure 6-1*.

Table 6-1 presents the address, jurisdiction and description/size of the twelve (12) related projects. *Table 6-2* presents the resultant trip generation for the twelve (12) related projects. As shown in *Table 6-2*, the twelve (12) related projects are expected to generate a combined total 22,100 daily trips (one half arriving, one half departing) on a “typical” weekday, with 1,561 trips (1,046 inbound and 515 outbound) forecast during the AM peak hour and 2,097 trips (1,104 inbound and 993 outbound) forecast during the PM peak hour. *Figures 6-2* and *6-3* present the AM and PM peak hour related project volumes.

6.3 Year 2018 Cumulative Traffic Volumes

Figures 6-4 and *6-5* present the AM and PM peak hour cumulative traffic volumes (existing traffic + ambient growth + related projects) at the two (2) key study intersections for the Year 2018, respectively. *Figures 6-6* and *6-7* illustrate the Year 2018 forecast AM and PM peak hour traffic volumes, with the inclusion of the “net” trips generated by the proposed Project, respectively.



- KEY**
1. 573 VICTORIA STREET
 2. 421 BERNARD STREET
 3. 1500 MESA VERDE DRIVE
 4. 372 VICTORIA STREET
 5. 2025 PLACENTIA AVENUE
 6. 2026 PLACENTIA AVENUE
 7. 2075 PLACENTIA AVENUE
 8. OCC MASTER PLAN
 9. 2095 HARBOR BOULEVARD
 10. ARGOTECH RESIDENTIAL
 11. AMETEK RESIDENTIAL
 12. WALGREENS STORE

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- KEY**
- # = CUMULATIVE PROJECT LOCATION
 - [Red hatched box] = PROJECT SITE

FIGURE 6-1

LOCATION OF RELATED PROJECTS
COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA

**TABLE 6-1
LIST OF RELATED PROJECTS⁷**

No.	Cumulative Project	Address	Description/Size
1.	573 Victoria Street	Southeast of Maple Street and north of Hamilton Street	37 DU live/work
2.	421 Bernard Street	East of Harbor Boulevard and North of 19 th Street	113 DU apartments
3.	1500 Mesa Verde Drive	West of Harbor Boulevard and North of Mesa Verde Drive	215 DU senior apartments
4.	372 Victoria Street	East of College Avenue and South of Avocado Street	30 DU condominiums
5.	2025 Placentia Avenue	Southwest of Hamilton Street and north of W. 20 th Street	36 DU live/work
6.	2026 Placentia Avenue	North of W 20 th Street and West of Palace Avenue	15 DU live/work
7.	2075 Placentia Avenue	South of Hamilton Street and West of Placentia Avenue	14 DU live/work
8.	OCC Master Plan	West of Fairview Road between Adams Avenue and Merrimac Way	120 room hotel, 15,000 SF shopping center, 1,900 bed student housing, 6,922 net increase student growth
9.	2095 Harbor Boulevard	South of Hamilton Street	28 DU live/work
10.	ArgoTech Residential	671 W. 17 th Street	42 detached live/work units, 89 attached live/work units, and 46 attached lofts
11.	Ametek Residential	1620-1644 Whittier Avenue	49 DU detached residential and 40 DU live/work units
12.	Walgreens Store	1726 Superior Avenue	14.310 TSF pharmacy/drugstore without drive-thru

⁷ Source: City of Costa Mesa Planning Department

TABLE 6-2
TRIP GENERATION FORECAST FOR RELATED PROJECTS ⁸

Cumulative Project/Location	Land Use	Size	Daily 2-Way	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Trip Rates									
210: Single Family Detached Housing (TE/DU)			9.52	0.19	0.56	0.75	0.63	0.37	1.00
220: Apartment (TE/DU)			6.65	0.10	0.41	0.51	0.40	0.22	0.62
230: Residential Condominium/Townhome (TE/DU)			5.81	0.07	0.37	0.44	0.35	0.17	0.52
252: Senior Adult Housing – Attached (TE/DU)			3.44	0.07	0.13	0.20	0.14	0.11	0.25
310: Hotel (TE/Room)			8.17	0.31	0.22	0.53	0.31	0.29	0.60
710: General Office Building (TE/1,000 SF)			11.03	1.37	0.19	1.56	0.25	1.24	1.49
820: Shopping Center (TE/1,000 SF)			42.70	0.60	0.36	0.96	1.78	1.93	3.71
880: Pharmacy/Drugstore Without Drive-Thru (TE/1,000 SF)			90.06	1.89	1.31	3.20	4.21	4.21	8.42
OCC Empirical Student Growth Rate (TE/Student) ⁹			1.271	0.107	0.018	0.125	0.076	0.065	0.141
Student Housing Empirical Rate (TE/Bed) ⁷			2.38	0.04	0.03	0.07	0.06	0.09	0.15
Existing Recycling Center Trip Generation ⁷			494	5	5	10	30	30	60
o Proposed Expansion (3 Times Existing Trips)									
1. 573 Victoria Street ¹⁰ (City of Costa Mesa)	Single Family Detached Housing General Office	37 DU 8,409 SF	352 <u>83</u>	7 <u>10</u>	21 <u>1</u>	28 <u>11</u>	23 <u>2</u>	14 <u>9</u>	37 <u>11</u>
		Sub-total:	435	17	22	39	25	23	48
2. 421 Bernard Street ⁷ (City of Costa Mesa)	Apartments	113 DU	751	12	46	58	46	24	70
		Sub-total:	751	12	46	58	46	24	70
3. 1500 Mesa Verde Drive ⁷ (City of Costa Mesa)	Senior Adult Housing - Attached	215 DU	740	15	28	43	29	25	54
		Sub-total:	740	15	28	43	29	25	54
4. 372 Victoria Street ⁷ (City of Costa Mesa)	Condominiums	30 DU	174	2	11	13	11	5	16
		Sub-total:	174	2	11	13	11	5	16

⁸ Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012)*. Where applicable, pass-by adjustment factors were utilized and are reflected in the cumulative projects trip generation potential.

⁹ Source: *Orange Coast College Vision 2020 Facilities Master Plan*, prepared by LLG Irvine.

¹⁰ Source: *Ametek Residential TIA*, prepared by LLG Irvine.

TABLE 6-2 (CONTINUED)
TRIP GENERATION FORECAST FOR RELATED PROJECTS¹¹

Cumulative Project/Location	Land Use	Size	Daily 2-Way	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
5. 2025 Placentia Avenue ¹² (City of Costa Mesa)	Condominiums	36 DU	209	3	13	16	13	6	19
		Sub-total:	209	3	13	16	13	6	19
6. 2026 Placentia Avenue (City of Costa Mesa)	Condominiums	15 DU	87	1	6	7	5	3	8
		Sub-total:	87	1	6	7	5	3	8
7. 2075 Placentia Avenue ¹⁰ (City of Costa Mesa)	Condominiums	14 DU	81	1	5	6	5	2	7
	General Office	3,500 SF	39	5	1	6	1	4	5
	<i>Mixed-Use Trip Reduction (10%)</i>		<u>-12</u>	<u>-1</u>	<u>-1</u>	<u>-2</u>	<u>-1</u>	<u>-1</u>	<u>-2</u>
	Sub-total:		108	5	5	10	5	5	10
8. OCC Master Plan ¹⁰ (City of Costa Mesa)	Student Growth	6,922 Students	8,798	741	124	865	526	450	976
	Student Housing	1,900 Beds	4,522	76	57	133	114	171	285
	Hotel	120 Rooms	980	38	26	64	37	35	72
	Shopping Center	15,000 SF	1,979	30	19	49	81	87	168
	<i>Pass-by Reduction</i>		-495	--	--	--	-27	-30	-57
	Proposed Recycling Center Exp.		1,482	15	15	30	90	90	180
	Existing Recycling Center		<u>-494</u>	<u>-5</u>	<u>-5</u>	<u>-10</u>	<u>-30</u>	<u>-30</u>	<u>-60</u>
Sub-total:		16,772	16,772	895	236	1,131	791	773	1,564
9. 2095 Harbor Boulevard (City of Costa Mesa)	Condominiums	28 DU	163	2	10	12	10	5	15
		Sub-total:	163	2	10	12	10	5	15

¹¹ Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012)*. Where applicable, pass-by adjustment factors were utilized and are reflected in the cumulative projects trip generation potential.

¹² Source: *Orange Coast College Vision 2020 Facilities Master Plan*, prepared by LLG Irvine.

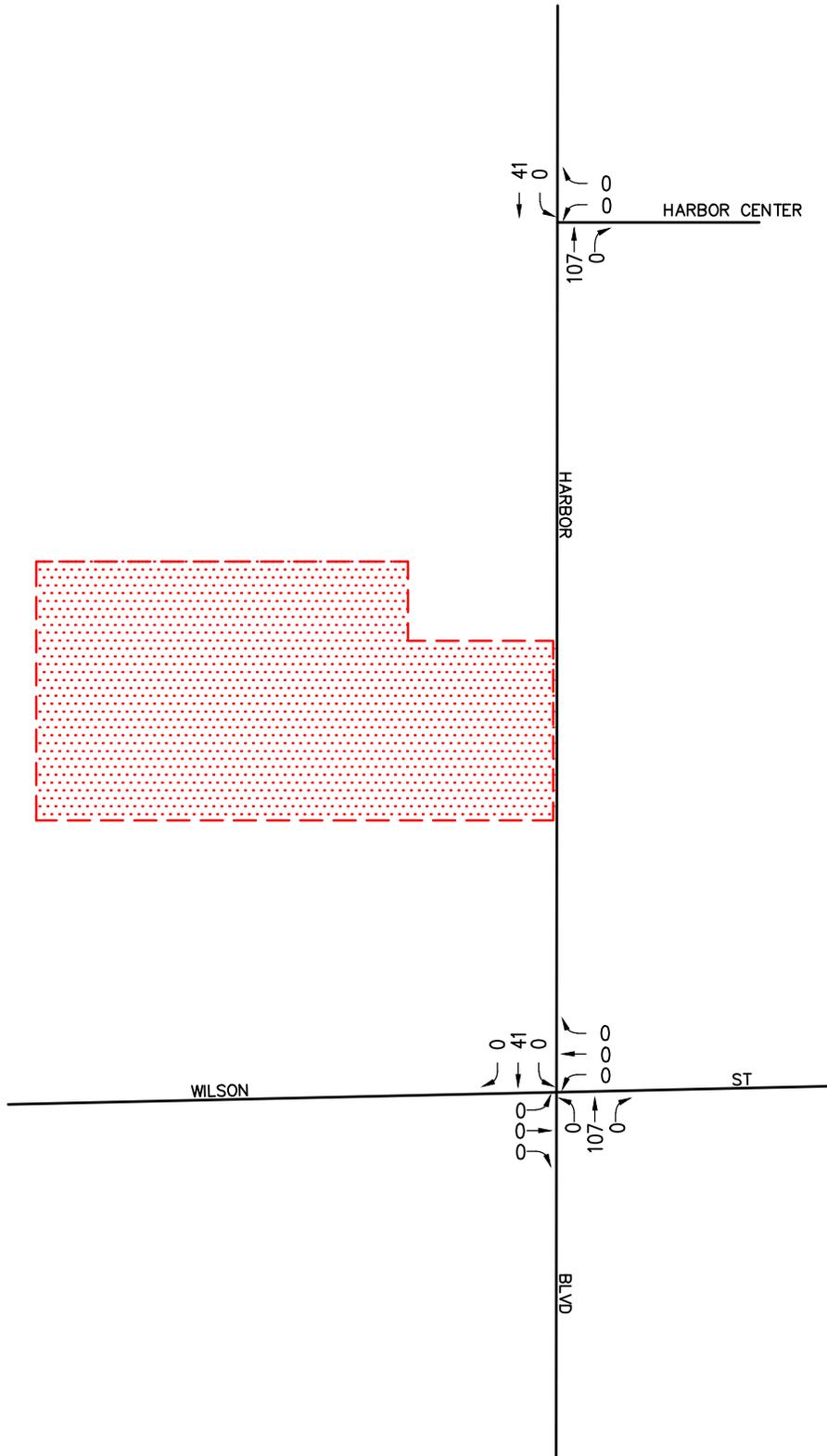
TABLE 6-2 (CONTINUED)
TRIP GENERATION FORECAST FOR RELATED PROJECTS¹³

Cumulative Project/Location	Land Use	Size	Daily 2-Way	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
10. ArgoTech Residential ¹⁴ 671 W. 17 th Street (City of Costa Mesa)	Single Family Detached Housing	42 DU	400	8	24	32	26	16	42
	Condominiums	135 DU	784	10	49	59	47	23	70
	General Office	36,067 SF	398	49	7	56	9	45	54
	<i>Mixed-Use Reduction (10%)</i>		-40	-5	-1	-6	-1	-4	-5
	Existing Site		<u>-598</u>	<u>-5</u>	<u>-3</u>	<u>-8</u>	<u>-16</u>	<u>-21</u>	<u>-37</u>
	Sub-total:		944	57	76	133	65	59	124
11. Ametek Residential ¹⁵ 1620-1644 Whittier Ave (City of Costa Mesa)	Single Family Detached Housing	89 DU	466	9	28	37	31	18	49
	General Office	13,501 SF	530	26	25	51	28	32	60
	<i>Mixed-Use Reduction (10%)</i>		-15	-2	-0	-2	-0	-2	-2
	Existing Site		<u>-424</u>	<u>-20</u>	<u>-8</u>	<u>-28</u>	<u>-9</u>	<u>-37</u>	<u>-46</u>
	Sub-total:		557	13	45	58	50	11	61
12. Walgreens ¹² (City of Costa Mesa)	Pharmacy without Drive-thru	14,310 SF	1,289	27	19	46	60	60	120
	<i>Pass-by Trip Reduction</i>		<u>-129</u>	<u>-3</u>	<u>-2</u>	<u>-5</u>	<u>-6</u>	<u>-6</u>	<u>-12</u>
	Sub-total:		1,160	24	17	41	54	54	108
Cumulative Projects Trip Generation Potential			22,100	1,046	515	1,561	1,104	993	2,097

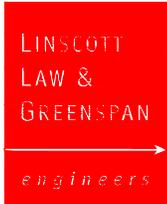
¹³ Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012)*. Where applicable, pass-by adjustment factors were utilized and are reflected in the cumulative projects trip generation potential.

¹⁴ Source: *ArgoTech TIA*, prepared by LLG Irvine.

¹⁵ Source: *Ametek Residential TIA*, prepared by LLG Irvine.



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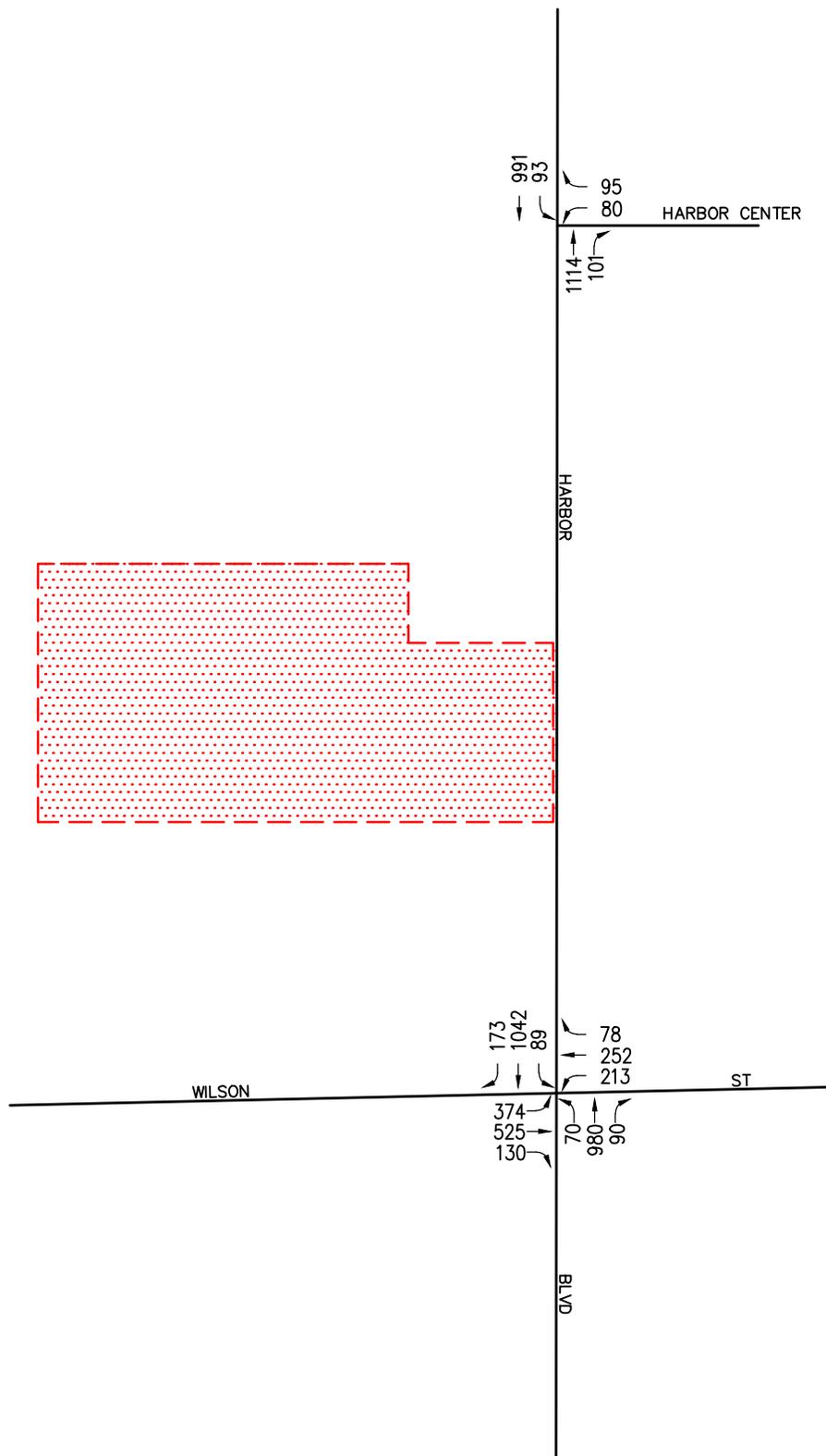


KEY
 = PROJECT SITE

FIGURE 6-2

AM PEAK HOUR RELATED PROJECTS TRAFFIC VOLUMES

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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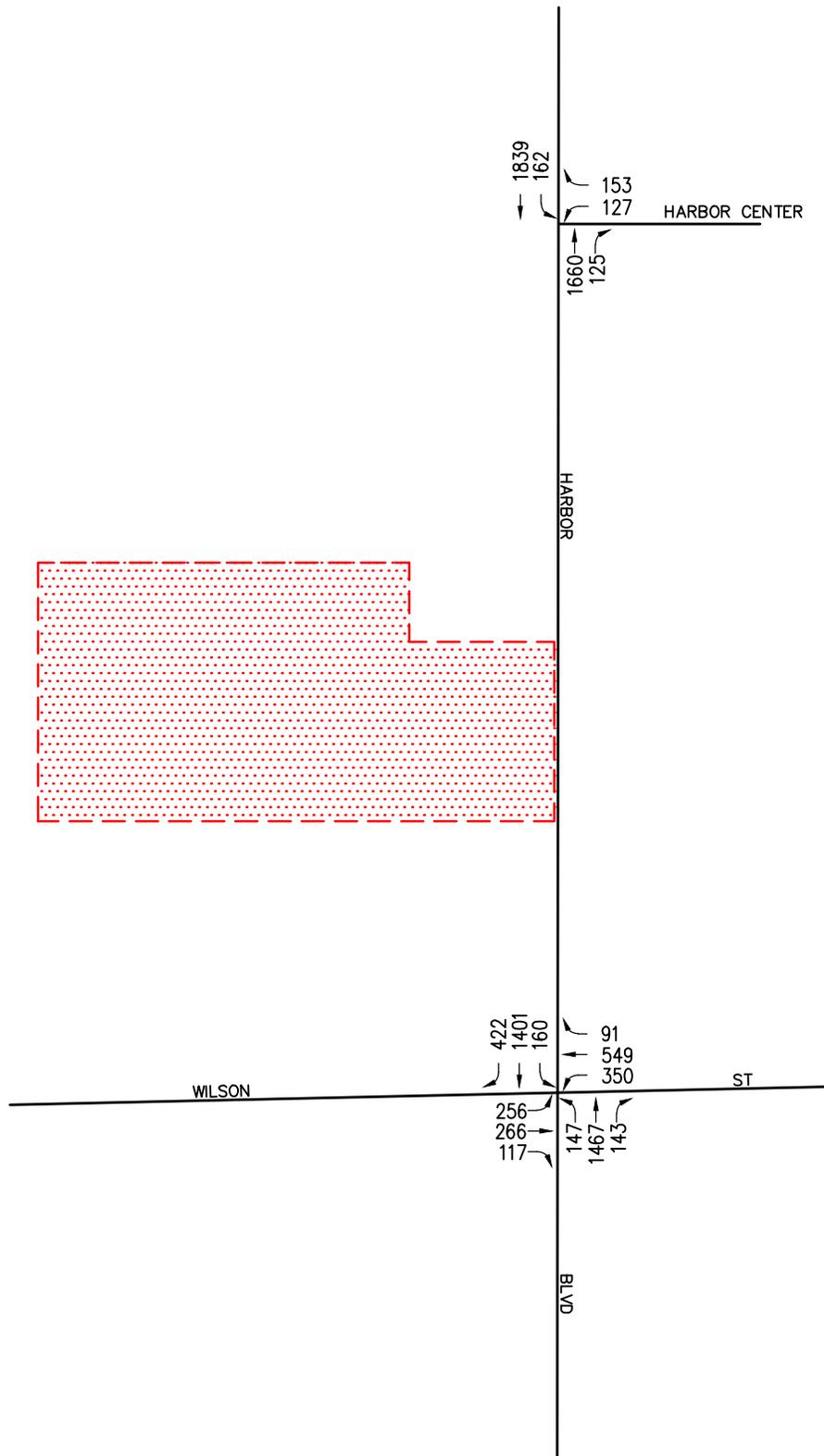
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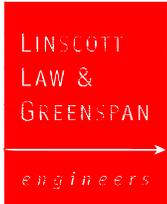
FIGURE 6-4

YEAR 2018 AM PEAK HOUR
CUMULATIVE TRAFFIC VOLUMES

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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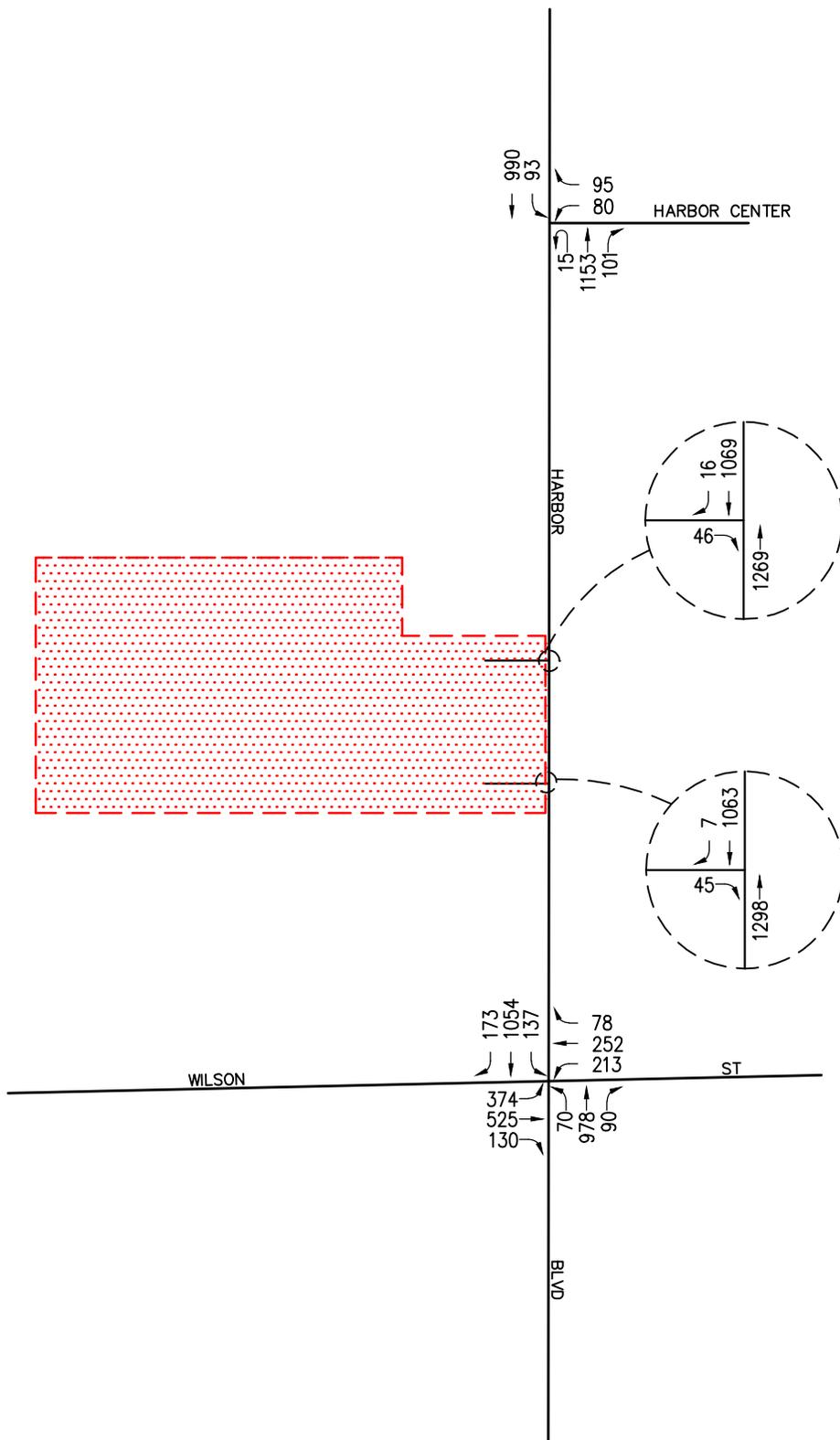
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KEY
 = PROJECT SITE

FIGURE 6-5

YEAR 2018 PM PEAK HOUR CUMULATIVE TRAFFIC VOLUMES

COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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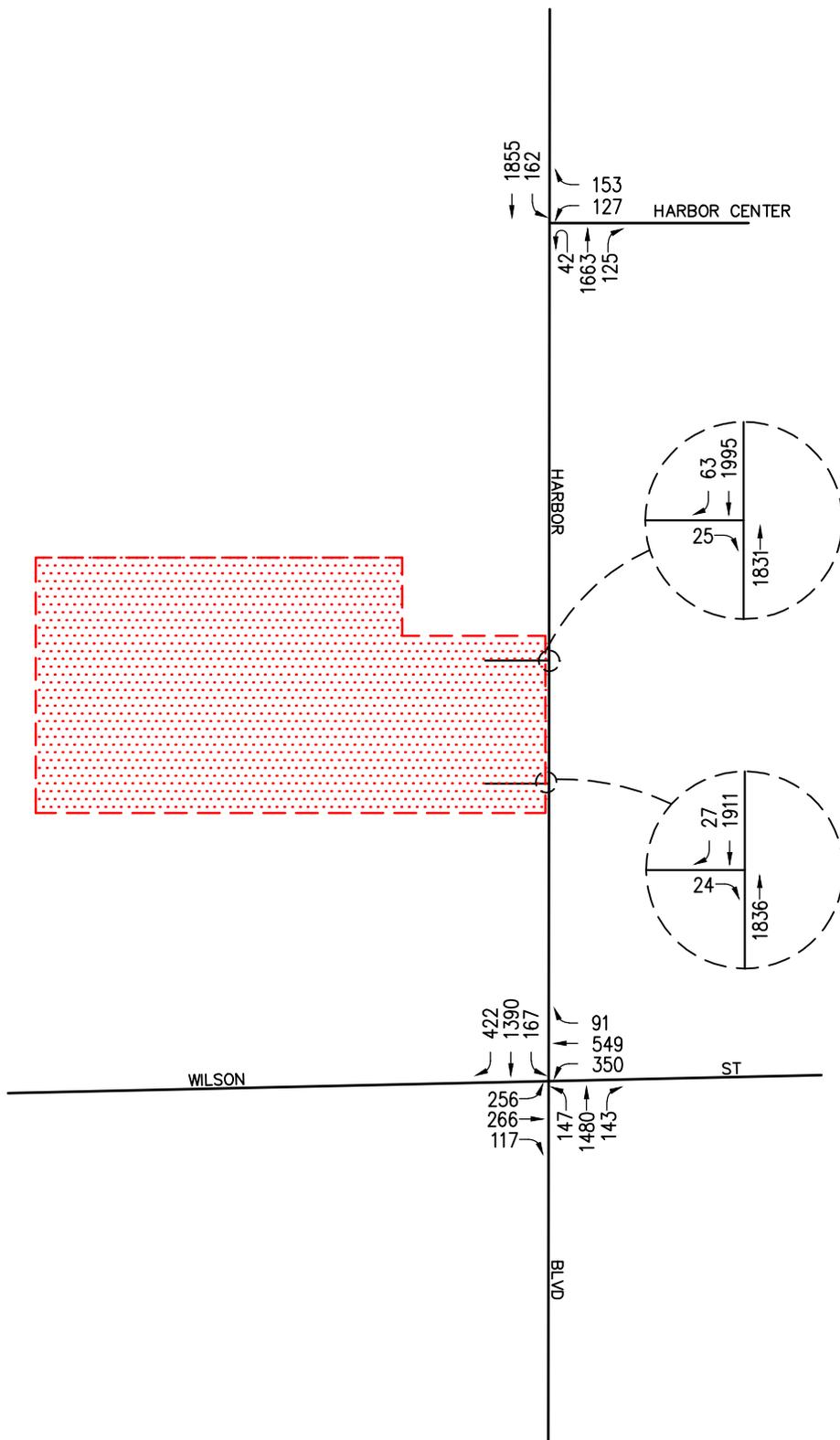


NO SCALE

KEY
 = PROJECT SITE

FIGURE 6-6

YEAR 2018 AM PEAK HOUR CUMULATIVE
TRAFFIC VOLUMES WITH PROJECT
COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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7.0 TRAFFIC IMPACT ANALYSIS METHODOLOGY

The relative impact of the proposed Project during the AM peak hour and PM peak hour was evaluated based on analysis of future operating conditions at the two (2) key study intersections, without, then with, the proposed Project. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each study intersection. The significance of the potential impacts of the Project at each key intersection was then evaluated using the following traffic impact criteria.

7.1 Significant Traffic Impact Criteria

Per the City of Costa Mesa guidelines, LOS D is the minimum acceptable level of service that should be maintained during the weekday AM peak hour and weekday PM peak hour. Per the City's criteria, the Project is considered to have a significant impact if the following criteria are met:

For Signalized Intersections:

- the ICU value under “with Project” conditions is 0.91 or greater (LOS E or F),
and
- the ICU increase attributable to the Project is 0.01 or greater.

For Unsignalized Intersections:

For unsignalized intersections an impact is considered to be significant if the project causes an intersection at LOS D or better to degrade to LOS E or F. However, unsignalized intersection LOS is based on the control delay, but delay is only assessed for those traffic movements that are stopped or must yield to through traffic. Some movements, including cross traffic on the minor street or left turns onto the major street are acceptable with long delays, provided through traffic and right turns from a major street do not experience any delays at stopped intersections. When delay for cross traffic is severe (LOS F), the intersection should be further evaluated for possible improvement with traffic signals. In some cases, this analysis determines that the delay is being experienced by a very low number of vehicles and traffic signals are not warranted. For this condition, the intersection does not need to be considered impacted, but measures to reduce delay may be considered, if appropriate. In other cases, the number of stopped vehicles is substantial and traffic signals may be justified as a mitigation measure.

- Therefore, the following significance criteria for unsignalized intersections is used in this traffic analysis:

An unsignalized intersection impact is considered to be significant if the project causes an intersection at LOS D or better to degrade to LOS E or F, and the traffic signal warrant analysis determines that a signal is justified.

7.2 Traffic Impact Analysis Scenarios

The following scenarios are those for which volume/capacity calculations have been performed at the two (2) key intersections for existing plus project and near-term (Year 2018) traffic conditions:

- A. Existing Traffic Conditions;
- B. Existing Plus Project Traffic Conditions;
- C. Scenario (B) with Improvements, if necessary;
- D. Near-Term (Year 2018) Cumulative Traffic Conditions,
- E. Near-Term (Year 2018) Cumulative plus Project Traffic Conditions;
- F. Scenario (E) with Improvements, if necessary.

8.0 INTERSECTION PEAK HOUR LOS ANALYSIS

8.1 Existing Plus Project Traffic Conditions

Table 8-1 summarizes the peak hour Level of Service results at the two (2) key study intersections for existing plus project traffic conditions. The first column (1) of ICU/LOS values in *Table 8-1* presents a summary of existing AM and PM peak hour traffic conditions (which were also presented in *Table 3-3*). The second column (2) lists existing plus project traffic conditions. The third column (3) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the LOS standards and significant impact criteria defined in this report.

Review of Columns 2 and 3 of *Table 8-1* indicates that traffic associated with the proposed Project ***will not*** significantly impact any of the two (2) key study intersections, when compared to the LOS standards and significant impact criteria specified in this report.

Appendix C presents the existing plus project ICU/LOS calculations for the key study intersections.

**TABLE 8-1
EXISTING PLUS PROJECT
INTERSECTION PEAK HOUR LOS**

Key Intersection	Time Period	(1) Existing Traffic Conditions ¹⁶		(2) Existing Plus Project Traffic Conditions		(3) Significant Impact	
		ICU	LOS	ICU	LOS	Increase	Yes/No
		1. Harbor Boulevard at Harbor Center	AM	0.338	A	0.346 ¹⁷	A
	PM	0.536	A	0.537	A	0.001	No
2. Harbor Boulevard at Wilson Street	AM	0.469	A	0.484	A	0.015	No
	PM	0.622	B	0.629	B	0.007	No

¹⁶ The existing volumes have been adjusted to account for the fully operational Costa Mesa Motor Inn motel.

¹⁷ With project conditions assumes implementation of a northbound U-turn lane.

8.2 Year 2018 Cumulative Traffic Conditions

Table 8-2 summarizes the peak hour Level of Service results at the two (2) key study intersections for the Year 2018 horizon year. The first column (1) of ICU/LOS values in *Table 8-2* presents a summary of existing AM and PM peak hour traffic conditions. The second column (2) lists projected cumulative traffic conditions (existing plus ambient plus related projects traffic) based on existing intersection geometry, but without any traffic generated from the proposed Project. The third column (3) presents forecast Year 2018 near-term traffic conditions with the addition of Project traffic. The fourth column (4) shows the increase in ICU value due to the added peak hour Project trips and indicates whether the traffic associated with the Project will have a significant impact based on the LOS standards and significant impact criteria defined in this report.

Review of column 2 of *Table 8-2* shows that projected near-term (Year 2018) without project traffic ***will not*** adversely impact any of the two (2) key study intersections when compared to the LOS standards in this report.

Review of Columns 3 and 4 of *Table 8-2* indicates that traffic associated with the proposed Project ***will not*** significantly impact any of the two (2) key study intersections, when compared to the LOS standards and significant impact criteria specified in this report.

Appendix C presents the near-term ICU/LOS calculations for the key study intersections.

TABLE 8-2
YEAR 2018
INTERSECTION PEAK HOUR LOS

Key Intersection	Time Period	(1) Existing Traffic Conditions ¹⁸		(2) Year 2018 Cumulative Traffic Conditions		(3) Year 2018 Cumulative Plus Project Traffic Conditions		(4) Significant Impact	
		ICU	LOS	ICU	LOS	ICU	LOS	Increase	Yes/No
1. Harbor Boulevard at Harbor Center	AM	0.338	A	0.371	A	0.379 ¹⁹	A	0.008	No
	PM	0.536	A	0.569	A	0.569	A	0.000	No
2. Harbor Boulevard at Wilson Street	AM	0.469	A	0.490	A	0.520	A	0.030	No
	PM	0.622	B	0.657	B	0.664	B	0.007	No

¹⁸ The existing volumes have been adjusted to account for the fully operational Costa Mesa Motor Inn motel.

¹⁹ With project conditions assumes implementation of a northbound U-turn lane.

9.0 SITE ACCESS AND INTERNAL CIRCULATION

9.1 Level of Service Analysis For Project Access Locations

As shown in *Figure 2-2*, vehicular access to the site from Harbor Boulevard is proposed to be provided via a right-turn in/right-turn out only driveway on the north (Project Driveway A), and a right-turn in/right-turn out only driveway on the south (Project Driveway B).

Based on conversations with City staff, due to the location of Project Driveway A, left-turn ingress at the midblock of Harbor Boulevard, between Wilson Street and Harbor Center, will be restricted. To facilitate ingress to the site median modifications are proposed as project design features. The access design features that will be constructed as part of the Project (and which are not mitigation measures intended to address Project-significant traffic impacts) include the following:

- Median modifications midblock to restrict northbound left-turn/U-turn movements from Harbor Boulevard
- Median modifications at Harbor Boulevard and Harbor Center to provide a U-turn only lane in the northbound direction along with signal modifications to provide proper signal phasing

These recommended improvements will be subject to the review and final approval of the City of Costa Mesa Transportation Services Division. Please note that based on these Project access design features, a shift in background traffic patterns is expected, and these have been accounted for under future traffic conditions with development of the Project. *Figure 2-3* presents the conceptual access improvements along Harbor Boulevard.

Table 9-1 summarizes the intersection operations for the two project driveways for Existing Year traffic conditions with the project and Year 2018 traffic conditions with the Project. Review of column one (1) in *Table 9-1* shows that project driveway intersections are forecast to operate at an acceptable LOS B or better during the AM and PM peak hours for Existing Year traffic. Review of column two (2) in *Table 9-1* shows that project driveways are forecast to operate at an acceptable LOS B or better during the AM and PM peak hours in the Year 2018. As such, motorists entering and exiting the Project site will be able to do so comfortably, safely, and without undue congestion.

Appendix D contains the detailed level of service calculation worksheets for the Project driveways.

9.2 Queuing Analysis For Project Access Locations

In response to City staff concerns, stacking/storage requirements at the Project driveways were evaluated. The queuing evaluation was conducted based on Year 2018 plus Project peak hour driveway traffic volumes and the Highway Capacity Manual (HCM) unsignalized methodology.

Harbor Boulevard at Driveway A: Based on the HCM service level calculation, which calculates a critical (95th percentile) queue value in number of vehicles, the AM peak hour and PM peak hour queue length is not more than one (1) vehicle for the eastbound (outbound) movement at Driveway

A. Review of the proposed site plan indicates that Driveway A provides one outbound lane (right-turn only) with stacking sufficient enough to accommodate up to nine (9) vehicles.

Harbor Boulevard at Driveway B: The AM peak hour and PM peak hour queue length is not more than one (1) vehicle for the eastbound (outbound) movement at proposed Driveway B. Review of the proposed site plan indicates that Driveway B provides one outbound lane with stacking sufficient enough to accommodate up to seven (7) vehicles.

9.3 Internal Circulation Evaluation

Based upon review of the conceptual site plan prepared by GMPA Architects, the proposed on-site circulation layout is adequate. Based on our evaluation, curb return radii have been confirmed and are considered adequate for small service/delivery trucks (Fedex, UPS), trash trucks, large delivery trucks and fire trucks.

**TABLE 9-1
YEAR 2018**

INTERSECTION PEAK HOUR LOS AT PROJECT DRIVEWAYS

Project Driveways	Time Period	(1) Existing Plus Project Traffic Conditions		(2) Year 2018 Cumulative Plus Project Traffic Conditions	
		HCM	LOS	HCM	LOS
A. Harbor Boulevard at Project Driveway A	AM	10.9 s/v	B	11.1 s/v	B
	PM	14.1 s/v	B	14.9 s/v	B
B. Harbor Boulevard at Project Driveway B	AM	10.8 s/v	B	11.0 s/v	B
	PM	13.4 s/v	B	14.2 s/v	B

Notes:

- s/v = seconds per vehicle

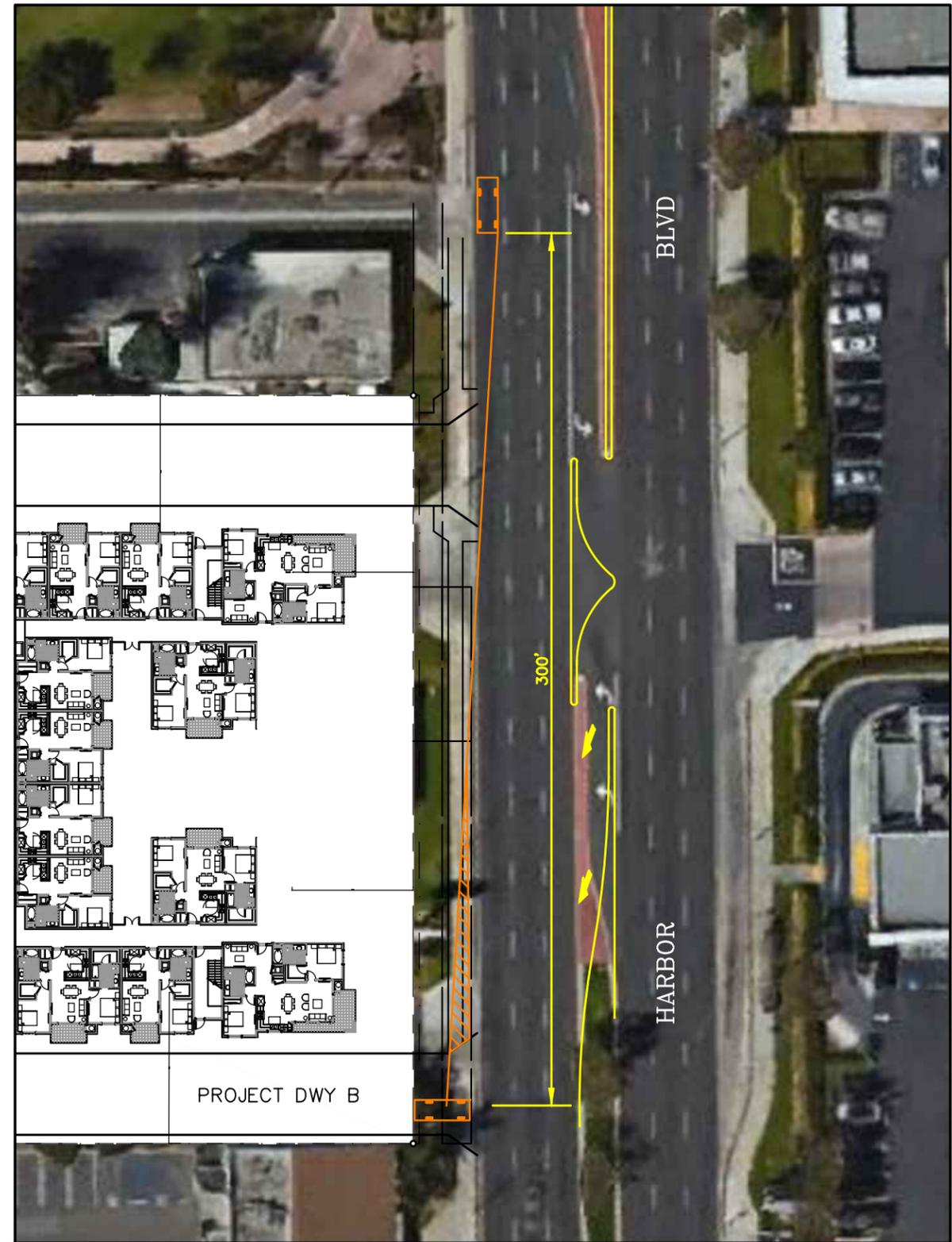
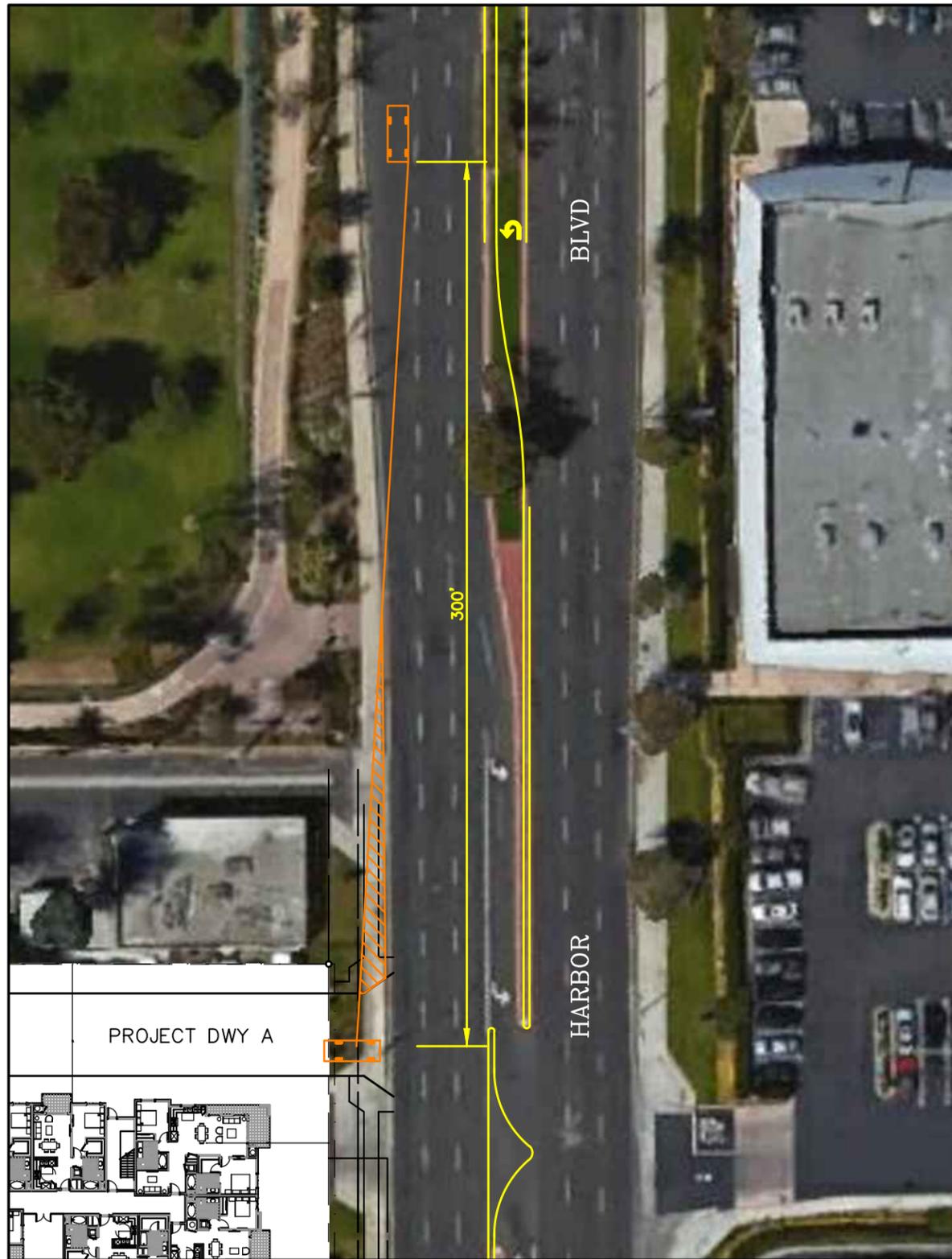
9.4 Sight Distance Evaluation

At project driveways, a clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed. The Sight Distance Evaluation prepared for the proposed Project driveways was based on the criteria and procedures set forth by the California Department of Transportation (Caltrans) in the State's *Highway Design Manual (HDM)*.

The Caltrans HDM, in Section 405.1(2)(c), page 400-22, indicates that for Private Road Intersections, "The minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1...", where stopping sight distance is defined as the distance required by the driver of a vehicle, traveling at a given speed, to bring his vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, which are assumed to be 3.5 feet above the pavement surface, to an object 0.5-foot high on the roadway. The speed used in determining stopping sight distance is defined as the "critical speed" or 85th percentile speed which is the speed at which 85% of the vehicles are traveling at or less. The critical speed is the single most important factor in determining stopping sight distance. Table 201.1 in the HDM is used in determining stopping sight distance based on the critical speed of vehicles on the affected roadway.

For this analysis, a design speed of 40 miles per hour for was utilized. Using Table 201.1, titled *Sight Distance Standards*, in the Caltrans HDM for stopping, a minimum stopping sight distance of 300 feet applies based on the critical speed of 40 mph.

Figure 9-1 presents the results of the sight distance evaluation for the Project driveways on Harbor Boulevard based on the application of the stopping sight distance criteria. The figures illustrate the limited use areas. As shown, the sight lines at the proposed Project driveways are expected to be adequate, as long as obstructions within the sight triangles are minimized.



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STOPPING SIGHT DISTANCE

DESIGN SPEED LIMIT:	40 MPH
REQUIRED CORNER SIGHT DISTANCE:	300 FEET

LEGEND

 LIMITED USE AREA: TO ENSURE ADEQUATE SIGHT DISTANCE, HARDSCAPE AND/OR LANDSCAPE SHALL NOT BE HIGHER THAN 30 INCHES. NO FENCES OR WALLS IN LIMITED USE AREA.

FIGURE 9-1

STOPPING SIGHT DISTANCE ANALYSIS
COSTA MESA MOTOR INN, COSTA MESA

10.0 SYNCHRO OPERATIONS ASSESSMENT

10.1 Year 2018 Cumulative Plus Project Traffic Conditions

In order to validate the existing southbound left-turn storage requirement on Harbor Boulevard at Wilson Street and the proposed northbound U-turn storage requirement on Harbor Boulevard at Harbor Center, a comprehensive traffic operations analysis of Harbor Boulevard between Wilson Street and Harbor Center was conducted utilizing the *SYNCHRO 9.0* traffic analysis software. Signal timing plans for the intersections of Harbor Boulevard at Harbor Center and Harbor Boulevard at Wilson Street were obtained from the City Costa Mesa staff and utilized within the Synchro network. Modifications to the signal phasing were implemented at the intersection of Harbor Boulevard and Harbor Center to account for the proposed northbound U-turn lane. Additionally, the Synchro network is consistent with the project improvements described in section 2.0 and presented in *Figure 2-3*.

10.1.1 Harbor Boulevard Queuing Assessment

The results of the queuing assessment, utilizing the *SYNCHRO 9.0* traffic analysis software, indicates that the existing southbound left-turn pocket on Harbor Boulevard at Wilson Street, which measures 200-feet with a 90-foot transition, is sufficient and will accommodate existing and forecast traffic volumes, inclusive of Project traffic. Further, the results of the queuing analysis indicate that the proposed northbound left-turn/U-turn pocket on Harbor Boulevard at Harbor Center, which will be designed with a 100-feet of storage with a 90-foot transition, will be sufficient as well.

Appendix E presents the detailed Synchro SimTraffic queuing results and level of service worksheets.

11.0 TRAFFIC IMPACT FEES

Pursuant to the requirements of the City of Costa Mesa, Traffic Impact Fees will be required of the proposed Project. The purpose of the fee is to fund the necessary transportation/circulation improvements that are related to incremental traffic impacts on the City's circulation system by new development. The "City-wide" traffic impact fee, based on Average Daily Trips Ends (ADT), for all new development is assessed based on an incremental basis.

Based on full occupancy, the existing motel generates 1,258 daily trips, and the proposed development is expected to generate 1,490 daily trips. This corresponds to a difference of 232 daily trips. Review of *Table 11-1* indicates that applying the net daily trips to the trip fee would result in a Project contribution of \$41,992. The precise fee will be determined upon issuance of building permits for the Project.

**TABLE 11-1
TRAFFIC IMPACT FEES**

Average Daily Trip Ends (ADT)	Traffic Impact Fee Rate (\$ per ADT)	Project ADT	Project Traffic Impact Fee
▪ 0 to 25 ADT	\$0 / ADT	0 ADT	\$0.00
▪ 26 to 50 ADT for incremental trips exceeding 25 ADT	\$50 / ADT	0 ADT	\$0.00
▪ 51 to 75 ADT for incremental trips exceeding 50ADT	\$75 / ADT	0 ADT	\$0.00
▪ 75 to 100 ADT for incremental trips exceeding 75 ADT	\$100 / ADT	0 ADT	\$0.00
▪ > 100 ADT for incremental trips exceeding 100 ADT	\$181 / ADT	232 ADT	\$41,992
	TOTALS	232 ADT	\$41,992

Notes:

- ADT = Average Daily Traffic

12.0 PARKING ANALYSIS

12.1 City Code Parking Requirements

The parking requirements for the proposed Project are based on the City of Costa Mesa requirements as outlined in *Section 13-85 Parking required* of the City of Costa Mesa Municipal Code.

The City's Municipal Code specifies the parking requirements for residential uses. Based on a review of the City's requirements, the following application code parking ratios have been utilized to calculate the parking requirements of the proposed Project:

Attached Residential Units²²

- one bedroom units – 1 covered space, 1 open space and 0.5 guest space
- two bedroom units – 1 covered space, 1.5 open space and 0.5 guest space

The above-referenced City parking codes were applied to the proposed Project. *Table 12-1* summarizes the parking requirements for the proposed project. As shown, direct application of the City's code to the proposed Project results in a code-parking requirement of 503 spaces. When compared against the proposed parking supply of 503 spaces, the Project satisfies the City's requirements.

²² Source: For attached residential units, City of Costa Mesa Municipal Code *Table 13-85*.

**TABLE 12-1
CITY CODE PARKING REQUIREMENTS²³**

Project Description	Size	Code Parking Ratio	Spaces Required	
			Covered	Uncovered
<u>Attached Residential Units (79 DU)</u>				
▪ 1 Bedroom Units	140 Units	1 space covered, 1.0 spaces uncovered per unit	140	140
▪ 2 Bedroom Units	84 Units	1 space covered, 1.5 spaces uncovered per unit	84	126
▪ Guest Parking	224 Units	0.5 spaces per unit for first 50 units, 0.25 spaces beyond 50 units	--	69
▪ Credit for Covered Spaces	224 Units	0.25 spaces per unit	-56	--
Total Code Parking Requirement:				503
Proposed Parking Supply:				503
City Parking Requirement Satisfied (Yes/No):				Yes

²³ Source: City of Costa Mesa Municipal Code.

13.0 CONGESTION MANAGEMENT PROGRAM (CMP) COMPLIANCE ASSESSMENT

This analysis is consistent with the requirements and procedures outlined in the current *Orange County Congestion Management Program (CMP)*. The CMP requires that a traffic impact analysis be conducted for any project generating 2,400 or more daily trips, or 1,600 or more daily trips for projects that directly access the CMP Highway System (HS). Per the CMP guidelines, this number is based on the desire to analyze any impacts that will be 3.0% or more of the existing CMP highway system facilities' capacity.

However, as noted in this traffic study, the proposed Project is expected to generate 1,490 daily trips, and thus does not meet the criteria required for a CMP traffic analysis. Therefore, it is concluded that the proposed Project will not have any significant traffic impacts on the Congestion Management Program Highway System.

14.0 SUMMARY OF FINDINGS AND CONCLUSIONS

- **Project Description** – The Project site is located at 2277 Harbor Boulevard, west of Harbor Boulevard and north of Wilson Street in the City of Costa Mesa, California. The property is currently developed with a 236-room motel of which only 159-rooms are currently occupied. The proposed Project includes the conversion of the existing motel site into a 224-unit apartment complex, which includes the development of one-bedroom units, two-bedroom units and a multi-level parking structure.
- **Study Scope** – The two (2) key study intersections selected for evaluation in this report provide both regional and local access to the study area. They consist of the following:

Study Intersections

1. Harbor Boulevard at Harbor Center
 2. Harbor Boulevard at Wilson Street
- **Existing Traffic Conditions** – The two (2) key study intersections currently operate at acceptable service levels (LOS D or better) during the AM and PM peak hour.
 - **Project Trip Generation** – the proposed Project is forecast to generate 1,490 daily trips, with 114 trips (23 inbound, 91 outbound) produced in the AM peak hour and 139 trips (90 inbound, 49 outbound) produced in the PM peak hour. The existing fully occupied motel is forecast to generate 1,258 daily trips, with 66 trips (26 inbound, 40 outbound) produced in the AM peak hour and 118 trips (61 inbound, 57 outbound) produced in the PM peak hour.

When the proposed Project is compared to the existing fully occupied motel, the Project is forecast to result in 232 additional daily trips, 48 net AM peak hour trips and 21 net PM peak hour. The potential impact of these added trips are assessed in this report.

- **Existing Plus Project Traffic Conditions** – Traffic associated with the proposed Project will not significantly impact any of the two (2) key study intersections, when compared to the LOS standards and significant impact criteria specified in this report.
- **Year 2018 Cumulative Plus Project Traffic Conditions** – Traffic associated with the proposed Project will not significantly impact any of the two (2) key study intersections, when compared to the LOS standards and significant impact criteria specified in this report.
- **Site Access** - Vehicular access to the site from Harbor Boulevard is proposed to be provided via a right-turn in/right-turn out only driveway on the north (Project Driveway A), and a right-turn in/right-turn out only driveway on the south (Project Driveway B). Based on conversations with City staff, due to the location of Project Driveway A, left-turn ingress at the midblock of Harbor Boulevard, between Wilson Street and Harbor Center, will be restricted. To help facilitate ingress to the site median modifications are proposed as project design features. The access design features that will be constructed as part of the Project (and which are not mitigation measures intended to address Project-significant traffic impacts) include the following:

- ❑ Median modifications midblock to restrict northbound left-turn/U-turn movements from Harbor Boulevard
- ❑ Median modifications at Harbor Boulevard and Harbor Center to provide a U-turn only lane in the northbound direction along with signal modifications to provide proper signal phasing

These recommended improvements will be subject to the review and final approval of the City of Costa Mesa Transportation Services Division.

Project driveway intersections are forecast to operate at an acceptable LOS B or better during the AM and PM peak hours in the Year 2018. As such, motorists entering and exiting the Project site will be able to do so comfortably, safely, and without undue congestion.

Driveway stacking/storage requirements were also evaluated, and both Driveway A and Driveway B are considered adequate.

Based upon review of the conceptual site plan prepared by GMPA Architects, the proposed on-site circulation layout is also adequate.

Based on the application of stopping sight distance criteria, the results of the sight distance evaluation indicate that both Driveway A and Driveway B are adequate, as long as obstructions within the sight triangles are minimized.

The Synchro queuing results indicate that even with the addition of the proposed project, the existing and proposed storage lengths will be sufficient to accommodate the added volume.

- ***Project Traffic Impact Fees*** - Based on the City's Traffic Impact Fee Program, the proposed Project can be expected to pay a total of \$41,992 in Traffic Impact Fees. The precise fees will be determined upon issuance of Project building permits.
- ***Parking Analysis*** – Direct application of the City's code to the proposed Project results in a code-parking requirement of 503 spaces. When compared against the proposed parking supply of 503 spaces, the Project satisfies the City's parking requirements.
- ***CMP Compliance Assessment*** – No significant impacts are expected to occur on the Orange County Congestion Management Program roadway network due to the development and full occupancy of the proposed Project

APPENDIX A
SCOPE OF WORK

MEMORANDUM

To: Mr. Pritam Deshmukh, P.E.
City of Costa Mesa

Date: June 4, 2015

From: Shane Green, P.E.
LLG Engineers

LLG Ref: 2.15.3560.1

Subject: *Traffic Study Scope of Work for the
Costa Mesa Motor Inn Apartment Project
Costa Mesa, California*

Engineers & Planners
Traffic
Transportation
Parking

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Based on discussions and email transactions with the City of Costa Mesa, Linscott, Law & Greenspan, Engineers (LLG) is pleased to document the following Traffic Study Scope of Work for the proposed Costa Mesa Motor Inn Apartments Project (herein referred to as Project) in the City of Costa Mesa, California.

Traffic Study Scope of Work

The Traffic Impact Analysis for the proposed Costa Mesa Motor Inn Apartments will satisfy the traffic impact requirements of the City of Costa Mesa and be consistent with the requirements and procedures outlined in the current *2013 Congestion Management Program (CMP) for Orange County*.

- A. Project Address/Location:** The Project site is located at 2277 Harbor Boulevard in the City of Costa Mesa, California. The subject property is currently developed with a 232 room motel. Please note that during the existing counts the motel was only occupied with 159 rooms. Access to the Project site is now provided via a full access driveway along Harbor Boulevard and right-turn in/out only driveway. See attached *Figure 1-1*, a Vicinity Map that illustrates the general location of the Project and surrounding street system. *Figure 2-1* is an existing aerial photograph of the Project site.
- B. Project Description:** The proposed Project includes the conversion of 232 room motel into a 224 unit apartment complex, consisting of 124 one-bedroom units, 16 one-bedroom units with a den, 76 two-bedroom units, 8 two-bedroom units with a den, and a 503 space multi-level parking structure. Access to the site is proposed to be provided via one right-turn in/right-turn out only driveway to the north (herein referred to as Project Driveway A) and one right-turn in/right-turn out only driveway to the south (herein referred to as Project Driveway B) along Harbor Boulevard. *Figure 2-2* illustrates the preliminary site plan for the Project prepared by GMPA Architects, dated April 2015.

Based on discussion with City Staff the project will be responsible for implementing median modifications along Harbor Boulevard to help facilitate ingress and egress to the site. *Figure 2-3* presents the conceptual improvement plan for Harbor Boulevard.

- C. Traffic Study Locations:** Based on our preliminary discussions and review of the project vicinity, the following two (2) key study intersections represent a list of study intersections to be evaluated in the Project's traffic impact study.

Study Intersections

1. Harbor Boulevard at Harbor Center (Signalized)
2. Harbor Boulevard at Wilson Street (Signalized)

- D. Traffic Counts:** AM peak hour and PM peak hour traffic counts for the two (2) key study intersections were collected during the AM peak period and PM peak period of a typical weekday. The traffic counts were collected in March 2015.

Please note that during the time of the counts the existing motel only had 159 occupied rooms. Therefore, the existing counts will be adjusted to account for a fully operational motel with 232 rooms.

- E. Project Trip Generation:** The trip generation potential of the proposed Project will be estimated using the average rates for ITE Land Use 220: Apartments published in the *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012)*. For the existing motel, daily counts were conducted in March 2015 at the existing driveways to derive daily, AM, and PM peak hour trip rates.

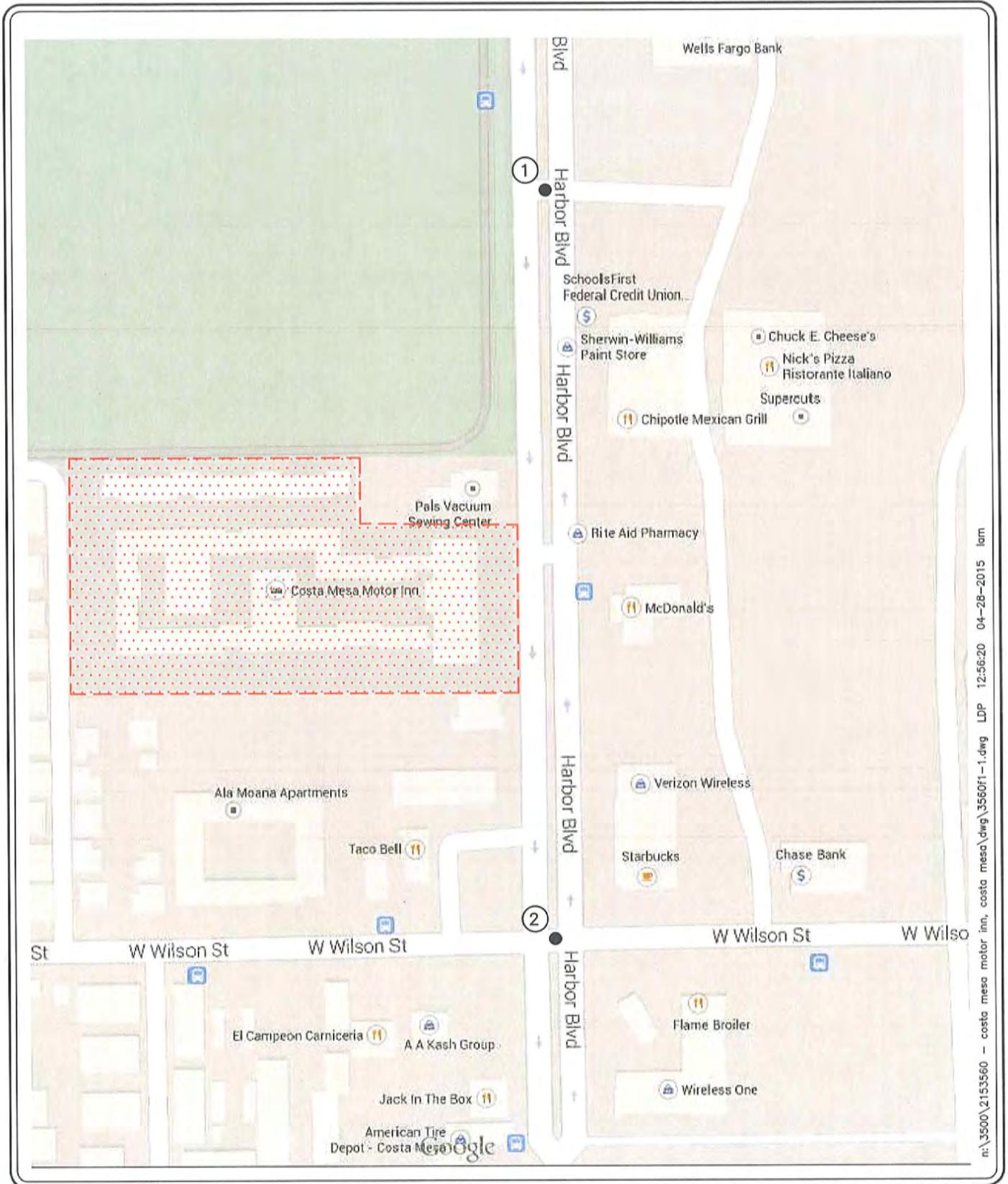
While the upper half of *Table 1* summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project Land Use, the lower half provides a summary of the Project's daily, AM and PM peak hour trip generation potential as well as the existing motel's trip generation "budget" assuming full occupancy of the site.

A review of *Table 1* shows the trip generation forecast for the Project. As shown, the proposed Project is forecast to generate 1,490 daily trips, with 114 trips (23 inbound, 91 outbound) produced in the AM peak hour and 139 trips (90 inbound, 49 outbound) produced in the PM peak hour. The existing motel assuming full occupancy is forecast to generate 1,237 daily trips, with 65 trips (26 inbound, 39 outbound) produced in the AM peak hour and 116 trips (60 inbound, 56 outbound) produced in the PM peak hour.

When the proposed Project is compared to the existing fully occupied motel, the Project is forecast to result in 253 additional daily trips, 49 net AM peak hour trips and 23 net PM peak hour trips.

- F. Trip Distribution:** See attached *Figure 5-1* for the Project Trip Distribution Pattern as well as a tabular summary on *Table 2*. *Figures 5-2* and *5-3* show the project volumes for the AM and PM peak hours, respectively. Project traffic

- Perform a Synchro operations assessment along Harbor Boulevard to validate the existing southbound left-turn storage requirement at Wilson Street and the proposed northbound U-turn storage requirement at Harbor Center.



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SOURCE: GOOGLE

KEY

- = STUDY INTERSECTION
- = PROJECT SITE

FIGURE 1-1

VICINITY MAP

COSTA MESA MOTOR INN, COSTA MESA

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engineers



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SOURCE: GOOGLE

KEY

 = PROJECT SITE



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LAW &
GREENSPAN
engineers

FIGURE 2-1

EXISTING SITE AERIAL
COSTA MESA MOTOR INN, COSTA MESA



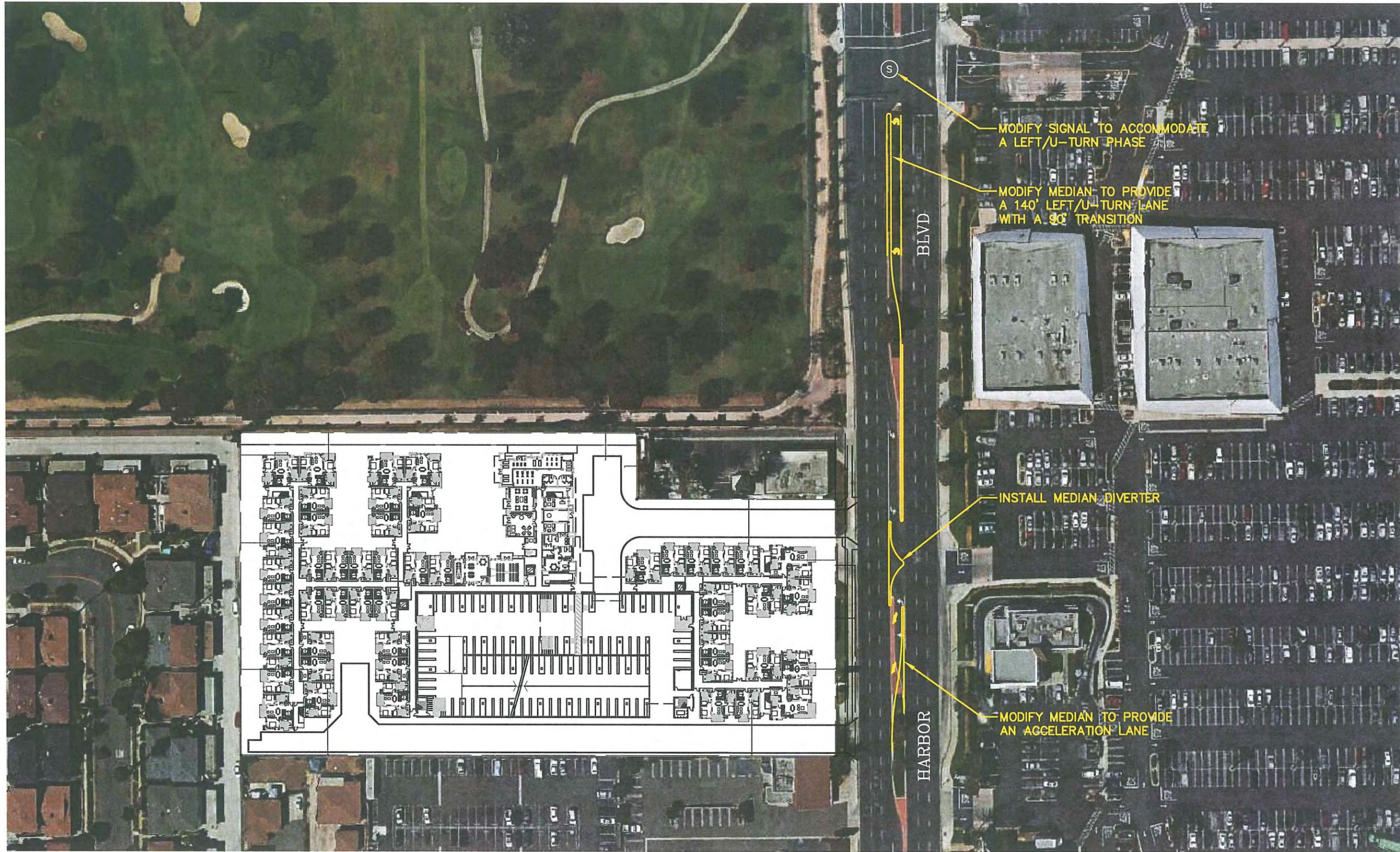
FIGURE 2-2
PROPOSED SITE PLAN
 COSTA MESA MOTOR INN, COSTA MESA

SOURCE: GMPA ARCHITECTS



NO SCALE

**LINSCOTT
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 GREENSPAN**
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FIGURE 2-3

CONCEPT IMPROVEMENT PLAN FOR HARBOR BOULEVARD
COSTA MESA MOTOR INN, COSTA MESA

TABLE 1
PROJECT TRAFFIC GENERATION FORECAST¹

ITE Land Use Code / Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Generation Rates:							
▪ ITE 220: Apartment (TE/DU)	6.65	0.10	0.41	0.51	0.40	0.22	0.62
▪ Empirical Rate: Motel (TE/Room) ²	5.33	0.11	0.17	0.28	0.26	0.24	0.50
Generation Forecasts:							
<u>Proposed Project</u>							
▪ Apartments (224 DU)	1,490	23	91	114	90	49	139
<u>Existing Occupied Floor Area</u>							
▪ Existing Fully Occupied Motel (232 Rooms) ³	<u>1,237</u>	<u>26</u>	<u>39</u>	<u>65</u>	<u>60</u>	<u>56</u>	<u>116</u>
Total "Net" Project Trip Generation: Proposed Project Minus Existing Motel	253	-3	52	49	30	-7	23

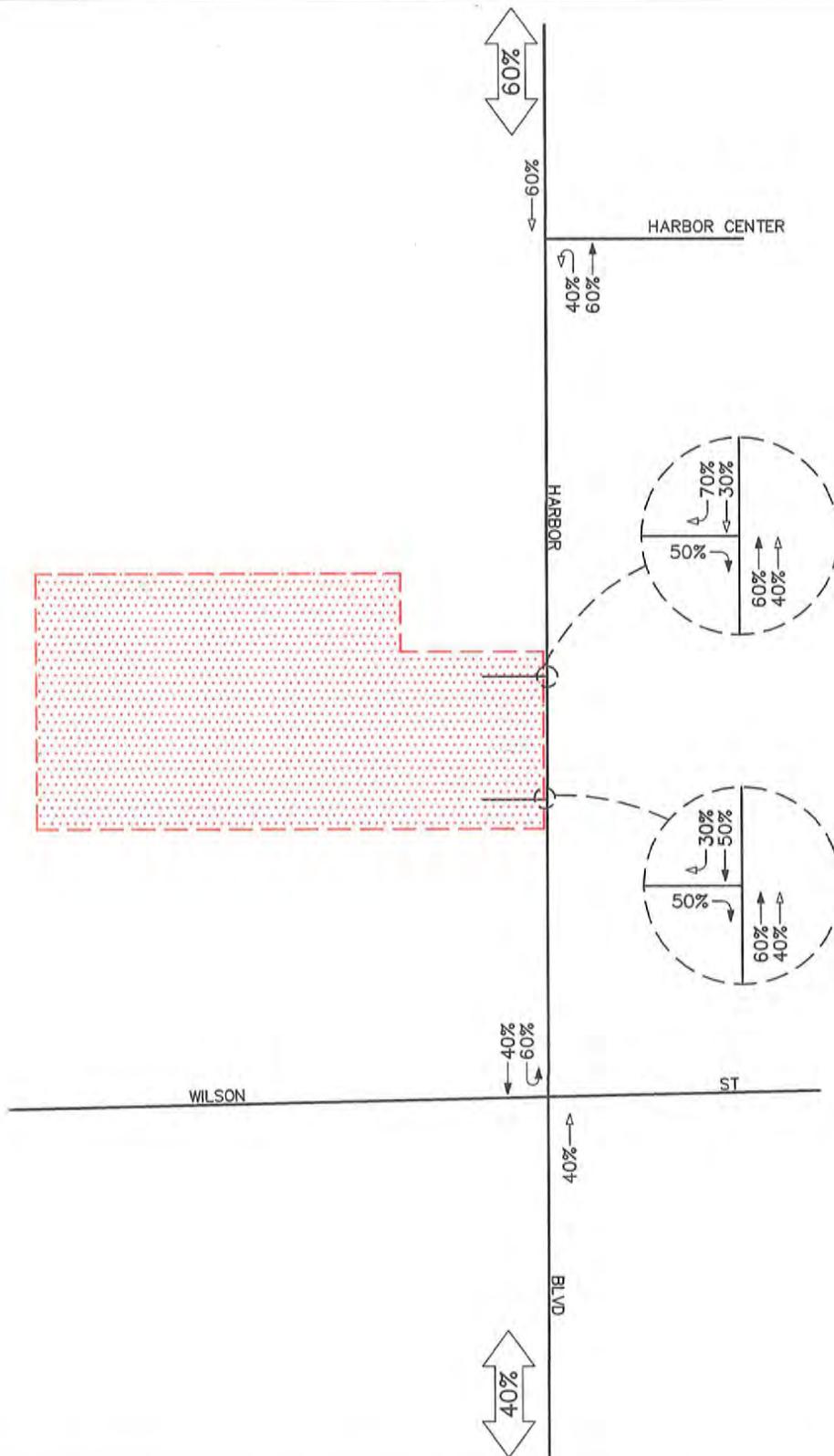
Notes:

TE/DU = Trip end per dwelling unit
TE/Room = Trip ends per room

¹ Source: *Trip Generation, 9th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2012)].

² Trip rates for the existing motel are based on driveway counts conducted at the existing site on Thursday, March 5, 2015. Please note that during the counts the existing motel had occupancy of 159 rooms.

³ Trip ends for the existing motel were calculated using the empirically derived rate applied to the full occupancy (232 rooms).



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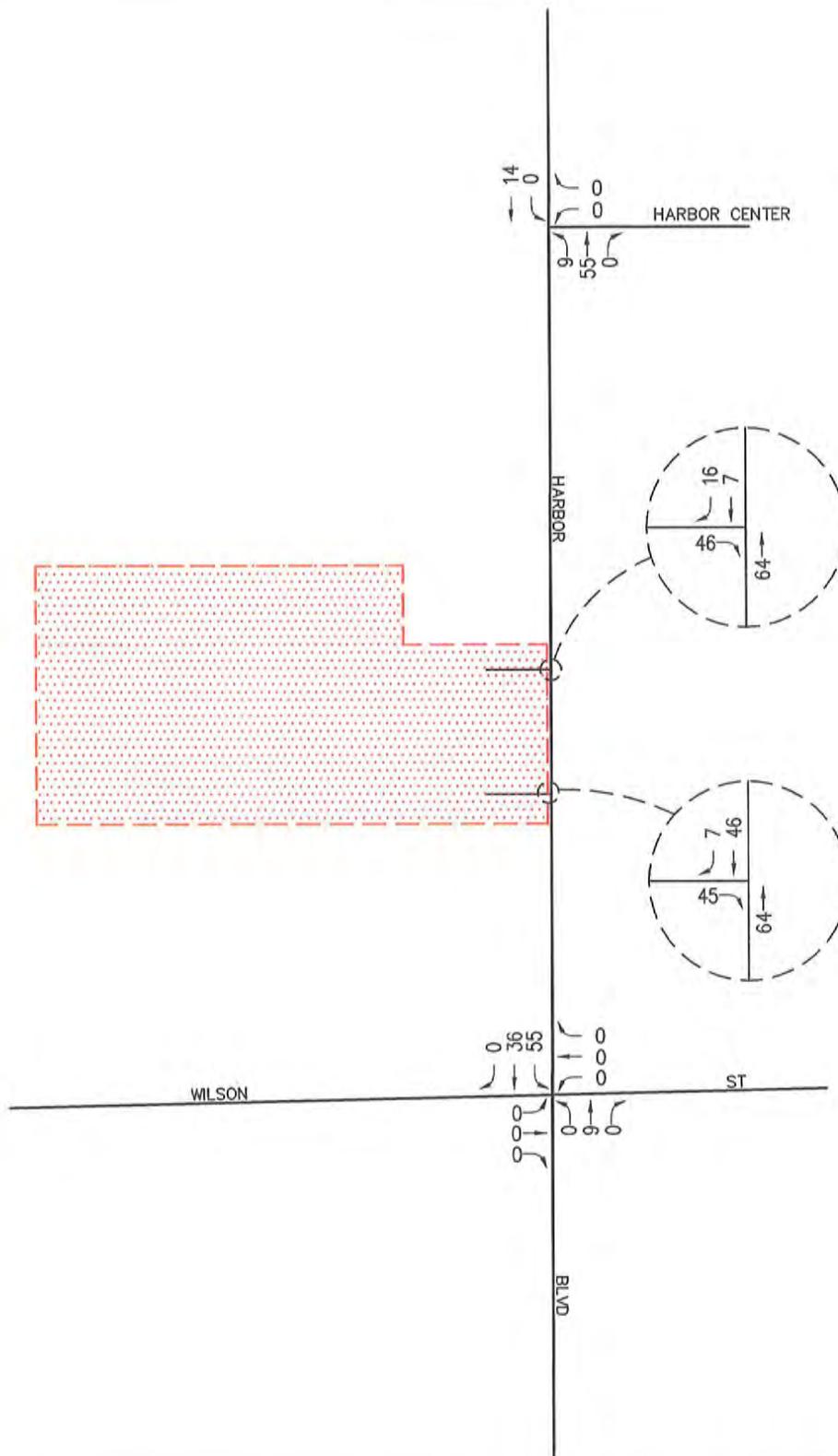
- = INBOUND PERCENTAGE
- = OUTBOUND PERCENTAGE
- = PROJECT SITE

FIGURE 5-1

PROJECT DISTRIBUTION PATTERN
COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA

TABLE 2
PROJECT DIRECTIONAL DISTRIBUTION PATTERN

Distribution Percentage	Orientation/Direction
60%	To/from the north via Harbor Boulevard
40%	To/from the south via Harbor Boulevard
100%	Total



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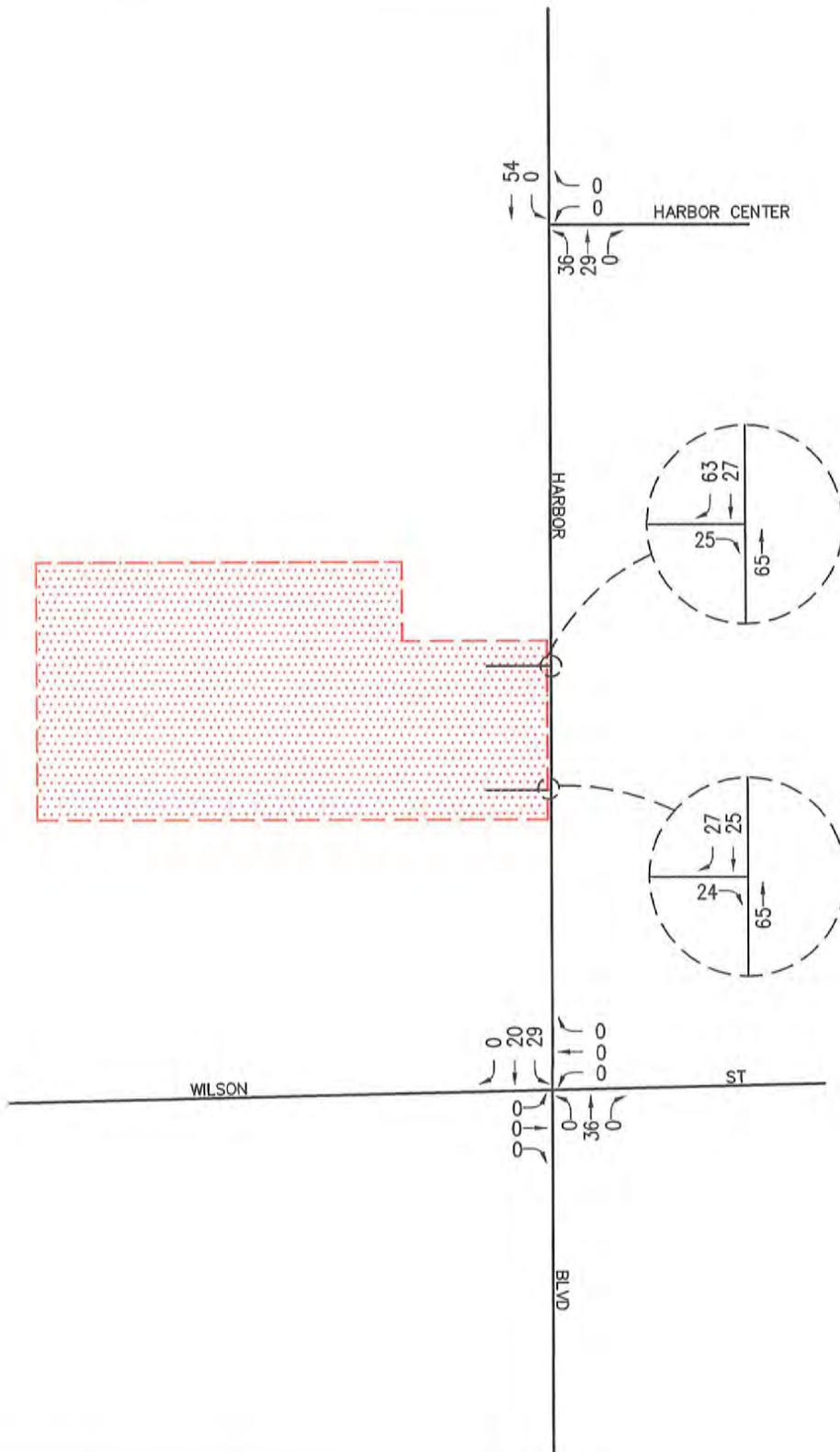
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FIGURE 5-2

AM PEAK HOUR PROJECT TRAFFIC VOLUMES
COSTA MESA MOTOR INN, COSTA MESA



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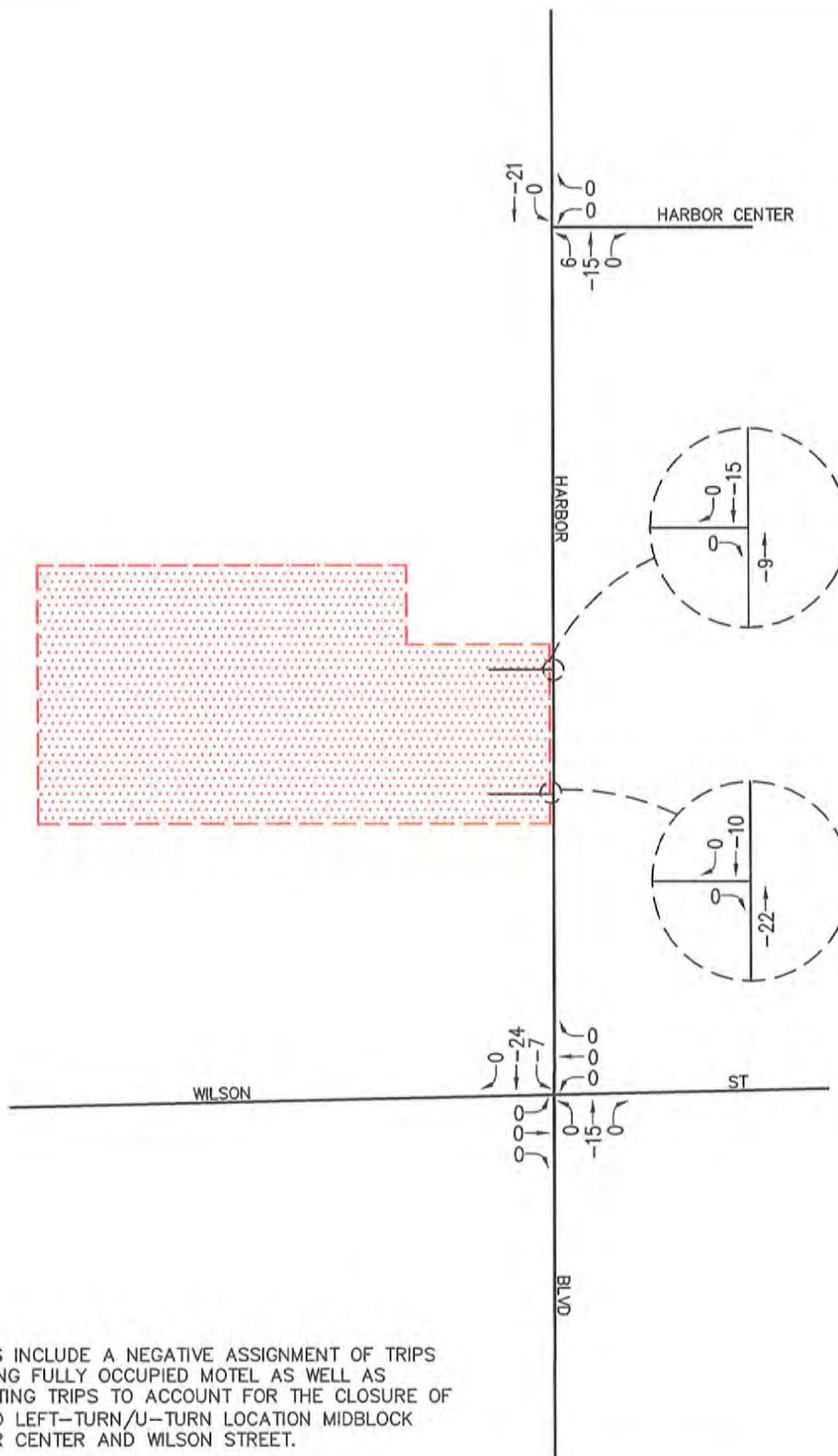
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FIGURE 5-3

PM PEAK HOUR PROJECT TRAFFIC VOLUMES
COSTA MESA MOTOR INN, COSTA MESA



NOTE:
 TRAFFIC VOLUMES INCLUDE A NEGATIVE ASSIGNMENT OF TRIPS FROM THE EXISTING FULLY OCCUPIED MOTEL AS WELL AS RE-ROUTED EXISTING TRIPS TO ACCOUNT FOR THE CLOSURE OF THE NORTHBOUND LEFT-TURN/U-TURN LOCATION MIDBLOCK BETWEEN HARBOR CENTER AND WILSON STREET.

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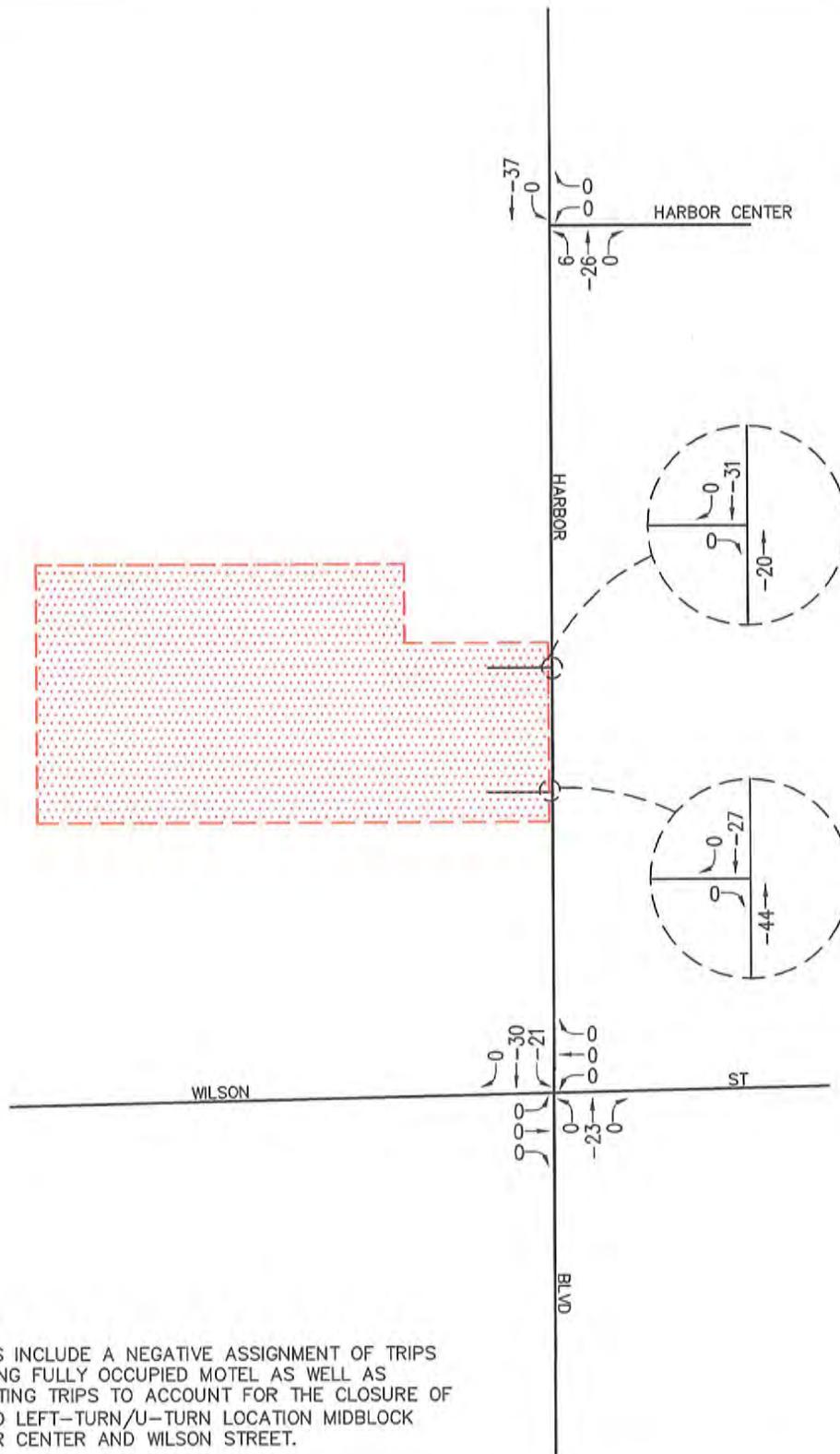
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FIGURE 5-4

EXISTING MOTEL AND RE-ROUTE
 AM PEAK HOUR TRAFFIC VOLUMES
 COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



NOTE:
 TRAFFIC VOLUMES INCLUDE A NEGATIVE ASSIGNMENT OF TRIPS FROM THE EXISTING FULLY OCCUPIED MOTEL AS WELL AS RE-ROUTED EXISTING TRIPS TO ACCOUNT FOR THE CLOSURE OF THE NORTHBOUND LEFT-TURN/U-TURN LOCATION MIDBLOCK BETWEEN HARBOR CENTER AND WILSON STREET.

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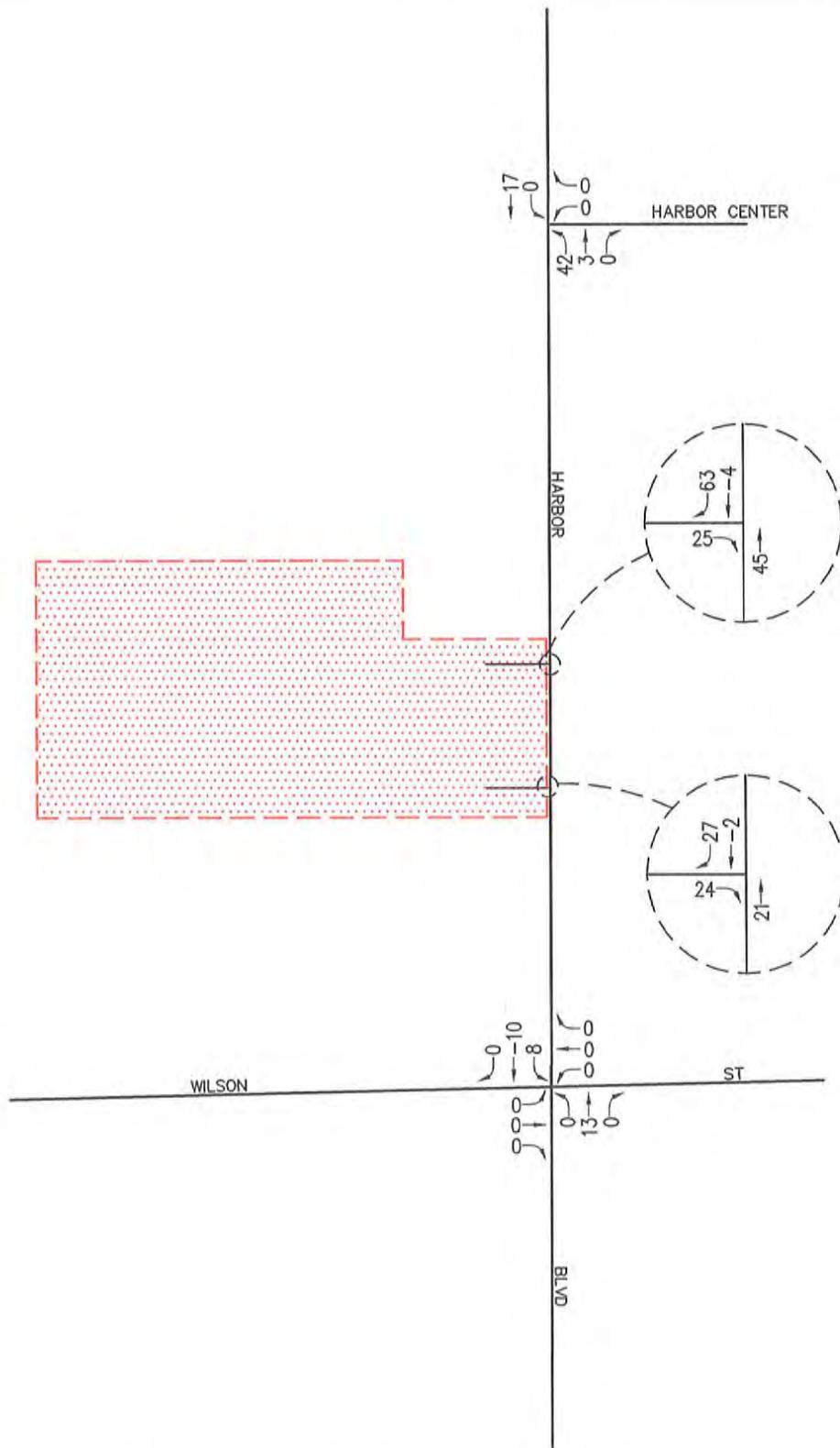
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FIGURE 5-5

EXISTING MOTEL AND RE-ROUTE
 PM PEAK HOUR TRAFFIC VOLUMES
 COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA



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FIGURE 5-7

PM PEAK HOUR
NET PROJECT TRAFFIC VOLUMES
COSTA MESA MOTOR INN RESIDENTIAL PROJECT, COSTA MESA

TABLE 3
LOCATION AND DESCRIPTION OF RELATED PROJECTS⁴

No.	Cumulative Project	Address	Description/Size
1.	573 Victoria Street	Southeast of Maple Street and north of Hamilton Street	37 DU live/work
2.	421 Bernard Street	East of Harbor Boulevard and North of 19 th Street	113 DU apartments
3.	1500 Mesa Verde Drive	West of Harbor Boulevard and North of Mesa Verde Drive	215 DU senior apartments
4.	372 Victoria Street	East of College Avenue and South of Avocado Street	30 DU condominiums
5.	2025 Placentia Avenue	Southwest of Hamilton Street and north of W. 20 th Street	36 DU live/work
6.	2026 Placentia Avenue	North of W 20 th Street and West of Palace Avenue	15 DU live/work
7.	2075 Placentia Avenue	South of Hamilton Street and West of Placentia Avenue	14 DU live/work
8.	OCC Master Plan	West of Fairview Road between Adams Avenue and Merrimac Way	120 room hotel, 15,000 SF shopping center, 1,900 bed student housing, 6,922 net increase student growth
9.	2095 Harbor Boulevard	South of Hamilton Street	28 DU live/work
10.	ArgoTech Residential	671 W. 17 th Street	42 detached live/work units, 89 attached live/work units, and 46 attached lofts
11.	Ametek Residential	1620-1644 Whittier Avenue	49 DU detached residential and 40 DU live/work units
12.	Walgreens Store	1726 Superior Avenue	14.310 TSF pharmacy/drugstore without drive-thru

⁴ Source: City of Costa Mesa Planning Department

APPENDIX B
EXISTING TRAFFIC COUNT DATA

ITM Peak Hour Summary

Prepared by:
NDS

National Data & Surveying Services

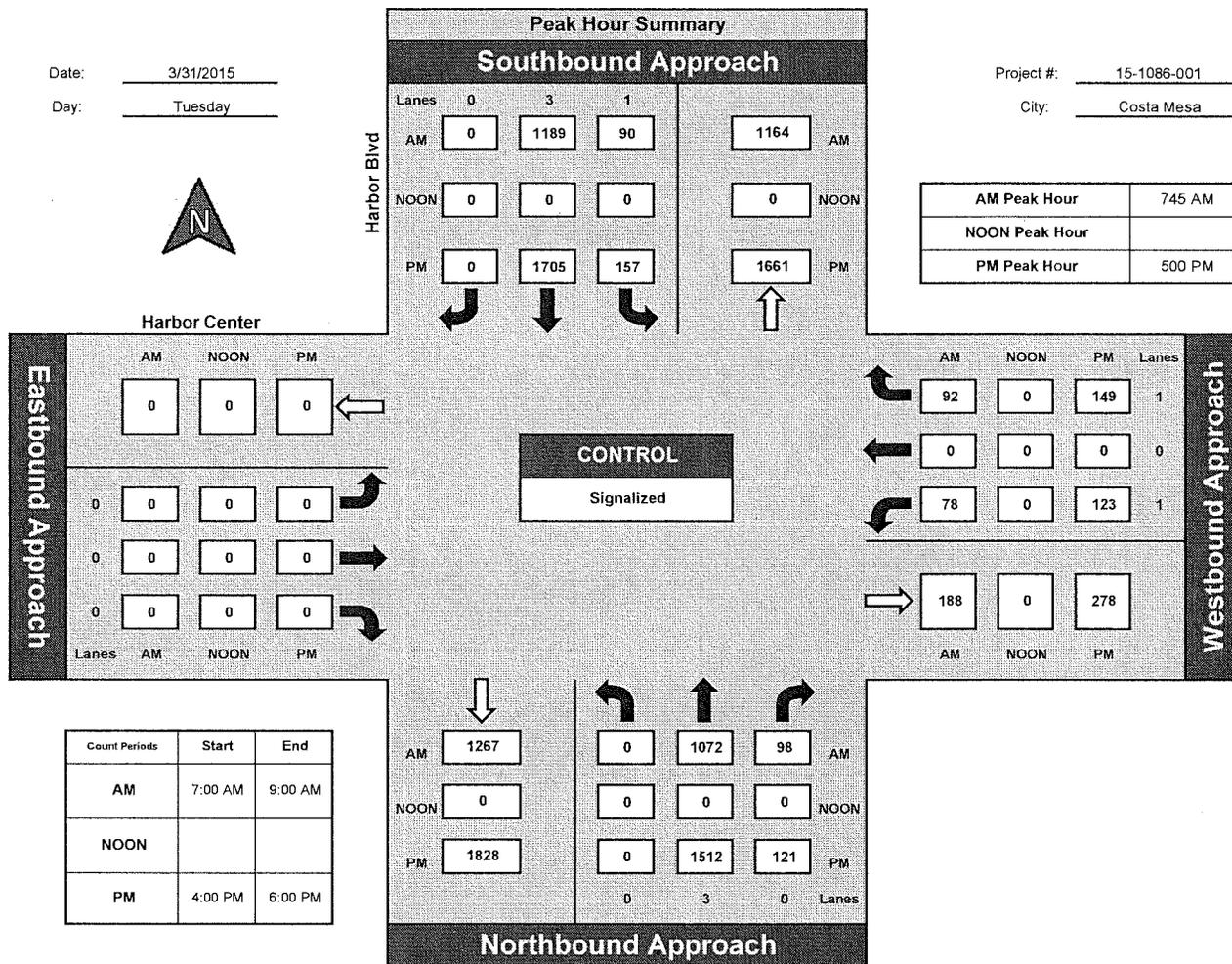
Harbor Blvd and Harbor Center, Costa Mesa

Date: 3/31/2015

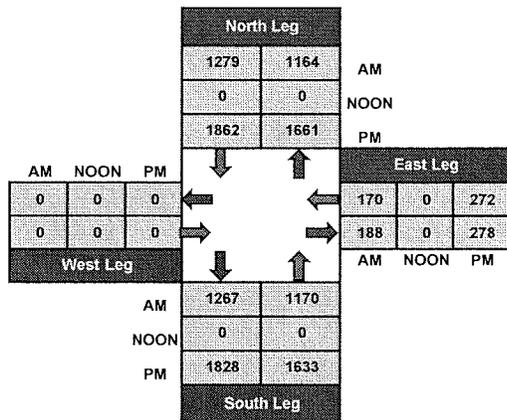
Day: Tuesday

Project #: 15-1086-001

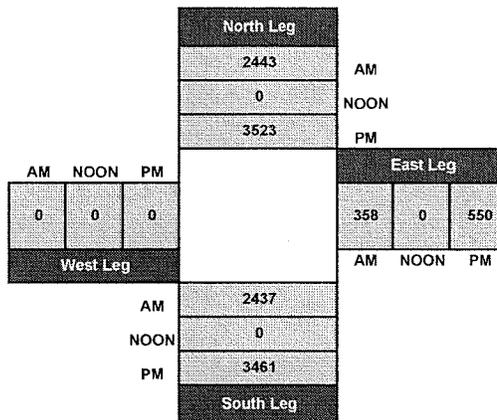
City: Costa Mesa



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1086-001

Day: Tuesday

City: Costa Mesa

Date: 3/31/2015

AM

NS/EW Streets:	Harbor Blvd		Harbor Blvd			Harbor Center			Harbor Center			TOTAL
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
	0	3	0	1	3	0	0	0	0	1	0	1
7:00 AM		160	27	16	163					8		10
7:15 AM		197	26	15	202					17		8
7:30 AM		257	16	14	256					13		13
7:45 AM		308	24	19	277					13		22
8:00 AM		244	25	16	290					20		22
8:15 AM		270	23	34	313					24		21
8:30 AM		250	26	21	309					21		27
8:45 AM		248	18	26	293					23		29

UTURNS			
NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1934	185	161	2103	0	0	0	0	139	0	152	4674
APPROACH %'s :	0.00%	91.27%	8.73%	7.11%	92.89%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	47.77%	0.00%	52.23%	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	0	1072	98	90	1189	0	0	0	0	78	0	92	2619
PEAK HR FACTOR :	0.881			0.921			0.000			0.885			0.956

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1086-001

Day: Tuesday

City: Costa Mesa

Date: 3/31/2015

PM

NS/EW Streets:	Harbor Blvd			Harbor Blvd			Harbor Center			Harbor Center			TOTAL
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 0	NT 3	NR 0	SL 1	ST 3	SR 0	EL 0	ET 0	ER 0	WL 1	WT 0	WR 1	
4:00 PM		328	42	43	332					41		23	809
4:15 PM		359	29	42	376					30		41	877
4:30 PM		341	29	52	399					25		58	904
4:45 PM		323	36	47	356					48		44	854
5:00 PM		372	27	41	438					34		44	956
5:15 PM		381	31	43	457					24		45	981
5:30 PM		366	26	31	418					32		26	899
5:45 PM		393	37	42	392					33		34	931

UTURNS			
NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	2863	257	341	3168	0	0	0	0	267	0	315	7211
APPROACH %'s :	0.00%	91.76%	8.24%	9.72%	90.28%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	45.88%	0.00%	54.12%	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	5:00 PM												TOTAL
PEAK HR VOL :	0	1512	121	157	1705	0	0	0	0	123	0	149	3767
PEAK HR FACTOR :		0.949		0.931			0.000			0.872			0.960

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:



National Data & Surveying Services

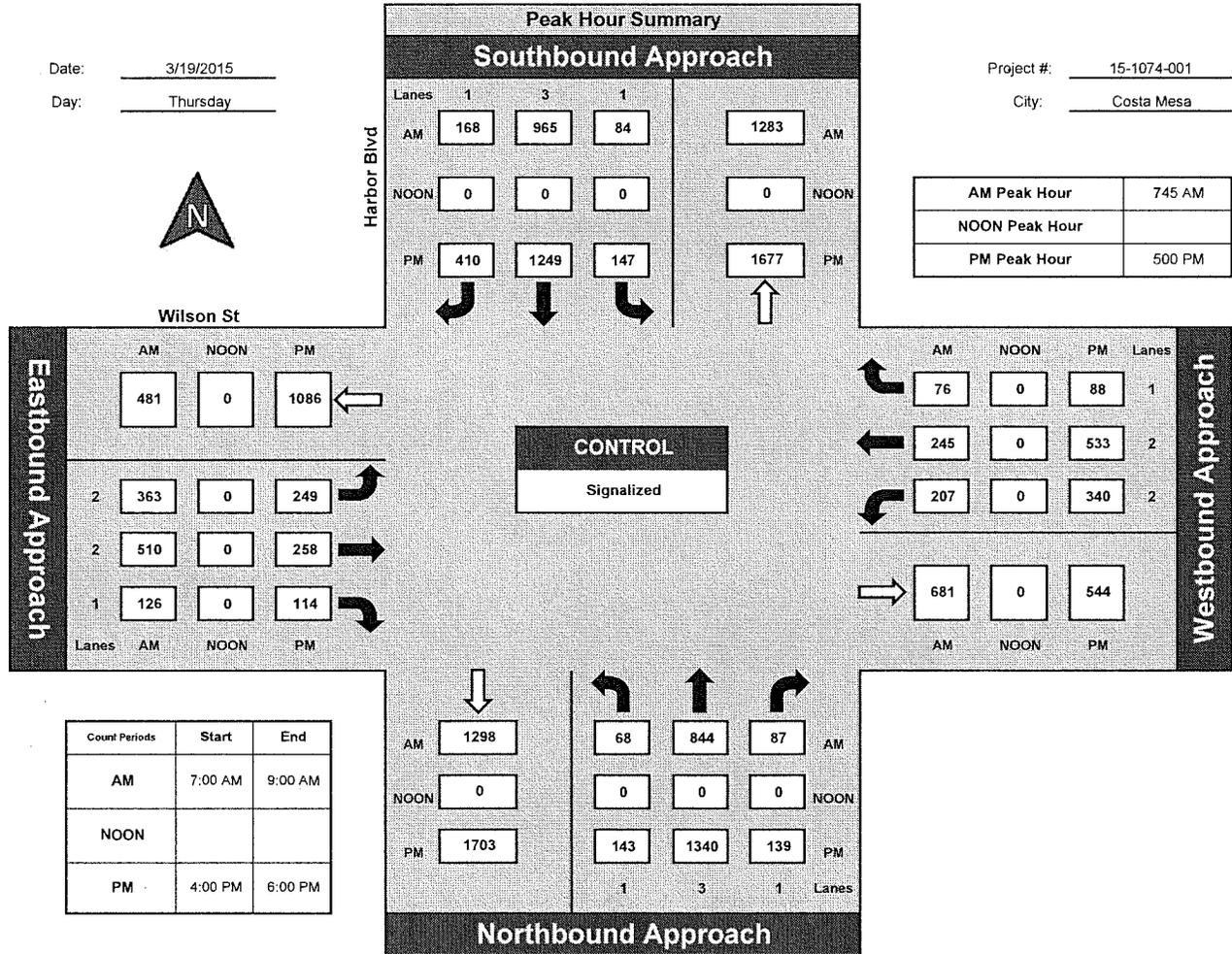
Harbor Blvd and Wilson St, Costa Mesa

Date: 3/19/2015

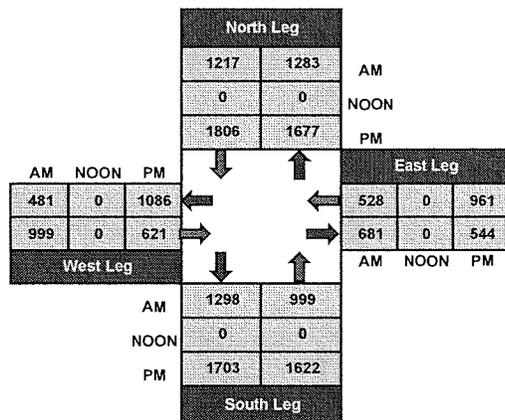
Day: Thursday

Project #: 15-1074-001

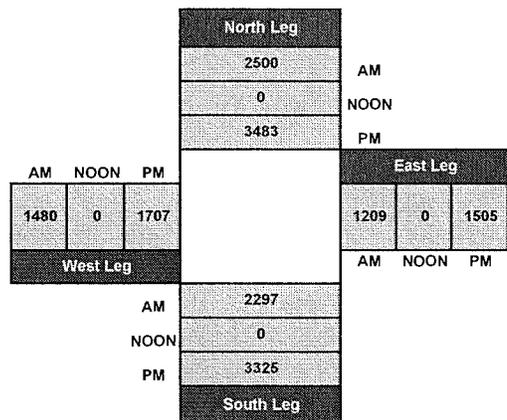
City: Costa Mesa



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1074-001

Day: Thursday

City: Costa Mesa

Date: 3/19/2015

NS/EW Streets:	AM												TOTAL
	Harbor Blvd			Harbor Blvd			Wilson St			Wilson St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 3	NR 1	SL 1	ST 3	SR 1	EL 2	ET 2	ER 1	WL 2	WT 2	WR 1	
7:00 AM	9	122	27	10	143	29	49	97	32	15	34	8	575
7:15 AM	13	154	35	7	152	22	70	112	33	34	45	17	694
7:30 AM	15	194	20	16	220	38	111	117	28	45	52	17	873
7:45 AM	19	231	26	23	247	51	110	130	37	52	62	19	1007
8:00 AM	14	221	20	13	240	36	98	149	23	48	64	15	941
8:15 AM	19	200	19	24	234	41	82	117	36	57	63	26	918
8:30 AM	16	192	22	24	244	40	73	114	30	50	56	16	877
8:45 AM	22	224	18	23	285	30	87	111	35	48	56	17	956

UTURNS			
NB	SB	EB	WB
3	1		0
2	1		0
2	3		0
2	2		1
2	1		0
0	1		0
1	1		0
3	1		0

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	127	1538	187	140	1765	287	680	947	254	349	432	135	6841
APPROACH %'s :	6.86%	83.05%	10.10%	6.39%	80.52%	13.09%	36.15%	50.35%	13.50%	38.10%	47.16%	14.74%	

NB	SB	EB	WB
15	11	0	1

PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	68	844	87	84	965	168	363	510	126	207	245	76	3743
PEAK HR FACTOR :	0.905			0.948			0.902			0.904			0.929

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1074-001

Day: Thursday

City: Costa Mesa

Date: 3/19/2015

PM

NS/EW Streets:	Harbor Blvd		Harbor Blvd			Wilson St			Wilson St			TOTAL	
	NORTHBOUND		SOUTHBOUND			EASTBOUND			WESTBOUND				
LANES:	NL 1	NT 3	NR 1	SL 1	ST 3	SR 1	EL 2	ET 2	ER 1	WL 2	WT 2	WR 1	
4:00 PM	17	313	39	29	274	98	49	65	18	94	126	21	1143
4:15 PM	19	313	40	29	287	90	65	68	18	93	123	27	1172
4:30 PM	25	375	38	29	289	83	64	57	24	92	127	27	1230
4:45 PM	36	313	30	26	298	75	60	66	26	75	134	24	1163
5:00 PM	36	336	31	35	292	91	57	61	15	81	125	24	1184
5:15 PM	35	349	35	36	336	97	67	69	36	88	129	28	1305
5:30 PM	42	327	36	40	332	118	53	63	39	94	140	17	1301
5:45 PM	30	328	37	36	289	104	72	65	24	77	139	19	1220

UTURNS			
NB	SB	EB	WB
2	5		0
1	5		0
7	5		0
2	0		0
4	4		1
10	2		0
8	5		0
4	3		0

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	240	2654	286	260	2397	756	487	514	200	694	1043	187	9718
APPROACH %'s :	7.55%	83.46%	8.99%	7.62%	70.23%	22.15%	40.55%	42.80%	16.65%	36.07%	54.21%	9.72%	

NB	SB	EB	WB
38	29	0	1

PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	143	1340	139	147	1249	410	249	258	114	340	533	88	5010
PEAK HR FACTOR :	0.968			0.921			0.903			0.957			0.960

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:
NDS

National Data & Surveying Services

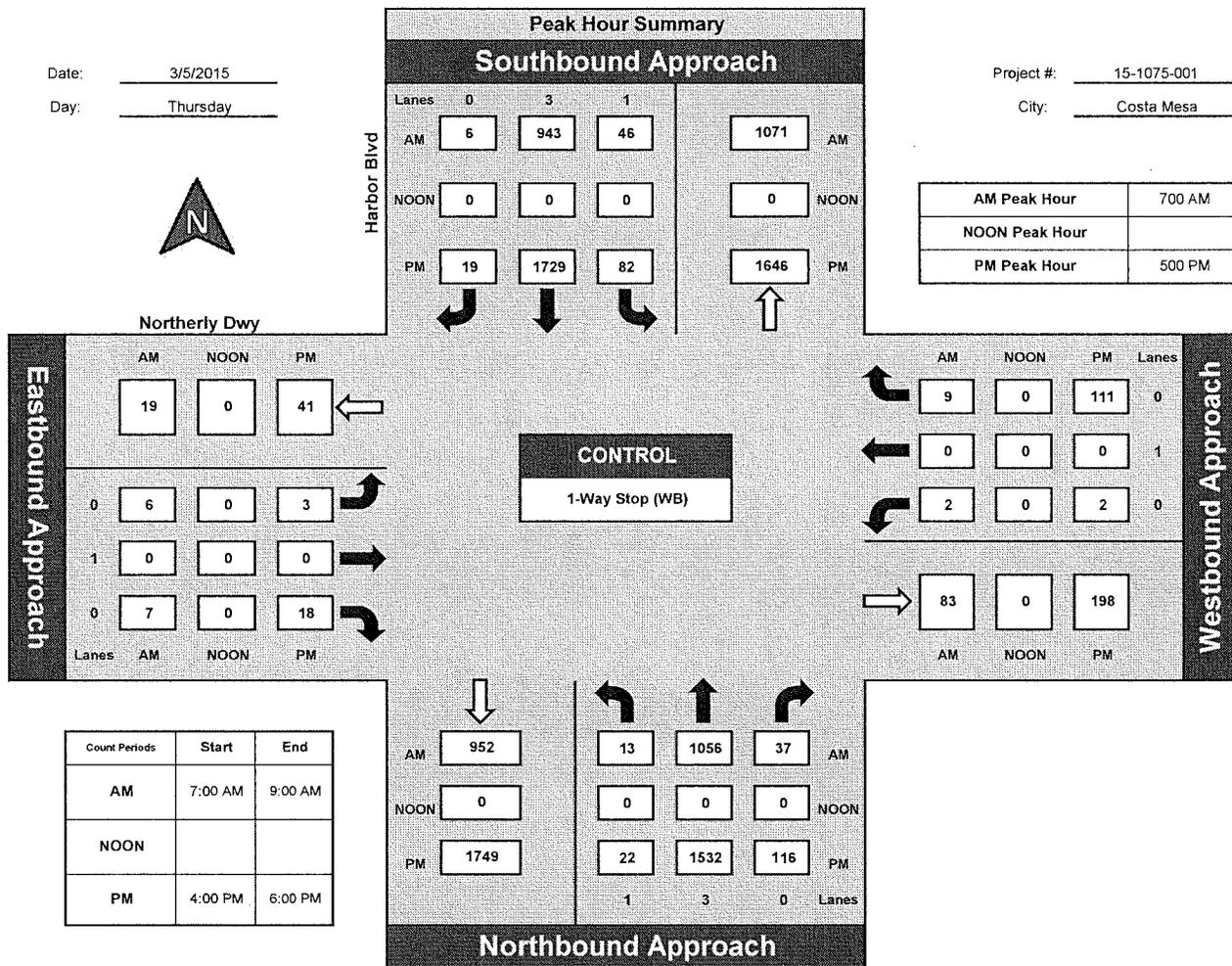
Harbor Blvd and Northerly Dwy, Costa Mesa

Date: 3/5/2015

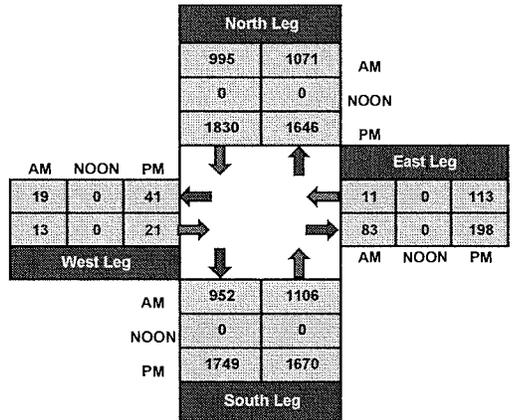
Day: Thursday

Project #: 15-1075-001

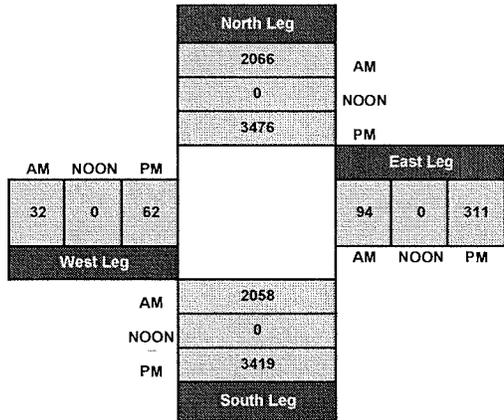
City: Costa Mesa



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1075-001

Day: Thursday

City: Costa Mesa

Date: 3/5/2015

AM

NS/EW Streets:	Harbor Blvd		Harbor Blvd			Northerly Dwy			Northerly Dwy			TOTAL	
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 3	NR 0	SL 1	ST 3	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	
7:00 AM	1	193	8	15	163	4	0		0	0		1	385
7:15 AM	4	224	10	13	185	0	5		1	1		5	448
7:30 AM	5	288	6	12	289	0	0		2	1		3	606
7:45 AM	3	351	13	6	306	2	1		4	0		0	686
8:00 AM	3	297	8	16	313	0	1		4	0		6	648
8:15 AM	3	298	7	18	333	2	1		2	0		4	668
8:30 AM	3	262	15	13	324	1	1		1	0		6	626
8:45 AM	3	296	15	12	320	1	2		0	0		6	655

UTURNS			
NB	SB	EB	WB
0	0		
2	0		
3	0		
1	0		
0	0		
2	0		
1	0		
1	1		

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	25	2209	82	105	2233	10	11	0	14	2	0	31	4722
APPROACH %'s :	1.08%	95.38%	3.54%	4.47%	95.10%	0.43%	44.00%	0.00%	56.00%	6.06%	0.00%	93.94%	

NB	SB	EB	WB
10	1	0	0

PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	13	1056	37	46	943	6	6	0	7	2	0	9	2125
PEAK HR FACTOR :	0.860			0.945			0.750			0.667			0.958

CONTROL : 1-Way Stop (WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1075-001

Day: Thursday

City: Costa Mesa

Date: 3/5/2015

PM

NS/EW Streets:	Harbor Blvd		Harbor Blvd			Northerly Dwy			Northerly Dwy			TOTAL	
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 3	NR 0	SL 1	ST 3	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	
4:00 PM	5	372	22	17	357	2	1		3	5		17	801
4:15 PM	6	401	22	19	374	3	0		0	3		19	847
4:30 PM	3	379	27	18	383	5	0		3	2		27	847
4:45 PM	5	345	25	24	434	2	1		2	0		18	856
5:00 PM	2	397	36	23	412	4	1		6	0		27	908
5:15 PM	5	413	20	13	425	4	1		4	0		24	909
5:30 PM	7	357	29	24	455	5	0		4	1		34	916
5:45 PM	8	365	31	22	437	6	1		4	1		26	901

UTURNS			
NB	SB	EB	WB
2	0		
3	0		
2	0		
2	1		
1	0		
1	0		
1	0		
3	1		

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	41	3029	212	160	3277	31	5	0	26	12	0	192	6985
APPROACH %'s :	1.25%	92.29%	6.46%	4.61%	94.49%	0.89%	16.13%	0.00%	83.87%	5.88%	0.00%	94.12%	

NB	SB	EB	WB
15	2	0	0

PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	22	1532	116	82	1729	19	3	0	18	2	0	111	3634
PEAK HR FACTOR :		0.953		0.945			0.750			0.807			0.992

CONTROL : 1-Way Stop (WB)

ITM Peak Hour Summary

Prepared by:



National Data & Surveying Services

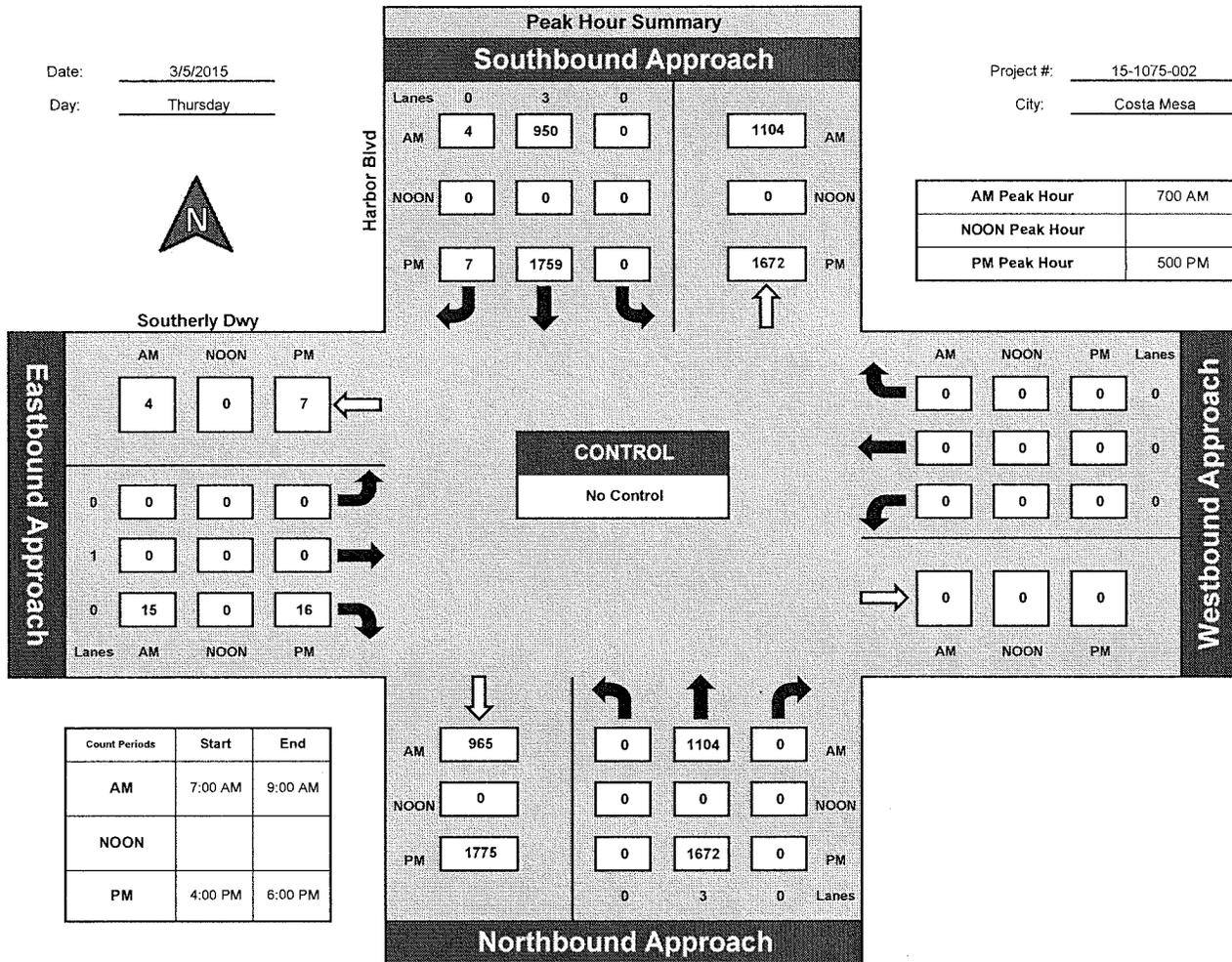
Harbor Blvd and Southerly Dwy, Costa Mesa

Date: 3/5/2015

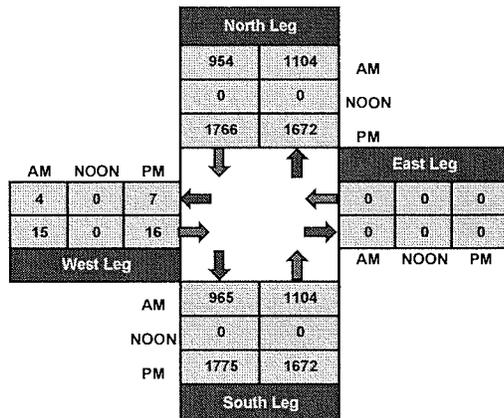
Day: Thursday

Project #: 15-1075-002

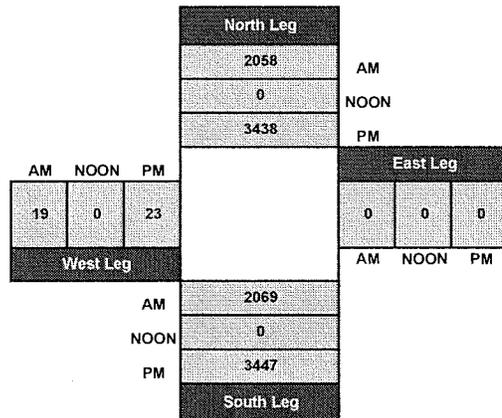
City: Costa Mesa



Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1075-002

Day: Thursday

City: Costa Mesa

Date: 3/5/2015

AM

NS/EW Streets:	Harbor Blvd			Harbor Blvd			Southerly Dwy			Southerly Dwy			TOTAL
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	3	0	0	3	0	0	1	0	0	0	0	
7:00 AM		200		163	1				4				368
7:15 AM		238		187	1				5				431
7:30 AM		304		296	2				2				604
7:45 AM		362		304	0				4				670
8:00 AM		310		323	0				1				634
8:15 AM		302		336	2				3				643
8:30 AM		280		327	0				0				607
8:45 AM		318		314	0				2				634

UTURNS			
NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	2314	0	0	2250	6	0	0	21	0	0	0	4591
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	99.73%	0.27%	0.00%	0.00%	100.00%	#DIV/0!	#DIV/0!	#DIV/0!	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	7:00 AM												TOTAL
PEAK HR VOL :	0	1104	0	0	950	4	0	0	15	0	0	0	2073
PEAK HR FACTOR :		0.866			0.956			0.500			0.000		0.953

CONTROL : No Control

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-1075-002

Day: Thursday

City: Costa Mesa

Date: 3/5/2015

PM

NS/EW Streets:	Harbor Blvd			Harbor Blvd			Southerly Dwy			Southerly Dwy			TOTAL
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
4:00 PM	0	404	0	0	362	1	0	1	0	4	0	0	771
4:15 PM		431			385	1				2			819
4:30 PM		410			390	1				3			804
4:45 PM		380			433	1				2			816
5:00 PM		450			413	4				2			869
5:15 PM		425			428	1				7			861
5:30 PM		398			465	0				3			866
5:45 PM		399			453	2				4			858

UTURNS			
NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	3297	0	0	3329	11	0	0	27	0	0	0	6664
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	99.67%	0.33%	0.00%	0.00%	100.00%	#DIV/0!	#DIV/0!	#DIV/0!	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	0	1672	0	0	1759	7	0	0	16	0	0	0	3454
PEAK HR FACTOR :		0.929			0.949				0.571			0.000	0.994

CONTROL : No Control

VOLUME

Harbor Boulevard n/o Project Dwy B

Day: Thursday
Date: 3/5/2015

City: Costa Mesa
Project #: CA15_1061_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	225	353	578		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			0	0	0	12:00			2	3	5
0:15			2	1	3	12:15			1	9	10
0:30			1	0	1	12:30			5	3	8
0:45			0	3	4	12:45			6	14	20
1:00			1	0	1	13:00			1	4	5
1:15			0	1	1	13:15			4	4	8
1:30			0	3	3	13:30			6	9	15
1:45			1	2	3	13:45			1	12	13
2:00			0	0	0	14:00			5	5	10
2:15			2	2	4	14:15			2	3	5
2:30			0	3	3	14:30			3	6	9
2:45			0	2	2	14:45			6	16	22
3:00			0	0	0	15:00			3	6	9
3:15			1	1	2	15:15			5	5	10
3:30			0	1	1	15:30			4	9	13
3:45			1	2	3	15:45			2	14	16
4:00			1	1	2	16:00			4	5	9
4:15			0	0	0	16:15			0	6	6
4:30			2	0	2	16:30			3	6	9
4:45			2	5	7	16:45			3	10	13
5:00			0	1	1	17:00			7	5	12
5:15			0	2	2	17:15			5	8	13
5:30			1	0	1	17:30			4	11	15
5:45			2	3	5	17:45			5	21	26
6:00			1	2	3	18:00			2	8	10
6:15			2	0	2	18:15			3	10	13
6:30			6	1	7	18:30			4	4	8
6:45			5	14	19	18:45			3	12	15
7:00			0	5	5	19:00			2	9	11
7:15			6	2	8	19:15			4	6	10
7:30			2	2	4	19:30			4	4	8
7:45			5	13	18	19:45			5	15	20
8:00			5	3	8	20:00			1	4	5
8:15			3	3	6	20:15			3	4	7
8:30			2	3	5	20:30			1	2	3
8:45			2	12	14	20:45			2	7	9
9:00			5	1	6	21:00			6	6	12
9:15			1	2	3	21:15			2	6	8
9:30			3	3	6	21:30			2	6	8
9:45			3	12	15	21:45			0	10	10
10:00			1	1	2	22:00			1	2	3
10:15			2	2	4	22:15			0	3	3
10:30			2	1	3	22:30			1	2	3
10:45			1	6	7	22:45			0	2	2
11:00			3	2	5	23:00			1	4	5
11:15			3	5	8	23:15			1	1	2
11:30			5	5	10	23:30			0	7	7
11:45			2	13	15	23:45			3	5	8
TOTALS			87	88	175	TOTALS			138	265	403
SPLIT %			49.7%	50.3%	30.3%	SPLIT %			34.2%	65.8%	69.7%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	225	353	578
AM Peak Hour		7:15	11:30	11:30	PM Peak Hour		17:00	17:30	17:00
AM Pk Volume		18	20	30	PM Pk Volume		21	40	56
Pk Hr Factor		0.750	0.556	0.750	Pk Hr Factor		0.750	0.909	0.875
7 - 9 Volume		25	25	50	4 - 6 Volume		31	57	88
7 - 9 Peak Hour		7:15	7:00	7:15	4 - 6 Peak Hour		17:00	17:00	17:00
7 - 9 Pk Volume		18	13	29	4 - 6 Pk Volume		21	35	56
Pk Hr Factor		0.750	0.650	0.806	Pk Hr Factor		0.750	0.795	0.875

VOLUME

Harbor Boulevard n/o Wilson Street

Day: Thursday
Date: 3/5/2015

City: Costa Mesa
Project #: CA15_1061_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	199	71	270		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			3	1	4	12:00			0	0	0
0:15			0	2	2	12:15			4	0	4
0:30			1	0	1	12:30			3	0	3
0:45			0	4	4	12:45			2	9	11
1:00			2	0	2	13:00			3	2	5
1:15			2	0	2	13:15			5	0	5
1:30			1	0	1	13:30			2	1	3
1:45			1	6	7	13:45			4	14	18
2:00			0	0	0	14:00			2	0	2
2:15			0	3	3	14:15			3	1	4
2:30			1	0	1	14:30			3	1	4
2:45			1	2	3	14:45			4	12	16
3:00			0	0	0	15:00			3	0	3
3:15			0	0	0	15:15			2	2	4
3:30			0	0	0	15:30			2	0	2
3:45			1	1	2	15:45			2	9	11
4:00			1	0	1	16:00			4	1	5
4:15			0	0	0	16:15			2	1	3
4:30			0	0	0	16:30			3	1	4
4:45			1	2	3	16:45			2	11	13
5:00			1	0	1	17:00			2	4	6
5:15			1	0	1	17:15			7	1	8
5:30			0	0	0	17:30			3	0	3
5:45			0	2	2	17:45			4	16	20
6:00			0	0	0	18:00			2	1	3
6:15			1	0	1	18:15			9	2	11
6:30			3	0	3	18:30			3	0	3
6:45			2	6	8	18:45			1	15	16
7:00			4	1	5	19:00			1	0	1
7:15			5	1	6	19:15			2	3	5
7:30			2	2	4	19:30			2	1	3
7:45			4	15	19	19:45			1	6	7
8:00			1	0	1	20:00			4	1	5
8:15			3	2	5	20:15			1	2	3
8:30			0	0	0	20:30			1	1	2
8:45			2	6	8	20:45			1	7	8
9:00			1	0	1	21:00			6	1	7
9:15			0	1	1	21:15			0	1	1
9:30			1	0	1	21:30			4	2	6
9:45			4	6	10	21:45			2	12	14
10:00			2	0	2	22:00			2	0	2
10:15			1	1	2	22:15			0	1	1
10:30			3	0	3	22:30			3	0	3
10:45			4	10	14	22:45			0	5	5
11:00			1	1	2	23:00			3	0	3
11:15			5	1	6	23:15			3	1	4
11:30			4	2	6	23:30			2	0	2
11:45			5	15	20	23:45			0	8	8
TOTALS			75	24	99	TOTALS			124	47	171
SPLIT %			75.8%	24.2%	36.7%	SPLIT %			72.5%	27.5%	63.3%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	199	71	270
AM Peak Hour		7:00	10:45	11:00	PM Peak Hour		17:30	16:15	17:00
AM Pk Volume		15	5	20	PM Pk Volume		18	7	23
Pk Hr Factor		0.750	0.625	0.833	Pk Hr Factor		0.500	0.438	0.719
7 - 9 Volume		21	6	27	4 - 6 Volume		27	11	38
7 - 9 Peak Hour		7:00	7:00	7:00	4 - 6 Peak Hour		17:00	16:15	17:00
7 - 9 Pk Volume		15	4	19	4 - 6 Pk Volume		16	7	23
Pk Hr Factor		0.750	0.500	0.792	Pk Hr Factor		0.571	0.438	0.719

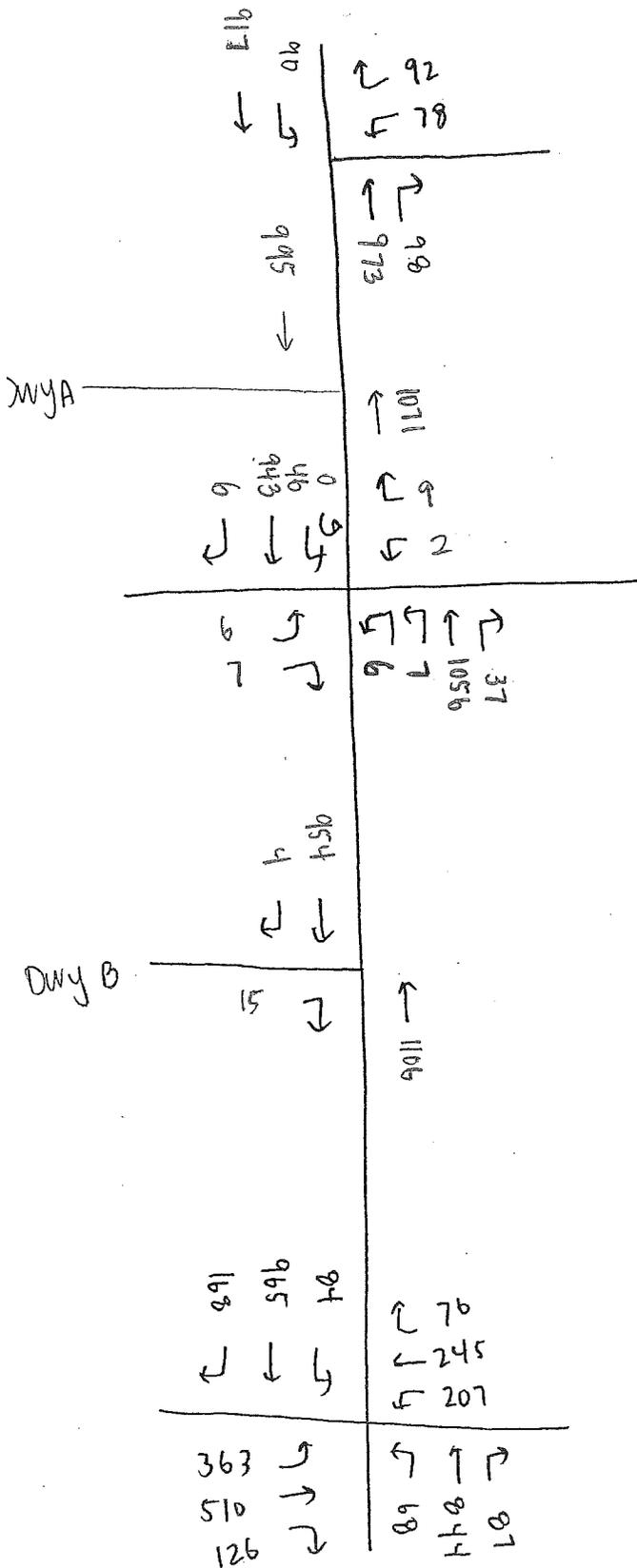
**TABLE A
PROJECT DRIVEWAYS COUNTS**

Time	Driveway 1			Driveway 2			Total of All Driveways
	In	Out	Total	In	Out	Total	
7:00 AM	5	0	5	1	4	5	10
7:15 AM	2	6	8	1	5	6	14
7:30 AM	2	2	4	2	2	4	8
7:45 AM	4	5	9	0	4	4	13
8:00 AM	3	5	8	0	1	1	9
8:15 AM	3	3	6	2	3	5	11
8:30 AM	3	2	5	0	0	0	5
8:45 AM	3	2	5	0	2	2	7
AM Peak Hour	13	13	26	4	15	19	45
4:00 PM	5	4	9	1	4	5	14
4:15 PM	6	0	6	1	2	3	9
4:30 PM	6	3	9	1	3	4	13
4:45 PM	5	3	8	1	2	3	11
5:00 PM	5	7	12	4	2	6	18
5:15 PM	8	5	13	1	7	8	21
5:30 PM	11	4	15	0	3	3	18
5:45 PM	11	5	16	2	4	6	22
PM Peak Hour	35	21	56	7	16	23	79

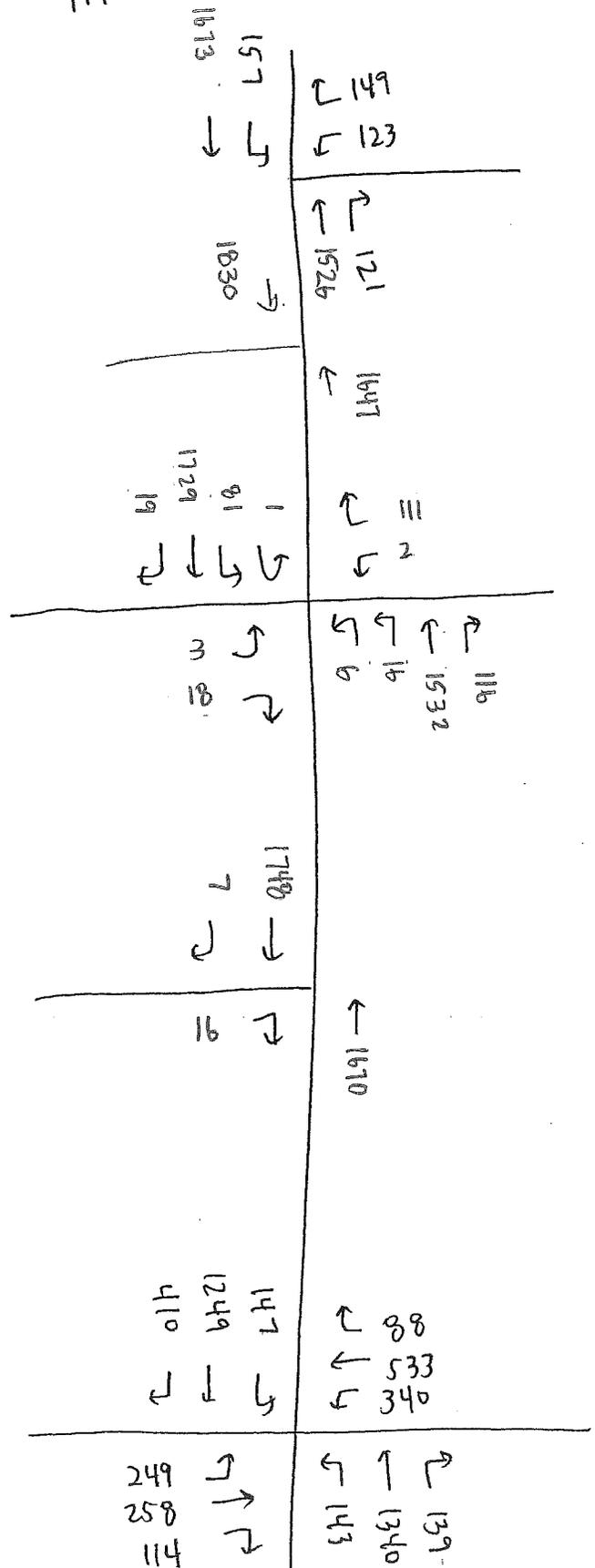
 = AM/PM Peak Hour turning movement counts conducted on Thursday, March 5, 2015.

Existing Volumes

AM:

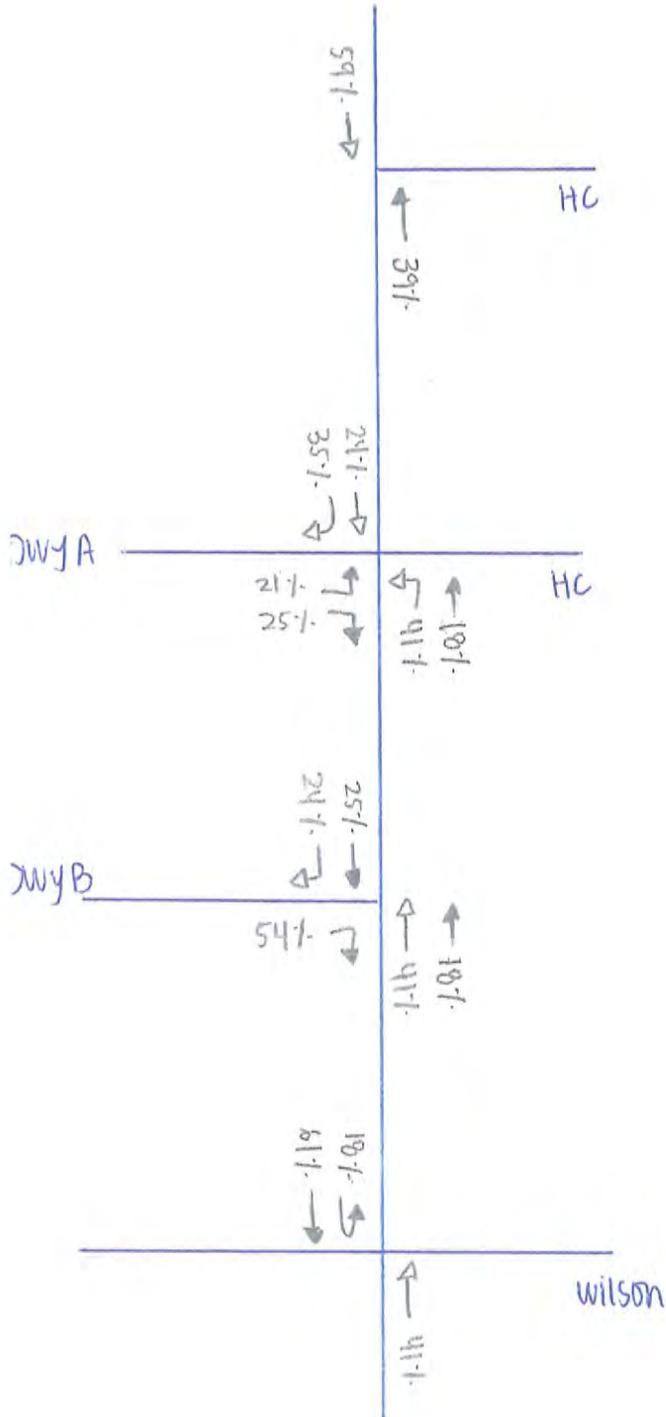


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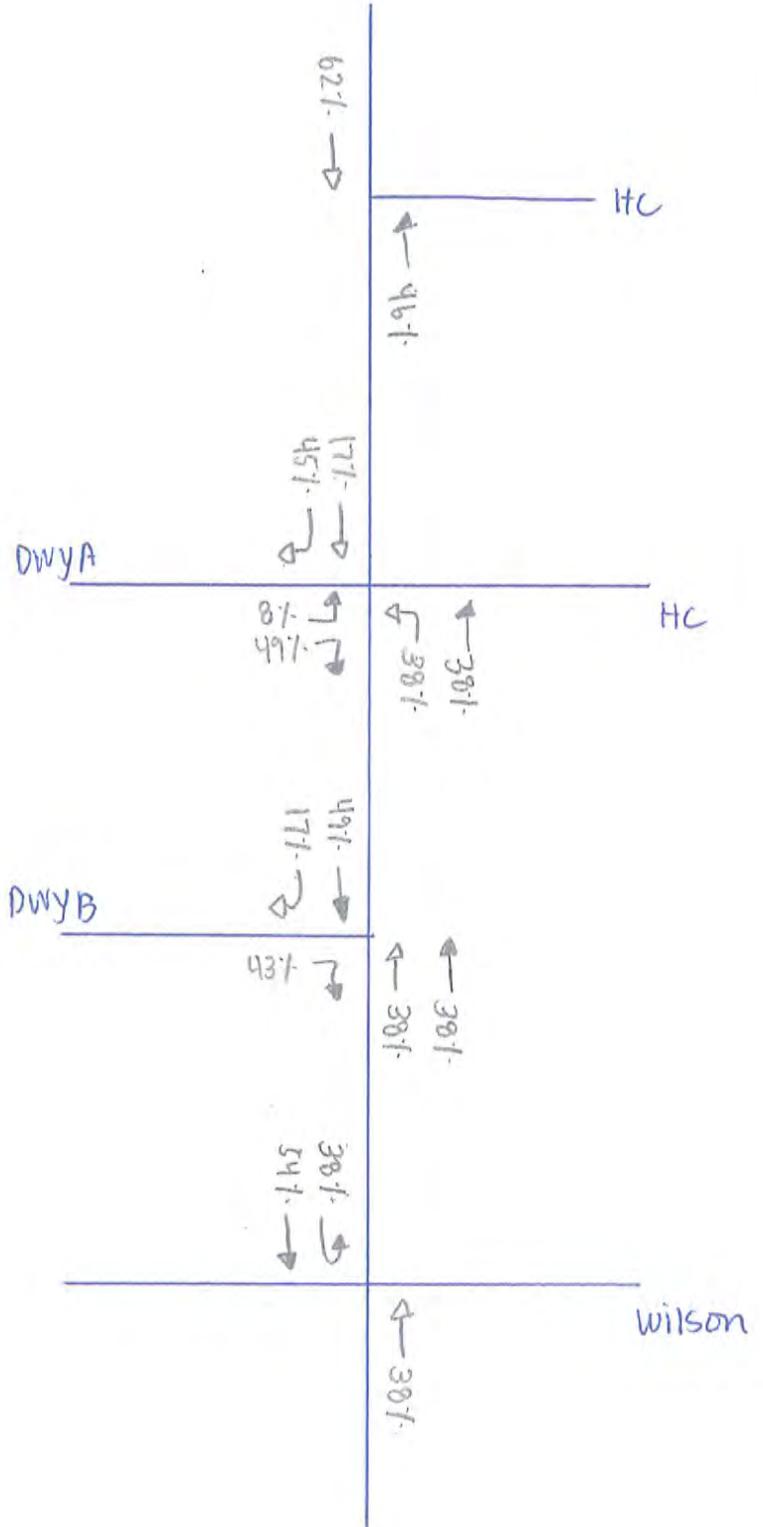


Existing Motel Distribution:

AM:

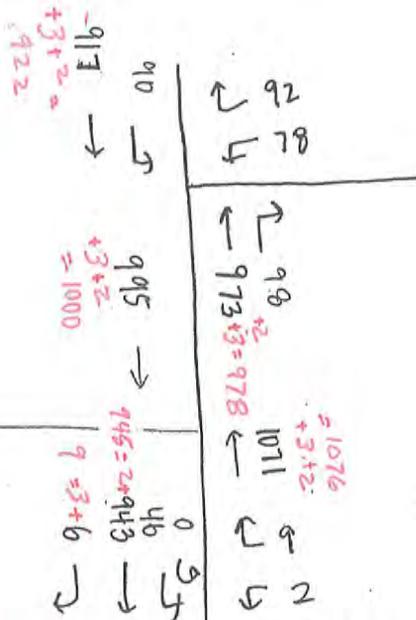


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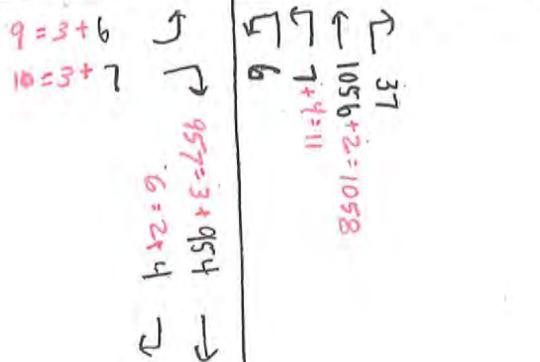


Existing Volumes (Factored to match fully occupied Motel)

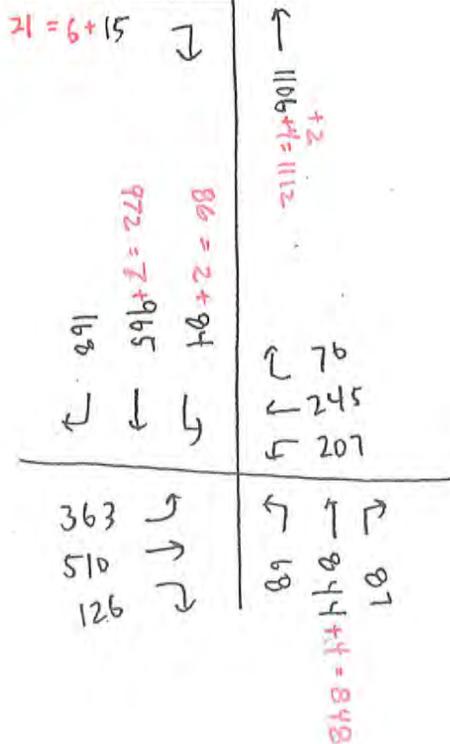
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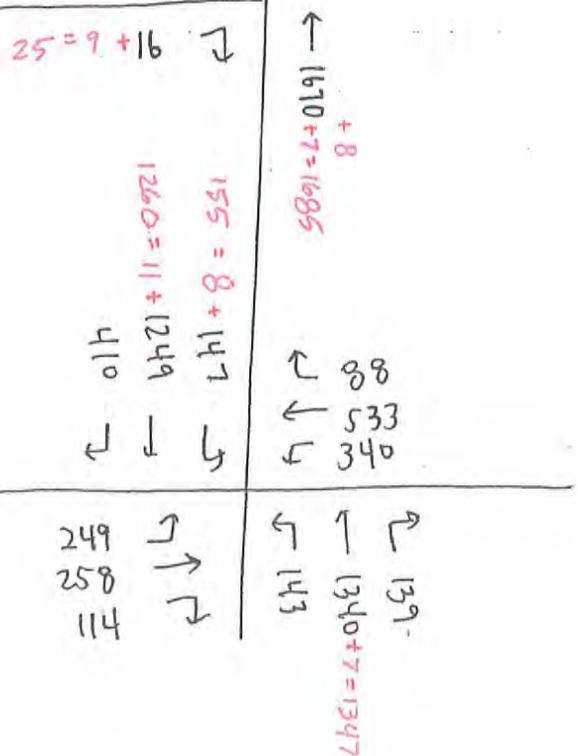
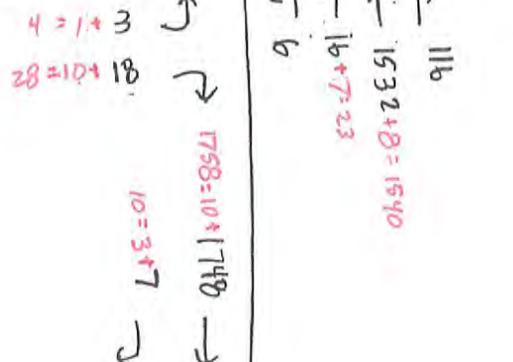
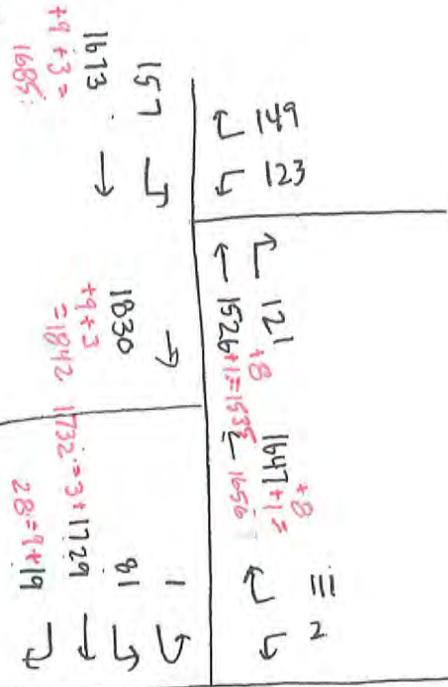
MVA



Dwy B

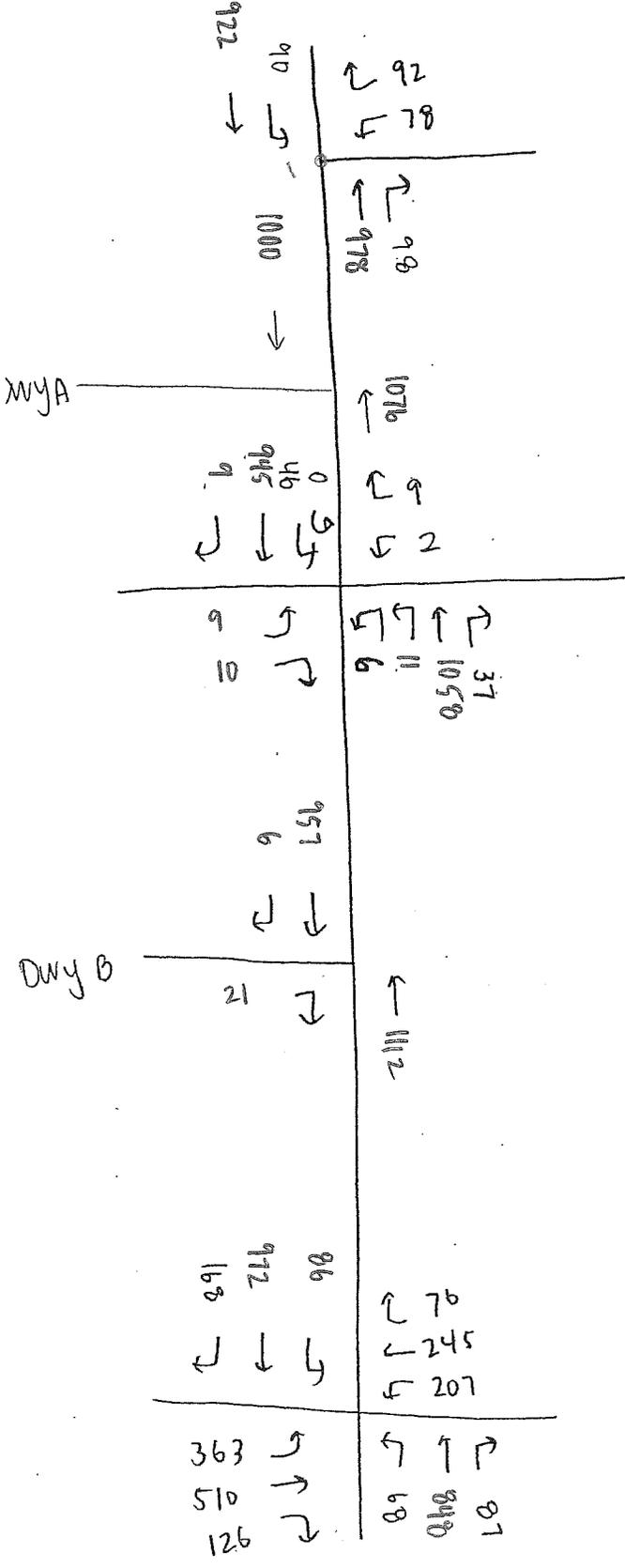


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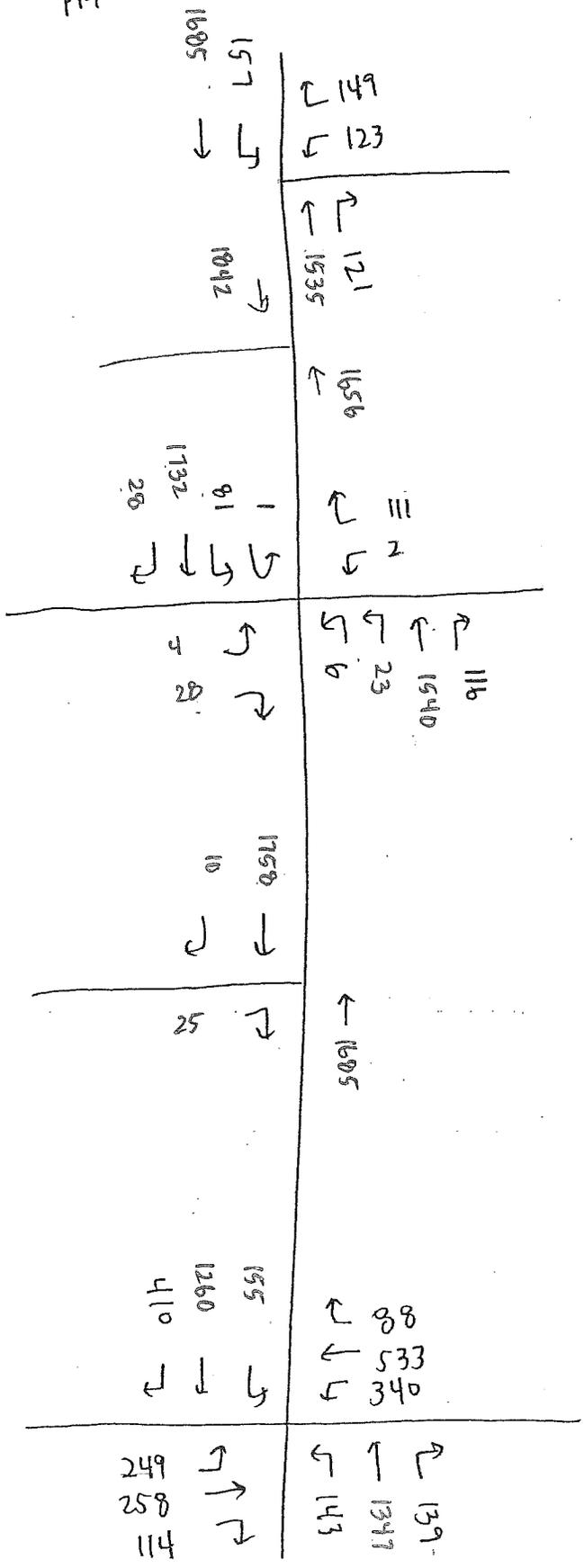


Existing Volumes (= Already factored)

AM:



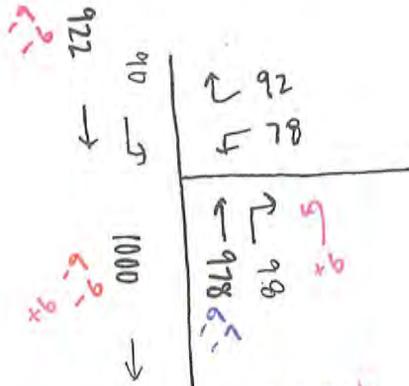
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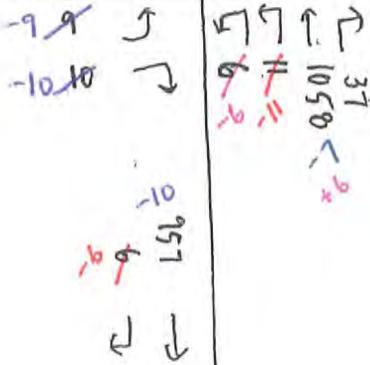
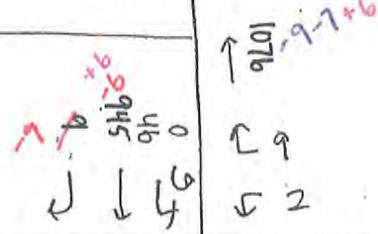
Existing Volumes (= Already factored)

-- = Negative existing site credit outbound
 -- = Negative existing site credit inbound
 -- = Reroute

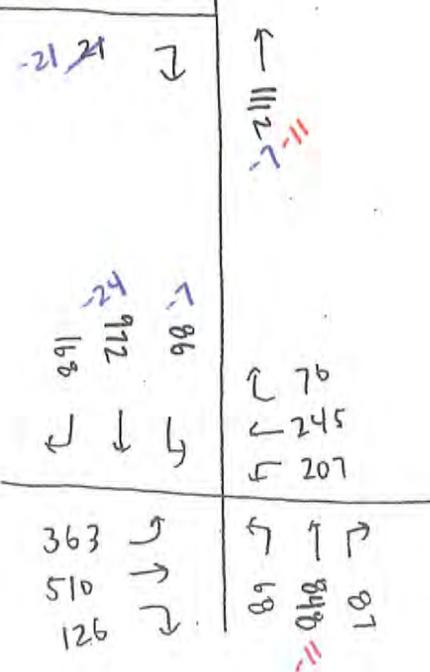
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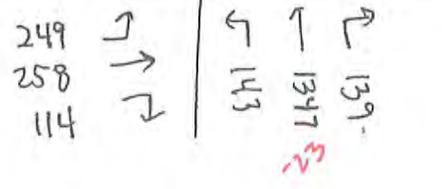
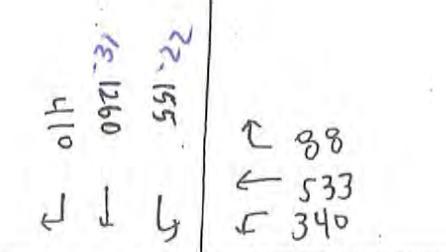
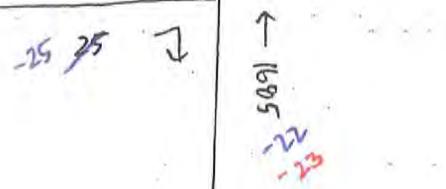
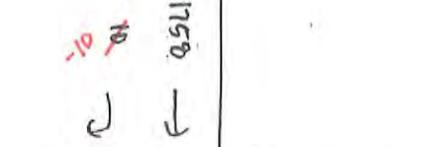
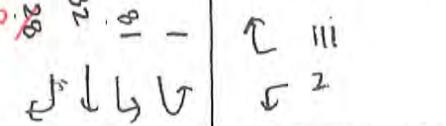
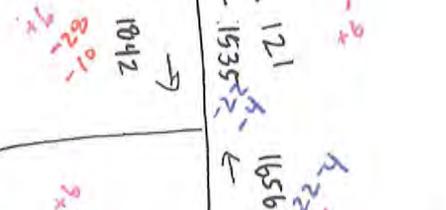
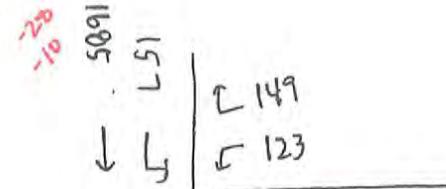
WYA



Dwy B



PM:



APPENDIX C

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

APPENDIX C-1

EXISTING TRAFFIC CONDITIONS

AM Existing Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap.(X): 0.338
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Permitted Protected Split Phase Split Phase
Rights: Include Include Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 0 0 2 1 0 1 0 3 0 0 0 0 0 0 0 1 0 0 0 1

Volume Module:
Base Vol: 0 978 98 90 922 0 0 0 0 78 0 92
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 978 98 90 922 0 0 0 0 78 0 92
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 978 98 90 922 0 0 0 0 78 0 92
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 0 978 98 90 922 0 0 0 0 78 0 92
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 0 978 98 90 922 0 0 0 0 78 0 92
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 0 978 98 90 922 0 0 0 0 78 0 92

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.00 2.73 0.27 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00
Final Sat.: 0 4363 437 1600 4800 0 0 0 0 1600 0 1600

Capacity Analysis Module:
Vol/Sat: 0.00 0.22 0.22 0.06 0.19 0.00 0.00 0.00 0.00 0.05 0.00 0.06
Crit Moves: **** **** ****

AM Existing Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.469
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: A

Street Name: Harbor Boulevard Wilson Street
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Protected Protected Protected Protected
Rights: Include Ovl Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 3 0 1 1 0 3 0 1 2 0 2 0 1 2 0 2 0 1

Volume Module:
Base Vol: 68 848 87 86 972 168 363 510 126 207 245 76
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 68 848 87 86 972 168 363 510 126 207 245 76
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 68 848 87 86 972 168 363 510 126 207 245 76
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 68 848 87 86 972 168 363 510 126 207 245 76
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 68 848 87 86 972 168 363 510 126 207 245 76
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 68 848 87 86 972 168 363 510 126 207 245 76
OvlAdjVol: 0

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 1.00 3.00 1.00 1.00 3.00 1.00 2.00 2.00 1.00 2.00 2.00 1.00
Final Sat.: 1600 4800 1600 1600 4800 1600 3200 3200 1600 3200 3200 1600

Capacity Analysis Module:
Vol/Sat: 0.04 0.18 0.05 0.05 0.20 0.11 0.11 0.16 0.08 0.06 0.08 0.05
OvlAdjV/S: 0.00
Crit Moves: **** **** **** ****

PM Existing Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap.(X): 0.536
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 40 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Permitted Protected Split Phase Split Phase
Rights: Include Include Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 0 0 2 1 0 1 0 3 0 0 0 0 0 0 0 1 0 0 0 1

Volume Module:
Base Vol: 0 1535 121 157 1685 0 0 0 0 123 0 149
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 1535 121 157 1685 0 0 0 0 123 0 149
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 1535 121 157 1685 0 0 0 0 123 0 149
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 0 1535 121 157 1685 0 0 0 0 123 0 149
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 0 1535 121 157 1685 0 0 0 0 123 0 149
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 0 1535 121 157 1685 0 0 0 0 123 0 149

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.00 2.78 0.22 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00
Final Sat.: 0 4449 351 1600 4800 0 0 0 0 1600 0 1600

Capacity Analysis Module:
Vol/Sat: 0.00 0.35 0.34 0.10 0.35 0.00 0.00 0.00 0.00 0.08 0.00 0.09
Crit Moves: **** **** ****

PM Existing Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.622
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: B

Table with columns for Street Name (Harbor Boulevard, Wilson Street), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, and Lanes.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume, and OvlAdjVol.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, OvlAdjV/S, and Crit Moves.

APPENDIX C-II

**EXISTING PLUS PROJECT
TRAFFIC CONDITIONS**

AM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap. (X): 0.346
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 35 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
Control: Protected Protected Split Phase Split Phase
Rights: Include Include Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 2 1 0 1 0 3 0 0 0 0 0 0 0 1 0 0 0 1

Volume Module:
Base Vol: 15 1017 98 90 921 0 0 0 0 78 0 92
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 15 1017 98 90 921 0 0 0 0 78 0 92
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 15 1017 98 90 921 0 0 0 0 78 0 92
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 15 1017 98 90 921 0 0 0 0 78 0 92
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 15 1017 98 90 921 0 0 0 0 78 0 92
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 15 1017 98 90 921 0 0 0 0 78 0 92

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 1.00 2.74 0.26 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00
Final Sat.: 1600 4378 422 1600 4800 0 0 0 0 1600 0 1600

Capacity Analysis Module:
Vol/Sat: 0.01 0.23 0.23 0.06 0.19 0.00 0.00 0.00 0.00 0.05 0.00 0.06
Crit Moves: **** **** ****

AM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.484
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 44 Level Of Service: A

Table with columns for Street Name (Harbor Boulevard, Wilson Street), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, and Lanes.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, FinalVolume, and OvlAdjVol.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, OvlAdjV/S, and Crit Moves.

PM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap. (X): 0.537
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 49 Level Of Service: A

Table with columns for Street Name, Approach, Movement, Control, Rights, Min. Green, Y+R, Lanes. Rows include Harbor Bouelvard and Harbor Center with various movement details.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, FinalVolume.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, Crit Moves.

PM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.629
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 61 Level Of Service: B

Table with columns for Street Name (Harbor Boulevard, Wilson Street), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, and Lanes.

Volume Module: Table showing traffic volume data including Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume, and OvlAdjVol.

Saturation Flow Module: Table showing saturation flow data including Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module: Table showing capacity analysis data including Vol/Sat, OvlAdjV/S, and Crit Moves.

APPENDIX C-III

**YEAR 2018 CUMULATIVE
TRAFFIC CONDITIONS**

AM Cumulative Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap.(X): 0.371

Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx

Optimal Cycle: 30 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

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Control: Permitted Protected Split Phase Split Phase

Rights: Include Include Include Include

Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0

Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

Lanes: 0 0 2 1 0 1 0 3 0 0 0 0 0 0 0 1 0 0 0 1

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Volume Module:

Base Vol: 0 1114 101 93 991 0 0 0 0 80 0 95

Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

Initial Bse: 0 1114 101 93 991 0 0 0 0 80 0 95

Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0

PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0

Initial Fut: 0 1114 101 93 991 0 0 0 0 80 0 95

User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

PHF Volume: 0 1114 101 93 991 0 0 0 0 80 0 95

Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0

Reduced Vol: 0 1114 101 93 991 0 0 0 0 80 0 95

PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

FinalVolume: 0 1114 101 93 991 0 0 0 0 80 0 95

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Saturation Flow Module:

Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600

Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

Lanes: 0.00 2.75 0.25 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00

Final Sat.: 0 4401 399 1600 4800 0 0 0 0 1600 0 1600

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Capacity Analysis Module:

Vol/Sat: 0.00 0.25 0.25 0.06 0.21 0.00 0.00 0.00 0.00 0.05 0.00 0.06

Crit Moves: **** **** ****

AM Cumulative Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.490
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 45 Level Of Service: A

Street Name: Harbor Boulevard Wilson Street
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Protected Protected Protected Protected
Rights: Include Ovl Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 3 0 1 1 0 3 0 1 2 0 2 0 1 2 0 2 0 1

Volume Module:
Base Vol: 70 980 90 89 1042 173 374 525 130 213 252 78
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 70 980 90 89 1042 173 374 525 130 213 252 78
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 70 980 90 89 1042 173 374 525 130 213 252 78
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 70 980 90 89 1042 173 374 525 130 213 252 78
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 70 980 90 89 1042 173 374 525 130 213 252 78
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 70 980 90 89 1042 173 374 525 130 213 252 78
OvlAdjVol: 0

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 1.00 3.00 1.00 1.00 3.00 1.00 2.00 2.00 1.00 2.00 2.00 1.00
Final Sat.: 1600 4800 1600 1600 4800 1600 3200 3200 1600 3200 3200 1600

Capacity Analysis Module:
Vol/Sat: 0.04 0.20 0.06 0.06 0.22 0.11 0.12 0.16 0.08 0.07 0.08 0.05
OvlAdjV/S: 0.00
Crit Moves: **** **** **** ****

PM Cumulative Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap. (X): 0.569
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Permitted Protected Split Phase Split Phase
Rights: Include Include Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 0 0 2 1 0 1 0 3 0 0 0 0 0 0 0 1 0 0 0 1

Volume Module:
Base Vol: 0 1660 125 162 1839 0 0 0 0 127 0 153
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 1660 125 162 1839 0 0 0 0 127 0 153
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 1660 125 162 1839 0 0 0 0 127 0 153
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 0 1660 125 162 1839 0 0 0 0 127 0 153
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 0 1660 125 162 1839 0 0 0 0 127 0 153
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 0 1660 125 162 1839 0 0 0 0 127 0 153

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.00 2.79 0.21 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00
Final Sat.: 0 4464 336 1600 4800 0 0 0 0 1600 0 1600

Capacity Analysis Module:
Vol/Sat: 0.00 0.37 0.37 0.10 0.38 0.00 0.00 0.00 0.00 0.08 0.00 0.10
Crit Moves: **** **** ****

PM Cumulative Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.657
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 67 Level Of Service: B

Table with columns for Street Name (Harbor Boulevard, Wilson Street), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, and Lanes.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, FinalVolume, and OvlAdjVol.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, OvlAdjV/S, and Crit Moves.

APPENDIX C-IV

**YEAR 2018 CUMULATIVE PLUS PROJECT
TRAFFIC CONDITIONS**

AM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap. (X): 0.379
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 37 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

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Control: Protected Protected Split Phase Split Phase
Rights: Include Include Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 2 1 0 1 0 3 0 0 0 0 0 0 0 0 1 0 0 0 1

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Volume Module:
Base Vol: 15 1153 101 93 990 0 0 0 0 80 0 95
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 15 1153 101 93 990 0 0 0 0 80 0 95
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 15 1153 101 93 990 0 0 0 0 80 0 95
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 15 1153 101 93 990 0 0 0 0 80 0 95
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 15 1153 101 93 990 0 0 0 0 80 0 95
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 15 1153 101 93 990 0 0 0 0 80 0 95

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Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 1.00 2.76 0.24 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00
Final Sat.: 1600 4413 387 1600 4800 0 0 0 0 1600 0 1600

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Capacity Analysis Module:
Vol/Sat: 0.01 0.26 0.26 0.06 0.21 0.00 0.00 0.00 0.00 0.05 0.00 0.06
Crit Moves: **** **** ****

AM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.520
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 47 Level Of Service: A

Street Name: Harbor Boulevard Wilson Street
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Protected Protected Protected Protected
Rights: Include Ovl Include Include
Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0 0
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 3 0 1 1 0 3 0 1 2 0 2 0 1 2 0 2 0 1

Volume Module:
Base Vol: 70 978 90 137 1054 173 374 525 130 213 252 78
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 70 978 90 137 1054 173 374 525 130 213 252 78
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 70 978 90 137 1054 173 374 525 130 213 252 78
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 70 978 90 137 1054 173 374 525 130 213 252 78
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 70 978 90 137 1054 173 374 525 130 213 252 78
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 70 978 90 137 1054 173 374 525 130 213 252 78
OvlAdjVol: 0

Saturation Flow Module:
Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 1.00 3.00 1.00 1.00 3.00 1.00 2.00 2.00 1.00 2.00 2.00 1.00
Final Sat.: 1600 4800 1600 1600 4800 1600 3200 3200 1600 3200 3200 1600

Capacity Analysis Module:
Vol/Sat: 0.04 0.20 0.06 0.09 0.22 0.11 0.12 0.16 0.08 0.07 0.08 0.05
OvlAdjV/S: 0.00
Crit Moves: **** * 0.00 ****

PM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Harbor Boulevard at Harbor Center

Cycle (sec): 100 Critical Vol./Cap. (X): 0.569

Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx

Optimal Cycle: 53 Level Of Service: A

Street Name: Harbor Bouelvard Harbor Center

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

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Control: Protected Protected Split Phase Split Phase

Rights: Include Include Include Include

Min. Green: 0 0 0 0 0 0 0 0 0 0 0 0 0

Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

Lanes: 1 0 2 1 0 1 0 3 0 0 0 0 0 0 1

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Volume Module:

Base Vol: 42 1663 125 162 1855 0 0 0 0 127 0 153

Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

Initial Bse: 42 1663 125 162 1855 0 0 0 0 127 0 153

Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0

PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0

Initial Fut: 42 1663 125 162 1855 0 0 0 0 127 0 153

User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

PHF Volume: 42 1663 125 162 1855 0 0 0 0 127 0 153

Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0

Reduced Vol: 42 1663 125 162 1855 0 0 0 0 127 0 153

PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

FinalVolume: 42 1663 125 162 1855 0 0 0 0 127 0 153

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Saturation Flow Module:

Sat/Lane: 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600 1600

Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

Lanes: 1.00 2.79 0.21 1.00 3.00 0.00 0.00 0.00 0.00 1.00 0.00 1.00

Final Sat.: 1600 4464 336 1600 4800 0 0 0 0 1600 0 1600

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Capacity Analysis Module:

Vol/Sat: 0.03 0.37 0.37 0.10 0.39 0.00 0.00 0.00 0.00 0.08 0.00 0.10

Crit Moves: **** **** ****

PM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Harbor Boulevard at Wilson Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.664
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 68 Level Of Service: B

Table with columns for Street Name (Harbor Boulevard, Wilson Street), Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, and Lanes.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, FinalVolume, and OvlAdjVol.

Saturation Flow Module: Table with columns for Sat/Lane, Adjustment, Lanes, and Final Sat.

Capacity Analysis Module: Table with columns for Vol/Sat, OvlAdjV/S, and Crit Moves.

APPENDIX D

PROJECT DRIVEWAYS LEVEL OF SERVICE CALCULATION WORKSHEETS

APPENDIX D-1

**EXISTING PLUS PROJECT
TRAFFIC CONDITIONS**

AM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Harbor Boulevard at Driveway A

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[10.9]

Table with columns for Street Name, Approach, Movement, Control, Rights, and Lanes. Rows include Harbor Boulevard and Driveway A with various movement and lane configurations.

Volume Module: Table showing traffic volume data including Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and FinalVolume.

Critical Gap Module: Table showing Critical Gap and FollowUpTime values for different approaches.

Capacity Module: Table showing Capacity values for different approaches including Cnflct Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module: Table showing Level of Service (LOS) values for different approaches and movements, including 2Way95thQ, Control Del, LOS by Move, Shared Cap., Shared Queue, Shrd ConDel, and Shared LOS.

Note: Queue reported is the number of cars per lane.

AM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Harbor Boulevard at Driveway B

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[10.8]

Table with columns: Street Name, Approach, Movement, Control, Rights, Lanes. Rows include Harbor Boulevard and Driveway B with various approach and movement details.

Volume Module table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume. Rows show volume calculations for Harbor Boulevard and Driveway B.

Critical Gap Module table with columns: Critical Gp, FollowUpTim. Rows show critical gap and follow-up time values.

Capacity Module table with columns: Cnflct Vol, Potent Cap., Move Cap., Volume/Cap. Rows show capacity-related metrics.

Level Of Service Module table with columns: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS. Rows show level of service and delay details.

Note: Queue reported is the number of cars per lane.

PM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Harbor Boulevard at Driveway A

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[14.1]

Table with columns for Street Name, Approach, Movement, Control, Rights, and Lanes. Rows include Harbor Boulevard and Driveway A with various movement and control details.

Volume Module: Table showing traffic volume data including Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and Final Volume.

Critical Gap Module: Table showing Critical Gap and FollowUpTime values for different approaches.

Capacity Module: Table showing Capacity values for Conflict Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module: Table showing Level of Service values for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS.

Note: Queue reported is the number of cars per lane.

PM Existing Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Harbor Boulevard at Driveway B

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[13.4]

Table with columns for Street Name, Approach, Movement, Control, Rights, Lanes. Rows include Harbor Boulevard and Driveway B with various lane configurations and control types like Uncontrolled and Stop Sign.

Volume Module table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume. Rows show volume calculations for each approach.

Critical Gap Module table with columns for Critical Gp, FollowUpTim. Rows show gap values and follow-up times for different approaches.

Capacity Module table with columns for Cnflct Vol, Potent Cap., Move Cap., Volume/Cap. Rows show capacity values for different approaches.

Level Of Service Module table with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS. Rows show LOS calculations and approach details.

Note: Queue reported is the number of cars per lane.

APPENDIX D-II

**YEAR 2018 CUMULATIVE PLUS PROJECT
TRAFFIC CONDITIONS**

AM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Harbor Boulevard at Driveway A

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[11.1]

Street Name: Harbor Boulevard Driveway A

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

Control: Uncontrolled Uncontrolled Stop Sign Stop Sign

Rights: Include Include Include Include

Lanes: 0 0 3 0 0 0 0 2 1 0 0 0 0 0 1 0 0 0 0 0

Volume Module:

Table with 13 columns and 13 rows showing traffic volume metrics like Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and FinalVolume.

Critical Gap Module:

Table with 13 columns and 2 rows showing Critical Gap and FollowUpTime values.

Capacity Module:

Table with 13 columns and 4 rows showing Capacity metrics like Cnflct Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module:

Table with 13 columns and 10 rows showing Level of Service metrics like 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS.

Note: Queue reported is the number of cars per lane.

AM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Harbor Boulevard at Driveway B

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[11.0]

Table with columns: Street Name, Approach, Movement, Control, Rights, Lanes. Rows include Harbor Boulevard and Driveway B with various traffic control details.

Volume Module:

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume. Rows show traffic volume and adjustment factors.

Critical Gap Module:

Table with columns: Critical Gp, FollowUpTim. Rows show critical gap and follow-up time values.

Capacity Module:

Table with columns: Cnflct Vol, Potent Cap., Move Cap., Volume/Cap. Rows show capacity-related metrics.

Level Of Service Module:

Table with columns: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS. Rows show level of service and delay details.

Note: Queue reported is the number of cars per lane.

PM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Harbor Boulevard at Driveway A

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[14.9]

Table with columns for Street Name, Approach, Movement, Control, Rights, and Lanes. Rows include Harbor Boulevard and Driveway A with various movement and lane configurations.

Volume Module: Table showing traffic volume data including Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and FinalVolume.

Critical Gap Module: Table showing Critical Gp and FollowUpTim values for different approaches.

Capacity Module: Table showing Capacity values for Conflict Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module: Table showing Level of Service (LOS) values for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS.

Note: Queue reported is the number of cars per lane.

PM Cumulative Plus Project Traffic Conditions
2-15-3560 Costa Mesa Motor Inn, Costa Mesa

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Harbor Boulevard at Driveway B

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[14.2]

Table with columns: Street Name, Approach, Movement, Control, Rights, Lanes. Rows include Harbor Boulevard and Driveway B with various traffic control details.

Volume Module: Table with columns for Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, FinalVolume.

Critical Gap Module: Table with columns for Critical Gp, FollowUpTim.

Capacity Module: Table with columns for Cnflct Vol, Potent Cap., Move Cap., Volume/Cap.

Level Of Service Module: Table with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS.

Note: Queue reported is the number of cars per lane.

APPENDIX E
SYNCHRO WORKSHEETS

APPENDIX E-1

**YEAR 2018 CUMULATIVE PLUS PROJECT
TRAFFIC CONDITIONS**

Intersection: 1: Harbor Blvd & Harbor Center

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	U	T	T	TR	L	T	T	T
Maximum Queue (ft)	152	75	64	192	183	204	190	240	157	121
Average Queue (ft)	73	40	17	85	85	83	85	82	36	28
95th Queue (ft)	131	66	49	160	167	184	150	191	109	81
Link Distance (ft)	465	465		378	378	378		478	478	478
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			140				140			
Storage Blk Time (%)				2			3	2		
Queuing Penalty (veh)				0			9	2		

Intersection: 2: Harbor Blvd & Wilson St

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	220	265	490	429	155	186	240	183	155	53	247	353
Average Queue (ft)	167	210	218	187	81	71	130	97	68	25	76	228
95th Queue (ft)	251	286	384	325	182	171	201	156	135	48	180	321
Link Distance (ft)			892	892				788	788			658
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175	175			65	175	175			120	158	
Storage Blk Time (%)	4	28	9	46	1	0	2	0	1		0	23
Queuing Penalty (veh)	10	73	35	60	2	0	3	1	1		0	16

Intersection: 2: Harbor Blvd & Wilson St

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (ft)	316	227	102	239	256	245	249	160
Average Queue (ft)	183	104	27	113	160	150	124	53
95th Queue (ft)	283	202	72	191	234	228	211	147
Link Distance (ft)	658	658			254	254	254	
Upstream Blk Time (%)				0	0	0	0	
Queuing Penalty (veh)				0	1	1	0	
Storage Bay Dist (ft)			60	200				70
Storage Blk Time (%)		16	1	1	3		16	0
Queuing Penalty (veh)		14	2	2	4		28	1

Intersection: 3: Harbor Blvd & Driveway A

Movement	EB	NB	SB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	60	55	39	4
Average Queue (ft)	26	15	4	0
95th Queue (ft)	55	55	21	3
Link Distance (ft)	566	6		378
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)			75	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Harbor Blvd & Driveway B

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	T	T	T
Maximum Queue (ft)	58	11	11	27	10
Average Queue (ft)	25	0	0	1	1
95th Queue (ft)	50	8	8	14	7
Link Distance (ft)	562	254	254	104	104
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Harbor Blvd & Harbor Center

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	L	T
Maximum Queue (ft)	48	17	13	44	64
Average Queue (ft)	11	1	1	18	38
95th Queue (ft)	37	9	6	44	81
Link Distance (ft)	452	104	104	6	6
Upstream Blk Time (%)				7	0
Queuing Penalty (veh)				21	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 285

HCM 2010 Signalized Intersection Summary
 1: Harbor Blvd & Harbor Center

Year 2018 Plus Project
 AM Peak Hour

								
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT	
Lane Configurations								
Traffic Volume (veh/h)	80	95	15	1153	101	93	990	
Future Volume (veh/h)	80	95	15	1153	101	93	990	
Number	3	18		2	12	1	6	
Initial Q (Qb), veh	0	0		0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	1.00		
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863		1863	1900	1863	1863	
Adj Flow Rate, veh/h	80	95		1153	101	93	990	
Adj No. of Lanes	1	1		3	0	1	3	
Peak Hour Factor	1.00	1.00		1.00	1.00	1.00	1.00	
Percent Heavy Veh, %	2	2		2	2	2	2	
Cap, veh/h	133	119		3609	316	115	4348	
Arrive On Green	0.07	0.07		1.00	1.00	0.06	0.86	
Sat Flow, veh/h	1774	1583		4930	417	1774	5253	
Grp Volume(v), veh/h	80	95		821	433	93	990	
Grp Sat Flow(s),veh/h/ln	1774	1583		1695	1789	1774	1695	
Q Serve(g_s), s	5.7	7.7		0.0	0.0	6.7	4.6	
Cycle Q Clear(g_c), s	5.7	7.7		0.0	0.0	6.7	4.6	
Prop In Lane	1.00	1.00			0.23	1.00		
Lane Grp Cap(c), veh/h	133	119		2569	1356	115	4348	
V/C Ratio(X)	0.60	0.80		0.32	0.32	0.81	0.23	
Avail Cap(c_a), veh/h	721	643		2569	1356	352	4348	
HCM Platoon Ratio	1.00	1.00		2.00	2.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	58.2	59.2		0.0	0.0	60.0	1.7	
Incr Delay (d2), s/veh	1.6	4.6		0.3	0.6	4.9	0.1	
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	2.8	3.5		0.1	0.2	3.5	2.2	
LnGrp Delay(d),s/veh	59.9	63.8		0.3	0.6	64.9	1.8	
LnGrp LOS	E	E		A	A	E	A	
Approach Vol, veh/h	175			1254			1083	
Approach Delay, s/veh	62.0			0.4			7.2	
Approach LOS	E			A			A	
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.6	103.4				116.1		13.9
Change Period (Y+Rc), s	*4.2	4.9				4.9		4.2
Max Green Setting (Gmax), s	*26	38.1				38.1		52.8
Max Q Clear Time (g_c+I1), s	8.7	2.0				6.6		9.7
Green Ext Time (p_c), s	0.0	27.3				24.5		0.1
Intersection Summary								
HCM 2010 Ctrl Delay				7.7				
HCM 2010 LOS				A				
Notes								

HCM 2010 Signalized Intersection Summary
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	374	525	130	213	252	78	70	978	90	137	1054	173
Future Volume (veh/h)	374	525	130	213	252	78	70	978	90	137	1054	173
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	374	525	130	213	252	78	70	978	90	137	1054	173
Adj No. of Lanes	2	2	1	2	2	1	1	3	1	1	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	422	663	297	264	500	224	89	2586	805	159	2788	989
Arrive On Green	0.12	0.19	0.19	0.08	0.14	0.14	0.05	0.51	0.51	0.18	1.00	1.00
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	374	525	130	213	252	78	70	978	90	137	1054	173
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	13.9	18.4	9.5	7.9	8.6	5.8	5.1	15.2	3.9	9.7	0.0	0.0
Cycle Q Clear(g_c), s	13.9	18.4	9.5	7.9	8.6	5.8	5.1	15.2	3.9	9.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	422	663	297	264	500	224	89	2586	805	159	2788	989
V/C Ratio(X)	0.89	0.79	0.44	0.81	0.50	0.35	0.79	0.38	0.11	0.86	0.38	0.17
Avail Cap(c_a), veh/h	445	1154	516	445	1154	516	243	2586	805	297	2788	989
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	50.4	46.8	59.1	51.6	50.4	61.1	19.4	16.6	52.5	0.0	0.0
Incr Delay (d2), s/veh	17.6	0.8	0.4	2.2	0.3	0.3	5.7	0.4	0.3	5.1	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	9.0	4.2	3.8	4.2	2.5	2.6	7.2	1.7	4.9	0.1	0.1
LnGrp Delay(d),s/veh	73.7	51.2	47.2	61.3	51.9	50.7	66.7	19.9	16.9	57.6	0.4	0.4
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	A	A
Approach Vol, veh/h		1029			543			1138			1364	
Approach Delay, s/veh		58.9			55.4			22.5			6.1	
Approach LOS		E			E			C			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.7	76.2	14.2	28.9	15.9	71.0	20.1	23.0				
Change Period (Y+Rc), s	*4.2	4.9	*4.2	4.6	*4.2	4.9	*4.2	4.6				
Max Green Setting (Gmax), s	*18	35.1	*17	42.4	*22	31.1	*17	42.4				
Max Q Clear Time (g_c+l1), s	7.1	2.0	9.9	20.4	11.7	17.2	15.9	10.6				
Green Ext Time (p_c), s	0.0	26.2	0.0	3.9	0.0	12.4	0.0	4.2				

Intersection Summary												
HCM 2010 Ctrl Delay											30.6	
HCM 2010 LOS											C	

Notes

Lanes, Volumes, Timings
1: Harbor Blvd & Harbor Center

Year 2018 Plus Project
AM Peak Hour



Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	80	95	15	1153	101	93	990
Future Volume (vph)	80	95	15	1153	101	93	990
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	140		0	140	
Storage Lanes	1	1	1		0	1	
Taper Length (ft)	90		90			90	
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.850		0.988			
Flt Protected	0.950		0.950			0.950	
Satd. Flow (prot)	1770	1583	1770	5024	0	1770	5085
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1770	1583	1770	5024	0	1770	5085
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		95		11			
Link Speed (mph)	30			40			40
Link Distance (ft)	523			442			512
Travel Time (s)	11.9			7.5			8.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	95	15	1153	101	93	990
Shared Lane Traffic (%)							
Lane Group Flow (vph)	80	95	15	1254	0	93	990
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	R NA	Left	Right	Left	Left
Median Width(ft)	12			12			12
Link Offset(ft)	0			0			0
Crosswalk Width(ft)	16			16			16
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9		9	15	
Number of Detectors	1	1	1	2		1	2
Detector Template	Left	Right	Left	Thru		Left	Thru
Leading Detector (ft)	20	20	20	100		20	100
Trailing Detector (ft)	0	0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0		0	0
Detector 1 Size(ft)	20	20	20	6		20	6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)				94			94
Detector 2 Size(ft)				6			6
Detector 2 Type				CI+Ex			CI+Ex
Detector 2 Channel							
Detector 2 Extend (s)				0.0			0.0
Turn Type	Prot	Perm	Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases		8					

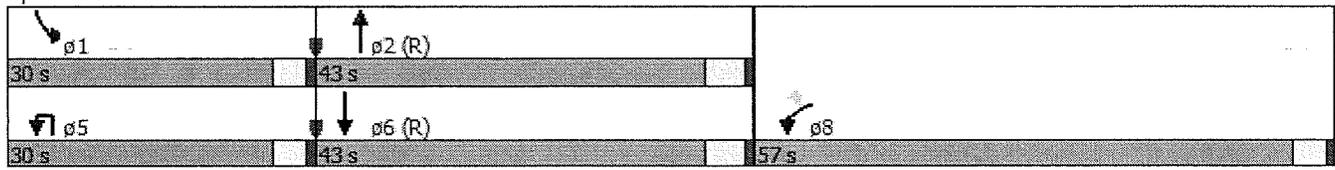


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Detector Phase	8	8	5	2		1	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	8.0		4.0	8.0
Minimum Split (s)	37.2	37.2	9.2	23.0		9.0	13.0
Total Split (s)	57.0	57.0	30.0	43.0		30.0	43.0
Total Split (%)	43.8%	43.8%	23.1%	33.1%		23.1%	33.1%
Maximum Green (s)	52.8	52.8	25.8	38.1		25.8	38.1
Yellow Time (s)	3.2	3.2	3.2	3.9		3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.9		4.2	4.9
Lead/Lag			Lead	Lag		Lead	Lag
Lead-Lag Optimize?			Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.0	1.0	1.0	4.0		1.0	4.0
Recall Mode	None	None	None	C-Max		None	C-Max
Walk Time (s)	9.0	9.0		7.0			
Flash Dont Walk (s)	24.0	24.0		10.0			
Pedestrian Calls (#/hr)	5	5		5			
Act Effct Green (s)	13.2	13.2	4.9	93.2		10.3	103.6
Actuated g/C Ratio	0.10	0.10	0.04	0.72		0.08	0.80
v/c Ratio	0.45	0.39	0.23	0.35		0.66	0.24
Control Delay	59.6	12.9	60.5	8.2		79.6	5.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	59.6	12.9	60.5	8.2		79.6	5.2
LOS	E	B	E	A		E	A
Approach Delay	34.3			8.9			11.6
Approach LOS	C			A			B
Queue Length 50th (ft)	67	0	12	143		78	39
Queue Length 95th (ft)	97	44	m29	171		131	173
Internal Link Dist (ft)	443			362			432
Turn Bay Length (ft)			140			140	
Base Capacity (vph)	718	699	351	3604		351	4053
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.11	0.14	0.04	0.35		0.26	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.8
 Intersection Capacity Utilization 45.2%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Harbor Blvd & Harbor Center



Lanes, Volumes, Timings
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	374	525	130	213	252	78	70	978	90	137	1054	173
Future Volume (vph)	374	525	130	213	252	78	70	978	90	137	1054	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		65	175		120	158		60	200		70
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frts			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86			84			84
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		962			858			722			346	
Travel Time (s)		21.9			19.5			16.4			7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	374	525	130	213	252	78	70	978	90	137	1054	173
Shared Lane Traffic (%)												
Lane Group Flow (vph)	374	525	130	213	252	78	70	978	90	137	1054	173
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right									
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases			4			8			6			2

Lanes, Volumes, Timings
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	40.0	40.0	9.0	40.0	40.0	9.0	36.0	36.0	9.0	36.0	9.0
Total Split (s)	21.0	47.0	47.0	21.0	47.0	47.0	22.0	36.0	36.0	26.0	40.0	21.0
Total Split (%)	16.2%	36.2%	36.2%	16.2%	36.2%	36.2%	16.9%	27.7%	27.7%	20.0%	30.8%	16.2%
Maximum Green (s)	16.8	42.4	42.4	16.8	42.4	42.4	17.8	31.1	31.1	21.8	35.1	16.8
Yellow Time (s)	3.2	3.6	3.6	3.2	3.6	3.6	3.2	3.9	3.9	3.2	3.9	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.6	4.6	4.2	4.6	4.6	4.2	4.9	4.9	4.2	4.9	4.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	0.5	2.0	2.0	0.5	2.0	2.0	0.5	4.0	4.0	0.5	4.0	0.5
Recall Mode	None	C-Max	C-Max	None	C-Max	None						
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		22.0	22.0		22.0	22.0		16.0	16.0		16.0	
Pedestrian Calls (#/hr)		5	5		5	5		5	5		5	
Act Effct Green (s)	15.8	24.6	24.6	11.0	19.8	19.8	8.1	63.5	63.5	13.0	70.0	90.7
Actuated g/C Ratio	0.12	0.19	0.19	0.08	0.15	0.15	0.06	0.49	0.49	0.10	0.54	0.70
v/c Ratio	0.90	0.78	0.35	0.73	0.47	0.25	0.64	0.39	0.11	0.77	0.38	0.15
Control Delay	81.0	58.6	19.1	72.9	52.0	9.1	83.6	23.5	6.3	87.5	17.4	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.0	58.6	19.1	72.9	52.0	9.1	83.6	23.5	6.3	87.5	17.4	3.2
LOS	F	E	B	E	D	A	F	C	A	F	B	A
Approach Delay		61.8			54.0			25.8			22.6	
Approach LOS		E			D			C			C	
Queue Length 50th (ft)	161	223	31	91	104	0	59	187	3	115	202	30
Queue Length 95th (ft)	#239	271	85	130	134	36	107	280	40	188	152	6
Internal Link Dist (ft)		882			778			642			266	
Turn Bay Length (ft)	175		65	175		120	158		60	200		70
Base Capacity (vph)	443	1154	574	443	1154	574	242	2482	815	296	2739	1142
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.45	0.23	0.48	0.22	0.14	0.29	0.39	0.11	0.46	0.38	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 37.6
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Harbor Blvd & Wilson St

 p1 22 s	 p2 (R) 40 s	 p3 21 s	 p4 47 s
 p5 26 s	 p6 (R) 36 s	 p7 21 s	 p8 47 s

Lanes, Volumes, Timings
3: Harbor Blvd & Driveway A

Year 2018 Plus Project
AM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↓↓↓↗	
Traffic Volume (vph)	0	46	0	1269	1069	16
Future Volume (vph)	0	46	0	1269	1069	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	90		90			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	0.86
Friction		0.865			0.998	
Fit Protected						
Satd. Flow (prot)	0	1611	0	5085	6395	0
Fit Permitted						
Satd. Flow (perm)	0	1611	0	5085	6395	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	631			57	442	
Travel Time (s)	14.3			1.3	10.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	46	0	1269	1069	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	46	0	1269	1085	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 27.9% ICU Level of Service A
 Analysis Period (min) 15

Lanes, Volumes, Timings
4: Harbor Blvd & Driveway B

Year 2018 Plus Project
AM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑↘	
Traffic Volume (vph)	0	45	0	1298	1063	7
Future Volume (vph)	0	45	0	1298	1063	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Friction		0.865			0.999	
Fit Protected						
Satd. Flow (prot)	0	1611	0	5085	5080	0
Fit Permitted						
Satd. Flow (perm)	0	1611	0	5085	5080	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	620			346	167	
Travel Time (s)	14.1			7.9	3.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	45	0	1298	1063	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	45	0	1298	1070	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.7% ICU Level of Service A

Analysis Period (min) 15



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑↑↑		↘	↑↑↑
Traffic Volume (vph)	2	9	1260	38	47	1066
Future Volume (vph)	2	9	1260	38	47	1066
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt	0.890		0.996			
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1643	0	5065	0	1770	5085
Flt Permitted	0.991				0.950	
Satd. Flow (perm)	1643	0	5065	0	1770	5085
Link Speed (mph)	30		30		30	30
Link Distance (ft)	511		167		57	57
Travel Time (s)	11.6		3.8		1.3	1.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	9	1260	38	47	1066
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	1298	0	47	1066
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12		12	12
Link Offset(ft)	0		0		0	0
Crosswalk Width(ft)	16		16		16	16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 41.9% ICU Level of Service A
 Analysis Period (min) 15

Intersection: 1: Harbor Blvd & Harbor Center

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	U	T	T	TR	L	T	T	T
Maximum Queue (ft)	209	113	229	370	376	390	228	388	333	302
Average Queue (ft)	107	56	58	242	252	257	135	180	115	112
95th Queue (ft)	184	94	165	369	381	397	219	329	260	227
Link Distance (ft)	465	465		378	378	378		478	478	478
Upstream Blk Time (%)				0	0	1		0		
Queuing Penalty (veh)				2	2	5		0		
Storage Bay Dist (ft)			140				140			
Storage Blk Time (%)			0	20			12	8		
Queuing Penalty (veh)			1	9			74	13		

Intersection: 2: Harbor Blvd & Wilson St

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	207	245	193	161	95	220	265	384	359	210	248	491
Average Queue (ft)	104	148	94	73	35	160	202	219	187	57	169	332
95th Queue (ft)	204	226	160	136	73	246	283	339	294	166	287	456
Link Distance (ft)			892	892				788	788			658
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175	175			65	175	175			120	158	
Storage Blk Time (%)	0	7	0	17	2	4	23	16	25		6	36
Queuing Penalty (veh)	0	9	1	20	2	11	63	55	23		28	53

Intersection: 2: Harbor Blvd & Wilson St

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (ft)	456	334	150	254	283	272	276	160
Average Queue (ft)	285	218	73	151	222	222	217	137
95th Queue (ft)	413	327	173	252	311	304	307	209
Link Distance (ft)	658	658			254	254	254	
Upstream Blk Time (%)				0	4	4	4	
Queuing Penalty (veh)				0	28	25	24	
Storage Bay Dist (ft)			60	200				70
Storage Blk Time (%)		35	1	3	12		29	7
Queuing Penalty (veh)		49	3	13	20		121	34

Intersection: 3: Harbor Blvd & Driveway A

Movement	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	T	T	TR
Maximum Queue (ft)	73	12	20	74	91	113	98	144
Average Queue (ft)	19	1	1	52	18	16	6	12
95th Queue (ft)	52	7	10	79	62	76	48	71
Link Distance (ft)	566	6	6	6		378	378	378
Upstream Blk Time (%)		0	0	1				
Queuing Penalty (veh)		1	1	5				
Storage Bay Dist (ft)					75			
Storage Blk Time (%)					1	1		
Queuing Penalty (veh)					6	3		

Intersection: 4: Harbor Blvd & Driveway B

Movement	EB	NB	SB	SB	SB
Directions Served	R	T	T	T	TR
Maximum Queue (ft)	67	11	120	124	119
Average Queue (ft)	22	0	40	36	32
95th Queue (ft)	51	8	115	107	105
Link Distance (ft)	562	254	104	104	104
Upstream Blk Time (%)			2	1	2
Queuing Penalty (veh)			11	7	11
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Harbor Blvd & Harbor Center

Movement	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LR	T	T	TR	L	T	T	T
Maximum Queue (ft)	245	22	36	34	39	35	30	71
Average Queue (ft)	71	1	2	4	25	6	2	29
95th Queue (ft)	199	10	16	20	46	27	16	74
Link Distance (ft)	452	104	104	104	6	6	6	6
Upstream Blk Time (%)	1				25	1	1	2
Queuing Penalty (veh)	0				125	6	3	8
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 874

HCM 2010 Signalized Intersection Summary
 1: Harbor Blvd & Harbor Center

Year 2018 Plus Project
 PM Peak Hour

								
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT	
Lane Configurations								
Traffic Volume (veh/h)	127	153	42	1663	125	162	1855	
Future Volume (veh/h)	127	153	42	1663	125	162	1855	
Number	3	18		2	12	1	6	
Initial Q (Qb), veh	0	0		0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	1.00		
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863		1863	1900	1863	1863	
Adj Flow Rate, veh/h	127	153		1663	125	162	1855	
Adj No. of Lanes	1	1		3	0	1	3	
Peak Hour Factor	1.00	1.00		1.00	1.00	1.00	1.00	
Percent Heavy Veh, %	2	2		2	2	2	2	
Cap, veh/h	198	176		3287	247	187	4163	
Arrive On Green	0.11	0.11		1.00	1.00	0.11	0.82	
Sat Flow, veh/h	1774	1583		4994	362	1774	5253	
Grp Volume(v), veh/h	127	153		1167	621	162	1855	
Grp Sat Flow(s), veh/h/ln	1774	1583		1695	1799	1774	1695	
Q Serve(g_s), s	8.9	12.4		0.0	0.0	11.7	13.5	
Cycle Q Clear(g_c), s	8.9	12.4		0.0	0.0	11.7	13.5	
Prop In Lane	1.00	1.00			0.20	1.00		
Lane Grp Cap(c), veh/h	198	176		2309	1225	187	4163	
V/C Ratio(X)	0.64	0.87		0.51	0.51	0.87	0.45	
Avail Cap(c_a), veh/h	721	643		2309	1225	352	4163	
HCM Platoon Ratio	1.00	1.00		2.00	2.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	55.3	56.8		0.0	0.0	57.3	3.4	
Incr Delay (d2), s/veh	1.3	4.9		0.8	1.5	4.7	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	4.4	5.7		0.3	0.5	6.0	6.3	
LnGrp Delay(d),s/veh	56.6	61.7		0.8	1.5	61.9	3.7	
LnGrp LOS	E	E		A	A	E	A	
Approach Vol, veh/h	280		1788			2017		
Approach Delay, s/veh	59.4		1.0			8.4		
Approach LOS	E		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	17.9	93.4				111.3		18.7
Change Period (Y+Rc), s	*4.2	4.9				4.9		4.2
Max Green Setting (Gmax), s	*26	38.1				38.1		52.8
Max Q Clear Time (g_c+I1), s	13.7	2.0				15.5		14.4
Green Ext Time (p_c), s	0.0	34.9				22.1		0.1
Intersection Summary								
HCM 2010 Ctrl Delay			8.7					
HCM 2010 LOS			A					
Notes								

HCM 2010 Signalized Intersection Summary
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	256	266	117	350	549	91	147	1480	143	167	1390	422
Future Volume (veh/h)	256	266	117	350	549	91	147	1480	143	167	1390	422
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	256	266	117	350	549	91	147	1480	143	167	1390	422
Adj No. of Lanes	2	2	1	2	2	1	1	3	1	1	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	306	582	260	398	677	303	171	2415	752	191	2470	952
Arrive On Green	0.09	0.16	0.16	0.12	0.19	0.19	0.10	0.47	0.47	0.14	0.65	0.65
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	256	266	117	350	549	91	147	1480	143	167	1390	422
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	9.5	8.8	8.7	13.0	19.3	6.4	10.6	28.0	6.8	12.0	19.8	14.7
Cycle Q Clear(g_c), s	9.5	8.8	8.7	13.0	19.3	6.4	10.6	28.0	6.8	12.0	19.8	14.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	306	582	260	398	677	303	171	2415	752	191	2470	952
V/C Ratio(X)	0.84	0.46	0.45	0.88	0.81	0.30	0.86	0.61	0.19	0.88	0.56	0.44
Avail Cap(c_a), veh/h	418	964	431	418	964	431	188	2415	752	216	2470	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.3	49.1	49.0	56.6	50.3	45.1	57.8	25.3	19.7	54.9	15.3	9.1
Incr Delay (d2), s/veh	7.8	0.2	0.5	17.5	2.3	0.2	26.7	1.2	0.6	26.5	0.9	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.3	3.8	7.1	9.7	2.8	6.5	13.3	3.1	7.2	9.4	6.8
LnGrp Delay(d),s/veh	66.1	49.3	49.5	74.1	52.7	45.3	84.6	26.5	20.3	81.4	16.3	10.6
LnGrp LOS	E	D	D	E	D	D	F	C	C	F	B	B
Approach Vol, veh/h		639			990			1770			1979	
Approach Delay, s/veh		56.0			59.5			30.8			20.6	
Approach LOS		E			E			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.8	68.0	19.2	26.0	18.2	66.6	15.8	29.5				
Change Period (Y+Rc), s	*4.2	4.9	*4.2	4.6	*4.2	4.9	*4.2	4.6				
Max Green Setting (Gmax), s	*14	47.1	*16	35.4	*16	45.1	*16	35.4				
Max Q Clear Time (g_c+11), s	12.6	21.8	15.0	10.8	14.0	30.0	11.5	21.3				
Green Ext Time (p_c), s	0.0	24.4	0.0	4.1	0.0	14.7	0.0	3.5				
Intersection Summary												
HCM 2010 Ctrl Delay			35.3									
HCM 2010 LOS			D									
Notes												

Lanes, Volumes, Timings
1: Harbor Blvd & Harbor Center

Year 2018 Plus Project
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Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	127	153	42	1663	125	162	1855
Future Volume (vph)	127	153	42	1663	125	162	1855
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	140		0	140	
Storage Lanes	1	1	1		0	1	
Taper Length (ft)	90		90			90	
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	0.91
Frnt		0.850		0.990			
Flt Protected	0.950		0.950			0.950	
Satd. Flow (prot)	1770	1583	1770	5034	0	1770	5085
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1770	1583	1770	5034	0	1770	5085
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		153		9			
Link Speed (mph)	30			40			40
Link Distance (ft)	523			442			512
Travel Time (s)	11.9			7.5			8.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	127	153	42	1663	125	162	1855
Shared Lane Traffic (%)							
Lane Group Flow (vph)	127	153	42	1788	0	162	1855
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	R NA	Left	Right	Left	Left
Median Width(ft)	12			12			12
Link Offset(ft)	0			0			0
Crosswalk Width(ft)	16			16			16
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	9		9	15	
Number of Detectors	1	1	1	2		1	2
Detector Template	Left	Right	Left	Thru		Left	Thru
Leading Detector (ft)	20	20	20	100		20	100
Trailing Detector (ft)	0	0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0		0	0
Detector 1 Size(ft)	20	20	20	6		20	6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)				94			94
Detector 2 Size(ft)				6			6
Detector 2 Type				CI+Ex			CI+Ex
Detector 2 Channel							
Detector 2 Extend (s)				0.0			0.0
Turn Type	Prot	Perm	Prot	NA		Prot	NA
Protected Phases	8		5	2		1	6
Permitted Phases		8					



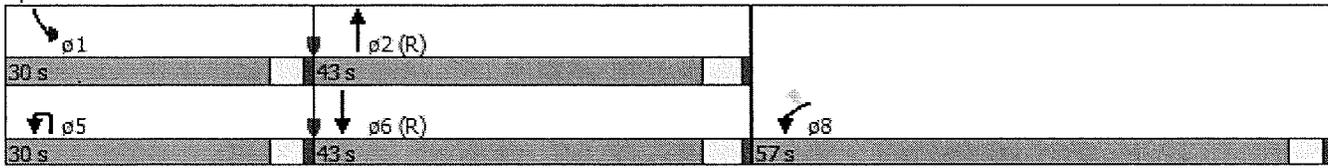
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Detector Phase	8	8	5	2		1	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	8.0		4.0	8.0
Minimum Split (s)	37.2	37.2	9.2	23.0		9.0	13.0
Total Split (s)	57.0	57.0	30.0	43.0		30.0	43.0
Total Split (%)	43.8%	43.8%	23.1%	33.1%		23.1%	33.1%
Maximum Green (s)	52.8	52.8	25.8	38.1		25.8	38.1
Yellow Time (s)	3.2	3.2	3.2	3.9		3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.9		4.2	4.9
Lead/Lag			Lead	Lag		Lead	Lag
Lead-Lag Optimize?			Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.0	1.0	1.0	4.0		1.0	4.0
Recall Mode	None	None	None	C-Max		None	C-Max
Walk Time (s)	9.0	9.0		7.0			
Flash Dont Walk (s)	24.0	24.0		10.0			
Pedestrian Calls (#/hr)	5	5		5			
Act Effect Green (s)	15.8	15.8	6.7	85.5		15.4	95.9
Actuated g/C Ratio	0.12	0.12	0.05	0.66		0.12	0.74
v/c Ratio	0.59	0.47	0.47	0.54		0.78	0.49
Control Delay	63.2	11.2	57.6	18.0		79.0	9.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	63.2	11.2	57.6	18.0		79.0	9.5
LOS	E	B	E	B		E	A
Approach Delay	34.8			18.9			15.1
Approach LOS	C			B			B
Queue Length 50th (ft)	93	0	32	174		118	174
Queue Length 95th (ft)	127	48	m51	380		178	371
Internal Link Dist (ft)	443			362			432
Turn Bay Length (ft)			140			140	
Base Capacity (vph)	718	733	351	3315		351	3750
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.18	0.21	0.12	0.54		0.46	0.49

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Harbor Blvd & Harbor Center



Lanes, Volumes, Timings
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	266	117	350	549	91	147	1480	143	167	1390	422
Future Volume (vph)	256	266	117	350	549	91	147	1480	143	167	1390	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		65	175		120	158		60	200		70
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	90			90			90			90		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frnt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117			86			84			103
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		962			858			722			346	
Travel Time (s)		21.9			19.5			16.4			7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	256	266	117	350	549	91	147	1480	143	167	1390	422
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	266	117	350	549	91	147	1480	143	167	1390	422
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right									
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		1	6		5	2	7
Permitted Phases			4			8			6			2

Lanes, Volumes, Timings
2: Harbor Blvd & Wilson St

Year 2018 Plus Project
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	40.0	40.0	9.0	40.0	40.0	9.0	36.0	36.0	9.0	36.0	9.0
Total Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	18.0	50.0	50.0	20.0	52.0	20.0
Total Split (%)	15.4%	30.8%	30.8%	15.4%	30.8%	30.8%	13.8%	38.5%	38.5%	15.4%	40.0%	15.4%
Maximum Green (s)	15.8	35.4	35.4	15.8	35.4	35.4	13.8	45.1	45.1	15.8	47.1	15.8
Yellow Time (s)	3.2	3.6	3.6	3.2	3.6	3.6	3.2	3.9	3.9	3.2	3.9	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.6	4.6	4.2	4.6	4.6	4.2	4.9	4.9	4.2	4.9	4.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	0.5	2.0	2.0	0.5	2.0	2.0	0.5	4.0	4.0	0.5	4.0	0.5
Recall Mode	None	C-Max	C-Max	None	C-Max	None						
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		22.0	22.0		22.0	22.0		16.0	16.0		16.0	
Pedestrian Calls (#/hr)		5	5		5	5		5	5		5	
Act Effct Green (s)	12.5	22.9	22.9	14.8	25.3	25.3	13.9	59.1	59.1	15.3	60.4	77.8
Actuated g/C Ratio	0.10	0.18	0.18	0.11	0.19	0.19	0.11	0.45	0.45	0.12	0.46	0.60
v/c Ratio	0.78	0.43	0.31	0.90	0.80	0.24	0.78	0.64	0.19	0.80	0.59	0.43
Control Delay	73.6	48.7	9.2	82.0	58.8	10.7	82.4	30.8	12.1	81.8	23.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.6	48.7	9.2	82.0	58.8	10.7	82.4	30.8	12.1	81.8	23.0	9.0
LOS	E	D	A	F	E	B	F	C	B	F	C	A
Approach Delay		51.5			62.6			33.6			25.0	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	96	94	0	132	205	3	107	308	25	103	289	146
Queue Length 95th (ft)	135	121	43	#200	247	42	170	424	74	172	368	137
Internal Link Dist (ft)		882			778			642			266	
Turn Bay Length (ft)	175		65	175		120	158		60	200		70
Base Capacity (vph)	417	963	516	417	963	493	207	2310	764	232	2364	1026
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.28	0.23	0.84	0.57	0.18	0.71	0.64	0.19	0.72	0.59	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 37.9
 Intersection Capacity Utilization 75.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Intersection LOS: D
 ICU Level of Service D

Queue shown is maximum after two cycles.

Splits and Phases: 2: Harbor Blvd & Wilson St

 $\phi 1$ 18 s	 $\phi 2 (R)$ 52 s	 $\phi 3$ 20 s	 $\phi 4$ 40 s
 $\phi 5$ 20 s	 $\phi 6 (R)$ 50 s	 $\phi 7$ 20 s	 $\phi 8$ 40 s

Lanes, Volumes, Timings
3: Harbor Blvd & Driveway A

Year 2018 Plus Project
PM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↓↓↓	
Traffic Volume (vph)	0	25	0	1831	1995	63
Future Volume (vph)	0	25	0	1831	1995	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	90		90			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.86	0.86
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	6376	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	6376	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	631			57	442	
Travel Time (s)	14.3			1.3	10.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	25	0	1831	1995	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	25	0	1831	2058	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 40.0% ICU Level of Service A
 Analysis Period (min) 15

Lanes, Volumes, Timings
4: Harbor Blvd & Driveway B

Year 2018 Plus Project
PM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	
Traffic Volume (vph)	0	24	0	1836	1911	27
Future Volume (vph)	0	24	0	1836	1911	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	5075	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	5075	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	620			346	167	
Travel Time (s)	14.1			7.9	3.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	24	0	1836	1911	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	24	0	1836	1938	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 47.5% ICU Level of Service A
 Analysis Period (min) 15



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑↑↑		↘	↑↑↑
Traffic Volume (vph)	2	114	1715	119	84	1935
Future Volume (vph)	2	114	1715	119	84	1935
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt	0.867		0.990			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1613	0	5034	0	1770	5085
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1613	0	5034	0	1770	5085
Link Speed (mph)	30		30			30
Link Distance (ft)	511		167			57
Travel Time (s)	11.6		3.8			1.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	114	1715	119	84	1935
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	0	1834	0	84	1935
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 57.6% ICU Level of Service B
 Analysis Period (min) 15