

# **Traffic Circulation Analysis**

**190<sup>th</sup> Street/Western Avenue  
Commercial Center**

Submitted to:  
City of Torrance

April 26, 2022



April 26, 2022

Ms. Jessamine Que  
Associate Engineer – Public Works  
City of Torrance  
20500 Madrona Avenue  
Torrance, CA 90503

**RE: Traffic Circulation Analysis Report for the 190<sup>th</sup> Street/Western Avenue Commercial Center**

Dear Ms. Que,

AGA Engineers, Inc., (AGA) is pleased to present to the City of Torrance this Traffic Circulation Analysis (TCA) report for the proposed 190<sup>th</sup> Street/Western Avenue Commercial Center located in the northwest corner of 190<sup>th</sup> Street and Western Avenue. The proposed project consists of constructing a new commercial retail development in the vacant site.

The purpose of this TCA report is to determine if the proposed project will negatively affect the nearby intersections and driveways and to assess if any traffic improvement measures would be necessary.

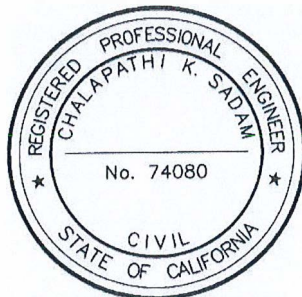
Should you have any questions regarding this study, please do not hesitate to contact Greg Wong or me at (714) 992-4592.

Respectfully submitted,

AGA ENGINEERS, INC.

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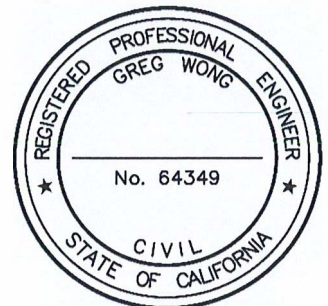
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T.R. 1813

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- 190th-Western TCA - Cover Letter (4-26-22).docx

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## EXECUTIVE SUMMARY

A commercial center housing several retail establishments is proposed for a vacant lot at the corner of 190<sup>th</sup> Street and Western Avenue in the City of Torrance. The 5.3-acre parcel at the northwest corner of the intersection will house approximately 23,000 square feet of restaurants with associated patios and parking lots. The food establishments include the following:

- ◆ Building 1 – 3,495 square-foot Shake Shack restaurant with drive-through window and an 853 square-foot patio
- ◆ Building 2 – 3,945 sq ft Panera Bread fast-food restaurant with drive-through window and a 400 sq ft patio
- ◆ Building 3 – 4,099 sq ft Chick Fil-A fast-food restaurant with drive-through window and a 311 sq ft patio
- ◆ Building 4A – 5,700 sq ft restaurant/retail space with an 800 sq ft patio
- ◆ Building 4B – 5,700 sq ft restaurant/retail space with a 700 sq ft patio

Per discussions with the City of Torrance, a scope of work per the City's Traffic Circulation Analysis (TCA) guidelines was developed which included trip generation rates per the ITE *Trip Generation Manual*, a 20% pass-by trip reduction for the high-turnover restaurant, a 50% pass-by trip reduction for AM and PM peak periods, 20% for Midday peak period for all other land uses. Per City staff, count data from previous Chick-fil-A and Shake Shack studies were utilized for the trip generation for those sites (Building 1-Chick Fil-A and Building 3-Shake Shack). Trip reduction and internal trip capture factors were not used for the study.

The approved scope of work covered three analysis scenarios at thirteen study intersections listed below:

### Analysis Scenarios:

1. Year 2021 Existing Conditions
2. Year 2023 Without Projects Conditions (Existing Conditions with Ambient Growth and Cumulative Projects)
3. Year 2023 With Project Conditions (Existing Conditions with Ambient Growth and Cumulative Projects Plus Project)

### Study Intersections:

1. Western Avenue and 182<sup>nd</sup> Street
2. Western Avenue and I-405 NB Ramps
3. Western Avenue and North Project Driveway
4. 190<sup>th</sup> Street and Van Ness Avenue
5. 190<sup>th</sup> Street and Gramercy Place
6. 190<sup>th</sup> Street and I-405 SB Ramps
7. 190<sup>th</sup> Street and West Project Driveway
8. 190<sup>th</sup> Street and East Project Driveway
9. 190<sup>th</sup> Street and Western Avenue
10. 190<sup>th</sup> Street and Harborgate Way
11. 190<sup>th</sup> Street and Normandie Avenue
12. 195<sup>th</sup> Street and Western Avenue
13. Del Amo Boulevard and Western Avenue

The project net trips will be approximately 267 trips in the AM peak hour, 740 trips in the Midday peak hour and 360 trips in the PM peak hour. These trips were distributed into the existing roadway network.

The following traffic operational analysis methodologies were utilized based on the jurisdictional geographic locations of the study intersections. The following methodologies were used:

- ◆ City of Torrance: Intersection Capacity Utilization (ICU)
- ◆ City of Los Angeles: Highway Capacity Manual
- ◆ Caltrans: Highway Capacity Manual
- ◆ Project Driveways: Highway Capacity Manual Unsignalized Methodology

The Level of Service (LOS) analyses for all study scenarios showed that the project is expected to not to negatively affect the traffic at all ten study signalized intersections and two of the project driveways. The intersection of 190<sup>th</sup> Street/West Project Driveway is expected to operate at LOS E during the midday and PM peak hours due to the delay within the driveway exit and be contained within the project site. The LOS for all other movements is expected to be LOS B or better for all time periods. An improvement to this intersection would be to install a traffic signal which would improve the LOS to LOS A. However, the addition of a traffic signal could most likely cause heavy congestion on 190<sup>th</sup> Street and also on the I-405 southbound ramp due to the close spacing of the traffic signals on 190<sup>th</sup> Street.

In analyzing the internal site circulation, queuing studies were conducted for the Shake Shack, Panera Bread and Chick-fil-A restaurants on a typical weekday during the respective busiest period, which is lunch time for Shake Shack and Panera Bread and evening for Chick-fil-A. Saturday lunch time and evening period was also evaluated for Shake Shack and Chick-fil-A. The queuing studies show that the drive-through queue storages provided (19 cars for Shake Shack, 11 cars for Panera Bread and 34 cars for Chick-fil-A) are adequate for the anticipated storage demand. Drive-through activities at these establishments will not impact the internal site circulation and public roadways.

The study also identified several project enhancement options for consideration by the City as follows:

- ◆ Provide right-in/right-out access at the North and East Project Driveways – already incorporated into the project.
- ◆ Provide full ingress/egress access at the West Project Driveway with two exit lanes (southbound left and southbound right-turn lanes) – already incorporated into the project.
- ◆ As an optional circulation enhancement measure, the installation of “Keep Clear” pavement legend and restriping the curb lane as a dedicated right-turn only lane on the westbound approach at the West Project Driveway.
- ◆ Implement signal timing coordination for the signalized intersections along 190<sup>th</sup> Street and Western Avenue. Synchronize the traffic signal of 190<sup>th</sup> Street/Western Avenue with the Caltrans traffic signal at 190<sup>th</sup> Street/I-405 southbound ramps during the morning, midday, and afternoon peak periods.

## I. INTRODUCTION

### **Purpose of the Traffic Circulation Analysis (TCA) Study**

Based on the City's Traffic Circulation Analysis (TCA) Guidelines for Land Use Projects, this project requires a Level-of-Service analysis since the project is expected to generate more than 500 weekday trips. The proposed project (expected opening in Year 2023) involves the redevelopment of an existing 5.3-acre vacant lot adjacent to the intersection of 190<sup>th</sup> Street and Western Avenue in the City of Torrance. The study will also provide decision makers with a complete assessment of the most probable traffic and transportation outcomes should the proposed project be approved, constructed, and fully occupied.

### **Project Location and Description**

The project site consists of several parcels located on the northwest corner of the intersection of 190th Street and Western Avenue just south of the I-405 freeway as shown in **Figure I-1**.

***Figure I-1: Project Location***

Based on the most current site plan (see **Figure 1-2**), the proposed land uses are:

- Building 1 – 3,495 square-foot Shake Shack restaurant with drive-through window and an 853 square-foot patio
- Building 2 – 3,945 sq ft Panera Bread fast-food restaurant with drive-through window and a 400 sq ft patio
- Building 3 – 4,099 sq ft Chick Fil-A fast-food restaurant with drive-through window and a 311 sq ft patio
- Building 4A – 5,700 sq ft restaurant/retail space with an 800 sq ft patio
- Building 4B – 5,700 sq ft restaurant/retail space with a 700 sq ft patio

The project will be served by three unsignalized driveways, detailed as follows:

- North Project Driveway – a 34.5-foot wide driveway along Western Avenue with one inbound right-turn only lane and one outbound right-turn only lane.
- East Project Driveway – a 30-foot wide driveway along 190<sup>th</sup> Street with one inbound shared thru/right-turn lane and one outbound right-turn only lane.
- West Project Driveway – a 33-foot wide driveway along 190<sup>th</sup> Street with one inbound lane, one dedicated outbound left-turn only lane and one dedicated outbound right-turn only lane. Left turn inbound from 190<sup>th</sup> Street is provided at this driveway.

The project requires a Traffic Circulation Analysis (TCA) report which includes a Level-of-Service (LOS) analysis. City staff also requested a queuing analysis be evaluated for the three sites with drive-through lanes. A scope of work was developed per the City's TCA guidelines and was approved by City staff. The TCA Scope of Work is provided in **Appendix A**.

***Figure I-2: Project Site Plan***

### Circulation Analysis - Study Area

Based on discussions with City staff and a review of the proposed project, street network, and anticipated project traffic generation, ten adjacent signalized intersections and three project driveways will be analyzed for any traffic impacts. The study intersections are listed below and shown graphically in **Figure I-3**.

	<b>Intersection</b>	<b>Traffic Control</b>
1.	Western Avenue and 182 <sup>nd</sup> Street	Signalized
2.	Western Avenue and I-405 NB Ramps	Signalized
3.	Western Avenue and North Project Driveway	Unsignalized
4.	190 <sup>th</sup> Street and Van Ness Avenue	Signalized
5.	190 <sup>th</sup> Street and Gramercy Place	Signalized
6.	190 <sup>th</sup> Street and I-405 SB Ramps	Signalized
7.	190 <sup>th</sup> Street and West Project Driveway	Unsignalized
8.	190 <sup>th</sup> Street and East Project Driveway	Unsignalized
9.	190 <sup>th</sup> Street and Western Avenue	Signalized
10.	190 <sup>th</sup> Street and Harborgate Way	Signalized
11.	190 <sup>th</sup> Street and Normandie Avenue	Signalized
12.	195 <sup>th</sup> Street and Western Avenue	Signalized
13.	Del Amo Boulevard and Western Avenue	Signalized

The following turn restrictions were posted at these study intersections:

- ◆ Western Avenue and I-405 NB Ramps - U-turns prohibited at off ramp
- ◆ 190<sup>th</sup> Street and Van Ness Avenue - U-turns prohibited all approaches
- ◆ 190<sup>th</sup> Street and Gramercy Place - U-turns prohibited EB and WB
- ◆ 190<sup>th</sup> Street and I-405 SB Ramps - U-turns prohibited all approaches
- ◆ 190<sup>th</sup> Street and Western Avenue - U-turns prohibited for NB, EB & WB
- ◆ 190<sup>th</sup> Street and Harborgate Way - U-turns prohibited WB
- ◆ 190<sup>th</sup> Street and Normandie Avenue - U-turns prohibited EB

The following restrictions will be imposed at the Project Driveways:

- ◆ Western Avenue and North Project Driveway - right-in/right-out only
- ◆ 190<sup>th</sup> Street and East Project Driveway - right-in/right-out only

Existing lane geometrics, intersection traffic control types, and any turning-movement restrictions for each of the study intersections are shown graphically in **Figure I-4**.



***Figure I-3: Project Study Intersections***

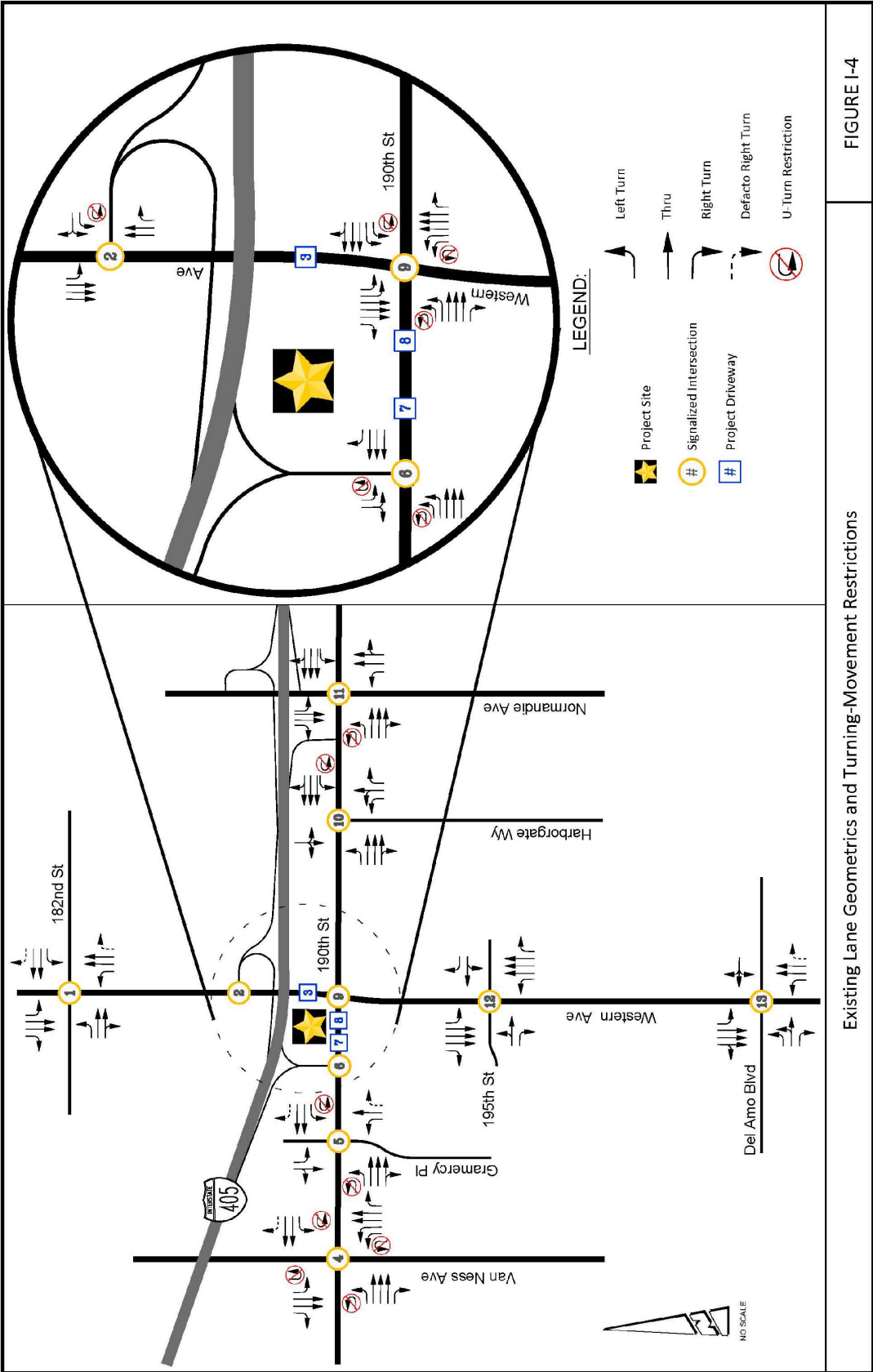


FIGURE I-4

Existing Lane Geometrics and Turning-Movement Restrictions



While the entire project parcel lies in the City of Torrance, Western Avenue forms the boundary between the City of Torrance and the City of Los Angeles. The City of Los Angeles maintains and controls the signalized intersections along Western Avenue and along 190<sup>th</sup> Street east of Western Avenue. South of the I-405 freeway, Western Avenue is a State Highway (SR-213).

The agencies responsible for maintenance and control of the project signalized intersections are as follows:

- City of Torrance
  - ◆ 190<sup>th</sup> Street and Van Ness Avenue
  - ◆ 190<sup>th</sup> Street and Gramercy Place
  
- City of Los Angeles
  - ◆ Western Avenue and 182<sup>nd</sup> Street
  - ◆ Western Avenue and I-405 NB Ramps
  - ◆ Western Avenue and 190<sup>th</sup> Street
  - ◆ 190<sup>th</sup> Street and Harborage Way
  - ◆ 190<sup>th</sup> Street and Normandie Avenue
  
- State of California Department of Transportation (Caltrans )
  - ◆ 190<sup>th</sup> Street and I-405 SB Ramps
  - ◆ Western Avenue and 195<sup>th</sup> Street
  - ◆ Western Avenue and Del Amo Boulevard

## Intersection Level of Service Analysis and Methodology

This traffic analysis performs intersection Level of Service (LOS) analyses for the following three scenarios for the morning (AM), Midday (MD) and afternoon (PM) peak hours:

1. Year 2021 Existing Conditions
2. Year 2023 Opening Year Without Project Conditions (Existing Conditions and Ambient Growth)
3. Year 2023 Opening Year With Project Conditions (Existing Conditions and Ambient Growth plus Project)

This study analyzes intersection LOS by evaluating traffic operations at the identified study intersections. The methodologies used are the following:

- ◆ City of Torrance: Intersection Capacity Utilization (ICU)
- ◆ City of Los Angeles: Highway Capacity Manual
- ◆ Caltrans: Highway Capacity Manual
- ◆ Project Driveways: Highway Capacity Manual Unsignalized Methodology



The analysis methodologies are further detailed below:

- The *Intersection Capacity Utilization* (ICU) is a simple demand-over-capacity assessment of key intersection movements. This methodology assigns LOS rankings from LOS A to LOS F based on the ratio of vehicles utilizing the intersection to the overall intersection capacity, which is also known as the volume-to-capacity (V/C) ratio (**Table I-1**).

**Table I-1. Level-of-Service by Capacity**  
*Intersection Capacity Utilization (ICU) Methodology*  
 Signalized Intersections

Volume/Capacity Ratio (V/C)	LOS	Description
0 - 60%	<b>A</b>	The intersection has no congestion.
>60 - 70%	<b>B</b>	The intersection has very little congestion.
>70 - 80%	<b>C</b>	The intersection has no major congestion.
>80 - 90%	<b>D</b>	The intersection normally has no congestion.
>90 - 100%	<b>E</b>	The intersection is on the verge of congested conditions.
>100 %	<b>F</b>	The intersection is over capacity.

- The *Highway Capacity Manual* (HCM) operations methodology, like the ICU method, also uses a LOS scale ranging from A to F. However, the HCM LOS rankings are defined by average vehicle delay in seconds at the intersection rather than the ICU V/C ratio (**Table 1-2**). Average vehicle delay is estimated based on traffic volumes, number of lanes, and signal timing parameters.

This study uses Synchro software for the HCM LOS calculations at the studied intersections. Synchro is an interactive simulation and analysis tool for signal timing development, capacity analysis, and LOS determination at unsignalized intersections.

Similar to the City of Torrance, the City of Los Angeles also adopted new VMT guidelines for development projects within the City of Los Angeles. The City of Los Angeles VMT calculator and the Department of Transportation Forecasting Model do not cover jurisdictions outside of the City of Los Angeles. However, the City of Los Angeles' new guidelines require Non-CEQA transportation analysis evaluating the LOS for the study intersections utilizing the HCM methodology.



The LOS analysis for the stop-controlled access driveways is determined by average vehicle delay per stopped approach based on traffic volumes traveling through the intersection (**Table I-3**). For the driveways, the intersection LOS is based on the approach with highest average vehicle delay.

**Table I-2. Level-of-Service by Delay**  
*Highway Capacity Manual (HCM) Methodology*  
 Signalized Intersections

Average Delay per Vehicle (sec)	LOS	Description
0 - 10	<b>A</b>	Free flow
>10 - 20	<b>B</b>	Stable flow (slight delay)
>20 - 35	<b>C</b>	Stable flow (acceptable delay)
>35 - 55	<b>D</b>	Approaching unstable flow (tolerable delay)
>55 - 80	<b>E</b>	Unstable flow
>80	<b>F</b>	Forced flow

**Table I-3. Level-of-Service by Delay**  
*Highway Capacity Manual (HCM) Methodology*  
 Stop-Controlled Intersections

Average Delay per Vehicle (sec)	LOS	Description
0 - 10	<b>A</b>	Usually no conflicting traffic
>10 - 15	<b>B</b>	Occasionally some delay
>15 - 25	<b>C</b>	Delay noticeable, but not inconveniencing
>25 - 35	<b>D</b>	Delay noticeable and irritating
>35 - 50	<b>E</b>	Delay approaches tolerance level
>50	<b>F</b>	Delay exceeds tolerance level



**Level of Service Criteria**

From the LOS analyses, the potential traffic from the proposed project may negatively affect the City’s traffic circulation. For this traffic analysis, the proposed project traffic could negatively affect the signalized study intersections under the following conditions:

- At signalized intersections with pre-project ICU LOS C, the addition of the anticipated project traffic increases the V/C ratio by 0.04 or more.
- Similarly, signalized intersections with pre-project ICU LOS D, the addition of the anticipated project traffic increases the V/C ratio by 0.02 or more.
- For signalized intersections with pre-project LOS E or F, the V/C ratio threshold is 0.01 or more.
- At the unsignalized project driveway, post-project HCM LOS degrades to E or F and the volume criteria of the California Manual on Uniform Traffic Control Devices (CA MUTCD) traffic signal warrant guidelines is expected to be met.

These Level-of-Service criteria are summarized in **Tables I-4** and **I-5**.

**Table I-4. Level-of-Service Criteria**  
*Signalized Intersections ICU Methodology*

Pre-Project LOS <sup>1</sup>	Project V/C <sup>2</sup> Increase
C	0.04 or more
D	0.02 or more
E/F	0.01 or more

**Table I-5. Level-of-Service Criteria**  
*Unsignalized Intersections HCM Methodology*

Existing + Ambient Growth + Project	Signal Warrant Analysis Result
LOS Degrades to E or F	Traffic Signal is Warranted

<sup>1</sup> LOS: Intersection Level-of-Service

<sup>2</sup> V/C: volume-to-capacity ratio

The City of Los Angeles Non-CEQA LOS guidelines do not have a delay-LOS threshold. Typically, nearby local cities utilize LOS D or E as the LOS threshold. Therefore, for this study, LOS D will be utilized as the LOS threshold for the City of Los Angeles intersections. Improvements at City of Los Angeles intersections would be required for the following.

- If the project causes a change in LOS D or better to LOS E or F
- If the project causes a change in LOS E to LOS F.

Caltrans LOS guidelines for project trips negatively affecting an intersection are as follows for the Caltrans study intersections.

- If the project causes a change in LOS A-C to LOS D.
- If the project causes a change in LOS D to LOS E or F.
- If the project causes a change in LOS E to LOS F.



## II. PROPOSED PROJECT TRAFFIC PROJECTIONS

### Project Trip Generation

In order to determine vehicle trips generated by various land use types, traffic engineers utilize the Institute of Transportation Engineers (ITE) *Trip Generation Manual* – 10th Edition for guidance. The Manual uses thousands of studies of varying land uses across the nation to determine common trip generation characteristics. The ITE trip generation rates were used for Buildings 2, 4A and 4B. The City required count data from other studies be used as the trip generation for Building 1, Shake Shack with drive-through restaurant and Building 3, Chick-fil-A with drive-through restaurant. Although the tenants for Buildings 4A and 4B have not been finalized, the trip generation is calculated for a high-turnover restaurant to provide a conservative, worst-case analysis.

The anticipated project trip generation Land Use Codes are summarized in **Table II-1** below:

**Table II-1: ITE Land Use Codes**

Building	Description	ITE Land Use
1	3,495 sq ft Shake Shack with drive-through window	N/A – City requirement to Develop Trip Generation based on Existing Shake Shack Site
2	3,945 sq ft Panera Bread fast-food restaurant with drive-through window	934 – Fast-food Restaurant with Drive-Through Window
3	4,099 sq ft Chick-Fil-A fast-food restaurant with drive-through window	N/A – City requirement to Develop Trip Generation based on Existing Chick-fil-A Site
4A	5,700 sq ft restaurant/retail space (TBD)	932 – High-Turnover (Sit-Down) Restaurant
4B	5,700 sq ft restaurant/retail space (TBD)	932 – High-Turnover (Sit-Down) Restaurant

Per City staff, the trip generation for Building 1, Shake Shack with drive-through and Building 3, Chick-fil-A with drive-through, is to utilize count data from other studies. For Building 1, Shake Shack with drive-through, since there are no existing Shake Shack restaurants that have a drive-through, a separate trip generation study was conducted for this land use. The trip generation study conducted counts (trips in and out) in June and July 2021 at an existing Shake Shack without drive-through restaurant located at 2171 Rosecrans Avenue, in the City of El Segundo. The study also evaluated the ITE trip generation for a fast food restaurant without drive-through and the trip generation for a fast-food restaurant with drive-through. The trip generation for a fast-food restaurant with drive-through is higher than the one without a drive-through. The percent difference between the two ITE rates was then applied to the Shake Shack without drive-through restaurant count data to obtain a trip generation for the Shake Shack with drive-through. There is no AM trip generation for Building 1 since all Shake Shack restaurants are not open during the morning hours. For Building 3, Chick-fil-A with drive-through, the City provided available



driveway count information from March 2019 from a nearby Chick-fil-A with drive-through restaurant located at 18200 Hawthorne Boulevard in the City of Torrance. Those driveway counts were used as the trip generation for Building 3. Both the Shake Shack with drive-through trip generation and Chick-fil-A count survey are provided in **Appendix B**. The proposed project trip generation for all buildings are summarized in **Table II-2**.





Table II-2: Proposed Project Trip Generation (Without Pass-By Trip Reduction)

Bldg	Proposed Business	ITE Land Use Code <sup>1,3</sup>	Gross Floor Area (sq. ft.)	Daily	AM Peak Hour (one hr 7-9am)		MD Peak Hr <sup>2</sup> (one hr 11am-1pm)		PM Peak Hour (one hr 4-6pm)			
					In	Out	Total	In	Out	Total	In	Out
1	Shake Shack	934 : Fast-Food Restaurant w. Drive-Through Window	3,495	1,034	0	0	0	61	61	38	38	76
2	Panera Bread	934 : Fast-Food Restaurant w. Drive-Through Window	3,945	1,858	81	78	159	114	109	68	62	130
3	Chick-Fil-A	934 : Fast-Food Restaurant w. Drive-Through Window	4,099	4,540	98	97	195	213	208	168	165	333
4A	TBD	932 : High-Turnover (Sit-Down) Restaurant	5,700	640	32	26	58	44	35	35	22	57
4B	TBD	932 : High-Turnover (Sit-Down) Restaurant	5,700	640	32	26	58	44	35	35	22	57
<b>Project Trip Generation (without Pass-By Trips)</b>				<b>8,712</b>	<b>243</b>	<b>227</b>	<b>470</b>	<b>476</b>	<b>448</b>	<b>344</b>	<b>309</b>	<b>653</b>

<sup>1</sup> Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Ed. (2017); Code 934 used instead of 933 due to small data sample size.

<sup>2</sup> Midday peak hour trip generation calculated using percent of daily traffic rate from ITE Manual Appendix A.

<sup>3</sup> Shake Shack and Chick-Fil-A Trip Generation: Did not utilize ITE Trip Generation rates. See attached analysis and calculations



### Project Trip Reduction/Credits

For re-purposed land parcels, it is common to determine the trips generated by the existing land uses and deducting those trips from the project trips generated by the new land uses to determine the net new trips generated. In this case, the project site has long been vacated and is currently being used as a vehicle depot for a delivery/courier service. This study analysis applies no trip reductions for the existing activity at the site resulting in a conservative worst-case analysis of traffic conditions.

Typically, a portion of trips accessing commercial developments come from vehicles already present on the roadway system. Such trips are referred to as “pass-by” trips as these are vehicles already on the roadway making an intermediate stop at the development before continuing on their original routes. Pass-by trip percentages can range from a few percentage points for some specialized retail uses to as high as 80% for fast-food and/or coffee shops with drive-through lanes.

Per discussions with City of Torrance staff, the following pass-by trip rates are applied to this study:

- ◆ a 20% pass-by trip reduction for the high-turnover restaurant;
- ◆ a 50% pass-by trip reduction for AM and PM peak periods, 20% for Midday peak period for all other land uses.

Additionally, businesses located within shopping centers typically experience what is referred to as “internal trip capture,” where some trips are made to more than one business at the site (e.g., a pharmacy, laundromat, or a retail store and a cafe, etc.). In some shopping centers, the internal trip capture can result in a total trip reduction of approximately 15-20%.

Analyzing the proposed land uses at the proposed project site, it is highly unlikely that customers would park and walk to several food related businesses within the project site. For this study, no internal trip capture factors are applied to provide a conservative worst-case traffic analysis.

The net project trips generated after application of the trip reduction credits will be approximately 267 trips in the AM peak hour, 740 trips in the Midday peak hour and 360 trips in the PM peak hour. The data is shown in detail in **Table II-3**.



Table II-3: Proposed Net Project Trip Generation

Bldg	Proposed Business	ITE Land Use Code <sup>1</sup>	Pass-By Trip Rate <sup>3</sup>	Gross Floor Area (sq. ft.)	Daily	AM Peak Hour (one hr 7-9am)		MD Peak Hr <sup>2</sup> (one hr 11am-1pm)		PM Peak Hour (one hr 4-6pm)					
						In	Out	In	Out	In	Out				
1	Shake Shack	934 : Fast-Food Restaurant w. Drive-Through Window	50%	3,495	517	--	--	49	49	19	19	38			
2	Panera Bread	934 : Fast-Food Restaurant w. Drive-Through Window	50%	3,945	929	40	39	91	87	34	31	65			
3	Chick-Fil-A	934 : Fast-Food Restaurant w. Drive-Through Window	50%	4,099	2,270	49	49	171	167	84	83	167			
4A	TBD	932 : High-Turnover (Sit-Down) Restaurant	20%	5,700	512	25	20	35	28	28	17	45			
4B	TBD	932 : High-Turnover (Sit-Down) Restaurant	20%	5,700	512	25	20	35	28	28	17	45			
<b>Net New Project Trip Generation</b>						<b>4,740</b>	<b>139</b>	<b>128</b>	<b>267</b>	<b>381</b>	<b>359</b>	<b>740</b>	<b>193</b>	<b>167</b>	<b>360</b>

<sup>1</sup> Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Ed. (2017); Code 934 used instead of 933 due to small data sample size.

<sup>2</sup> Midday peak hour trip generation calculated using percent of daily traffic rate from ITE Manual Appendix A.

<sup>3</sup> 20% Pass-By Trip Rate was used for all land uses for the Midday peak hour



## Project Trip Distribution and Assignment

After determination of the proposed project trips, the next step is to distribute these trips over the existing roadway network and through the proposed project site driveways. Per discussions with City staff, it was decided to distribute the project trips according to the following criteria:

- intersection traffic control types for the study intersections and project driveways;
- turning-movement restrictions at each of the study intersections and project driveways; and
- current traffic patterns in the study area.

Project inbound and outbound trips balance out on a daily basis but vary in any given hour due to the nature of the trip generation for the land use.

A summary of the project trip distribution and assignment is shown in the following graphics. **Figure II-1** presents the project trip distribution in percentages. **Figure II-2, II-3** and **II-4** show respective study intersection new project trips for the AM, MD and PM peak hours.

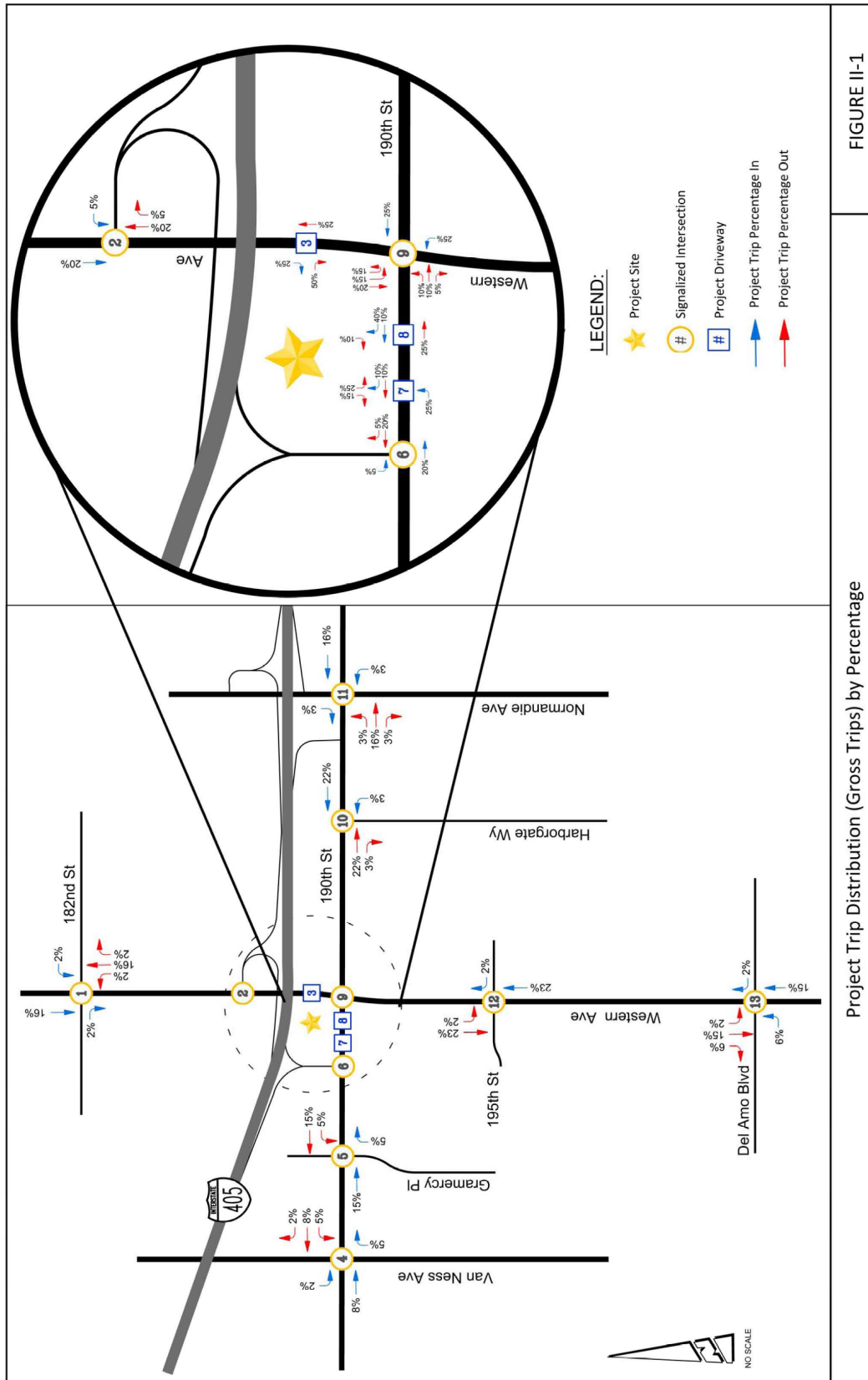
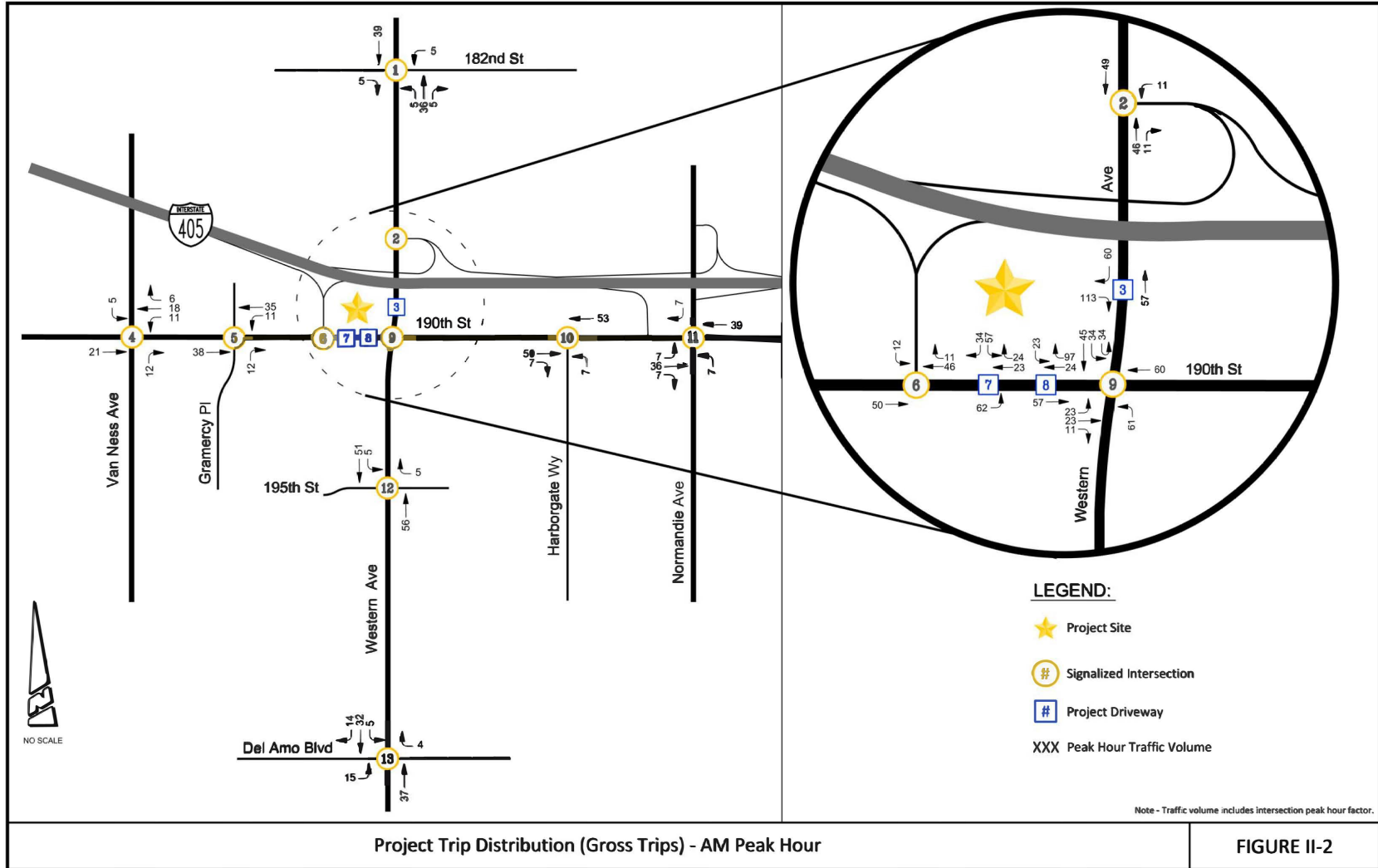


FIGURE II-1

Project Trip Distribution (Gross Trips) by Percentage



Project Trip Distribution (Gross Trips) - AM Peak Hour

FIGURE II-2



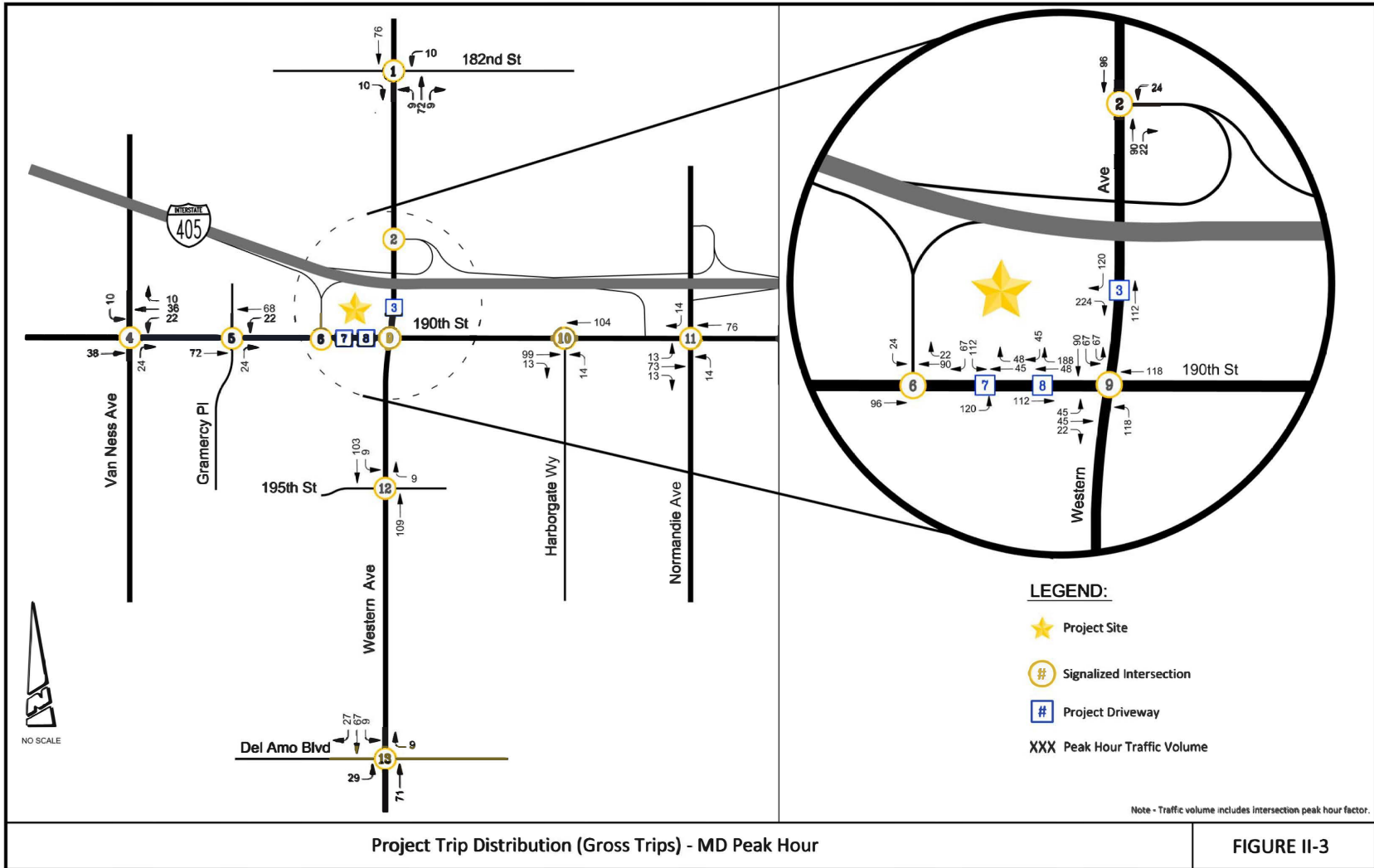
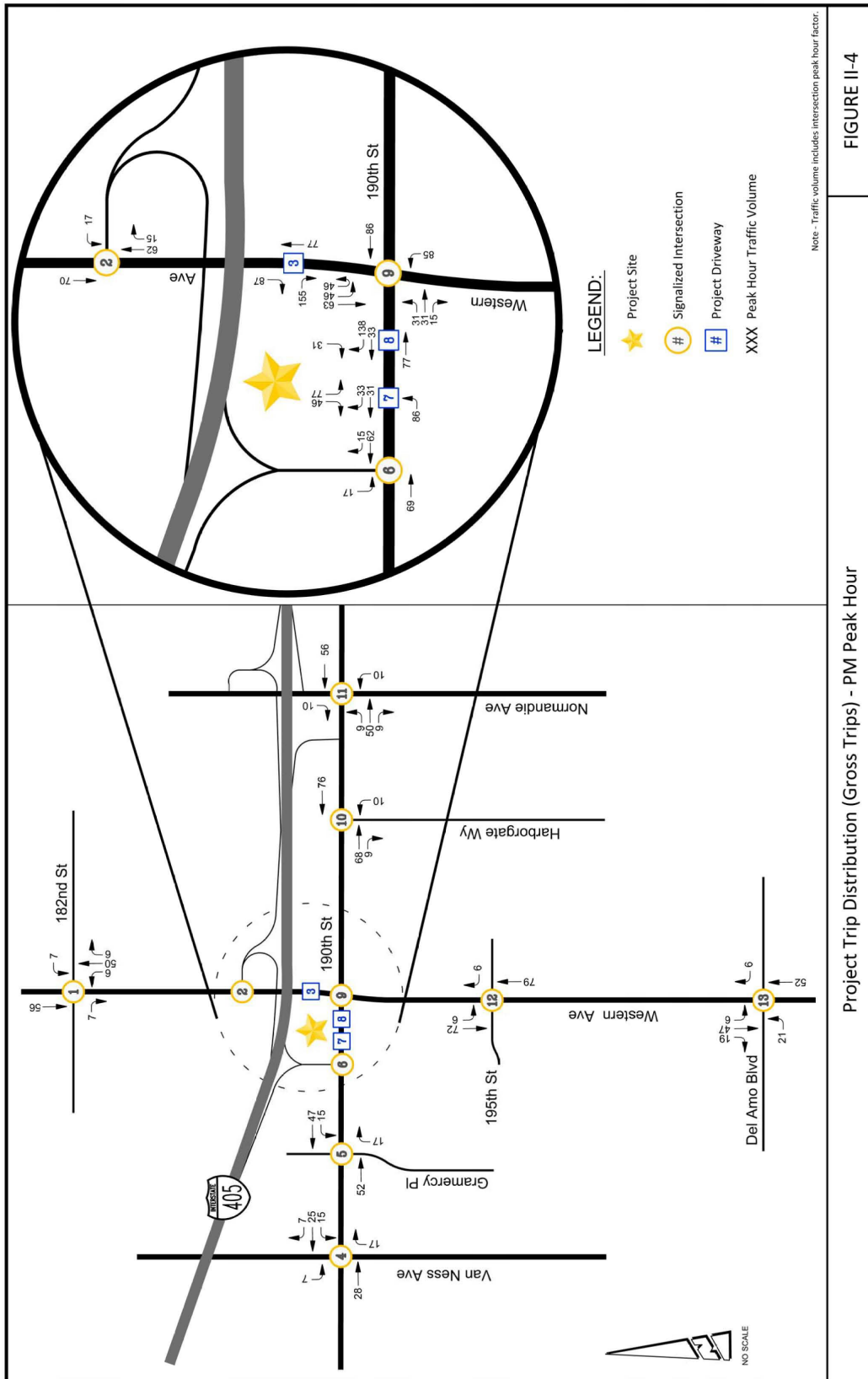


FIGURE II-3







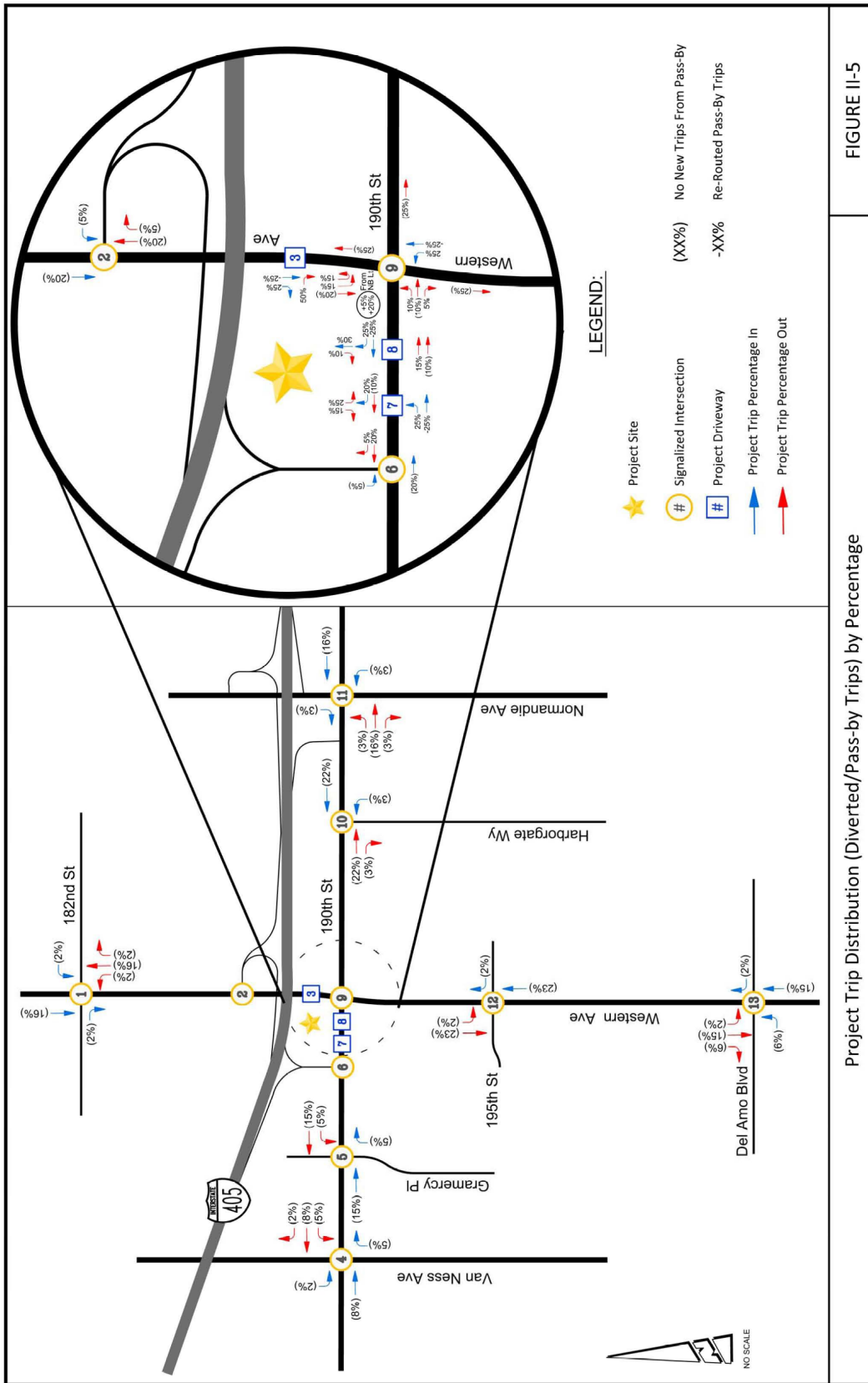


### Pass-By Trip Distribution

Pass-by trips were previously defined as diverted vehicles already part of existing traffic on the roadway making an intermediate stop at the proposed development before continuing on their original routes. Inbound and outbound trips may vary as they may not occur in the same hour or use the same project driveway.

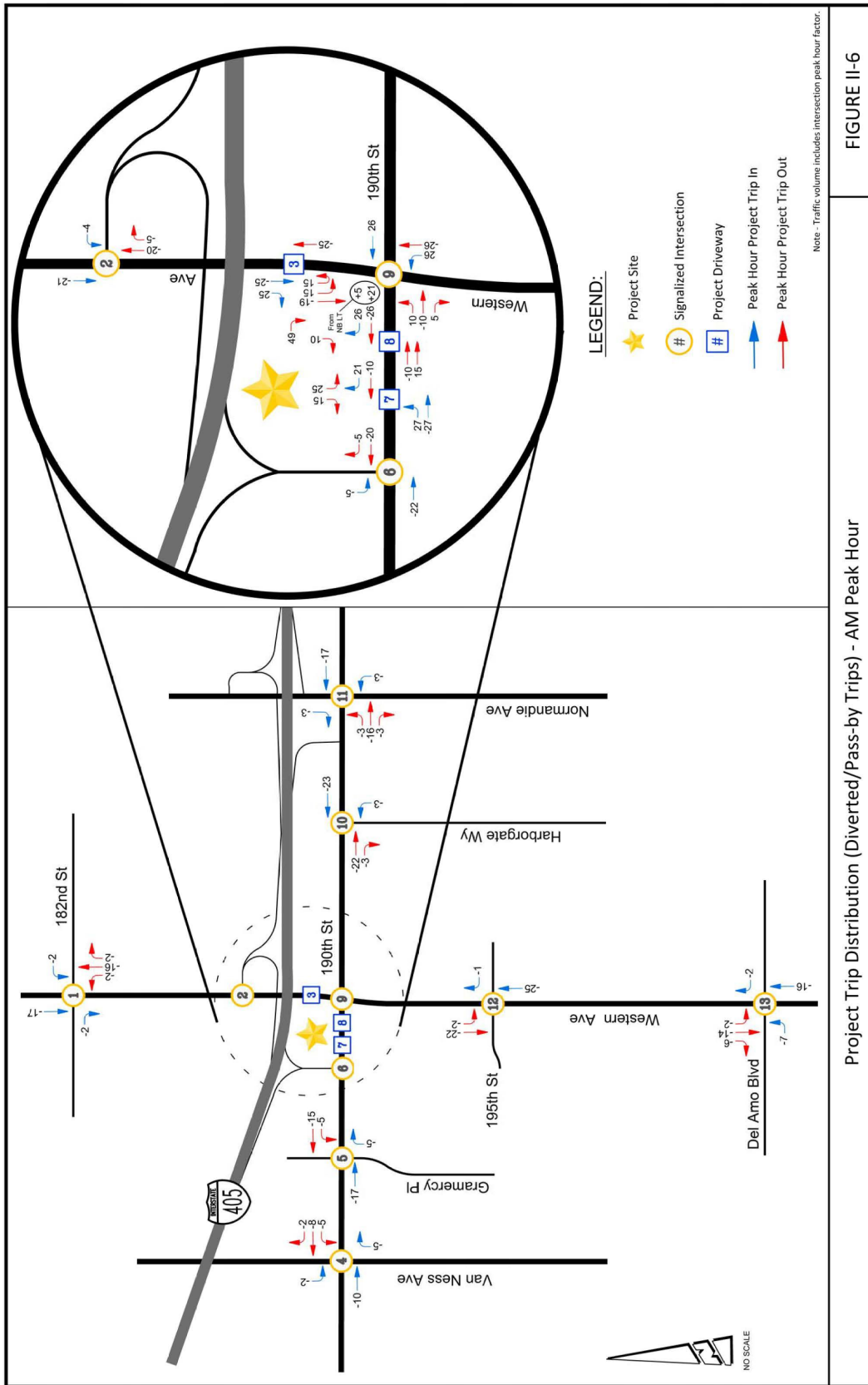
The overall trip distribution for these diverted/pass-by trips is summarized in **Figure II-5**. The corresponding AM, MD and PM peak hour diverted/pass-by trips are shown in **Figures II-6, II-7 and II-8**.

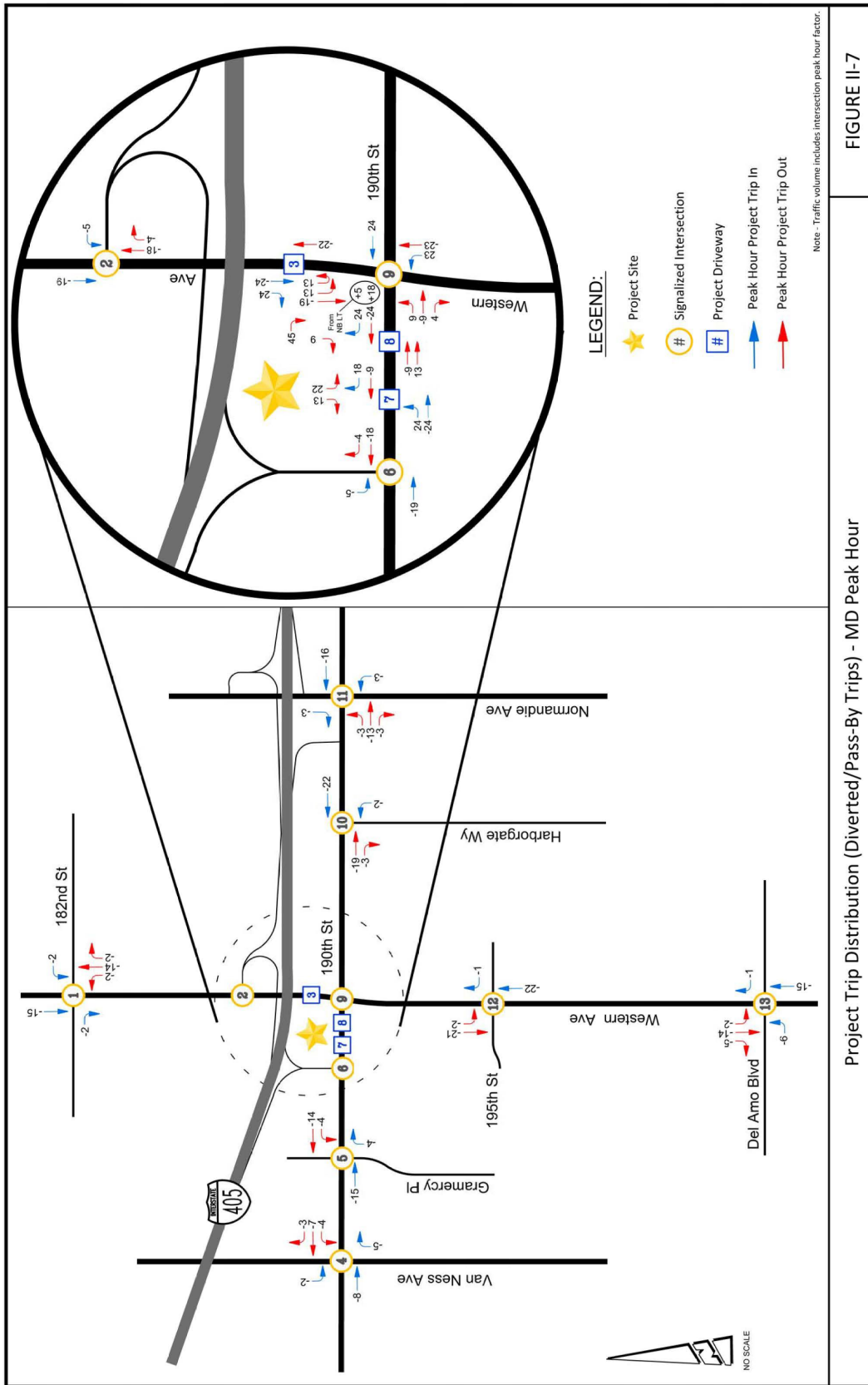
The project net trips are shown in **Figures II-9, II-10 and II-11**.



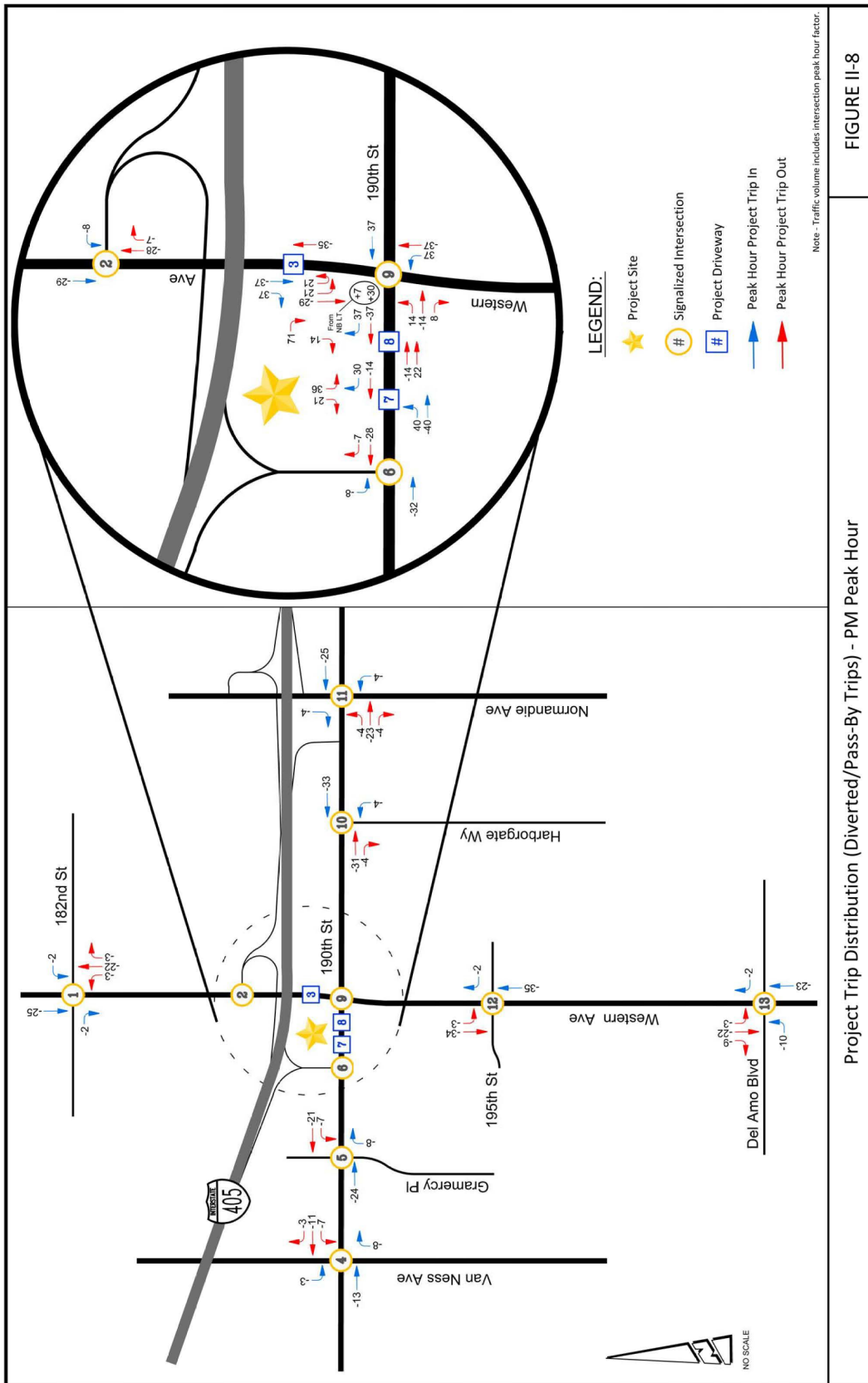
Project Trip Distribution (Diverted/Pass-by Trips) by Percentage

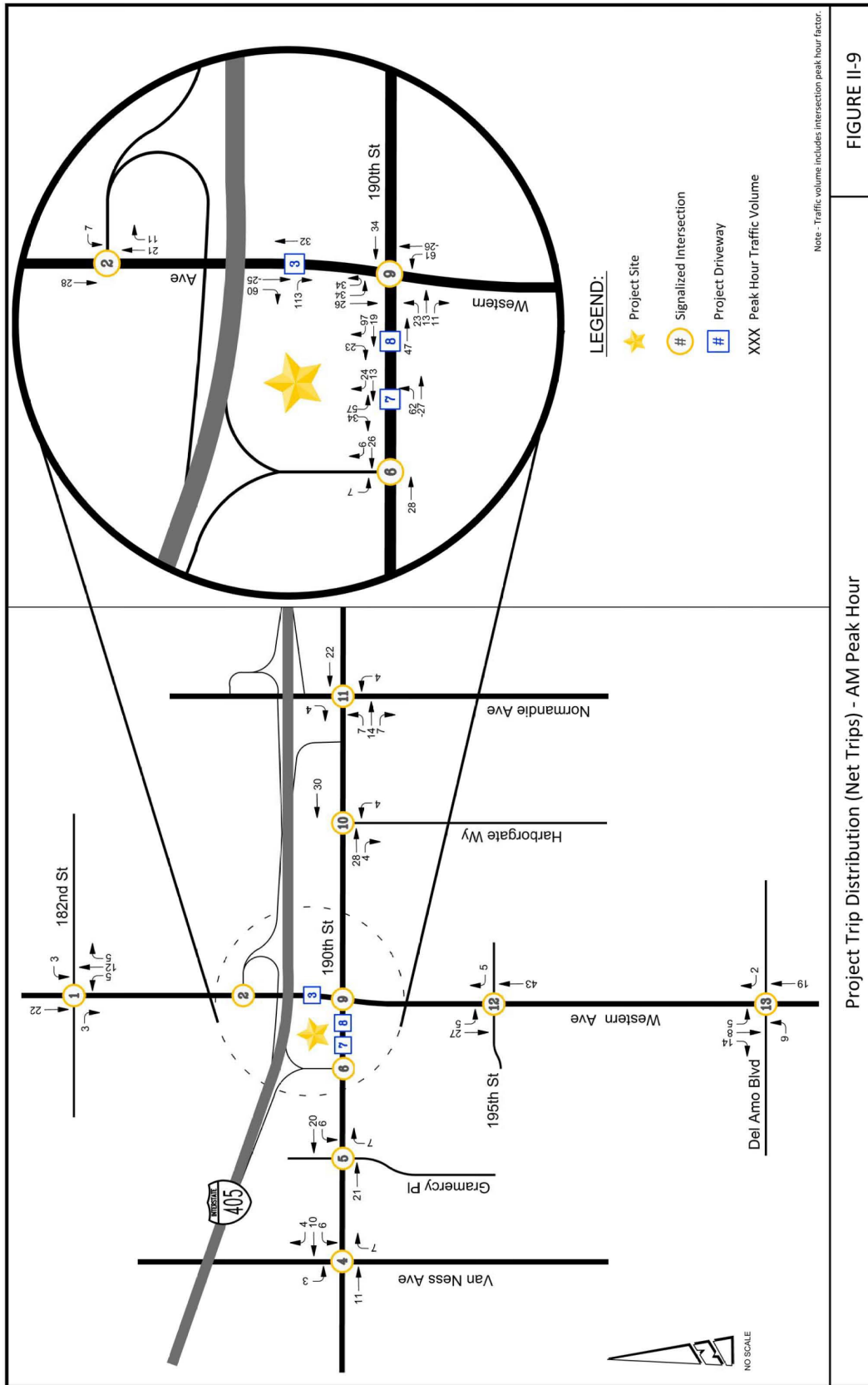
FIGURE II-5

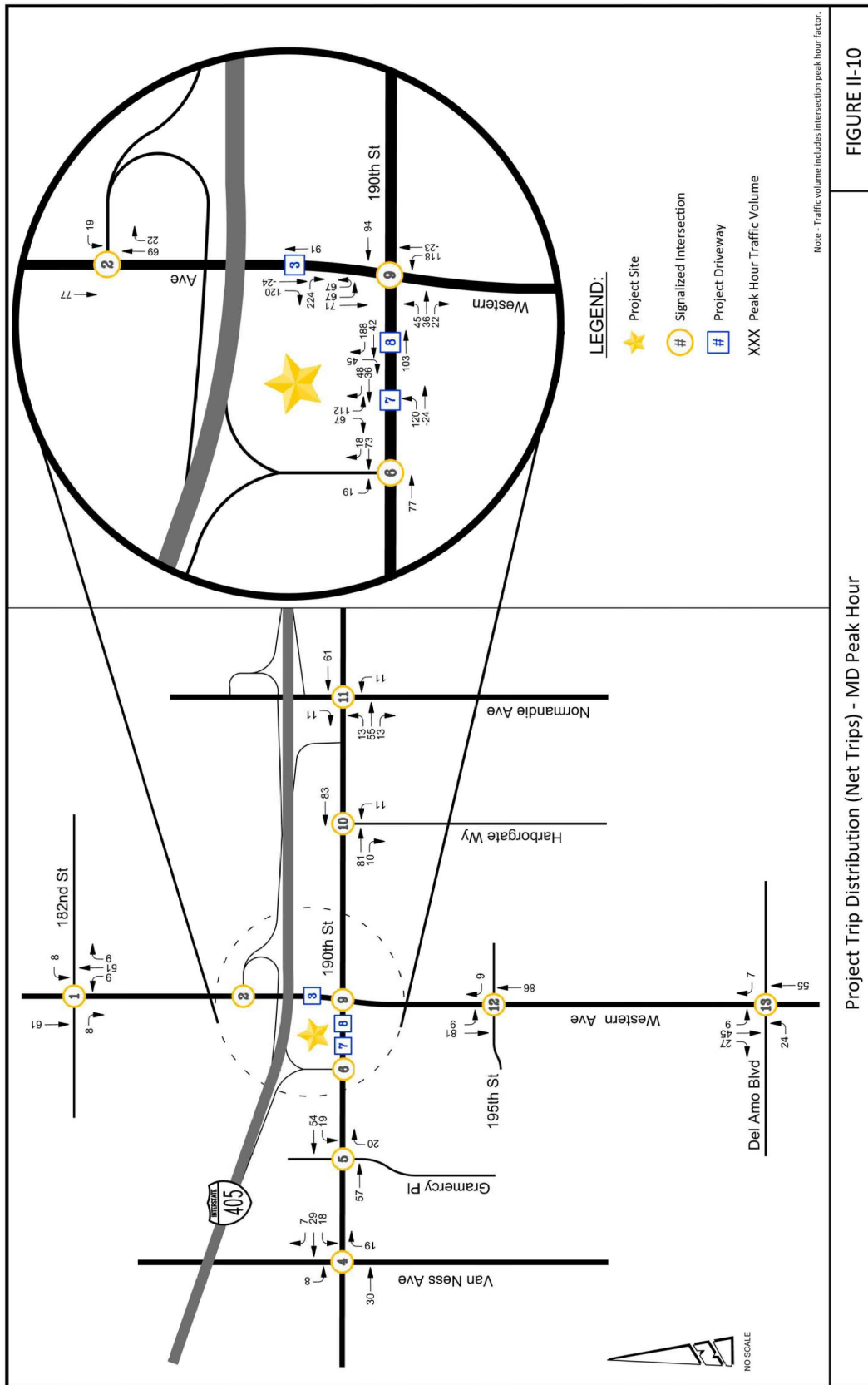


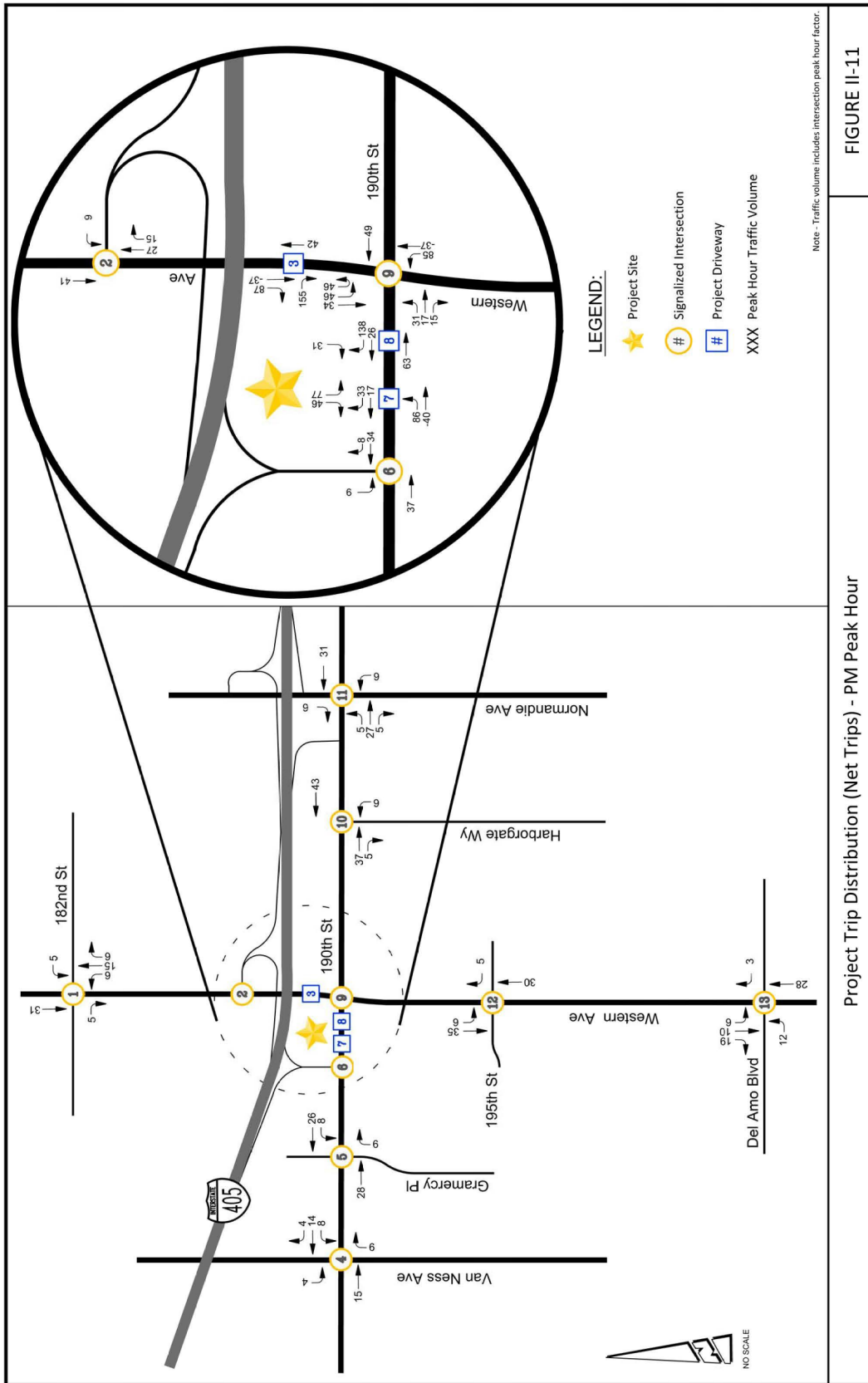


Project Trip Distribution (Diverted/Pass-By Trips) - MD Peak Hour













### III. YEAR 2021 EXISTING CONDITIONS LEVEL-OF-SERVICE ANALYSIS

#### Year 2021 Existing Conditions (Ambient Growth Only)

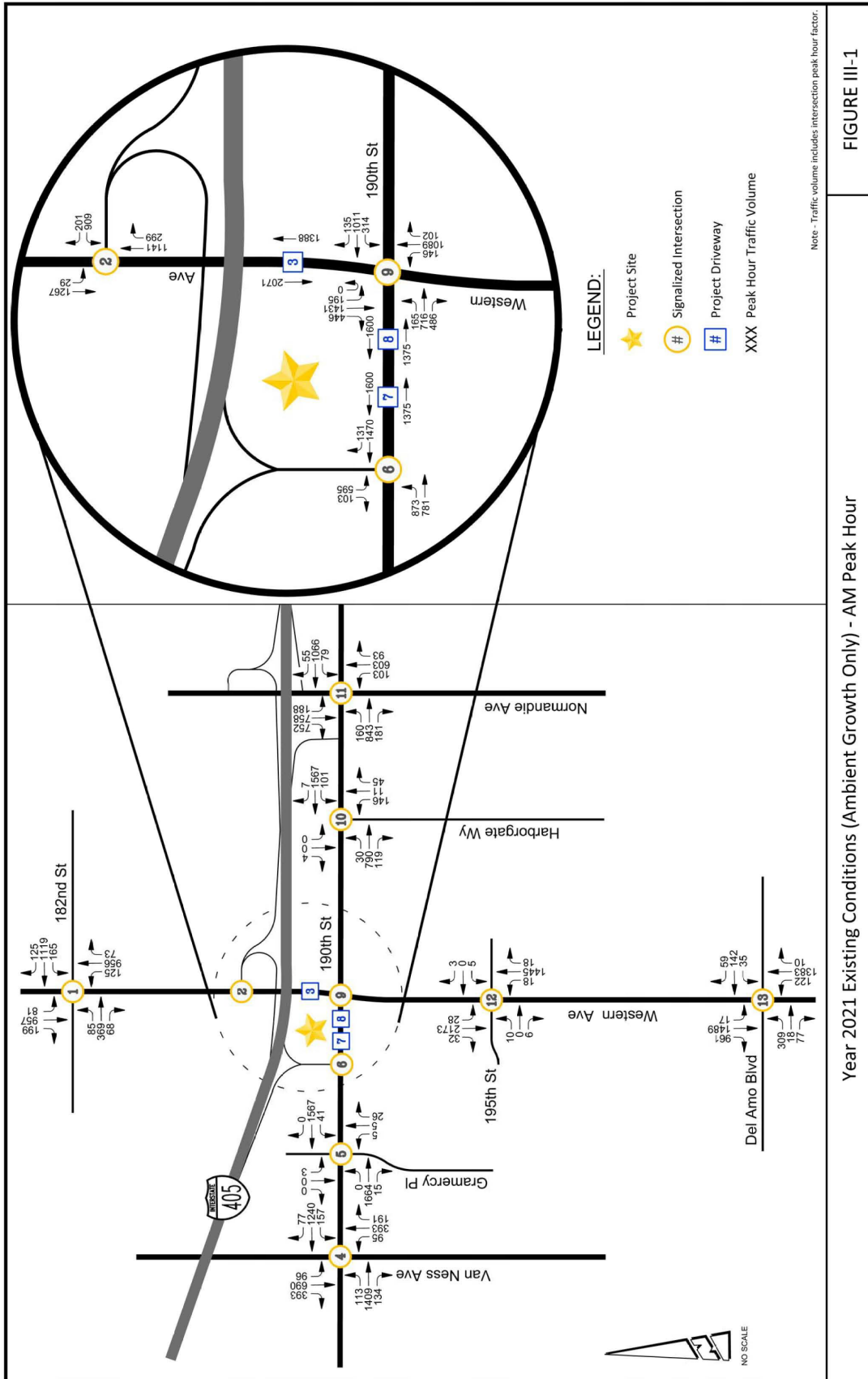
The proposed redevelopment project site is located at the northwest corner of 190<sup>th</sup> Street and Western Avenue in the City of Torrance. The project is bounded by the I-405 freeway to the north, Western Avenue to the east, 190<sup>th</sup> Street to the south and the I-405 SB ramps to the west.

As previously mentioned, this analysis covers ten signalized intersections in the immediate vicinity of the proposed project site as well as three unsignalized driveways providing access to the development.

In the vicinity of the project site, 190<sup>th</sup> Street is a six-lane east-west roadway with a striped median and is designated as a major arterial in the City of Torrance General Plan. Western Avenue is a six-lane north-south roadway with a striped median. It is also designated as a major arterial in the City General Plan. Both arterials are existing truck routes within the City.

Western Avenue is within the eastern city limits between Torrance and Los Angeles. South of 190<sup>th</sup> Street, Western Avenue is a State Highway (SR-213) from 195<sup>th</sup> Street to Del Amo Boulevard and the signalized intersections are maintained by Caltrans. Signalized intersections along Western Avenue and along 190<sup>th</sup> Street east of Western Avenue are maintained by the City of Los Angeles.

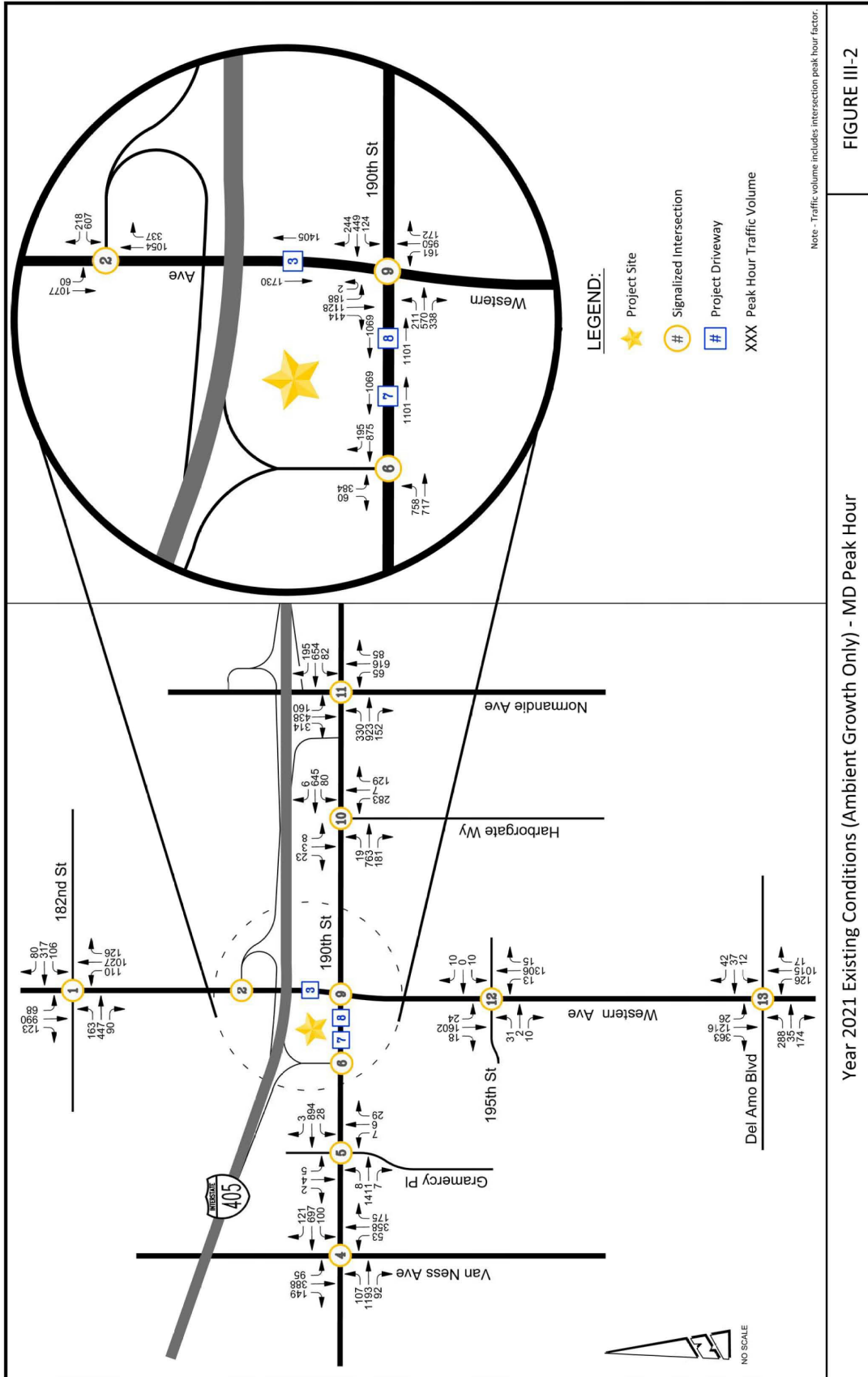
To establish a baseline analysis for Year 2021 existing traffic conditions, intersection turning movement count data from August and October 2019 were used. These counts (Pre-COVID conditions) were conducted while the schools were in session during the morning (AM), midday (MD) and afternoon (PM) peak periods. Per the City of Torrance Traffic Impact Study Guidelines, an annual ambient growth rate of 0.525% was used for the estimated growth. For Year 2021, the total ambient growth would be 1.05%. This is a conservative assessment since the count data was taken prior to the COVID-19 pandemic and the existing traffic volumes now (late fall 2021) are generally lower than pre-COVID-19 periods. The through volumes for the project driveway on Western Avenue were derived from the approach and departure count data at 190<sup>th</sup> Street/Western Avenue, while the through volumes for the project driveways along 190<sup>th</sup> Street were derived from the approach and departure count data from 190<sup>th</sup> Street/I-405 SB ramp. The peak period turning movements counts with ambient growth for the study intersections are summarized in **Figures III-1, III-2 and III-3**. The turning movement count details are provided in the **Appendix C** along with the ambient growth rate calculations. The ambient growth rate calculations show all calculations for both existing and Year 2023 (next section).

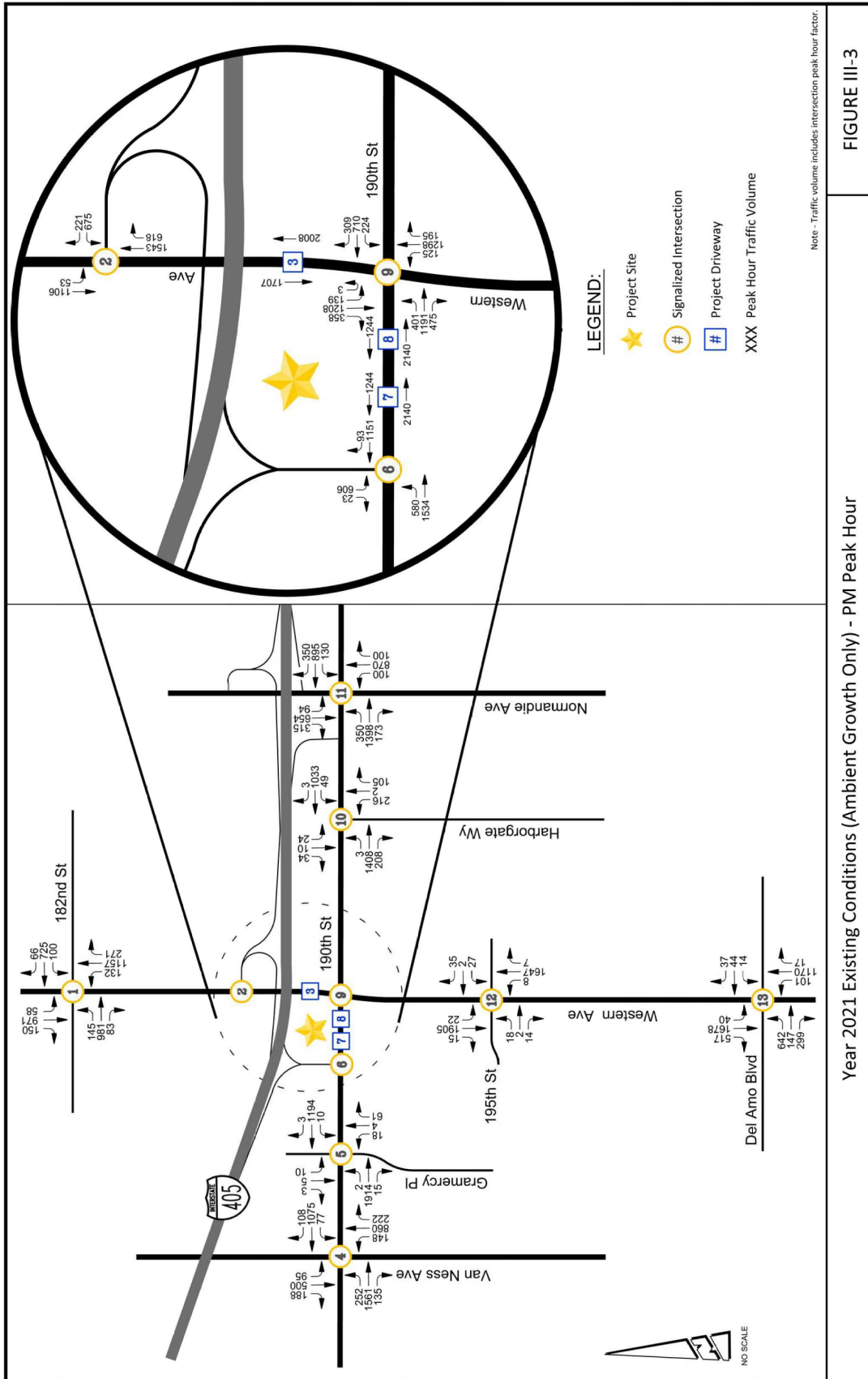


Year 2021 Existing Conditions (Ambient Growth Only) - AM Peak Hour

FIGURE III-1







Year 2021 Existing Conditions (Ambient Growth Only) - PM Peak Hour



**Cumulative Projects Analysis**

In addition to the ambient growth rate, which is a City’s average growth from previous established baseline, additional traffic may be generated from other projects that are planned around the City. Since the counts used for this study are from Year 2019, projects within the study area that were anticipated to be open in Year 2021 were included for Year 2021 Existing Conditions scenario. Per discussion with City staff, the cumulative effects of all planned and approved projects within the following boundaries will be included in the study:

- I-110 freeway to the east
- 166<sup>th</sup> St/Gardena Blvd to the north
- Crenshaw Blvd to the west
- Torrance Blvd to the south

**Table III-1** lists the projects that have been approved by the City in 2019 and identified as being within the boundaries of the study. These cumulative projects were expected to be operational in Year 2021. To be conservative, all cumulative projects in the list were considered, whether or not they were completed by 2021.

**Table III-1: Cumulative Project List**

Entitlement	Description	Project Address
CUP 13-00031	Two Industrial Buildings (90,000 sf)	305 Crenshaw Blvd (7352-002-034)
CUP13-00032	17,800 sf Regional Transit Center with a 3,100 sf food/service	465 Crenshaw Blvd
CUP15-00007	Replace 4-unit with a 2-unit residential condo	17502 Van Ness Ave
CUP18-00005	Three light industrial buildings (410,000 sq. ft.)	2200 195th St (7352-003-076, 7352-003-077)
CUP18-0030	Two 3-story apartment buildings containing 46 units	18021-18045 Western Ave
CUP19-00028	Convert commercial building to 1785 sq. ft. Starbucks Drive-Thru	2124 Artesia Blvd
CUP19-00012	Office to light industrial conversion and three light industrial buildings totaling 760,072sf	19801 Western Ave
CUP19-00027	Development of an approximately 430,000 sq. ft. industrial/warehouse complex	WS Prairie Ave 520 ft. S of 190th Street
CUP19-00032	48-Unit Townhome Development	2706 182nd St



The AM and PM peak hour trips for these cumulative projects were obtained from their respective traffic impact studies provided by the City of Torrance. The MD peak hour trips were derived using an average of the AM and PM peak hour trips making for a conservative worst-case scenario.

The trips generated by the cumulative projects are presented in **Table III-2**. The trips were then distributed into the roadway system.



Table III-2: Cumulative Projects Trip Generation

No	Project Address	Size Description <sup>2</sup>	Daily	AM Peak Hour			MD Peak Hour <sup>1</sup>			PM Peak Hour		
				In	Out	Total	In	Out	Total	In	Out	Total
1	305 Crenshaw Blvd CUP13-00031	90,000 sf Industrial	409	36	7	43	22	22	44	8	37	45
2	465 Crenshaw Blvd CUP13-00032	17,800 sf Regional Transit Ctr 3100 sf Food/Service	2,426	189	85	274	138	125	263	87	165	252
3	17502 Van Ness Ave CUP15-00007	2-unit Condominiums	13	1	1	2	1	1	2	1	0	1
4	2200 195th St CUP18-00005	410,000 sf Light Industrial	1,618	161	39	200	100	100	200	39	161	200
5	18021-18045 Western Ave CUP18-00030	46 units Apartments	250	5	13	18	9	11	20	13	8	21
6	2124 Artesia Blvd CUP19-00028	1785 sf Starbucks Drive-Thru	732	41	39	80	31	30	61	20	20	40
7	19801 Western Ave CUP19-00012	760,072 sf Light Industrial	2,748	81	32	113	53	51	104	24	70	94
8	WS Prairie Ave 520 ft. S of 190th Street	430,000 sf Industrial/Warehouse	947	71	22	93	50	49	99	29	75	104
9	2706 182nd St CUP19-00032	48-Unit Townhomes	384	3	23	26	13	18	31	23	12	35
<b>Total</b>			<b>9,527</b>	<b>588</b>	<b>261</b>	<b>849</b>	<b>417</b>	<b>407</b>	<b>824</b>	<b>244</b>	<b>548</b>	<b>792</b>

<sup>1</sup> MD Peak Hour Trips - The MD peak hour trips were derived using an average of the AM and PM peak hour trips.

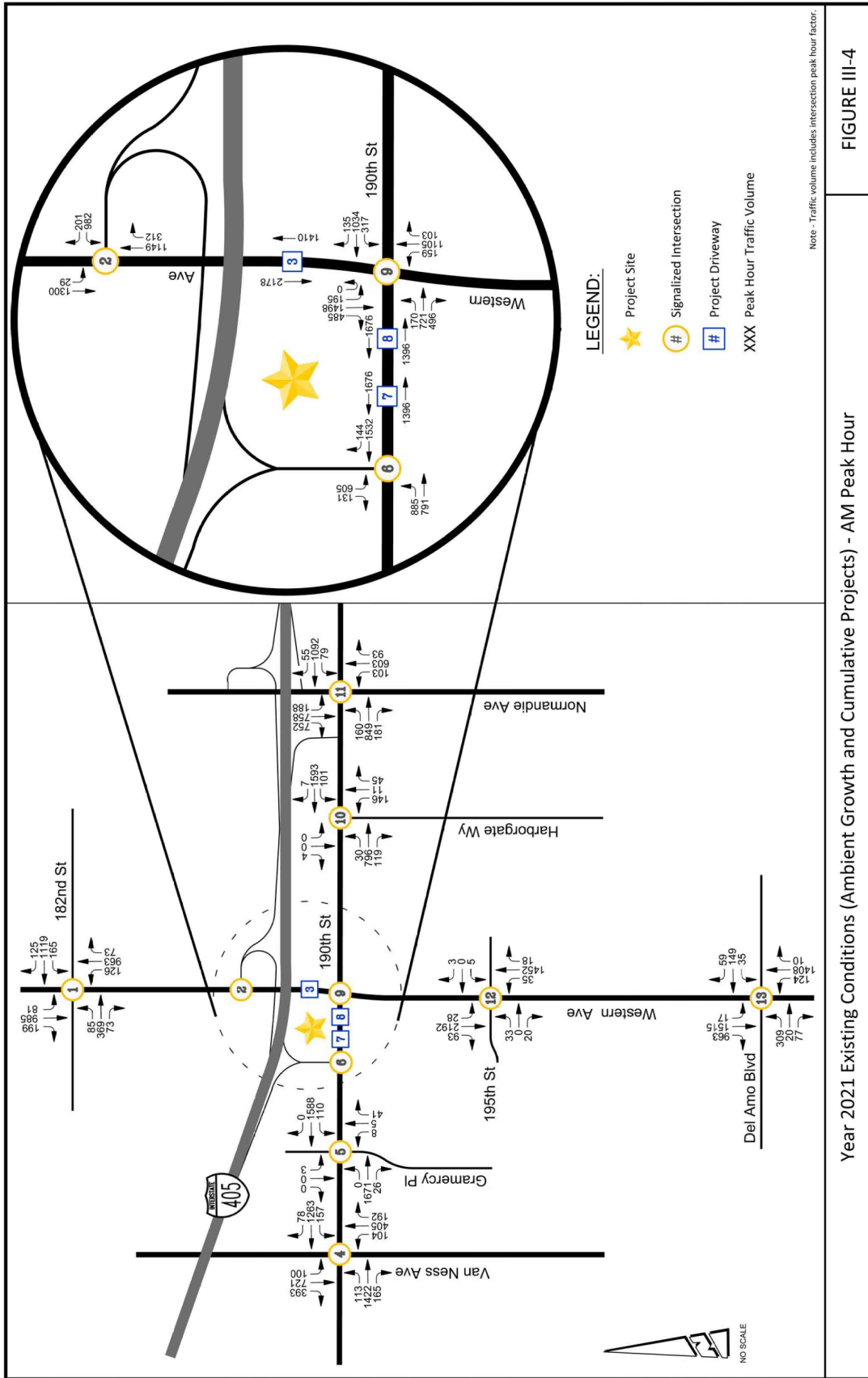
<sup>2</sup> sf - square feet



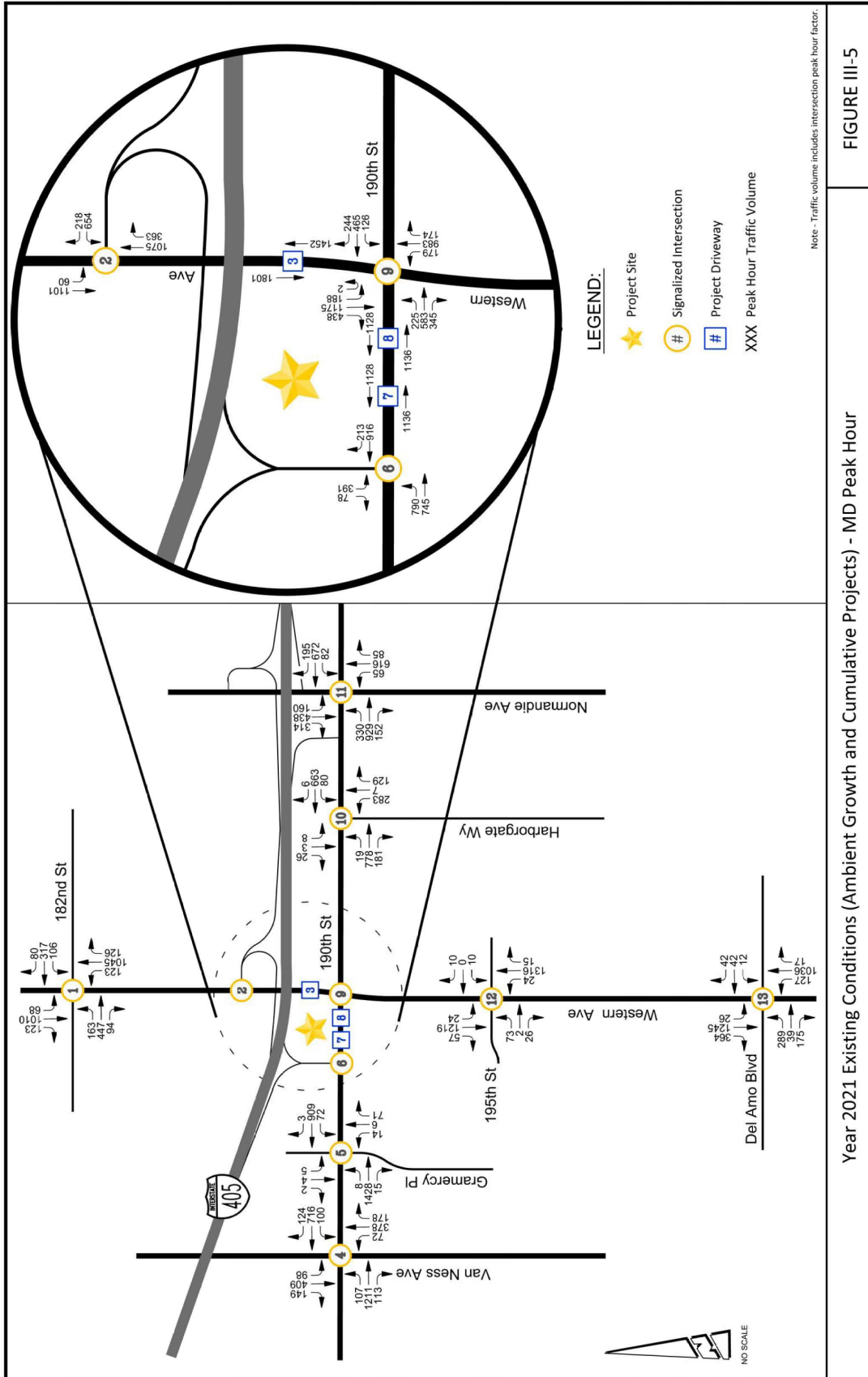
### Year 2021 Existing Conditions (Ambient Growth and Cumulative Projects)

The Year 2021 ambient growth only condition reflects existing traffic conditions plus additional traffic from the expected ambient area growth. The cumulative projects were then included to those traffic volumes to develop the Year 2021 Existing Conditions scenario (see **Appendix C**). The peak period turning movements counts with ambient growth plus cumulative projects for the study intersections are summarized in **Figures III-4, III-5 and III-6**.

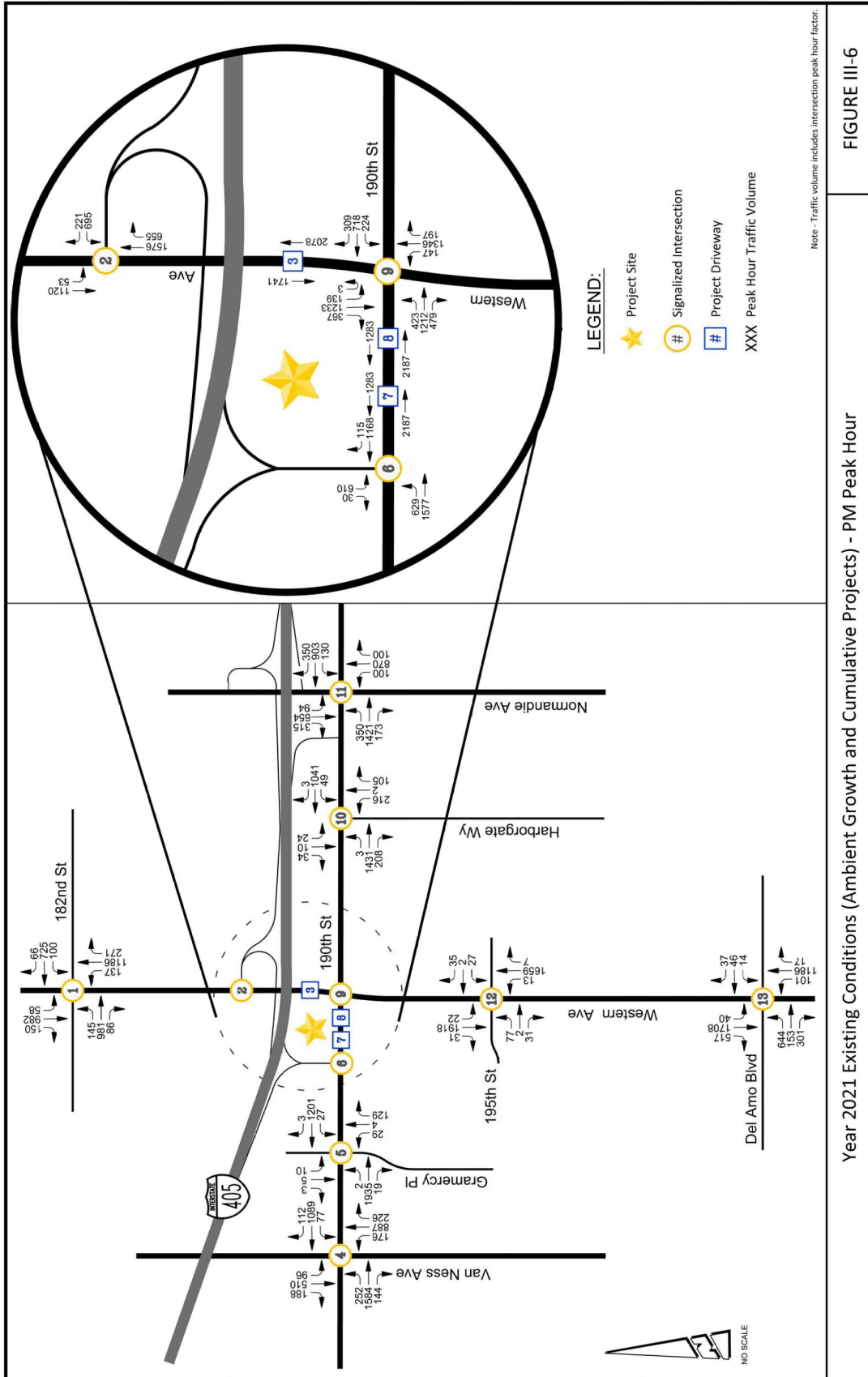




Year 2021 Existing Conditions (Ambient Growth and Cumulative Projects) - AM Peak Hour



Year 2021 Existing Conditions (Ambient Growth and Cumulative Projects) - MD Peak Hour



Year 2021 Existing Conditions (Ambient Growth and Cumulative Projects) - PM Peak Hour



A LOS analysis was conducted for the Year 2021 Existing Conditions scenario. The intersection LOS analysis results are summarized in **Table III-3**. The detailed analysis worksheets are provided in the **Appendix D**.

Under Year 2021 Existing Conditions, the LOS analyses show the following:

- 190<sup>th</sup> Street/Van Ness Avenue operates at LOS E using the ICU methodology for the PM peak hour.
- 190<sup>th</sup> Street/Western Avenue operates at LOS D for the AM peak hours.
- 190<sup>th</sup> Street/Normandie Avenue operates at LOS D for AM, MD and PM peak hours.
- Western Avenue/Del Amo Boulevard operates at LOS D for the PM peak hour.
- All other intersections operate at acceptable LOS C or better for the remaining peak hours.



**Table III-3. Year 2021 Existing Conditions (Ambient Growth & Cumulative Projects)  
Level-of-Service (LOS) Analysis**

No	Intersection	Control Type	Analysis Peak Hour								
			AM				PM				
			Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS
<b>Intersection Capacity Utilization Methodology</b>											
4	190th St @ Van Ness Ave	Traffic Signal	--	0.800	C	--	0.595	A	--	0.923	E
5	190th St @ Gramercy Ave	Traffic Signal	--	0.624	B	--	0.493	A	--	0.612	B
<b>Highway Capacity Manual Methodology</b>											
1	Western Ave @ 182nd St	Traffic Signal	30.6	--	C	15.8	--	B	21.1	--	C
2	Western Ave @ I-405 NB Ramps	Traffic Signal	13.9	--	B	13.6	--	B	19.5	--	B
3	Western Ave @ North Project Drwy	One-Way Stop	N/A								
6	190th St @ I-405 SB Ramps	Traffic Signal	27.0	--	C	20.7	--	C	29.1	--	C
7	190th St @ West Project Drwy	One-Way Stop	N/A								
8	190th St @ East Project Drwy	One-Way Stop	N/A								
9	Western Ave @ 190th St	Traffic Signal	36.1	--	D	20.6	--	C	30.9	--	C
10	190th St @ Harbortgate Wy	Traffic Signal	9.0	--	A	15.6	--	B	13.1	--	B
11	190th St @ Normandie Ave	Traffic Signal	36.8	--	D	37.8	--	D	47.8	--	D
12	Western Ave @ 195th St	Traffic Signal	8.4	--	A	2.2	--	A	8.0	--	A
13	Western Ave @ Del Amo Blvd	Traffic Signal	24.8	--	C	13.9	--	B	43.0	--	D

<sup>1</sup> V/C - Volume to Capacity ratio



#### IV. YEAR 2023 CONDITIONS LEVEL-OF-SERVICE ANALYSIS

##### Year 2023 Without Project Conditions (Ambient Growth Only)

To assess the anticipated impacts of the proposed project on opening day, Year 2023, the Year 2019 traffic volumes were increased by an ambient growth rate of 2.10% (0.525% x four years) to develop the base Year 2023 traffic volumes. The peak hour traffic volumes for the AM, MD and PM peak hours are shown in **Figures IV-1, IV-2 and IV-3**.

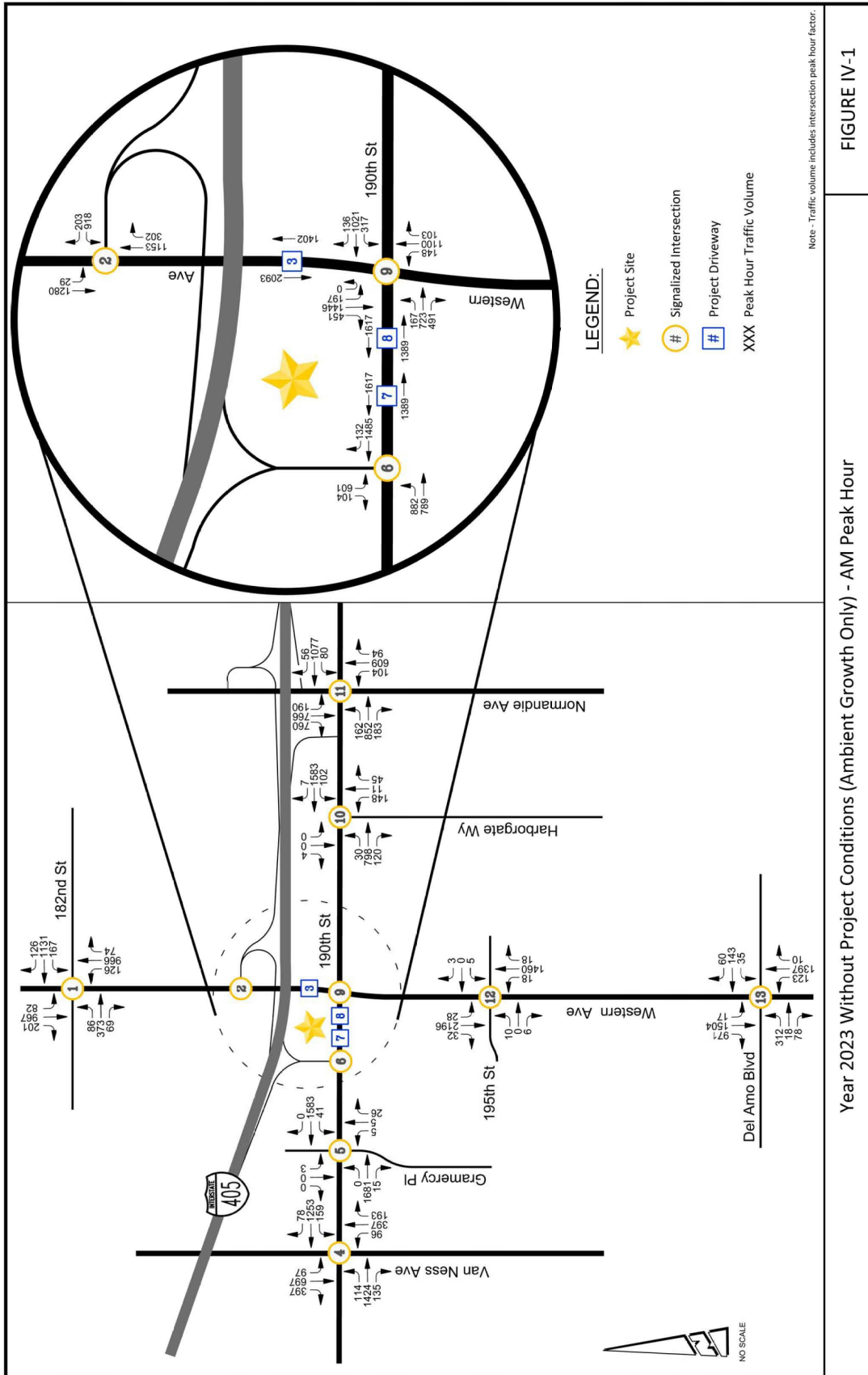
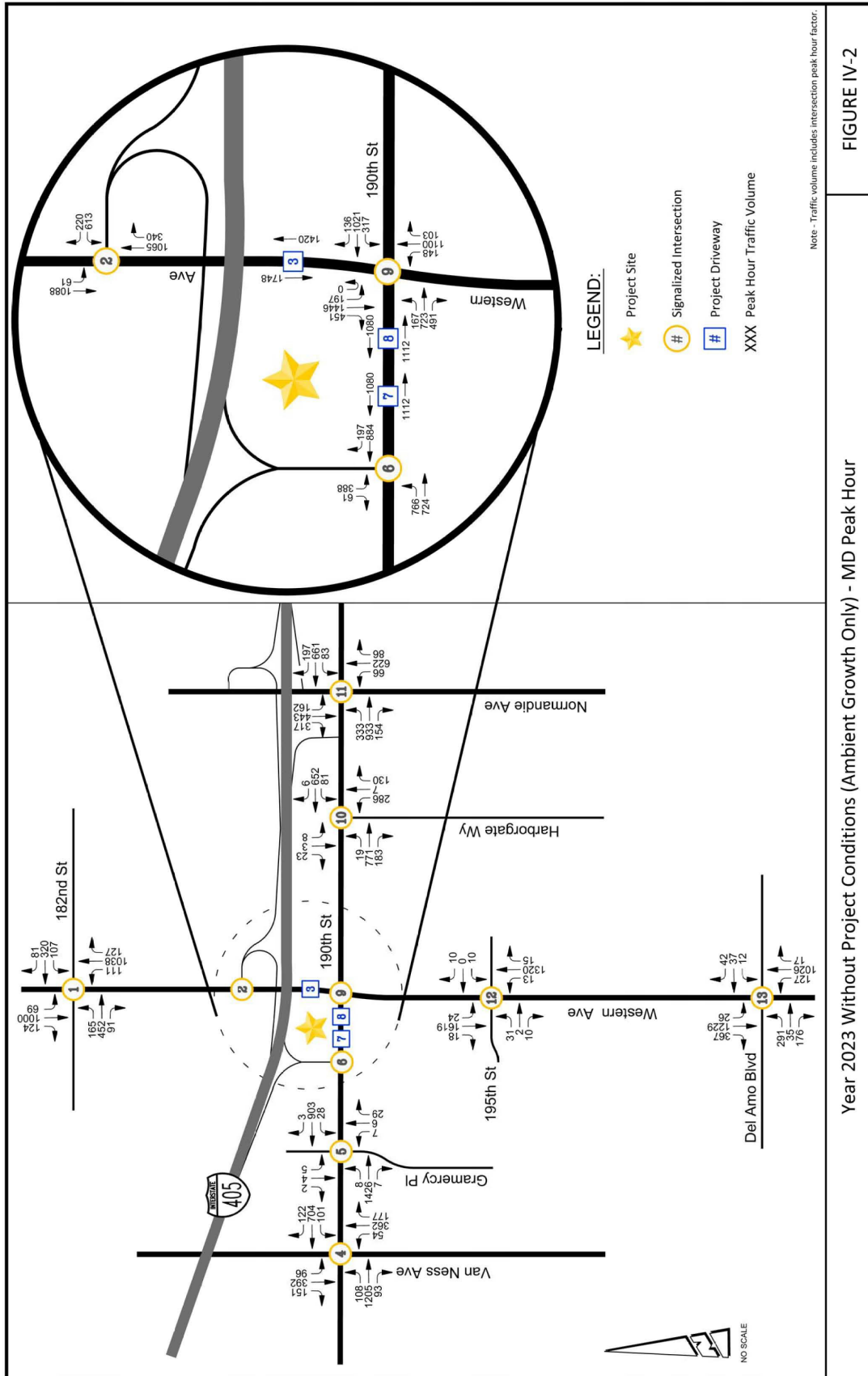
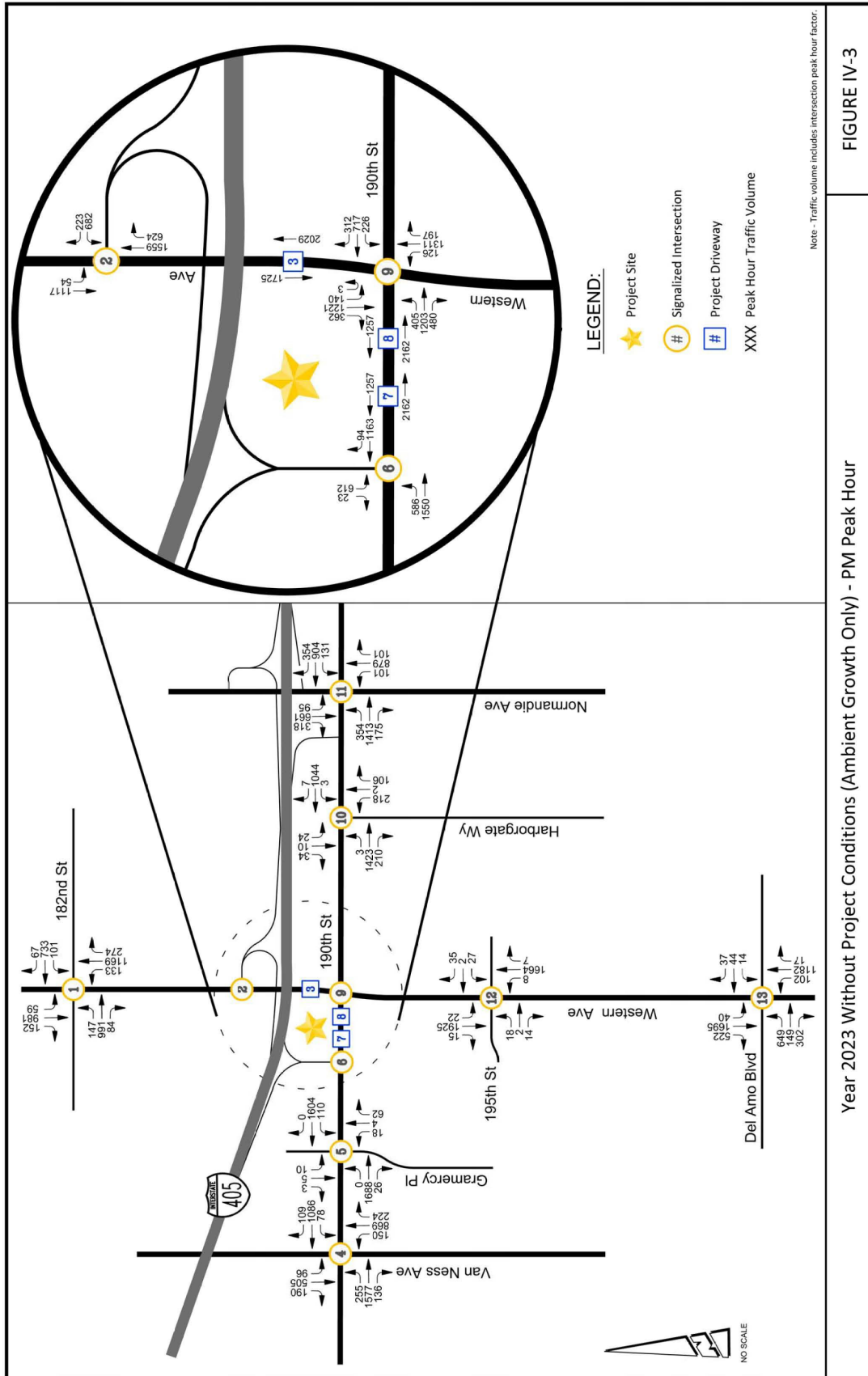


FIGURE IV-1







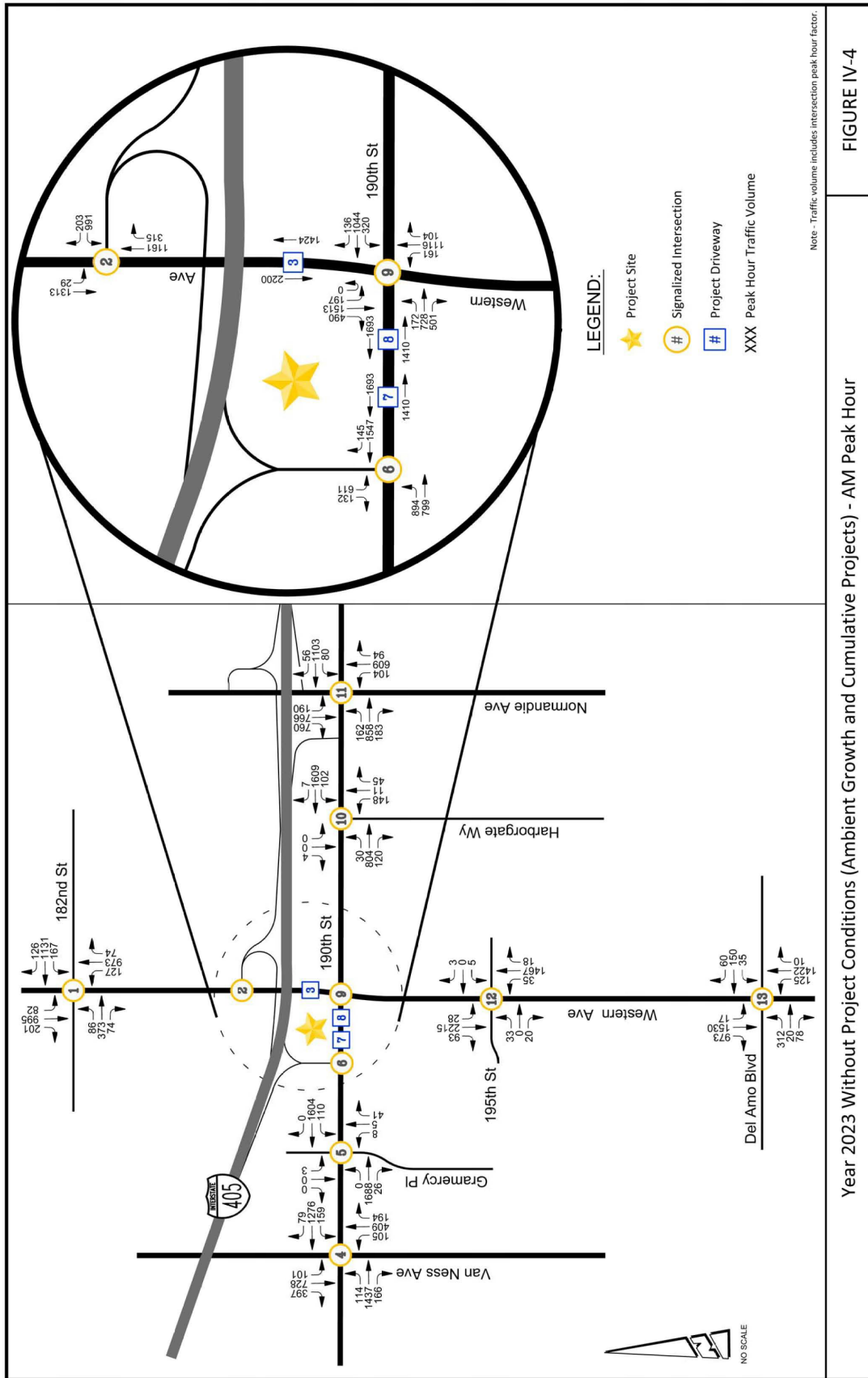


### Year 2023 Without Project Conditions (Ambient Growth and Cumulative Projects)

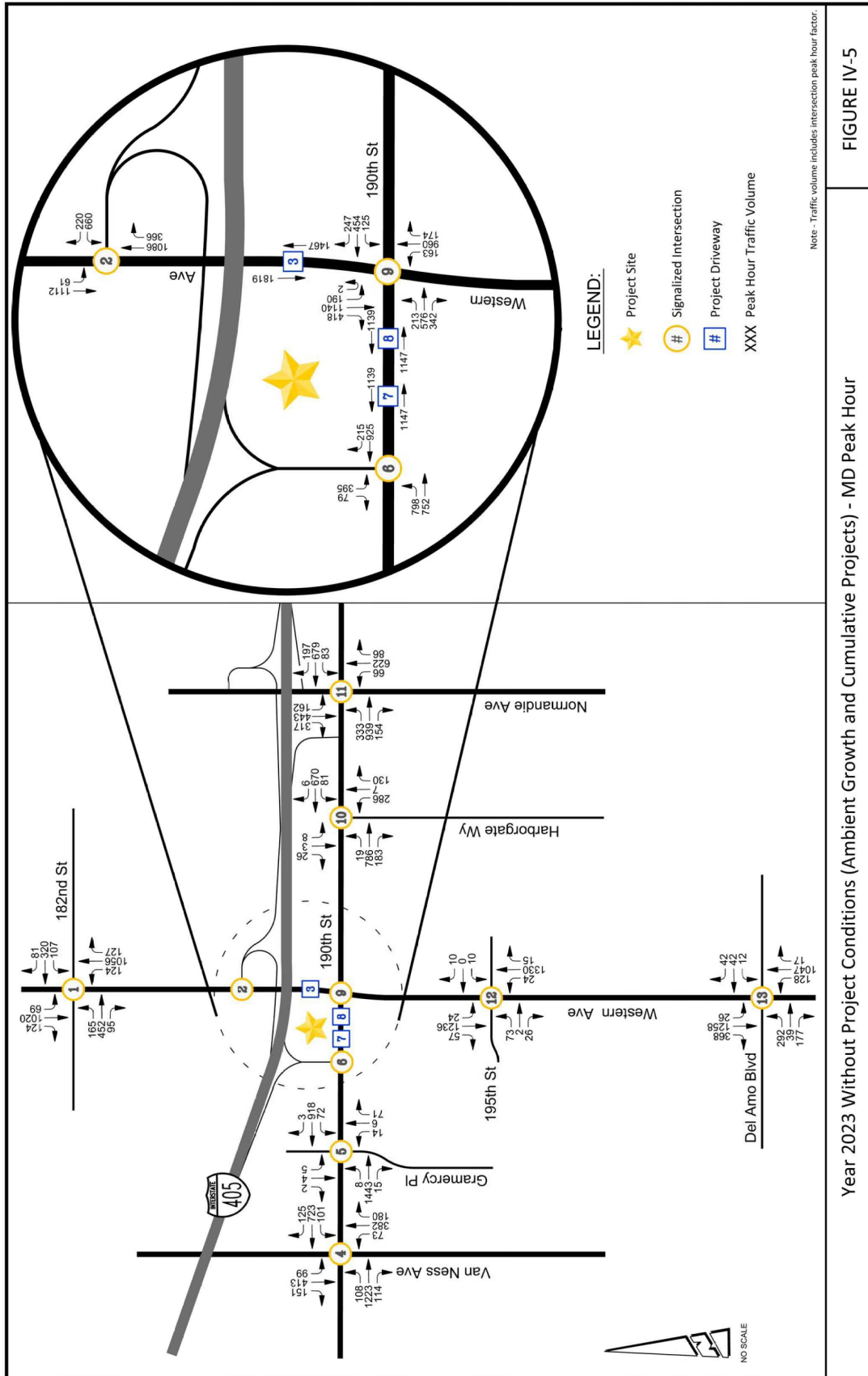
The cumulative projects identified in Table III-2 were then added to the base Year 2023 traffic volumes. The peak hour traffic volumes for the AM, MD and PM peak hours are shown in **Figures IV-4, IV-5 and IV-6**. The corresponding levels of service summary is detailed in **Table IV-1**. The detailed analysis worksheets are provided in the **Appendix E**.

Under Year 2023 Conditions Without Project conditions, the LOS analyses show the following:

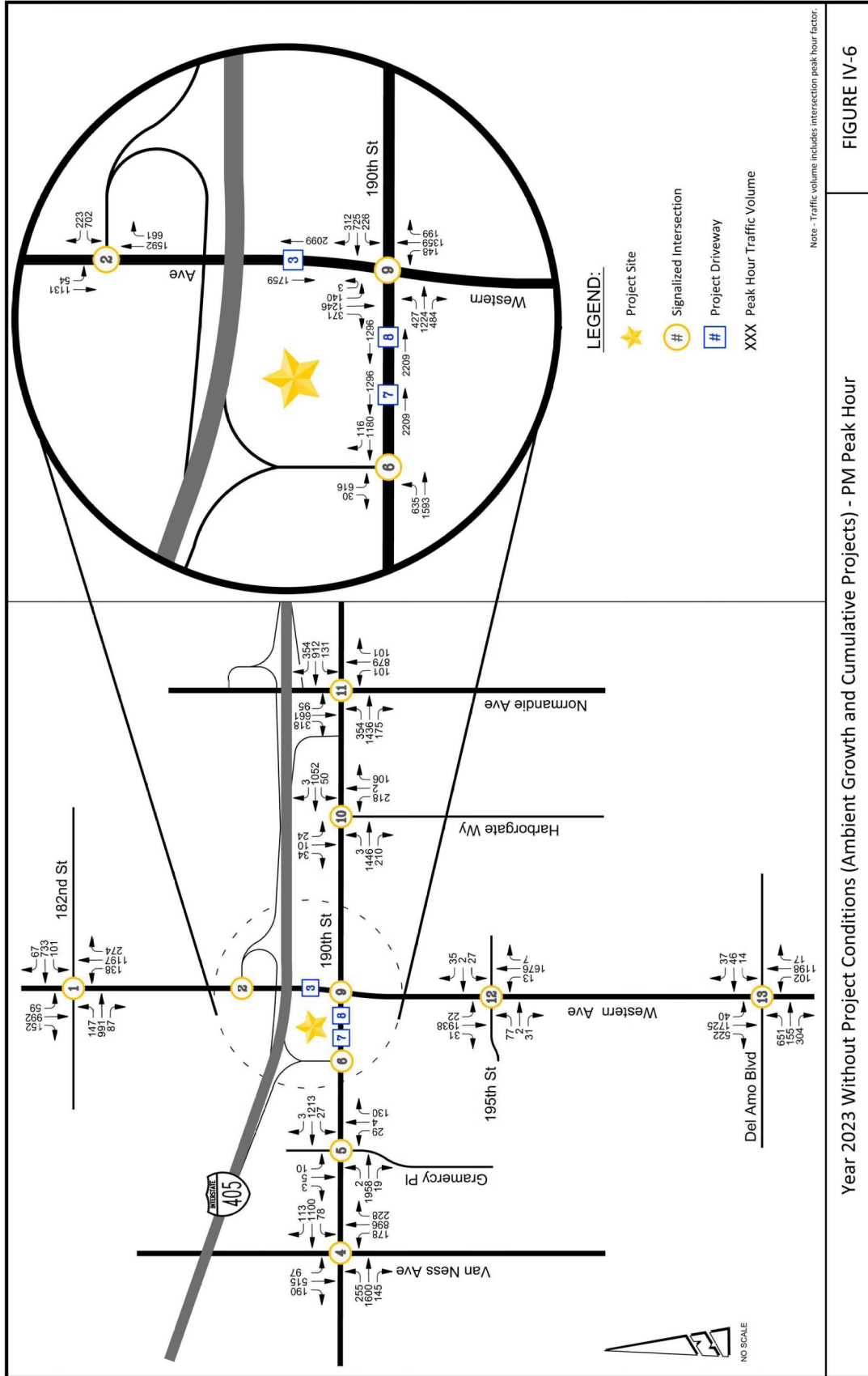
- 190<sup>th</sup> Street/Van Ness Avenue continues to operate at LOS E using the ICU methodology for the PM peak hour.
- 190<sup>th</sup> Street/Western Avenue continues to operate at LOS D for the AM peak hour.
- 190<sup>th</sup> Street/Normandie Avenue continues to operate at LOS D for AM, MD and PM peak hours.
- Western Avenue/Del Amo Boulevard continues to operate at LOS D for the PM peak hour.
- All other intersections continue to operate at acceptable LOS C or better for the remaining peak hours.



Year 2023 Without Project Conditions (Ambient Growth and Cumulative Projects) - AM Peak Hour



Year 2023 Without Project Conditions (Ambient Growth and Cumulative Projects) - MD Peak Hour





**Table IV-1. Year 2023 Without Project Conditions (Ambient Growth & Cumulative Projects)  
Level-of-Service (LOS) Analysis**

No	Intersection	Control Type	Year 2023 Without Project - Analysis Peak Hour											
			AM				MD				PM			
			Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS
<b>Intersection Capacity Utilization Methodology</b>														
4	190th St @ Van Ness Ave	Traffic Signal	--	0.838	D	--	0.600	A	--	0.944	E			
5	190th St @ Gramercy Ave	Traffic Signal	--	0.629	B	--	0.496	A	--	0.616	B			
<b>Highway Capacity Manual Methodology</b>														
1	Western Ave @ 182nd St	Traffic Signal	30.7	--	C	15.9	--	B	21.4	--	C			
2	Western Ave @ I-405 NB Ramps	Traffic Signal	15.2	--	B	14.4	--	B	19.8	--	B			
3	Western Ave @ North Project Drwy	One-Way Stop						N/A						
6	190th St @ I-405 SB Ramps	Traffic Signal	28.9	--	C	21.3	--	C	29.5	--	C			
7	190th St @ West Project Drwy	One-Way Stop						N/A						
8	190th St @ East Project Drwy	One-Way Stop						N/A						
9	Western Ave @ 190th St	Traffic Signal	36.9	--	D	20.7	--	C	31.1	--	C			
10	190th St @ Harborgate Wy	Traffic Signal	9.0	--	A	15.6	--	B	13.1	--	B			
11	190th St @ Normandie Ave	Traffic Signal	38.4	--	D	38.5	--	D	48.7	--	D			
12	Western Ave @ 195th St	Traffic Signal	23.5	--	C	8.8	--	A	7.9	--	A			
13	Western Ave @ Del Amo Blvd	Traffic Signal	26.6	--	C	14.3	--	B	43.9	--	D			

<sup>1</sup> V/C - Volume to Capacity ratio  
LOS worksheets are provided in the Appendix.



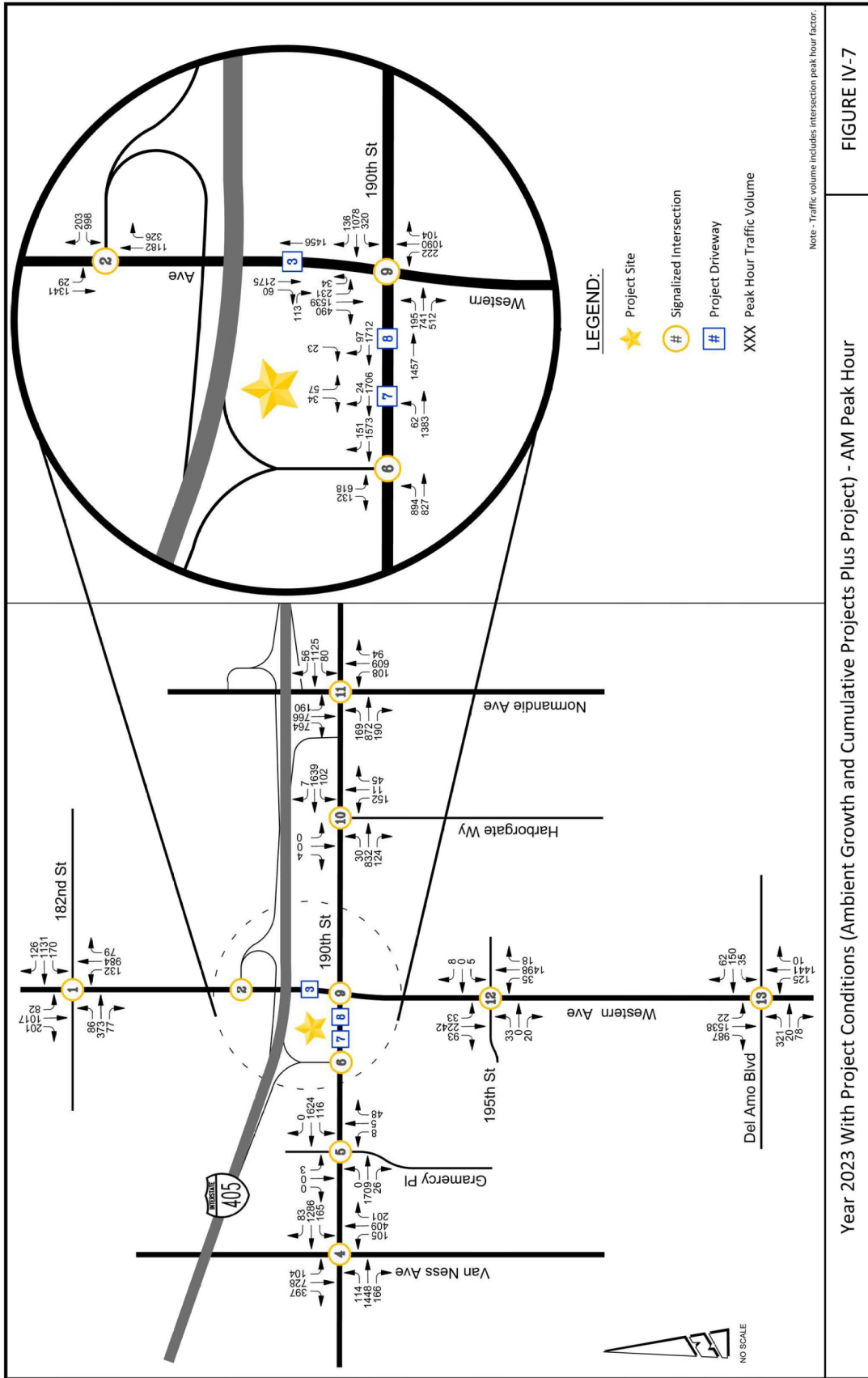
### Year 2023 With Project Conditions (Ambient Growth and Cumulative Projects Plus Project)

To assess the anticipated overall impact of the proposed project on its Opening Day (Year 2023), the proposed project net new trips are added to the previous scenario which included the existing plus ambient growth (for four years) and cumulative projects.

The Year 2023 With Project Conditions scenario traffic volumes for the AM, MD and PM peak hours are shown in **Figures IV-7, IV-8 and IV-9**. The corresponding levels of service summary is detailed in **Table IV-2**. The detailed analysis worksheets are provided in the **Appendix F**.

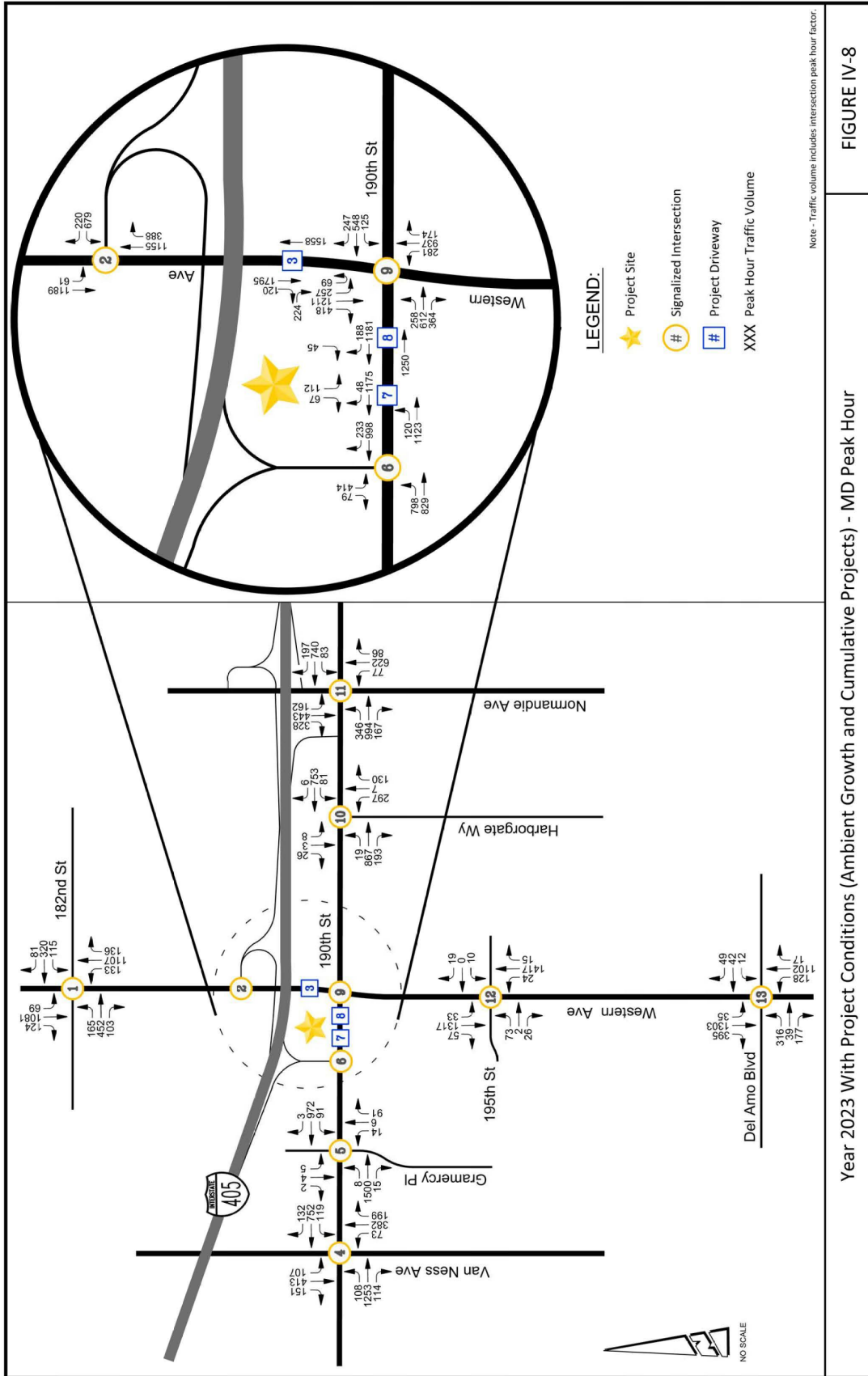
Under Year 2023 Conditions With Project (ambient growth with cumulative projects plus proposed project) scenario, the LOS analyses show the following:

- 190<sup>th</sup> Street/Van Ness Avenue will continue to operate at LOS E using the ICU methodology for the PM peak hour.
- 190<sup>th</sup> Street/West Project Driveway is expected to operate at LOS E during the MD and PM peak hours.
- 190<sup>th</sup> Street/Western Avenue will continue to operate at LOS D for the AM peak hour.
- 190<sup>th</sup> Street/Normandie Avenue will continue operate at LOS D for AM, MD and PM peak hours.
- Western Avenue/Del Amo Boulevard will continue to operate at LOS D for the PM peak hour.
- All other intersections operate at LOS C or better for the remaining peak hours.

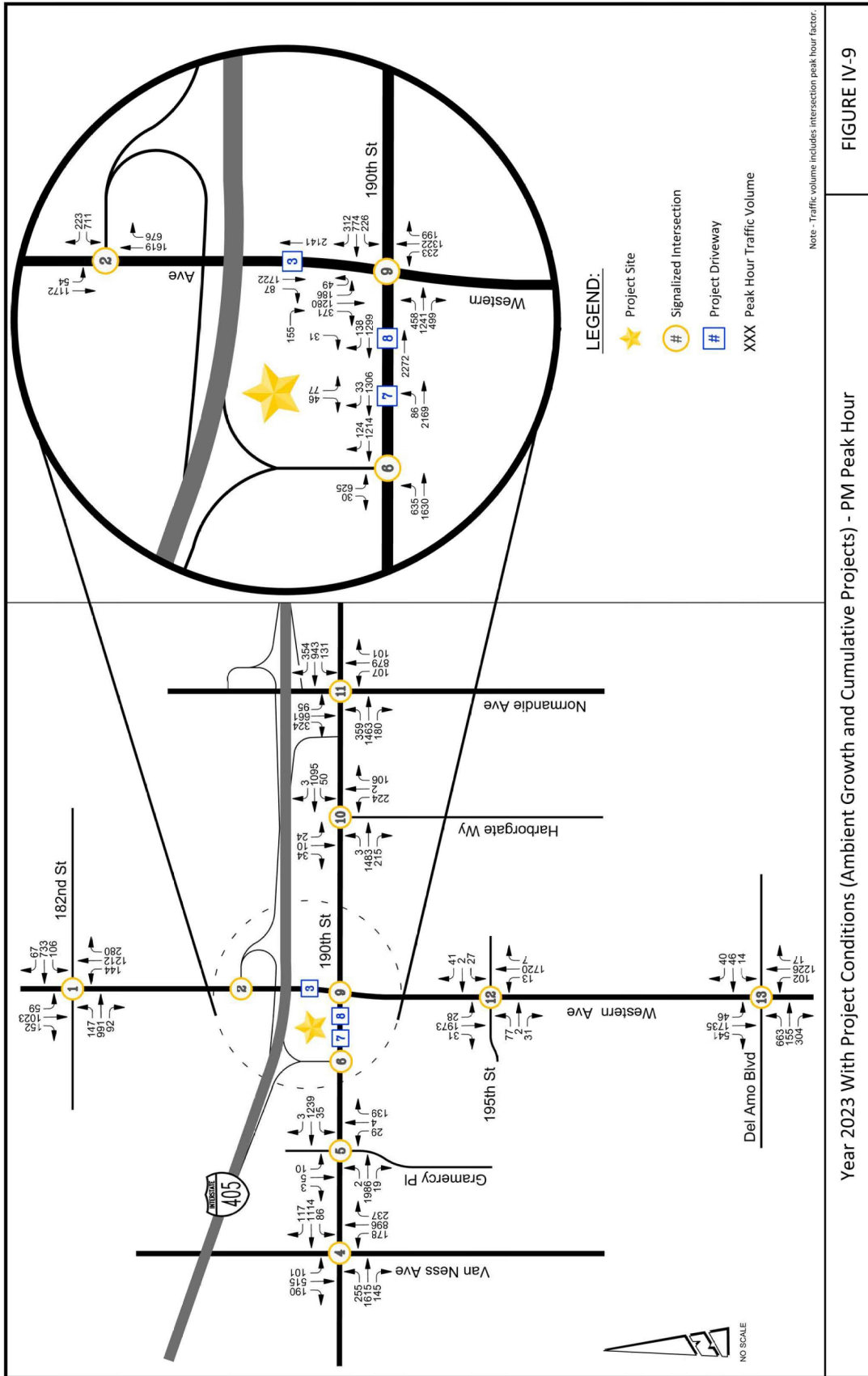


Year 2023 With Project Conditions (Ambient Growth and Cumulative Projects Plus Project) - AM Peak Hour





Year 2023 With Project Conditions (Ambient Growth and Cumulative Projects) - MD Peak Hour



Year 2023 With Project Conditions (Ambient Growth and Cumulative Projects) - PM Peak Hour



**Table IV-2. Year 2023 Conditions With Project (Ambient Growth & Cumulative Projects Plus Project) Level-of-Service (LOS) Analysis**

No	Intersection	Control Type <sup>2</sup>	Year 2023 Without Project						Year 2023 With Project						Change in V/C, LOS			Improvement Needed						
			AM		MD		PM		AM		MD		PM		AM	MD	PM							
			Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS		Delay (sec)	V/C <sup>1</sup>	LOS			
<b>Intersection Capacity Utilization Methodology</b>																								
4	190th St @ Van Ness Ave	Traffic Signal	--	0.838	D	--	0.600	A	--	0.944	E	--	0.841	D	--	0.622	B	--	0.950	E	0.003	0.022	0.006	No
5	190th St @ Gramercy Ave	Traffic Signal	--	0.629	B	--	0.496	A	--	0.616	B	--	0.640	B	--	0.533	A	--	0.633	B	0.011	0.037	0.017	NO
<b>Highway Capacity Manual Methodology</b>																								
1	Western Ave @ 182nd St	Traffic Signal	30.7	--	C	15.9	--	B	21.4	--	C	31.7	--	C	15.9	--	B	21.7	--	C	NO	NO	NO	NO
2	Western Ave @ I-405 NB Ramps	Traffic Signal	15.2	--	B	14.4	--	B	19.8	--	B	15.2	--	B	14.3	--	B	20.1	--	C	NO	NO	YES	NO
3	Western Ave @ North Project Drwy	One-Way Stop						N/A				10.3		B	12.2	--	B	11.0	--	B	Acceptable LOS			NO
6	190th St @ I-405 SB Ramps	Traffic Signal	28.9	--	C	21.3	--	C	29.5	--	C	29.2	--	C	21.4	--	C	29.4	--	C	NO	NO	NO	NO
7	190th St @ West Project Drwy	One-Way Stop						N/A				23.7		C	37.5	--	E	35.2	--	E	MD & PM, SBL Unacceptable LOS			Yes
8	190th St @ East Project Drwy	One-Way Stop						N/A				9.2		A	11.4	--	B	11.3	--	B	Acceptable LOS			NO
9	Western Ave @ 190th St	Traffic Signal	36.9	--	D	20.7	--	C	31.1	--	C	38.3	--	D	24.6	--	C	33.7	--	C	NO	NO	NO	NO
10	190th St @ Harborage Wy	Traffic Signal	9.0	--	A	15.6	--	B	13.1	--	B	9.1	--	A	15.4	--	B	13.2	--	B	NO	NO	NO	NO
11	190th St @ Normandie Ave	Traffic Signal	38.4	--	D	38.5	--	D	48.7	--	D	38.2	--	D	40.9	--	D	50.3	--	D	NO	NO	NO	NO
12	Western Ave @ 195th St	Traffic Signal	23.5	--	C	8.8	--	A	7.9	--	A	23.7	--	C	8.6	--	A	7.9	--	A	NO	NO	NO	NO
13	Western Ave @ Del Amo Blvd	Traffic Signal	26.6	--	C	14.3	--	B	43.9	--	D	27.3	--	C	14.9	--	B	45.2	--	D	NO	NO	NO	NO

<sup>1</sup> V/C - Volume to Capacity ratio

<sup>2</sup> Unsignalized Intersection, LOS reflects the highest vehicle delay for minor approach (side-street) LOS worksheets are provided in the Appendix.



The intersection of 190<sup>th</sup> Street/West Project Driveway (unsignalized) is expected to operate at LOS E during the MD and PM peak hours due to the project traffic. The LOS for an unsignalized intersection is based on the approach with the worst LOS. For this intersection, the southbound left turn is expected to operate at LOS E during the MD and PM peak hours and all other movements are expected to operate at LOS B or better for AM, MD and PM peak hours. The delays to the project traffic will primarily affect internally to the project and be contained within the project site. City staff may not require improvements to be conducted since the LOS E does not occur within the public right-of-way. Even though the above LOS E occurs within the project site, a signal warrant analysis utilizing the CA MUTCD guidelines was conducted for this intersection. Based on the peak hour warrant, the minimum traffic volume threshold for the minor street (two lanes) is 150 vehicles for one peak hour of the day. It is expected that 179 vehicles per hour will be exiting the west driveway during the MD peak hour. The 179 vehicles includes 67 vehicles turning right. Typically for traffic signal warrants, the right turn volumes could be reduced by as much as 50 percent since motorists turning right usually have ample opportunities to turn right since there is only one direction of opposing traffic (westbound). If the right turn movement is reduced by 50 percent (33 vehicles), the total driveway volume would be 146 vehicles, which is less than the required 150 vehicles. The other time periods are expected to have no more than 123 vehicles (PM peak hour) per hour exiting the driveway. Although the west driveway may not warrant a traffic signal if the right turns were reduced, a LOS analysis was conducted if the intersection were to be modified to a traffic signal. The LOS analysis for a traffic signal (see **Table IV-3**) showed that the LOS would improve to LOS A for all peak hours.

**Table IV-3: 190<sup>th</sup> Street @ West Driveway with Improvements, Level-of-Service Analysis**

No	Intersection	Control Type <sup>2</sup>	Year 2023 With Project									Acceptable LOS			
			AM			MD			PM			AM	MD	PM	
			Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS	Delay (sec)	V/C <sup>1</sup>	LOS				
<b>Highway Capacity Manual Methodology</b>															
7	190th St @ West Project Drwy	One-Way Stop	23.7	--	C	37.5	--	E	35.2	--	E	<i>MD &amp; PM, SBL Unacceptable LOS</i>			
	190th St @ West Project Drwy	Traffic Signal	1.8	--	A	3.9	--	A	2.1	--	A	<i>Acceptable LOS</i>			

<sup>1</sup> V/C -Volume to Capacity ratio

<sup>2</sup> Unsignalized Intersection, LOS reflects the highest vehicle delay for minor approach (side-street) LOS worksheets are provided in the Appendix.

The intersection is located only a few hundred feet from the intersection of 190<sup>th</sup> Street/I-405 Southbound ramp traffic signal. While the change to a traffic signal would improve the intersection’s LOS, a traffic signal may cause more congestion on 190<sup>th</sup> Street and also affect traffic on the southbound off-ramp. The traffic signal would need to be continuously synchronized with the I-405 southbound traffic signal. If the synchronization were to be interrupted, congestion can quickly occur and east/west traffic



can quickly build up between the I-405 southbound traffic signal and project driveway. This would also affect the I-405 southbound traffic exiting the I-405 freeway and potentially the traffic on the southbound I-405 freeway. Traffic exiting the freeway may not be able to proceed through the I-405 southbound ramp intersection, which would then cause long queues along the I-405 southbound off-ramp. If the traffic signal were to be installed, the operation of the traffic signal would need to be continuously coordinated with the I-405 southbound traffic signal to ensure no congestion occur between the two intersections. It would be difficult to guarantee that both intersections be consistently coordinated as Caltrans maintains the I-405 southbound traffic signal and the City of Torrance would maintain the new traffic signal at the west project driveway. The CA MUTCD traffic signal warrant guidelines and LOS worksheets are provided in **Appendix G**.



## V. DRIVE-THROUGH QUEUING ANALYSIS

Queuing analyses were conducted for the drive-through facilities at the three proposed businesses with drive-throughs at the project site. The queuing analysis for Building 1, Shake Shack with Drive-Through is shown last since it was dependent on the queuing analysis for Building 3, Chick-fil-A with Drive-Through

- ◆ Building 2 - Panera Bread with Drive-Through
- ◆ Building 3 - Chick-fil-A with Drive-Through
- ◆ Building 1 - Shake Shack with Drive-Through

### Building 2 - Panera Bread Queueing Analysis

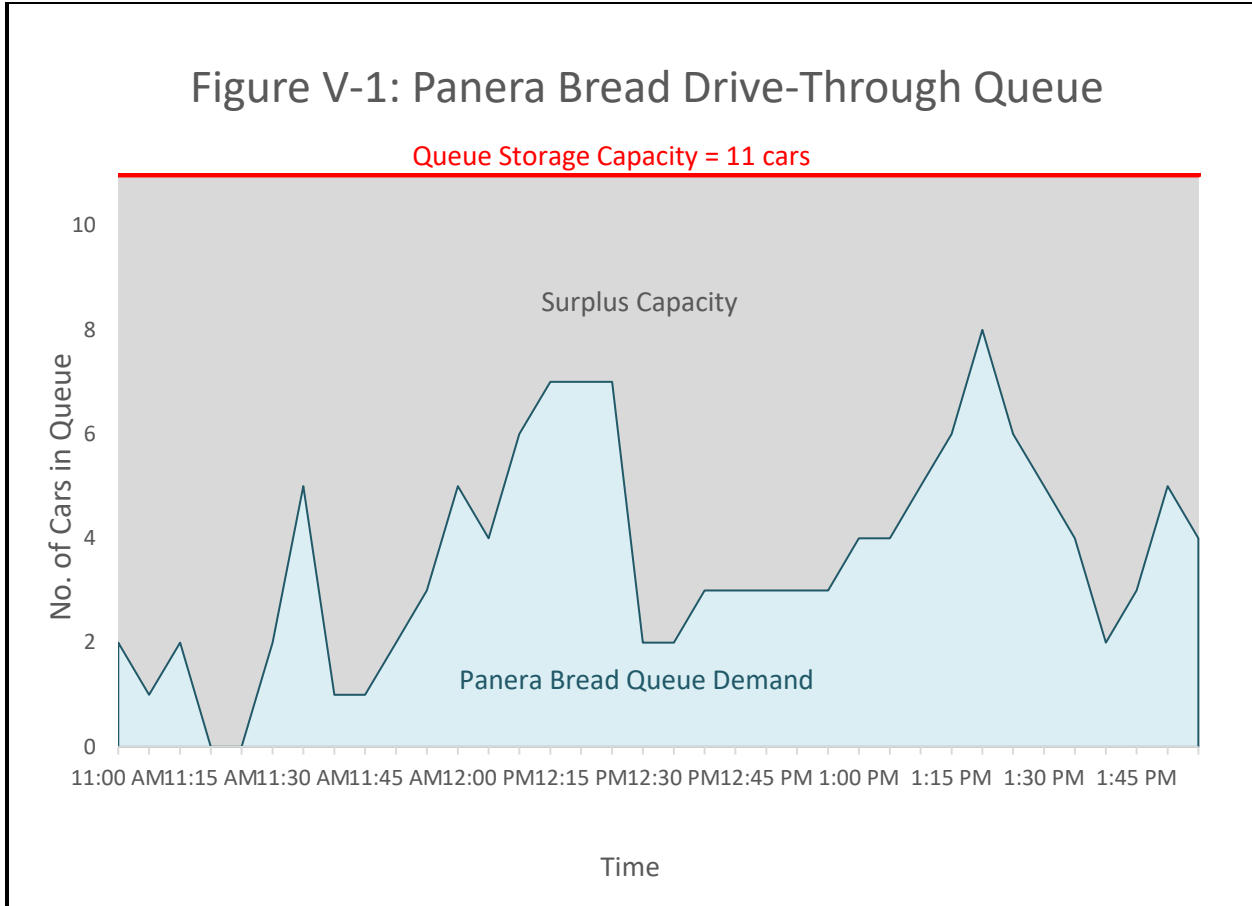
The proposed Panera Bread fast-food restaurant was analyzed as a 3,945 square-foot building with a 400 square-foot patio. The drive through window has a capacity for 11 cars. The queuing analysis was conducted at a similar location on a typical weekday during the midday peak period. The weekday midday period was evaluated as this time period is the peak demand for Panera Bread. The site chosen is located at 8900 Apollo Way in the City of Downey. The study was conducted on Thursday, October 24, 2019, prior to the COVID-19 pandemic.

The study showed that the maximum queue was eight cars. With a drive-through storage capacity for eleven cars, it is anticipated that the maximum queue will not exceed the storage provided. The queue will be contained on-site and not impact the internal site traffic. The queue data for the Panera Bread queuing study is shown in **Table V-1** and graphically in **Figure V-1**. The queuing data is provided in the **Appendix H**.



**Table V-1. Panera Bread Queuing Study**  
 8900 Apollo Way, Downey, CA

Date	Time	Queue Size
<b>Maximum Queue:</b>		<b>8</b>
<b>Thursday, October 24, 2019</b>	11:00 AM	2
	11:05 AM	1
	11:10 AM	2
	11:15 AM	0
	11:20 AM	0
	11:25 AM	2
	11:30 AM	5
	11:35 AM	1
	11:40 AM	1
	11:45 AM	2
	11:50 AM	3
	11:55 AM	5
	12:00 PM	4
	12:05 PM	6
	12:10 PM	7
	12:15 PM	7
	12:20 PM	7
	12:25 PM	2
	12:30 PM	2
	12:35 PM	3
	12:40 PM	3
	12:45 PM	3
	12:50 PM	3
	12:55 PM	3
	1:00 PM	4
	1:05 PM	4
	1:10 PM	5
	1:15 PM	6
	1:20 PM	8
	1:25 PM	6
1:30 PM	5	
1:35 PM	4	
1:40 PM	2	
1:45 PM	3	
1:50 PM	5	
1:55 PM	4	



Chick-fil-A Queueing Analysis

The proposed Chick-fil-A fast-food restaurant was analyzed as a 4,099 square-foot building with a 311 square-foot patio. The drive through window has a capacity for 34 cars. The queuing analysis was conducted at a similar location on a typical weekday (Thursday, October 1, 2020) and Saturday (October 17, 2020) during both the midday peak and PM peak periods. Per City staff, the site chosen was located at 18200 Hawthorne Boulevard in the City of Torrance. Due to COVID-19 restrictions at this restaurant, there was no walk-in traffic and only drive-through and pick-up traffic were present. The City of Torrance provided available weekday 2019 driveway count data that was conducted at the 18200 Hawthorne Boulevard location. Per City request, similar driveway counts were conducted at the Hawthorne location during the queuing surveys.

The queuing study showed that the maximum queue was 34 cars, which occurred on the Thursday night survey. As previously mentioned, only drive-through and pick-up traffic were allowed. The maximum queue only lasted approximately 10 minutes, from 6:10 pm to 6:20 pm and the queue for the remaining of the PM period and MD period was considerably less. The Saturday survey showed a maximum queue of 31 cars during the MD peak period. The queue data for the Chick-fil-A queuing study is shown in **Tables V-2a and V-2b** and graphically in **Figures V-2a and V-2b**.





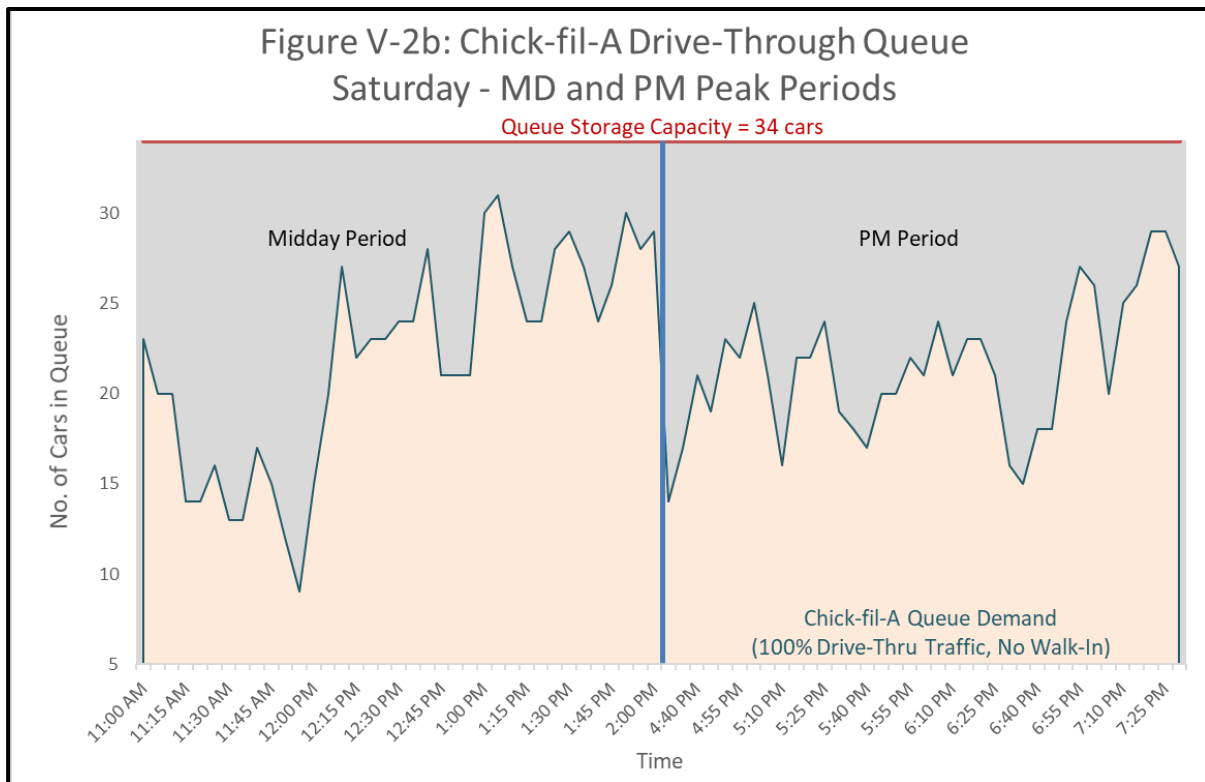
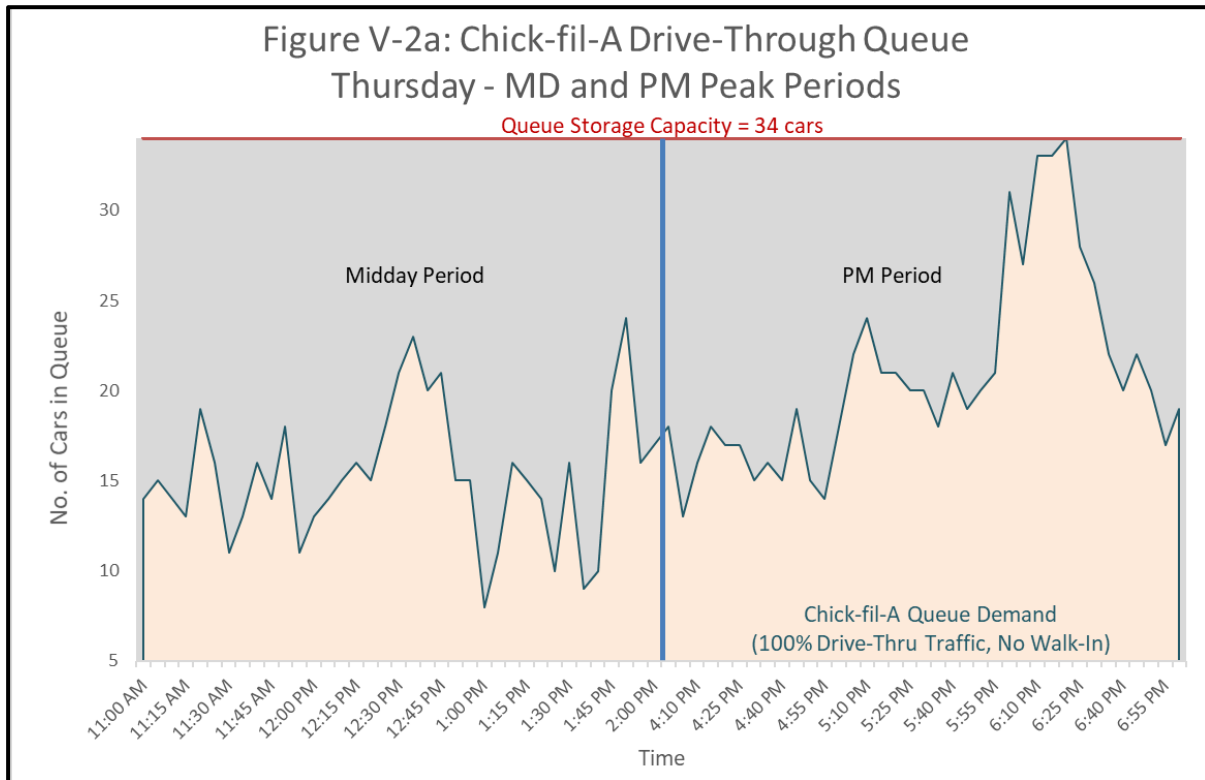
**Table V-2a. Chick-fil-A Queuing Study, Thursday**  
 18200 Hawthorne Boulevard, Torrance, CA

Date	Time	Queue Size	Time	Queue Size
<b>Thursday, October 1, 2020</b>	<b>Maximum Queue:</b>	<b>24</b>	<b>Maximum Queue:</b>	<b>34</b>
	11:00 AM	14	4:00 PM	18
	11:05 AM	15	4:05 PM	13
	11:10 AM	14	4:10 PM	16
	11:15 AM	13	4:15 PM	18
	11:20 AM	19	4:20 PM	17
	11:25 AM	16	4:25 PM	17
	11:30 AM	11	4:30 PM	15
	11:35 AM	13	4:35 PM	16
	11:40 AM	16	4:40 PM	15
	11:45 AM	14	4:45 PM	19
	11:50 AM	18	4:50 PM	15
	11:55 AM	11	4:55 PM	14
	12:00 PM	13	5:00 PM	18
	12:05 PM	14	5:05 PM	22
	12:10 PM	15	5:10 PM	24
	12:15 PM	16	5:15 PM	21
	12:20 PM	15	5:20 PM	21
	12:25 PM	18	5:25 PM	20
	12:30 PM	21	5:30 PM	20
	12:35 PM	23	5:35 PM	18
	12:40 PM	20	5:40 PM	21
	12:45 PM	21	5:45 PM	19
	12:50 PM	15	5:50 PM	20
	12:55 PM	15	5:55 PM	21
	1:00 PM	8	6:00 PM	31
	1:05 PM	11	6:05 PM	27
	1:10 PM	16	6:10 PM	33
	1:15 PM	15	6:15 PM	33
	1:20 PM	14	6:20 PM	34
	1:25 PM	10	6:25 PM	28
	1:30 PM	16	6:30 PM	26
1:35 PM	9	6:35 PM	22	
1:40 PM	10	6:40 PM	20	
1:45 PM	20	6:45 PM	22	
1:50 PM	24	6:50 PM	20	
1:55 PM	16	6:55 PM	17	
2:00 PM	17	7:00 PM	19	



**Table V-2b. Chick-fil-A Queuing Study, Saturday**  
 18200 Hawthorne Boulevard, Torrance, CA

Date	Time	Queue Size	Time	Queue Size
<b>Saturday, October 17, 2020</b>	<b>Maximum Queue:</b>	<b>31</b>	<b>Maximum Queue:</b>	<b>29</b>
	11:00 AM	23	4:30 PM	14
	11:05 AM	20	4:35 PM	17
	11:10 AM	20	4:40 PM	21
	11:15 AM	14	4:45 PM	19
	11:20 AM	14	4:50 PM	23
	11:25 AM	16	4:55 PM	22
	11:30 AM	13	5:00 PM	25
	11:35 AM	13	5:05 PM	21
	11:40 AM	17	5:10 PM	16
	11:45 AM	15	5:15 PM	22
	11:50 AM	12	5:20 PM	22
	11:55 AM	9	5:25 PM	24
	12:00 PM	15	5:30 PM	19
	12:05 PM	20	5:35 PM	18
	12:10 PM	27	5:40 PM	17
	12:15 PM	22	5:45 PM	20
	12:20 PM	23	5:50 PM	20
	12:25 PM	23	5:55 PM	22
	12:30 PM	24	6:00 PM	21
	12:35 PM	24	6:05 PM	24
	12:40 PM	28	6:10 PM	21
	12:45 PM	21	6:15 PM	23
	12:50 PM	21	6:20 PM	23
	12:55 PM	21	6:25 PM	21
	1:00 PM	30	6:30 PM	16
	1:05 PM	31	6:35 PM	15
	1:10 PM	27	6:40 PM	18
	1:15 PM	24	6:45 PM	18
	1:20 PM	24	6:50 PM	24
	1:25 PM	28	6:55 PM	27
	1:30 PM	29	7:00 PM	26
1:35 PM	27	7:05 PM	20	
1:40 PM	24	7:10 PM	25	
1:45 PM	26	7:15 PM	26	
1:50 PM	30	7:20 PM	29	
1:55 PM	28	7:25 PM	29	
2:00 PM	29	7:30 PM	27	





Sales data for the 18200 Hawthorne Boulevard location was obtained for the six months (April 2020 to September 2020) during COVID-19 conditions from Chick-fil-A corporate headquarters (Irvine, CA) and showed that approximately 75 percent of sales were from the drive-through, while 25 percent of sales were from pick-up orders (online catering and/or 3<sup>rd</sup> party delivery). The pick-up order customers had to park and wait in their cars for their food to be brought to them by Chick-fil-A staff. Based on the 75/25 percent split between the orders, the pick-up orders are 33 percent of the drive through orders. Since the maximum queue was 34 cars, the pick-up order maximum would be 11 cars (33 percent of 34). The total peak demand for this case is 45 cars.

**Hawthorne Chick-fil-A  
Average Monthly Sale Percent Breakdown**

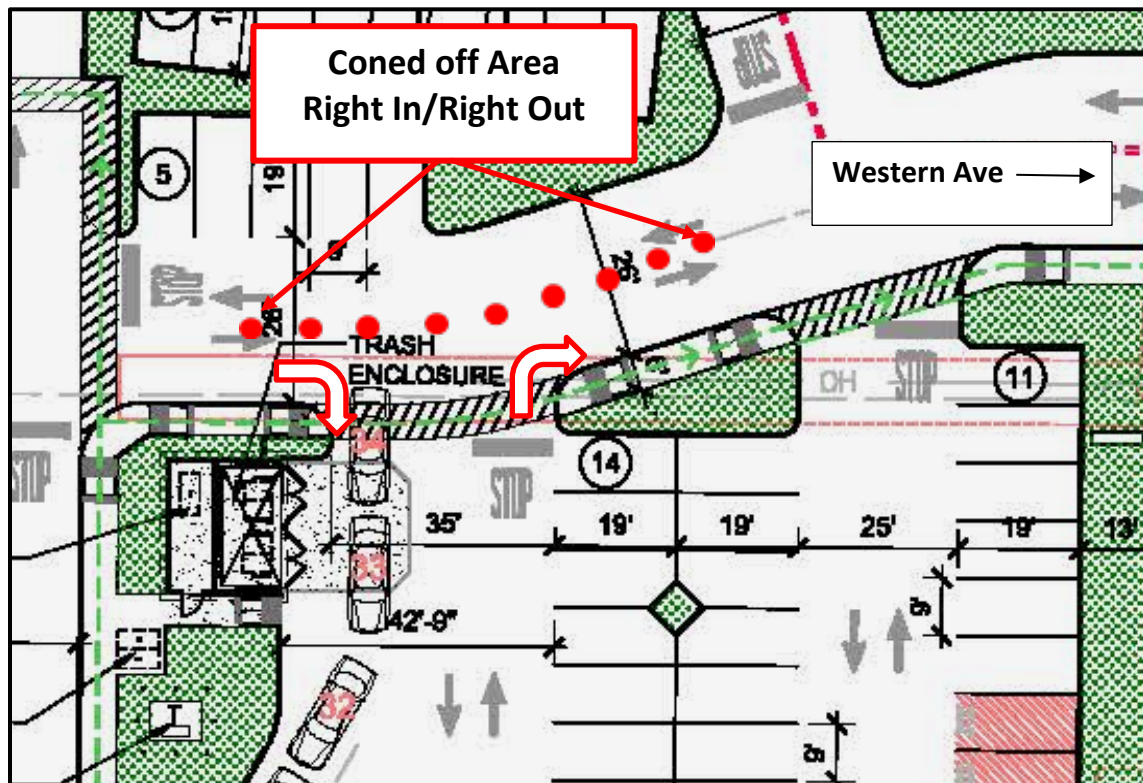
Description	Drive-Thru Customer	Dine-In & Takeout Customer
Pre-COVID Conditions	49.1%	51.9%
During COVID Conditions	74.2%	25.8%

Typically, there is also a high demand for walk-in traffic at the Chick-fil-A restaurants. Sales data for the 12 months prior to March 2020 (pre-COVID-19 conditions) was also obtained from Chick-fil-A corporate headquarters and showed that of the total sales, approximately 50 percent was from walk-in/take-out and 50 percent was from the drive-through (shown above). Using the total peak demand of 45 vehicles, determined above, and applying a reduction factor of 50 percent to account for walk-in traffic, the projected queue length would be around 23 vehicles (50% of total demand of 45). However, as the current traffic patterns and demand are not typical due to the COVID-19 conditions, additional adjustments are needed to determine maximum drive-through queues for normal traffic conditions. Based on the recent driveway counts collected, the driveway counts were down 27% due to COVID-19 conditions. In order to estimate the queue length for Pre-COVID-19 conditions, the queue length of 23 cars (discussed above) was converted to 2019 conditions using the 2019 count data from the City. Since the driveway counts were down the 27 percent from 2019, the queue length of 23 vehicles was divided by 73% (100 percent – 27 percent) resulting in an estimate of 32 vehicles for the maximum queue for pre-COVID-19 conditions. The study data that includes the queueing survey driveway counts, City provided count data and sales information are provided in **Appendix H**.

COVID-19 Maximum Queue Length (Measured)	34
COVID-19 Conditions, Pick-Up Traffic (33% of Drive-Thru)	11
Total Demand COVID-19 Conditions	45
Pre-COVID Walk-In Sales Percentage	50%
Max Expected Queue assuming 50% Walk-in Sales (50% of 45)	23
Change in Driveway Counts from 2019 (-27%) - Convert Max Expected Queue to pre-COVID-2019 conditions (23/0.73)	<b>32</b>

The storage capacity for 34 cars for this project is equal to the total demand from the queuing study that included the majority of sales via drive-through. Accounting for walk-in traffic and pre-COVID-19 demand, the maximum queue is expected to be 32 cars. Per Chick-fil-A corporate team, if the queue were to extend to the 30-32 car lengths, additional staff members would be deployed to begin taking orders in the queue. This would speed up the ordering process as they can be processed faster. Chick-fil-A will assign a team of staff members just for the drive-thru, and their duties will include managing the traffic to maintain the circulation flow. Although it is not expected that the queue will extend to the aisle way of the project site, if there is a special event or during the grand opening the queue begins to extend near the capacity of 34 cars, Chick-fil-A will have a contingency plan to prevent the drive through queue from impacting traffic entering the project site from Western Avenue. As shown on **Figure V-3**, the drive aisle way could be coned off to prevent the inbound left turn movement by placing cones in the center of the aisle way. This will provide for right in/right out only movements at the driveway and therefore contain the queue within the project site and not have it extend towards Western Avenue.

**Figure V-3. Chick-fil-A Drive-Through Queue Contingency Plan**



Also, as more Chick-fil-A restaurants open up in the area, it is anticipated that the demand will be redistributed (i.e., lower VMT), and the queue lengths for each location will be further reduced. Therefore, it is anticipated that the maximum drive-through queue will not exceed the storage provided.

It should be noted that the 18200 Hawthorne Boulevard restaurant queue storage capacity is approximately 20 cars prior to entering the site's parking area. Once the drive-through queue is over 20,



any additional cars in the queue will interrupt the parking area. For these surveys, although the pick-up traffic was not included in the drive-through queue data, the pick-up traffic was often in the drive-through queue prior to parking. The combination of the drive-through queue overflowing into the parking area along with the pick-up customers parking/leaving causes additional friction and congestion. Therefore, when there is walk-in traffic at this restaurant, there is significantly more interaction between the drive-through traffic and vehicles parking/leaving, which causes even more congestion. Whereas for the proposed project, the drive-through storage can accommodate up to 34 cars and not interfere with the parking. Therefore, while both locations are similar in building size, this project's site provides a greater amount of storage for the drive-through queue without interfering with the parking area and provides for a better circulation of traffic.

### Building 1 – Shake Shack with Drive-Through Queuing Analysis

A queuing analysis was conducted for the proposed Shake Shack with drive-through at the proposed Western/190<sup>th</sup> project. Since there are no existing Shake Shack restaurants with drive-throughs to evaluate, the data from the drive-through queue study at the Chick-fil-A drive-through restaurant (18200 Hawthorne Boulevard) was used. The queue evaluation for Building 3, Chick-fil-A, (conducted in October 2020) evaluated the both the drive-through queue lengths and driveway counts (weekday and Saturday). The driveway counts were used as the peak hour trip generation and the percent difference between the Shake Shack trip generation was evaluated. The percent difference was then applied to the maximum queue from the Chick-fil-A queue survey to determine an estimated drive-through queue for the proposed Shake Shack with drive-through. The Shake Shack trip generation is presented in **Appendix B** and the results are shown in **Table V-3**.

The Chick-fil-A drive-through survey counts showed a weekday maximum of 326 trips (in/out) during the midday peak hour and 224 trips (in/out) during the PM peak hour and a Saturday maximum of 317 trips (in/out) during the midday peak hour and 302 trips (in/out) during the PM peak hour. The Chick-fil-A driveway count data is shown on **Table V-4** and is provided in **Appendix H**.



**Table V-3. Proposed Shake Shack With Drive-Through Trip Generation\***

Shake Shack Survey	Midday Peak Hour Trips			PM Peak Hour Trips			Daily Trips (MD is 11.8% of Daily)
	In	Out	Total	In	Out	Total	
<b>Weekday</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	38	38	76	33	33	66	
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>61</b>	<b>61</b>	<b>122</b>	<b>38</b>	<b>38</b>	<b>76</b>	
<b>Saturday (for Queuing Analysis)</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	53	53	106	48	48	96	N/A <sup>2</sup>
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>85</b>	<b>85</b>	<b>170</b>	<b>55</b>	<b>55</b>	<b>111</b>	

\* Per Shake Shack with Drive-Through Trip Generation Analysis Table 4b (under Appendix B).

**Table V-4. Chick-fil-A Driveway Counts (October 2020)**

Chick-fil-A Driveway Counts	Midday Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
<b>Weekday</b>						
Driveway 1 (Hawthorne Blvd)	86	119	205	61	110	171
Driveway 2 (182nd St)	81	40	121	51	2	53
<b>Total Trip Generation</b>	<b>167</b>	<b>159</b>	<b>326</b>	<b>112</b>	<b>112</b>	<b>224</b>
<b>Saturday</b>						
Driveway 1 (Hawthorne Blvd)	85	118	203	69	113	182
Driveway 2 (182nd St)	88	26	114	80	40	120
<b>Total Trip Generation</b>	<b>173</b>	<b>144</b>	<b>317</b>	<b>149</b>	<b>153</b>	<b>302</b>





Based on the driveway count data/trip generation, the demand for the Chick-fil-A restaurant is significantly higher than the proposed Shake Shack. The proposed Shake Shack with drive-through is expected to have a peak hour trip generation that is approximately only 34 to 54 percent of the Chick-fil-A with drive-through restaurant (see **Table V-5**). This can be attributed to the different type of menus for each restaurant, especially the pricing of the food and beverages. The Shake Shack restaurants serve higher priced food items and beverages, which includes beer and wine. Whereas the Chick-fil-A restaurants have a lower priced menu and the restaurant is geared more towards a typical fast food restaurant.

**Table V-5. Trip Generation Comparison**

Trip Generation - Peak Hour				Shake Shack Comparison to Chick-fil-A	
Shake Shack with Drive-Through		Chick-fil-A with Drive-Through			
Weekday					
MD	PM	MD	PM	MD	PM
122	76	326	224	37%	34%
Saturday					
MD	PM	MD	PM	MD	PM
170	111	317	302	<b>54%</b>	37%

Per the Chick-fil-A queue evaluation, the maximum drive-through queue from the Chick-fil-A restaurant was 34 car lengths during the weekday PM peak hour. It should be noted, that the 34 car queue length was the maximum queue length for the weekday and Saturday surveys. The average queue length was about 21 cars for both weekday and Saturday surveys. Using the Saturday midday trip generation comparison (highest percentage difference), the trip generation for the proposed Shake Shack is approximately 54% of the Chick-fil-A trip generation. Therefore, it is expected that the Shake Shack drive-through queue will be approximately 54 percent of the 34 maximum queue length from Chick-fil-A, which is 19 vehicles. This is a worst case scenario, as the Saturday trip generation percent difference was applied to the maximum queue length during the weekday. Since the Shake Shack menu is different to that of the Chick-fil-A’s menu, the food and beverages may take longer to serve and therefore queue length could be longer. The proposed site plan for the Shake Shack shows a drive-through capacity of 23 vehicles, therefore it can accommodate four more vehicles (21 percent) beyond the estimated 19 vehicle queue. Even if there is an unexpected surge for the





drive-through demand (opening week) beyond the drive-through capacity, the excess queue could spill over into the parking area and will be contained within the Shake Shack lot and not interfere with City streets.



## VI. PROJECT ENHANCEMENT RECOMMENDATIONS

During the course of the study, several operational enhancements were identified to help improve traffic flow in and around the project site. These options include:

- ◆ Right-in/right-out access at the project driveways – This recommendation has been incorporated into the traffic operational analysis and is designed for the North Project Driveway along Western Avenue and the East Project Driveway along 190<sup>th</sup> Street.
- ◆ Provide full ingress/egress access at the West Project Driveway with the two exit lanes – This recommendation has been incorporated into the traffic operational analysis for the West Project Driveway. The project will include a wider (33 foot width) and longer throat for the driveway to facilitate ingress/egress access. The driveway will have a 13-foot inbound lane, a 10-foot left-turn outbound lane and a 10-foot right-turn outbound lane.
- ◆ Synchronize the traffic signal of 190<sup>th</sup> Street/Western Avenue with the Caltrans traffic signal at 190<sup>th</sup> Street/I-405 southbound ramps during the morning, midday, and afternoon peak periods for smoother traffic flow during the AM, MD and PM peak hours. Additional signal hardware may be needed in order to synchronize signal timing for these intersections as the traffic signals in the immediate vicinity of the project site are owned/maintained by different agencies (Cities of Torrance and Los Angeles and the State of California Department of Transportation).



## VII. SUMMARY AND CONCLUSIONS

An existing 5.3-acre vacant parcel lot located at the northwest corner of 190<sup>th</sup> Street and Western Avenue in the City of Torrance is to be converted into a commercial center housing several commercial/retail buildings totaling approximately 23,000 square feet with associated patios and parking lots. Three unsignalized project access driveways will service the site. The project will have the following land uses:

- ◆ Building 1 – 3,495 square-foot Shake Shack restaurant with drive-through window and an 853 square-foot patio
- ◆ Building 2 – 3,945 sq ft Panera Bread fast-food restaurant with drive-through window and a 400 sq ft patio
- ◆ Building 3 – 4,099 sq ft Chick Fil-A fast-food restaurant with drive-through window and a 311 sq ft patio
- ◆ Building 4A – 5,700 sq ft restaurant/retail space with an 800 sq ft patio
- ◆ Building 4B – 5,700 sq ft restaurant/retail space with a 700 sq ft patio

Anticipated project trip generation is based on ITE *Trip Generation Manual* rates. Per discussions with City of Torrance staff, a 20% pass-by trip reduction for the high-turnover restaurant as well as a 50% pass-by trip reduction for AM and PM peak periods, 20% for Midday peak period for all other land uses were applied to the study. In addition, no trip reductions for the existing activity and no internal trip capture factors were used. The net project trips will be approximately 267 trips in the AM peak hour, 740 trips in the Midday peak hour and 360 trips in the PM peak hour. These trips will be using the existing roadway network.

The study considered six analysis scenarios at thirteen study intersections as outlined below:

### Analysis Scenarios:

1. Year 2021 Existing Conditions
2. Year 2023 Without Project Conditions (Existing Conditions with Ambient Growth plus Cumulative Projects)
3. Year 2023 With Project Conditions (Existing Conditions with Ambient Growth plus Cumulative Projects plus Project Traffic)

### Study Intersections:

- |   |   |
|---|---|
| 1. Western Avenue and 182 <sup>nd</sup> Street        | 8. 190 <sup>th</sup> Street and East Project Driveway |
| 2. Western Avenue and I-405 NB Ramps                  | 9. 190 <sup>th</sup> Street and Western Avenue        |
| 3. Western Avenue and North Project Driveway          | 10. 190 <sup>th</sup> Street and Harborgate Way       |
| 4. 190 <sup>th</sup> Street and Van Ness Avenue       | 11. 190 <sup>th</sup> Street and Normandie Avenue     |
| 5. 190 <sup>th</sup> Street and Gramercy Place        | 12. 195 <sup>th</sup> Street and Western Avenue       |
| 6. 190 <sup>th</sup> Street and I-405 SB Ramps        | 13. Del Amo Boulevard and Western Avenue              |
| 7. 190 <sup>th</sup> Street and West Project Driveway |   |



Traffic operations analyses for the above scenarios were analyzed using the following methodologies:

- ◆ City of Torrance: Intersection Capacity Utilization (ICU)
- ◆ City of Los Angeles: Highway Capacity Manual
- ◆ Caltrans: Highway Capacity Manual
- ◆ Project Driveways: Highway Capacity Manual Unsignalized Methodology

Per the Level of Service (LOS) analysis, the project is expected to produce no considerable traffic impacts at all ten existing traffic signalized intersections and two of the project driveways. The project driveway of 190<sup>th</sup> Street/West Project Driveway, is expected to operate at LOS E during the MD and PM peak hours. The LOS E is due to the expected delays for the southbound left turn lane and the project trips are not expected to negatively affect the traffic on the City street. Addition of a traffic signal at this intersection would improve the LOS to LOS A, however, due to the close spacing from the I-405 southbound traffic signal to the west on 190<sup>th</sup> Street, the traffic signal could cause heavy congestion on 190<sup>th</sup> Street and on the I-405 Southbound off-ramp.

A queuing analysis conducted for the Panera Bread restaurant shows that the drive-through queue storage of 11 cars respectively is adequate to accommodate the anticipated project demand. The drive-through queue will not impact the internal site circulation. Another queuing analysis conducted at Chick-fil-A restaurant occurred during COVID-19 conditions and therefore only drive-thru and pick-up traffic (no walk-in) were present. The queue analysis showed the maximum drive thru demand of 34 vehicles. For normal conditions (pre-COVID-19) with walk-in traffic, the queue should be shorter as there is typically about 50 percent of walk-in sales. Therefore, it is expected that the queue storage of 34 cars will be adequate and not impact the internal site circulation. A drive-through queuing analysis was then conducted for the proposed Shake Shack with drive-through restaurant. Based on that study, it is expected that the proposed queue storage of 23 cars will be adequate and also not impact the internal site circulation. It is expected that all three drive-throughs will not impact the adjacent public roadways.

To further improve the traffic operations at the study intersections, the project recommends the following enhancements:

- ◆ Right-in/right-out access at the North and East Project Driveways has already been incorporated into the project.
- ◆ Full ingress/egress access at the West Project Driveway with southbound left and southbound right-turn exit lanes has already been incorporated into the project.
- ◆ Implement signal timing coordination along 190<sup>th</sup> Street and Western Avenue and synchronize the traffic signal of 190<sup>th</sup> Street/Western Avenue with the Caltrans traffic signal at 190<sup>th</sup> Street/I-405 southbound ramps during all peak periods.

# Traffic Circulation Analysis

190<sup>th</sup> Street/Western Avenue  
Commercial Center

## APPENDICES

Submitted to:  
City of Torrance



April 26, 2022



# APPENDICES

- A **Approved Traffic Circulation Analysis (TCA) Project Scope of Work**
- B **Shake Shack and Chick-fil-A Trip Generation Analysis**
- C **Existing Traffic Volume Data (2019)**
  - 1. **Count Data**
  - 2. **With Growth Calculations for both Year 2021 and Year 2023**
- D **2021 Existing Conditions - Intersection Analysis Worksheets**
- E **2023 Without Project Conditions - Intersection Analysis Worksheets**
- F **2023 With Project Conditions - Intersection Analysis Worksheets**
- G **California Manual on Uniform Traffic Control Devices – Traffic Signal Warrant Guidelines and 190<sup>th</sup> Street/West Project Driveway Traffic Signal Level-of-Service Analysis Worksheets**
- H **Queuing Surveys**

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **TCA Approved Scope of Work**



**190th Street and Western Avenue – Mixed Use Development**  
Traffic Circulation Analysis (TCA) Scope of Work - 10/29/2021

The scope of work is based on discussion with City staff on the new development located at 190<sup>th</sup> Street and Western Avenue. Based on TIA Section 3.3, a LOS-Based TCA is required since this project is expected to generate more than 500 weekday trips. A report will be developed and all analysis will be per the City's Traffic Circulation Analysis (TCA) guidelines and the proposed project site plan (see attached). The project is expected to open early 2023.

**1. Study Intersections:** The following signalized intersections and project driveways are to be evaluated for traffic impacts of the proposed project at and around the project location:

1. 182<sup>nd</sup> St and Western Ave (Signalized)
2. Western Ave and I-405 NB Ramps (Signalized)
3. Western Ave and Project Driveway (Unsignalized)
4. 190<sup>th</sup> St and Van Ness Ave (Signalized)
5. 190<sup>th</sup> St and Gramercy Pl (Signalized)
6. 190<sup>th</sup> St and I-405 SB Ramps (Signalized)
7. 190<sup>th</sup> St and Project Driveway West (Unsignalized)
8. 190<sup>th</sup> St and Project Driveway East (Unsignalized)
9. 190<sup>th</sup> St and Western Ave (Signalized)
10. 190<sup>th</sup> St and Harborgate Wy (Signalized)
11. 190<sup>th</sup> St and Normandie Ave (Signalized)
12. 195<sup>th</sup> St and Western Ave (Signalized)
13. Del Amo Blvd and Western Ave (Signalized)

**2. Study Scenarios**

The peak period turning movement count data was conducted in 2019. The 2019 data was utilized for this study since it is pre-COVID information and traffic volumes at that time were consistent with "typical" traffic flow patterns and there was significant vehicular demand during this time period. For existing conditions and Opening Year conditions, the count data will be increased by the City's traffic growth forecast of 0.525% annual growth rate. Therefore, a growth rate of 1.05% will be applied to the count data for Existing Year 2021 and a growth rate of 2.10% will be applied to the count data for Opening Year 2023.

For a conservative assessment, an estimated traffic generation of cumulative projects that were expected to start operation between 2019 and 2021 will also be incorporated into Existing Year 2021 conditions.



The study intersections will be analyzed for the morning (AM), Midday (MD) and afternoon (PM) peak periods under the following scenarios:

- Existing Conditions Year 2021 (2019 Counts + Ambient Growth + Cumulative Projects)
- Forecast Opening Year 2023 (Existing Year 2021 + Ambient Growth)
- Forecast Opening Year 2023 with Project

**3. Level-of-Service Criteria:** For intersections under the City of Torrance jurisdiction, a developer may be required to incorporate offsite work into the project under the following circumstances:

- At signalized intersections with pre-project ICU LOS C, the addition of the anticipated project traffic increases the V/C ratio by 0.04 or more.
- Similarly, signalized intersections with pre-project ICU LOS D are considered impacted with V/C ratio increase of 0.02 or more.
- For signalized intersections with pre-project LOS E or F, the V/C ratio threshold is 0.01 or more.
- At the unsignalized project driveway, post-project HCM LOS degrades to E or F and the volume criteria of the MUTCD traffic signal warrant guidelines is expected to be met.

The City of Los Angeles maintains and controls the signalized intersections along Western Avenue and along 190<sup>th</sup> Street (east of Western Avenue). These seven signalized intersections will be analyzed using the HCM analysis methodology.

The Level-of-Service (LOS) analysis methodology for the study intersection will be as follows:

- ICU (for City of Torrance intersections):
  - 190<sup>th</sup> St and Van Ness Ave
  - 190<sup>th</sup> St and Gramercy Pl
  
- HCM (for City of Los Angeles intersections):
  - Western Ave and 182<sup>nd</sup> St
  - Western Ave and I-405 NB Ramps
  - Western Ave and 190<sup>th</sup> St
  - 190<sup>th</sup> St and Harborage Wy
  - 190<sup>th</sup> St and Normandie Ave
  
- HCM (for Caltrans intersection):
  - 190<sup>th</sup> St and I-405 SB Ramps
  - Western Ave and 195<sup>th</sup> St
  - Western Ave and Del Amo Blvd

- HCM Unsignalized Methodology (for project driveways):
  - Western Ave and Project Driveway North
  - 190<sup>th</sup> St and Project Driveway West
  - 190<sup>th</sup> St and Project Driveway East

The City of Los Angeles Non-CEQA LOS guidelines do not have a delay-LOS threshold. Typically, nearby local cities utilize LOS D or E as the LOS threshold. Therefore, for this study, LOS D will be utilized as the LOS threshold for the City of Los Angeles intersections. Improvements at City of Los Angeles intersections would be required for the following.

- If the project causes a change in LOS D or better to LOS E or F
- If the project causes a change in LOS E to LOS F.

Caltrans LOS guidelines for project impacts are as follows for the Caltrans study intersections.

- If the project causes a change in LOS A-C to LOS D.
- If the project causes a change in LOS D to LOS E or F.
- If the project causes a change in LOS E to LOS F.

4. **Project Trip Generation and Trip Credits:** The proposed project trip generation will be based on the latest ITE Trip Generation Manual (10th Ed) for Buildings 2, 4A and 4B. Trips will be generated for the AM, Midday and PM peak periods. The tenants for the parcel(s) to the rear of the property (Buildings 4A and 4B) have not been finalized, therefore, the trip generation is calculated for high-turnover restaurants to provide a conservative, worst-case analysis. The trip generation for the Panera Bread restaurant (Building 2) will use the trip generation of fast-food restaurant with drive-through.

The trip generation analysis for the proposed Shake Shack (Building 1) restaurant was conducted using Year 2020 Chick-fil-A driveway (Torrance, CA) count data and recent surveys conducted at Shake Shack (El Segundo, CA). The trip generation analysis determined the proposed project trips for the Shake Shack with drive-through restaurant. The weekday midday and PM peak hour trip generation analysis for the proposed Shake Shack with drive-through was pre-approved by the City. A short discussion on the trip generation analyses will be incorporated in the TCA report and the Shake Shack trip generation evaluation will be provided in the TCA appendices.

For the Chick-fil-A (Building 3) peak hour trip generation, City data from March 2019 will be used for the weekday AM Peak, midday Peak and PM peak hours. The data comprises of a driveway count survey from the Chick-fil-A restaurant located at 18200 Hawthorne Boulevard in the City of Torrance.

The following pass-by trip rates will be used:

- High-turnover restaurant: 20%
- All others: 50% for AM and PM peak periods, 20% for Midday peak period

No internal capture rates are applied to the analyses.

Daily Trips – The following approaches will be used to determine the daily trips from each building.

- Building 1, Shake Shack: Utilize ITE Code 934, midday trips as a percentage of the daily trips. Per ITE Trip Generation Manual, Appendix A - Code 934, the weekday midday peak hour trips are 11.8% of the weekday daily trips. This percentage will be used along with the midday Shake Shack trip generation analysis (stated above) to determine the weekday daily trips. The midday trip generation was utilized for this analysis since it is the highest trip generation peak hour. ITE Code 930 - Fast Casual Restaurant was not evaluated since there was only one case study evaluating the daily trips.
- Building 3, Chick-fil-A: For the Chick-fil-A daily trip analysis, the trip generation will be determined using the City provided 2019 driveway count data from the Chick-fil-A restaurant located at 18200 Hawthorne Boulevard in the City of Torrance.
- Buildings 2, 4A and 4B: Utilize corresponding ITE weekday daily rates.

Per these proposed parameters, the project is expected to generate the new trips as detailed in the attached **Project Trip Generation** tables.

Project Trip Distribution and Pass-By Trips will utilize the same distribution as per Attachment 5.

5. **Queuing Study:** The project is proposing three drive-through services: one for Shake Shack, one for Panera Bread and one for Chick-fil-A. Queue surveys have been conducted at a Panera site and Chick-fil-A site.

- Panera Bread at 8900 Apollo Way, Downey – AM, midday, PM peak hours
- Chick-fil-A at 18200 Hawthorne Boulevard, Torrance – Midday and PM peak hours. This survey was conducted in October 2020, during the COVID-19 pandemic and there was no dining-in at that time and the demand to the restaurant was almost 100 percent drive-through demand with some pick-up orders. Therefore, the queue survey represented a worst case scenario for the evaluation.

- Shake Shack with Drive-Through – Since there are no Shake Shack with drive-through restaurants to survey, an evaluation was conducted using the above Chick-fil-A queue data and the estimated Shake Shack with drive-through trip generation analysis. The City reviewed this evaluation and has pre-approved the analysis. The evaluation and analysis will be included in the Queuing Section of the TCA.

6. **Site Access:** The project is serviced via three unsignalized driveways as shown in the **Project Site Plan**, and also detailed below:

- Project Driveway on Western Ave – SB right-in / EB right-out access only
- East Project Driveway on 190<sup>th</sup> St – WB right-in / SB right-out access only
- West Project Driveway on 190<sup>th</sup> St – One lane for EB left-in / WB right-in access, one exclusive lane for SB left-out access and one exclusive lane for SB right-out access.

**Attachments:**

1. City of Torrance Traffic Circulation Analysis Guidelines
2. Proposed Site Plan
3. Chick-fil-A (*Updated 9-30-21*) and Shake Shack Trip Generation Calculations
4. Proposed Project Trip Generation Tables
  - a. Gross and Net Project Trip Generations
5. Proposed Project Trip & Pass-By Distributions

# City of Torrance Traffic Circulation Analysis Guidelines

Attachment 1



## SCOPE OF WORK

If a TCA is required for a project, the applicant shall initiate the review process by sending a TCA Scope of Work to the City Traffic Engineer for approval.

The TCA Scope of Work must include the following information:

- Short description of the project
- Project opening year
- Site Plan showing proposed uses and corresponding square footage, number of floors, total building square footage, and site access points
- Trip Generation Table per ITE Trip Generation Manual
- Pass-by trip calculation, if any
- Internal capture calculation, if any
- Proposed study intersections
- Proposed Trip Distribution
- Proposed Traffic Counts (driveways and intersections, day/s of the week, and time)

TCA Report preparation, including traffic counts, shall not be initiated until the TCA Scope of Work has been approved by the City Traffic Engineer in writing.

## LEVEL-OF-SERVICE (LOS) ANALYSIS

Applicants shall use the [LA County Traffic Impact Analysis Report Guidelines](#) for general TCA format and requirements, with the exception of the requirements listed below. Two-lane residential roadways shall be assessed in general conformance with Section 2.3 of the [LA City Transportation Impact Study Guidelines](#).

A summary of TCA requirements is provided below:

- A Traffic Circulation Analysis is required when the project is expected to generate 500 or more trips per day. The applicant may be required to submit a Trip Generation Memo for to facilitate exemption review.
- Use the following Analysis Scenarios:
  - Existing (E)
  - Forecast Opening Year (E + Ambient Growth, A)
  - Forecast Opening Year with Project (E + A + P)
- The City may require Cumulative Project Analysis on a case-by-case basis. Specific directions will be given by the City during Scope of Work review.
- Traffic growth forecasts shall use a 0.525% annual growth rate (see [Growth Forecast Calculation](#)).
- For intersections under City of Torrance jurisdiction, a developer may be required to incorporate offsite work into the project to offset the project's negative effect in the City's traffic circulation when the following conditions are met:

Signalized Intersections (ICU Methodology)	
Pre-project LOS	Project V/C Increase
C	0.04 or more
D	0.02 or more
E/F	0.01 or more

Unsignalized Intersections	
Existing + Ambient Growth + Project HCM Methodology LOS	Signal Warrant Analysis Result
Degrades to E or F	Traffic signal is warranted

Two-Lane Residential Streets	
Projected ADT with Project	Project-Related Increase in ADT
0 to 999	120 or more
1,000 to 1,999	12% or more or final ADT
2,000 to 2,999	10% or more or final ADT
3,000 or more	8% or more or final ADT

- Improvements may also be required to address negative effects on intersections owned and operated by other agencies.

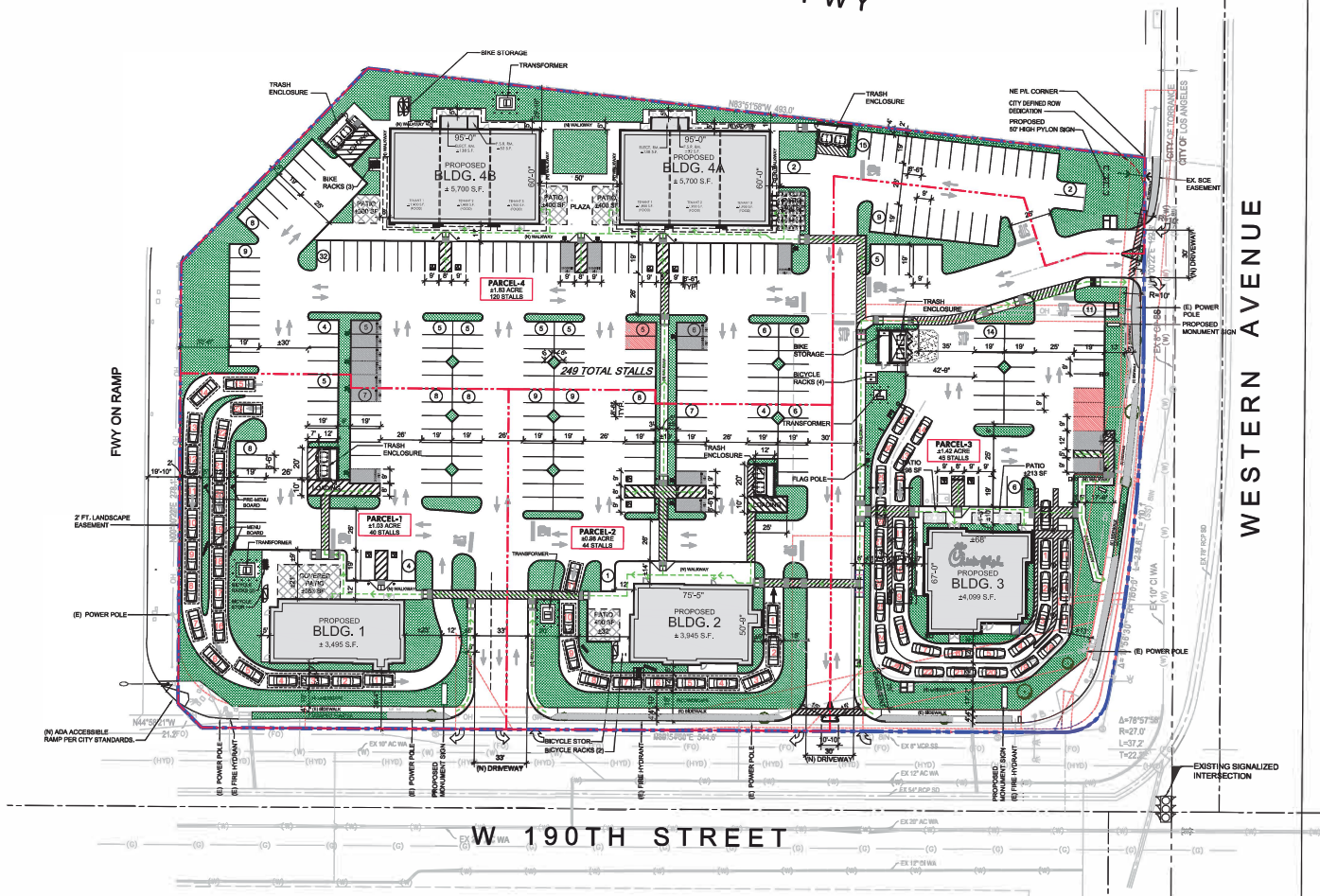
## Proposed Site Plan

# Attachment 2



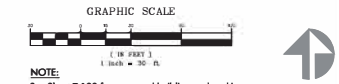


405 FWY



**LEGEND**

- EXISTING PROPERTY LINE
- HANDICAP INDICATION PATH OR TRAVEL
- NEW BUILDING
- EXISTING EASEMENTS
- PROPOSED PLANTER = ±-- S.F.
- EXISTING PLANTER = ±-- S.F.
- EV STATION VAN & STD, ACCESSIBLE STALL W/ CHARGER (16 STALLS)
- CLEAN AIR/ VANPOOL/ EV (EV READY, 5 STALLS)



**McKently Malak ARCHITECTS**  
 35 Hugus Alley Suite 200  
 Pasadena California 91103-3648  
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A PROJECT FOR:  
  
 3770 HIGHLAND AVE., SUITE 208  
 MANHATTAN BEACH, CA 90266  
 TEL (310) 545-8350

CONDITIONAL USE PERMIT

**COMMERCIAL CENTER**  
 190th Street & Western Avenue  
 Torrance, CA 90248

ISSUES / REVISIONS

No.	DATE	DESCRIPTION
2	10-26-2020	CONDITIONAL USE PERMIT RESUBMITAL

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 DATE: 08.02.2021  
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SHEET NUMBER:  
**SP-18**  
 BASED ON SCHEME SP-17

# Chick-fil-A & Shake Shack Trip Generation Calculation Tables

Attachment 3



Chick-fil-A Driveway Count Analysis

TMC Peak Hour - Western/190th

AM - Noon Totals				Noon - Midnight Totals					
Drwy 1 Tot	Drwy 2 Tot	Total		0	Drwy 1 Tot	Drwy 2 Tot	Total		
0:00	0	0	0		12:00	207	156	363	
0:15	0	0	0	11:30 am to 2:00 pm	12:15	200	186	386	12:00 AM
0:30	0	0	0		12:30	176	204	380	
0:45	7	6	13		12:45	167	216	383	
1:00	4	6	10		13:00	182	226	408	
1:15	2	2	4		13:15	181	219	400	
1:30	2	2	4		13:30	185	235	420	
1:45	2	2	4		<b>13:45</b>	<b>189</b>	<b>232</b>	<b>421</b>	
2:00	0	2	2	14:00	159	228	387	12:00 AM	
2:15	1	0	1	14:15	159	228	387		
2:30	1	1	2	14:30	163	199	362		
2:45	1	1	2	14:45	150	194	344		
3:00	1	1	2	15:00	154	186	340		
3:15	0	1	1	15:15	152	172	324		
3:30	1	0	1	15:30	154	172	326		
3:45	1	0	1	15:45	149	169	318		
4:00	1	0	1	16:00	145	166	311		
4:15	1	1	2	16:15	147	166	313		
4:30	1	1	2	16:30	144	152	296		
4:45	1	1	2	16:45	150	153	303		4:00 pm to 6:30 pm
5:00	2	1	3	17:00	166	140	306		
5:15	5	1	6	17:15	168	137	305		
5:30	6	2	8	<b>17:30</b>	<b>169</b>	<b>140</b>	<b>309</b>	<b>4:45 PM</b> TMC	
5:45	9	2	11	17:45	167	138	305		
6:00	12	5	17	18:00	154	167	321		
6:15	11	4	15	<b>18:15</b>	<b>154</b>	<b>179</b>	<b>333</b>	<b>5:30 PM</b> CFA	
6:30	25	8	33	18:30	154	170	324	12:00 AM	
6:45	35	23	58	18:45	163	159	322		
7:00	47	32	79	19:00	157	136	293		
7:15	64	50	114	19:15	150	127	277		
7:30	74	68	142	19:30	140	144	284		
7:45	79	73	152	19:45	128	147	275		
8:00	90	81	171	20:00	121	149	270		
8:15	91	80	171	20:15	115	164	279		
<b>8:30</b>	<b>101</b>	<b>81</b>	<b>182</b>	<b>7:45 AM TMC</b>	20:30	126	163		289
<b>8:45</b>	<b>112</b>	<b>83</b>	<b>195</b>	<b>8:00 AM CFA</b>	20:45	123	161		284
9:00	105	80	185	21:00	128	167	295		
9:15	109	88	197	21:15	121	155	276		
9:30	100	81	181	21:30	113	145	258		
9:45	90	79	169	21:45	117	149	266		
10:00	98	84	182	22:00	102	130	232		
10:15	111	83	194	22:15	87	115	202		
10:30	121	91	212	22:30	63	98	161		
10:45	142	108	250	22:45	34	68	102		
11:00	163	115	278	23:00	24	49	73		
11:15	173	117	290	23:15	18	28	46		
11:30	191	132	323	23:30	10	14	24		
11:45	204	139	343	23:45	11	6	17		

TMC - Peak Hour for Turning Movement Count at Western/190th

CFA - Peak Hour for Chick-fil-A

Chick-fil-A Weekday Trip Generation (Gross)

AM Peak Hour			MD Peak Hour			PM Peak Hour		
In	Out	Total	In	Out	Total	In	Out	Total
98	97	195	213	208	421	168	165	333

### Shake Shack with Drive-Through Trip Generation

Shake Shack Survey	Midday Peak Hour Trips			PM Peak Hour Trips			Daily Trips (MD is 11.8% of Daily) <sup>1</sup>
	In	Out	Total	In	Out	Total	
<b>Weekday</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	38	38	76	33	33	66	
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>61</b>	<b>61</b>	<b>122</b>	<b>38</b>	<b>38</b>	<b>76</b>	
<b>Saturday (for Queuing Analysis)</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	53	53	106	48	48	96	N/A <sup>2</sup>
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>85</b>	<b>85</b>	<b>170</b>	<b>55</b>	<b>55</b>	<b>111</b>	

<sup>1</sup> Per ITE Code 934, Fast-Food with Drive-Through Restaurant, Appendix A.

<sup>2</sup> Saturday evaluation for peak hour queuing analysis

## Proposed Project Trip Generation

- Gross Project Trip Generation
- Net Project Trip Generation



**Table: Proposed Project Trip Generation without Pass-By Trip Reduction**

Bldg	Proposed Business	ITE Land Use Code <sup>1,3</sup>	Gross Floor Area (sq. ft.)	Daily	AM Peak Hour (one hr 7-9am)			MD Peak Hr <sup>2</sup> (one hr 11am-1pm)			PM Peak Hour (one hr 4-6pm)		
					In	Out	Total	In	Out	Total	In	Out	Total
1	Shake Shack	934 : Fast-Food Restaurant w. Drive-Through Window	3,495	1,034	0	0	0	61	61	122	38	38	76
2	Panera Bread	934 : Fast-Food Restaurant w. Drive-Through Window	3,945	1,858	81	78	159	114	109	223	68	62	130
3	Chick-Fil-A	934 : Fast-Food Restaurant w. Drive-Through Window	4,099	3,568	98	97	195	213	208	421	168	165	333
4A	TBD	932 : High-Turnover (Sit-Down) Restaurant	5,700	640	32	26	58	44	35	79	35	22	57
4B	TBD	932 : High-Turnover (Sit-Down) Restaurant	5,700	640	32	26	58	44	35	79	35	22	57
<b>Project Trip Generation (without Pass-By Trips)</b>				<b>7,740</b>	<b>243</b>	<b>227</b>	<b>470</b>	<b>476</b>	<b>448</b>	<b>924</b>	<b>344</b>	<b>309</b>	<b>653</b>

<sup>1</sup> Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Ed. (2017); Code 934 used instead of 933 due to small data sample size.

<sup>2</sup> Midday peak hour trip generation calculated using percent of daily traffic rate from ITE Manual Appendix A.

<sup>3</sup> Shake Shack and Chick-Fil-A Trip Generation: Did not utilize ITE Trip Generation rates. See attached analysis and calculations

**Table: Proposed Net Project Trip Generation**

Bldg	Proposed Business	ITE Land Use Code <sup>1</sup>	Pass-By Trip Rate <sup>3</sup>	Gross Floor Area (sq. ft.)	Daily	AM Peak Hour (one hr 7-9am)		MD Peak Hr <sup>2</sup> (one hr 11am-1pm)		PM Peak Hour (one hr 4-6pm)		
						In	Out	Total	In	Out	Total	In
1	Shake Shack	934 : Fast-Food Restaurant w. Drive-Through Window	50%	3,495	517			49	49	19	19	38
2	Panera Bread	934 : Fast-Food Restaurant w. Drive-Through Window	50%	3,945	929	40	39	91	87	34	31	65
3	Chick-Fil-A	934 : Fast-Food Restaurant w. Drive-Through Window	50%	4,099	1,784	49	49	171	167	84	83	167
4A	TBD	932 : High-Turnover (Sit-Down) Restaurant	20%	5,700	512	25	20	35	28	28	17	45
4B	TBD	932 : High-Turnover (Sit-Down) Restaurant	20%	5,700	512	25	20	35	28	28	17	45
<b>Net New Project Trip Generation</b>						<b>4,254</b>	<b>139</b>	<b>128</b>	<b>267</b>	<b>193</b>	<b>167</b>	<b>360</b>

<sup>1</sup> Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Ed. (2017); Code 934 used instead of 933 due to small data sample size.

<sup>2</sup> Midday peak hour trip generation calculated using percent of daily traffic rate from ITE Manual Appendix A.

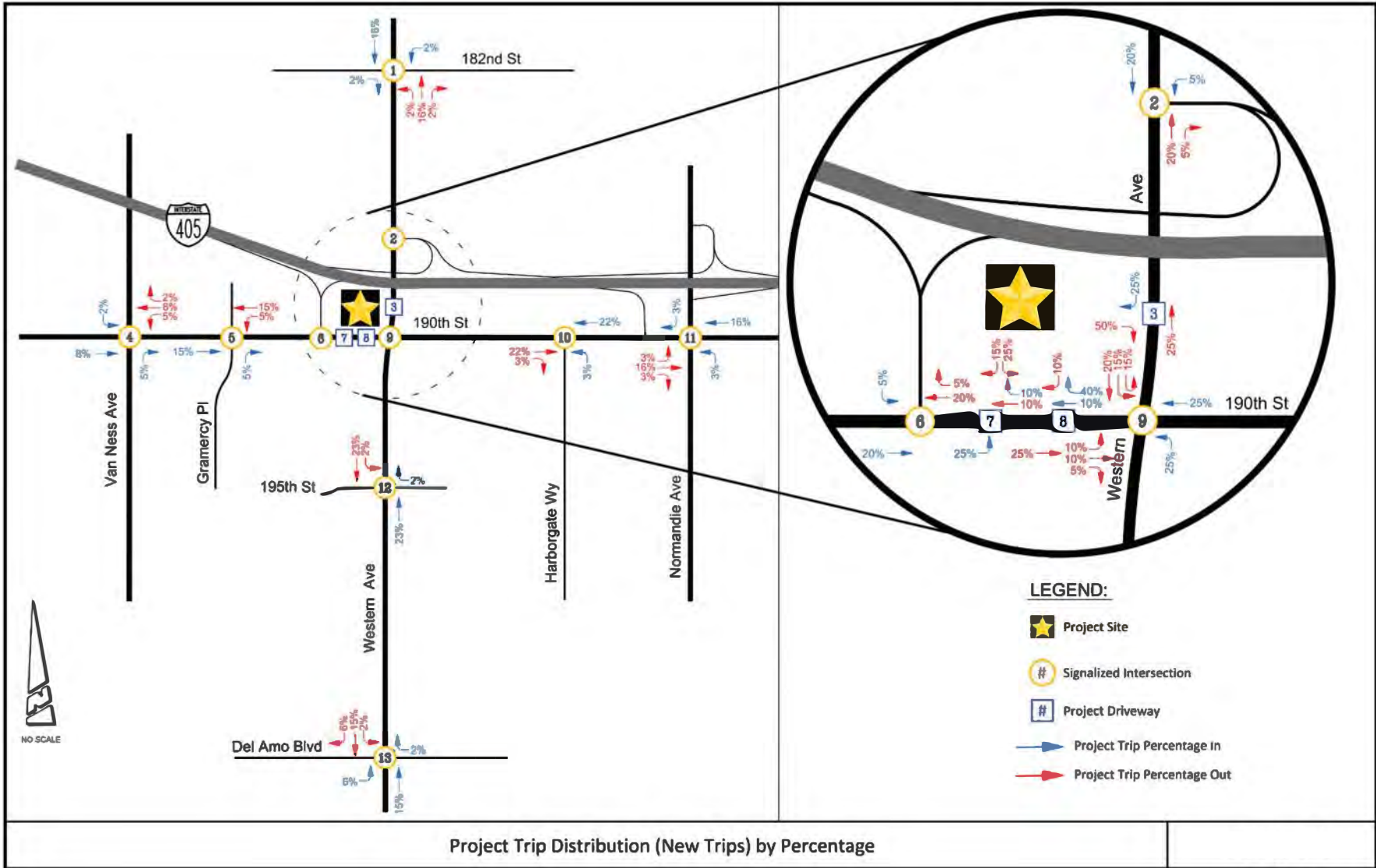
<sup>3</sup> 20% Pass-By Trip Rate was used for all land uses for the Midday peak hour

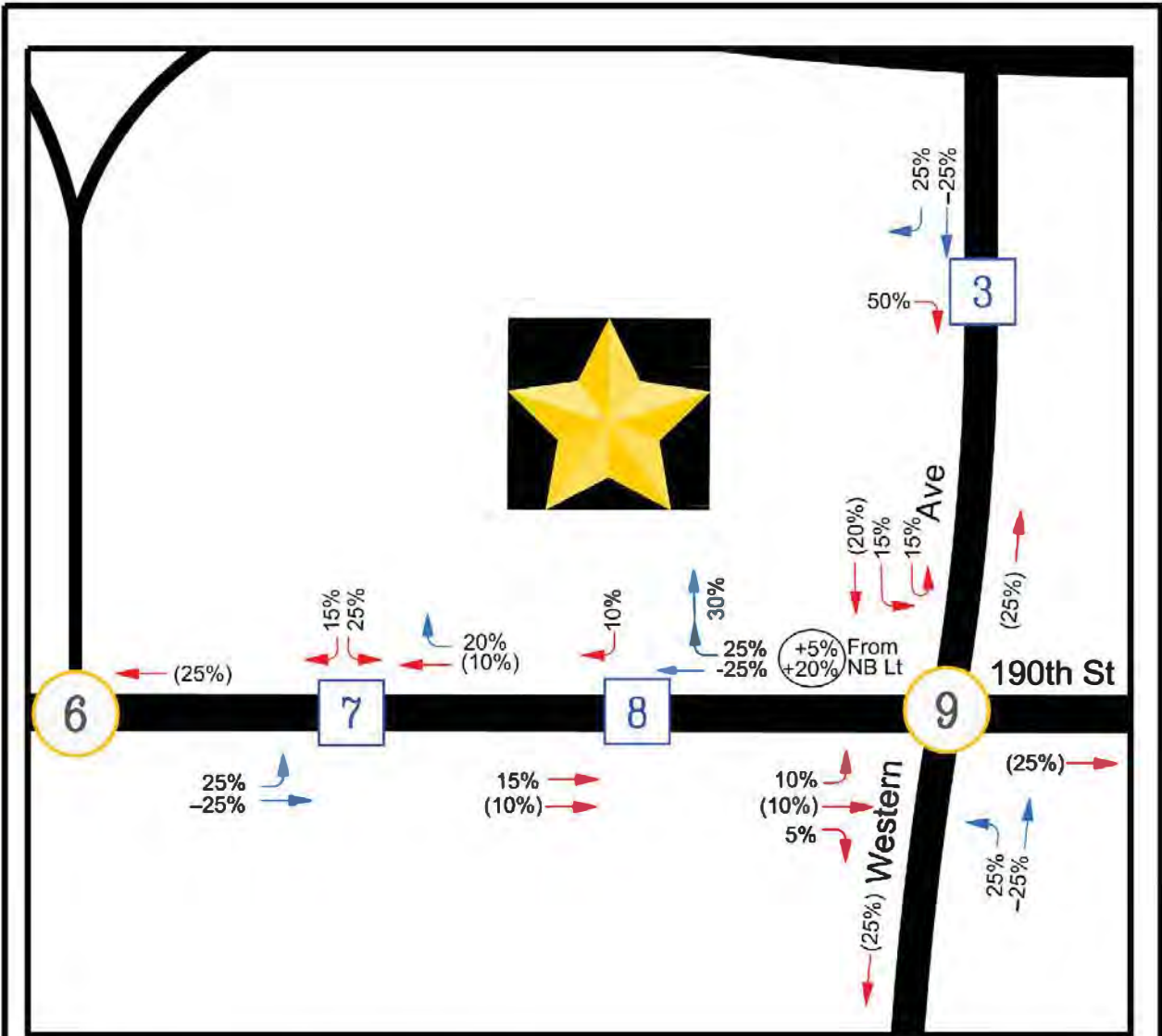
**Proposed Project & Pass-By Trip  
Distribution**

**Attachment 5**









**LEGEND:**



Project Site



Signalized Intersection



Project Driveway



Pass-By Trip In



Pass-By Trip Out

(XX%)

No New Trips From Pass-By

-XX%

Re-routed Pass-by Trips\*



NO SCALE

**Project Trip Distribution (Diverted/Pass-By Trips)  
by Percentage**

\*Negative numbers are vehicles that are pass-by trips re-routed to the project.

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **Shake Shack Trip Generation Analysis**
- **Chick-fil-A Trip Generation Analysis (Using  
2019 Driveway Count Data)**



190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **Shake Shack Trip Generation Analysis**





**MEMORANDUM**

**November 23, 2021**

To: Kattie Rounds, Kaidence

From: Greg Wong, Vice President, AGA Engineers, Inc. (AGA)

**Subject: Shake Shack With Drive-Through Trip Generation Analysis**

Trip generation analysis was conducted for the proposed Shake Shack with drive-through at the proposed Western/190<sup>th</sup> project. Since there are no existing Shake Shack restaurants with drive-through facilities, surveys were conducted at a Shake Shack without a drive-through; data from the original 190<sup>th</sup>/Western traffic study was used and data was obtained from Chick-fil-A corporation to develop a trip generation demand for the proposed Shake Shack with drive-through facility.

Shake Shack Survey and Trip Generation

In order to determine the trip generation of a Shake Shack with drive-through restaurant, a survey was initially conducted at a nearby Shake Shack restaurant (without drive-through) to determine a base trip generation. We then evaluated data from two Chick-fil-A restaurants in Torrance, one with a drive-through and one without a drive-through facility. Both Chick-fil-A restaurants are located on Hawthorne Boulevard and are approximately 2.5 miles away from each other. Sales data from both sites were evaluated to determine the increase in sales due to the drive-through. The increase in sales between the Chick-fil-A restaurants with drive-through and without drive-through will help determine the expected increase in trip generation for Shake Shack with drive-through facility using the Shake Shack without drive-through facility as a basis.

**Shake Shack Surveys – Shake Shack Without Drive-Through Trip Generation**

Surveys were conducted at the Shake Shack restaurant located on 2171 Rosecrans Avenue in the City of El Segundo. The surveys counted the number of people and groups entering and exiting the restaurant at the restaurant entry doors which included both types of patrons—walk-ins and those arriving by car. Another survey at the same time also counted the number of people and groups arriving to the restaurant by car. This survey counted the number of people and groups leaving from a parked car and entering the Shake Shack restaurant. It was assumed that the number of people and groups leaving their cars equal to the number of people and groups coming back to their cars within the peak hour (peak hour trips in = peak hour trips out). ITE trip generation rates for fast-food restaurants have more inbound trips than outbound trips. Therefore, having the outbound equal the inbound trips

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represents a higher than normal project trip generation. The difference between the restaurant door counts (total) and the parking counts equals the number of walk-ins. For trip generation purposes, each group from a car was evaluated as one trip. Since Shake Shack opens for business at 11:00 am, no morning surveys were conducted. In addition to the weekday peak hours that were evaluated in the traffic study, the surveys also included a Saturday evaluation as well. The surveys were conducted for the following days and time periods. All data from the surveys is attached and summarized in **Tables 1a and 1b**.

- Wednesday, June 30, 2021 11:00 am to 2:00 pm and 4:00 pm to 7:00 pm
- Saturday, July 10, 2021 11:00 am to 2:00 pm and 4:00 pm to 7:00 pm

Based on the surveys, the peak demand (number of groups/trips) occurs during the weekday midday period. During this time period, the door counts show that there were a total of 142 trips (in and out). This included 76 total trips via car and 66 total trips via walk-ins. There were significantly more number of walk-ins during the weekday periods than during the Saturday periods. This is due to the restaurant being located in a heavily dense office area. The higher Saturday trips via car can be attributed to the nearby movie theatre (open during this time) along with weekend retail shopping that is common in this area. The following tables show the summary of each of the surveys.

**Table 1a. Shake Shack Survey – Weekday**

Shake Shack Survey	Site Size	Midday Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Trips (Door Count)	3.64 kSF	66	76	142	51	50	101
Trips via Car (Parking Lot)		38	38	76	33	33	66
<b>Trips via Walk-Ins (Difference)</b>		<b>28</b>	<b>38</b>	<b>66</b>	<b>18</b>	<b>17</b>	<b>35</b>

**Table 1b. Shake Shack Survey – Saturday**

Shake Shack Survey	Site Size	Midday Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Trips (Door Count)	3.64 kSF	55	57	112	50	51	101
Trips via Car (Parking Lot)		53	53	106	48	48	96
<b>Trips via Walk-Ins (Difference)</b>		<b>2</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>5</b>

To assess what the trip generation for the Western/190<sup>th</sup> site would be, a baseline trip generation will need to be established. The proposed Shake Shack restaurant (3,495 SF) for this project is similar in size to the one surveyed (3,640 SF), therefore, no factoring of the trip generation was done in the analysis. The survey totals included both walk-ins and trips via cars. Since project trip generation only pertains to the number of vehicular trips, the trip generation for the Shake Shack without drive-through is 76 weekday midday peak hour trips, 66 weekday PM peak hour trips, 106 Saturday midday peak hour trips and 96 Saturday PM peak hour trips. In general, the trip generation is relatively low for all time periods. **Table 2a** shows the trip generation or baseline trip generation for the existing Shake Shack without drive-through. It should be noted that the proposed Shake Shack with drive-through site is also expected to have a large number of walk-in demand from the renovation of the previous Toyota site and therefore the percentage of walk-ins and trips via cars will be similar to the one surveyed.

**Table 2a. Shake Shack Without Drive-Through Trip Generation**

Shake Shack Survey	Midday Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
<b>Weekday</b>						
Trip Generation (Trips via Cars)	38	38	76	33	33	66
<b>Saturday</b>						
Trip Generation (Trips via Cars)	53	53	106	48	48	96

City staff also requested that a comparison of the ITE, Fast Casual Restaurant, Code 930, be evaluated with the results of the survey. The Shake Shack restaurant could be considered this type of land use as the menu does not coincide with either a fast-food restaurant or a sit-down restaurant. ITE Trip Generation Manual does not have any data for the midday period and there was only one case study conducted for each weekday AM peak hour and Saturday peak hour time periods. Therefore, only the PM peak hour was evaluated. The evaluation using ITE Code 930, showed 51 total PM peak hour trips (see **Table 2b**). Since the ITE Code 930 project trips are less than the surveyed data (66 PM peak hour trips), the surveyed data was utilized for this study. Daily trips were also not evaluated as there were only one case study data for each weekday and Saturday.

**Table 2b. ITE Code 930, Fast Casual Restaurant Trip Generation**

ITE 930, Fast Casual Restaurant	Project Size	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Trip Rates	3.64 kSF	--	--	--	7.772	6.359	14.130
Trips		--	--	--	28	23	51
<b>Total Trips</b>		--	--	--	28	23	<b>51</b>

Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition.  
 kSF – 1,000 square feet

**Shake Shack With Drive-Through Trip Generation**

As stated earlier, transaction data from two Chick-fil-A restaurants was obtained from Chick-fil-A corporate offices. It should be noted that exact transaction/sales information was not available, but the number of peak hour transactions (80<sup>th</sup> percentile) were provided. Chick-fil-A could not provide any other transaction data, but the data is consistent between the two restaurants and therefore is appropriate to use for comparison. The data from the two restaurants were evaluated to see what the difference in transactions are between a non-drive-through restaurant and a restaurant with drive-through. Both Chick-fil-A restaurants are approximately 4,300 SF and therefore there was no factoring based on the size of each restaurant included in the evaluation. Chick-fil-A provided data from October 2020 (month the traffic study queue analysis was conducted), May 2021 and June 2021, as well as pre-COVID data. The Chick-fil-A restaurant with drive-through only had drive-through transactions while the Chick-fil-A restaurant without drive-through had only walk-in transactions. The data (see **Table 3**) showed a consistently higher number of transactions for the Chick-fil-A without drive-through restaurant than the Chick-fil-A with drive-through restaurant. The higher transactions could be attributed to the location of the site without a drive-through. This location is across the street from the Del Amo Fashion Center and there could be trips associated with the mall. Pre-COVID data was also provided. The pre-COVID data was an average number of peak hour (80 percentile) transactions for a few months prior to March 2020. The number of transactions during COVID conditions were actually higher than pre-COVID. Dates were not provided for the pre-COVID data.





**Table 3. Chick-fil-A Transaction Information**

Chick-fil-A Site	Month	Year	Transaction Type		
			Carry-Out	Drive-Through	Dine-In
18200 Hawthorne Blvd With Drive-Through	October	2020	--	124	n/a
	May	2021	--	112	n/a
	June	2021	--	108	n/a
	Pre-Covid*		101 <i>(Total of Dine-In, Drive-Through and Carry-Out)</i>		
21821 Hawthorne Blvd Without Drive-Through	October	2020	194	n/a	n/a
	May	2021	198	n/a	n/a
	June	2021	201	n/a	n/a
	Pre-Covid*		165 <i>(Total of Dine-In and Carry-Out)</i>		

\* Pre-COVID Transaction Data is the average of the three months prior to March 2020.  
 Transactions – 80<sup>th</sup> Percentile of the Peak Hour  
 Square footage for both locations are similar, approximately 4,300 SF each.

Since there was a surprisingly higher number of transactions at the Chick-fil-A restaurant without drive-through, we analyzed another method to determine the Shake Shack drive-through trip generation. We utilized the difference between the ITE Trip Generation Manual (ITE) rate of a fast-food restaurant without drive-through and the rate of a fast-food restaurant with drive-through. Since the ITE rates do not provide a midday trip generation rate, the ITE AM trip generation rates were utilized. This is a conservative approach since the AM peak hour generally has greater demand for fast-food restaurants with drive-throughs. Per ITE, the AM and PM peak hour rates (total trips/kSF) for a fast-food restaurant without drive-through are 25.10 and 28.34, respectively. The ITE AM and PM peak hour rates for a fast-food restaurant with drive-through are 40.19 and 32.65, respectively. Based on these ITE rates, the rates for a fast food restaurant with drive-through are 60.1% higher during the AM peak hour and 15.2% higher for the PM peak hour than the fast food restaurant without drive-through. The AM percent difference is significantly higher between the two facility types. This could be attributed to the small sample size for the fast food restaurant without drive-through. ITE Trip Generation Manual shows that there were only five locations evaluated for this land use. Although the AM peak hour differences seem to be overstated, the percent difference was utilized since the ITE rates show an actual increase as expected with drive-through and the Chick-fil-A data did not. The increase percentages were applied

to the Shake Shack without drive-through trip generation (Table 2) to obtain a trip generation for the proposed Shake Shack with drive-through facility. Only the weekday peak hours were evaluated since the peak traffic demand near the project site occurs during the weekdays which is consistent with the original traffic study.

Based on the analysis, the proposed Shake Shack with drive-through restaurant is expected to generate a total of 122 weekday midday peak hour trips and 76 weekday PM peak hour trips. The same percentage increases were used for the Saturday analysis. Based on the Saturday analysis, it is expected that the Shake Shack with drive-through restaurant will generate 170 midday peak hour trips and 111 PM peak hour trips. For the daily trip evaluation, ITE Trip Generation Manual Code 930, Casual Fast Food restaurant, only has one case study for the daily trips. Therefore, ITE Code 934, Fast-Food Restaurant with Drive-Through was used to evaluate the daily trips. Utilizing the weekday midday peak hour (highest demand), the ITE Trip Generation Appendix A (see attached) shows the midday peak hour rate is 11.8% of the weekday daily rate. Using this percentage along with the calculated 170 midday peak hour trips, it is expected that the Shake Shack with drive-through will generate 1,034 weekday daily trips. The Saturday daily trips were not evaluated since that evaluation was considered for the maximum queuing analysis. **Tables 4a and 4b** show the comparison of the ITE rates and the trip generation calculation of the proposed Shake Shack with drive-through.

**Table 4a. ITE Fast Food Restaurant Without Drive-Through and With Drive-Through Comparison**

ITE Land Use (ITE Code #)	Trip Generation Peak Hour Total	
	AM Peak Hour	PM Peak Hour
Fast Food Restaurant <u>Without</u> Drive-Through (933)	25.10	28.34
Fast Food Restaurant <u>With</u> Drive-Through (934)	40.19	32.65
Percent Increase " <u>With</u> Drive-Through"	60.12%	15.21%

ITE Peak Hour Trip Rates above are per 1,000 square feet.

**Table 4b. Proposed Shake Shack With Drive-Through Trip Generation**

Shake Shack Survey	Midday Peak Hour Trips			PM Peak Hour Trips			Daily Trips (MD is 11.8% of Daily) <sup>1</sup>
	In	Out	Total	In	Out	Total	
<b>Weekday</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	38	38	76	33	33	66	
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>61</b>	<b>61</b>	<b>122</b>	<b>38</b>	<b>38</b>	<b>76</b>	<b>1,034</b>
<b>Saturday (for Queuing Analysis)</b>							
Trip Generation - Shake Shack <u>Without</u> Drive-Through	53	53	106	48	48	96	N/A <sup>2</sup>
Percent Increase <u>With</u> Drive-Through (from Table 4a)	60.12%			15.21%			
<b>Trip Generation - Proposed Shake Shack <u>With</u> Drive-Through</b>	<b>85</b>	<b>85</b>	<b>170</b>	<b>55</b>	<b>55</b>	<b>111</b>	

<sup>1</sup> Per ITE Trip Generation Appendix A - Code 934, Fast-Food with Drive-Through Restaurant is 11.8% of Daily Traffic (see attached)

<sup>2</sup>Saturday analysis required for only peak hour trip generation.

Attachments – Shake Shack Surveys 2021, ITE Trip Generation Manual Appendix A, Chick-fil-A Driveway Counts, Proposed Shake Shack Site Plan

## Shake Shack Surveys 2021

Attachment



### Shake Shack Survey - Weekday Afternoon

2171 Rosecrans Ave  
El Segundo, CA 90245

6/30/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
11:00 AM	3	1	0	0	2	1	0	0	1(2), 3(1)
11:15 AM	1	4	1	0	1	0	0	0	1(3), 2(2), 1(2)
11:30 AM	12	4	1	0	16	3	1	0	3(2), 10(1), 1(3)
11:45 AM	11	2	1	0	3	2	1	0	1(3), 4(1), 2(2)
12:00 PM	8	2	1	1(4)	5	2	0	0	3(1), 1(4), 1(3)
12:15 PM	8	1	4	0	5	2	2	0	6(1), 1(2), 1(3)
12:30 PM	13	1	0	0	12	2	1	1(4)	6(1), 1(2)
12:45 PM	8	4	2	0	5	5	3	0	4(1), 2(2), 2(3)
1:00 PM	13	3	0	1(4)	7	4	3	0	5(1), 1(4), 3(2)
1:15 PM	13	4	0	1(4), 1(5)	20	1	1	0	6(1), 3(2), 1(3), 1(4)
1:30 PM	12	2	0	2(4)	20	4	2	1(4)	5(1), 2(2), 1(3), 2(4)
1:45 PM	2	2	0	1(9)	11	1	0	1(5)	2(4), 2(2), 3(1)
TOTAL	104	30	10	7	107	27	14	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
4	3			4	
6	1			4	
17	20			14	
14	6	41	30	7	29
12	7	49	34	5	30
13	9	56	42	8	34
14	16	53	38	7	27
14	13	53	45	8	28
17	14	58	52	9	32
19	22	64	65	11	35
16	27	66	76	10	38
5	13	57	76	7	37

assume enter = exit (50/50)

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NOTES: 4 people were inside of the restaurant before 11 AM

	Pk Hr		Total
	Enter	Exit	
Pk Hr Total Entering and Exiting	66	76	142
Pk Hr from Veh Parking	38	38	76
Difference Pk Hr (A-C, B-C) = Walk-Ins	28	38	66

### Shake Shack Survey - Weekday PM

2171 Rosecrans Ave  
El Segundo, CA 90245

6/30/2021	Door Counts								Parking Counts
	(A) Entering Shake Shack				(B) Exiting Shake Shack				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	Group of 4/5 Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4/5 Exit	Vehicles parked for Shake Shack and (# of people)
4:00 PM	10	1	2	0	9	1	0	0	1(3), 5(1), 1(2)
4:15 PM	2	2	0	1(4)	5	4	0	0	1(2), 1(1)
4:30 PM	4	2	1	0	5	2	1	0	1(3), 2(2), 3(1)
4:45 PM	3	2	2	0	6	0	1	0	1(3), 1(2)
5:00 PM	7	2	2	0	8	1	1	1(4)	4(1), 1(2), 1(3)
5:15 PM	5	2	0	0	4	1	2	0	3(1), 2(2)
5:30 PM	7	4	1	0	6	3	0	0	5(1), 3(2), 1(3)
5:45 PM	11	1	2	0	9	2	1	0	7(1), 2(2)
6:00 PM	4	4	1	0	4	3	1	0	2(1), 2(2), 1(3)
6:15 PM	8	0	1	1(5)	7	3	1	0	6(1), 1(3)
6:30 PM	11	4	1	1(7)	12	3	1	0	3(3), 2(2), 1(4), 5(1)
6:45 PM	9	2	2	2	10	2	2	1(7)	4(1), 2(2), 2(3), 2(4)
<b>TOTAL</b>	<b>81</b>	<b>26</b>	<b>15</b>	<b>6</b>	<b>85</b>	<b>25</b>	<b>11</b>	<b>1</b>	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
13	10			7	
5	9			2	
7	8			6	
7	7	32	34	2	17
11	11	30	35	6	16
7	7	32	33	5	19
12	9	37	34	9	22
14	12	44	39	9	29
9	8	42	36	5	28
10	11	45	40	7	30
17	16	50	47	11	32
15	15	<b>51</b>	<b>50</b>	10	<b>33</b>

assume enter = exit (50/50)

	Pk Hr		Total
	Enter	Exit	
<b>Pk Hr Total Entering and Exiting</b>	<b>51</b>	<b>50</b>	<b>101</b>
<b>Pk Hr from Veh Parking</b>	<b>33</b>	<b>33</b>	<b>66</b>
<b>Difference Pk Hr (A-C, B-C) = Walk-Ins</b>	<b>18</b>	<b>17</b>	<b>35</b>

Prepared by AimTD LLC  
sc@aimtd.com

### Shake Shack Survey - Saturday Afternoon

2171 Rosecrans Ave  
El Segundo, CA 90245

7/10/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
11:00 AM	5	0	1	0	1	0	0	0	6(1), 1(3)
11:15 AM	5	0	0	1(5)	6	0	0	0	5(1), 1(5)
11:30 AM	6	8	0	1(4)	8	0	0	0	6(1), 1(4), 6(2)
11:45 AM	12	1	2	0	6	3	2	1(4)	11(1), 1(2), 2(3)
12:00 PM	4	6	4	0	8	4	3	0	4(1), 6(2), 4(3)
12:15 PM	7	3	2	1(5)	9	4	2	1(4)	7(1), 3(2), 2(3)
12:30 PM	8	1	2	2(4)	11	3	0	0	8(1), 1(2), 2(3), 2(4)
12:45 PM	4	1	2	0	6	3	1	0	4(1), 1(2), 2(3)
1:00 PM	8	3	2	0	6	3	3	1(4)	8(1), 3(2), 2(3)
1:15 PM	4	3	2	0	5	3	2	1(4)	4(1), 3(2),
1:30 PM	11	1	1	1(4)	4	5	2	0	10(1), 1(2), 1(3)
1:45 PM	5	3	0	1(4)	3	2	1	0	5(1), 3(2), 1(4)
TOTAL	79	30	18	7	73	30	16	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
6	1			7	
6	6			6	
15	8			13	
15	12	42	27	14	40
14	15	50	41	14	47
13	16	57	51	12	53
13	14	55	57	13	53
7	10	47	55	7	46
13	13	46	53	13	45
9	11	42	48	7	40
14	11	43	45	12	39
9	6	45	41	9	41

assume enter = exit (50/50)

Prepared by AimTD LLC  
714.253.7888  
cs@aimtd.com

	Pk Hr		Total
	Enter	Exit	
Pk Hr Total Entering and Exiting	55	57	112
Pk Hr from Veh Parking	53	53	106
Difference Pk Hr (A-C, B-C) = Walk-Ins	2	4	6

### Shake Shack Survey - Saturday PM

2171 Rosecrans Ave  
El Segundo, CA 90245

7/10/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
4:00 PM	2	2	2	0	1	1	1	1(4)	2(1), 2(2), 2(3)
4:15 PM	3	2	1	1(4)	1	1	0	0	3(1), 2(2), 1(3)
4:30 PM	5	2	1	1(4)	7	2	3	0	5(1), 2(1), 1(3), 1(4)
4:45 PM	11	0	0	0	8	3	1	0	7(1)
5:00 PM	9	4	1	4(4)	12	3	1	0	9(1), 4(2), 1(3), 3(4)
5:15 PM	9	4	0	1(5)	2	2	1	1(4)	8(1), 4(2), 1(5)
5:30 PM	8	0	1	1(4)	7	3	2	1(4)	8(1), 1(3), 1(4)
5:45 PM	4	2	0	2(4)	10	2	1	3(4)	4(1), 2(2), 2(4)
6:00 PM	8	2	2	1(4)	5	2	1	1(5)	7(1), 2(2), 2(3), 1(4)
6:15 PM	3	1	1	2(4)	8	3	1	4(4)	2(1), 1(2), 1(3), 2(4)
6:30 PM	5	2	3	0	7	4	0	3(4)	4(1), 2(2), 3(3)
6:45 PM	5	5	1	1(4)	6	4	4	0	5(1), 5(2), 1(3), 1(4)
TOTAL	72	26	13	7	74	30	16	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
6	4			6	
7	2			6	
9	12			9	
11	12	33	30	7	28
18	16	45	42	17	39
14	6	52	46	13	46
10	13	53	47	10	47
8	16	50	51	8	48
13	9	45	44	12	43
7	16	38	54	6	36
10	14	38	55	9	35
12	14	42	53	12	39

assume enter = exit (50/50)

Prepared by AimTD LLC  
714.253.7888  
cs@aimtd.com

	Pk Hr		
	Enter	Exit	Total
Pk Hr Total Entering and Exiting	50	51	101
Pk Hr from Veh Parking	48	48	96
Difference Pk Hr (A-C, B-C) = Walk-Ins	2	3	5



**ITE Trip Generation Manual, Appendix A  
Peak Hour, Percentage of Daily Traffic**

**Attachment**



Land Use	933 Fast-Food Restaurant without Drive-Through Window				934 Fast-Food Restaurant with Drive-Through Window							
	General Urban/Suburban		General Urban/Suburban				Dense Multi-Use Urban					
Setting	General Urban/Suburban		General Urban/Suburban				Dense Multi-Use Urban					
Time Period	Weekday		Weekday		Saturday		Sunday		Weekday		Saturday	
Trip Type	Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle	
# Data Sites	4		46		6		4		1		1	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
12:00	1.1	14.6	0.9	11.8	0.4	10.1	0.4	8.9	0.3	10.6	0.6	7.6
12:15	0.5	15.4	0.8	11.2	0.3	10.3	0.4	9.3	0.2	10.0	0.2	8.2
12:30	0.7	14.3	0.7	10.2	0.1	10.0	0.3	9.7	0.3	9.0	0.2	6.6
12:45	0.7	13.9	0.5	9.3	0.1	9.5	0.2	9.5	0.3	7.8	0.1	6.1
1:00	1.0	11.7	0.5	8.3	0.1	8.7	0.1	9.2	0.3	7.0	0.1	6.0
1:15	1.0	10.5	0.4	7.6	0.1	8.3	0.0	8.6	0.3	5.6	0.5	6.3
1:30	0.8	8.8	0.4	7.1	0.1	8.0	0.1	8.1	0.2	5.3	0.5	6.5
1:45	0.5	8.2	0.4	6.6	0.1	8.1	0.1	7.9	0.2	4.9	0.5	7.6
2:00	0.0	7.7	0.4	6.1	0.1	7.8	0.1	7.6	0.0	4.3	0.4	7.9
2:15	0.0	7.7	0.3	5.7	0.1	7.7	0.1	8.0	0.0	5.0	0.1	9.0
2:30	0.0	8.1	0.3	5.5	0.1	7.5	0.0	8.3	0.0	4.9	0.1	9.5
2:45	0.0	8.1	0.3	5.4	0.1	7.2	0.0	8.4	0.0	5.2	0.1	8.0
3:00	0.0	9.1	0.3	5.6	0.1	7.3	0.0	8.4	0.0	5.7	0.1	8.0
3:15	0.0	8.0	0.3	5.6	0.0	7.3	0.0	8.4	0.0	5.3	0.0	6.8
3:30	0.0	7.1	0.3	5.6	0.1	7.4	0.0	8.0	0.0	5.7	0.0	6.1
3:45	0.0	6.1	0.3	5.7	0.1	7.3	0.0	8.1	0.0	5.8	0.0	5.7
4:00	0.0	5.1	0.3	5.6	0.1	7.4	0.0	8.3	0.0	5.8	0.0	4.7
4:15	0.0	4.9	0.4	5.8	0.2	7.4	0.0	8.6	0.0	6.0	0.3	4.3
4:30	0.0	4.9	0.6	6.1	0.2	7.6	0.0	9.4	0.0	6.5	0.5	4.3
4:45	0.0	5.8	0.7	6.3	0.2	8.3	0.0	9.5	0.0	6.8	0.5	4.9
5:00	0.0	6.5	0.7	6.6	0.1	8.4	0.1	9.9	0.0	7.2	0.5	6.4
5:15	0.0	7.0	1.0	6.8	0.2	8.5	0.2	10.3	0.0	7.3	0.2	6.9
5:30	0.0	8.0	1.2	7.1	0.3	8.6	0.3	10.3	0.0	7.4	0.0	8.2
5:45	0.1	6.9	1.6	7.3	0.4	8.3	0.4	11.1	0.0	7.7	0.0	9.0
6:00	0.1	6.6	2.1	7.3	0.4	8.2	0.5	10.9	0.1	8.1	0.1	9.4
6:15	0.2	6.7	2.4	7.2	0.6	8.4	0.5	10.8	0.1	8.1	0.3	9.7
6:30	0.4	5.4	2.7	7.0	0.6	8.3	0.6	10.9	0.1	7.9	0.3	8.8
6:45	0.4	5.0	2.9	6.8	0.7	8.2	0.7	10.6	0.2	8.3	0.3	8.2
7:00	0.6	4.4	3.0	6.5	1.0	8.0	0.8	10.6	0.2	8.2	0.2	7.6
7:15	0.7	4.2	3.2	6.3	1.2	7.6	0.8	10.2	0.3	8.6	0.2	8.3
7:30	0.7	4.8	3.2	6.2	1.2	7.5	0.8	9.6	0.3	8.8	0.2	9.8
7:45	0.7	5.2	3.3	6.1	1.4	7.5	0.8	8.5	0.3	7.8	0.3	9.8
8:00	0.7	5.5	3.3	5.9	1.5	7.3	0.8	7.6	0.3	8.6	0.4	9.7
8:15	0.9	5.2	3.3	5.7	1.8	7.1	0.9	6.8	0.2	9.1	0.2	9.1
8:30	1.1	4.8	3.2	5.5	1.8	7.0	1.3	5.6	0.3	9.0	0.3	8.5
8:45	1.5	4.4	3.3	4.9	1.9	6.9	1.5	4.8	0.3	9.5	0.2	9.1
9:00	1.8	4.4	3.2	4.6	2.1	6.7	2.1	4.0	0.3	8.9	0.2	10.0
9:15	2.1	4.1	3.3	4.2	2.2	6.1	2.4	3.1	0.2	8.0	0.5	12.0
9:30	2.1	3.3	3.4	3.6	2.3	5.2	2.4	2.5	0.4	7.6	0.8	10.8
9:45	2.7	3.2	3.5	3.4	2.5	4.0	2.6	1.8	0.9	8.8	1.5	10.2
10:00	3.8	2.1	3.9	3.0	3.0	3.2	2.4	1.4	1.3	9.4	1.7	8.7
10:15	5.7	1.7	4.5	2.6	3.4	2.7	2.6	1.0	2.5	10.0	2.0	5.5
10:30	8.0	1.6	5.5	2.3	4.2	2.0	3.1	0.8	4.1	9.8	2.4	6.0
10:45	9.6	1.7	6.9	2.0	5.6	1.8	4.3	0.8	5.9	7.2	3.2	5.4
11:00	11.6	1.6	8.4	1.8	6.6	1.4	5.0	0.6	8.3	5.3	4.6	5.0
11:15	11.9	1.7	9.9	1.5	7.7	1.0	6.3	0.5	10.2	2.9	5.0	4.6
11:30	13.9	1.5	11.1	1.3	8.9	1.0	7.3	0.4	10.8	1.5	7.1	2.6
11:45	14.2	1.0	11.6	1.1	9.4	0.6	7.8	0.3	11.3	1.0	7.6	1.8

Percent of Daily Traffic During the 60-Minute Period Beginning at Displayed Time



## Chick-fil-A Drive-Through Surveys

Attachment



**Chick-fil-A**

18200 Hawthorne Blvd  
Torrance, CA 90504  
Thursday, 10/01/20

**Driveway Enter/Exit Volume Study**

Prepared by:  
AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	Driveway 1 (Hawthorne)		Combined (Driveway 1)	Driveway 2		Combined (Driveway 2)
	Enter	Exit		Enter	Exit	
11:00 AM	19	30	49	19	7	26
11:15 AM	24	29	53	20	7	27
11:30 AM	21	22	43	13	13	26
11:45 AM	21	30	51	24	12	36
<b>12:00 PM</b>	<b>20</b>	<b>38</b>	<b>58</b>	<b>24</b>	<b>8</b>	<b>32</b>
12:15 PM	23	30	53	10	2	12
12:30 PM	18	40	58	17	3	20
12:45 PM	15	26	41	17	5	22
1:00 PM	21	24	45	19	8	27
1:15 PM	13	24	37	14	13	27
1:30 PM	17	18	35	18	9	27
1:45 PM	9	30	39	17	5	22
4:00 PM	12	21	33	11	7	18
4:15 PM	6	11	17	15	8	23
4:30 PM	14	17	31	7	5	12
4:45 PM	20	16	36	14	6	20
5:00 PM	11	26	37	12	3	15
5:15 PM	16	22	38	12	4	16
5:30 PM	9	25	34	19	5	24
5:45 PM	18	27	45	13	1	14
<b>6:00 PM</b>	<b>15</b>	<b>28</b>	<b>43</b>	<b>9</b>	<b>1</b>	<b>10</b>
6:15 PM	15	23	38	12	0	12
<b>6:30 PM</b>	<b>13</b>	<b>32</b>	<b>45</b>	<b>17</b>	<b>0</b>	<b>17</b>
6:45 PM	8	25	33	17	1	18

Weekday Peak Hour Analysis								
Driveway 1 (Hawthorne)		Enter + Exit Driveway 1	Driveway 2		Enter + Exit Driveway 2	Driveway 1 + 2		
Enter	Exit		Enter	Exit		Enter	Exit	Total
19	30	49	19	7	26	38	37	75
43	59	102	39	14	53	82	73	155
64	81	145	52	27	79	116	108	224
85	111	196	76	39	115	161	150	311
<b>86</b>	<b>119</b>	<b>205</b>	<b>81</b>	<b>40</b>	<b>121</b>	<b>167</b>	<b>159</b>	<b>326</b>
85	120	205	71	35	106	156	155	311
82	138	220	75	25	100	157	163	320
76	134	210	68	18	86	144	152	296
77	120	197	63	18	81	140	138	278
67	114	181	67	29	96	134	143	277
66	92	158	68	35	103	134	127	261
60	96	156	68	35	103	128	131	259
51	93	144	60	34	94	111	127	238
44	80	124	61	29	90	105	109	214
41	79	120	50	25	75	91	104	195
52	65	117	47	26	73	99	91	190
51	70	121	48	22	70	99	92	191
61	81	142	45	18	63	106	99	205
56	89	145	57	18	75	113	107	220
54	100	154	56	13	69	110	113	223
58	102	160	53	11	64	<b>111</b>	<b>113</b>	<b>224</b>
57	103	160	53	7	60	110	110	220
<b>61</b>	<b>110</b>	<b>171</b>	<b>51</b>	<b>2</b>	<b>53</b>	<b>112</b>	<b>112</b>	<b>224</b>
51	108	159	55	2	57	106	110	216

**Chick-fil-A**

18200 Hawthorne Blvd  
Torrance, CA 90504  
Saturday, 10/17/20

**Driveway Enter/Exit Volume Study**

Prepared by:  
AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	Driveway 1 (Hawthorne)		Combined (Driveway 1)	Driveway 2		Combined (Driveway 2)
	Enter	Exit		Enter	Exit	
11:00 AM	15	23	38	12	16	28
11:15 AM	16	19	35	19	18	37
11:30 AM	18	17	35	21	11	32
11:45 AM	10	22	32	14	21	35
12:00 PM	21	18	39	28	11	39
12:15 PM	25	37	62	16	7	23
12:30 PM	20	30	50	23	4	27
<b>12:45 PM</b>	<b>19</b>	<b>33</b>	<b>52</b>	<b>21</b>	<b>4</b>	<b>25</b>
1:00 PM	22	29	51	14	7	21
1:15 PM	16	25	41	16	10	26
1:30 PM	21	37	58	30	10	40
1:45 PM	19	28	47	21	5	26
4:30 PM	18	16	34	13	6	19
4:45 PM	14	27	41	22	10	32
5:00 PM	14	26	40	8	8	16
5:15 PM	15	17	32	19	9	28
5:30 PM	12	20	32	16	9	25
5:45 PM	21	22	43	18	10	28
6:00 PM	13	21	34	14	5	19
6:15 PM	15	30	45	28	7	35
6:30 PM	12	28	40	18	12	30
6:45 PM	19	25	44	27	10	37
7:00 PM	13	30	43	17	10	27
<b>7:15 PM</b>	<b>25</b>	<b>30</b>	<b>55</b>	<b>18</b>	<b>8</b>	<b>26</b>

Saturday Peak Hour Analysis									
Driveway 1 (Hawthorne)		Enter + Exit Driveway 1	Driveway 2		Enter + Exit Driveway 2	Driveway 1 + 2			
Enter	Exit		Enter	Exit		Enter	Exit	Total	
15	23	38	12	16	28	27	39	66	
31	42	73	31	34	65	62	76	138	
49	59	108	52	45	97	101	104	205	
59	81	140	66	66	132	125	147	272	
65	76	141	82	61	143	147	137	284	
74	94	168	79	50	129	153	144	297	
76	107	183	81	43	124	157	150	307	
<b>85</b>	<b>118</b>	<b>203</b>	<b>88</b>	<b>26</b>	<b>114</b>	<b>173</b>	<b>144</b>	<b>317</b>	
86	129	215	74	22	96	160	151	311	
77	117	194	74	25	99	151	142	293	
78	124	202	81	31	112	159	155	314	
78	119	197	81	32	113	159	151	310	
74	106	180	80	31	111	154	137	291	
72	108	180	86	31	117	158	139	297	
65	97	162	64	29	93	129	126	255	
61	86	147	62	33	95	123	119	242	
55	90	145	65	36	101	120	126	246	
62	85	147	61	36	97	123	121	244	
61	80	141	67	33	100	128	113	241	
61	93	154	76	31	107	137	124	261	
61	101	162	78	34	112	139	135	274	
59	104	163	87	34	121	146	138	284	
59	113	172	90	39	129	149	152	301	
<b>69</b>	<b>113</b>	<b>182</b>	<b>80</b>	<b>40</b>	<b>120</b>	<b>149</b>	<b>153</b>	<b>302</b>	

**Proposed Shake Shack With Drive-Through  
Site Plan**

**Attachment**





A PROJECT FOR:



3770 HIGHLAND AVE., SUITE 208  
MANHATTAN BEACH, CA 90266  
TEL. (310) 545-8350

CONDITIONAL USE PERMIT

**COMMERCIAL CENTER**

190th Street & Western Avenue  
Torrance, CA 90248

ISSUES / REVISIONS

No.	DATE	DESCRIPTION
2	10-26-2020	CONDITIONAL USE PERMIT RESUBMITTAL

AS INSTRUMENTS OF SERVICE, ALL DESIGNS, IDEAS, AND INFORMATION SHOWN ON THESE DRAWINGS ARE AND SHALL REMAIN THE PROPERTY OF MCKENTLY + ASSOCIATES. NO PART THEREOF SHALL BE COPIED, DISCLOSED TO OTHERS, OR USED IN CONNECTION WITH ANY WORK OR PROJECT OTHER THAN THE SPECIFIC PROJECT FOR WHICH THEY HAVE BEEN PREPARED AND DEVELOPED WITHOUT THE WRITTEN CONSENT OF MCKENTLY + ASSOCIATES. VISUAL CONTACT WITH THESE DRAWINGS SHALL CONSTITUTE CONCLUSIVE EVIDENCE OF ACCEPTANCE OF THESE RESTRICTIONS.

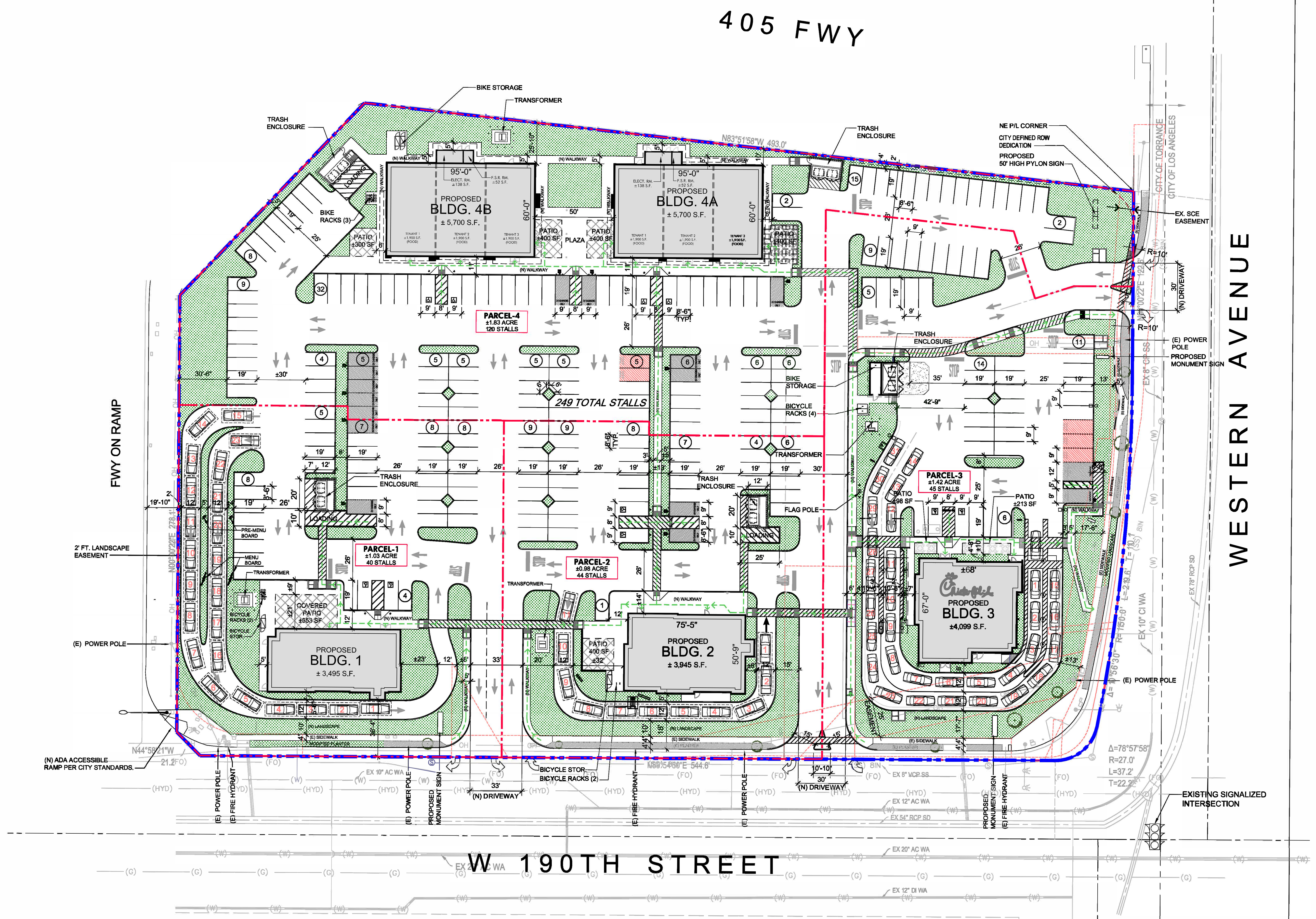
JOB NUMBER: 20099MMA  
DRAWN BY: CHECKED BY: H.M.  
DATE: 08.02.2021  
SHEET DESCRIPTION:

**PROPOSED SITE PLAN**

SHEET NUMBER:

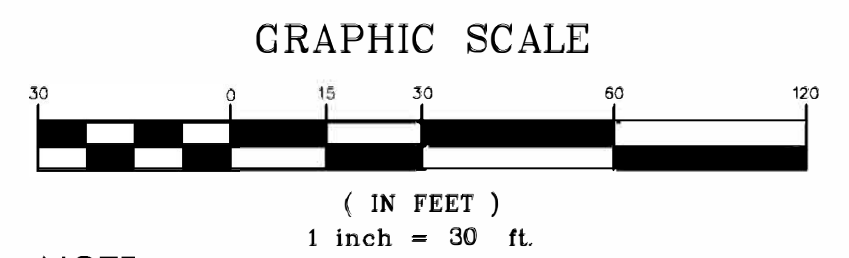
**SP-18**

BASED ON SCHEME SP-17



**LEGEND**

- EXISTING PROPERTY LINE
- HANDICAP INDICATION PATH OR TRAVEL
- NEW BUILDING
- EXISTING EASEMENTS
- PROPOSED PLANTER = ± S.F.
- EXISTING PLANTER = ± S.F.
- EV STATION VAN & STD. ACCESSIBLE STALL W/ CHARGER (16 STALLS)
- CLEAN AIR/ VANPOOL/ EV (EV READY, 5 STALLS)



NOTE:  
See Sheet T 100 for proposed building and parking summary.



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **Chick-fil-A Trip Generation Analysis (Using  
2019 Driveway Count Data)**





Day: Wednesday  
Date: 3/13/2019

Dwy 001/(18200 Hawthorne Blvd) & 182nd St

City: Torrance  
Project #: CA19\_5112\_001

DAILY TOTALS							IN	OUT				Total
							1,422	809				2,231
AM Period	IN	OUT		TOTAL	PM Period	IN	OUT		TOTAL		TOTAL	
0:00	1	4		5	12:00	30	22				52	
0:15	1	1		2	12:15	27	13				40	
0:30	0	0		0	12:30	19	12				31	
0:45	0	2	0	2	12:45	27	103	17	64		167	
1:00	1	1		2	13:00	43	24				67	
1:15	0	0		0	13:15	27	12				39	
1:30	0	0		0	13:30	24	11				35	
1:45	0	1	0	1	13:45	32	126	16	63		189	
2:00	0	0		0	14:00	21	16				37	
2:15	1	0		1	14:15	27	12				39	
2:30	0	0		0	14:30	25	14				39	
2:45	0	1	0	1	14:45	24	97	11	53		150	
3:00	0	0		0	15:00	20	21				41	
3:15	0	0		0	15:15	24	13				37	
3:30	1	0		1	15:30	30	11				41	
3:45	0	1	0	1	15:45	22	96	8	53		149	
4:00	0	0		0	16:00	22	15				37	
4:15	0	0		0	16:15	23	16				39	
4:30	1	0		1	16:30	22	16				38	
4:45	0	1	0	1	16:45	28	95	8	55		150	
5:00	1	0		1	17:00	29	24				53	
5:15	3	0		3	17:15	27	14				41	
5:30	2	0		2	17:30	24	15				39	
5:45	2	8	1	11	17:45	24	104	10	63		167	
6:00	2	2		4	18:00	24	16				40	
6:15	2	0		2	18:15	25	16				41	
6:30	11	5		16	18:30	21	18				39	
6:45	11	26	2	39	18:45	27	97	16	66		163	
7:00	10	6		16	19:00	23	11				34	
7:15	12	7		19	19:15	25	9				34	
7:30	17	9		26	19:30	18	11				29	
7:45	10	49	8	67	19:45	19	85	12	43		128	
8:00	16	11		27	20:00	20	7				27	
8:15	12	8		20	20:15	18	10				28	
8:30	23	13		36	20:30	24	16				40	
8:45	17	68	12	97	20:45	22	84	6	39		123	
9:00	12	8		20	21:00	18	14				32	
9:15	15	9		24	21:15	15	6				21	
9:30	19	8		27	21:30	19	13				32	
9:45	16	62	3	81	21:45	15	67	17	50		117	
10:00	15	13		28	22:00	10	7				17	
10:15	23	14		37	22:15	2	4				6	
10:30	24	13		37	22:30	4	4				8	
10:45	28	90	12	130	22:45	2	18	1	16		34	
11:00	30	19		49	23:00	2	5				7	
11:15	30	17		47	23:15	0	0				0	
11:30	38	17		55	23:30	0	0				0	
11:45	38	136	15	191	23:45	3	5	1	6		11	
<b>TOTALS</b>		445	238	683	<b>TOTALS</b>		977	571			1548	
<b>SPLIT %</b>		65.2%	34.8%	30.6%	<b>SPLIT %</b>		63.1%	36.9%			69.4%	

DAILY TOTALS							IN	OUT				Total
							1,422	809				2,231

AM Peak Hour	11:00	11:15		11:15	PM Peak Hour	13:00	12:15		13:00	
AM Pk Volume	136	71		207	PM Pk Volume	126	66		189	
Pk Hr Factor	0.895	0.807		0.941	Pk Hr Factor	0.733	0.688		0.705	
7 - 9 Volume	117	74	0	0	4 - 6 Volume	199	118	0	0	317
7 - 9 Peak Hour	8:00	8:00		8:00	4 - 6 Peak Hour	16:45	16:15		16:45	
7 - 9 Pk Volume	68	44	0	0	4 - 6 Pk Volume	108	64	0	0	169
Pk Hr Factor	0.739	0.846	0.000	0.000	Pk Hr Factor	0.931	0.667	0.000	0.000	0.797

Day: Wednesday  
Date: 3/13/2019

Hawthorne Blvd & Dwy 002/(18200 Hawthorne Blvd)

City: Torrance  
Project #: CA19\_5112\_002

DAILY TOTALS							IN	OUT					Total
							848	1,461					2,309
AM Period	IN	OUT			TOTAL	PM Period	IN	OUT			TOTAL		
0:00	0	0			0	12:00	22	24			46		
0:15	2	4			6	12:15	24	32			56		
0:30	0	0			0	12:30	30	28			58		
0:45	0	2	0	4	0	12:45	14	90	42	126	56	216	
1:00	0	0			0	13:00	17	39			56		
1:15	1	1			2	13:15	21	28			49		
1:30	0	0			0	13:30	30	44			74		
1:45	0	1	0	1	0	13:45	19	87	34	145	53	232	
2:00	0	0			0	14:00	21	31			52		
2:15	0	0			0	14:15	17	32			49		
2:30	0	1			1	14:30	14	31			45		
2:45	0	0	0	1	0	14:45	17	69	31	125	48	194	
3:00	0	0			0	15:00	18	26			44		
3:15	0	0			0	15:15	16	19			35		
3:30	0	0			0	15:30	18	27			45		
3:45	0	0			0	15:45	14	66	31	103	45	169	
4:00	0	0			0	16:00	10	31			41		
4:15	0	1			1	16:15	10	25			35		
4:30	0	0			0	16:30	18	13			31		
4:45	0	0	0	1	0	16:45	18	56	28	97	46	153	
5:00	0	0			0	17:00	8	20			28		
5:15	0	1			1	17:15	14	18			32		
5:30	0	1			1	17:30	17	17			34		
5:45	0	0	0	2	0	17:45	14	53	30	85	44	138	
6:00	2	1			3	18:00	19	38			57		
6:15	0	0			0	18:15	21	23			44		
6:30	5	0			5	18:30	8	17			25		
6:45	5	12	10	11	15	18:45	11	59	22	100	33	159	
7:00	4	8			12	19:00	9	25			34		
7:15	7	11			18	19:15	16	19			35		
7:30	9	14			23	19:30	14	28			42		
7:45	10	30	10	43	20	19:45	18	57	18	90	36	147	
8:00	7	13			20	20:00	17	19			36		
8:15	9	8			17	20:15	16	34			50		
8:30	5	19			24	20:30	12	29			41		
8:45	9	30	13	53	22	20:45	12	57	22	104	34	161	
9:00	6	11			17	21:00	15	27			42		
9:15	7	18			25	21:15	14	24			38		
9:30	7	10			17	21:30	11	20			31		
9:45	10	30	10	49	20	21:45	14	54	24	95	38	149	
10:00	5	17			22	22:00	3	20			23		
10:15	7	17			24	22:15	6	17			23		
10:30	11	14			25	22:30	4	10			14		
10:45	16	39	21	69	37	22:45	1	14	7	54	8	68	
11:00	6	23			29	23:00	0	4			4		
11:15	11	15			26	23:15	1	1			2		
11:30	12	28			40	23:30	0	0			0		
11:45	12	41	32	98	44	23:45	0	1	0	5	0	6	
<b>TOTALS</b>	<b>185</b>	<b>332</b>			<b>517</b>	<b>TOTALS</b>	<b>663</b>	<b>1129</b>			<b>1792</b>		
<b>SPLIT %</b>	<b>35.8%</b>	<b>64.2%</b>			<b>22.4%</b>	<b>SPLIT %</b>	<b>37.0%</b>	<b>63.0%</b>			<b>77.6%</b>		

DAILY TOTALS							IN	OUT					Total
							848	1,461					2,309
AM Peak Hour	11:45	11:30			11:45	PM Peak Hour	13:15	12:45			12:45		
AM Pk Volume	88	116			204	PM Pk Volume	91	153			235		
Pk Hr Factor	0.733	0.906			0.879	Pk Hr Factor	0.758	0.869			0.794		
7 - 9 Volume	60	96	0	0	156	4 - 6 Volume	109	182	0	0	291		
7 - 9 Peak Hour	7:30	8:00			8:00	4 - 6 Peak Hour	16:30	16:00			16:00		
7 - 9 Pk Volume	35	53	0	0	83	4 - 6 Pk Volume	58	97	0	0	153		
Pk Hr Factor	0.875	0.697	0.000	0.000	0.865	Pk Hr Factor	0.806	0.782	0.000	0.000	0.832		

**Drwy 1**

AM - Noon Totals			Noon - Midnight Totals		
In	Out	Total	In	Out	Total
			136	71	207
			133	67	200
			114	62	176
			103	64	167
			116	66	182
			116	65	181
			121	64	185
			126	63	189
			104	55	159
			104	55	159
			105	58	163
			97	53	150
			96	58	154
			93	59	152
			98	56	154
			96	53	149
			98	47	145
			97	50	147
			89	55	144
			95	55	150
			102	64	166
			106	62	168
			108	61	169
			104	63	167
			99	55	154
			97	57	154
			94	60	154
			97	66	163
			96	61	157
			96	54	150
			93	47	140
			85	43	128
			82	39	121
			75	40	115
			81	45	126
			84	39	123
			82	46	128
			79	42	121
			74	39	113
			67	50	117
			59	43	102
			46	41	87
			31	32	63
			18	16	34
			10	14	24
			8	10	18
			4	6	10
			5	6	11
2	5	7			
2	2	4			
1	1	2			
1	1	2			
1	1	2			
0	0	0			
1	0	1			
1	0	1			
1	0	1			
1	0	1			
0	0	0			
1	0	1			
1	0	1			
1	0	1			
1	0	1			
1	0	1			
1	0	1			
2	0	2			
5	0	5			
6	0	6			
8	1	9			
9	3	12			
8	3	11			
17	8	25			
26	9	35			
34	13	47			
44	20	64			
50	24	74			
49	30	79			
55	35	90			
55	36	91			
61	40	101			
68	44	112			
64	41	105			
67	42	109			
63	37	100			
62	28	90			
65	33	98			
73	38	111			
78	43	121			
90	52	142			
105	58	163			
112	61	173			
126	65	191			
136	68	204			

**Drwy 2**

AM - Noon Totals			Noon - Midnight Totals			
In	Out	Total	In	Out	Total	
			57	99	156	
			70	116	186	
			88	116	204	
			90	126	216	
			85	141	226	
			82	137	219	
			82	153	235	
			1:00 PM	87	145	232
			91	137	228	
			87	141	228	
			71	128	199	
			69	125	194	
			66	120	186	
			65	107	172	
			69	103	172	
			66	103	169	
			58	108	166	
			52	114	166	
			52	100	152	
			56	97	153	
			54	86	140	
			58	79	137	
			57	83	140	
			53	85	138	
			64	103	167	
			71	108	179	
			62	108	170	
			59	100	159	
			49	87	136	
			44	83	127	
			50	94	144	
			57	90	147	
			65	84	149	
			65	99	164	
			63	100	163	
			57	104	161	
			55	112	167	
			53	102	155	
			52	93	145	
			54	95	149	
			42	88	130	
			34	81	115	
			27	71	98	
			14	54	68	
			11	38	49	
			6	22	28	
			2	12	14	
			1	5	6	
2	4	6				
2	4	6				
1	1	2				
1	1	2				
1	1	2				
1	1	2				
0	0	0				
0	1	1				
0	1	1				
0	1	1				
0	1	1				
0	0	0				
0	0	0				
0	1	1				
0	1	1				
0	1	1				
0	1	1				
0	2	2				
0	2	2				
2	3	5				
2	2	4				
7	1	8				
12	11	23				
14	18	32				
21	29	50				
25	43	68				
30	43	73				
33	48	81				
35	45	80				
31	50	81				
30	53	83				
29	51	80				
27	61	88				
29	52	81				
30	49	79				
29	55	84				
29	54	83				
33	58	91				
39	69	108				
40	75	115				
44	73	117				
45	87	132				
41	98	139				

TMC Peak Hour - Western/190th

AM - Noon Totals				Noon - Midnight Totals			
	Drwy 1 Total	Drwy 2 Total	Total		Drwy 1 Total	Drwy 2 Total	Total
0:00				12:00	207	156	363
0:15				12:15	200	186	386
0:30				12:30	176	204	380
0:45	7	6	13	12:45	167	216	383
1:00	4	6	10	13:00	182	226	408
1:15	2	2	4	13:15	181	219	400
1:30	2	2	4	13:30	185	235	420
1:45	2	2	4	<b>13:45</b>	<b>189</b>	<b>232</b>	<b>421</b>
2:00	0	2	2	14:00	159	228	387
2:15	1	0	1	14:15	159	228	387
2:30	1	1	2	14:30	163	199	362
2:45	1	1	2	14:45	150	194	344
3:00	1	1	2	15:00	154	186	340
3:15	0	1	1	15:15	152	172	324
3:30	1	0	1	15:30	154	172	326
3:45	1	0	1	15:45	149	169	318
4:00	1	0	1	16:00	145	166	311
4:15	1	1	2	16:15	147	166	313
4:30	1	1	2	16:30	144	152	296
4:45	1	1	2	16:45	150	153	303
5:00	2	1	3	17:00	166	140	306
5:15	5	1	6	17:15	168	137	305
5:30	6	2	8	<b>17:30</b>	<b>169</b>	<b>140</b>	<b>309</b>
5:45	9	2	11	17:45	167	138	305
6:00	12	5	17	18:00	154	167	321
6:15	11	4	15	<b>18:15</b>	<b>154</b>	<b>179</b>	<b>333</b>
6:30	25	8	33	18:30	154	170	324
6:45	35	23	58	18:45	163	159	322
7:00	47	32	79	19:00	157	136	293
6:30 am to 9:00 am	7:15	64	50	19:15	150	127	277
	7:30	74	68	19:30	140	144	284
	7:45	79	73	19:45	128	147	275
	8:00	90	81	20:00	121	149	270
	8:15	91	80	20:15	115	164	279
	<b>8:30</b>	<b>101</b>	<b>81</b>	<b>182</b>	20:30	126	163
<b>8:45</b>	<b>112</b>	<b>83</b>	<b>195</b>	20:45	123	161	284
9:00	105	80	185	21:00	128	167	295
9:15	109	88	197	21:15	121	155	276
9:30	100	81	181	21:30	113	145	258
9:45	90	79	169	21:45	117	149	266
10:00	98	84	182	22:00	102	130	232
10:15	111	83	194	22:15	87	115	202
10:30	121	91	212	22:30	63	98	161
10:45	142	108	250	22:45	34	68	102
11:00	163	115	278	23:00	24	49	73
11:15	173	117	290	23:15	18	28	46
11:30	191	132	323	23:30	10	14	24
11:45	204	139	343	23:45	11	6	17

NEW TRIP GENERATION (GROSS)

	AM			MD			PM			Daily
	In	Out	Total	In	Out	Total	In	Out	Total	
SS	0	0	0	61	61	122	38	38	76	
Panera	81	78	159	114	109	223	68	62	130	
CFA	<b>98</b>	<b>97</b>	<b>195</b>	<b>213</b>	<b>208</b>	<b>421</b>	<b>168</b>	<b>165</b>	<b>333</b>	<b>4,540</b>
Bldg 4A	32	26	58	44	35	79	35	22	57	
Bldg 4B	32	26	58	44	35	79	35	22	57	
	243	227	470	476	448	924	344	309	653	

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **Count Data**
- **With Growth Calculations for both Year  
2021 and Year 2023**



190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **Count Data**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

- **Turning Movement Counts**
- **24-Hour Machine Counts**





**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Turning Movement Counts**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Western Avenue at 182<sup>nd</sup> Street**

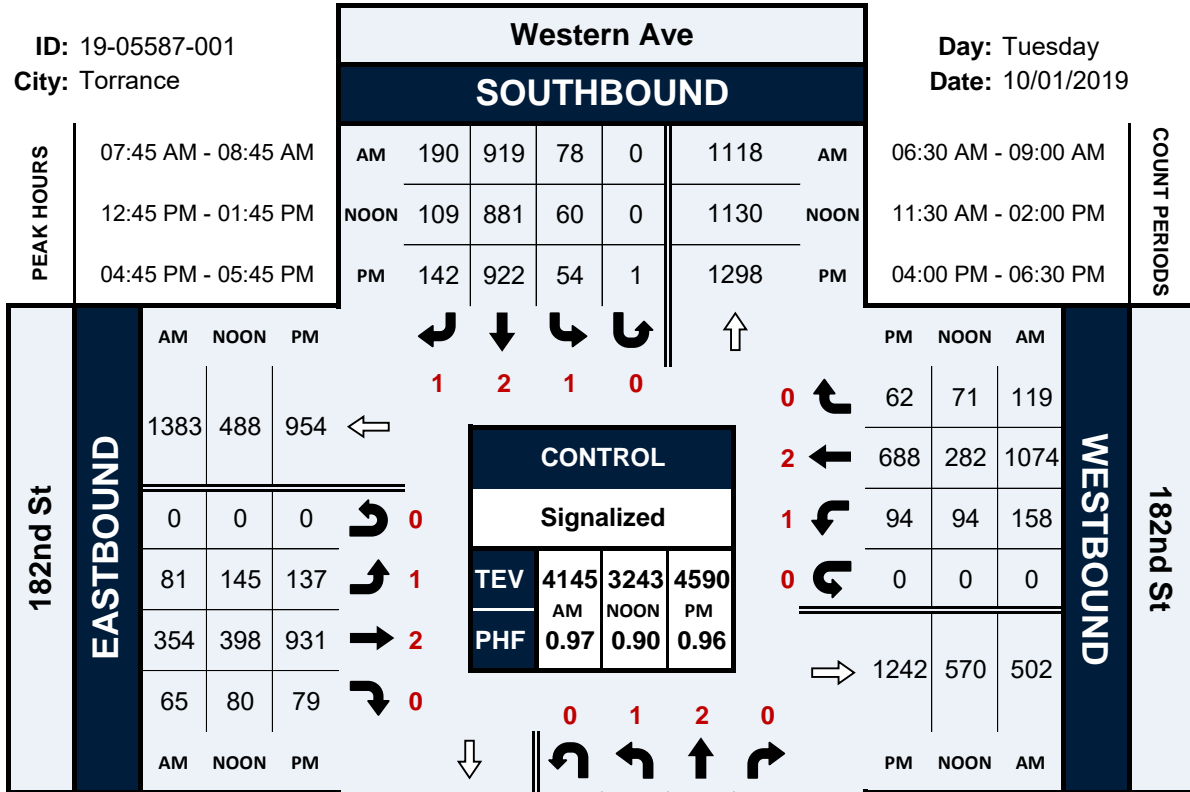


# Western Ave & 182nd St

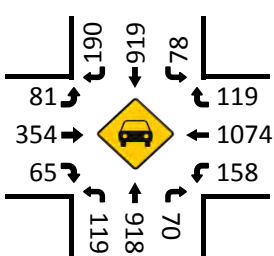
## Peak Hour Turning Movement Count

ID: 19-05587-001  
City: Torrance

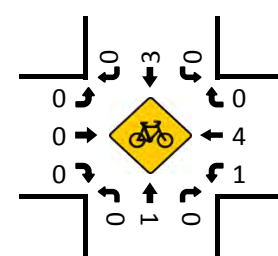
Day: Tuesday  
Date: 10/01/2019



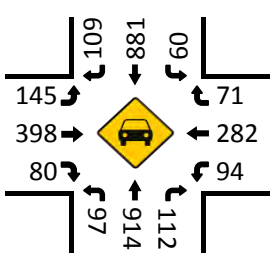
Total Vehicles (AM)



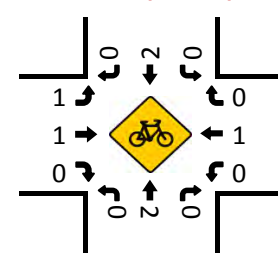
Bikes (AM)



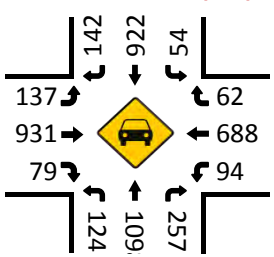
Total Vehicles (Noon)



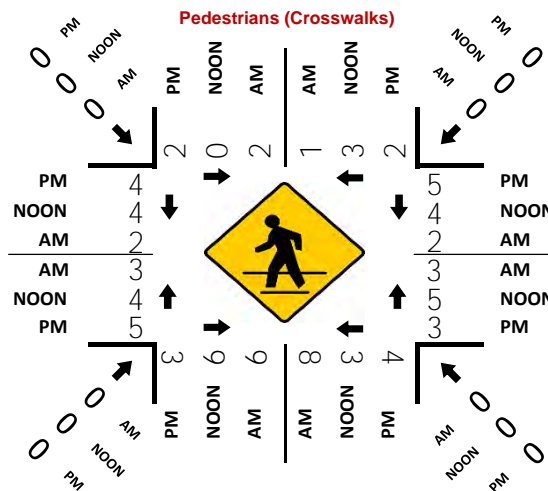
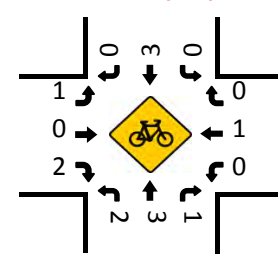
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & 182nd St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-001  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Western Ave				Western Ave				182nd St				182nd St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	1	0	1	2	0	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	22	164	13	0	5	112	28	0	12	47	3	0	21	169	12	0	608
6:45 AM	36	232	17	0	5	144	26	0	15	58	9	0	28	230	24	0	824
7:00 AM	29	170	15	0	5	154	32	0	19	45	10	0	36	229	13	0	757
7:15 AM	26	197	13	0	11	187	34	0	9	52	9	0	27	259	19	0	843
7:30 AM	26	224	23	0	22	219	42	0	14	104	12	0	35	262	25	0	1008
7:45 AM	26	254	18	0	40	220	47	0	19	89	9	0	39	227	47	0	1035
8:00 AM	26	213	21	0	17	244	50	0	18	98	19	0	50	265	41	0	1062
8:15 AM	29	222	11	0	17	207	42	0	25	80	16	0	40	275	16	0	980
8:30 AM	38	229	20	0	4	248	51	0	19	87	21	0	29	307	15	0	1068
8:45 AM	28	244	23	0	7	226	49	0	34	86	24	0	30	180	17	0	948
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	286	2149	174	0	133	1961	401	0	184	746	132	0	335	2403	229	0	9133
	10.96%	82.37%	6.67%	0.00%	5.33%	78.60%	16.07%	0.00%	17.33%	70.24%	12.43%	0.00%	11.29%	80.99%	7.72%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																
<b>PEAK HR VOL:</b>	119	918	70	0	78	919	190	0	81	354	65	0	158	1074	119	0	4145
<b>PEAK HR FACTOR:</b>	0.783	0.904	0.833	0.000	0.488	0.926	0.931	0.000	0.810	0.903	0.774	0.000	0.790	0.875	0.633	0.000	0.970
	0.929				0.954				0.926				0.949				

NS/EW Streets:	Western Ave				Western Ave				182nd St				182nd St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	1	0	1	2	0	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	21	199	21	0	13	150	34	0	40	62	20	0	24	70	18	0	672
11:45 AM	28	201	26	0	11	176	23	0	52	71	21	0	34	56	17	0	716
12:00 PM	31	254	18	0	10	165	36	0	44	85	24	0	19	78	15	0	779
12:15 PM	22	225	25	0	17	207	31	0	44	79	36	0	27	80	18	0	811
12:30 PM	19	220	20	0	7	163	31	0	36	74	22	0	30	70	27	0	719
12:45 PM	20	215	28	0	13	204	31	0	52	87	36	0	33	69	30	0	818
1:00 PM	23	239	23	0	12	235	21	0	20	80	14	0	10	55	8	0	740
1:15 PM	27	204	31	0	14	210	26	0	32	111	17	0	23	77	12	0	784
1:30 PM	27	256	30	0	21	232	31	0	41	120	13	0	28	81	21	0	901
1:45 PM	24	261	16	0	16	225	26	0	30	102	17	0	15	72	11	0	815
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	242	2274	238	0	134	1967	290	0	391	871	220	0	243	708	177	0	7755
	8.79%	82.57%	8.64%	0.00%	5.60%	82.27%	12.13%	0.00%	26.38%	58.77%	14.84%	0.00%	21.54%	62.77%	15.69%	0.00%	
<b>PEAK HR:</b>	<b>12:45 PM - 01:45 PM</b>																
<b>PEAK HR VOL:</b>	97	914	112	0	60	881	109	0	145	398	80	0	94	282	71	0	3243
<b>PEAK HR FACTOR:</b>	0.898	0.893	0.903	0.000	0.714	0.937	0.879	0.000	0.697	0.829	0.556	0.000	0.712	0.870	0.592	0.000	0.900
	0.897				0.924				0.890				0.847				

NS/EW Streets:	Western Ave				Western Ave				182nd St				182nd St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	1	0	1	2	0	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	15	243	38	0	24	262	35	0	32	209	22	0	34	94	20	0	1028
4:15 PM	28	248	72	0	18	200	21	0	33	244	21	0	15	100	18	0	1018
4:30 PM	24	270	56	0	13	191	20	0	41	236	24	0	28	99	19	0	1021
4:45 PM	35	293	53	0	12	218	39	0	40	228	21	0	23	151	10	0	1123
5:00 PM	31	248	53	1	14	225	30	0	31	226	20	0	22	159	17	0	1077
5:15 PM	29	280	72	0	11	228	40	0	27	255	17	0	23	190	20	0	1192
5:30 PM	29	277	79	0	17	251	33	1	39	222	21	0	26	188	15	0	1198
5:45 PM	26	258	55	0	10	210	18	0	30	224	15	0	21	180	20	0	1067
6:00 PM	27	256	42	0	18	224	27	0	35	210	24	0	30	148	17	0	1058
6:15 PM	31	242	31	0	9	223	31	0	28	185	28	0	23	135	17	0	983
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	275	2615	551	1	146	2232	294	1	336	2239	213	0	245	1444	173	0	10765
	7.99%	75.97%	16.01%	0.03%	5.46%	83.50%	11.00%	0.04%	12.05%	80.31%	7.64%	0.00%	13.16%	77.55%	9.29%	0.00%	
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>																
<b>PEAK HR VOL:</b>	124	1098	257	1	54	922	142	1	137	931	79	0	94	688	62	0	4590
<b>PEAK HR FACTOR:</b>	0.886	0.937	0.813	0.250	0.794	0.918	0.888	0.250	0.856	0.913	0.940	0.000	0.904	0.905	0.775	0.000	0.958
	0.961				0.926				0.959				0.906				

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & 182nd St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-001  
**Date:** 10/1/2019

### Bikes

NS/EW Streets:	Western Ave				Western Ave				182nd St				182nd St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:15 AM	0	1	0	0	0	3	0	0	0	0	0	0	0	1	0	0	5
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
7:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	1	3	0	0	6
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
8:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	5	0	0	0	6	0	0	0	1	0	0	1	7	0	0	20
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	12.50%	87.50%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	0	1	0	0	0	3	0	0	0	0	0	0	1	4	0	0	9
<b>PEAK HR FACTOR:</b>	0.000	0.250	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.333	0.000	0.000	0.375
	0.250				0.375				0.313								
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
12:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
12:30 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
12:45 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
1:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	4	0	0	0	6	0	0	1	3	0	0	0	5	0	0	19
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>12:45 PM - 01:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	0	2	0	0	0	2	0	0	1	1	0	0	0	1	0	0	7
<b>PEAK HR FACTOR:</b>	0.00	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.438
	0.250				0.250				0.500				0.250				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
5:00 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	3
5:30 PM	1	1	0	0	0	1	0	0	0	0	2	0	0	0	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	1	0	0	0	1	0	0	0	2	0	0	0	0	0	0	4
6:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	2	7	1	0	0	5	0	0	1	2	2	0	0	3	0	0	23
	20.00%	70.00%	10.00%	0.00%	0.00%	100.00%	0.00%	0.00%	20.00%	40.00%	40.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	2	3	1	0	0	3	0	0	1	0	2	0	0	1	0	0	13
<b>PEAK HR FACTOR:</b>	0.50	0.750	0.250	0.000	0.000	0.375	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.650
	0.750				0.375				0.375				0.250				

# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Western Ave & 182nd St  
City: Torrance

Project ID: 19-05587-001  
Date: 10/1/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Western Ave		Western Ave		182nd St		182nd St		TOTAL
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	3	1	0	1	0	0	3	8
6:45 AM	1	0	0	0	0	0	1	0	2
7:00 AM	1	0	1	1	0	2	0	0	5
7:15 AM	0	0	1	1	1	2	1	0	6
7:30 AM	2	0	0	0	1	0	0	2	5
7:45 AM	0	0	2	3	0	0	0	0	5
8:00 AM	0	1	2	3	3	2	1	1	13
8:15 AM	1	0	1	0	0	0	0	0	2
8:30 AM	1	0	4	2	0	0	2	1	10
8:45 AM	0	1	2	2	2	2	1	3	13
<b>TOTAL VOLUMES :</b>	6	5	14	12	8	8	6	10	69
<b>APPROACH %'s :</b>	54.55%	45.45%	53.85%	46.15%	50.00%	50.00%	37.50%	62.50%	
<b>PEAK HR :</b>	07:45 AM - 08:45 AM								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	2	1	9	8	3	2	3	2	30
<b>PEAK HR FACTOR :</b>	0.500	0.250	0.563	0.667	0.250	0.250	0.375	0.500	0.577
	0.750		0.708		0.250		0.417		

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	1	0	0	0	0	0	1	1	
11:45 AM	1	0	2	0	0	2	0	0	5
12:00 PM	0	0	3	2	2	3	0	1	11
12:15 PM	1	0	2	4	4	4	3	2	20
12:30 PM	0	0	0	1	0	2	0	0	3
12:45 PM	0	0	2	1	1	0	0	1	5
1:00 PM	0	1	5	0	3	2	1	1	13
1:15 PM	0	0	2	1	1	2	3	0	9
1:30 PM	0	2	0	1	0	0	0	2	5
1:45 PM	0	0	4	1	2	0	2	0	9
<b>TOTAL VOLUMES :</b>	3	3	20	11	13	15	10	8	83
<b>APPROACH %'s :</b>	50.00%	50.00%	64.52%	35.48%	46.43%	53.57%	55.56%	44.44%	
<b>PEAK HR :</b>	12:45 PM - 01:45 PM								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	3	9	3	5	4	4	4	32
<b>PEAK HR FACTOR :</b>		0.375	0.450	0.750	0.417	0.500	0.333	0.500	0.615
	0.375		0.600		0.450		0.667		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	1	0	0	0	1	2	
4:15 PM	2	0	0	2	0	0	1	0	5
4:30 PM	0	0	0	1	0	0	1	1	3
4:45 PM	0	0	1	0	1	0	0	0	2
5:00 PM	0	1	1	4	1	3	0	1	11
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	2	1	1	0	1	2	5	3	15
5:45 PM	2	1	1	2	0	0	0	1	7
6:00 PM	1	1	0	0	1	0	1	0	4
6:15 PM	2	0	0	1	0	3	2	0	8
<b>TOTAL VOLUMES :</b>	9	4	5	10	4	8	11	8	59
<b>APPROACH %'s :</b>	69.23%	30.77%	33.33%	66.67%	33.33%	66.67%	57.89%	42.11%	
<b>PEAK HR :</b>	04:45 PM - 05:45 PM								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	2	2	3	4	3	5	5	4	28
<b>PEAK HR FACTOR :</b>	0.250	0.500	0.750	0.250	0.750	0.417	0.250	0.333	0.467
	0.333		0.350		0.500		0.281		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Western Avenue at I-405 NB Ramps**

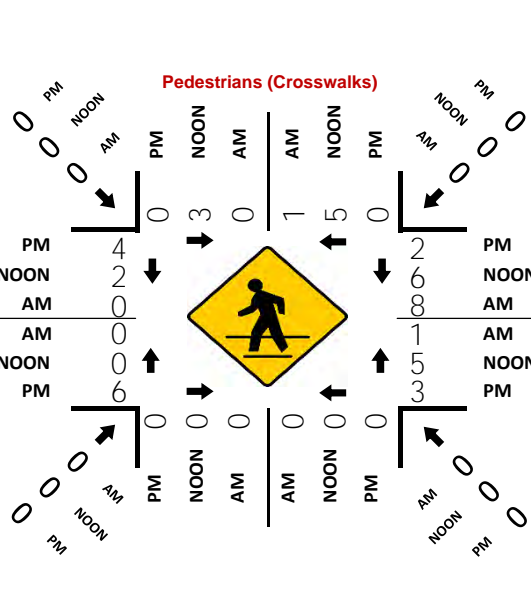
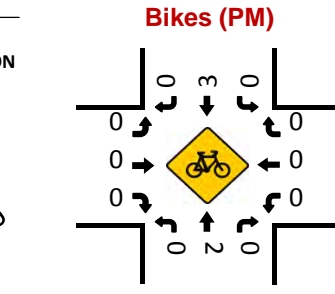
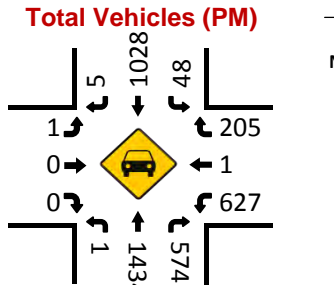
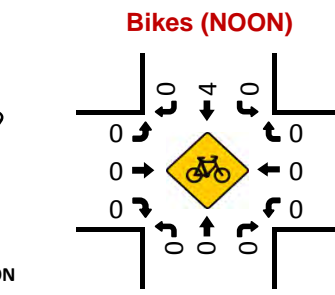
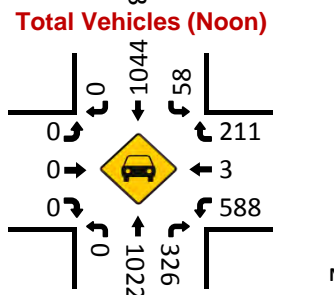
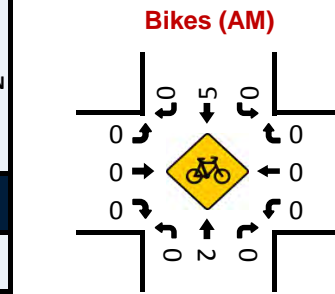
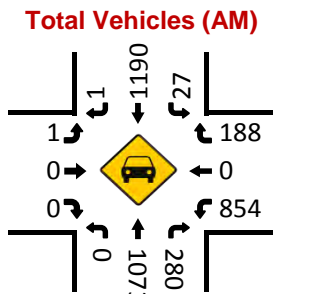
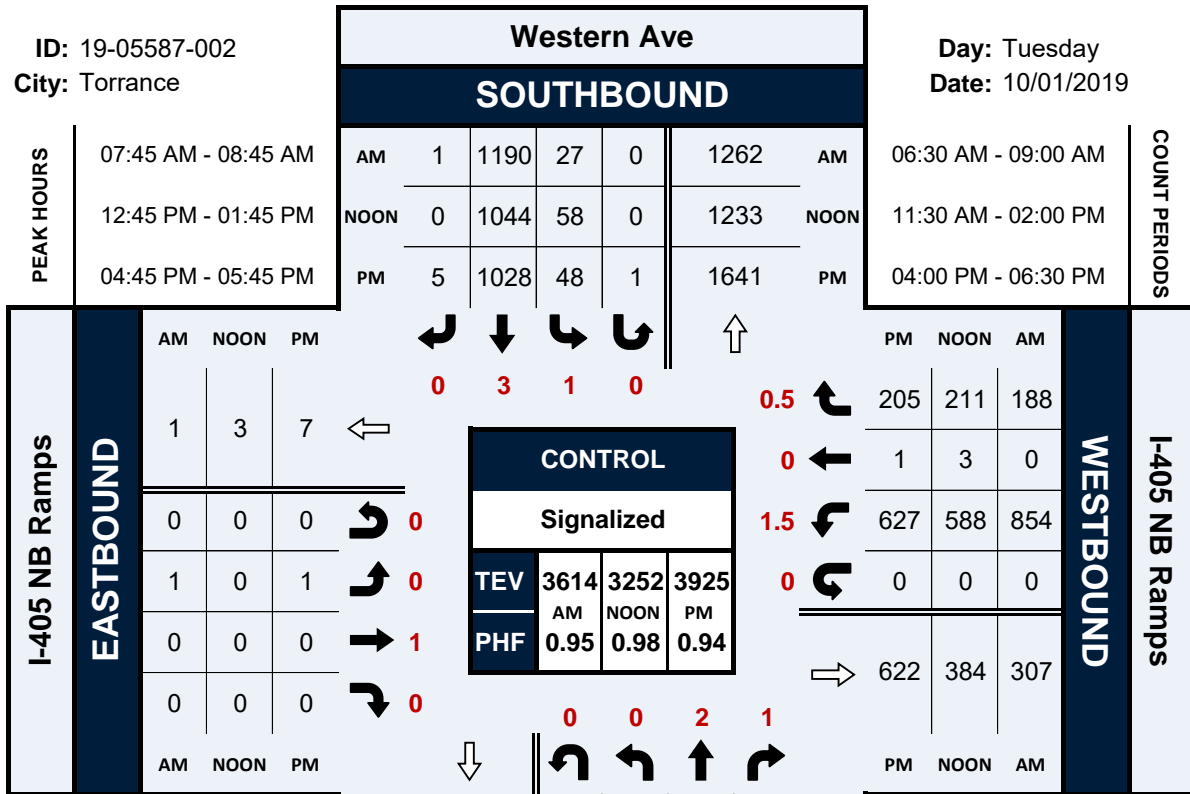


# Western Ave & I-405 NB Ramps

## Peak Hour Turning Movement Count

ID: 19-05587-002  
City: Torrance

Day: Tuesday  
Date: 10/01/2019





# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & I-405 NB Ramps  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-002  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Western Ave				Western Ave				I-405 NB Ramps				I-405 NB Ramps				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	144	40	0	6	124	2	0	0	0	0	0	152	0	78	0	546
6:45 AM	0	173	54	0	5	182	2	0	1	0	1	0	193	0	81	0	692
7:00 AM	0	193	64	0	9	187	0	0	1	0	0	0	200	0	59	0	713
7:15 AM	1	222	66	0	5	233	0	2	0	0	0	0	179	0	48	0	756
7:30 AM	0	273	79	0	5	273	0	0	0	0	0	0	198	0	44	0	872
7:45 AM	0	312	91	0	8	279	0	0	0	0	0	0	208	0	50	0	948
8:00 AM	0	272	60	0	6	347	1	0	0	0	0	0	220	0	36	0	942
8:15 AM	0	240	62	0	5	271	0	0	0	0	0	0	206	0	46	0	830
8:30 AM	0	249	67	0	8	293	0	0	1	0	0	0	220	0	56	0	894
8:45 AM	0	247	68	0	7	267	1	0	0	0	1	0	182	0	54	0	827
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	1	2325	651	0	64	2456	6	2	3	0	2	0	1958	0	552	0	8020
	0.03%	78.10%	21.87%	0.00%	2.53%	97.15%	0.24%	0.08%	60.00%	0.00%	40.00%	0.00%	78.01%	0.00%	21.99%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>				27	1190	1	0	1	0	0	0	854	0	188	0	TOTAL
<b>PEAK HR VOL:</b>	0	1073	280	0	0.844	0.857	0.250	0.000	0.250	0.000	0.000	0.000	0.970	0.000	0.839	0.000	3614
<b>PEAK HR FACTOR:</b>	0.000	0.860	0.769	0.000	0.860	0.250	0.000	0.000	0.250	0.000	0.250	0.000	0.944	0.000	0.839	0.000	0.953

NS/EW Streets:	Western Ave				Western Ave				I-405 NB Ramps				I-405 NB Ramps				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
NOON	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	0	247	64	0	11	184	0	0	0	0	0	0	121	1	51	0	679
11:45 AM	0	247	80	0	14	214	0	0	0	0	0	0	125	0	60	0	740
12:00 PM	1	289	76	1	15	218	0	0	0	0	0	0	156	0	48	0	804
12:15 PM	0	252	76	0	9	257	0	0	0	0	0	0	117	0	50	0	761
12:30 PM	1	282	81	0	13	233	0	0	0	0	1	0	136	0	55	0	802
12:45 PM	0	236	85	0	18	281	0	0	0	0	0	0	148	0	63	0	831
1:00 PM	0	267	82	0	18	263	0	0	0	0	0	0	131	0	49	0	810
1:15 PM	0	242	78	0	11	255	0	0	0	0	0	0	153	3	40	0	782
1:30 PM	0	277	81	0	11	245	0	0	0	0	0	0	156	0	59	0	829
1:45 PM	0	235	72	0	25	263	0	0	0	0	0	0	169	1	55	0	820
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	2	2574	775	1	145	2413	0	0	0	0	1	0	1412	5	530	0	7858
	0.06%	76.79%	23.12%	0.03%	5.67%	94.33%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	72.52%	0.26%	27.22%	0.00%	
<b>PEAK HR:</b>	<b>12:45 PM - 01:45 PM</b>				58	1044	0	0	0	0	0	0	588	3	211	0	TOTAL
<b>PEAK HR VOL:</b>	0	1022	326	0	0.806	0.929	0.000	0.000	0.000	0.000	0.000	0.000	0.942	0.250	0.837	0.000	3252
<b>PEAK HR FACTOR:</b>	0.000	0.922	0.959	0.000	0.921	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.933	0.250	0.837	0.000	0.978

NS/EW Streets:	Western Ave				Western Ave				I-405 NB Ramps				I-405 NB Ramps				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	308	113	0	13	264	0	0	1	0	0	0	161	2	53	0	915
4:15 PM	0	331	106	0	11	226	1	0	0	0	0	0	155	0	50	0	880
4:30 PM	0	311	104	0	8	210	0	0	0	0	0	0	184	0	67	0	884
4:45 PM	1	385	123	0	13	249	0	0	0	0	0	0	165	0	59	0	995
5:00 PM	0	335	137	0	13	247	1	0	0	0	0	0	164	1	49	0	947
5:15 PM	0	408	179	0	11	260	1	0	1	0	0	0	140	0	47	0	1047
5:30 PM	0	306	135	0	11	272	3	1	0	0	0	0	158	0	50	0	936
5:45 PM	1	333	138	0	12	239	1	0	1	0	0	0	143	0	43	0	911
6:00 PM	0	248	112	0	18	234	0	0	1	0	0	0	170	0	60	0	843
6:15 PM	0	294	110	0	9	288	0	0	1	0	0	0	153	0	46	0	901
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	2	3259	1257	0	119	2489	7	1	5	0	0	0	1593	3	524	0	9259
	0.04%	72.13%	27.82%	0.00%	4.55%	95.15%	0.27%	0.04%	100.00%	0.00%	0.00%	0.00%	75.14%	0.14%	24.72%	0.00%	
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>				48	1028	5	1	1	0	0	0	627	1	205	0	TOTAL
<b>PEAK HR VOL:</b>	1	1434	574	0	0.923	0.945	0.417	0.250	0.250	0.000	0.000	0.000	0.950	0.250	0.869	0.000	3925
<b>PEAK HR FACTOR:</b>	0.250	0.879	0.802	0.000	0.943	0.250	0.000	0.250	0.250	0.000	0.250	0.000	0.930	0.250	0.869	0.000	0.937

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & I-405 NB Ramps  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-002  
**Date:** 10/1/2019

### Bikes

NS/EW Streets:	Western Ave				Western Ave				I-405 NB Ramps				I-405 NB Ramps				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	3	0	0	0	1	0	0	1.5	0	0.5	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s :</b>	0	4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	9
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	2	0	0	0	5	0	0	0	0	0	0	0	0	0	0	7
<b>PEAK HR FACTOR :</b>	0.000	0.250	0.000	0.000	0.000	0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.350
	0.250				0.417												
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	3	0	0	0	1	0	0	1.5	0	0.5	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s :</b>	0	4	0	0	0	6	0	0	0	0	0	0	0	0	0	0	10
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
<b>PEAK HR :</b>	<b>12:45 PM - 01:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4
<b>PEAK HR FACTOR :</b>	0.00	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.333
	0.333																
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	3	0	0	0	1	0	0	1.5	0	0.5	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s :</b>	0	6	0	0	0	5	0	0	0	0	0	0	0	0	0	0	11
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5
<b>PEAK HR FACTOR :</b>	0.00	0.500	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.417
	0.500				0.375												

# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Western Ave & I-405 NB Ramps  
City: Torrance

Project ID: 19-05587-002  
Date: 10/1/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Western Ave		Western Ave		I-405 NB Ramps		I-405 NB Ramps		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	0	0	0	2	0	0	2
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	1	0	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	1	0	0	0	0	2	0	0	3
7:45 AM	0	1	0	0	1	4	0	0	6
8:00 AM	0	0	0	0	0	2	0	0	2
8:15 AM	0	0	0	0	0	2	0	0	2
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	1	1	0	0	1	12	1	0	16
	50.00%	50.00%			7.69%	92.31%	100.00%	0.00%	
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>				1	8	0	0	TOTAL
<b>PEAK HR VOL :</b>	0	1	0	0	0.250	0.500	0	0	10
<b>PEAK HR FACTOR :</b>	0.250				0.450		0.250		0.417

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	0	0	1	3	0	0	4
11:45 AM	0	0	0	0	2	0	1	0	3
12:00 PM	0	0	0	0	1	2	0	0	3
12:15 PM	1	0	0	0	1	0	1	0	3
12:30 PM	1	3	0	0	1	0	0	0	5
12:45 PM	0	4	0	0	2	0	0	2	8
1:00 PM	0	0	0	0	2	0	0	0	2
1:15 PM	0	0	0	0	1	2	0	0	3
1:30 PM	3	1	0	0	0	4	0	0	8
1:45 PM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	5	8	0	0	11	11	2	2	39
	38.46%	61.54%			50.00%	50.00%	50.00%	50.00%	
<b>PEAK HR :</b>	<b>12:45 PM - 01:45 PM</b>				5	6	0	2	TOTAL
<b>PEAK HR VOL :</b>	3	5	0	0	0.625	0.375	0	0.250	21
<b>PEAK HR FACTOR :</b>	0.500				0.688		0.250		0.656

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	1	1
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	2	0	3	0	5
5:00 PM	0	0	0	0	0	2	1	3	6
5:15 PM	0	0	0	0	1	0	1	0	2
5:30 PM	0	0	0	0	0	0	1	1	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	2	0	0	1	3
6:15 PM	0	1	0	0	0	2	0	0	3
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	0	1	0	0	6	4	6	6	23
	0.00%	100.00%			60.00%	40.00%	50.00%	50.00%	
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>				3	2	6	4	TOTAL
<b>PEAK HR VOL :</b>	0	0	0	0	0.375	0.250	0.500	0.333	15
<b>PEAK HR FACTOR :</b>					0.625		0.625		0.625

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

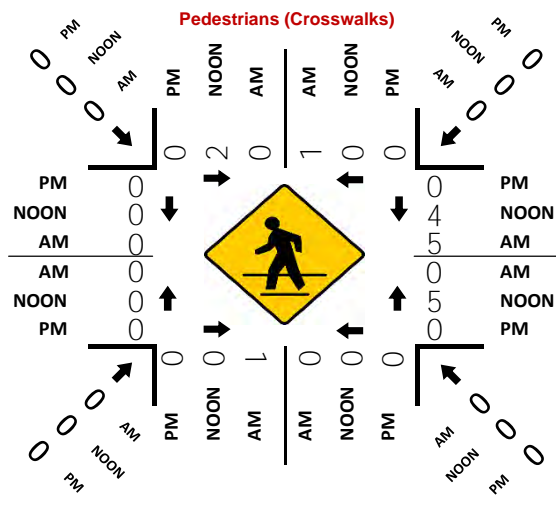
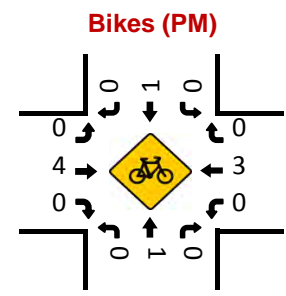
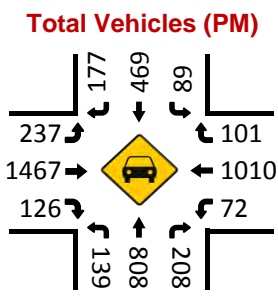
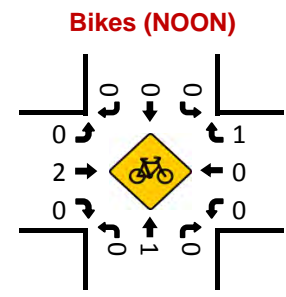
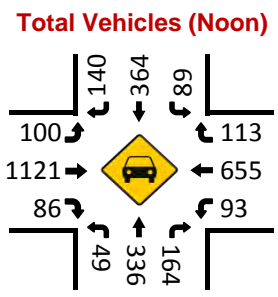
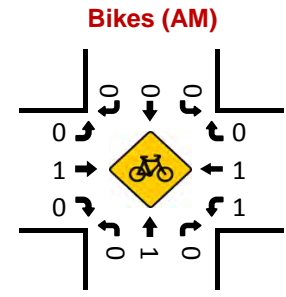
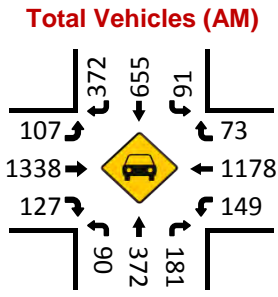
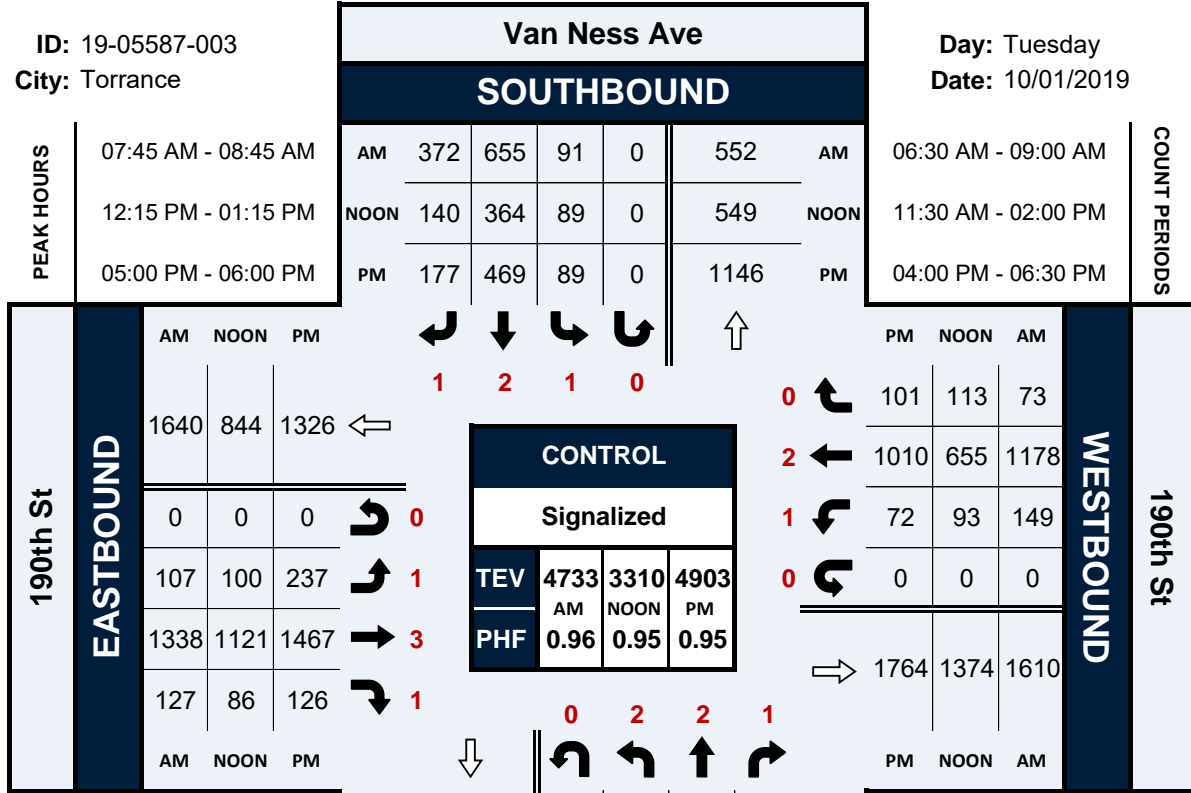
**➤ 190<sup>th</sup> Street at Van Ness Avenue**



# Peak Hour Turning Movement Count

ID: 19-05587-003  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



National Data & Surveying Services

Intersection Turning Movement Count **Project ID:** 19-05587-003

**City:** Torrance  
**Control:** Signalized

**Date:** 10/1/2019

**Total**

NS/EW Streets:	Van Ness Ave				Van Ness Ave				190th St				190th St				
<b>AM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:30 AM	12	50	36	0	11	78	39	0	10	206	9	0	28	241	29	0	749
6:45 AM	7	64	36	0	11	117	64	0	8	244	20	0	39	272	24	0	906
7:00 AM	10	63	28	0	17	100	62	0	9	230	10	0	18	267	23	0	837
7:15 AM	10	101	44	0	18	123	67	0	9	332	18	0	21	307	27	0	1077
7:30 AM	23	111	28	0	18	158	68	0	12	310	24	0	35	336	21	0	1144
7:45 AM	27	125	42	0	25	167	71	0	23	333	33	0	39	287	17	0	1189
8:00 AM	15	85	49	0	25	145	82	0	25	323	30	0	37	287	23	0	1126
8:15 AM	19	80	46	0	21	169	101	0	25	351	28	0	41	293	17	0	1191
8:30 AM	29	82	44	0	20	174	118	0	34	331	36	0	32	311	16	0	1227
8:45 AM	18	77	46	0	20	154	75	0	31	353	26	0	32	296	20	0	1148
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	170	838	399	0	186	1385	747	0	186	3013	234	0	322	2897	217	0	10594
	12.08%	59.56%	28.36%	0.00%	8.02%	59.75%	32.23%	0.00%	5.42%	87.77%	6.82%	0.00%	9.37%	84.31%	6.32%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																TOTAL
<b>PEAK HR VOL:</b>	90	372	181	0	91	655	372	0	107	1338	127	0	149	1178	73	0	4733
<b>PEAK HR FACTOR:</b>	0.776	0.744	0.923	0.000	0.910	0.941	0.788	0.000	0.787	0.953	0.882	0.000	0.909	0.947	0.793	0.000	0.964
	0.829				0.896				0.973				0.975				
<b>NOON</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:30 AM	18	78	36	0	21	65	34	0	25	224	27	0	17	160	16	0	721
11:45 AM	19	111	37	0	18	78	30	0	30	248	18	0	23	157	18	0	787
12:00 PM	28	114	35	0	16	77	36	0	26	273	11	0	22	148	29	0	815
12:15 PM	12	81	42	0	21	67	35	0	26	272	22	0	25	158	20	0	781
12:30 PM	14	81	46	0	23	89	34	0	20	281	16	0	20	155	43	0	822
12:45 PM	11	90	41	0	28	107	34	0	27	273	24	0	22	185	33	0	875
1:00 PM	12	84	35	0	17	101	37	0	27	295	24	0	26	157	17	0	832
1:15 PM	9	66	47	0	20	85	40	0	18	271	15	0	22	143	11	0	747
1:30 PM	15	94	56	0	22	89	37	0	24	236	15	0	23	160	11	0	782
1:45 PM	17	100	59	0	15	92	48	0	34	292	18	0	30	168	16	0	889
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	155	899	434	0	201	850	365	0	257	2665	190	0	230	1591	214	0	8051
	10.42%	60.42%	29.17%	0.00%	14.19%	60.03%	25.78%	0.00%	8.26%	85.64%	6.11%	0.00%	11.30%	78.18%	10.52%	0.00%	
<b>PEAK HR:</b>	<b>12:15 PM - 01:15 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	49	336	164	0	89	364	140	0	100	1121	86	0	93	655	113	0	3310
<b>PEAK HR FACTOR:</b>	0.875	0.933	0.891	0.000	0.795	0.850	0.946	0.000	0.926	0.950	0.896	0.000	0.894	0.885	0.657	0.000	0.946
	0.967				0.877				0.944				0.897				
<b>PM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	17	133	43	0	25	97	47	0	50	329	14	0	18	202	15	0	990
4:15 PM	20	153	41	0	19	85	26	0	39	329	24	0	15	192	20	0	963
4:30 PM	24	162	50	0	19	106	39	0	53	395	17	0	8	234	22	0	1129
4:45 PM	23	177	45	0	20	123	55	0	32	389	33	0	13	217	18	0	1145
5:00 PM	40	195	56	0	13	89	47	0	52	352	30	0	15	264	22	0	1175
5:15 PM	48	205	49	0	26	113	44	0	69	382	30	0	26	240	28	0	1260
5:30 PM	34	222	52	0	25	154	43	0	56	375	35	0	19	241	36	0	1292
5:45 PM	17	186	51	0	25	113	43	0	60	358	31	0	12	265	15	0	1176
6:00 PM	22	148	51	0	20	110	44	0	45	319	30	0	19	241	30	0	1079
6:15 PM	21	146	38	0	21	103	43	0	29	351	36	0	23	236	21	0	1068
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	266	1727	476	0	213	1093	431	0	485	3579	280	0	168	2332	227	0	11277
	10.77%	69.95%	19.28%	0.00%	12.26%	62.92%	24.81%	0.00%	11.16%	82.39%	6.45%	0.00%	6.16%	85.52%	8.32%	0.00%	
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	139	808	208	0	89	469	177	0	237	1467	126	0	72	1010	101	0	4903
<b>PEAK HR FACTOR:</b>	0.724	0.910	0.929	0.000	0.856	0.761	0.941	0.000	0.859	0.960	0.900	0.000	0.692	0.953	0.701	0.000	0.949
	0.938				0.828				0.951				0.983				

# National Data & Surveying Services

## Intersection Turning Movement Count

City: Torrance  
Control: Signalized

Project ID: 19-05587-003  
Date: 10/1/2019

### Bikes

NS/EW Streets:	Van Ness Ave				Van Ness Ave				190th St				190th St					
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
6:30 AM	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
8:45 AM	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	0	3	0	0	0	0	0	0	0	3	0	0	1	2	0	0	9	
	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	33.33%	66.67%	0.00%	0.00%	0.500	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																TOTAL	
<b>PEAK HR VOL:</b>	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	4	
<b>PEAK HR FACTOR:</b>	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.250	0.000	0.000	0.500	
	0.250								0.250				0.500					
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
11:30 AM	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	0	0
11:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	0	4	0	0	0	2	0	0	0	3	0	0	0	0	1	0	10	
	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.500	
<b>PEAK HR:</b>	<b>12:15 PM - 01:15 PM</b>																TOTAL	
<b>PEAK HR VOL:</b>	0	1	0	0	0	0	0	0	0	2	0	0	0	0	1	0	4	
<b>PEAK HR FACTOR:</b>	0.00	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.250	0.000	0.500	
	0.250								0.500				0.250					
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
4:00 PM	2	2	1	0	1	2	1	0	1	3	1	0	1	2	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	1	0	0	0	4	0	0	0	1	0	0	0	6
6:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	0	3	0	0	1	1	0	0	0	5	0	0	0	5	0	0	15	
	0.00%	100.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.375	
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																TOTAL	
<b>PEAK HR VOL:</b>	0	1	0	0	0	1	0	0	0	4	0	0	0	3	0	0	9	
<b>PEAK HR FACTOR:</b>	0.00	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.375	0.000	0.000	0.375	
	0.250				0.250				0.250				0.375					

# National Data & Surveying Services

Location: Van Ness Ave @ 190th St  
City: Torrance

Project ID: 10-0158-000  
Date: 10/17/2019

## Intersection Turning Movement Count Pedestrians (Crosswalks)

NS/EW Streets:	Van Ness Ave		Van Ness Ave		190th St		190th St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	1	0	0	1	2	0	0	4
7:00 AM	0	1	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	1	1
7:45 AM	0	0	1	0	0	2	0	0	3
8:00 AM	0	1	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	3	0	0	3
8:45 AM	1	1	0	0	0	0	0	0	2
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	1	4	1	0	1	7	0	1	15
	20.00%	80.00%	100.00%	0.00%	12.50%	87.50%	0.00%	100.00%	
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>								TOTAL
<b>PEAK HR VOL :</b>	0	1	1	0	0	5	0	0	7
<b>PEAK HR FACTOR :</b>	0.250		0.250		0.417				0.583

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	0	0	0	0	0	0	0
11:45 AM	1	0	0	0	0	2	0	0	3
12:00 PM	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	2	0	0	2
12:30 PM	0	0	0	0	5	0	0	0	5
12:45 PM	0	0	0	0	0	0	0	0	0
1:00 PM	2	0	0	0	0	2	0	0	4
1:15 PM	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	1	0	0	1	0	0	0	2
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	3	1	0	0	6	6	0	0	16
	75.00%	25.00%			50.00%	50.00%			
<b>PEAK HR :</b>	<b>12:15 PM - 01:15 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	2	0	0	0	5	4	0	0	11
<b>PEAK HR FACTOR :</b>	0.250				0.450				0.550

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	1	0	0	0	0	0	0	0	1
4:15 PM	2	0	0	0	0	2	0	0	4
4:30 PM	1	0	0	0	1	2	0	0	4
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	1	0	0	0	1
6:15 PM	0	0	0	0	0	2	0	0	2
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	4	0	0	0	2	6	0	0	12
	100.00%	0.00%			25.00%	75.00%			
<b>PEAK HR :</b>	<b>05:00 PM - 06:00 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	0	0	0	0	0	0	0	0	0
<b>PEAK HR FACTOR :</b>									



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ 190<sup>th</sup> Street at Gramercy Place**

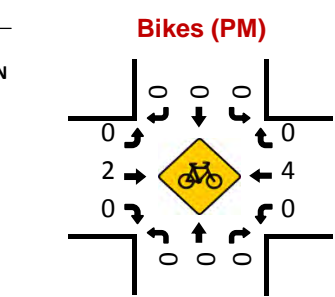
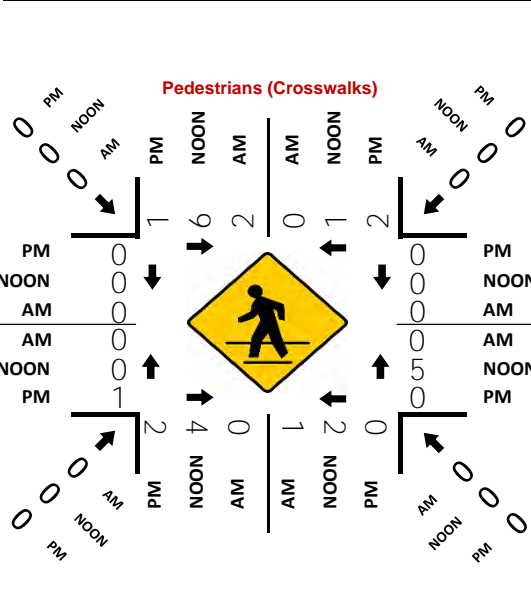
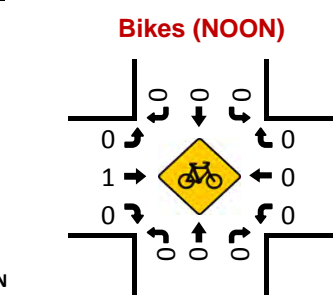
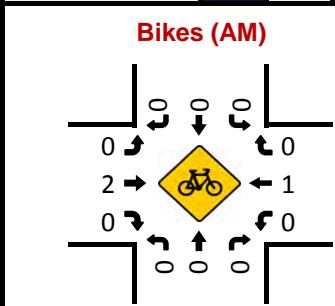
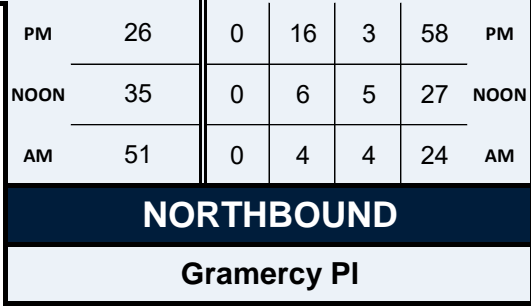
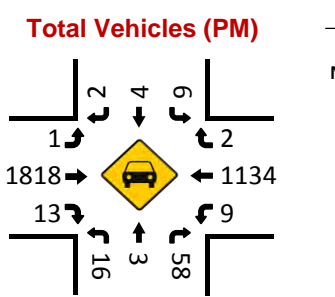
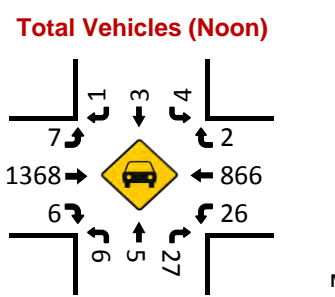
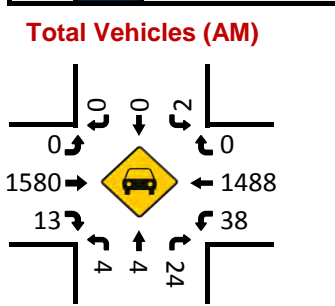
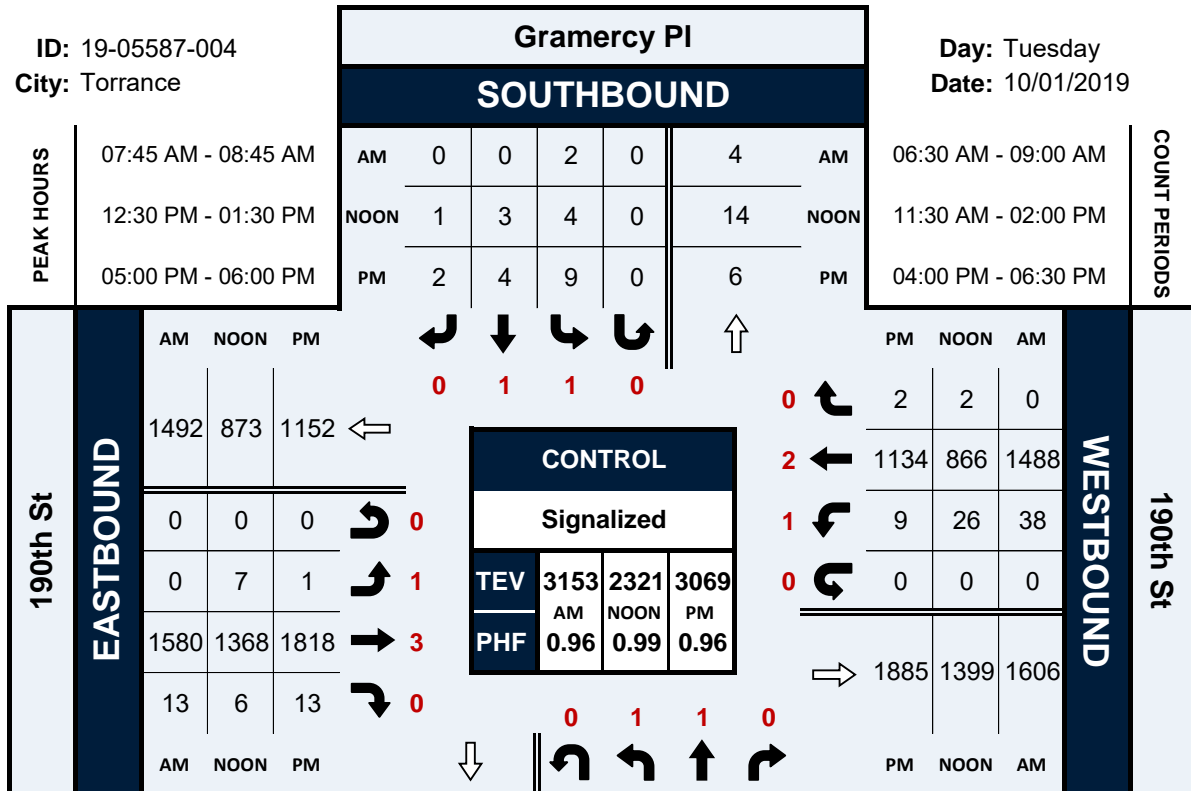


# Gramercy Pl & 190th St

## Peak Hour Turning Movement Count

ID: 19-05587-004  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



National Data & Surveying Services

Intersection Turning Movement Count **Project ID:** 19-05587-004

**City:** Torrance  
**Control:** Signalized

**Date:** 10/1/2019

**Total**

NS/EW Streets:	Gramercy PI				Gramercy PI				190th St				190th St				
<b>AM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	3	0	0	1	2	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	2	0	0	3	1	0	0	0	269	1	0	4	304	0	0	584
6:45 AM	0	1	7	0	0	2	0	0	0	273	3	0	4	349	1	0	640
7:00 AM	0	0	5	0	1	1	0	0	0	291	0	0	8	326	1	0	633
7:15 AM	1	1	5	0	0	0	0	0	0	357	1	0	4	368	0	0	737
7:30 AM	0	0	3	0	1	1	0	0	0	341	2	0	7	394	0	0	749
7:45 AM	0	0	2	0	0	0	0	0	0	385	4	0	12	367	0	0	770
8:00 AM	3	2	9	0	0	0	0	0	0	396	3	0	14	368	0	0	795
8:15 AM	1	0	10	0	2	0	0	0	0	423	4	0	6	375	0	0	821
8:30 AM	0	2	3	0	0	0	0	0	0	376	2	0	6	378	0	0	767
8:45 AM	1	1	7	0	1	1	0	0	0	405	2	0	4	337	0	0	759
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s:</b>	6	9	51	0	8	6	0	0	0	3516	22	0	69	3566	2	0	7255
	9.09%	13.64%	77.27%	0.00%	57.14%	42.86%	0.00%	0.00%	0.00%	99.38%	0.62%	0.00%	1.90%	98.05%	0.05%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	4	4	24	0	2	0	0	0	0	1580	13	0	38	1488	0	0	3153
<b>PEAK HR FACTOR:</b>	0.333	0.500	0.600	0.000	0.250	0.000	0.000	0.000	0.000	0.934	0.813	0.000	0.679	0.984	0.000	0.000	0.960
			0.571			0.250				0.933				0.993			
<b>NOON</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	3	0	0	1	2	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	3	1	8	0	1	0	0	0	0	289	1	0	2	182	1	0	488
11:45 AM	4	1	6	0	1	2	0	0	0	300	1	0	3	198	1	0	517
12:00 PM	7	2	8	0	0	1	0	0	0	332	3	0	7	195	0	0	555
12:15 PM	4	0	15	0	0	3	2	0	2	324	1	0	6	201	2	0	560
12:30 PM	1	1	10	0	1	0	1	0	0	351	1	0	5	217	1	0	589
12:45 PM	1	0	6	0	0	1	0	0	1	325	2	0	4	228	0	0	568
1:00 PM	2	2	4	0	2	0	0	0	1	349	1	0	9	217	1	0	588
1:15 PM	2	2	7	0	1	2	0	0	5	343	2	0	8	204	0	0	576
1:30 PM	0	2	15	0	2	0	0	0	0	309	4	0	4	188	2	0	526
1:45 PM	0	0	14	0	3	3	0	0	0	363	0	0	4	220	4	0	611
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s:</b>	24	11	93	0	11	12	3	0	9	3285	16	0	52	2050	12	0	5578
	18.75%	8.59%	72.66%	0.00%	42.31%	46.15%	11.54%	0.00%	0.27%	99.24%	0.48%	0.00%	2.46%	96.97%	0.57%	0.00%	
<b>PEAK HR:</b>	<b>12:30 PM - 01:30 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	6	5	27	0	4	3	1	0	7	1368	6	0	26	866	2	0	2321
<b>PEAK HR FACTOR:</b>	0.750	0.625	0.675	0.000	0.500	0.375	0.250	0.000	0.350	0.974	0.750	0.000	0.722	0.950	0.500	0.000	0.985
			0.792			0.667				0.981				0.963			
<b>PM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	3	0	0	1	2	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	5	1	11	0	2	0	0	0	0	417	3	0	3	222	2	0	666
4:15 PM	2	0	14	0	4	0	1	0	0	427	0	0	2	234	3	0	687
4:30 PM	6	0	14	0	0	2	1	0	0	464	0	0	4	234	2	0	727
4:45 PM	1	1	10	0	1	2	3	0	0	468	1	0	2	256	2	0	747
5:00 PM	7	0	20	0	1	1	0	0	0	449	2	0	4	255	0	0	739
5:15 PM	2	1	13	0	3	0	0	0	1	460	4	0	2	311	1	0	798
5:30 PM	4	1	14	0	3	2	1	0	0	464	4	0	0	278	0	0	771
5:45 PM	3	1	11	0	2	1	1	0	0	445	3	0	3	290	1	0	761
6:00 PM	2	0	9	0	4	0	1	0	0	383	0	0	0	274	4	0	677
6:15 PM	3	0	13	0	1	2	2	0	0	429	1	0	1	277	1	0	730
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s:</b>	35	5	129	0	21	10	10	0	1	4406	18	0	21	2631	16	0	7303
	20.71%	2.96%	76.33%	0.00%	51.22%	24.39%	24.39%	0.00%	0.02%	99.57%	0.41%	0.00%	0.79%	98.61%	0.60%	0.00%	
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	16	3	58	0	9	4	2	0	1	1818	13	0	9	1134	2	0	3069
<b>PEAK HR FACTOR:</b>	0.571	0.750	0.725	0.000	0.750	0.500	0.500	0.000	0.250	0.980	0.813	0.000	0.563	0.912	0.500	0.000	0.961
			0.713			0.625				0.979				0.912			

# National Data & Surveying Services

## Intersection Turning Movement Count

City: Torrance  
Control: Signalized

Project ID: 19-05587-004  
Date: 10/1/2019

### Bikes

NS/EW Streets:	Gramercy Pl				Gramercy Pl				190th St				190th St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	1 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	0	0	0	0	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	3
<b>PEAK HR:</b>	07:45 AM - 08:45 AM																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
<b>PEAK HR FACTOR:</b>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.375
										0.500				0.250			
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	1 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	0	0	0	0	0.00%	100.00%	0.00%	0.00%	0	0	0	0	1
<b>PEAK HR:</b>	12:30 PM - 01:30 PM																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.250
										0.250							
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	1 NL	1 NT	0 NR	0 NU	1 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	2 WT	0 WR	0 WU	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	0	0	0	0	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	8
<b>PEAK HR:</b>	05:00 PM - 06:00 PM																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	6
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.500	0.000	0.000	0.375
										0.250				0.500			

# National Data & Surveying Services

Location: Gramercy Pl @ 190th St  
City: Torrance

Project ID: 10-0158-001  
Date: 10/17/2019

## Intersection Turning Movement Count Pedestrians (Crosswalks)

NS/EW Streets:	Gramercy Pl		Gramercy Pl		190th St		190th St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	1	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	2	2
7:00 AM	0	1	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	1	2
7:45 AM	1	0	0	0	0	0	0	0	1
8:00 AM	1	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	1	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	1
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	2	2	2	1	0	0	0	3	10
	50.00%	50.00%	66.67%	33.33%			0.00%	100.00%	
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>								TOTAL
<b>PEAK HR VOL :</b>	2	0	0	1	0	0	0	0	3
<b>PEAK HR FACTOR :</b>	0.500			0.250					0.750
	0.500		0.250						

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	2	2	0	0	0	0	4
11:45 AM	0	0	0	0	0	0	0	0	0
12:00 PM	0	1	0	0	0	0	0	0	1
12:15 PM	0	0	0	1	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0
12:45 PM	4	0	4	0	5	0	0	0	13
1:00 PM	1	1	0	2	0	0	0	0	4
1:15 PM	1	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	1	0	0	0	0	0	1
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	6	2	7	5	5	0	0	0	25
	75.00%	25.00%	58.33%	41.67%	100.00%	0.00%			
<b>PEAK HR :</b>	<b>12:30 PM - 01:30 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	6	1	4	2	5	0	0	0	18
<b>PEAK HR FACTOR :</b>	0.375	0.250	0.250	0.250	0.250				0.346
	0.438		0.375		0.250				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	6	2	1	0	2	0	7	18
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	1	0	0	0	0	0	1	0	2
5:15 PM	0	2	1	0	0	0	0	0	3
5:30 PM	0	0	1	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	1	8	4	1	0	2	1	7	24
	11.11%	88.89%	80.00%	20.00%	0.00%	100.00%	12.50%	87.50%	
<b>PEAK HR :</b>	<b>05:00 PM - 06:00 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	1	2	2	0	0	0	1	0	6
<b>PEAK HR FACTOR :</b>	0.250	0.250	0.500				0.250		0.500
	0.375		0.500				0.250		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ 190<sup>th</sup> Street at I-405 SB Ramps**

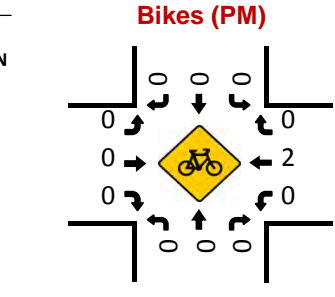
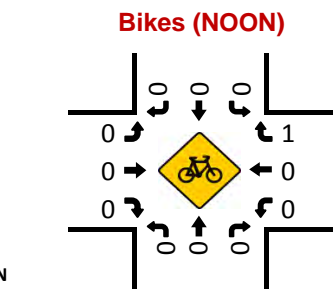
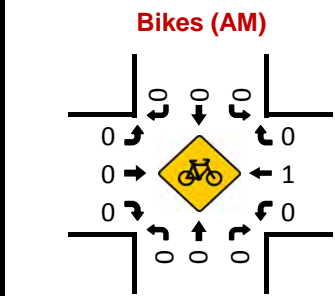
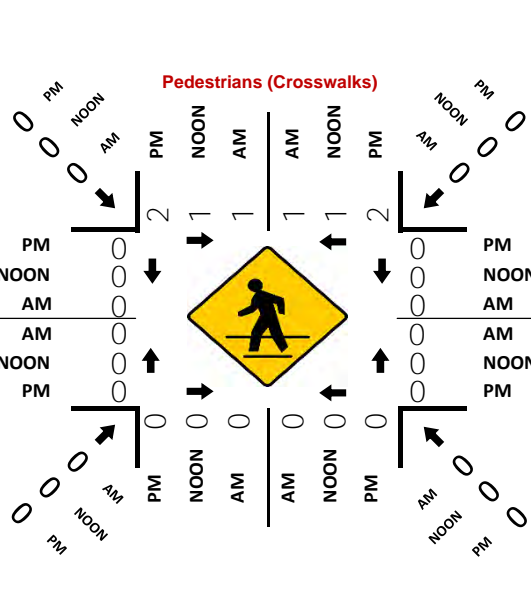
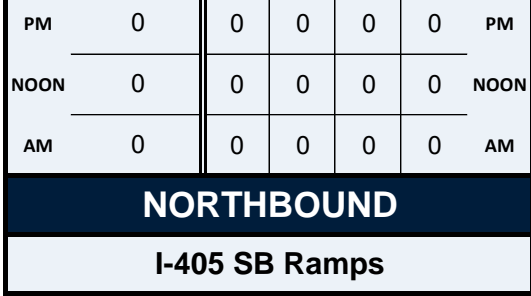
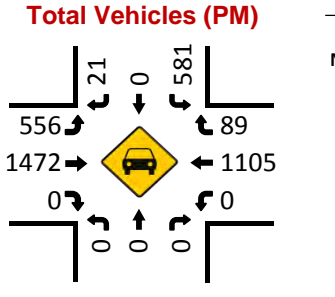
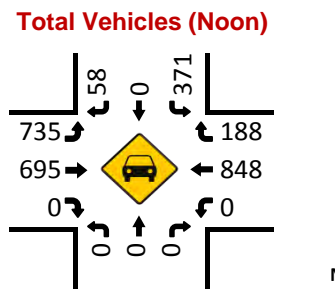
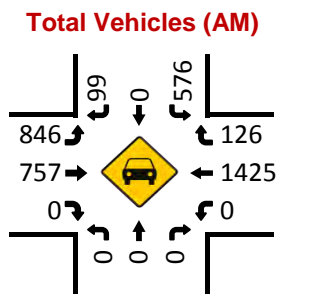
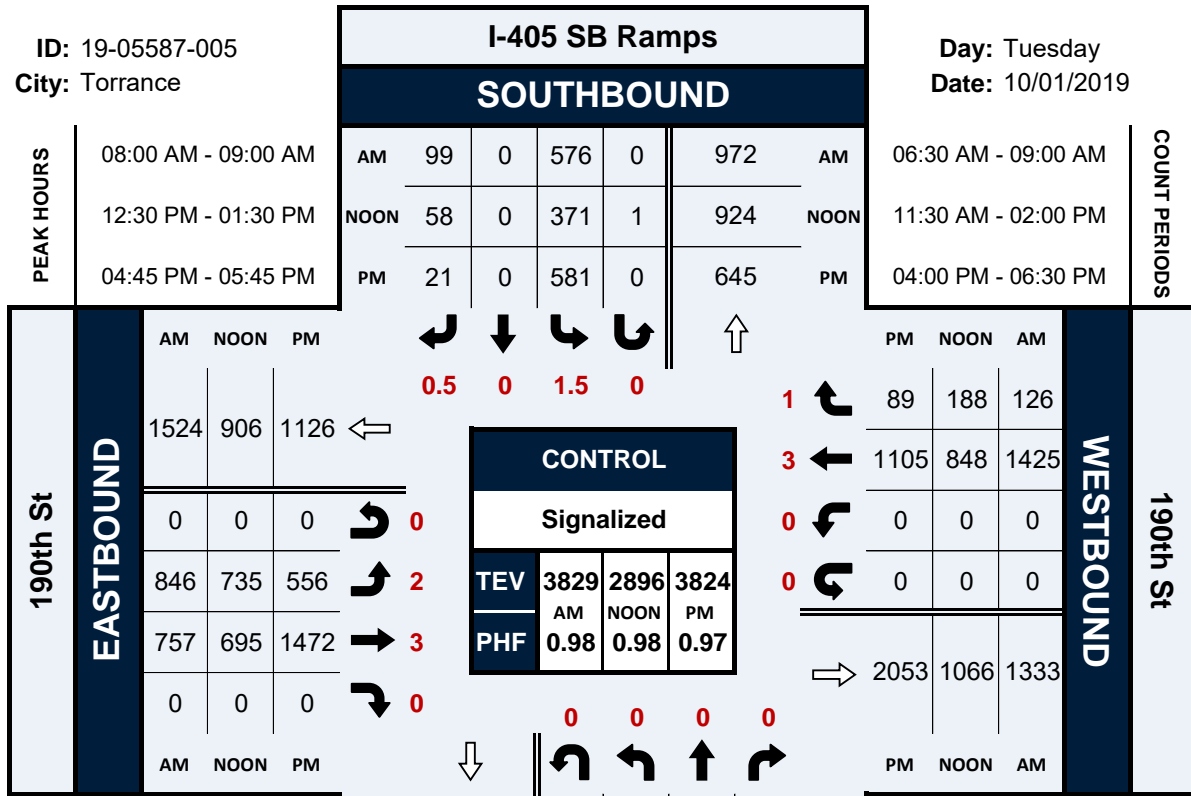


# I-405 SB Ramps & 190th St

## Peak Hour Turning Movement Count

ID: 19-05587-005  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



National Data & Surveying Services

Intersection Turning Movement Count **Project ID:** 19-05587-005 **Date:** 10/1/2019

**City:** Torrance  
**Control:** Signalized

**Total**

NS/EW Streets:	I-405 SB Ramps				I-405 SB Ramps				190th St				190th St				
<b>AM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	0	0	0	54	0	10	0	202	70	0	0	0	306	38	0	680
6:45 AM	0	0	0	0	84	0	13	0	198	93	0	0	0	353	26	0	767
7:00 AM	0	0	0	0	101	0	16	0	184	103	0	0	0	318	30	0	752
7:15 AM	0	0	0	0	87	0	17	0	187	143	0	0	0	353	19	0	806
7:30 AM	0	0	0	0	120	0	21	0	206	156	0	0	0	383	32	0	918
7:45 AM	0	0	0	0	125	0	19	0	193	191	0	0	0	353	23	0	904
8:00 AM	0	0	0	0	158	0	26	0	208	192	0	0	0	362	27	0	973
8:15 AM	0	0	0	0	134	0	29	0	207	215	0	0	0	361	32	0	978
8:30 AM	0	0	0	0	137	0	21	0	211	168	0	0	0	374	28	0	939
8:45 AM	0	0	0	0	147	0	23	0	220	182	0	0	0	328	39	0	939
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	1147	0	195	0	2016	1513	0	0	0	3491	294	0	8656
					85.47%	0.00%	14.53%	0.00%	57.13%	42.87%	0.00%	0.00%	0.00%	92.23%	7.77%	0.00%	
<b>PEAK HR:</b>	<b>08:00 AM - 09:00 AM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	576	0	99	0	846	757	0	0	0	1425	126	0	3829
<b>PEAK HR FACTOR:</b>	0.000	0.000	0.000	0.000	0.911	0.000	0.853	0.000	0.961	0.880	0.000	0.000	0.000	0.953	0.808	0.000	0.979
							0.917				0.950				0.965		
<b>NOON</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	0	0	0	0	74	0	16	0	175	135	0	0	0	176	47	0	623
11:45 AM	0	0	0	0	107	0	9	0	158	153	0	0	0	198	42	0	667
12:00 PM	0	0	0	0	98	0	15	0	170	164	0	0	0	187	49	0	683
12:15 PM	0	0	0	0	93	0	10	1	171	177	0	0	0	189	43	0	684
12:30 PM	0	0	0	0	108	0	18	0	171	175	0	0	0	206	38	0	716
12:45 PM	0	0	0	0	79	0	11	0	177	156	0	0	0	239	54	0	716
1:00 PM	0	0	0	0	100	0	19	1	202	174	0	0	0	182	50	0	728
1:15 PM	0	0	0	0	84	0	10	0	185	190	0	0	0	221	46	0	736
1:30 PM	0	0	0	0	93	0	13	0	144	157	0	0	0	190	46	0	643
1:45 PM	0	0	0	0	110	0	19	0	207	181	0	0	0	200	34	0	751
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	946	0	140	2	1760	1662	0	0	0	1988	449	0	6947
					86.95%	0.00%	12.87%	0.18%	51.43%	48.57%	0.00%	0.00%	0.00%	81.58%	18.42%	0.00%	
<b>PEAK HR:</b>	<b>12:30 PM - 01:30 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	371	0	58	1	735	695	0	0	0	848	188	0	2896
<b>PEAK HR FACTOR:</b>	0.000	0.000	0.000	0.000	0.859	0.000	0.763	0.250	0.910	0.914	0.000	0.000	0.000	0.887	0.870	0.000	0.984
							0.853				0.951				0.884		
<b>PM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	0	0	0	155	0	7	0	122	270	0	0	0	228	24	0	806
4:15 PM	0	0	0	0	124	0	5	0	135	346	0	0	0	241	32	0	883
4:30 PM	0	0	0	0	123	0	6	0	126	337	0	0	0	246	22	0	860
4:45 PM	0	0	0	0	132	0	4	0	133	419	0	0	0	262	22	0	972
5:00 PM	0	0	0	0	127	0	8	0	142	363	0	0	0	274	19	0	933
5:15 PM	0	0	0	0	157	0	3	0	142	316	0	0	0	289	24	0	931
5:30 PM	0	0	0	0	165	0	6	0	139	374	0	0	0	280	24	0	988
5:45 PM	0	0	0	0	150	0	4	0	142	343	0	0	0	292	26	0	957
6:00 PM	0	0	0	0	166	0	6	0	128	242	0	0	0	276	29	0	847
6:15 PM	0	0	0	0	131	0	8	0	151	312	0	0	0	262	27	0	891
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	1430	0	57	0	1360	3322	0	0	0	2650	249	0	9068
					96.17%	0.00%	3.83%	0.00%	29.05%	70.95%	0.00%	0.00%	0.00%	91.41%	8.59%	0.00%	
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	581	0	21	0	556	1472	0	0	0	1105	89	0	3824
<b>PEAK HR FACTOR:</b>	0.000	0.000	0.000	0.000	0.880	0.000	0.656	0.000	0.979	0.878	0.000	0.000	0.000	0.956	0.927	0.000	0.968
							0.880				0.918				0.954		



# National Data & Surveying Services

## Intersection Turning Movement Count

City: Torrance  
Control: Signalized

Project ID: 19-05587-005  
Date: 10/1/2019

### Bikes

NS/EW Streets:	I-405 SB Ramps				I-405 SB Ramps				190th St				190th St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	0	0	0	0	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	5
<b>PEAK HR:</b>	<b>08:00 AM - 09:00 AM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<b>PEAK HR FACTOR:</b>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.250
	0.250																
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	100.00%	0.00%	0.00%	0.00%	0	0	0	0	0.00%	0.00%	100.00%	0.00%	2
<b>PEAK HR:</b>	<b>12:30 PM - 01:30 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250
	0.250																
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	0	0	0	1.5	0	0.5	0	2	3	0	0	0	3	1	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	3
6:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0	0	0	0	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	80.00%	20.00%	0.00%	7
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>																TOTAL
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.500
	0.500																

# National Data & Surveying Services

Location: I-405 SB Ramps @ 190th St  
City: Torrance

Project ID: 10-0158-005  
Date: 10/17/2019

## Intersection Turning Movement Count Pedestrians (Crosswalks)

NS/EW Streets:	I-405 SB Ramps		I-405 SB Ramps		190th St		190th St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	1	0	0	0	0	0	0	0	1
7:00 AM	1	1	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	2	0	0	0	0	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	1	0	0	0	0	0	0	0	1
8:30 AM	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	3	4	0	0	0	0	0	0	7
	42.86%	57.14%							
<b>PEAK HR :</b>	<b>08:00 AM - 09:00 AM</b>								TOTAL
<b>PEAK HR VOL :</b>	1	1	0	0	0	0	0	0	2
<b>PEAK HR FACTOR :</b>	0.250	0.250							0.500
	0.500								

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	0	0	0	0	0	0	0
11:45 AM	0	1	0	0	0	0	0	0	1
12:00 PM	1	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0
1:00 PM	1	1	0	0	0	0	0	0	2
1:15 PM	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	2	2	0	0	0	0	0	0	4
	50.00%	50.00%							
<b>PEAK HR :</b>	<b>12:30 PM - 01:30 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	1	1	0	0	0	0	0	0	2
<b>PEAK HR FACTOR :</b>	0.250	0.250							0.250
	0.250								

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	1
5:15 PM	1	1	0	0	0	0	0	0	2
5:30 PM	1	0	0	0	0	0	0	0	1
5:45 PM	3	0	0	0	0	0	0	0	3
6:00 PM	0	1	0	0	0	0	0	0	1
6:15 PM	1	1	0	0	0	0	0	0	2
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	6	5	0	0	0	0	0	0	11
	54.55%	45.45%							
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	2	2	0	0	0	0	0	0	4
<b>PEAK HR FACTOR :</b>	0.500	0.500							0.500
	0.500								

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Western Avenue at 190<sup>th</sup> Street**

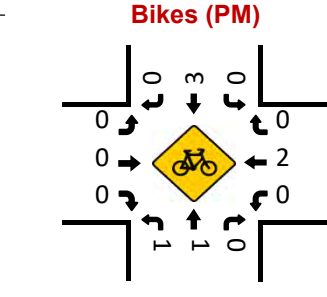
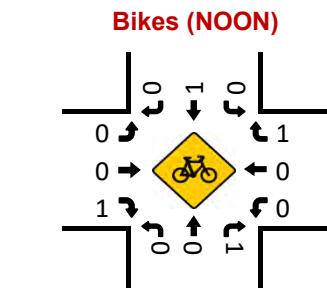
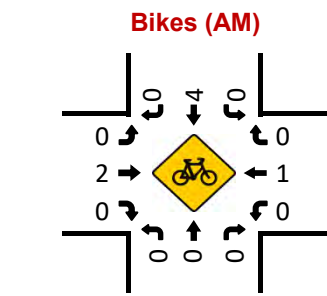
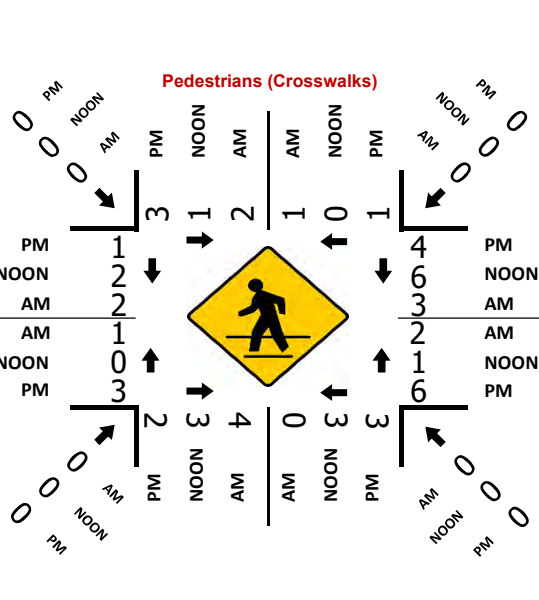
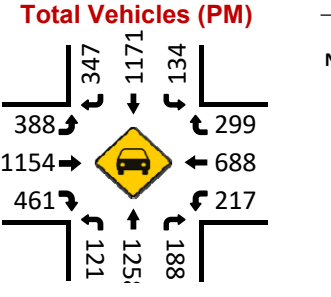
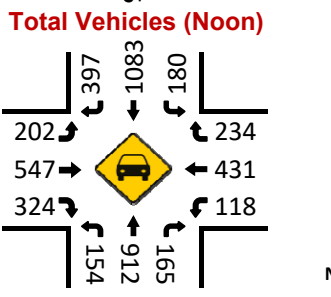
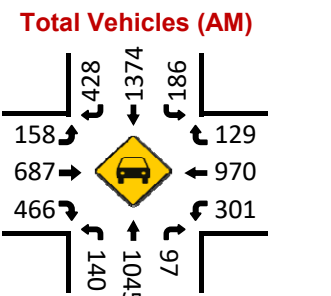
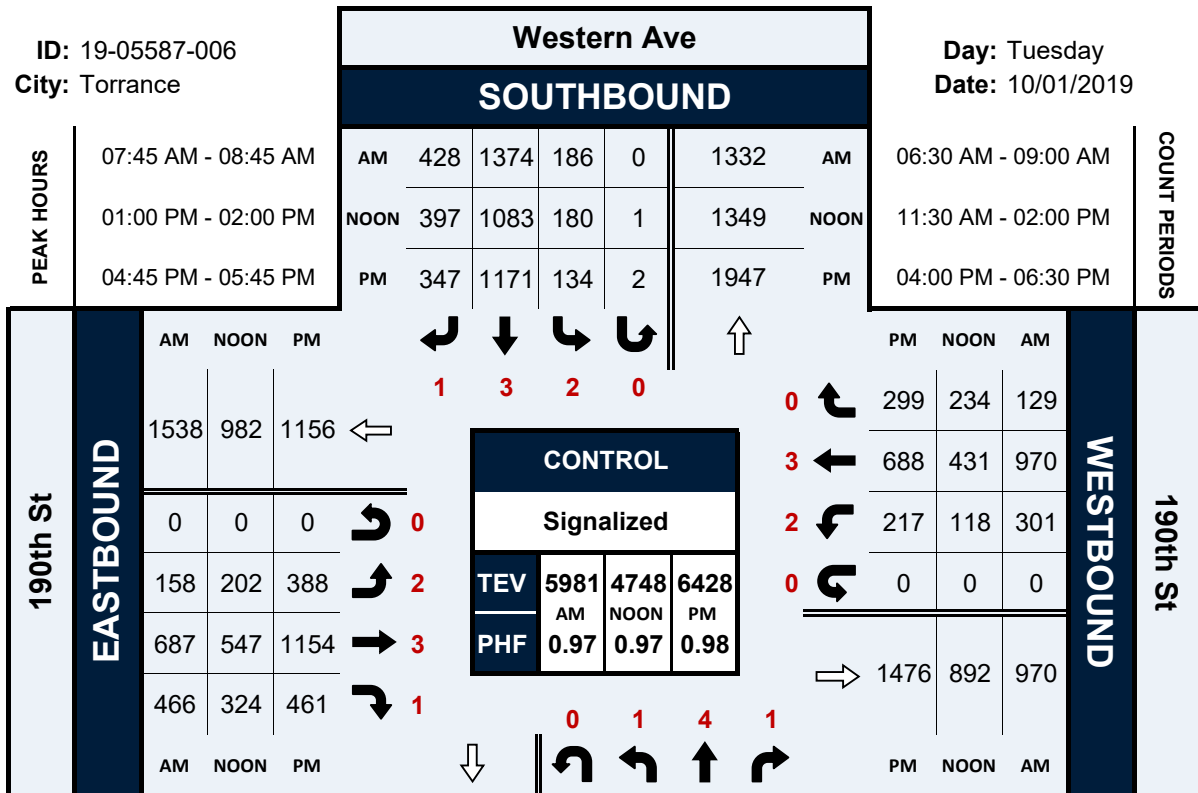


# Western Ave & 190th St

## Peak Hour Turning Movement Count

ID: 19-05587-006  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



National Data & Surveying Services

Intersection Turning Movement Count **Project ID:** 19-05587-006

City: Torrance  
Control: Signalized

Date: 10/1/2019

**Total**

NS/EW Streets:	Western Ave				Western Ave				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1 NL	4 NT	1 NR	0 NU	2 SL	3 ST	1 SR	0 SU	2 EL	3 ET	1 ER	0 EU	2 WL	3 WT	0 WR	0 WU	TOTAL
6:30 AM	34	156	15	0	16	181	99	0	19	44	46	0	41	188	23	0	862
6:45 AM	28	175	37	0	21	224	99	0	25	88	76	0	69	219	17	0	1078
7:00 AM	36	218	22	0	22	268	125	0	33	86	67	0	55	199	21	0	1152
7:15 AM	20	222	45	0	22	260	104	0	29	146	72	0	70	269	34	0	1293
7:30 AM	45	308	40	0	35	344	127	0	28	134	94	0	77	200	27	0	1459
7:45 AM	27	315	37	0	42	300	94	0	38	185	112	0	79	273	32	0	1534
8:00 AM	40	246	23	0	51	390	123	0	48	154	122	0	74	204	31	0	1506
8:15 AM	36	205	22	0	42	311	104	0	37	203	128	0	84	263	37	0	1472
8:30 AM	37	279	15	0	51	373	107	0	35	145	104	0	64	230	29	0	1469
8:45 AM	43	208	36	0	32	300	97	0	49	169	137	0	76	233	41	0	1421
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	346	2332	292	0	334	2951	1079	0	341	1354	958	0	689	2278	292	0	13246
	11.65%	78.52%	9.83%	0.00%	7.65%	67.62%	24.73%	0.00%	12.85%	51.04%	36.11%	0.00%	21.14%	69.90%	8.96%	0.00%	
<b>PEAK HR :</b>	07:45 AM - 08:45 AM																TOTAL
<b>PEAK HR VOL :</b>	140	1045	97	0	186	1374	428	0	158	687	466	0	301	970	129	0	5981
<b>PEAK HR FACTOR :</b>	0.875	0.829	0.655	0.000	0.912	0.881	0.870	0.000	0.823	0.846	0.910	0.000	0.896	0.888	0.872	0.000	0.975
	0.846				0.881				0.891				0.911				
NOON	1 NL	4 NT	1 NR	0 NU	2 SL	3 ST	1 SR	0 SU	2 EL	3 ET	1 ER	0 EU	2 WL	3 WT	0 WR	0 WU	TOTAL
11:30 AM	38	195	38	0	27	193	75	0	50	114	61	0	30	128	51	0	1000
11:45 AM	29	201	28	0	42	221	74	0	62	107	71	0	23	105	50	0	1013
12:00 PM	38	215	26	0	41	225	104	0	64	127	84	0	24	104	66	0	1118
12:15 PM	30	185	30	0	35	250	93	1	61	101	86	0	35	108	48	0	1063
12:30 PM	34	222	40	0	51	209	76	1	52	150	77	1	28	126	74	0	1141
12:45 PM	38	220	30	0	55	275	114	0	59	124	69	0	36	119	54	0	1193
1:00 PM	41	222	35	0	67	228	87	0	44	130	93	0	34	122	76	0	1179
1:15 PM	34	238	32	0	31	289	119	0	53	140	70	0	24	97	48	0	1175
1:30 PM	44	235	52	0	43	256	85	0	55	136	71	0	26	110	58	0	1171
1:45 PM	35	217	46	0	39	310	106	1	50	141	90	0	34	102	52	0	1223
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	361	2150	357	0	431	2456	933	3	550	1270	772	1	294	1121	577	0	11276
	12.59%	74.97%	12.45%	0.00%	11.27%	64.24%	24.40%	0.08%	21.21%	48.98%	29.77%	0.04%	14.76%	56.28%	28.97%	0.00%	
<b>PEAK HR :</b>	01:00 PM - 02:00 PM																TOTAL
<b>PEAK HR VOL :</b>	154	912	165	0	180	1083	397	1	202	547	324	0	118	431	234	0	4748
<b>PEAK HR FACTOR :</b>	0.875	0.958	0.793	0.000	0.672	0.873	0.834	0.250	0.918	0.970	0.871	0.000	0.868	0.883	0.770	0.000	0.971
	0.930				0.911				0.955				0.844				
PM	1 NL	4 NT	1 NR	0 NU	2 SL	3 ST	1 SR	0 SU	2 EL	3 ET	1 ER	0 EU	2 WL	3 WT	0 WR	0 WU	TOTAL
4:00 PM	36	306	45	0	43	305	90	0	47	289	97	0	25	138	70	0	1491
4:15 PM	35	258	47	0	28	266	73	0	80	255	131	0	41	140	59	0	1413
4:30 PM	28	345	41	0	36	317	98	1	83	262	117	0	62	165	65	0	1620
4:45 PM	30	280	54	0	35	265	94	0	89	338	106	0	51	140	78	0	1560
5:00 PM	30	337	44	0	32	299	85	1	81	270	107	0	38	186	77	0	1587
5:15 PM	32	334	53	0	27	278	80	0	121	260	124	0	61	193	77	0	1640
5:30 PM	29	307	37	0	40	329	88	1	97	286	124	0	67	169	67	0	1641
5:45 PM	31	289	48	0	28	243	75	1	87	305	118	0	51	218	62	0	1556
6:00 PM	35	246	40	0	23	296	96	2	67	214	109	0	39	158	67	0	1392
6:15 PM	29	226	36	0	26	301	75	0	73	283	113	0	52	167	56	0	1437
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	315	2928	445	0	318	2899	854	6	825	2762	1146	0	487	1674	678	0	15337
	8.54%	79.39%	12.07%	0.00%	7.80%	71.11%	20.95%	0.15%	17.43%	58.36%	24.21%	0.00%	17.15%	58.96%	23.88%	0.00%	
<b>PEAK HR :</b>	04:45 PM - 05:45 PM																TOTAL
<b>PEAK HR VOL :</b>	121	1258	188	0	134	1171	347	2	388	1154	461	0	217	688	299	0	6428
<b>PEAK HR FACTOR :</b>	0.945	0.933	0.870	0.000	0.838	0.890	0.923	0.500	0.802	0.854	0.929	0.000	0.810	0.891	0.958	0.000	0.979
	0.935				0.903				0.939				0.909				

# National Data & Surveying Services

## Intersection Turning Movement Count

City: Torrance  
Control: Signalized

Project ID: 19-05587-006  
Date: 10/1/2019

### Bikes

NS/EW Streets:	Western Ave				Western Ave				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1	4	1	0	2	3	1	0	2	3	1	0	2	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
7:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
7:45 AM	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	5
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	15
<b>PEAK HR :</b>	07:45 AM - 08:45 AM																TOTAL
<b>PEAK HR VOL :</b>	0	0	0	0	0	4	0	0	0	2	0	0	0	1	0	0	7
<b>PEAK HR FACTOR :</b>	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.350
					0.333				0.250				0.250				
NOON	1	4	1	0	2	3	1	0	2	3	1	0	2	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
12:45 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
1:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
1:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	0.00%	50.00%	50.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	50.00%	50.00%	0.00%	9
<b>PEAK HR :</b>	01:00 PM - 02:00 PM																TOTAL
<b>PEAK HR VOL :</b>	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	4
<b>PEAK HR FACTOR :</b>	0.00	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.500
					0.250				0.250				0.250				
PM	1	4	1	0	2	3	1	0	2	3	1	0	2	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
5:30 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	3
5:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	25.00%	75.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	80.00%	20.00%	0.00%	14
<b>PEAK HR :</b>	04:45 PM - 05:45 PM																TOTAL
<b>PEAK HR VOL :</b>	1	1	0	0	0	3	0	0	0	0	0	0	0	2	0	0	7
<b>PEAK HR FACTOR :</b>	0.25	0.250	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.583
					0.500				0.750				0.500				

# National Data & Surveying Services

Location: Western Ave & 190th St  
City: Torrance

Project ID: 19-0158-000  
Date: 10/1/2019

## Intersection Turning Movement Count

### Pedestrians (Crosswalks)

NS/EW Streets:	Western Ave		Western Ave		190th St		190th St		TOTAL
	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
AM	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	1	0	2	0	0	0	3
6:45 AM	0	1	2	1	0	2	0	1	7
7:00 AM	0	0	1	0	0	2	1	1	5
7:15 AM	0	0	1	0	0	0	0	0	1
7:30 AM	0	1	1	0	1	0	0	0	3
7:45 AM	0	0	4	0	0	0	0	0	4
8:00 AM	1	0	0	0	2	3	1	0	7
8:15 AM	1	1	0	0	0	0	0	2	4
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	2	3	10	1	5	7	2	4	34
<b>APPROACH %'s :</b>	40.00%	60.00%	90.91%	9.09%	41.67%	58.33%	33.33%	66.67%	
<b>PEAK HR :</b>	07:45 AM - 08:45 AM								TOTAL
<b>PEAK HR VOL :</b>	2	1	4	0	2	3	1	2	15
<b>PEAK HR FACTOR :</b>	0.500	0.250	0.250		0.250	0.250	0.250	0.250	0.536
	0.375		0.250		0.250		0.375		

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	2	2	0	0	1	0	5
11:45 AM	0	0	1	1	0	0	0	0	2
12:00 PM	0	0	1	0	0	0	1	0	2
12:15 PM	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	2	0	0	0	0	0	2
12:45 PM	0	0	1	0	1	2	0	0	4
1:00 PM	1	0	3	1	0	0	0	2	7
1:15 PM	0	0	0	0	1	0	0	0	1
1:30 PM	0	0	0	0	0	3	0	0	3
1:45 PM	0	0	0	2	0	3	0	0	5
<b>TOTAL VOLUMES :</b>	1	0	10	6	2	8	2	2	31
<b>APPROACH %'s :</b>	100.00%	0.00%	62.50%	37.50%	20.00%	80.00%	50.00%	50.00%	
<b>PEAK HR :</b>	01:00 PM - 02:00 PM								TOTAL
<b>PEAK HR VOL :</b>	1	0	3	3	1	6	0	2	16
<b>PEAK HR FACTOR :</b>	0.250		0.250	0.375	0.250	0.500		0.250	0.571
	0.250		0.375		0.583		0.250		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	1	0	0	0	0	1
4:15 PM	0	0	1	2	1	3	0	1	8
4:30 PM	0	4	1	0	6	2	0	4	17
4:45 PM	0	1	0	1	2	2	1	0	7
5:00 PM	0	0	1	1	0	0	1	1	4
5:15 PM	3	0	0	1	2	2	1	0	9
5:30 PM	0	0	1	0	2	0	0	0	3
5:45 PM	1	2	2	0	0	0	0	2	7
6:00 PM	1	0	0	0	0	0	2	0	3
6:15 PM	1	0	0	0	0	2	0	0	3
<b>TOTAL VOLUMES :</b>	6	7	6	6	13	11	5	8	62
<b>APPROACH %'s :</b>	46.15%	53.85%	50.00%	50.00%	54.17%	45.83%	38.46%	61.54%	
<b>PEAK HR :</b>	04:45 PM - 05:45 PM								TOTAL
<b>PEAK HR VOL :</b>	3	1	2	3	6	4	3	1	23
<b>PEAK HR FACTOR :</b>	0.250	0.250	0.500	0.750	0.750	0.500	0.750	0.250	0.639
	0.333		0.625		0.625		0.500		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

➤ **190<sup>th</sup> Street at Harborgate Way**



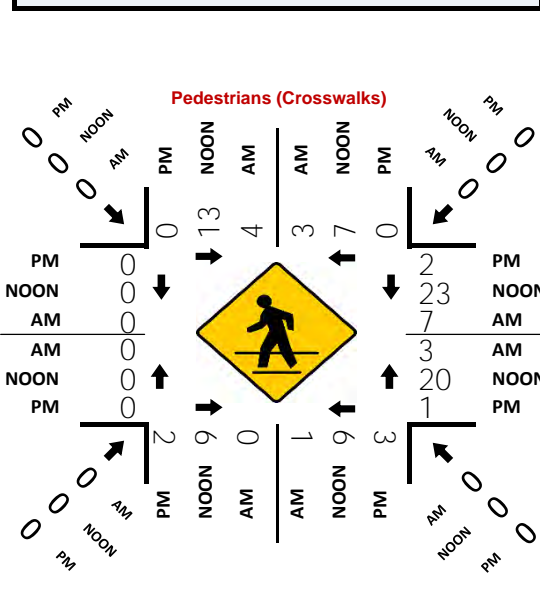
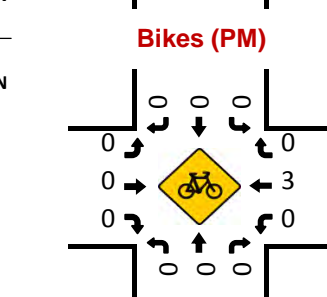
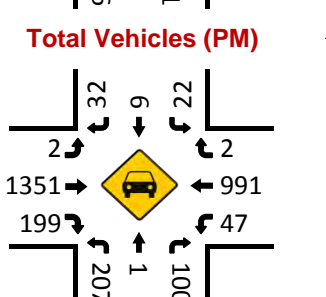
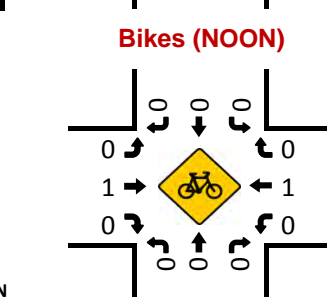
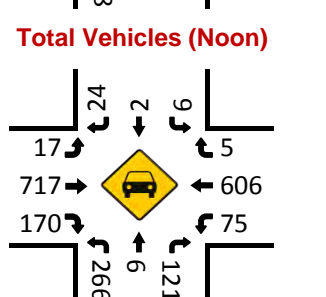
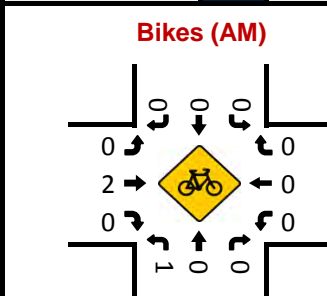
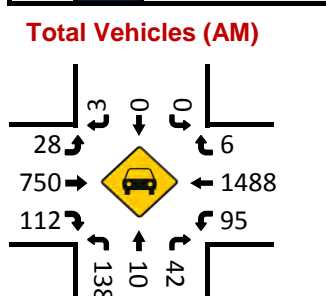
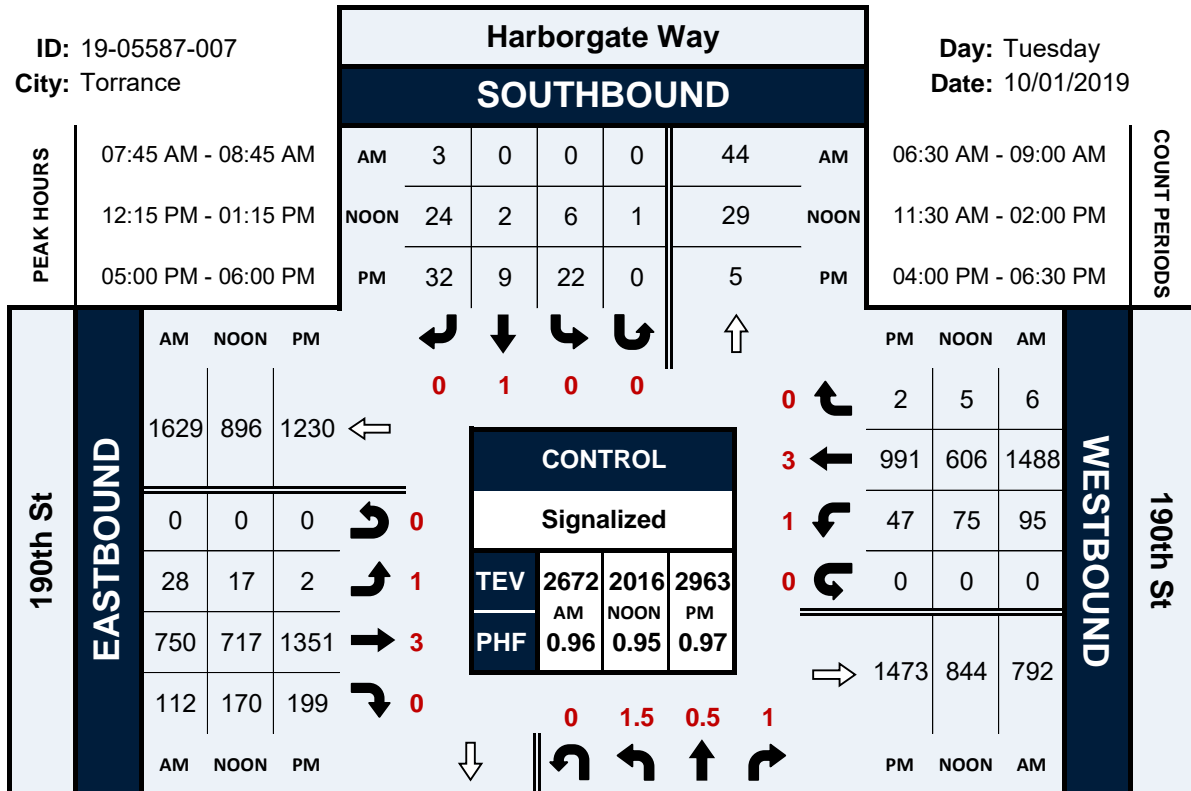


# Harborgate Way & 190th St

## Peak Hour Turning Movement Count

ID: 19-05587-007  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Harbortgate Way & 190th St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-007  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Harbortgate Way				Harbortgate Way				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1.5 NL	0.5 NT	1 NR	0 NU	0 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	3 WT	0 WR	0 WU	
6:30 AM	13	0	19	0	0	0	1	0	0	56	14	0	5	279	1	0	388
6:45 AM	25	2	11	0	0	0	1	0	2	113	11	0	8	323	0	0	496
7:00 AM	19	0	11	0	0	0	0	0	2	106	14	0	11	334	0	0	497
7:15 AM	36	0	17	0	0	0	0	0	1	166	19	0	13	331	0	0	583
7:30 AM	21	3	12	0	0	0	0	0	3	195	18	1	13	346	0	0	612
7:45 AM	38	1	10	0	0	0	0	0	5	197	26	0	16	393	0	0	686
8:00 AM	33	3	11	0	0	0	1	0	3	175	28	0	30	362	3	0	649
8:15 AM	43	5	6	0	0	0	1	0	8	212	30	0	19	373	0	0	697
8:30 AM	24	1	15	0	0	0	1	0	12	166	28	0	30	360	3	0	640
8:45 AM	33	5	15	0	1	0	0	0	12	167	36	0	29	334	3	0	635
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	285	20	127	0	1	0	5	0	48	1553	224	1	174	3435	10	0	5883
	65.97%	4.63%	29.40%	0.00%	16.67%	0.00%	83.33%	0.00%	2.63%	85.05%	12.27%	0.05%	4.81%	94.92%	0.28%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																
<b>PEAK HR VOL:</b>	138	10	42	0	0	0	3	0	28	750	112	0	95	1488	6	0	2672
<b>PEAK HR FACTOR:</b>	0.802	0.500	0.700	0.000	0.000	0.000	0.750	0.000	0.583	0.884	0.933	0.000	0.792	0.947	0.500	0.000	0.958
	0.880				0.750				0.890				0.971				
NOON	1.5 NL	0.5 NT	1 NR	0 NU	0 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	3 WT	0 WR	0 WU	
11:30 AM	51	0	15	0	1	2	2	0	3	141	37	0	20	163	0	0	435
11:45 AM	50	1	32	0	1	1	3	0	1	131	43	0	16	148	0	0	427
12:00 PM	53	2	35	0	1	0	10	0	1	166	44	1	17	149	3	0	482
12:15 PM	55	2	26	0	1	0	5	1	3	170	34	0	20	158	1	0	476
12:30 PM	70	2	24	0	2	1	6	0	3	195	51	0	16	150	2	0	522
12:45 PM	69	1	40	0	1	1	2	0	6	160	41	0	20	147	1	0	489
1:00 PM	72	1	31	0	2	0	11	0	5	192	44	0	19	151	1	0	529
1:15 PM	60	3	29	0	0	0	3	0	3	164	27	0	14	128	0	0	431
1:30 PM	51	3	29	0	2	0	7	0	8	186	38	0	16	143	0	0	483
1:45 PM	48	4	21	0	0	0	2	0	5	201	41	0	21	141	0	0	484
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	579	19	282	0	11	5	51	1	38	1706	400	1	179	1478	8	0	4758
	65.80%	2.16%	32.05%	0.00%	16.18%	7.35%	75.00%	1.47%	1.77%	79.53%	18.65%	0.05%	10.75%	88.77%	0.48%	0.00%	
<b>PEAK HR:</b>	<b>12:15 PM - 01:15 PM</b>																
<b>PEAK HR VOL:</b>	266	6	121	0	6	2	24	1	17	717	170	0	75	606	5	0	2016
<b>PEAK HR FACTOR:</b>	0.924	0.750	0.756	0.000	0.750	0.500	0.545	0.250	0.708	0.919	0.833	0.000	0.938	0.959	0.625	0.000	0.953
	0.893				0.635				0.908				0.958				
PM	1.5 NL	0.5 NT	1 NR	0 NU	0 SL	1 ST	0 SR	0 SU	1 EL	3 ET	0 ER	0 EU	1 WL	3 WT	0 WR	0 WU	
4:00 PM	52	0	27	0	2	1	5	0	0	331	50	0	16	170	1	0	655
4:15 PM	53	0	20	0	3	0	3	0	5	307	35	0	16	165	1	0	608
4:30 PM	59	0	36	0	2	2	6	0	2	375	33	0	6	188	0	0	709
4:45 PM	46	0	23	0	2	0	4	0	1	383	53	0	15	189	0	0	716
5:00 PM	60	0	36	0	6	3	7	0	0	328	55	0	13	232	1	0	741
5:15 PM	58	1	20	0	3	1	4	0	1	349	42	0	17	265	0	0	761
5:30 PM	43	0	28	0	9	4	15	0	1	316	43	0	7	248	0	0	714
5:45 PM	46	0	16	0	4	1	6	0	0	358	59	0	10	246	1	0	747
6:00 PM	40	0	27	0	8	0	6	0	0	270	36	0	17	236	0	0	640
6:15 PM	40	0	26	0	2	2	2	0	1	340	47	0	15	213	0	0	688
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	497	1	259	0	41	14	58	0	11	3357	453	0	132	2152	4	0	6979
	65.65%	0.13%	34.21%	0.00%	36.28%	12.39%	51.33%	0.00%	0.29%	87.86%	11.86%	0.00%	5.77%	94.06%	0.17%	0.00%	
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																
<b>PEAK HR VOL:</b>	207	1	100	0	22	9	32	0	2	1351	199	0	47	991	2	0	2963
<b>PEAK HR FACTOR:</b>	0.863	0.250	0.694	0.000	0.611	0.563	0.533	0.000	0.500	0.943	0.843	0.000	0.691	0.935	0.500	0.000	0.973
	0.802				0.563				0.930				0.922				

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Harbortgate Way & 190th St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-007  
**Date:** 10/1/2019

### Bikes

NS/EW Streets:	Harbortgate Way				Harbortgate Way				190th St				190th St					
<b>AM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1.5	0.5	1	0	0	1	0	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	7:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
	<b>APPROACH %'s:</b>	1	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	5
		100.00%	0.00%	0.00%	0.00%					0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL:</b>	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	
<b>PEAK HR FACTOR:</b>	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.375	
				0.250							0.250							
<b>NOON</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1.5	0.5	1	0	0	1	0	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	12:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
	<b>APPROACH %'s:</b>	1	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	4
		100.00%	0.00%	0.00%	0.00%					0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>12:15 PM - 01:15 PM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.500	
				0.250							0.250				0.250			
<b>PM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1.5	0.5	1	0	0	1	0	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	4:45 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
	<b>APPROACH %'s:</b>	0	0	0	0	0	0	0	0	0	1	1	0	0	6	0	0	8
		0.00%	0.00%	0.00%	0.00%					0.00%	50.00%	50.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL:</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
<b>PEAK HR FACTOR:</b>	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.750	
				0.750														

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Harborgate Way & 190th St  
**City:** Torrance

**Project ID:** 19-05587-007  
**Date:** 10/1/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Harborgate Way		Harborgate Way		190th St		190th St		TOTAL
	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
AM	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	2	0	0	0	0	0	0	2
7:00 AM	1	0	1	0	0	0	0	0	2
7:15 AM	0	0	1	0	0	0	0	0	1
7:30 AM	0	0	0	1	0	2	0	0	3
7:45 AM	0	0	0	0	2	0	0	0	2
8:00 AM	0	1	0	0	0	0	0	0	1
8:15 AM	3	1	0	0	1	5	0	0	10
8:30 AM	1	1	0	1	0	2	0	0	5
8:45 AM	1	2	0	1	3	0	0	0	7
<b>TOTAL VOLUMES :</b>	6	7	2	3	6	9	0	0	33
<b>APPROACH %'s :</b>	46.15%	53.85%	40.00%	60.00%	40.00%	60.00%			
<b>PEAK HR :</b>	07:45 AM - 08:45 AM								
<b>PEAK HR VOL :</b>	4	3	0	1	3	7	0	0	18
<b>PEAK HR FACTOR :</b>	0.333	0.750		0.250	0.375	0.350			0.450
	0.438		0.250		0.417				

NS/EW Streets:	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	1	3	0	1	5	5	0	0	15
11:45 AM	2	1	0	1	0	2	0	0	6
12:00 PM	0	3	6	2	2	4	0	0	17
12:15 PM	6	2	0	1	1	9	0	0	19
12:30 PM	1	1	2	2	7	8	0	0	21
12:45 PM	2	3	1	2	3	0	0	0	11
1:00 PM	4	1	3	1	9	6	0	0	24
1:15 PM	2	0	1	2	3	3	0	0	11
1:30 PM	1	0	0	4	1	5	0	0	11
1:45 PM	3	3	0	1	3	3	0	0	13
<b>TOTAL VOLUMES :</b>	22	17	13	17	34	45	0	0	148
<b>APPROACH %'s :</b>	56.41%	43.59%	43.33%	56.67%	43.04%	56.96%			
<b>PEAK HR :</b>	12:15 PM - 01:15 PM								
<b>PEAK HR VOL :</b>	13	7	6	6	20	23	0	0	75
<b>PEAK HR FACTOR :</b>	0.542	0.583	0.500	0.750	0.556	0.639			0.781
	0.625		0.750		0.717				

NS/EW Streets:	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	2	1	1	0	2	3	0	0	9
4:15 PM	0	0	1	1	1	2	0	0	5
4:30 PM	0	1	2	4	1	3	0	0	11
4:45 PM	0	0	0	0	1	2	0	0	3
5:00 PM	0	0	0	1	1	0	0	0	2
5:15 PM	0	0	0	2	0	2	0	0	4
5:30 PM	0	0	2	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	1	0	0	0	0	1
<b>TOTAL VOLUMES :</b>	2	2	6	9	6	12	0	0	37
<b>APPROACH %'s :</b>	50.00%	50.00%	40.00%	60.00%	33.33%	66.67%			
<b>PEAK HR :</b>	05:00 PM - 06:00 PM								
<b>PEAK HR VOL :</b>	0	0	2	3	1	2	0	0	8
<b>PEAK HR FACTOR :</b>			0.250	0.375	0.250	0.250			0.500
			0.625		0.375				

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

➤ **190<sup>th</sup> Street at Normandie Avenue**

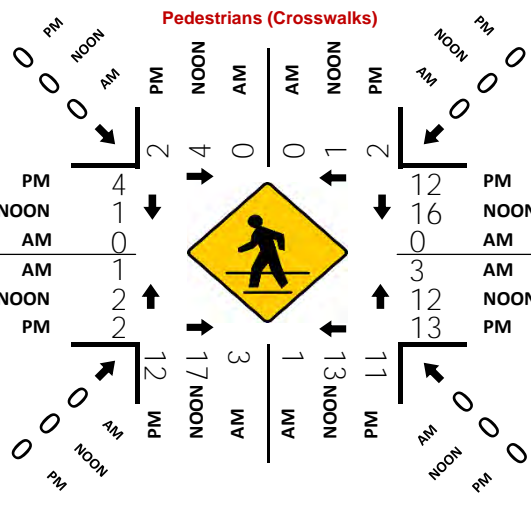
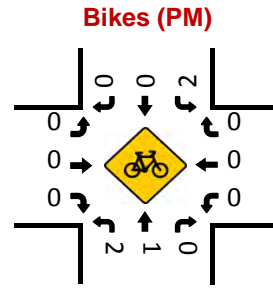
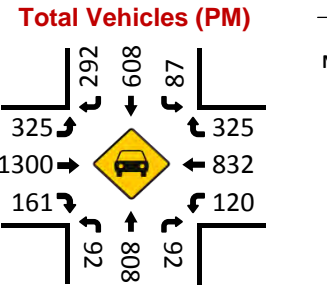
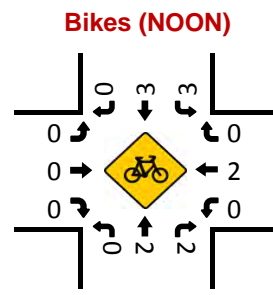
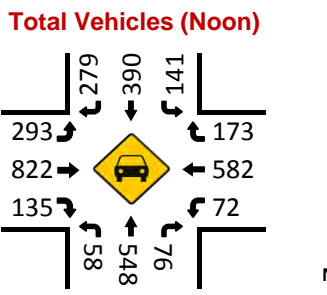
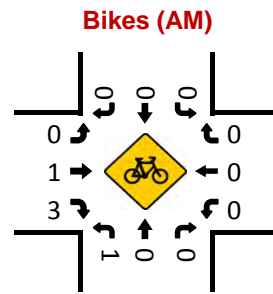
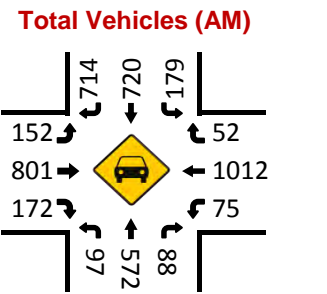
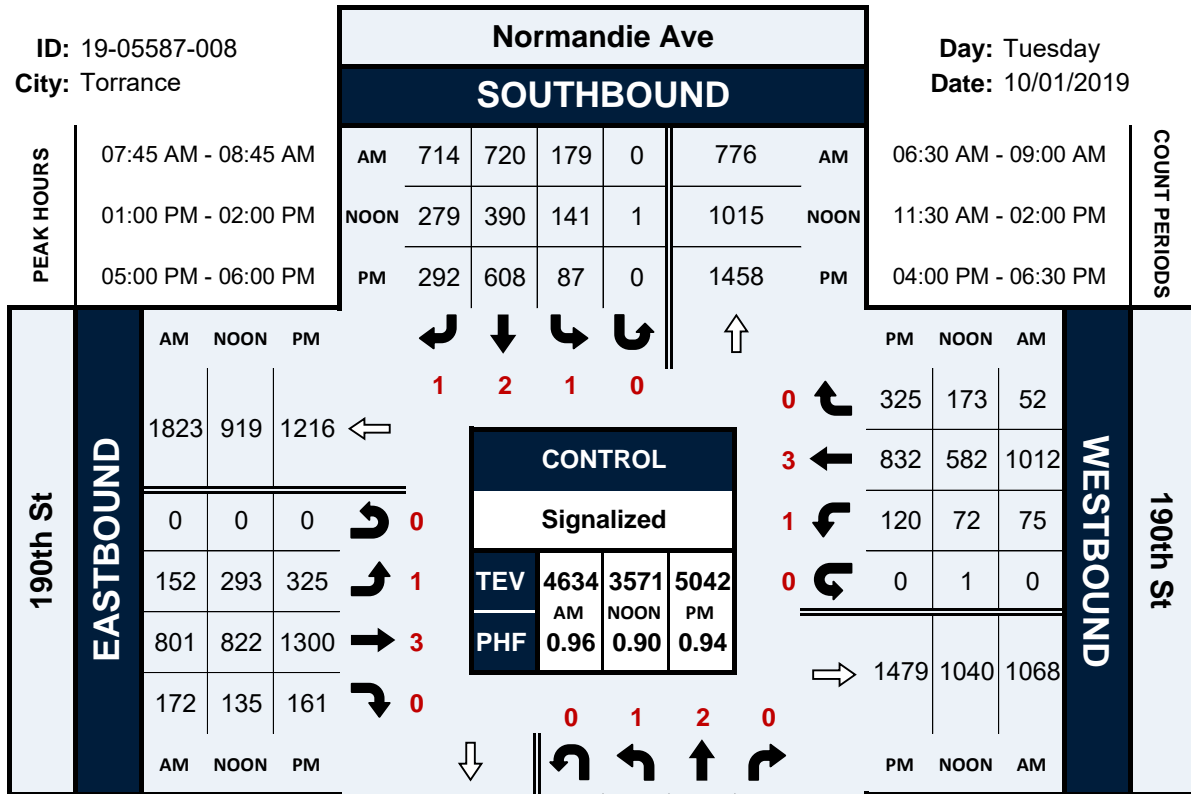


# Normandie Ave & 190th St

## Peak Hour Turning Movement Count

ID: 19-05587-008  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Normandie Ave & 190th St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-008  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Normandie Ave				Normandie Ave				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	14	83	15	0	2	101	140	0	25	71	12	0	14	184	10	0	671
6:45 AM	12	99	12	0	26	160	164	0	24	109	21	0	15	202	7	0	851
7:00 AM	22	114	7	0	21	120	136	0	32	124	25	0	17	236	13	0	867
7:15 AM	29	159	18	0	28	149	132	0	29	155	31	0	25	219	11	0	985
7:30 AM	28	145	19	0	28	152	145	0	41	227	28	0	18	252	12	0	1095
7:45 AM	28	159	25	0	54	200	169	0	34	174	37	0	18	252	16	0	1166
8:00 AM	20	132	19	0	42	184	184	0	38	226	54	0	32	266	7	0	1204
8:15 AM	29	138	26	0	38	180	177	0	30	198	33	0	16	243	18	0	1126
8:30 AM	20	143	18	0	45	156	184	0	50	203	48	0	9	251	11	0	1138
8:45 AM	22	124	16	0	46	170	138	0	33	190	36	0	25	235	19	0	1054
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	13.22%	76.46%	10.32%	0.00%	9.51%	45.29%	45.20%	0.00%	14.37%	71.73%	13.90%	0.00%	7.12%	88.20%	4.67%	0.00%	10157
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																
<b>PEAK HR VOL:</b>	97	572	88	0	179	720	714	0	152	801	172	0	75	1012	52	0	4634
<b>PEAK HR FACTOR:</b>	0.836	0.899	0.846	0.000	0.829	0.900	0.970	0.000	0.760	0.886	0.796	0.000	0.586	0.951	0.722	0.000	0.962
	0.893				0.953				0.884				0.934				

NS/EW Streets:	Normandie Ave				Normandie Ave				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
NOON	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	22	128	12	0	17	84	63	0	65	172	37	0	14	171	48	0	833
11:45 AM	17	124	24	0	25	89	71	0	76	170	27	0	18	159	60	0	860
12:00 PM	19	132	15	0	24	76	59	0	88	187	29	0	18	175	62	0	884
12:15 PM	19	143	15	0	35	87	65	0	78	181	38	0	20	179	47	0	907
12:30 PM	18	114	16	0	40	93	66	0	51	204	27	0	15	161	57	0	862
12:45 PM	11	113	17	0	51	97	64	0	60	205	33	0	12	151	58	0	872
1:00 PM	18	138	21	0	35	83	57	0	76	203	32	0	14	142	36	0	855
1:15 PM	10	135	16	0	34	92	61	0	77	192	29	0	21	144	38	0	849
1:30 PM	15	143	19	0	40	111	88	1	88	226	36	0	19	153	55	0	994
1:45 PM	15	132	20	0	32	104	73	0	52	201	38	0	18	143	44	1	873
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	9.99%	79.34%	10.66%	0.00%	17.37%	47.78%	34.79%	0.05%	23.88%	65.18%	10.95%	0.00%	7.50%	70.04%	22.41%	0.04%	8789
<b>PEAK HR:</b>	<b>01:00 PM - 02:00 PM</b>																
<b>PEAK HR VOL:</b>	58	548	76	0	141	390	279	1	293	822	135	0	72	582	173	1	3571
<b>PEAK HR FACTOR:</b>	0.806	0.958	0.905	0.000	0.881	0.878	0.793	0.250	0.832	0.909	0.888	0.000	0.857	0.951	0.786	0.250	0.898
	0.963				0.845				0.893				0.912				

NS/EW Streets:	Normandie Ave				Normandie Ave				190th St				190th St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	15	166	26	0	18	96	64	0	69	395	51	0	16	168	50	0	1134
4:15 PM	15	167	25	0	24	142	61	0	75	271	39	0	16	141	43	0	1019
4:30 PM	15	183	37	0	18	132	68	0	77	370	37	0	26	166	62	0	1191
4:45 PM	20	217	23	0	28	145	70	0	67	340	37	0	20	147	37	0	1151
5:00 PM	19	220	29	0	19	140	76	0	71	347	34	0	32	203	107	0	1297
5:15 PM	35	239	27	0	35	167	74	0	90	315	44	0	26	209	78	0	1339
5:30 PM	21	164	13	0	22	149	65	0	68	292	44	0	39	221	90	0	1188
5:45 PM	17	185	23	0	11	152	77	0	96	346	39	0	23	199	50	0	1218
6:00 PM	14	141	19	0	28	129	77	0	88	301	43	0	23	206	51	0	1120
6:15 PM	13	159	20	0	16	148	62	0	64	290	52	0	20	163	51	0	1058
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	8.12%	81.21%	10.67%	0.00%	9.47%	60.53%	30.00%	0.00%	17.18%	73.38%	9.43%	0.00%	8.98%	67.95%	23.07%	0.00%	11715
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																
<b>PEAK HR VOL:</b>	92	808	92	0	87	608	292	0	325	1300	161	0	120	832	325	0	5042
<b>PEAK HR FACTOR:</b>	0.657	0.845	0.793	0.000	0.621	0.910	0.948	0.000	0.846	0.937	0.915	0.000	0.769	0.941	0.759	0.000	0.941
	0.824				0.894				0.928				0.912				

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Normandie Ave & 190th St  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-008  
**Date:** 10/1/2019

### Bikes

NS/EW Streets:	Normandie Ave				Normandie Ave				190th St				190th St					
<b>AM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
	7:30 AM	1	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	6
	7:45 AM	1	0	0	1	0	0	0	0	0	1	2	0	0	0	0	0	5
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	3	0	1	1	1	3	0	0	0	3	5	0	0	2	0	0	19	
	60.00%	0.00%	20.00%	20.00%	25.00%	75.00%	0.00%	0.00%	0.00%	37.50%	62.50%	0.00%	0.00%	100.00%	0.00%	0.00%		
<b>PEAK HR:</b>	<b>07:45 AM - 08:45 AM</b>																TOTAL	
<b>PEAK HR VOL:</b>	1	0	0	1	0	0	0	0	0	1	3	0	0	0	0	0	6	
<b>PEAK HR FACTOR:</b>	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.250	0.375	0.000	0.000	0.000	0.000	0.000	0.300	
	0.250								0.333									
<b>NOON</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
	11:30 AM	0	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	4
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	12:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	12:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
	1:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
	1:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
	1:30 PM	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	4
1:45 PM	0	0	1	0	1	1	0	0	0	0	0	0	0	1	0	0	4	
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	3	5	2	0	4	4	0	0	0	2	0	0	0	4	0	0	24	
	30.00%	50.00%	20.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%		
<b>PEAK HR:</b>	<b>01:00 PM - 02:00 PM</b>																TOTAL	
<b>PEAK HR VOL:</b>	0	2	2	0	3	3	0	0	0	0	0	0	0	2	0	0	12	
<b>PEAK HR FACTOR:</b>	0.00	0.250	0.500	0.000	0.750	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.750	
	0.333				0.750								0.500					
<b>PM</b>	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND					
	1	2	0	0	1	2	1	0	1	3	0	0	1	3	0	0	TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	4:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4
	5:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	6:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
6:15 PM	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	4	
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
<b>APPROACH %'s:</b>	2	3	0	0	3	1	1	0	0	2	0	0	0	2	0	1	15	
	40.00%	60.00%	0.00%	0.00%	60.00%	20.00%	20.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	66.67%	0.00%	33.33%		
<b>PEAK HR:</b>	<b>05:00 PM - 06:00 PM</b>																TOTAL	
<b>PEAK HR VOL:</b>	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	6	
<b>PEAK HR FACTOR:</b>	0.50	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.375	
	0.375				0.250								0.250					



# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Normandie Ave & 190th St  
City: Torrance

Project ID: 19-05587-008  
Date: 10/11/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Normandie Ave		Normandie Ave		190th St		190th St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	1	0	3	0	0	0	0	0	4
6:45 AM	0	0	0	0	1	3	0	0	4
7:00 AM	1	0	3	0	0	0	0	0	4
7:15 AM	0	0	3	1	0	2	0	1	7
7:30 AM	0	1	4	0	2	2	0	1	10
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	2	0	0	0	2
8:15 AM	0	0	1	0	0	0	0	0	1
8:30 AM	0	0	2	1	1	0	1	0	5
8:45 AM	0	0	1	1	1	0	0	0	3
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	2	1	17	3	7	7	1	2	40
	66.67%	33.33%	85.00%	15.00%	50.00%	50.00%	33.33%	66.67%	
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>								TOTAL
<b>PEAK HR VOL :</b>	0	0	3	1	3	0	1	0	8
<b>PEAK HR FACTOR :</b>			0.375	0.250	0.375		0.250		0.400
			0.333		0.375		0.250		

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	1	0	4	3	4	3	3	0	18
11:45 AM	0	1	5	0	4	0	0	0	10
12:00 PM	0	1	3	4	2	3	0	0	13
12:15 PM	1	1	10	2	9	2	0	0	25
12:30 PM	0	0	5	1	6	2	0	0	14
12:45 PM	0	2	2	4	1	4	1	0	14
1:00 PM	0	0	2	2	3	3	0	0	10
1:15 PM	1	1	10	4	3	4	1	0	24
1:30 PM	2	0	3	6	3	7	1	1	23
1:45 PM	1	0	2	1	3	2	0	0	9
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	6	6	46	27	38	30	6	1	160
	50.00%	50.00%	63.01%	36.99%	55.88%	44.12%	85.71%	14.29%	
<b>PEAK HR :</b>	<b>01:00 PM - 02:00 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	4	1	17	13	12	16	2	1	66
<b>PEAK HR FACTOR :</b>	0.500	0.250	0.425	0.542	1.000	0.571	0.500	0.250	0.688
	0.625		0.536		0.700		0.375		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	1	0	3	1	0	3	0	0	8
4:15 PM	0	1	3	1	3	3	0	0	11
4:30 PM	0	3	3	5	2	2	1	0	16
4:45 PM	1	0	0	1	3	0	2	0	7
5:00 PM	2	1	4	1	3	3	0	0	14
5:15 PM	0	0	3	5	5	2	0	1	16
5:30 PM	0	1	5	3	5	5	1	2	22
5:45 PM	0	0	0	2	0	2	1	1	6
6:00 PM	0	0	2	1	1	2	0	0	6
6:15 PM	0	0	2	2	1	0	0	0	5
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	4	6	25	22	23	22	5	4	111
	40.00%	60.00%	53.19%	46.81%	51.11%	48.89%	55.56%	44.44%	
<b>PEAK HR :</b>	<b>05:00 PM - 06:00 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	2	2	12	11	13	12	2	4	58
<b>PEAK HR FACTOR :</b>	0.250	0.500	0.600	0.550	0.650	0.600	0.500	0.500	0.659
	0.333		0.719		0.625		0.500		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Western Avenue at 195<sup>th</sup> Street**

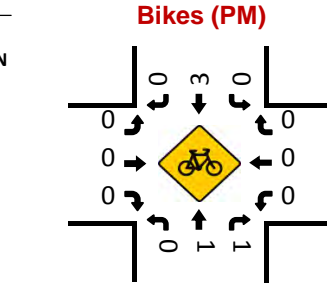
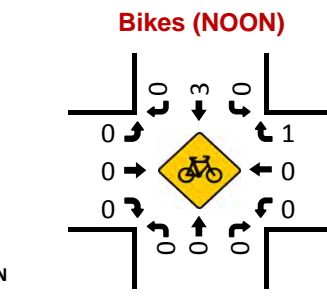
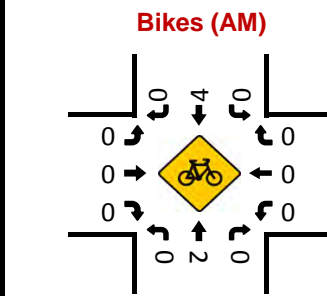
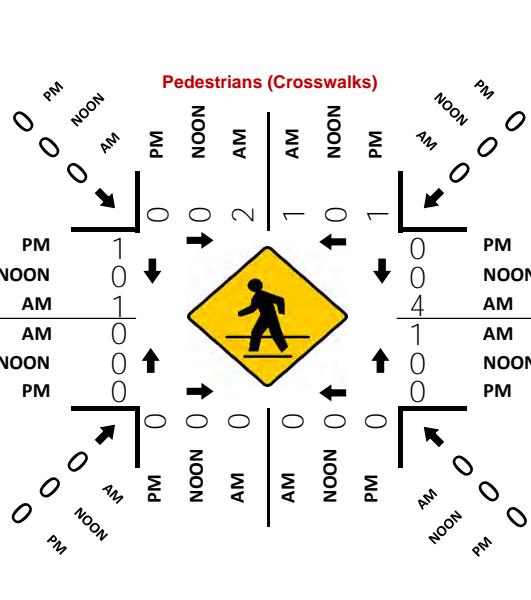
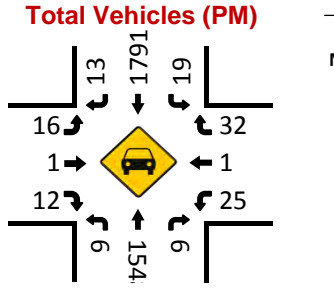
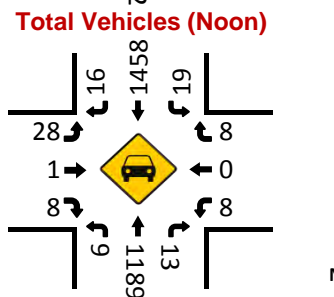
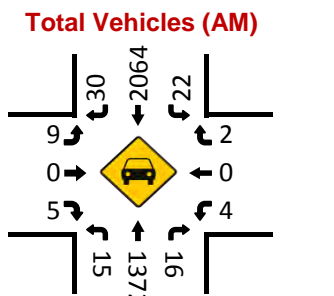
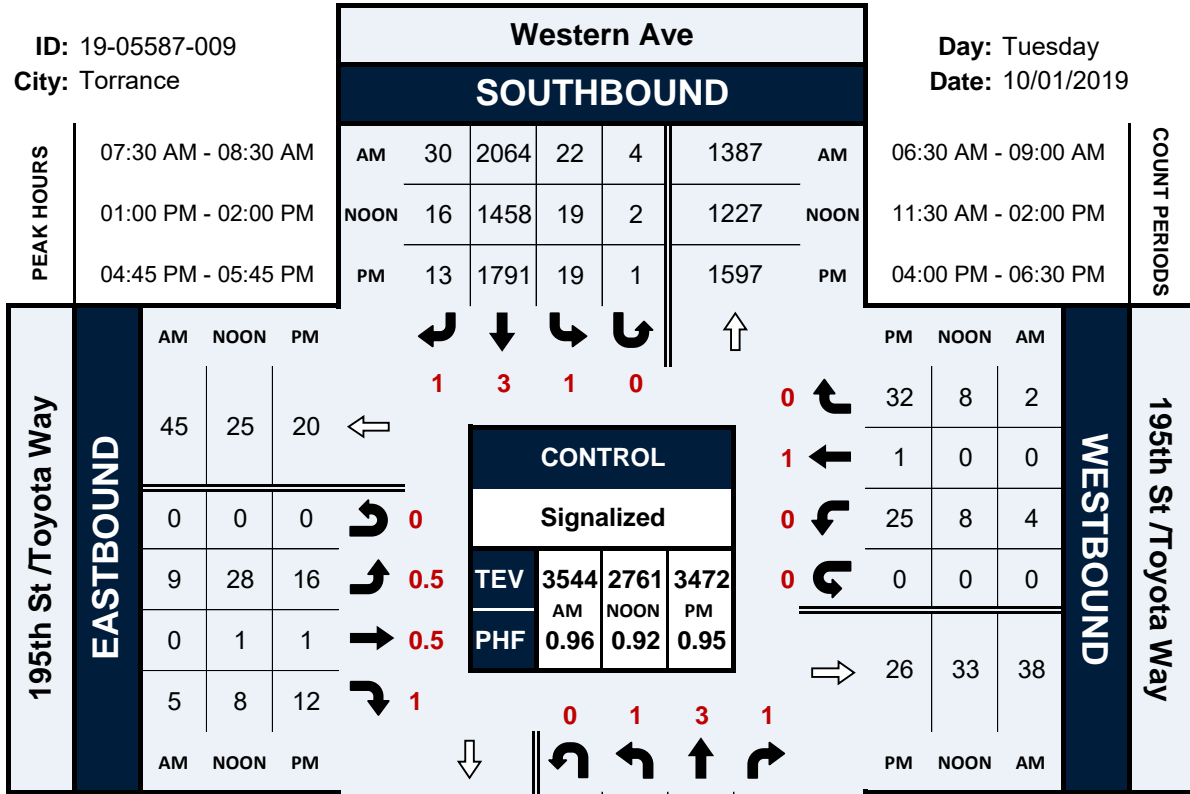


# Western Ave & 195th St /Toyota Way

## Peak Hour Turning Movement Count

ID: 19-05587-009  
City: Torrance

Day: Tuesday  
Date: 10/01/2019



# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & 195th St /Toyota Way  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-009  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Western Ave				Western Ave				195th St /Toyota Way				195th St /Toyota Way				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1	3	1	0	1	3	1	0	0.5	0.5	1	0	0	1	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	1	217	1	0	8	238	19	1	3	0	0	0	0	0	0	0	488
6:45 AM	4	236	2	0	13	341	11	1	3	1	2	0	0	0	0	0	614
7:00 AM	1	274	2	0	9	363	14	0	1	0	0	0	1	0	2	0	667
7:15 AM	1	291	2	0	8	391	8	0	6	0	1	0	1	0	0	1	710
7:30 AM	6	397	4	0	2	501	9	0	0	0	2	0	1	0	1	0	923
7:45 AM	2	388	2	0	5	490	5	1	5	0	1	0	0	0	0	0	899
8:00 AM	5	291	3	0	11	567	10	0	2	0	0	0	1	0	1	0	891
8:15 AM	2	296	7	1	4	506	6	3	2	0	2	0	2	0	0	0	831
8:30 AM	3	307	6	0	4	516	11	0	3	0	1	0	0	0	0	0	851
8:45 AM	1	315	1	0	6	477	7	1	3	0	0	0	3	0	2	0	816
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0.85%	98.14%	0.98%	0.03%	1.53%	96.12%	2.19%	0.15%	73.68%	2.63%	23.68%	0.00%	56.25%	0.00%	37.50%	6.25%	7690
<b>PEAK HR:</b>	07:30 AM - 08:30 AM				22	2064	30	4	9	0	5	0	4	0	2	0	TOTAL
<b>PEAK HR VOL:</b>	15	1372	16	1	0.500	0.910	0.750	0.333	0.450	0.000	0.625	0.000	0.500	0.000	0.500	0.000	3544
<b>PEAK HR FACTOR:</b>	0.625	0.864	0.571	0.250	0.901				0.583				0.750				0.960
<b>NOON</b>	1	3	1	0	1	3	1	0	0.5	0.5	1	0	0	1	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	1	268	3	0	4	263	6	0	5	0	4	0	4	0	5	0	563
11:45 AM	0	259	2	0	9	304	4	1	8	0	1	0	2	1	4	0	595
12:00 PM	1	274	2	0	10	310	3	1	6	0	3	0	4	0	4	0	618
12:15 PM	0	267	3	0	9	342	9	3	8	0	6	0	2	0	5	0	654
12:30 PM	0	254	5	1	3	299	5	1	6	0	1	1	5	1	3	0	585
12:45 PM	1	278	6	0	2	352	6	1	3	1	1	0	3	0	1	0	655
1:00 PM	0	280	4	1	8	336	4	1	8	0	1	0	2	0	4	0	649
1:15 PM	3	303	3	1	7	369	5	0	5	0	1	0	0	0	1	0	698
1:30 PM	3	303	2	0	2	334	3	0	10	1	4	0	2	0	2	0	666
1:45 PM	3	303	4	0	2	419	4	1	5	0	2	0	4	0	1	0	748
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0.42%	98.27%	1.20%	0.11%	1.63%	96.69%	1.42%	0.26%	70.33%	2.20%	26.37%	1.10%	46.67%	3.33%	50.00%	0.00%	6431
<b>PEAK HR:</b>	01:00 PM - 02:00 PM				19	1458	16	2	28	1	8	0	8	0	8	0	TOTAL
<b>PEAK HR VOL:</b>	9	1189	13	2	0.594	0.870	0.800	0.500	0.700	0.250	0.500	0.000	0.500	0.000	0.500	0.000	2761
<b>PEAK HR FACTOR:</b>	0.750	0.981	0.813	0.500	0.877				0.617				0.667				0.923
<b>PM</b>	1	3	1	0	1	3	1	0	0.5	0.5	1	0	0	1	0	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	1	379	2	0	2	423	2	4	2	0	3	0	4	0	6	0	828
4:15 PM	0	330	3	1	4	429	3	1	4	1	1	0	5	0	2	0	784
4:30 PM	0	401	1	0	3	402	4	1	2	0	1	0	3	0	10	0	828
4:45 PM	3	375	0	0	4	418	4	0	6	1	5	0	3	0	5	0	824
5:00 PM	0	382	3	1	9	426	3	1	6	0	3	0	9	1	15	0	859
5:15 PM	1	426	2	0	3	461	3	0	3	0	3	0	5	0	5	0	912
5:30 PM	2	365	1	0	3	486	3	0	1	0	1	0	8	0	7	0	877
5:45 PM	0	364	0	0	3	438	0	0	3	0	2	0	1	0	3	0	814
6:00 PM	1	352	0	0	0	456	6	0	2	0	2	0	3	0	0	0	822
6:15 PM	0	326	0	0	2	438	6	2	4	0	3	0	3	0	2	0	786
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	0.21%	99.41%	0.32%	0.05%	0.74%	98.29%	0.76%	0.20%	55.93%	3.39%	40.68%	0.00%	44.00%	1.00%	55.00%	0.00%	8334
<b>PEAK HR:</b>	04:45 PM - 05:45 PM				19	1791	13	1	16	1	12	0	25	1	32	0	TOTAL
<b>PEAK HR VOL:</b>	6	1548	6	1	0.528	0.921	0.813	0.250	0.667	0.250	0.600	0.000	0.694	0.250	0.533	0.000	3472
<b>PEAK HR FACTOR:</b>	0.500	0.908	0.500	0.250	0.927				0.604				0.580				0.952



# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Western Ave & 195th St / Toyota Way  
 City: Torrance

Project ID: 19-05587-009  
 Date: 10/1/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Western Ave		Western Ave		195th St /Toyota Way		195th St /Toyota Way		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	1	0	0	0	1
7:00 AM	0	1	0	0	1	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	2	1	0	0	1	2	0	0	6
8:00 AM	0	0	0	0	0	2	0	0	2
8:15 AM	0	0	0	0	0	0	0	1	1
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	2	2	0	0	3	4	0	1	12
	50.00%	50.00%			42.86%	57.14%	0.00%	100.00%	
<b>PEAK HR :</b>	<b>07:30 AM - 08:30 AM</b>								TOTAL
<b>PEAK HR VOL :</b>	2	1	0	0	1	4	0	1	9
<b>PEAK HR FACTOR :</b>	0.250	0.250			0.250	0.500		0.250	0.375
	0.250				0.417		0.250		

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	1	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	2	0	0	2
12:45 PM	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	0	0	0	0	1	2	0	0	3
					33.33%	66.67%			
<b>PEAK HR :</b>	<b>01:00 PM - 02:00 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	0	0	0	0	0	0	0	0	0
<b>PEAK HR FACTOR :</b>									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	2	0	0	2
6:15 PM	0	0	0	0	0	2	0	0	2
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
<b>APPROACH %'s :</b>	0	1	0	0	0	4	0	1	6
	0.00%	100.00%			0.00%	100.00%	0.00%	100.00%	
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>								TOTAL
<b>PEAK HR VOL :</b>	0	1	0	0	0	0	0	1	2
<b>PEAK HR FACTOR :</b>		0.250						0.250	0.500
	0.250						0.250		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ Western Avenue at Del Amo Avenue**

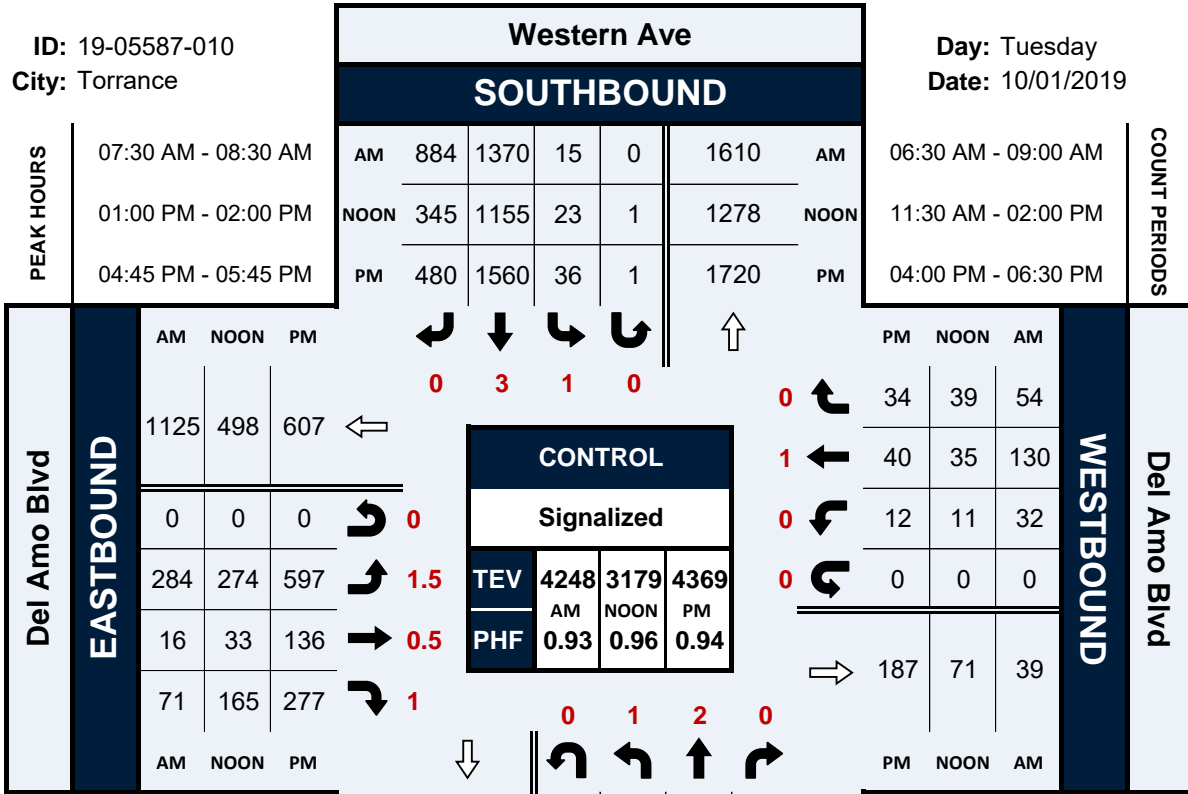


# Western Ave & Del Amo Blvd

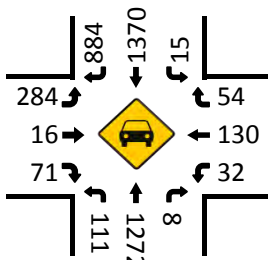
## Peak Hour Turning Movement Count

ID: 19-05587-010  
City: Torrance

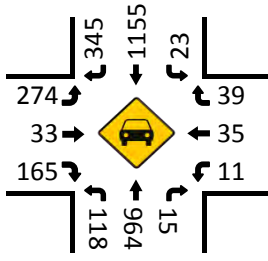
Day: Tuesday  
Date: 10/01/2019



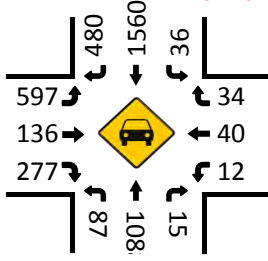
Total Vehicles (AM)



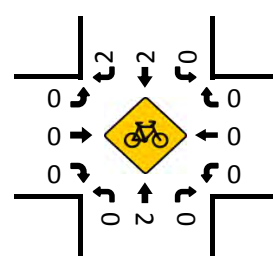
Total Vehicles (Noon)



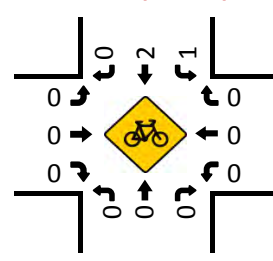
Total Vehicles (PM)



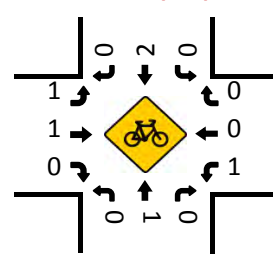
Bikes (AM)



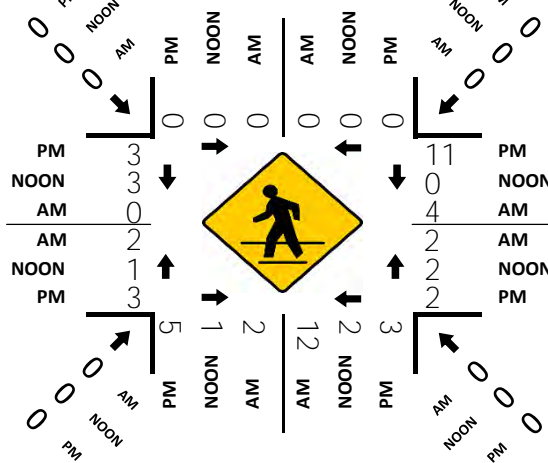
Bikes (NOON)



Bikes (PM)



Pedestrians (Crosswalks)





# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & Del Amo Blvd  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-010  
**Date:** 10/1/2019

### Total

NS/EW Streets:	Western Ave				Western Ave				Del Amo Blvd				Del Amo Blvd				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	3	0	0	1.5	0.5	1	0	0	1	0	0	
AM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
6:30 AM	44	165	2	0	4	131	106	0	15	1	17	0	2	15	6	0	508
6:45 AM	60	238	2	0	2	192	139	0	38	1	15	0	3	16	11	0	717
7:00 AM	45	233	1	1	1	203	162	0	32	1	16	0	3	22	10	0	730
7:15 AM	38	262	3	2	2	246	158	0	59	3	5	0	6	29	9	0	822
7:30 AM	29	352	1	0	4	319	203	0	61	2	10	0	14	32	11	0	1038
7:45 AM	34	367	0	1	2	341	228	0	77	4	26	0	11	34	22	0	1147
8:00 AM	23	266	5	0	7	322	223	0	70	4	17	0	5	23	12	0	977
8:15 AM	25	287	2	0	2	388	230	0	76	6	18	0	2	41	9	0	1086
8:30 AM	25	262	4	1	2	347	185	0	72	4	21	0	6	42	12	0	983
8:45 AM	23	267	3	1	3	338	220	0	87	4	30	0	5	47	11	0	1039
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	346	2699	23	6	29	2827	1854	0	587	30	175	0	57	301	113	0	9047
	11.26%	87.80%	0.75%	0.20%	0.62%	60.02%	39.36%	0.00%	74.12%	3.79%	22.10%	0.00%	12.10%	63.91%	23.99%	0.00%	
<b>PEAK HR:</b>	<b>07:30 AM - 08:30 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	111	1272	8	1	15	1370	884	0	284	16	71	0	32	130	54	0	4248
<b>PEAK HR FACTOR:</b>	0.816	0.866	0.400	0.250	0.536	0.883	0.961	0.000	0.922	0.667	0.683	0.000	0.571	0.793	0.614	0.000	0.926
		0.866				0.915				0.867				0.806			

NS/EW Streets:	Western Ave				Western Ave				Del Amo Blvd				Del Amo Blvd				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	3	0	0	1.5	0.5	1	0	0	1	0	0	
NOON	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:30 AM	23	210	0	0	2	231	57	0	60	5	28	1	0	9	8	0	634
11:45 AM	35	205	2	1	3	276	68	0	58	9	30	0	2	9	3	0	701
12:00 PM	23	211	0	0	1	251	59	0	87	8	33	0	3	5	11	0	692
12:15 PM	23	220	3	0	3	291	76	0	78	9	40	0	3	9	7	0	762
12:30 PM	24	221	0	0	4	295	92	0	41	8	49	0	3	11	5	0	753
12:45 PM	35	247	3	1	3	254	72	0	58	7	33	0	5	7	9	0	734
1:00 PM	24	228	3	1	4	269	99	0	55	13	40	0	2	4	13	0	755
1:15 PM	33	250	7	0	6	307	92	0	58	6	45	0	3	8	9	0	824
1:30 PM	35	258	4	0	3	244	67	1	89	4	39	0	3	14	8	0	769
1:45 PM	26	228	1	0	10	335	87	0	72	10	41	0	3	9	9	0	831
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	281	2278	23	3	39	2753	769	1	656	79	378	1	27	85	82	0	7455
	10.87%	88.12%	0.89%	0.12%	1.09%	77.29%	21.59%	0.03%	58.89%	7.09%	33.93%	0.09%	13.92%	43.81%	42.27%	0.00%	
<b>PEAK HR:</b>	<b>01:00 PM - 02:00 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	118	964	15	1	23	1155	345	1	274	33	165	0	11	35	39	0	3179
<b>PEAK HR FACTOR:</b>	0.843	0.934	0.536	0.250	0.575	0.862	0.871	0.250	0.770	0.635	0.917	0.000	0.917	0.625	0.750	0.000	0.956
		0.924				0.882				0.894				0.850			

NS/EW Streets:	Western Ave				Western Ave				Del Amo Blvd				Del Amo Blvd				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	3	0	0	1.5	0.5	1	0	0	1	0	0	
PM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	24	262	7	0	14	369	97	0	142	31	59	0	5	16	7	0	1033
4:15 PM	32	254	9	1	10	377	101	0	128	24	66	0	8	9	9	0	1028
4:30 PM	20	251	4	3	4	350	109	0	125	29	69	0	4	9	10	0	987
4:45 PM	30	257	1	0	8	369	100	0	143	30	78	0	1	13	6	0	1036
5:00 PM	14	275	3	1	5	384	126	0	119	30	68	0	5	8	7	0	1045
5:15 PM	20	283	6	4	12	376	117	1	186	39	64	0	3	10	9	0	1130
5:30 PM	23	273	5	1	11	431	137	0	149	37	67	0	3	9	12	0	1158
5:45 PM	22	255	10	1	4	391	111	0	126	29	60	0	8	6	10	0	1033
6:00 PM	22	251	4	0	8	350	104	0	113	29	60	0	8	9	5	0	963
6:15 PM	22	237	3	2	13	387	105	0	92	32	60	0	4	12	6	0	975
<b>TOTAL VOLUMES:</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s:</b>	229	2598	52	13	89	3784	1107	1	1323	310	651	0	49	101	81	0	10388
	7.92%	89.83%	1.80%	0.45%	1.79%	75.97%	22.22%	0.02%	57.92%	13.57%	28.50%	0.00%	21.21%	43.72%	35.06%	0.00%	
<b>PEAK HR:</b>	<b>04:45 PM - 05:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL:</b>	87	1088	15	6	36	1560	480	1	597	136	277	0	12	40	34	0	4369
<b>PEAK HR FACTOR:</b>	0.725	0.961	0.625	0.375	0.750	0.905	0.876	0.250	0.802	0.872	0.888	0.000	0.600	0.769	0.708	0.000	0.943
		0.955				0.897				0.874				0.896			

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Western Ave & Del Amo Blvd  
**City:** Torrance  
**Control:** Signalized

**Project ID:** 19-05587-010  
**Date:** 10/1/2019

### Bikes

NS/EW Streets:	Western Ave				Western Ave				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1 NL	2 NT	0 NR	0 NU	1 SL	3 ST	0 SR	0 SU	1.5 EL	0.5 ET	1 ER	0 EU	0 WL	1 WT	0 WR	0 WU	TOTAL
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3
7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	2	0	0	0	1	2	0	0	0	0	0	0	0	0	0	5
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>																	TOTAL
<b>APPROACH %'s :</b>	0.00%	100.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	TOTAL
<b>PEAK HR :</b>	<b>07:30 AM - 08:30 AM</b>																
<b>PEAK HR VOL :</b>	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0	TOTAL
<b>PEAK HR FACTOR :</b>	0.000	0.250	0.000	0.000	0.000	0.500	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	TOTAL
	0.250				0.333				0.000				0.000				0.300
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1 NL	2 NT	0 NR	0 NU	1 SL	3 ST	0 SR	0 SU	1.5 EL	0.5 ET	1 ER	0 EU	0 WL	1 WT	0 WR	0 WU	TOTAL
11:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>																	TOTAL
<b>APPROACH %'s :</b>	0.00%	100.00%	0.00%	0.00%	20.00%	80.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	TOTAL
<b>PEAK HR :</b>	<b>01:00 PM - 02:00 PM</b>																
<b>PEAK HR VOL :</b>	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	TOTAL
<b>PEAK HR FACTOR :</b>	0.00	0.000	0.000	0.000	0.250	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	TOTAL
	0.000				0.375				0.000				0.000				0.375
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1 NL	2 NT	0 NR	0 NU	1 SL	3 ST	0 SR	0 SU	1.5 EL	0.5 ET	1 ER	0 EU	0 WL	1 WT	0 WR	0 WU	TOTAL
4:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	2	0	0	0	1	0	0	1	0	0	0	4
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL VOLUMES :</b>																	TOTAL
<b>APPROACH %'s :</b>	0.00%	100.00%	0.00%	0.00%	33.33%	66.67%	0.00%	0.00%	33.33%	66.67%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	TOTAL
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>																
<b>PEAK HR VOL :</b>	0	1	0	0	0	2	0	0	1	1	0	0	1	0	0	0	TOTAL
<b>PEAK HR FACTOR :</b>	0.00	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.250	0.000	0.000	0.250	0.000	0.000	0.000	TOTAL
	0.250				0.250				0.500				0.250				0.375

# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Western Ave & Del Amo Blvd  
City: Torrance

Project ID: 19-05587-010  
Date: 10/1/2019

### Pedestrians (Crosswalks)

NS/EW Streets:	Western Ave		Western Ave		Del Amo Blvd		Del Amo Blvd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
6:30 AM	0	0	1	3	0	0	0	0	4
6:45 AM	0	0	0	5	0	0	0	0	5
7:00 AM	0	0	1	3	1	0	0	0	5
7:15 AM	0	0	0	6	1	0	0	0	7
7:30 AM	0	0	2	11	2	0	0	0	15
7:45 AM	0	0	0	1	0	0	2	0	3
8:00 AM	0	0	0	0	0	2	0	0	2
8:15 AM	0	0	0	0	0	2	0	0	2
8:30 AM	0	0	1	4	1	0	0	0	6
8:45 AM	0	0	0	3	0	0	0	1	4
<b>TOTAL VOLUMES :</b>	0	0	5	36	5	4	2	1	53
<b>APPROACH %'s :</b>			12.20%	87.80%	55.56%	44.44%	66.67%	33.33%	
<b>PEAK HR :</b>	<b>07:30 AM - 08:30 AM</b>								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	0	2	12	2	4	2	0	22
<b>PEAK HR FACTOR :</b>			0.250	0.273	0.250	0.500	0.250	0	0.367
			0.269		0.750		0.250		

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
11:30 AM	0	0	0	3	0	2	0	1	6
11:45 AM	0	0	1	0	1	0	1	0	3
12:00 PM	0	0	2	1	1	2	1	1	8
12:15 PM	0	0	1	1	0	4	0	0	6
12:30 PM	0	0	0	2	1	0	0	1	4
12:45 PM	0	0	0	1	0	0	1	0	2
1:00 PM	0	0	1	0	1	0	0	0	2
1:15 PM	0	0	0	1	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	1	1	0	1	3	6
<b>TOTAL VOLUMES :</b>	0	0	5	10	5	8	4	6	38
<b>APPROACH %'s :</b>			33.33%	66.67%	38.46%	61.54%	40.00%	60.00%	
<b>PEAK HR :</b>	<b>01:00 PM - 02:00 PM</b>								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	0	1	2	2	0	1	3	9
<b>PEAK HR FACTOR :</b>			0.250	0.500	0.500	0	0.250	0.250	0.375
			0.750		0.500		0.250		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	2	2	0	2	0	0	6
4:15 PM	0	0	0	0	1	0	0	0	1
4:30 PM	0	0	6	1	2	0	0	0	9
4:45 PM	0	0	2	1	1	4	3	0	11
5:00 PM	0	0	0	1	0	2	0	0	3
5:15 PM	0	0	0	1	0	3	0	2	6
5:30 PM	0	0	3	0	1	2	0	1	7
5:45 PM	0	0	1	0	0	0	0	0	1
6:00 PM	0	0	2	0	0	0	0	1	3
6:15 PM	0	0	1	0	0	0	1	1	3
<b>TOTAL VOLUMES :</b>	0	0	17	6	5	13	4	5	50
<b>APPROACH %'s :</b>			73.91%	26.09%	27.78%	72.22%	44.44%	55.56%	
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>								<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	0	5	3	2	11	3	3	27
<b>PEAK HR FACTOR :</b>			0.417	0.750	0.500	0.688	0.250	0.375	0.614
			0.667		0.650		0.500		

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

**➤ 24-Hour Machine Counts**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

- **190<sup>th</sup> Street west of I-405 SB Ramps**



### VOLUME

190th St W/O 405 SB Ramps

Day: Tuesday  
Date: 8/6/2019

City: Torrance  
Project #: CA19\_5461\_001

DAILY TOTALS					NB	SB	EB	WB	Total			
					0	0	22,614	15,949	38,563			
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL	
00:00			86	32	118	12:00			317	225	542	
00:15			54	19	73	12:15			366	243	609	
00:30			41	17	58	12:30			355	207	562	
00:45			53	234	13	81	12:45		289	1327	244	919
01:00			49	10	59	13:00			323	229	552	
01:15			19	10	29	13:15			332	276	608	
01:30			26	13	39	13:30			385	295	680	
01:45			18	112	9	42	13:45		332	1372	232	1032
02:00			27	7	34	14:00			408	212	620	
02:15			36	16	52	14:15			340	192	532	
02:30			30	7	37	14:30			397	213	610	
02:45			14	107	16	46	14:45		381	1526	201	818
03:00			16	16	32	15:00			398	218	616	
03:15			27	18	45	15:15			369	193	562	
03:30			25	19	44	15:30			400	228	628	
03:45			29	97	28	81	15:45		389	1556	185	824
04:00			30	27	57	16:00			439	225	664	
04:15			38	44	82	16:15			416	241	657	
04:30			55	61	116	16:30			489	243	732	
04:45			54	177	89	221	16:45		418	1762	242	951
05:00			102	66	168	17:00			493	269	762	
05:15			96	114	210	17:15			439	249	688	
05:30			130	161	291	17:30			445	274	719	
05:45			128	456	251	592	17:45		401	1778	276	1068
06:00			161	179	340	18:00			334	242	576	
06:15			198	253	451	18:15			417	190	607	
06:30			230	261	491	18:30			390	195	585	
06:45			225	814	316	1009	18:45		321	1462	183	810
07:00			293	310	603	19:00			303	184	487	
07:15			266	293	559	19:15			283	169	452	
07:30			331	342	673	19:30			304	152	456	
07:45			368	1258	349	1294	19:45		279	1169	143	648
08:00			319	336	655	20:00			225	102	327	
08:15			295	323	618	20:15			252	126	378	
08:30			351	355	706	20:30			226	88	314	
08:45			315	1280	348	1362	20:45		206	909	86	402
09:00			285	309	594	21:00			198	97	295	
09:15			284	279	563	21:15			226	79	305	
09:30			296	315	611	21:30			229	80	309	
09:45			242	1107	248	1151	21:45		208	861	91	347
10:00			309	243	552	22:00			147	67	214	
10:15			265	220	485	22:15			157	59	216	
10:30			298	226	524	22:30			139	67	206	
10:45			263	1135	231	920	22:45		107	550	56	249
11:00			305	217	522	23:00			127	51	178	
11:15			278	242	520	23:15			94	32	126	
11:30			304	237	541	23:30			91	36	127	
11:45			292	1179	243	939	23:45		74	386	24	143
<b>TOTALS</b>			7956	7738	15694	<b>TOTALS</b>			14658	8211	22869	
<b>SPLIT %</b>			50.7%	49.3%	40.7%	<b>SPLIT %</b>			64.1%	35.9%	59.3%	

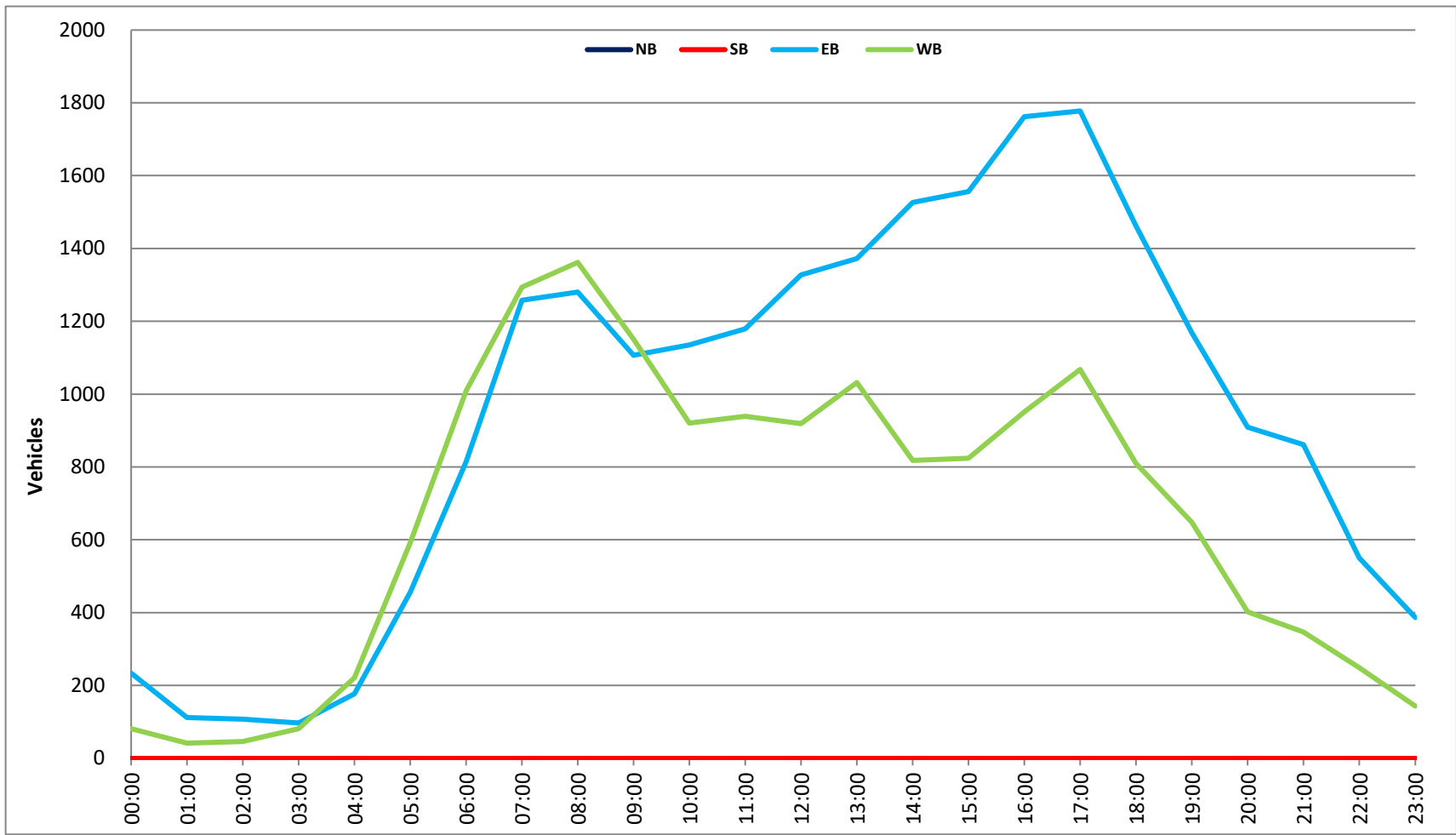
DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	22,614	15,949	38,563		
AM Peak Hour			07:45	07:45	07:45	PM Peak Hour			16:30	17:00	17:00
AM Pk Volume			1333	1363	2696	PM Pk Volume			1839	1068	2846
Pk Hr Factor			0.906	0.960	0.940	Pk Hr Factor			0.933	0.967	0.934
7 - 9 Volume	0	0	2538	2656	5194	4 - 6 Volume	0	0	3540	2019	5559
7 - 9 Peak Hour			07:45	07:45	07:45	4 - 6 Peak Hour			16:30	17:00	17:00
7 - 9 Pk Volume	0	0	1333	1363	2696	4 - 6 Pk Volume	0	0	1839	1068	2846
Pk Hr Factor	0.000	0.000	0.906	0.960	0.940	Pk Hr Factor	0.000	0.000	0.933	0.967	0.934

Project #: CA19\_5461\_001

City: Torrance

Location: 190th St W/O 405 SB Ramps

Date: 8/6/2019



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

- **190<sup>th</sup> Street between I-405 SB Ramps and  
Western Avenue**





### VOLUME

190th St Bet. 405 SB Ramps & Western Ave

Day: Tuesday  
Date: 8/6/2019

City: Torrance  
Project #: CA19\_5461\_002

DAILY TOTALS					NB	SB	EB	WB	Total			
					0	0	18,972	17,665	36,637			
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL	
00:00			61	48	109	12:00			259	265	524	
00:15			39	26	65	12:15			259	267	526	
00:30			33	33	66	12:30			245	252	497	
00:45			39	172	17	12:45			232	995	268	1052
01:00			27	19	46	13:00			200	271	471	
01:15			31	23	54	13:15			228	321	549	
01:30			22	21	43	13:30			248	337	585	
01:45			21	101	16	13:45			277	953	273	1202
02:00			26	11	37	14:00			277	257	534	
02:15			27	33	60	14:15			285	217	502	
02:30			28	12	40	14:30			337	240	577	
02:45			17	98	25	14:45			314	1213	215	929
03:00			19	32	51	15:00			361	220	581	
03:15			29	17	46	15:15			340	229	569	
03:30			15	30	45	15:30			357	233	590	
03:45			21	84	37	15:45			364	1422	218	900
04:00			20	34	54	16:00			423	244	667	
04:15			19	46	65	16:15			441	269	710	
04:30			34	75	109	16:30			466	252	718	
04:45			38	111	106	16:45			429	1759	265	1030
05:00			50	84	134	17:00			481	289	770	
05:15			46	121	167	17:15			450	274	724	
05:30			83	167	250	17:30			461	276	737	
05:45			102	281	257	17:45			439	1831	305	1144
06:00			95	203	298	18:00			345	248	593	
06:15			129	244	373	18:15			425	211	636	
06:30			148	275	423	18:30			491	206	697	
06:45			198	570	319	18:45			377	1638	212	877
07:00			200	295	495	19:00			304	194	498	
07:15			212	313	525	19:15			283	192	475	
07:30			245	327	572	19:30			259	176	435	
07:45			331	988	344	19:45			237	1083	156	718
08:00			305	330	635	20:00			182	141	323	
08:15			274	333	607	20:15			212	161	373	
08:30			295	342	637	20:30			169	116	285	
08:45			281	1155	342	20:45			160	723	113	531
09:00			220	301	521	21:00			175	128	303	
09:15			215	312	527	21:15			140	107	247	
09:30			193	324	517	21:30			171	117	288	
09:45			220	848	287	21:45			120	606	120	472
10:00			190	262	452	22:00			98	109	207	
10:15			179	240	419	22:15			107	77	184	
10:30			222	245	467	22:30			102	95	197	
10:45			191	782	275	22:45			78	385	81	362
11:00			233	270	503	23:00			89	70	159	
11:15			205	268	473	23:15			71	39	110	
11:30			239	257	496	23:30			60	51	111	
11:45			219	896	256	23:45			58	278	34	194
<b>TOTALS</b>				6086	8254	<b>14340</b>	<b>TOTALS</b>			12886	9411	<b>22297</b>
<b>SPLIT %</b>				42.4%	57.6%	<b>39.1%</b>	<b>SPLIT %</b>			57.8%	42.2%	<b>60.9%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	18,972	17,665	36,637

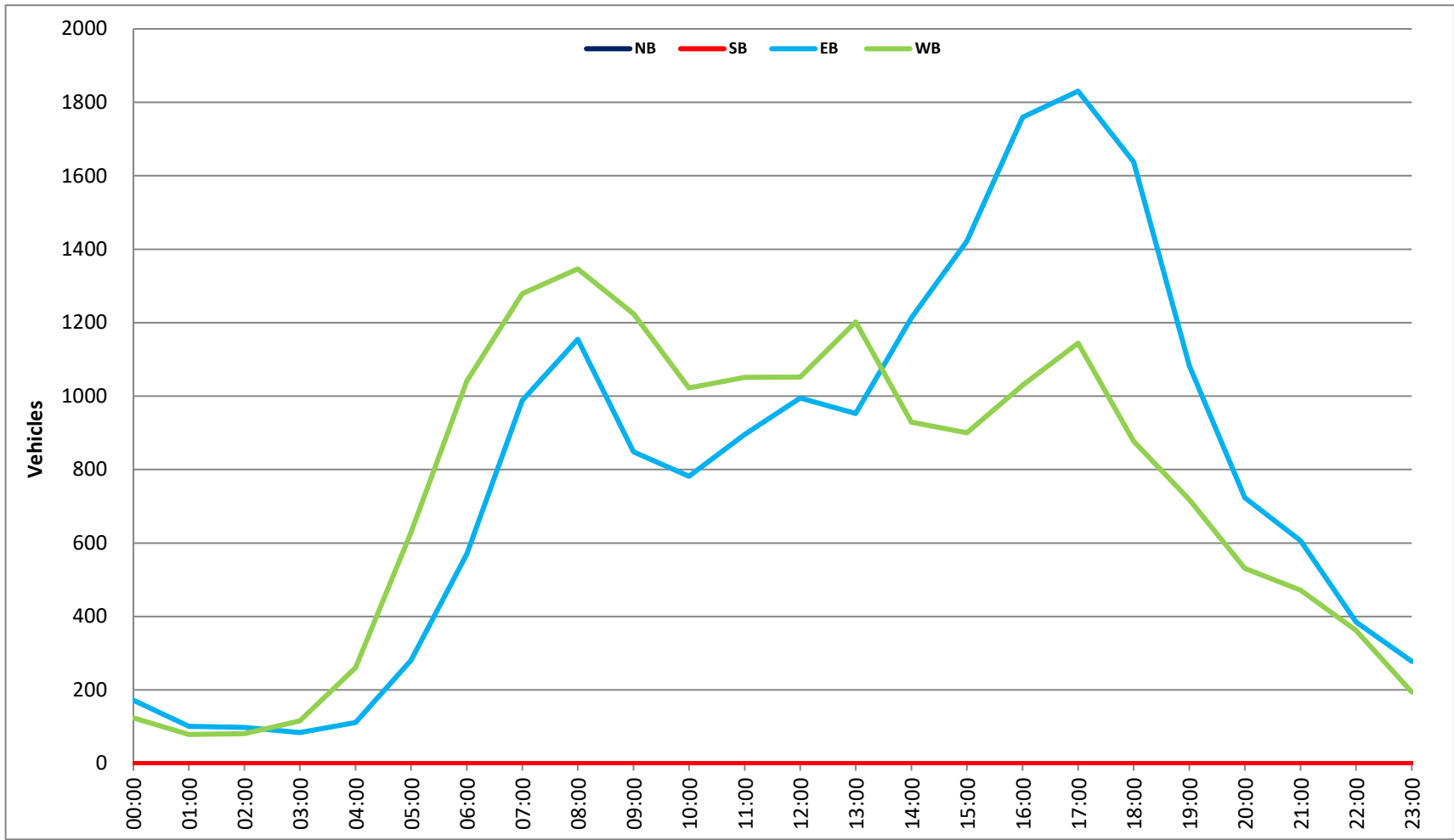
AM Peak Hour			07:45	07:45	07:45	PM Peak Hour			17:00	13:00	17:00
AM Pk Volume			1205	1349	2554	PM Pk Volume			1831	1202	2975
Pk Hr Factor			0.910	0.980	0.946	Pk Hr Factor			0.952	0.892	0.966
7 - 9 Volume	0	0	2143	2626	4769	4 - 6 Volume	0	0	3590	2174	5764
7 - 9 Peak Hour			07:45	07:45	07:45	4 - 6 Peak Hour			17:00	17:00	17:00
7 - 9 Pk Volume	0	0	1205	1349	2554	4 - 6 Pk Volume	0	0	1831	1144	2975
Pk Hr Factor	0.000	0.000	0.910	0.980	0.946	Pk Hr Factor	0.000	0.000	0.952	0.938	0.966

Project #: CA19\_5461\_002

City: Torrance

Location: 190th St Bet. 405 SB Ramps & Western Ave

Date: 8/6/2019



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

➤ **190<sup>th</sup> Street east of Western Avenue**



# VOLUME

190th St E/O Western Ave

Day: Tuesday  
Date: 8/6/2019

City: Torrance  
Project #: CA19\_5461\_003

DAILY TOTALS					NB	SB						Total
					0	0						29,152
							14,465			14,687		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL	
00:00			35	22	57	12:00			207	207	414	
00:15			16	20	36	12:15			176	222	398	
00:30			12	12	24	12:30			228	204	432	
00:45			21	84	15	69	12:45		203	814	216	849
01:00			8	12	20	13:00			207	223	430	
01:15			12	15	27	13:15			196	277	473	
01:30			14	4	18	13:30			244	270	514	
01:45			12	46	8	39	13:45		221	868	219	989
02:00			14	4	18	14:00			243	189	432	
02:15			26	9	35	14:15			255	177	432	
02:30			15	5	20	14:30			350	208	558	
02:45			8	63	8	26	14:45		278	1126	196	770
03:00			16	10	26	15:00			343	187	530	
03:15			13	14	27	15:15			300	272	572	
03:30			18	16	34	15:30			320	234	554	
03:45			16	63	6	46	15:45		284	1247	196	889
04:00			11	18	29	16:00			379	264	643	
04:15			16	21	37	16:15			372	250	622	
04:30			15	23	38	16:30			397	254	651	
04:45			31	73	42	104	16:45		356	1504	243	1011
05:00			27	22	49	17:00			375	291	666	
05:15			33	74	107	17:15			346	298	644	
05:30			43	148	191	17:30			383	323	706	
05:45			51	154	216	460	17:45		316	1420	305	1217
06:00			61	149	210	18:00			273	239	512	
06:15			89	213	302	18:15			352	228	580	
06:30			85	236	321	18:30			402	177	579	
06:45			141	376	295	893	18:45		288	1315	212	856
07:00			140	264	404	19:00			218	154	372	
07:15			170	268	438	19:15			180	146	326	
07:30			180	328	508	19:30			176	120	296	
07:45			255	745	349	1209	19:45		151	725	117	537
08:00			227	291	518	20:00			121	106	227	
08:15			206	280	486	20:15			114	88	202	
08:30			205	324	529	20:30			117	61	178	
08:45			178	816	285	1180	20:45		96	448	93	348
09:00			163	263	426	21:00			106	70	176	
09:15			157	263	420	21:15			86	60	146	
09:30			153	240	393	21:30			100	66	166	
09:45			144	617	210	976	21:45		64	356	63	259
10:00			143	195	338	22:00			59	85	144	
10:15			133	203	336	22:15			53	34	87	
10:30			171	187	358	22:30			60	44	104	
10:45			123	570	197	782	22:45		48	220	43	206
11:00			180	215	395	23:00			37	28	65	
11:15			161	207	368	23:15			38	27	65	
11:30			177	217	394	23:30			31	33	64	
11:45			157	675	223	862	23:45		34	140	22	110
<b>TOTALS</b>			4282	6646	10928	<b>TOTALS</b>			10183	8041	18224	
<b>SPLIT %</b>			39.2%	60.8%	37.5%	<b>SPLIT %</b>			55.9%	44.1%	62.5%	

DAILY TOTALS					NB	SB						Total
					0	0						29,152
							14,465			14,687		

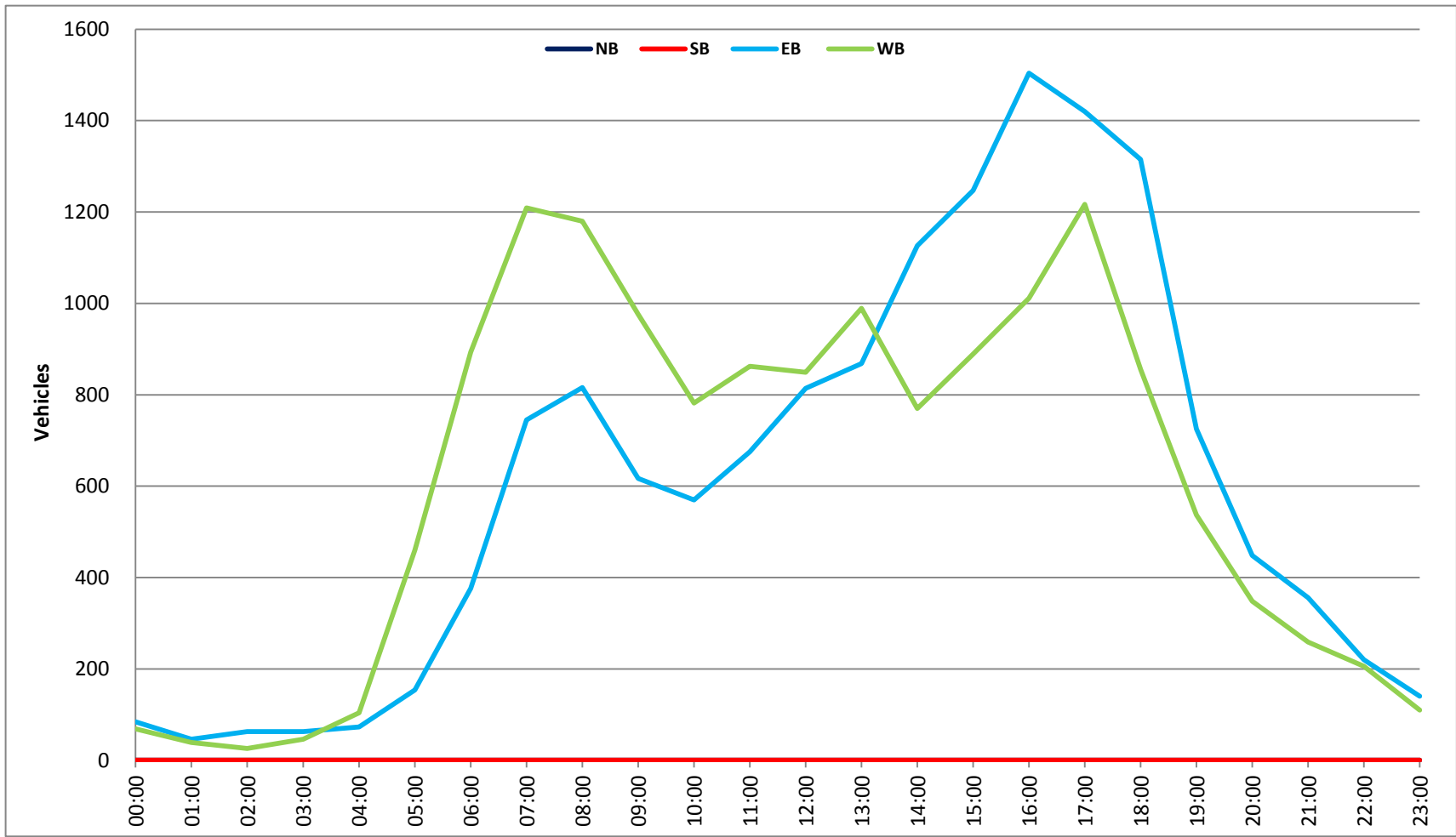
AM Peak Hour			07:45	07:30	07:45	PM Peak Hour			16:00	17:00	17:00
AM Pk Volume			893	1248	2137	PM Pk Volume			1504	1217	2637
Pk Hr Factor			0.875	0.894	0.885	Pk Hr Factor			0.947	0.942	0.934
7 - 9 Volume	0	0	1561	2389	3950	4 - 6 Volume	0	0	2924	2228	5152
7 - 9 Peak Hour			07:45	07:30	07:45	4 - 6 Peak Hour			16:00	17:00	17:00
7 - 9 Pk Volume	0	0	893	1248	2137	4 - 6 Pk Volume	0	0	1504	1217	2637
Pk Hr Factor	0.000	0.000	0.875	0.894	0.885	Pk Hr Factor	0.000	0.000	0.947	0.942	0.934

Project #: CA19\_5461\_003

City: Torrance

Location: 190th St E/O Western Ave

Date: 8/6/2019



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

- **Western Avenue north of 190<sup>th</sup> Street**



**VOLUME**

Western Ave N/O 190th St

Day: Tuesday  
Date: 8/6/2019

City: Torrance  
Project #: CA19\_5461\_004

DAILY TOTALS					NB	SB	EB	WB	Total		
					20,205	24,266	0	0	44,471		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	66	63			129	12:00	349	381			730
00:15	57	53			110	12:15	337	367			704
00:30	51	44			95	12:30	313	399			712
00:45	45	219	28	188	73	12:45	305	1304	403	1550	708
					407						2854
01:00	33	43			76	13:00	288	410			698
01:15	26	30			56	13:15	308	418			726
01:30	28	24			52	13:30	352	418			770
01:45	32	119	36	133	68	13:45	302	1250	390	1636	692
					252						2886
02:00	18	31			49	14:00	272	367			639
02:15	43	36			79	14:15	272	362			634
02:30	44	32			76	14:30	363	344			707
02:45	44	149	44	143	88	14:45	329	1236	370	1443	699
					292						2679
03:00	11	35			46	15:00	310	385			695
03:15	27	34			61	15:15	361	373			734
03:30	25	53			78	15:30	376	371			747
03:45	47	110	72	194	119	15:45	391	1438	360	1489	751
					304						2927
04:00	42	40			82	16:00	362	319			681
04:15	44	97			141	16:15	400	363			763
04:30	59	149			208	16:30	389	340			729
04:45	77	222	201	487	278	16:45	408	1559	350	1372	758
					709						2931
05:00	86	111			197	17:00	441	380			821
05:15	107	153			260	17:15	501	382			883
05:30	143	178			321	17:30	444	373			817
05:45	123	459	229	671	352	17:45	450	1836	373	1508	823
					1130						3344
06:00	124	185			309	18:00	357	352			709
06:15	163	261			424	18:15	379	421			800
06:30	198	336			534	18:30	288	445			733
06:45	193	678	369	1151	562	18:45	274	1298	370	1588	644
					1829						2886
07:00	209	343			552	19:00	285	335			620
07:15	224	369			593	19:15	214	315			529
07:30	241	374			615	19:30	266	236			502
07:45	272	946	409	1495	681	19:45	215	980	219	1105	434
					2441						2085
08:00	260	437			697	20:00	247	232			479
08:15	261	444			705	20:15	227	221			448
08:30	248	396			644	20:30	197	207			404
08:45	256	1025	424	1701	680	20:45	205	876	182	842	387
					2726						1718
09:00	212	325			537	21:00	197	218			415
09:15	242	329			571	21:15	154	167			321
09:30	233	344			577	21:30	195	178			373
09:45	258	945	324	1322	582	21:45	153	699	163	726	316
					2267						1425
10:00	234	305			539	22:00	136	140			276
10:15	256	305			561	22:15	125	113			238
10:30	218	338			556	22:30	107	95			202
10:45	249	957	356	1304	605	22:45	105	473	104	452	209
					2261						925
11:00	281	346			627	23:00	86	98			184
11:15	266	353			619	23:15	76	77			153
11:30	274	372			646	23:30	74	73			147
11:45	309	1130	380	1451	689	23:45	61	297	67	315	128
					2581						612
<b>TOTALS</b>	6959	10240			17199	<b>TOTALS</b>	13246	14026			27272
<b>SPLIT %</b>	40.5%	59.5%			38.7%	<b>SPLIT %</b>	48.6%	51.4%			61.3%

DAILY TOTALS					NB	SB	EB	WB	Total
					20,205	24,266	0	0	44,471
AM Peak Hour	11:45	08:00			11:45	PM Peak Hour	17:00	12:45	17:00
AM Pk Volume	1308	1701			2835	PM Pk Volume	1836	1649	3344
Pk Hr Factor	0.937	0.958			0.971	Pk Hr Factor	0.916	0.986	0.947
7 - 9 Volume	1971	3196	0	0	5167	4 - 6 Volume	3395	2880	0
7 - 9 Peak Hour	07:45	08:00			07:45	4 - 6 Peak Hour	17:00	17:00	17:00
7 - 9 Pk Volume	1041	1701	0	0	2727	4 - 6 Pk Volume	1836	1508	0
Pk Hr Factor	0.957	0.958	0.000	0.000	0.967	Pk Hr Factor	0.916	0.987	0.000

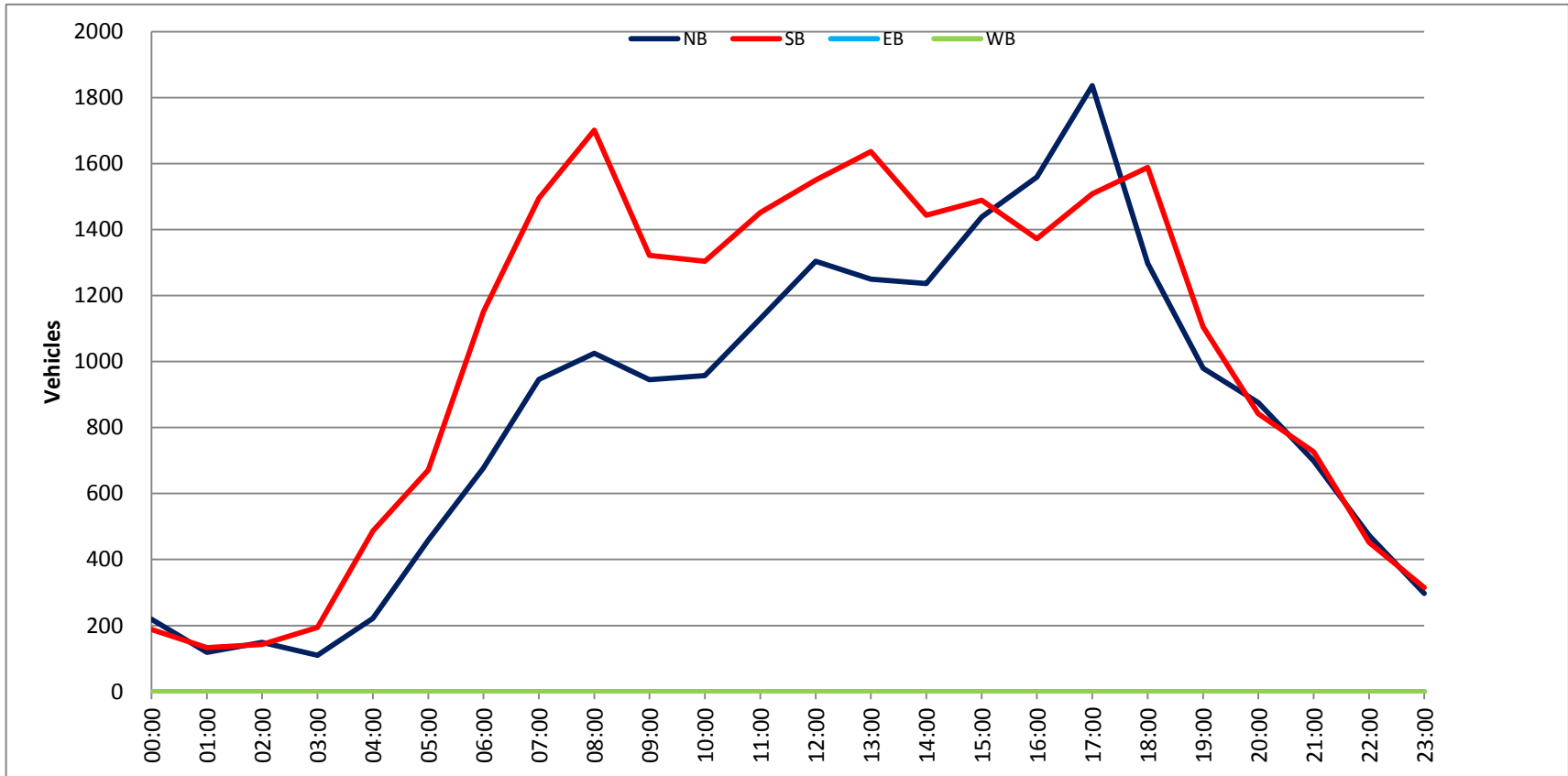
Prepared by NDS/ATD

Project #: CA19\_5461\_004

City: Torrance

Location: Western Ave N/O 190th St

Date: 8/6/2019





**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Existing Traffic Volume Data (2019)**

- **Western Avenue south of 190<sup>th</sup> Street**



**VOLUME**

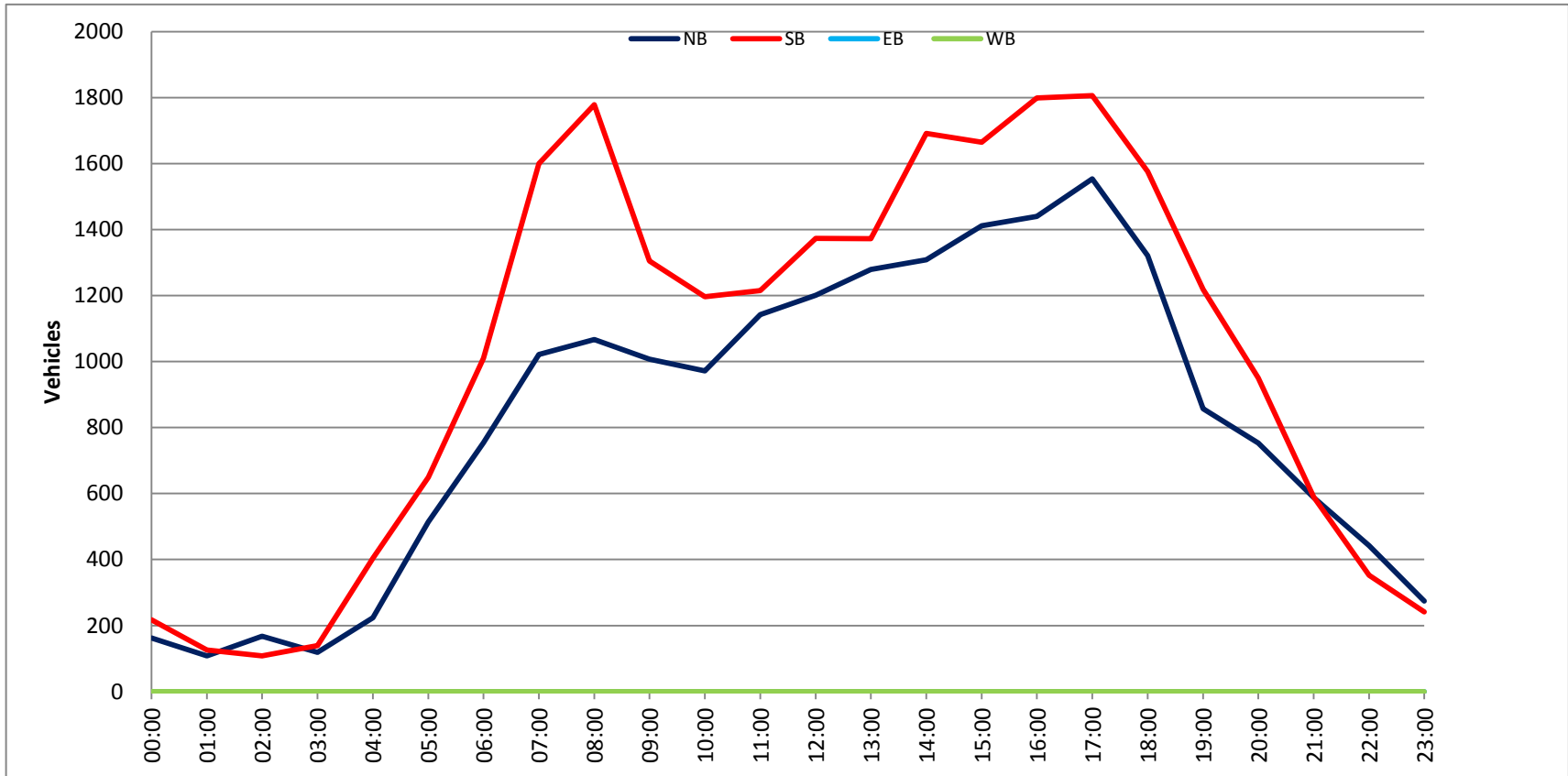
Western Ave S/O 190th St

Day: Tuesday  
Date: 8/6/2019

City: Torrance  
Project #: CA19\_5461\_005

DAILY TOTALS					NB	SB	EB	WB	Total		
					19,686	24,381	0	0	44,067		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	41	60			101	12:00	312	308			620
00:15	35	63			98	12:15	315	355			670
00:30	45	59			104	12:30	307	344			651
00:45	41	162	35	217	76	12:45	267	1201	366	1373	633
01:00	28	44			72	13:00	298	298			596
01:15	18	38			56	13:15	301	382			683
01:30	33	24			57	13:30	364	324			688
01:45	29	108	20	126	49	13:45	316	1279	368	1372	684
02:00	21	25			46	14:00	274	437			711
02:15	61	26			87	14:15	308	454			762
02:30	48	33			81	14:30	362	382			744
02:45	38	168	24	108	62	14:45	364	1308	418	1691	782
03:00	16	26			42	15:00	288	409			697
03:15	22	28			50	15:15	368	431			799
03:30	31	35			66	15:30	404	443			847
03:45	50	119	50	139	100	15:45	351	1411	382	1665	733
04:00	38	40			78	16:00	376	408			784
04:15	42	59			101	16:15	335	484			819
04:30	58	146			204	16:30	370	474			844
04:45	86	224	159	404	245	16:45	359	1440	433	1799	792
05:00	97	87			184	17:00	417	446			863
05:15	117	128			245	17:15	373	365			738
05:30	148	175			323	17:30	392	470			862
05:45	152	514	259	649	411	17:45	372	1554	525	1806	897
06:00	134	167			301	18:00	344	481			825
06:15	176	220			396	18:15	341	333			674
06:30	208	283			491	18:30	337	365			702
06:45	236	754	340	1010	576	18:45	299	1321	397	1576	696
07:00	226	361			587	19:00	271	362			633
07:15	250	358			608	19:15	201	304			505
07:30	267	418			685	19:30	205	296			501
07:45	278	1021	463	1600	741	19:45	180	857	257	1219	437
08:00	258	441			699	20:00	233	233			466
08:15	277	427			704	20:15	196	316			512
08:30	283	481			764	20:30	154	221			375
08:45	249	1067	429	1778	678	20:45	170	753	180	950	350
09:00	242	332			574	21:00	169	159			328
09:15	236	305			541	21:15	129	143			272
09:30	266	361			627	21:30	158	159			317
09:45	263	1007	307	1305	570	21:45	132	588	129	590	261
10:00	257	302			559	22:00	129	96			225
10:15	249	316			565	22:15	119	114			233
10:30	220	285			505	22:30	104	69			173
10:45	246	972	293	1196	539	22:45	90	442	73	352	163
11:00	264	277			541	23:00	80	60			140
11:15	284	318			602	23:15	75	68			143
11:30	289	302			591	23:30	70	61			131
11:45	305	1142	318	1215	623	23:45	49	274	52	241	101
<b>TOTALS</b>	<b>7258</b>	<b>9747</b>			<b>17005</b>	<b>TOTALS</b>	<b>12428</b>	<b>14634</b>			<b>27062</b>
<b>SPLIT %</b>	<b>42.7%</b>	<b>57.3%</b>			<b>38.6%</b>	<b>SPLIT %</b>	<b>45.9%</b>	<b>54.1%</b>			<b>61.4%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					19,686	24,381	0	0	44,067
AM Peak Hour	11:45	07:45			07:45	PM Peak Hour	17:00	17:15	17:00
AM Pk Volume	1239	1812			2908	PM Pk Volume	1554	1841	3360
Pk Hr Factor	0.983	0.942			0.952	Pk Hr Factor	0.932	0.877	0.936
7 - 9 Volume	2088	3378	0	0	5466	4 - 6 Volume	2994	3605	6599
7 - 9 Peak Hour	07:45	07:45			07:45	4 - 6 Peak Hour	17:00	16:15	17:00
7 - 9 Pk Volume	1096	1812	0	0	2908	4 - 6 Pk Volume	1554	1837	3360
Pk Hr Factor	0.968	0.942	0.000	0.000	0.952	Pk Hr Factor	0.932	0.949	0.936



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **With Growth Calculations for both Year  
2021 and Year 2023**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

➤ **1. 182<sup>nd</sup> St at Western Ave**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **182nd St at Western Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>123</b>	<b>946</b>	<b>72</b>	<b>80</b>	<b>947</b>	<b>196</b>	<b>84</b>	<b>365</b>	<b>67</b>	<b>163</b>	<b>1107</b>	<b>123</b>
Existing 2021 Growth	2	10	1	1	10	3	1	4	1	2	12	2
<b>Existing 2021</b>	<b>125</b>	<b>956</b>	<b>73</b>	<b>81</b>	<b>957</b>	<b>199</b>	<b>85</b>	<b>369</b>	<b>68</b>	<b>165</b>	<b>1119</b>	<b>125</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	123	946	NBR	80	947	196	84	365	67	163	1107	123
Opening Year 2023 Growth	3	20	NBR	2	20	5	2	8	2	4	24	3
<b>Opening Year 2023</b>	<b>126</b>	<b>966</b>	NBR	<b>82</b>	<b>967</b>	<b>201</b>	<b>86</b>	<b>373</b>	<b>69</b>	<b>167</b>	<b>1131</b>	<b>126</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **182nd St at Western Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>125</b>	<b>956</b>	<b>73</b>	<b>0</b>	<b>81</b>	<b>957</b>	<b>199</b>	<b>85</b>	<b>369</b>	<b>68</b>	<b>165</b>	<b>1119</b>	<b>125</b>
Cumulative Projects Volume	1	7	0	0	0	28	0	0	0	5	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>126</b>	<b>963</b>	<b>73</b>	<b>0</b>	<b>81</b>	<b>985</b>	<b>199</b>	<b>85</b>	<b>369</b>	<b>73</b>	<b>165</b>	<b>1119</b>	<b>125</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>126</b>	<b>966</b>	<b>74</b>	<b>0</b>	<b>82</b>	<b>967</b>	<b>201</b>	<b>86</b>	<b>373</b>	<b>69</b>	<b>167</b>	<b>1131</b>	<b>126</b>
Cumulative Projects Volume	1	7	0	0	0	28	0	0	0	5	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>127</b>	<b>973</b>	<b>74</b>	<b>0</b>	<b>82</b>	<b>995</b>	<b>201</b>	<b>86</b>	<b>373</b>	<b>74</b>	<b>167</b>	<b>1131</b>	<b>126</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>5</b>	<b>11</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>132</b>	<b>984</b>	<b>79</b>	<b>0</b>	<b>82</b>	<b>1017</b>	<b>201</b>	<b>86</b>	<b>373</b>	<b>77</b>	<b>170</b>	<b>1131</b>	<b>126</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **182nd St and Western Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>108</b>	<b>1016</b>	<b>124</b>	<b>0</b>	<b>67</b>	<b>979</b>	<b>121</b>	<b>161</b>	<b>442</b>	<b>89</b>	<b>104</b>	<b>313</b>	<b>79</b>
Existing 2021 Growth	2	11	2	0	1	11	2	2	5	1	2	4	1
<b>Existing 2021</b>	<b>110</b>	<b>1027</b>	<b>126</b>	<b>0</b>	<b>68</b>	<b>990</b>	<b>123</b>	<b>163</b>	<b>447</b>	<b>90</b>	<b>106</b>	<b>317</b>	<b>80</b>
2019	108	1016	124	0	67	979	121	161	442	89	104	313	79
Opening Year 2023 Growth	3	22	3	0	2	21	3	4	10	2	3	7	2
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>111</b>	<b>1038</b>	<b>127</b>	<b>0</b>	<b>69</b>	<b>1000</b>	<b>124</b>	<b>165</b>	<b>452</b>	<b>91</b>	<b>107</b>	<b>320</b>	<b>81</b>



**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **182nd St at Western Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>110</b>	<b>1027</b>	<b>126</b>	<b>0</b>	<b>68</b>	<b>990</b>	<b>123</b>	<b>163</b>	<b>447</b>	<b>90</b>	<b>106</b>	<b>317</b>	<b>80</b>
Cumulative Projects Volume	13	18	0	0	0	20	0	0	0	4	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>123</b>	<b>1045</b>	<b>126</b>	<b>0</b>	<b>68</b>	<b>1010</b>	<b>123</b>	<b>163</b>	<b>447</b>	<b>94</b>	<b>106</b>	<b>317</b>	<b>80</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>111</b>	<b>1038</b>	<b>127</b>	<b>0</b>	<b>69</b>	<b>1000</b>	<b>124</b>	<b>165</b>	<b>452</b>	<b>91</b>	<b>107</b>	<b>320</b>	<b>81</b>
Cumulative Projects Volume	13	18	0	0	0	20	0	0	0	4	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>124</b>	<b>1056</b>	<b>127</b>	<b>0</b>	<b>69</b>	<b>1020</b>	<b>124</b>	<b>165</b>	<b>452</b>	<b>95</b>	<b>107</b>	<b>320</b>	<b>81</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>9</b>	<b>51</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>61</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>8</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>133</b>	<b>1107</b>	<b>136</b>	<b>0</b>	<b>69</b>	<b>1081</b>	<b>124</b>	<b>165</b>	<b>452</b>	<b>103</b>	<b>115</b>	<b>320</b>	<b>81</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: <b>182nd St at Western Ave</b>		Peak Hour: <b>PM</b>												
Ex Growth Rate: <b>1.05%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: <b>2.10%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		<b>130</b>	<b>1144</b>	<b>268</b>	<b>0</b>	<b>57</b>	<b>960</b>	<b>148</b>	<b>143</b>	<b>970</b>	<b>82</b>	<b>98</b>	<b>717</b>	<b>65</b>
Existing 2021 Growth		2	13	3	0	1	11	2	2	11	1	2	8	1
<b>Existing 2021</b>		<b>132</b>	<b>1157</b>	<b>271</b>	<b>0</b>	<b>58</b>	<b>971</b>	<b>150</b>	<b>145</b>	<b>981</b>	<b>83</b>	<b>100</b>	<b>725</b>	<b>66</b>
		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		130	1144	268	0	57	960	148	143	970	82	98	717	65
Opening Year 2023 Growth		3	25	6	0	2	21	4	4	21	2	3	16	2
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>133</b>	<b>1169</b>	<b>274</b>	<b>0</b>	<b>59</b>	<b>981</b>	<b>152</b>	<b>147</b>	<b>991</b>	<b>84</b>	<b>101</b>	<b>733</b>	<b>67</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **182nd St at Western Ave**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	132	1157	271	0	58	971	150	145	981	83	100	725	66
Cumulative Projects Volume	5	28	0	0	0	11	0	0	0	3	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>137</b>	<b>1185</b>	<b>271</b>	<b>0</b>	<b>58</b>	<b>982</b>	<b>150</b>	<b>145</b>	<b>981</b>	<b>86</b>	<b>100</b>	<b>725</b>	<b>66</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	133	1169	274	0	59	981	152	147	991	84	101	733	67
Cumulative Projects Volume	5	28	0	0	0	11	0	0	0	3	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>138</b>	<b>1197</b>	<b>274</b>	<b>0</b>	<b>59</b>	<b>992</b>	<b>152</b>	<b>147</b>	<b>991</b>	<b>87</b>	<b>101</b>	<b>733</b>	<b>67</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
Project NET Volumes	6	15	6	0	0	31	0	0	0	5	5	0	0
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>144</b>	<b>1212</b>	<b>280</b>	<b>0</b>	<b>59</b>	<b>1023</b>	<b>152</b>	<b>147</b>	<b>991</b>	<b>92</b>	<b>106</b>	<b>733</b>	<b>67</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**2. Western Ave at I-405 NB Ramps**



**Existing 2021 and Opening Year 2023 - Ambient Growth Only**

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>0</b>	<b>1129</b>	<b>295</b>	<b>28</b>	<b>1253</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>899</b>	<b>0</b>	<b>198</b>
Existing 2021 Growth	0	12	4	1	14	0	0	0	0	10	0	3
<b>Existing 2021</b>	<b>0</b>	<b>1141</b>	<b>299</b>	<b>29</b>	<b>1267</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>909</b>	<b>0</b>	<b>201</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	1129	295	28	1253	0	0	0	0	899	0	198
Opening Year 2023 Growth	0	24	7	1	27	0	0	0	0	19	0	5
<b>Opening Year 2023</b>	<b>0</b>	<b>1153</b>	<b>302</b>	<b>29</b>	<b>1280</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>918</b>	<b>0</b>	<b>203</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	1141	299	0	29	1267	0	0	0	0	909	0	201
Cumulative Projects Volume	0	8	13	0	0	33	0	0	0	0	73	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>1149</b>	<b>312</b>	<b>0</b>	<b>29</b>	<b>1300</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>982</b>	<b>0</b>	<b>201</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	1153	302	0	29	1280	0	0	0	0	918	0	203
Cumulative Projects Volume	0	8	13	0	0	33	0	0	0	0	73	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>1161</b>	<b>315</b>	<b>0</b>	<b>29</b>	<b>1313</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>991</b>	<b>0</b>	<b>203</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>21</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>1182</b>	<b>326</b>	<b>0</b>	<b>29</b>	<b>1341</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>998</b>	<b>0</b>	<b>203</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	1043	333	0	59	1065	0	0	0	0	600	0	215
Existing 2021 Growth	0	11	4	0	1	12	0	0	0	0	7	0	3
<b>Existing 2021</b>	<b>0</b>	<b>1054</b>	<b>337</b>	<b>0</b>	<b>60</b>	<b>1077</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>607</b>	<b>0</b>	<b>218</b>
2019	0	1043	333	0	59	1065	0	0	0	0	600	0	215
Opening Year 2023 Growth	0	22	7	0	2	23	0	0	0	0	13	0	5
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>1065</b>	<b>340</b>	<b>0</b>	<b>61</b>	<b>1088</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>613</b>	<b>0</b>	<b>220</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	1054	337	0	60	1077	0	0	0	0	607	0	218
Cumulative Projects Volume	0	21	26	0	0	24	0	0	0	0	47	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>1075</b>	<b>363</b>	<b>0</b>	<b>60</b>	<b>1101</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>654</b>	<b>0</b>	<b>218</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	1065	340	0	61	1088	0	0	0	0	613	0	220
Cumulative Projects Volume	0	21	26	0	0	24	0	0	0	0	47	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>1086</b>	<b>366</b>	<b>0</b>	<b>61</b>	<b>1112</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>660</b>	<b>0</b>	<b>220</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>69</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>1155</b>	<b>388</b>	<b>0</b>	<b>61</b>	<b>1189</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>679</b>	<b>0</b>	<b>220</b>



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	1526	611	0	52	1094	0	0	0	0	667	0	218
Existing 2021 Growth	0	17	7	0	1	12	0	0	0	0	8	0	3
<b>Existing 2021</b>	<b>0</b>	<b>1543</b>	<b>618</b>	<b>0</b>	<b>53</b>	<b>1106</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>675</b>	<b>0</b>	<b>221</b>
2019	0	1526	611	0	52	1094	0	0	0	0	667	0	218
Opening Year 2023 Growth	0	33	13	0	2	23	0	0	0	0	15	0	5
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>1559</b>	<b>624</b>	<b>0</b>	<b>54</b>	<b>1117</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>682</b>	<b>0</b>	<b>223</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **Western Ave at I-405 NB Ramps**

Peak Hour: **PM**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
OLD Report 2021 Ambient Growth Plus	0	1576	655	0	53	1120	0	0	0	0	695	0	221
OLD Report 2021 Ambient Growth	0	1543	618	0	53	1106	0	0	0	0	675	0	221
<b>Cumulative Projects Volume</b>	<b>0</b>	<b>33</b>	<b>37</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>0</b>

**New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	1543	618	0	53	1106	0	0	0	0	675	0	221
Cumulative Projects Volume	0	33	37	0	0	14	0	0	0	0	20	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>1576</b>	<b>655</b>	<b>0</b>	<b>53</b>	<b>1120</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>695</b>	<b>0</b>	<b>221</b>

**New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	1559	624	0	54	1117	0	0	0	0	682	0	223
Cumulative Projects Volume	0	33	37	0	0	14	0	0	0	0	20	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>1592</b>	<b>661</b>	<b>0</b>	<b>54</b>	<b>1131</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>702</b>	<b>0</b>	<b>223</b>

**New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT**

<b>Project NET Volumes</b>	<b>0</b>	<b>27</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>41</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>1619</b>	<b>676</b>	<b>0</b>	<b>54</b>	<b>1172</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>711</b>	<b>0</b>	<b>223</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**3. Western Ave at North Project Driveway**





**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Western Ave at Project Driveway**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	1388	0	0	0	2071	0	0	0	0	0	0	0
Cumulative Projects Volume	0	22	0	0	0	107	0	0	0	0	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>1410</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2178</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	1402	0	0	0	2093	0	0	0	0	0	0	0
Cumulative Projects Volume	0	22	0	0	0	107	0	0	0	0	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>1424</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2200</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>32</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-25</b>	<b>60</b>	<b>0</b>	<b>0</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>1456</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2175</b>	<b>60</b>	<b>0</b>	<b>0</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>0</b>



**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Western Ave at Project Driveway**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	1405	0	0	0	1730	0	0	0	0	0	0	0
Cumulative Projects Volume	0	47	0	0	0	71	0	0	0	0	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>1452</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1801</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	1420	0	0	0	1748	0	0	0	0	0	0	0
Cumulative Projects Volume	0	47	0	0	0	71	0	0	0	0	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>1467</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1819</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>91</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-24</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>224</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>1558</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1795</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>224</b>	<b>0</b>	<b>0</b>	<b>0</b>





Year 2021 and Year 2023 Traffic Volumes

Intersection: **Western Ave at Project Driveway**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	2008	0	0	0	1707	0	0	0	0	0	0	0
Cumulative Projects Volume	0	70	0	0	0	34	0	0	0	0	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>2078</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1741</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	2029	0	0	0	1725	0	0	0	0	0	0	0
Cumulative Projects Volume	0	70	0	0	0	34	0	0	0	0	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>2099</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1759</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>42</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-37</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>2141</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1722</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>0</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**4. 190<sup>th</sup> St at Van Ness Ave**



**Existing 2021 and Opening Year 2023 - Ambient Growth Only**

Intersection: **190th St at Van Ness Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>94</b>	<b>388</b>	<b>189</b>	<b>95</b>	<b>682</b>	<b>388</b>	<b>111</b>	<b>1394</b>	<b>132</b>	<b>155</b>	<b>1227</b>	<b>76</b>
Existing 2021 Growth	1	5	2	1	8	5	2	15	2	2	13	1
<b>Existing 2021</b>	<b>95</b>	<b>393</b>	<b>191</b>	<b>96</b>	<b>690</b>	<b>393</b>	<b>113</b>	<b>1409</b>	<b>134</b>	<b>157</b>	<b>1240</b>	<b>77</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	94	388	189	95	682	388	111	1394	132	155	1227	76
Opening Year 2023 Growth	2	9	4	2	15	9	3	30	3	4	26	2
<b>Opening Year 2023</b>	<b>96</b>	<b>397</b>	<b>193</b>	<b>97</b>	<b>697</b>	<b>397</b>	<b>114</b>	<b>1424</b>	<b>135</b>	<b>159</b>	<b>1253</b>	<b>78</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Van Ness Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>95</b>	<b>393</b>	<b>191</b>	<b>0</b>	<b>96</b>	<b>690</b>	<b>393</b>	<b>113</b>	<b>1409</b>	<b>134</b>	<b>157</b>	<b>1240</b>	<b>77</b>
Cumulative Projects Volume	9	12	1	0	4	31	0	0	13	31	0	23	1
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>104</b>	<b>405</b>	<b>192</b>	<b>0</b>	<b>100</b>	<b>721</b>	<b>393</b>	<b>113</b>	<b>1422</b>	<b>165</b>	<b>157</b>	<b>1263</b>	<b>78</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>96</b>	<b>397</b>	<b>193</b>	<b>0</b>	<b>97</b>	<b>697</b>	<b>397</b>	<b>114</b>	<b>1424</b>	<b>135</b>	<b>159</b>	<b>1253</b>	<b>78</b>
Cumulative Projects Volume	9	12	1	0	4	31	0	0	13	31	0	23	1
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>105</b>	<b>409</b>	<b>194</b>	<b>0</b>	<b>101</b>	<b>728</b>	<b>397</b>	<b>114</b>	<b>1437</b>	<b>166</b>	<b>159</b>	<b>1276</b>	<b>79</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>6</b>	<b>10</b>	<b>4</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>105</b>	<b>409</b>	<b>201</b>	<b>0</b>	<b>104</b>	<b>728</b>	<b>397</b>	<b>114</b>	<b>1448</b>	<b>166</b>	<b>165</b>	<b>1286</b>	<b>83</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Van Ness Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	52	354	173	0	94	383	147	105	1180	91	98	689	119
Existing 2021 Growth	1	4	2	0	1	5	2	2	13	1	2	8	2
<b>Existing 2021</b>	<b>53</b>	<b>358</b>	<b>175</b>	<b>0</b>	<b>95</b>	<b>388</b>	<b>149</b>	<b>107</b>	<b>1193</b>	<b>92</b>	<b>100</b>	<b>697</b>	<b>121</b>
2019	52	354	173	0	94	383	147	105	1180	91	98	689	119
Opening Year 2023 Growth	2	8	4	0	2	9	4	3	25	2	3	15	3
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>54</b>	<b>362</b>	<b>177</b>	<b>0</b>	<b>96</b>	<b>392</b>	<b>151</b>	<b>108</b>	<b>1205</b>	<b>93</b>	<b>101</b>	<b>704</b>	<b>122</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Van Ness Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>53</b>	<b>358</b>	<b>175</b>	<b>0</b>	<b>95</b>	<b>388</b>	<b>149</b>	<b>107</b>	<b>1193</b>	<b>92</b>	<b>100</b>	<b>697</b>	<b>121</b>
Cumulative Projects Volume	19	20	3	0	3	21	0	0	18	21	0	19	3
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>72</b>	<b>378</b>	<b>178</b>	<b>0</b>	<b>98</b>	<b>409</b>	<b>149</b>	<b>107</b>	<b>1211</b>	<b>113</b>	<b>100</b>	<b>716</b>	<b>124</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>54</b>	<b>362</b>	<b>177</b>	<b>0</b>	<b>96</b>	<b>392</b>	<b>151</b>	<b>108</b>	<b>1205</b>	<b>93</b>	<b>101</b>	<b>704</b>	<b>122</b>
Cumulative Projects Volume	19	20	3	0	3	21	0	0	18	21	0	19	3
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>73</b>	<b>382</b>	<b>180</b>	<b>0</b>	<b>99</b>	<b>413</b>	<b>151</b>	<b>108</b>	<b>1223</b>	<b>114</b>	<b>101</b>	<b>723</b>	<b>125</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>18</b>	<b>29</b>	<b>7</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>73</b>	<b>382</b>	<b>199</b>	<b>0</b>	<b>107</b>	<b>413</b>	<b>151</b>	<b>108</b>	<b>1253</b>	<b>114</b>	<b>119</b>	<b>752</b>	<b>132</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: <b>190th St at Van Ness Ave</b>		Peak Hour: <b>PM</b>												
Ex Growth Rate: <b>1.05%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: <b>2.10%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		<b>146</b>	<b>851</b>	<b>219</b>	<b>0</b>	<b>94</b>	<b>494</b>	<b>186</b>	<b>249</b>	<b>1544</b>	<b>133</b>	<b>76</b>	<b>1063</b>	<b>106</b>
Existing 2021 Growth		2	9	3	0	1	6	2	3	17	2	1	12	2
<b>Existing 2021</b>		<b>148</b>	<b>860</b>	<b>222</b>	<b>0</b>	<b>95</b>	<b>500</b>	<b>188</b>	<b>252</b>	<b>1561</b>	<b>135</b>	<b>77</b>	<b>1075</b>	<b>108</b>
		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		146	851	219	0	94	494	186	249	1544	133	76	1063	106
Opening Year 2023 Growth		4	18	5	0	2	11	4	6	33	3	2	23	3
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>150</b>	<b>869</b>	<b>224</b>	<b>0</b>	<b>96</b>	<b>505</b>	<b>190</b>	<b>255</b>	<b>1577</b>	<b>136</b>	<b>78</b>	<b>1086</b>	<b>109</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Van Ness Ave**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	148	860	222	0	95	500	188	252	1561	135	77	1075	108
Cumulative Projects Volume	28	27	4	0	1	10	0	0	23	9	0	14	4
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>176</b>	<b>887</b>	<b>226</b>	<b>0</b>	<b>96</b>	<b>510</b>	<b>188</b>	<b>252</b>	<b>1584</b>	<b>144</b>	<b>77</b>	<b>1089</b>	<b>112</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	150	869	224	0	96	505	190	255	1577	136	78	1086	109
Cumulative Projects Volume	28	27	4	0	1	10	0	0	23	9	0	14	4
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>178</b>	<b>896</b>	<b>228</b>	<b>0</b>	<b>97</b>	<b>515</b>	<b>190</b>	<b>255</b>	<b>1600</b>	<b>145</b>	<b>78</b>	<b>1100</b>	<b>113</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
Project NET Volumes	0	0	9	0	4	0	0	0	15	0	8	14	4
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>178</b>	<b>896</b>	<b>237</b>	<b>0</b>	<b>101</b>	<b>515</b>	<b>190</b>	<b>255</b>	<b>1615</b>	<b>145</b>	<b>86</b>	<b>1114</b>	<b>117</b>



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**5. 190<sup>th</sup> St at Gramercy Pl**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Gramercy Pl**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	4	4	25	2	0	0	0	1646	14	40	1550	0
Existing 2021 Growth	1	1	1	1	0	0	0	18	1	1	17	0
<b>Existing 2021</b>	<b>5</b>	<b>5</b>	<b>26</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1664</b>	<b>15</b>	<b>41</b>	<b>1567</b>	<b>0</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	4	4	25	2	0	0	0	1646	14	40	1550	0
Opening Year 2023 Growth	1	1	1	1	0	0	0	35	1	1	33	0
<b>Opening Year 2023</b>	<b>5</b>	<b>5</b>	<b>26</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1681</b>	<b>15</b>	<b>41</b>	<b>1583</b>	<b>0</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Gramercy Pl**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	5	5	26	0	3	0	0	0	1664	15	41	1567	0
Cumulative Projects Volume	3	0	15	0	0	0	0	0	7	11	69	21	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>8</b>	<b>5</b>	<b>41</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1671</b>	<b>26</b>	<b>110</b>	<b>1588</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	5	5	26	0	3	0	0	0	1681	15	41	1583	0
Cumulative Projects Volume	3	0	15	0	0	0	0	0	7	11	69	21	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>8</b>	<b>5</b>	<b>41</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1688</b>	<b>26</b>	<b>110</b>	<b>1604</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>6</b>	<b>20</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>8</b>	<b>5</b>	<b>48</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1709</b>	<b>26</b>	<b>116</b>	<b>1624</b>	<b>0</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: 190th St at Gramercy Pl		Peak Hour: MD												
Ex Growth Rate: 1.05%														
Fut Growth Rate: 2.10%														
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
2019	6	5	28	0	4	3	1	7	1396	6	27	884	2	
Existing 2021 Growth	1	1	1	0	1	1	1	1	15	1	1	10	1	
<b>Existing 2021</b>	<b>7</b>	<b>6</b>	<b>29</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>1411</b>	<b>7</b>	<b>28</b>	<b>894</b>	<b>3</b>	
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
2019	6	5	28	0	4	3	1	7	1396	6	27	884	2	
Opening Year 2023 Growth	1	1	1	0	1	1	1	1	30	1	1	19	1	
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>7</b>	<b>6</b>	<b>29</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>1426</b>	<b>7</b>	<b>28</b>	<b>903</b>	<b>3</b>	

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Gramercy Pl**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	7	6	29	0	5	4	2	8	1411	7	28	894	3
Cumulative Projects Volume	7	0	42	0	0	0	0	0	17	8	44	15	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>14</b>	<b>6</b>	<b>71</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>1428</b>	<b>15</b>	<b>72</b>	<b>909</b>	<b>3</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	7	6	29	0	5	4	2	8	1426	7	28	903	3
Cumulative Projects Volume	7	0	42	0	0	0	0	0	17	8	44	15	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>14</b>	<b>6</b>	<b>71</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>1443</b>	<b>15</b>	<b>72</b>	<b>918</b>	<b>3</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57</b>	<b>0</b>	<b>19</b>	<b>54</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>14</b>	<b>6</b>	<b>91</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>1500</b>	<b>15</b>	<b>91</b>	<b>972</b>	<b>3</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: 190th St at Gramercy Pl		Peak Hour: PM												
Ex Growth Rate: 1.05%		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: 2.10%		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		17	3	60	0	9	4	2	1	1894	14	9	1181	2
Existing 2021 Growth		1	1	1	0	1	1	1	1	20	1	1	13	1
<b>Existing 2021</b>		<b>18</b>	<b>4</b>	<b>61</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1914</b>	<b>15</b>	<b>10</b>	<b>1194</b>	<b>3</b>
2019		17	3	60	0	9	4	2	1	1894	14	9	1181	2
Opening Year 2023 Growth		1	1	2	0	1	1	1	1	40	1	1	25	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>18</b>	<b>4</b>	<b>62</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1934</b>	<b>15</b>	<b>10</b>	<b>1206</b>	<b>3</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Gramercy Pl**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	18	4	61	0	10	5	3	2	1914	15	10	1194	3
Cumulative Projects Volume	11	0	68	0	0	0	0	0	24	4	17	7	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>29</b>	<b>4</b>	<b>129</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1938</b>	<b>19</b>	<b>27</b>	<b>1201</b>	<b>3</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	18	4	62	0	10	5	3	2	1934	15	10	1206	3
Cumulative Projects Volume	11	0	68	0	0	0	0	0	24	4	17	7	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>29</b>	<b>4</b>	<b>130</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1958</b>	<b>19</b>	<b>27</b>	<b>1213</b>	<b>3</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>8</b>	<b>26</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>29</b>	<b>4</b>	<b>139</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>1986</b>	<b>19</b>	<b>35</b>	<b>1239</b>	<b>3</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**6. 190<sup>th</sup> St at I-405 SB Ramps**





Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at I-405 SB Ramps**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	588	0	101	863	772	0	0	1454	129
Existing 2021 Growth	0	0	0	7	0	2	10	9	0	0	16	2
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>595</b>	<b>0</b>	<b>103</b>	<b>873</b>	<b>781</b>	<b>0</b>	<b>0</b>	<b>1470</b>	<b>131</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	588	0	101	863	772	0	0	1454	129
Opening Year 2023 Growth	0	0	0	13	0	3	19	17	0	0	31	3
<b>Opening Year 2023</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>601</b>	<b>0</b>	<b>104</b>	<b>882</b>	<b>789</b>	<b>0</b>	<b>0</b>	<b>1485</b>	<b>132</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at I-405 SB Ramps**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	595	0	103	873	781	0	0	1470	131
Cumulative Projects Volume	0	0	0	0	10	0	28	12	10	0	0	62	13
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>605</b>	<b>0</b>	<b>131</b>	<b>885</b>	<b>791</b>	<b>0</b>	<b>0</b>	<b>1532</b>	<b>144</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	601	0	104	882	789	0	0	1485	132
Cumulative Projects Volume	0	0	0	0	10	0	28	12	10	0	0	62	13
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>611</b>	<b>0</b>	<b>132</b>	<b>894</b>	<b>799</b>	<b>0</b>	<b>0</b>	<b>1547</b>	<b>145</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>26</b>	<b>6</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>618</b>	<b>0</b>	<b>132</b>	<b>894</b>	<b>827</b>	<b>0</b>	<b>0</b>	<b>1573</b>	<b>151</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: 190th St at I-405 SB Ramps		Peak Hour: MD												
Ex Growth Rate: 1.05%														
Fut Growth Rate: 2.10%		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		0	0	0	0	380	0	59	750	709	0	0	865	192
Existing 2021 Growth		0	0	0	0	4	0	1	8	8	0	0	10	3
<b>Existing 2021</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>384</b>	<b>0</b>	<b>60</b>	<b>758</b>	<b>717</b>	<b>0</b>	<b>0</b>	<b>875</b>	<b>195</b>
2019		0	0	0	0	380	0	59	750	709	0	0	865	192
Opening Year 2023 Growth		0	0	0	0	8	0	2	16	15	0	0	19	5
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>388</b>	<b>0</b>	<b>61</b>	<b>766</b>	<b>724</b>	<b>0</b>	<b>0</b>	<b>884</b>	<b>197</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: 190th St at I-405 SB Ramps

Peak Hour: MD

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	384	0	60	758	717	0	0	875	195
Cumulative Projects Volume	0	0	0	0	7	0	18	32	28	0	0	41	18
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>391</b>	<b>0</b>	<b>78</b>	<b>790</b>	<b>745</b>	<b>0</b>	<b>0</b>	<b>916</b>	<b>213</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	388	0	61	766	724	0	0	884	197
Cumulative Projects Volume	0	0	0	0	7	0	18	32	28	0	0	41	18
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>395</b>	<b>0</b>	<b>79</b>	<b>798</b>	<b>752</b>	<b>0</b>	<b>0</b>	<b>925</b>	<b>215</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>0</b>	<b>0</b>	<b>73</b>	<b>18</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>414</b>	<b>0</b>	<b>79</b>	<b>798</b>	<b>829</b>	<b>0</b>	<b>0</b>	<b>998</b>	<b>233</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at I-405 SB Ramps**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	599	0	22	573	1518	0	0	1139	92
Existing 2021 Growth	0	0	0	0	7	0	1	7	16	0	0	12	1
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>606</b>	<b>0</b>	<b>23</b>	<b>580</b>	<b>1534</b>	<b>0</b>	<b>0</b>	<b>1151</b>	<b>93</b>
2019	0	0	0	0	599	0	22	573	1518	0	0	1139	92
Opening Year 2023 Growth	0	0	0	0	13	0	1	13	32	0	0	24	2
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>612</b>	<b>0</b>	<b>23</b>	<b>586</b>	<b>1550</b>	<b>0</b>	<b>0</b>	<b>1163</b>	<b>94</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at I-405 SB Ramps**

Peak Hour: **PM**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
OLD Report 2021 Ambient Growth Plus	0	0	0	0	610	0	30	629	1577	0	0	1168	115
OLD Report 2021 Ambient Growth	0	0	0	0	606	0	23	580	1534	0	0	1151	93
<b>Cumulative Projects Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>7</b>	<b>49</b>	<b>43</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>22</b>

**New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	606	0	23	580	1534	0	0	1151	93
Cumulative Projects Volume	0	0	0	0	4	0	7	49	43	0	0	17	22
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>610</b>	<b>0</b>	<b>30</b>	<b>629</b>	<b>1577</b>	<b>0</b>	<b>0</b>	<b>1168</b>	<b>115</b>

**New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	612	0	23	586	1550	0	0	1163	94
Cumulative Projects Volume	0	0	0	0	4	0	7	49	43	0	0	17	22
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>616</b>	<b>0</b>	<b>30</b>	<b>635</b>	<b>1593</b>	<b>0</b>	<b>0</b>	<b>1180</b>	<b>116</b>

**New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT**

<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>37</b>	<b>0</b>	<b>0</b>	<b>34</b>	<b>8</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>625</b>	<b>0</b>	<b>30</b>	<b>635</b>	<b>1630</b>	<b>0</b>	<b>0</b>	<b>1214</b>	<b>124</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**7. 190<sup>th</sup> St at West Project Driveway**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Project Driveway West** Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	1360	0	0	1583	0
Existing 2021 Growth	0	0	0	0	0	0	0	15	0	0	17	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1375</b>	<b>0</b>	<b>0</b>	<b>1600</b>	<b>0</b>
2019	0	0	0	0	0	0	0	1360	0	0	1583	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	29	0	0	34	0
<b>Opening Year 2023</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1389</b>	<b>0</b>	<b>0</b>	<b>1617</b>	<b>0</b>



Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Project Driveway West**

Peak Hour: **AM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	1375	0	0	1600	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	21	0	0	76	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1396</b>	<b>0</b>	<b>0</b>	<b>1676</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	1389	0	0	1617	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	21	0	0	76	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1410</b>	<b>0</b>	<b>0</b>	<b>1693</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57</b>	<b>0</b>	<b>34</b>	<b>62</b>	<b>-27</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>24</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57</b>	<b>0</b>	<b>34</b>	<b>62</b>	<b>1383</b>	<b>0</b>	<b>0</b>	<b>1706</b>	<b>24</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: 190th St at Project Driveway West

Peak Hour: MD

Ex Growth Rate: 1.05%

Fut Growth Rate: 2.10%

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	0	1089	0	0	1057	0
Existing 2021 Growth	0	0	0	0	0	0	0	0	12	0	0	12	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1101</b>	<b>0</b>	<b>0</b>	<b>1069</b>	<b>0</b>
2019	0	0	0	0	0	0	0	0	1089	0	0	1057	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	0	23	0	0	23	0
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1112</b>	<b>0</b>	<b>0</b>	<b>1080</b>	<b>0</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Project Driveway West**

Peak Hour: **MD**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	1101	0	0	1069	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	35	0	0	59	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1136</b>	<b>0</b>	<b>0</b>	<b>1128</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	1112	0	0	1080	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	35	0	0	59	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1147</b>	<b>0</b>	<b>0</b>	<b>1139</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>112</b>	<b>0</b>	<b>67</b>	<b>120</b>	<b>-24</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>48</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>112</b>	<b>0</b>	<b>67</b>	<b>120</b>	<b>1123</b>	<b>0</b>	<b>0</b>	<b>1175</b>	<b>48</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Project Driveway West**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	0	2117	0	0	1231	0
Existing 2021 Growth	0	0	0	0	0	0	0	0	23	0	0	13	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2140</b>	<b>0</b>	<b>0</b>	<b>1244</b>	<b>0</b>
2019	0	0	0	0	0	0	0	0	2117	0	0	1231	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	0	45	0	0	26	0
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2162</b>	<b>0</b>	<b>0</b>	<b>1257</b>	<b>0</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Project Driveway West**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	2140	0	0	1244	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	47	0	0	39	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2187</b>	<b>0</b>	<b>0</b>	<b>1283</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	2162	0	0	1257	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	47	0	0	39	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2209</b>	<b>0</b>	<b>0</b>	<b>1296</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>0</b>	<b>46</b>	<b>86</b>	<b>-40</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>33</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>0</b>	<b>46</b>	<b>86</b>	<b>2169</b>	<b>0</b>	<b>0</b>	<b>1306</b>	<b>33</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**8. 190<sup>th</sup> St at East Project Driveway**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Project Driveway East**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	1360	0	0	1583	0
Existing 2021 Growth	0	0	0	0	0	0	0	15	0	0	17	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1375</b>	<b>0</b>	<b>0</b>	<b>1600</b>	<b>0</b>
2019	0	0	0	0	0	0	0	1360	0	0	1583	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	29	0	0	34	0
<b>Opening Year 2023</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1389</b>	<b>0</b>	<b>0</b>	<b>1617</b>	<b>0</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Project Driveway East**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	1375	0	0	1600	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	21	0	0	76	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1396</b>	<b>0</b>	<b>0</b>	<b>1676</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	1389	0	0	1617	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	21	0	0	76	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1410</b>	<b>0</b>	<b>0</b>	<b>1693</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>47</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>97</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>1457</b>	<b>0</b>	<b>0</b>	<b>1712</b>	<b>97</b>



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Project Driveway East**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	0	1089	0	0	1057	0
Existing 2021 Growth	0	0	0	0	0	0	0	0	12	0	0	12	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1101</b>	<b>0</b>	<b>0</b>	<b>1069</b>	<b>0</b>
2019	0	0	0	0	0	0	0	0	1089	0	0	1057	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	0	23	0	0	23	0
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1112</b>	<b>0</b>	<b>0</b>	<b>1080</b>	<b>0</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Project Driveway East**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	1101	0	0	1069	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	35	0	0	59	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1136</b>	<b>0</b>	<b>0</b>	<b>1128</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	1112	0	0	1080	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	35	0	0	59	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1147</b>	<b>0</b>	<b>0</b>	<b>1139</b>	<b>0</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>103</b>	<b>0</b>	<b>0</b>	<b>42</b>	<b>188</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>1250</b>	<b>0</b>	<b>0</b>	<b>1181</b>	<b>188</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Project Driveway East**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	0	0	0	0	0	0	0	0	2117	0	0	1231	0
Existing 2021 Growth	0	0	0	0	0	0	0	0	23	0	0	13	0
<b>Existing 2021</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2140</b>	<b>0</b>	<b>0</b>	<b>1244</b>	<b>0</b>
2019	0	0	0	0	0	0	0	0	2117	0	0	1231	0
Opening Year 2023 Growth	0	0	0	0	0	0	0	0	45	0	0	26	0
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2162</b>	<b>0</b>	<b>0</b>	<b>1257</b>	<b>0</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Project Driveway East**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	0	0	0	0	0	0	0	0	2140	0	0	1244	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	47	0	0	39	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2187</b>	<b>0</b>	<b>0</b>	<b>1283</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	0	0	0	0	0	0	0	0	2162	0	0	1257	0
Cumulative Projects Volume	0	0	0	0	0	0	0	0	47	0	0	39	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2209</b>	<b>0</b>	<b>0</b>	<b>1296</b>	<b>0</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>63</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>138</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>2272</b>	<b>0</b>	<b>0</b>	<b>1299</b>	<b>138</b>

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**9. 190<sup>th</sup> St at Western Ave**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Western Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	144	1077	100	0	192	1416	441	163	708	480	310	1000	133
Existing 2021 Growth	2	12	2	0	3	15	5	2	8	6	4	11	2
<b>Existing 2021</b>	<b>146</b>	<b>1089</b>	<b>102</b>	<b>0</b>	<b>195</b>	<b>1431</b>	<b>446</b>	<b>165</b>	<b>716</b>	<b>486</b>	<b>314</b>	<b>1011</b>	<b>135</b>
2019	144	1077	100	0	192	1416	441	163	708	480	310	1000	133
Opening Year 2023 Growth	4	23	3	0	5	30	10	4	15	11	7	21	3
<b>Opening Year 2023</b>	<b>148</b>	<b>1100</b>	<b>103</b>	<b>0</b>	<b>197</b>	<b>1446</b>	<b>451</b>	<b>167</b>	<b>723</b>	<b>491</b>	<b>317</b>	<b>1021</b>	<b>136</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Western Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>146</b>	<b>1089</b>	<b>102</b>	<b>0</b>	<b>195</b>	<b>1431</b>	<b>446</b>	<b>165</b>	<b>716</b>	<b>486</b>	<b>314</b>	<b>1011</b>	<b>135</b>
Cumulative Projects Volume	13	16	1	0	0	67	39	5	5	10	3	23	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>159</b>	<b>1105</b>	<b>103</b>	<b>0</b>	<b>195</b>	<b>1498</b>	<b>485</b>	<b>170</b>	<b>721</b>	<b>496</b>	<b>317</b>	<b>1034</b>	<b>135</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>148</b>	<b>1100</b>	<b>103</b>	<b>0</b>	<b>197</b>	<b>1446</b>	<b>451</b>	<b>167</b>	<b>723</b>	<b>491</b>	<b>317</b>	<b>1021</b>	<b>136</b>
Cumulative Projects Volume	13	16	1	0	0	67	39	5	5	10	3	23	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>161</b>	<b>1116</b>	<b>104</b>	<b>0</b>	<b>197</b>	<b>1513</b>	<b>490</b>	<b>172</b>	<b>728</b>	<b>501</b>	<b>320</b>	<b>1044</b>	<b>136</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>61</b>	<b>-26</b>	<b>0</b>	<b>34</b>	<b>34</b>	<b>26</b>	<b>0</b>	<b>23</b>	<b>13</b>	<b>11</b>	<b>0</b>	<b>34</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>222</b>	<b>1090</b>	<b>104</b>	<b>34</b>	<b>231</b>	<b>1539</b>	<b>490</b>	<b>195</b>	<b>741</b>	<b>512</b>	<b>320</b>	<b>1078</b>	<b>136</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Western Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	159	940	170	1	186	1116	409	208	564	334	122	444	241
Existing 2021 Growth	2	10	2	1	2	12	5	3	6	4	2	5	3
<b>Existing 2021</b>	<b>161</b>	<b>950</b>	<b>172</b>	<b>2</b>	<b>188</b>	<b>1128</b>	<b>414</b>	<b>211</b>	<b>570</b>	<b>338</b>	<b>124</b>	<b>449</b>	<b>244</b>
2019	159	940	170	1	186	1116	409	208	564	334	122	444	241
Opening Year 2023 Growth	4	20	4	1	4	24	9	5	12	8	3	10	6
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>163</b>	<b>960</b>	<b>174</b>	<b>2</b>	<b>190</b>	<b>1140</b>	<b>418</b>	<b>213</b>	<b>576</b>	<b>342</b>	<b>125</b>	<b>454</b>	<b>247</b>



**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Western Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>161</b>	<b>950</b>	<b>172</b>	<b>2</b>	<b>188</b>	<b>1128</b>	<b>414</b>	<b>211</b>	<b>570</b>	<b>338</b>	<b>124</b>	<b>449</b>	<b>244</b>
Cumulative Projects Volume	18	33	2	0	0	47	24	14	13	7	2	16	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>179</b>	<b>983</b>	<b>174</b>	<b>2</b>	<b>188</b>	<b>1175</b>	<b>438</b>	<b>225</b>	<b>583</b>	<b>345</b>	<b>126</b>	<b>465</b>	<b>244</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>148</b>	<b>1100</b>	<b>103</b>	<b>0</b>	<b>197</b>	<b>1446</b>	<b>451</b>	<b>167</b>	<b>723</b>	<b>491</b>	<b>317</b>	<b>1021</b>	<b>136</b>
Cumulative Projects Volume	18	33	2	0	0	47	24	14	13	7	2	16	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>163</b>	<b>960</b>	<b>174</b>	<b>2</b>	<b>190</b>	<b>1140</b>	<b>418</b>	<b>213</b>	<b>576</b>	<b>342</b>	<b>125</b>	<b>454</b>	<b>247</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>118</b>	<b>-23</b>	<b>0</b>	<b>67</b>	<b>67</b>	<b>71</b>	<b>0</b>	<b>45</b>	<b>36</b>	<b>22</b>	<b>0</b>	<b>94</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>281</b>	<b>937</b>	<b>174</b>	<b>69</b>	<b>257</b>	<b>1211</b>	<b>418</b>	<b>258</b>	<b>612</b>	<b>364</b>	<b>125</b>	<b>548</b>	<b>247</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Western Ave**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>123</b>	<b>1284</b>	<b>192</b>	<b>2</b>	<b>137</b>	<b>1195</b>	<b>354</b>	<b>396</b>	<b>1178</b>	<b>470</b>	<b>221</b>	<b>702</b>	<b>305</b>
Existing 2021 Growth	2	14	3	1	2	13	4	5	13	5	3	8	4
<b>Existing 2021</b>	<b>125</b>	<b>1298</b>	<b>195</b>	<b>3</b>	<b>139</b>	<b>1208</b>	<b>358</b>	<b>401</b>	<b>1191</b>	<b>475</b>	<b>224</b>	<b>710</b>	<b>309</b>
2019	123	1284	192	2	137	1195	354	396	1178	470	221	702	305
Opening Year 2023 Growth	3	27	5	1	3	26	8	9	25	10	5	15	7
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>126</b>	<b>1311</b>	<b>197</b>	<b>3</b>	<b>140</b>	<b>1221</b>	<b>362</b>	<b>405</b>	<b>1203</b>	<b>480</b>	<b>226</b>	<b>717</b>	<b>312</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Western Ave**

Peak Hour: **PM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>125</b>	<b>1298</b>	<b>195</b>	<b>3</b>	<b>139</b>	<b>1208</b>	<b>358</b>	<b>401</b>	<b>1191</b>	<b>475</b>	<b>224</b>	<b>710</b>	<b>309</b>
Cumulative Projects Volume	22	48	2	0	0	25	9	22	21	4	0	8	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>147</b>	<b>1346</b>	<b>197</b>	<b>3</b>	<b>139</b>	<b>1233</b>	<b>367</b>	<b>423</b>	<b>1212</b>	<b>479</b>	<b>224</b>	<b>718</b>	<b>309</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>126</b>	<b>1311</b>	<b>197</b>	<b>3</b>	<b>140</b>	<b>1221</b>	<b>362</b>	<b>405</b>	<b>1203</b>	<b>480</b>	<b>226</b>	<b>717</b>	<b>312</b>
Cumulative Projects Volume	22	48	2	0	0	25	9	22	21	4	0	8	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>148</b>	<b>1359</b>	<b>199</b>	<b>3</b>	<b>140</b>	<b>1246</b>	<b>371</b>	<b>427</b>	<b>1224</b>	<b>484</b>	<b>226</b>	<b>725</b>	<b>312</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>85</b>	<b>-37</b>	<b>0</b>	<b>46</b>	<b>46</b>	<b>34</b>	<b>0</b>	<b>31</b>	<b>17</b>	<b>15</b>	<b>0</b>	<b>49</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>233</b>	<b>1322</b>	<b>199</b>	<b>49</b>	<b>186</b>	<b>1280</b>	<b>371</b>	<b>458</b>	<b>1241</b>	<b>499</b>	<b>226</b>	<b>774</b>	<b>312</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**10. 190<sup>th</sup> St at Harborgate Wy**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Harborgate Wy**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>144</b>	<b>10</b>	<b>44</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>29</b>	<b>781</b>	<b>117</b>	<b>99</b>	<b>1550</b>	<b>6</b>
Existing 2021 Growth	2	1	1	0	0	1	1	9	2	2	17	1
<b>Existing 2021</b>	<b>146</b>	<b>11</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>790</b>	<b>119</b>	<b>101</b>	<b>1567</b>	<b>7</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	144	10	44	0	0	3	29	781	117	99	1550	6
Opening Year 2023 Growth	4	1	1	0	0	1	1	17	3	3	33	1
<b>Opening Year 2023</b>	<b>148</b>	<b>11</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>798</b>	<b>120</b>	<b>102</b>	<b>1583</b>	<b>7</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Harborgate Wy**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	146	11	45	0	0	0	4	30	790	119	101	1567	7
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	26	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>146</b>	<b>11</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>796</b>	<b>119</b>	<b>101</b>	<b>1593</b>	<b>7</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	148	11	45	0	0	0	4	30	798	120	102	1583	7
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	26	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>148</b>	<b>11</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>804</b>	<b>120</b>	<b>102</b>	<b>1609</b>	<b>7</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>4</b>	<b>0</b>	<b>30</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>152</b>	<b>11</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>832</b>	<b>124</b>	<b>102</b>	<b>1639</b>	<b>7</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: <b>190th St at Harborside Wy</b>		Peak Hour: <b>MD</b>												
Ex Growth Rate: <b>1.05%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: <b>2.10%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>280</b>	<b>6</b>	<b>127</b>	<b>0</b>	<b>7</b>	<b>2</b>	<b>22</b>	<b>18</b>	<b>755</b>	<b>179</b>	<b>79</b>	<b>638</b>	<b>5</b>	
Existing 2021 Growth	3	1	2	0	1	1	1	1	8	2	1	7	1	
<b>Existing 2021</b>	<b>283</b>	<b>7</b>	<b>129</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>23</b>	<b>19</b>	<b>763</b>	<b>181</b>	<b>80</b>	<b>645</b>	<b>6</b>	
2019	280	6	127	0	7	2	22	18	755	179	79	638	5	
Opening Year 2023 Growth	6	1	3	0	1	1	1	1	16	4	2	14	1	
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>286</b>	<b>7</b>	<b>130</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>23</b>	<b>19</b>	<b>771</b>	<b>183</b>	<b>81</b>	<b>652</b>	<b>6</b>	

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Harborgate Wy**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>283</b>	<b>7</b>	<b>129</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>23</b>	<b>19</b>	<b>763</b>	<b>181</b>	<b>80</b>	<b>645</b>	<b>6</b>
Cumulative Projects Volume	0	0	0	0	0	0	3	0	15	0	0	18	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>283</b>	<b>7</b>	<b>129</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>26</b>	<b>19</b>	<b>778</b>	<b>181</b>	<b>80</b>	<b>663</b>	<b>6</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>286</b>	<b>7</b>	<b>130</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>23</b>	<b>19</b>	<b>771</b>	<b>183</b>	<b>81</b>	<b>652</b>	<b>6</b>
Cumulative Projects Volume	0	0	0	0	0	0	3	0	15	0	0	18	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>286</b>	<b>7</b>	<b>130</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>26</b>	<b>19</b>	<b>786</b>	<b>183</b>	<b>81</b>	<b>670</b>	<b>6</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>81</b>	<b>10</b>	<b>0</b>	<b>83</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>297</b>	<b>7</b>	<b>130</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>26</b>	<b>19</b>	<b>867</b>	<b>193</b>	<b>81</b>	<b>753</b>	<b>6</b>



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: <b>190th St at Harborage Wy</b>		Peak Hour: <b>PM</b>												
Ex Growth Rate: <b>1.05%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: <b>2.10%</b>		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Existing 2021 Growth		3	1	2	0	1	1	1	1	15	3	1	11	1
<b>Existing 2021</b>		<b>216</b>	<b>2</b>	<b>105</b>	<b>0</b>	<b>24</b>	<b>10</b>	<b>34</b>	<b>3</b>	<b>1408</b>	<b>208</b>	<b>49</b>	<b>1033</b>	<b>3</b>
Opening Year 2023 Growth		5	1	3	0	1	1	1	1	30	5	2	22	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>218</b>	<b>2</b>	<b>106</b>	<b>0</b>	<b>24</b>	<b>10</b>	<b>34</b>	<b>3</b>	<b>1423</b>	<b>210</b>	<b>50</b>	<b>1044</b>	<b>3</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Harborgate Wy**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	216	2	105	0	24	10	34	3	1408	208	49	1033	3
Cumulative Projects Volume	0	0	0	0	0	0	0	0	23	0	0	8	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>216</b>	<b>2</b>	<b>105</b>	<b>0</b>	<b>24</b>	<b>10</b>	<b>34</b>	<b>3</b>	<b>1431</b>	<b>208</b>	<b>49</b>	<b>1041</b>	<b>3</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	218	2	106	0	24	10	34	3	1423	210	50	1044	3
Cumulative Projects Volume	0	0	0	0	0	0	0	0	23	0	0	8	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>218</b>	<b>2</b>	<b>106</b>	<b>0</b>	<b>24</b>	<b>10</b>	<b>34</b>	<b>3</b>	<b>1446</b>	<b>210</b>	<b>50</b>	<b>1052</b>	<b>3</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
<b>Project NET Volumes</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>37</b>	<b>5</b>	<b>0</b>	<b>43</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>224</b>	<b>2</b>	<b>106</b>	<b>0</b>	<b>24</b>	<b>10</b>	<b>34</b>	<b>3</b>	<b>1483</b>	<b>215</b>	<b>50</b>	<b>1095</b>	<b>3</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**11. 190<sup>th</sup> St at Normandie Ave**



**Existing 2021 and Opening Year 2023 - Ambient Growth Only**

Intersection: **190th St at Normandie Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>101</b>	<b>596</b>	<b>92</b>	<b>186</b>	<b>750</b>	<b>744</b>	<b>158</b>	<b>834</b>	<b>179</b>	<b>78</b>	<b>1054</b>	<b>54</b>
Existing 2021 Growth	2	7	1	2	8	8	2	9	2	1	12	1
<b>Existing 2021</b>	<b>103</b>	<b>603</b>	<b>93</b>	<b>188</b>	<b>758</b>	<b>752</b>	<b>160</b>	<b>843</b>	<b>181</b>	<b>79</b>	<b>1066</b>	<b>55</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	101	596	92	186	750	744	158	834	179	78	1054	54
Opening Year 2023 Growth	3	13	2	4	16	16	4	18	4	2	23	2
<b>Opening Year 2023</b>	<b>104</b>	<b>609</b>	<b>94</b>	<b>190</b>	<b>766</b>	<b>760</b>	<b>162</b>	<b>852</b>	<b>183</b>	<b>80</b>	<b>1077</b>	<b>56</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Normandie Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>103</b>	<b>603</b>	<b>93</b>	<b>0</b>	<b>188</b>	<b>758</b>	<b>752</b>	<b>160</b>	<b>843</b>	<b>181</b>	<b>79</b>	<b>1066</b>	<b>55</b>
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	26	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>103</b>	<b>603</b>	<b>93</b>	<b>0</b>	<b>188</b>	<b>758</b>	<b>752</b>	<b>160</b>	<b>849</b>	<b>181</b>	<b>79</b>	<b>1092</b>	<b>55</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>104</b>	<b>609</b>	<b>94</b>	<b>0</b>	<b>190</b>	<b>766</b>	<b>760</b>	<b>162</b>	<b>852</b>	<b>183</b>	<b>80</b>	<b>1077</b>	<b>56</b>
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	26	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>104</b>	<b>609</b>	<b>94</b>	<b>0</b>	<b>190</b>	<b>766</b>	<b>760</b>	<b>162</b>	<b>858</b>	<b>183</b>	<b>80</b>	<b>1103</b>	<b>56</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
Project NET Volumes	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>7</b>	<b>14</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>108</b>	<b>609</b>	<b>94</b>	<b>0</b>	<b>190</b>	<b>766</b>	<b>764</b>	<b>169</b>	<b>872</b>	<b>190</b>	<b>80</b>	<b>1125</b>	<b>56</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **190th St at Normandie Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>64</b>	<b>609</b>	<b>84</b>	<b>0</b>	<b>158</b>	<b>433</b>	<b>310</b>	<b>326</b>	<b>913</b>	<b>150</b>	<b>81</b>	<b>647</b>	<b>192</b>
Existing 2021 Growth	1	7	1	0	2	5	4	4	10	2	1	7	3
<b>Existing 2021</b>	<b>65</b>	<b>616</b>	<b>85</b>	<b>0</b>	<b>160</b>	<b>438</b>	<b>314</b>	<b>330</b>	<b>923</b>	<b>152</b>	<b>82</b>	<b>654</b>	<b>195</b>
2019	64	609	84	0	158	433	310	326	913	150	81	647	192
Opening Year 2023 Growth	2	13	2	0	4	10	7	7	20	4	2	14	5
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>66</b>	<b>622</b>	<b>86</b>	<b>0</b>	<b>162</b>	<b>443</b>	<b>317</b>	<b>333</b>	<b>933</b>	<b>154</b>	<b>83</b>	<b>661</b>	<b>197</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **190th St at Normandie Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	65	616	85	0	160	438	314	330	923	152	82	654	195
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	18	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>65</b>	<b>616</b>	<b>85</b>	<b>0</b>	<b>160</b>	<b>438</b>	<b>314</b>	<b>330</b>	<b>929</b>	<b>152</b>	<b>82</b>	<b>672</b>	<b>195</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	66	622	86	0	162	443	317	333	933	154	83	661	197
Cumulative Projects Volume	0	0	0	0	0	0	0	0	6	0	0	18	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>66</b>	<b>622</b>	<b>86</b>	<b>0</b>	<b>162</b>	<b>443</b>	<b>317</b>	<b>333</b>	<b>939</b>	<b>154</b>	<b>83</b>	<b>679</b>	<b>197</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>13</b>	<b>55</b>	<b>13</b>	<b>0</b>	<b>61</b>	<b>0</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>77</b>	<b>622</b>	<b>86</b>	<b>0</b>	<b>162</b>	<b>443</b>	<b>328</b>	<b>346</b>	<b>994</b>	<b>167</b>	<b>83</b>	<b>740</b>	<b>197</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: <b>190th St at Normandie Ave</b>		Peak Hour: <b>PM</b>												
Ex Growth Rate: <b>1.05%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Fut Growth Rate: <b>2.10%</b>		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		<b>98</b>	<b>860</b>	<b>98</b>	<b>0</b>	<b>93</b>	<b>647</b>	<b>311</b>	<b>346</b>	<b>1383</b>	<b>171</b>	<b>128</b>	<b>885</b>	<b>346</b>
Existing 2021 Growth		2	10	2	0	1	7	4	4	15	2	2	10	4
<b>Existing 2021</b>		<b>100</b>	<b>870</b>	<b>100</b>	<b>0</b>	<b>94</b>	<b>654</b>	<b>315</b>	<b>350</b>	<b>1398</b>	<b>173</b>	<b>130</b>	<b>895</b>	<b>350</b>
		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		98	860	98	0	93	647	311	346	1383	171	128	885	346
Opening Year 2023 Growth		3	19	3	0	2	14	7	8	30	4	3	19	8
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>101</b>	<b>879</b>	<b>101</b>	<b>0</b>	<b>95</b>	<b>661</b>	<b>318</b>	<b>354</b>	<b>1413</b>	<b>175</b>	<b>131</b>	<b>904</b>	<b>354</b>



Year 2021 and Year 2023 Traffic Volumes

Intersection: **190th St at Normandie Ave**

Peak Hour: **PM**

New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	100	870	100	0	94	654	315	350	1398	173	130	895	350
Cumulative Projects Volume	0	0	0	0	0	0	0	0	23	0	0	8	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>100</b>	<b>870</b>	<b>100</b>	<b>0</b>	<b>94</b>	<b>654</b>	<b>315</b>	<b>350</b>	<b>1421</b>	<b>173</b>	<b>130</b>	<b>903</b>	<b>350</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	101	879	101	0	95	661	318	354	1413	175	131	904	354
Cumulative Projects Volume	0	0	0	0	0	0	0	0	23	0	0	8	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>101</b>	<b>879</b>	<b>101</b>	<b>0</b>	<b>95</b>	<b>661</b>	<b>318</b>	<b>354</b>	<b>1436</b>	<b>175</b>	<b>131</b>	<b>912</b>	<b>354</b>

New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT													
Project NET Volumes	6	0	0	0	0	0	6	5	27	5	0	31	0
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>107</b>	<b>879</b>	<b>101</b>	<b>0</b>	<b>95</b>	<b>661</b>	<b>324</b>	<b>359</b>	<b>1463</b>	<b>180</b>	<b>131</b>	<b>943</b>	<b>354</b>

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**12. Western Ave at 195<sup>th</sup> St**



Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **195th St at Western Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	17	1429	17	27	2150	31	9	0	5	4	0	2
Existing 2021 Growth	1	16	1	1	23	1	1	0	1	1	0	1
<b>Existing 2021</b>	<b>18</b>	<b>1445</b>	<b>18</b>	<b>28</b>	<b>2173</b>	<b>32</b>	<b>10</b>	<b>0</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>3</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	17	1429	17	27	2150	31	9	0	5	4	0	2
Opening Year 2023 Growth	1	31	1	1	46	1	1	0	1	1	0	1
<b>Opening Year 2023</b>	<b>18</b>	<b>1460</b>	<b>18</b>	<b>28</b>	<b>2196</b>	<b>32</b>	<b>10</b>	<b>0</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>3</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **195th St at Western Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>18</b>	<b>1445</b>	<b>18</b>	<b>0</b>	<b>28</b>	<b>2173</b>	<b>32</b>	<b>10</b>	<b>0</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>3</b>
Cumulative Projects Volume	17	7	0	0	0	19	61	23	0	14	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>35</b>	<b>1452</b>	<b>18</b>	<b>0</b>	<b>28</b>	<b>2192</b>	<b>93</b>	<b>33</b>	<b>0</b>	<b>20</b>	<b>5</b>	<b>0</b>	<b>3</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>18</b>	<b>1460</b>	<b>18</b>	<b>0</b>	<b>28</b>	<b>2196</b>	<b>32</b>	<b>10</b>	<b>0</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>3</b>
Cumulative Projects Volume	17	7	0	0	0	19	61	23	0	14	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>35</b>	<b>1467</b>	<b>18</b>	<b>0</b>	<b>28</b>	<b>2215</b>	<b>93</b>	<b>33</b>	<b>0</b>	<b>20</b>	<b>5</b>	<b>0</b>	<b>3</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>27</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>35</b>	<b>1498</b>	<b>18</b>	<b>0</b>	<b>33</b>	<b>2242</b>	<b>93</b>	<b>33</b>	<b>0</b>	<b>20</b>	<b>5</b>	<b>0</b>	<b>8</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **195th St at Western Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	12	1292	14	0	23	1585	17	30	1	9	9	0	9
Existing 2021 Growth	1	14	1	0	1	17	1	1	1	1	1	0	1
<b>Existing 2021</b>	<b>13</b>	<b>1306</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1602</b>	<b>18</b>	<b>31</b>	<b>2</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>10</b>
2019	12	1292	14	0	23	1585	17	30	1	9	9	0	9
Opening Year 2023 Growth	1	28	1	0	1	34	1	1	1	1	1	0	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>13</b>	<b>1320</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1619</b>	<b>18</b>	<b>31</b>	<b>2</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>10</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **195th St at Western Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>13</b>	<b>1306</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1602</b>	<b>18</b>	<b>31</b>	<b>2</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>10</b>
Cumulative Projects Volume	11	10	0	0	0	-383	39	42	0	16	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>24</b>	<b>1316</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1219</b>	<b>57</b>	<b>73</b>	<b>2</b>	<b>26</b>	<b>10</b>	<b>0</b>	<b>10</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>13</b>	<b>1320</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1619</b>	<b>18</b>	<b>31</b>	<b>2</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>10</b>
Cumulative Projects Volume	11	10	0	0	0	-383	39	42	0	16	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>24</b>	<b>1330</b>	<b>15</b>	<b>0</b>	<b>24</b>	<b>1236</b>	<b>57</b>	<b>73</b>	<b>2</b>	<b>26</b>	<b>10</b>	<b>0</b>	<b>10</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>81</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>24</b>	<b>1417</b>	<b>15</b>	<b>0</b>	<b>33</b>	<b>1317</b>	<b>57</b>	<b>73</b>	<b>2</b>	<b>26</b>	<b>10</b>	<b>0</b>	<b>19</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **195th St at Western Ave**

Peak Hour: **PM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	7	1629	6	0	21	1885	14	17	1	13	26	1	34
Existing 2021 Growth	1	18	1	0	1	20	1	1	1	1	1	1	1
<b>Existing 2021</b>	<b>8</b>	<b>1647</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1905</b>	<b>15</b>	<b>18</b>	<b>2</b>	<b>14</b>	<b>27</b>	<b>2</b>	<b>35</b>
2019	7	1629	6	0	21	1885	14	17	1	13	26	1	34
Opening Year 2023 Growth	1	35	1	0	1	40	1	1	1	1	1	1	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>8</b>	<b>1664</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1925</b>	<b>15</b>	<b>18</b>	<b>2</b>	<b>14</b>	<b>27</b>	<b>2</b>	<b>35</b>

Year 2021 and Year 2023 Traffic Volumes

Intersection: **195th St at Western Ave**

Peak Hour: **PM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>8</b>	<b>1647</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1905</b>	<b>15</b>	<b>18</b>	<b>2</b>	<b>14</b>	<b>27</b>	<b>2</b>	<b>35</b>
Cumulative Projects Volume	5	12	0	0	0	13	16	59	0	17	0	0	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>13</b>	<b>1659</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1918</b>	<b>31</b>	<b>77</b>	<b>2</b>	<b>31</b>	<b>27</b>	<b>2</b>	<b>35</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>8</b>	<b>1664</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1925</b>	<b>15</b>	<b>18</b>	<b>2</b>	<b>14</b>	<b>27</b>	<b>2</b>	<b>35</b>
Cumulative Projects Volume	5	12	0	0	0	13	16	59	0	17	0	0	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>13</b>	<b>1676</b>	<b>7</b>	<b>0</b>	<b>22</b>	<b>1938</b>	<b>31</b>	<b>77</b>	<b>2</b>	<b>31</b>	<b>27</b>	<b>2</b>	<b>35</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>44</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>35</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>13</b>	<b>1720</b>	<b>7</b>	<b>0</b>	<b>28</b>	<b>1973</b>	<b>31</b>	<b>77</b>	<b>2</b>	<b>31</b>	<b>27</b>	<b>2</b>	<b>41</b>



190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

**13. Western Ave at Del Amo Blvd**



**Existing 2021 and Opening Year 2023 - Ambient Growth Only**

Intersection: **Del Amo Blvd at Western Ave**

Peak Hour: **AM**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	<b>120</b>	<b>1368</b>	<b>9</b>	<b>16</b>	<b>1473</b>	<b>951</b>	<b>305</b>	<b>17</b>	<b>76</b>	<b>34</b>	<b>140</b>	<b>58</b>
Existing 2021 Growth	2	15	1	1	16	10	4	1	1	1	2	1
<b>Existing 2021</b>	<b>122</b>	<b>1383</b>	<b>10</b>	<b>17</b>	<b>1489</b>	<b>961</b>	<b>309</b>	<b>18</b>	<b>77</b>	<b>35</b>	<b>142</b>	<b>59</b>
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	120	1368	9	16	1473	951	305	17	76	34	140	58
Opening Year 2023 Growth	3	29	1	1	31	20	7	1	2	1	3	2
<b>Opening Year 2023</b>	<b>123</b>	<b>1397</b>	<b>10</b>	<b>17</b>	<b>1504</b>	<b>971</b>	<b>312</b>	<b>18</b>	<b>78</b>	<b>35</b>	<b>143</b>	<b>60</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Del Amo Blvd at Western Ave**

Peak Hour: **AM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>122</b>	<b>1383</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>1489</b>	<b>961</b>	<b>309</b>	<b>18</b>	<b>77</b>	<b>35</b>	<b>142</b>	<b>59</b>
Cumulative Projects Volume	2	25	0	0	0	26	2	0	2	0	0	7	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>124</b>	<b>1408</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>1515</b>	<b>963</b>	<b>309</b>	<b>20</b>	<b>77</b>	<b>35</b>	<b>149</b>	<b>59</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>123</b>	<b>1397</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>1504</b>	<b>971</b>	<b>312</b>	<b>18</b>	<b>78</b>	<b>35</b>	<b>143</b>	<b>60</b>
Cumulative Projects Volume	2	25	0	0	0	26	2	0	2	0	0	7	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>125</b>	<b>1422</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>1530</b>	<b>973</b>	<b>312</b>	<b>20</b>	<b>78</b>	<b>35</b>	<b>150</b>	<b>60</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
Project NET Volumes	<b>0</b>	<b>19</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>8</b>	<b>14</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>125</b>	<b>1441</b>	<b>10</b>	<b>0</b>	<b>22</b>	<b>1538</b>	<b>987</b>	<b>321</b>	<b>20</b>	<b>78</b>	<b>35</b>	<b>150</b>	<b>62</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: **Del Amo Blvd at Western Ave**

Peak Hour: **MD**

Ex Growth Rate: **1.05%**

Fut Growth Rate: **2.10%**

	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019	124	1004	16	0	25	1203	359	285	34	172	11	36	41
Existing 2021 Growth	2	11	1	0	1	13	4	3	1	2	1	1	1
<b>Existing 2021</b>	<b>126</b>	<b>1015</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1216</b>	<b>363</b>	<b>288</b>	<b>35</b>	<b>174</b>	<b>12</b>	<b>37</b>	<b>42</b>
2019	124	1004	16	0	25	1203	359	285	34	172	11	36	41
Opening Year 2023 Growth	3	22	1	0	1	26	8	6	1	4	1	1	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>	<b>127</b>	<b>1026</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1229</b>	<b>367</b>	<b>291</b>	<b>35</b>	<b>176</b>	<b>12</b>	<b>37</b>	<b>42</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Del Amo Blvd at Western Ave**

Peak Hour: **MD**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>126</b>	<b>1015</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1216</b>	<b>363</b>	<b>288</b>	<b>35</b>	<b>174</b>	<b>12</b>	<b>37</b>	<b>42</b>
Cumulative Projects Volume	1	21	0	0	0	29	1	1	4	1	0	5	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>127</b>	<b>1036</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1245</b>	<b>364</b>	<b>289</b>	<b>39</b>	<b>175</b>	<b>12</b>	<b>42</b>	<b>42</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>127</b>	<b>1026</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1229</b>	<b>367</b>	<b>291</b>	<b>35</b>	<b>176</b>	<b>12</b>	<b>37</b>	<b>42</b>
Cumulative Projects Volume	1	21	0	0	0	29	1	1	4	1	0	5	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>128</b>	<b>1047</b>	<b>17</b>	<b>0</b>	<b>26</b>	<b>1258</b>	<b>368</b>	<b>292</b>	<b>39</b>	<b>177</b>	<b>12</b>	<b>42</b>	<b>42</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>55</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>45</b>	<b>27</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>128</b>	<b>1102</b>	<b>17</b>	<b>0</b>	<b>35</b>	<b>1303</b>	<b>395</b>	<b>316</b>	<b>39</b>	<b>177</b>	<b>12</b>	<b>42</b>	<b>49</b>

Existing 2021 and Opening Year 2023 - Ambient Growth Only

Intersection: Del Amo Blvd at Western Ave		Peak Hour: PM												
Ex Growth Rate: 1.05%														
Fut Growth Rate: 2.10%		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		99	1157	16	0	39	1660	511	635	145	295	13	43	36
Existing 2021 Growth		2	13	1	0	1	18	6	7	2	4	1	1	1
<b>Existing 2021</b>		<b>101</b>	<b>1170</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1678</b>	<b>517</b>	<b>642</b>	<b>147</b>	<b>299</b>	<b>14</b>	<b>44</b>	<b>37</b>
		NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2019		99	1157	16	0	39	1660	511	635	145	295	13	43	36
Opening Year 2023 Growth		3	25	1	0	1	35	11	14	4	7	1	1	1
<b>Opening Year 2023 (2019 with Ambient Growth)</b>		<b>102</b>	<b>1182</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1695</b>	<b>522</b>	<b>649</b>	<b>149</b>	<b>302</b>	<b>14</b>	<b>44</b>	<b>37</b>

**Year 2021 and Year 2023 Traffic Volumes**

Intersection: **Del Amo Blvd at Western Ave**

Peak Hour: **PM**

<b>New Report - 2021 Traffic Volumes Existing Conditions (Ambient Growth plus Cumulative Projects)</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2021 with Ambient Growth	<b>101</b>	<b>1170</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1678</b>	<b>517</b>	<b>642</b>	<b>147</b>	<b>299</b>	<b>14</b>	<b>44</b>	<b>37</b>
Cumulative Projects Volume	0	16	0	0	0	30	0	2	6	2	0	2	0
<b>Year 2021 Traffic Volumes with Cumulative Projects (A)</b>	<b>101</b>	<b>1186</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1708</b>	<b>517</b>	<b>644</b>	<b>153</b>	<b>301</b>	<b>14</b>	<b>46</b>	<b>37</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects</b>													
	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
New Report 2023 with Ambient Growth	<b>102</b>	<b>1182</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1695</b>	<b>522</b>	<b>649</b>	<b>149</b>	<b>302</b>	<b>14</b>	<b>44</b>	<b>37</b>
Cumulative Projects Volume	0	16	0	0	0	30	0	2	6	2	0	2	0
<b>Year 2023 Traffic Volumes without Project (B)</b>	<b>102</b>	<b>1198</b>	<b>17</b>	<b>0</b>	<b>40</b>	<b>1725</b>	<b>522</b>	<b>651</b>	<b>155</b>	<b>304</b>	<b>14</b>	<b>46</b>	<b>37</b>

<b>New Report - 2023 Traffic Volumes with Ambient Growth plus Cumulative Projects WITH PROJECT</b>													
<b>Project NET Volumes</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>10</b>	<b>19</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Year 2023 Traffic Volumes WITH Project = (B) + Project NET Volumes</b>	<b>102</b>	<b>1226</b>	<b>17</b>	<b>0</b>	<b>46</b>	<b>1735</b>	<b>541</b>	<b>663</b>	<b>155</b>	<b>304</b>	<b>14</b>	<b>46</b>	<b>40</b>

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Intersection Analysis Worksheets**

- Year 2021 Existing Conditions (Ambient Growth and Cumulative Projects)




























190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **AM Peak Hour**


















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	369	73	165	1119	125	126	963	73	81	985	199
Future Volume (veh/h)	85	369	73	165	1119	125	126	963	73	81	985	199
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	85	369	73	165	1119	125	126	963	73	81	985	199
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	178	1468	288	461	1760	787	168	1573	704	163	1573	704
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.15	0.15	0.15	0.44	0.44	0.44
Sat Flow, veh/h	445	2952	578	944	3539	1583	471	3539	1583	542	3539	1583
Grp Volume(v), veh/h	85	220	222	165	1119	125	126	963	73	81	985	199
Grp Sat Flow(s),veh/h/ln	445	1770	1761	944	1770	1583	471	1770	1583	542	1770	1583
Q Serve(g_s), s	20.8	8.6	8.7	14.6	27.9	5.2	27.6	30.6	4.8	17.1	25.7	9.6
Cycle Q Clear(g_c), s	48.7	8.6	8.7	23.3	27.9	5.2	53.3	30.6	4.8	47.7	25.7	9.6
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	880	876	461	1760	787	168	1573	704	163	1573	704
V/C Ratio(X)	0.48	0.25	0.25	0.36	0.64	0.16	0.75	0.61	0.10	0.50	0.63	0.28
Avail Cap(c_a), veh/h	185	907	902	475	1814	811	168	1573	704	163	1573	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
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	40.1	17.3	17.4	24.1	22.2	16.5	66.0	41.5	30.5	46.4	25.7	21.2
Incr Delay (d2), s/veh	2.0	0.1	0.2	0.5	0.7	0.1	25.8	1.8	0.3	10.5	1.9	1.0
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	2.6	4.2	4.2	3.9	13.7	2.3	5.4	15.4	2.2	3.0	13.0	4.4
LnGrp Delay(d),s/veh	42.1	17.5	17.5	24.5	22.9	16.6	91.8	43.3	30.8	56.9	27.6	22.2
LnGrp LOS	D	B	B	C	C	B	F	D	C	E	C	C
Approach Vol, veh/h		527			1409			1162			1265	
Approach Delay, s/veh		21.4			22.5			47.8			28.6	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.8		63.2		56.8		63.2				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		49.5		59.5		49.5		59.5				
Max Q Clear Time (g_c+I1), s		55.3		50.7		49.7		29.9				
Green Ext Time (p_c), s		0.0		7.0		0.0		17.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				30.9								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Existing Year 2021  
Timing Plan: AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	982	201	1149	312	29	1300		
Future Volume (veh/h)	982	201	1149	312	29	1300		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1170	0	1149	312	29	1300		
Adj No. of Lanes	2	1	2	1	1	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	0	2	2	2	2		
Cap, veh/h	1296	590	1627	1306	384	2974		
Arrive On Green	0.37	0.00	0.92	0.92	0.21	1.00		
Sat Flow, veh/h	3548	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	1170	0	1149	312	29	1300		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	37.5	0.0	8.9	1.0	0.8	0.0		
Cycle Q Clear(g_c), s	37.5	0.0	8.9	1.0	0.8	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1296	590	1627	1306	384	2974		
V/C Ratio(X)	0.90	0.00	0.71	0.24	0.08	0.44		
Avail Cap(c_a), veh/h	1375	626	1627	1306	384	2974		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.1	0.0	3.0	0.3	9.9	0.0		
Incr Delay (d2), s/veh	8.3	0.0	2.6	0.4	0.4	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	19.9	0.0	4.1	1.4	0.4	0.1		
LnGrp Delay(d),s/veh	44.4	0.0	5.6	0.7	10.3	0.5		
LnGrp LOS	D		A	A	B	A		
Approach Vol, veh/h	1170		1461			1329		
Approach Delay, s/veh	44.4		4.5			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.0	58.7				73.7		46.3
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	50.5				65.5		44.5
Max Q Clear Time (g_c+I1), s	2.8	10.9				2.0		39.5
Green Ext Time (p_c), s	0.0	29.5				40.8		2.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			15.0					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: Existing Conditions

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	104	2	2880	104/2,880= 0.04	< ==	
NB Thru	405	2	3200	405/3,200= 0.13		
NB Right	192	1	1600	192/1,600= 0.12		
SB Left	100	1	1600	100/1,600= 0.06		
SB Thru	721	2	3200	721/3,200= 0.23	< ==	
SB Right**	393	1	1840	393/1,840= 0.21		
EB Left	113	1	1600	113/1,600= 0.07	< ==	
EB Thru	1422	3	4800	1,422/4,800= 0.30		
EB Right	165	1	1600	165/1,600= 0.10		
WB Left	157	1	1600	157/1,600= 0.10		
WB Thru	1263	2	3200	1,263/3,200= 0.40	< ==	
WB Right	78	1	1600	78/1,600= 0.05		
Sum of Critical V/C Ratios						0.731
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.831</b>
Level of Service (LOS) - Refer to table below						<b>D</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: Existing Conditions

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	8	1	1600	8/1,600= 0.01		
NB Thru	5	1	1600	5/1,600= ----		
NB Right	41	1	1600	41/1,600= 0.03	< ==	
SB Left	3	1	1600	3/1,600= 0.00		
SB Thru		1	1600	0/1,600= ----		
SB Right				----		
EB Left		1	1600	0/1,600= ----		
EB Thru	1671	3	4800	1,697/4,800= 0.35		
EB Right	26			----		
WB Left	110	1	1600	110/1,600= 0.07		
WB Thru	1588	2	3200	1,588/3,200= 0.50	< ==	
WB Right		1	1600	0/1,600= ----		
Sum of Critical V/C Ratios						0.524
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.624</b>
Level of Service (LOS) - Refer to table below						<b>B</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB
























Existing Year 2021  
Timing Plan: AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	885	791	1532	144	605	131		
Future Volume (veh/h)	885	791	1532	144	605	131		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	885	791	1532	144	727	0		
Adj No. of Lanes	2	3	3	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	0		
Cap, veh/h	1039	3588	1912	595	808	368		
Arrive On Green	0.30	0.71	0.38	0.38	0.23	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	885	791	1532	144	727	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	21.8	4.9	24.2	5.6	17.9	0.0		
Cycle Q Clear(g_c), s	21.8	4.9	24.2	5.6	17.9	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1039	3588	1912	595	808	368		
V/C Ratio(X)	0.85	0.22	0.80	0.24	0.90	0.00		
Avail Cap(c_a), veh/h	1128	3588	1912	595	808	368		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	29.5	4.6	25.1	19.3	33.8	0.0		
Incr Delay (d2), s/veh	6.1	0.1	3.6	1.0	13.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.2	2.3	11.9	2.6	10.2	0.0		
LnGrp Delay(d),s/veh	35.6	4.8	28.7	20.2	46.8	0.0		
LnGrp LOS	D	A	C	C	D			
Approach Vol, veh/h		1676	1676		727			
Approach Delay, s/veh		21.0	28.0		46.8			
Approach LOS		C	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		67.0		23.0	29.7	37.3		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		61.5		18.5	27.5	29.5		
Max Q Clear Time (g_c+I1), s		6.9		19.9	23.8	26.2		
Green Ext Time (p_c), s		33.1		0.0	1.4	3.1		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			28.5					
HCM 2010 LOS			C					
<b>Notes</b>								





















HCM 2010 Signalized Intersection Summary  
 9: Western Ave & 190th St

Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	721	496	317	1034	135	159	1105	103	195	1498	485
Future Volume (veh/h)	170	721	496	317	1034	135	159	1105	103	195	1498	485
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	170	721	496	317	1034	135	159	1105	103	195	1498	485
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	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	281	1585	620	416	1598	208	276	1925	791	307	1970	743
Arrive On Green	0.08	0.31	0.31	0.12	0.35	0.35	0.03	0.12	0.12	0.12	0.52	0.52
Sat Flow, veh/h	3442	5085	1583	3442	4555	594	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	170	721	496	317	769	400	159	1105	103	195	1498	485
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1758	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.7	13.6	33.3	10.7	22.9	22.9	5.5	24.6	5.6	6.5	28.2	26.1
Cycle Q Clear(g_c), s	5.7	13.6	33.3	10.7	22.9	22.9	5.5	24.6	5.6	6.5	28.2	26.1
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	281	1585	620	416	1190	617	276	1925	791	307	1970	743
V/C Ratio(X)	0.61	0.45	0.80	0.76	0.65	0.65	0.58	0.57	0.13	0.64	0.76	0.65
Avail Cap(c_a), veh/h	330	1589	622	416	1190	617	387	1925	791	416	1970	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	0.93	0.93	0.93	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	33.1	32.3	51.1	32.7	32.7	56.4	43.4	23.2	51.0	24.6	18.9
Incr Delay (d2), s/veh	2.3	0.2	7.3	7.5	1.1	2.2	1.8	1.2	0.3	2.2	2.8	4.4
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	2.8	6.4	15.7	5.5	10.9	11.5	2.7	11.8	2.5	3.2	13.6	12.2
LnGrp Delay(d),s/veh	55.6	33.3	39.7	58.6	33.8	34.9	58.2	44.6	23.5	53.2	27.5	23.3
LnGrp LOS	E	C	D	E	C	C	E	D	C	D	C	C
Approach Vol, veh/h		1387			1486			1367			2178	
Approach Delay, s/veh		38.3			39.4			44.6			28.8	
Approach LOS		D			D			D			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	13.2	48.9	17.0	40.9	12.1	50.0	12.3	45.6				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	12.5	39.5	12.5	35.5	11.5	40.5	9.5	38.5				
Max Q Clear Time (g_c+I1), s	8.5	26.6	12.7	35.3	7.5	30.2	7.7	24.9				
Green Ext Time (p_c), s	0.2	11.9	0.0	0.1	0.2	9.7	0.1	10.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			36.7									
HCM 2010 LOS			D									
<b>Notes</b>												

HCM 2010 Signalized Intersection Summary  
 10: Harborsgate Wy & 190th St






















Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	796	119	101	1593	7	146	11	45	0	0	4
Future Volume (veh/h)	30	796	119	101	1593	7	146	11	45	0	0	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	30	796	119	101	1593	7	154	0	45	0	0	4
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	284	2879	428	166	3998	18	326	0	293	0	0	42
Arrive On Green	0.64	0.64	0.64	0.09	0.77	0.77	0.09	0.00	0.09	0.00	0.00	0.03
Sat Flow, veh/h	316	4472	664	1774	5226	23	3548	0	1583	0	0	1583
Grp Volume(v), veh/h	30	602	313	101	1033	567	154	0	45	0	0	4
Grp Sat Flow(s),veh/h/ln	316	1695	1746	1774	1695	1859	1774	0	1583	0	0	1583
Q Serve(g_s), s	3.4	6.9	7.0	4.9	9.3	9.3	3.7	0.0	2.1	0.0	0.0	0.2
Cycle Q Clear(g_c), s	3.4	6.9	7.0	4.9	9.3	9.3	3.7	0.0	2.1	0.0	0.0	0.2
Prop In Lane	1.00		0.38	1.00		0.01	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	284	2183	1124	166	2594	1422	326	0	293	0	0	42
V/C Ratio(X)	0.11	0.28	0.28	0.61	0.40	0.40	0.47	0.00	0.15	0.00	0.00	0.10
Avail Cap(c_a), veh/h	284	2183	1124	227	2594	1422	1084	0	632	0	0	150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.93	0.93	0.93	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.3	6.9	7.0	39.2	3.6	3.6	38.8	0.0	30.7	0.0	0.0	42.8
Incr Delay (d2), s/veh	0.7	0.3	0.5	3.3	0.4	0.8	1.1	0.0	0.2	0.0	0.0	1.0
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	0.3	3.3	3.5	2.6	4.5	5.0	1.9	0.0	1.0	0.0	0.0	0.1
LnGrp Delay(d),s/veh	7.0	7.2	7.5	42.5	4.0	4.4	39.9	0.0	31.0	0.0	0.0	43.7
LnGrp LOS	A	A	A	D	A	A	D		C			D
Approach Vol, veh/h		945			1701			199				4
Approach Delay, s/veh		7.3			6.4			37.9				43.7
Approach LOS		A			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		11.8	10.9	61.4		5.9		72.4				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	9.5	27.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		5.7	6.9	9.0		2.2		11.3				
Green Ext Time (p_c), s		0.6	0.0	15.4		0.0		23.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			9.0									
HCM 2010 LOS			A									
<b>Notes</b>												

























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	849	181	79	1092	55	103	603	93	188	758	752
Future Volume (veh/h)	160	849	181	79	1092	55	103	603	93	188	758	752
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	160	849	181	79	1092	55	103	603	93	188	758	752
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	218	1349	286	129	1342	68	155	1273	196	426	1484	858
Arrive On Green	0.12	0.32	0.32	0.07	0.27	0.27	0.09	0.41	0.41	0.09	0.42	0.42
Sat Flow, veh/h	1774	4205	891	1774	4959	250	1774	3075	473	1774	3539	1583
Grp Volume(v), veh/h	160	684	346	79	746	401	103	346	350	188	758	752
Grp Sat Flow(s),veh/h/ln	1774	1695	1705	1774	1695	1819	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	10.4	20.6	20.8	5.2	24.7	24.7	6.8	17.1	17.2	7.0	19.0	49.7
Cycle Q Clear(g_c), s	10.4	20.6	20.8	5.2	24.7	24.7	6.8	17.1	17.2	7.0	19.0	49.7
Prop In Lane	1.00		0.52	1.00		0.14	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	218	1087	547	129	917	492	155	733	737	426	1484	858
V/C Ratio(X)	0.73	0.63	0.63	0.61	0.81	0.81	0.66	0.47	0.47	0.44	0.51	0.88
Avail Cap(c_a), veh/h	466	1342	675	200	917	492	170	733	737	462	1484	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	50.7	34.7	34.7	54.0	40.9	41.0	53.1	25.6	25.6	17.9	25.8	24.0
Incr Delay (d2), s/veh	4.7	0.6	1.3	4.7	5.7	10.2	8.3	2.2	2.2	0.7	1.3	12.2
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	5.4	9.7	10.0	2.7	12.3	13.9	3.7	8.8	8.9	3.5	9.5	24.4
LnGrp Delay(d),s/veh	55.5	35.3	36.1	58.7	46.6	51.1	61.4	27.8	27.8	18.7	27.0	36.1
LnGrp LOS	E	D	D	E	D	D	E	C	C	B	C	D
Approach Vol, veh/h		1190			1226			799			1698	
Approach Delay, s/veh		38.2			48.9			32.1			30.1	
Approach LOS		D			D			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	13.6	53.2	11.2	42.0	13.0	53.8	17.2	36.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	11.5	30.5	11.5	45.5	9.5	32.5	29.5	28.5				
Max Q Clear Time (g_c+I1), s	9.0	19.2	7.2	22.8	8.8	51.7	12.4	26.7				
Green Ext Time (p_c), s	0.1	8.6	0.1	13.7	0.0	0.0	0.4	1.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				37.1								
HCM 2010 LOS				D								























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	0	20	5	0	3	35	1452	18	28	2192	93
Future Volume (veh/h)	33	0	20	5	0	3	35	1452	18	28	2192	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	33	0	20	5	0	3	35	1452	18	28	2192	93
Adj No. of Lanes	0	1	1	0	1	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	64	0	481	62	0	481	94	2883	898	89	2869	893
Arrive On Green	0.30	0.00	0.30	0.30	0.00	0.30	0.04	0.38	0.38	0.03	0.38	0.38
Sat Flow, veh/h	13	0	1583	5	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	33	0	20	5	0	3	35	1452	18	28	2192	93
Grp Sat Flow(s),veh/h/ln	13	0	1583	6	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.3	0.0	1.1	0.1	0.0	0.2	2.3	26.3	0.9	1.9	45.2	4.6
Cycle Q Clear(g_c), s	36.5	0.0	1.1	36.5	0.0	0.2	2.3	26.3	0.9	1.9	45.2	4.6
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	64	0	481	62	0	481	94	2883	898	89	2869	893
V/C Ratio(X)	0.52	0.00	0.04	0.08	0.00	0.01	0.37	0.50	0.02	0.32	0.76	0.10
Avail Cap(c_a), veh/h	64	0	482	62	0	482	155	2883	898	155	2869	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.67	0.67	0.67	0.58	0.58	0.58
Uniform Delay (d), s/veh	60.0	0.0	29.4	60.0	0.0	29.1	55.9	24.3	16.4	56.0	30.3	17.7
Incr Delay (d2), s/veh	6.8	0.0	0.0	0.6	0.0	0.0	1.6	0.4	0.0	1.2	1.2	0.1
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	1.2	0.0	0.5	0.2	0.0	0.1	1.2	12.5	0.4	0.9	21.6	2.0
LnGrp Delay(d),s/veh	66.8	0.0	29.5	60.5	0.0	29.1	57.6	24.7	16.4	57.2	31.5	17.8
LnGrp LOS	E		C	E		C	E	C	B	E	C	B
Approach Vol, veh/h		53			8			1505			2313	
Approach Delay, s/veh		52.7			48.8			25.4			31.3	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	71.5		40.0	8.8	71.2		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	61.5		34.5	8.5	61.5		34.5				
Max Q Clear Time (g_c+I1), s	3.9	28.3		38.5	4.3	47.2		38.5				
Green Ext Time (p_c), s	0.0	31.4		0.0	0.0	13.9		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			29.3									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Existing Year 2021  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	309	20	77	35	149	59	124	1408	10	17	1515	963
Future Volume (veh/h)	309	20	77	35	149	59	124	1408	10	17	1515	963
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	323	0	77	35	149	59	124	1408	10	17	1515	963
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	464	0	207	24	104	41	152	2428	1086	240	2326	1086
Arrive On Green	0.13	0.00	0.13	0.10	0.10	0.10	0.69	0.69	0.69	1.00	1.00	1.00
Sat Flow, veh/h	3548	0	1583	256	1088	431	134	3539	1583	377	3390	1583
Grp Volume(v), veh/h	323	0	77	243	0	0	124	1408	10	17	1515	963
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	0	134	1770	1583	377	1695	1583
Q Serve(g_s), s	10.4	0.0	5.3	11.5	0.0	0.0	82.3	24.9	0.2	1.8	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	5.3	11.5	0.0	0.0	82.3	24.9	0.2	26.6	0.0	0.0
Prop In Lane	1.00		1.00	0.14		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	464	0	207	170	0	0	152	2428	1086	240	2326	1086
V/C Ratio(X)	0.70	0.00	0.37	1.43	0.00	0.00	0.82	0.58	0.01	0.07	0.65	0.89
Avail Cap(c_a), veh/h	872	0	389	170	0	0	152	2428	1086	240	2326	1086
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.80	0.80	0.80
Uniform Delay (d), s/veh	49.9	0.0	47.7	54.3	0.0	0.0	29.6	9.8	6.0	4.0	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	1.1	223.7	0.0	0.0	36.7	1.0	0.0	0.5	1.1	8.8
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	5.2	0.0	2.4	16.2	0.0	0.0	5.6	12.3	0.1	0.2	0.4	2.7
LnGrp Delay(d),s/veh	51.8	0.0	48.8	277.9	0.0	0.0	66.3	10.8	6.0	4.5	1.1	8.8
LnGrp LOS	D		D	F			E	B	A	A	A	A
Approach Vol, veh/h		400			243			1542			2495	
Approach Delay, s/veh		51.2			277.9			15.3			4.1	
Approach LOS		D			F			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		85.8		19.2		85.8		15.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		66.5		27.5		66.5		9.5				
Max Q Clear Time (g_c+I1), s		84.3		12.4		28.6		13.5				
Green Ext Time (p_c), s		0.0		1.2		37.3		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			26.0									
HCM 2010 LOS			C									
<b>Notes</b>												





























190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **MD Peak Hour**


















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (veh/h)	163	447	94	106	317	80	123	1045	126	68	1010	123
Future Volume (veh/h)	163	447	94	106	317	80	123	1045	126	68	1010	123
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	163	447	94	106	317	80	123	1045	126	68	1010	123
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	302	915	191	222	1110	497	297	2223	994	360	2223	994
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	1.00	1.00	1.00	0.63	0.63	0.63
Sat Flow, veh/h	983	2916	609	861	3539	1583	495	3539	1583	477	3539	1583
Grp Volume(v), veh/h	163	270	271	106	317	80	123	1045	126	68	1010	123
Grp Sat Flow(s),veh/h/ln	983	1770	1755	861	1770	1583	495	1770	1583	477	1770	1583
Q Serve(g_s), s	18.0	14.8	15.0	13.7	8.1	4.4	11.7	0.0	0.0	7.4	17.8	3.8
Cycle Q Clear(g_c), s	26.1	14.8	15.0	28.7	8.1	4.4	29.5	0.0	0.0	7.4	17.8	3.8
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	555	551	222	1110	497	297	2223	994	360	2223	994
V/C Ratio(X)	0.54	0.49	0.49	0.48	0.29	0.16	0.41	0.47	0.13	0.19	0.45	0.12
Avail Cap(c_a), veh/h	342	627	622	257	1253	561	297	2223	994	360	2223	994
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
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	40.9	33.4	33.4	45.1	31.0	29.8	3.5	0.0	0.0	9.7	11.6	9.0
Incr Delay (d2), s/veh	1.5	0.7	0.7	1.6	0.1	0.2	4.2	0.7	0.3	1.2	0.7	0.3
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	5.0	7.4	7.4	3.3	4.0	1.9	1.9	0.2	0.1	1.1	8.9	1.7
LnGrp Delay(d),s/veh	42.4	34.0	34.1	46.7	31.2	29.9	7.7	0.7	0.3	10.8	12.3	9.3
LnGrp LOS	D	C	C	D	C	C	A	A	A	B	B	A
Approach Vol, veh/h		704			503			1294			1201	
Approach Delay, s/veh		36.0			34.2			1.3			11.9	
Approach LOS		D			C			A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		78.9		41.1		78.9		41.1				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		68.5		40.5		68.5		40.5				
Max Q Clear Time (g_c+I1), s		31.5		28.1		19.8		30.7				
Green Ext Time (p_c), s		26.8		5.8		32.3		4.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				15.8								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Existing Year 2021  
Timing Plan: MD Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	654	218	1075	363	60	1101		
Future Volume (veh/h)	654	218	1075	363	60	1101		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	436	452	1075	363	60	1101		
Adj No. of Lanes	1	1	2	1	1	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	0	2	2	2	2		
Cap, veh/h	544	495	1937	1352	396	3271		
Arrive On Green	0.31	0.31	1.00	1.00	0.15	1.00		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	436	452	1075	363	60	1101		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	27.1	32.3	0.0	0.0	1.4	0.0		
Cycle Q Clear(g_c), s	27.1	32.3	0.0	0.0	1.4	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	544	495	1937	1352	396	3271		
V/C Ratio(X)	0.80	0.91	0.55	0.27	0.15	0.34		
Avail Cap(c_a), veh/h	554	505	1937	1352	403	3271		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	38.2	40.0	0.0	0.0	7.4	0.0		
Incr Delay (d2), s/veh	8.1	20.7	1.2	0.5	0.2	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	14.4	17.2	0.3	0.2	0.7	0.1		
LnGrp Delay(d),s/veh	46.4	60.8	1.2	0.5	7.6	0.3		
LnGrp LOS	D	E	A	A	A	A		
Approach Vol, veh/h	888		1438			1161		
Approach Delay, s/veh	53.7		1.0			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.5	69.2				80.7		39.3
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	7.5	62.5				74.5		35.5
Max Q Clear Time (g_c+I1), s	3.4	2.0				2.0		34.3
Green Ext Time (p_c), s	0.0	34.4				37.7		0.5
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			14.3					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: Existing Conditions

Peak Hr: MD

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	72	2	2880	72/2,880= 0.03		
NB Thru	378	2	3200	378/3,200= 0.12	< ==	
NB Right	178	1	1600	178/1,600= 0.11		
SB Left	98	1	1600	98/1,600= 0.06	< ==	
SB Thru	409	2	3200	409/3,200= 0.13		
SB Right**	149	1	1840	149/1,840= 0.08		
EB Left	107	1	1600	107/1,600= 0.07		
EB Thru	1211	3	4800	1,211/4,800= 0.25	< ==	
EB Right	113	1	1600	113/1,600= 0.07		
WB Left	100	1	1600	100/1,600= 0.06	< ==	
WB Thru	716	2	3200	716/3,200= 0.22		
WB Right	124	1	1600	124/1,600= 0.08		
Sum of Critical V/C Ratios						0.496
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.596</b>
Level of Service (LOS) - Refer to table below						<b>A</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: Existing Conditions

Peak Hr: MD

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	14	1	1600	14/1,600= 0.01		
NB Thru	6	1	1600	6/1,600= ----		
NB Right	71	1	1600	71/1,600= 0.04	< ==	
SB Left	5	1	1600	5/1,600= 0.00		
SB Thru	4	1	1600	6/1,600= 0.00		
SB Right	2			----		
EB Left	8	1	1600	8/1,600= 0.01		
EB Thru	1428	3	4800	1,443/4,800= 0.30	< ==	
EB Right	15			----		
WB Left	72	1	1600	72/1,600= 0.05	< ==	
WB Thru	909	2	3200	909/3,200= 0.28		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.393
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.493</b>
Level of Service (LOS) - Refer to table below						<b>A</b>

**\* NOTES**




















Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

























HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Existing Year 2021  
Timing Plan: MD Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	 	  	  		 	 		
Traffic Volume (veh/h)	790	745	916	213	391	78		
Future Volume (veh/h)	790	745	916	213	391	78		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	790	745	916	213	464	0		
Adj No. of Lanes	2	3	3	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	0		
Cap, veh/h	1166	3832	1968	613	638	290		
Arrive On Green	0.34	0.75	0.39	0.39	0.18	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	790	745	916	213	464	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	17.7	3.8	12.1	8.6	11.1	0.0		
Cycle Q Clear(g_c), s	17.7	3.8	12.1	8.6	11.1	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1166	3832	1968	613	638	290		
V/C Ratio(X)	0.68	0.19	0.47	0.35	0.73	0.00		
Avail Cap(c_a), veh/h	1166	3832	1968	613	887	404		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	25.5	3.2	20.6	19.5	34.8	0.0		
Incr Delay (d2), s/veh	3.2	0.1	0.8	1.6	1.9	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	8.9	1.8	5.8	4.0	5.6	0.0		
LnGrp Delay(d),s/veh	28.7	3.3	21.4	21.1	36.7	0.0		
LnGrp LOS	C	A	C	C	D			
Approach Vol, veh/h		1535	1129		464			
Approach Delay, s/veh		16.4	21.4		36.7			
Approach LOS		B	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		71.3		18.7	33.0	38.3		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		59.5		20.5	28.5	26.5		
Max Q Clear Time (g_c+I1), s		5.8		13.1	19.7	14.1		
Green Ext Time (p_c), s		20.5		1.1	2.2	8.8		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			21.2					
HCM 2010 LOS			C					
<b>Notes</b>								

HCM 2010 Signalized Intersection Summary  
 9: Western Ave & 190th St
























Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	225	583	345	126	465	244	179	983	174	2	188	1175
Future Volume (veh/h)	225	583	345	126	465	244	179	983	174	2	188	1175
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	225	583	345	126	465	244	179	983	174		188	1175
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	330	1455	583	235	876	409	284	2343	838		292	2356
Arrive On Green	0.10	0.29	0.29	0.07	0.26	0.26	0.16	0.92	0.92		0.17	0.93
Sat Flow, veh/h	3442	5085	1583	3442	3390	1583	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	225	583	345	126	465	244	179	983	174		188	1175
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583		1721	1695
Q Serve(g_s), s	7.6	11.1	21.1	4.2	14.1	16.2	5.8	3.0	1.2		6.1	3.8
Cycle Q Clear(g_c), s	7.6	11.1	21.1	4.2	14.1	16.2	5.8	3.0	1.2		6.1	3.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	330	1455	583	235	876	409	284	2343	838		292	2356
V/C Ratio(X)	0.68	0.40	0.59	0.54	0.53	0.60	0.63	0.42	0.21		0.64	0.50
Avail Cap(c_a), veh/h	330	1759	678	272	1116	521	330	2343	838		330	2356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	0.96	0.96	0.96		1.00	1.00
Uniform Delay (d), s/veh	52.5	34.5	30.6	54.1	38.2	39.0	48.4	2.6	2.0		48.1	2.5
Incr Delay (d2), s/veh	5.7	0.2	1.0	1.8	0.5	1.4	2.9	0.5	0.5		3.6	0.8
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
%ile BackOfQ(50%),veh/ln	3.9	5.2	9.3	2.1	6.6	7.3	2.8	1.4	0.5		3.0	1.7
LnGrp Delay(d),s/veh	58.1	34.7	31.6	55.9	38.7	40.4	51.3	3.2	2.5		51.7	3.3
LnGrp LOS	E	C	C	E	D	D	D	A	A		D	A
Approach Vol, veh/h		1153			835			1336				1801
Approach Delay, s/veh		38.4			41.8			9.5				8.4
Approach LOS		D			D			A				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	12.7	58.8	10.7	37.8	12.4	59.1	14.0	34.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	9.5	43.5	7.5	39.5	9.5	43.5	9.5	37.5				
Max Q Clear Time (g_c+I1), s	8.1	5.0	6.2	23.1	7.8	6.5	9.6	18.2				
Green Ext Time (p_c), s	0.1	27.4	0.0	9.2	0.1	26.6	0.0	10.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			20.9									
HCM 2010 LOS			C									
<b>Notes</b>												

Movement	SBR
Left Configurations	7
Traffic Volume (veh/h)	438
Future Volume (veh/h)	438
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	438
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	885
Arrive On Green	0.93
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	438
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	4.5
Cycle Q Clear(g_c), s	4.5
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	885
V/C Ratio(X)	0.49
Avail Cap(c_a), veh/h	885
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	1.7
Incr Delay (d2), s/veh	2.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	2.1
LnGrp Delay(d),s/veh	3.7
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	19	778	181	80	663	6	283	7	129	8	3	26
Future Volume (veh/h)	19	778	181	80	663	6	283	7	129	8	3	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	19	778	181	80	663	6	288	0	129	8	3	26
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	519	2369	546	141	3538	32	482	0	341	24	9	77
Arrive On Green	0.57	0.57	0.57	0.08	0.68	0.68	0.14	0.00	0.14	0.07	0.07	0.07
Sat Flow, veh/h	765	4132	953	1774	5198	47	3548	0	1583	355	133	1153
Grp Volume(v), veh/h	19	637	322	80	432	237	288	0	129	37	0	0
Grp Sat Flow(s),veh/h/ln	765	1695	1695	1774	1695	1854	1774	0	1583	1641	0	0
Q Serve(g_s), s	1.0	8.9	9.0	3.9	4.2	4.2	6.9	0.0	6.3	1.9	0.0	0.0
Cycle Q Clear(g_c), s	1.0	8.9	9.0	3.9	4.2	4.2	6.9	0.0	6.3	1.9	0.0	0.0
Prop In Lane	1.00		0.56	1.00		0.03	1.00		1.00	0.22		0.70
Lane Grp Cap(c), veh/h	519	1944	972	141	2308	1262	482	0	341	109	0	0
V/C Ratio(X)	0.04	0.33	0.33	0.57	0.19	0.19	0.60	0.00	0.38	0.34	0.00	0.00
Avail Cap(c_a), veh/h	519	1944	972	246	2308	1262	1163	0	645	155	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.4	10.1	10.1	39.9	5.3	5.3	36.6	0.0	30.2	40.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.8	3.5	0.2	0.3	1.2	0.0	0.7	1.8	0.0	0.0
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	0.2	4.3	4.4	2.0	2.0	2.2	3.4	0.0	2.8	0.9	0.0	0.0
LnGrp Delay(d),s/veh	8.5	10.5	10.9	43.5	5.4	5.6	37.7	0.0	30.8	41.9	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		978			749			417				37
Approach Delay, s/veh		10.6			9.5			35.6				41.9
Approach LOS		B			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		15.7	9.7	55.1		9.5		64.8				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		27.5	10.5	24.5		6.5		39.5				
Max Q Clear Time (g_c+I1), s		8.9	5.9	11.0		3.9		6.2				
Green Ext Time (p_c), s		1.4	0.1	8.6		0.0		14.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			15.6									
HCM 2010 LOS			B									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	929	152	82	672	195	65	616	85	160	438	314
Future Volume (veh/h)	330	929	152	82	672	195	65	616	85	160	438	314
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	330	929	152	82	672	195	65	616	85	160	438	314
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	386	1528	249	132	801	229	112	1174	162	378	1411	976
Arrive On Green	0.22	0.35	0.35	0.07	0.20	0.20	0.06	0.38	0.38	0.09	0.40	0.40
Sat Flow, veh/h	1774	4408	719	1774	3931	1123	1774	3126	431	1774	3539	1583
Grp Volume(v), veh/h	330	714	367	82	578	289	65	348	353	160	438	314
Grp Sat Flow(s),veh/h/ln	1774	1695	1736	1774	1695	1664	1774	1770	1787	1774	1770	1583
Q Serve(g_s), s	21.5	20.9	21.0	5.4	19.6	20.1	4.3	18.4	18.4	6.3	10.2	11.4
Cycle Q Clear(g_c), s	21.5	20.9	21.0	5.4	19.6	20.1	4.3	18.4	18.4	6.3	10.2	11.4
Prop In Lane	1.00		0.41	1.00		0.67	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	386	1175	602	132	691	339	112	664	671	378	1411	976
V/C Ratio(X)	0.85	0.61	0.61	0.62	0.84	0.85	0.58	0.52	0.53	0.42	0.31	0.32
Avail Cap(c_a), veh/h	495	1229	629	214	692	340	182	664	671	439	1411	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	45.1	32.4	32.5	53.9	45.9	46.0	54.7	29.1	29.2	20.4	24.8	11.0
Incr Delay (d2), s/veh	11.2	0.8	1.6	4.6	8.8	18.3	4.7	2.9	2.9	0.8	0.6	0.9
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	11.7	9.9	10.4	2.8	10.1	11.0	2.2	9.5	9.7	3.1	5.1	5.2
LnGrp Delay(d),s/veh	56.3	33.2	34.1	58.5	54.7	64.3	59.3	32.1	32.1	21.2	25.3	11.9
LnGrp LOS	E	C	C	E	D	E	E	C	C	C	C	B
Approach Vol, veh/h		1411			949			766			912	
Approach Delay, s/veh		38.9			57.9			34.4			20.0	
Approach LOS		D			E			C			B	
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	13.9	48.6	12.5	45.1	11.1	51.3	29.6	28.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	12.5	31.5	12.5	41.5	10.3	33.7	31.5	22.5				
Max Q Clear Time (g_c+I1), s	8.3	20.4	7.4	23.0	6.3	13.4	23.5	22.1				
Green Ext Time (p_c), s	0.1	6.2	0.1	12.5	0.0	8.8	0.7	0.4				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			38.2									
HCM 2010 LOS			D									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	2	26	10	0	10	24	1316	15	24	1219	57
Future Volume (veh/h)	73	2	26	10	0	10	24	1316	15	24	1219	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	73	2	26	10	0	10	24	1316	15	24	1219	57
Adj No. of Lanes	0	1	1	0	1	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	59	1	475	60	0	475	62	2979	928	62	2979	928
Arrive On Green	0.30	0.30	0.30	0.30	0.00	0.30	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	75	0	26	10	0	10	24	1316	15	24	1219	57
Grp Sat Flow(s),veh/h/ln	3	0	1583	0	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.5	1.6	0.0	0.0	1.6	0.0	0.0
Cycle Q Clear(g_c), s	36.0	0.0	1.4	36.0	0.0	0.5	1.6	0.0	0.0	1.6	0.0	0.0
Prop In Lane	0.97		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	475	60	0	475	62	2979	928	62	2979	928
V/C Ratio(X)	1.25	0.00	0.05	0.17	0.00	0.02	0.39	0.44	0.02	0.39	0.41	0.06
Avail Cap(c_a), veh/h	60	0	475	60	0	475	126	2979	928	155	2979	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.88	0.88	0.88	0.86	0.86	0.86
Uniform Delay (d), s/veh	59.5	0.0	29.9	60.0	0.0	29.6	54.6	0.0	0.0	54.6	0.0	0.0
Incr Delay (d2), s/veh	197.3	0.0	0.0	1.3	0.0	0.0	3.4	0.4	0.0	3.3	0.4	0.1
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	5.3	0.0	0.6	0.4	0.0	0.2	0.8	0.1	0.0	0.8	0.1	0.0
LnGrp Delay(d),s/veh	256.8	0.0	29.9	61.3	0.0	29.6	58.0	0.4	0.0	57.9	0.4	0.1
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		101			20			1355			1300	
Approach Delay, s/veh		198.4			45.4			1.4			1.4	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	73.8		39.5	6.7	73.8		39.5				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	62.0		34.0	6.5	64.0		34.0				
Max Q Clear Time (g_c+I1), s	3.6	2.0		38.0	3.6	2.0		38.0				
Green Ext Time (p_c), s	0.0	38.1		0.0	0.0	38.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			8.9									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Existing Year 2021  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	289	39	175	12	42	42	127	1036	17	26	1245	364
Future Volume (veh/h)	289	39	175	12	42	42	127	1036	17	26	1245	364
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	317	0	175	12	42	42	127	1036	17	26	1245	364
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	536	0	239	15	53	53	263	2444	1094	360	2700	789
Arrive On Green	0.15	0.00	0.15	0.07	0.07	0.07	0.69	0.69	0.69	0.92	0.92	0.92
Sat Flow, veh/h	3548	0	1583	215	752	752	314	3539	1583	534	3910	1142
Grp Volume(v), veh/h	317	0	175	96	0	0	127	1036	17	26	1079	530
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1719	0	0	314	1770	1583	534	1695	1661
Q Serve(g_s), s	10.0	0.0	12.7	6.6	0.0	0.0	28.9	15.4	0.4	1.6	5.4	5.4
Cycle Q Clear(g_c), s	10.0	0.0	12.7	6.6	0.0	0.0	34.3	15.4	0.4	16.9	5.4	5.4
Prop In Lane	1.00		1.00	0.12		0.44	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	536	0	239	122	0	0	263	2444	1094	360	2341	1147
V/C Ratio(X)	0.59	0.00	0.73	0.79	0.00	0.00	0.48	0.42	0.02	0.07	0.46	0.46
Avail Cap(c_a), veh/h	872	0	389	122	0	0	263	2444	1094	360	2341	1147
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	47.5	0.0	48.6	54.9	0.0	0.0	12.7	8.1	5.8	4.3	1.7	1.7
Incr Delay (d2), s/veh	1.0	0.0	4.3	28.3	0.0	0.0	6.3	0.5	0.0	0.4	0.6	1.3
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	5.0	0.0	5.8	4.1	0.0	0.0	2.9	7.7	0.2	0.3	2.4	2.6
LnGrp Delay(d),s/veh	48.5	0.0	52.9	83.2	0.0	0.0	18.9	8.7	5.8	4.6	2.4	3.0
LnGrp LOS	D		D	F			B	A	A	A	A	A
Approach Vol, veh/h		492			96			1180			1635	
Approach Delay, s/veh		50.1			83.2			9.7			2.6	
Approach LOS		D			F			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		86.4		21.6		86.4		12.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		69.5		27.5		69.5		6.5				
Max Q Clear Time (g_c+I1), s		36.3		14.7		18.9		8.6				
Green Ext Time (p_c), s		28.2		1.5		40.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			14.2									
HCM 2010 LOS			B									
<b>Notes</b>												

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**
























➤ **PM Peak Hour**




















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Existing Year 2021  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	981	86	100	725	66	137	1185	271	58	982	150
Future Volume (veh/h)	145	981	86	100	725	66	137	1185	271	58	982	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	145	981	86	100	725	66	137	1185	271	58	982	150
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	243	1299	114	152	1396	625	252	1868	836	185	1868	836
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	683	3293	289	527	3539	1583	495	3539	1583	364	3539	1583
Grp Volume(v), veh/h	145	527	540	100	725	66	137	1185	271	58	982	150
Grp Sat Flow(s),veh/h/ln	683	1770	1812	527	1770	1583	495	1770	1583	364	1770	1583
Q Serve(g_s), s	18.5	23.1	23.1	12.4	14.0	2.4	22.5	21.4	8.8	12.1	16.3	4.4
Cycle Q Clear(g_c), s	32.5	23.1	23.1	35.5	14.0	2.4	38.8	21.4	8.8	33.5	16.3	4.4
Prop In Lane	1.00		0.16	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	698	715	152	1396	625	252	1868	836	185	1868	836
V/C Ratio(X)	0.60	0.76	0.76	0.66	0.52	0.11	0.54	0.63	0.32	0.31	0.53	0.18
Avail Cap(c_a), veh/h	243	698	715	152	1396	625	252	1868	836	185	1868	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	33.1	23.5	23.5	40.5	20.8	17.2	26.6	15.1	12.1	27.0	13.9	11.1
Incr Delay (d2), s/veh	4.0	4.7	4.6	9.8	0.3	0.1	8.2	1.7	1.0	4.4	1.1	0.5
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	3.7	12.2	12.5	2.9	6.9	1.0	3.7	10.8	4.1	1.4	8.2	2.0
LnGrp Delay(d),s/veh	37.1	28.2	28.1	50.3	21.1	17.3	34.8	16.7	13.1	31.3	15.0	11.6
LnGrp LOS	D	C	C	D	C	B	C	B	B	C	B	B
Approach Vol, veh/h		1212			891			1593			1190	
Approach Delay, s/veh		29.2			24.1			17.7			15.3	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.0		39.0		51.0		39.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		45.5		33.5		45.5		33.5				
Max Q Clear Time (g_c+I1), s		40.8		34.5		35.5		37.5				
Green Ext Time (p_c), s		3.7		0.0		5.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				21.1								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Existing Year 2021  
Timing Plan: PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	695	221	1576	655	53	1120		
Future Volume (veh/h)	695	221	1576	655	53	1120		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	458	475	1576	655	53	1120		
Adj No. of Lanes	1	1	2	1	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	575	523	1985	1401	187	3184		
Arrive On Green	0.32	0.32	0.75	0.75	0.04	0.63		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	458	475	1576	655	53	1120		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	28.2	33.8	33.3	7.3	1.4	12.7		
Cycle Q Clear(g_c), s	28.2	33.8	33.3	7.3	1.4	12.7		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	575	523	1985	1401	187	3184		
V/C Ratio(X)	0.80	0.91	0.79	0.47	0.28	0.35		
Avail Cap(c_a), veh/h	599	545	1985	1401	293	3184		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	37.0	38.9	10.9	0.7	16.4	10.8		
Incr Delay (d2), s/veh	7.2	18.7	3.4	1.1	0.8	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	15.0	17.8	16.7	12.3	0.8	6.0		
LnGrp Delay(d),s/veh	44.2	57.6	14.3	1.8	17.2	11.1		
LnGrp LOS	D	E	B	A	B	B		
Approach Vol, veh/h	933		2231			1173		
Approach Delay, s/veh	51.0		10.6			11.3		
Approach LOS	D		B			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.8	70.8				78.6		41.4
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	56.5				71.5		38.5
Max Q Clear Time (g_c+I1), s	3.4	35.3				14.7		35.8
Green Ext Time (p_c), s	0.0	15.3				10.9		1.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			19.5					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: Existing Conditions

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	176	2	2880	176/2,880= 0.06		
NB Thru	887	2	3200	887/3,200= 0.28	< ==	
NB Right	226	1	1600	226/1,600= 0.14		
SB Left	96	1	1600	96/1,600= 0.06	< ==	
SB Thru	510	2	3200	510/3,200= 0.16		
SB Right**	188	1	1840	188/1,840= 0.10		
EB Left	252	1	1600	252/1,600= 0.16	< ==	
EB Thru	1584	3	4800	1,584/4,800= 0.33		
EB Right	144	1	1600	144/1,600= 0.09		
WB Left	77	1	1600	77/1,600= 0.05		
WB Thru	1089	2	3200	1,089/3,200= 0.34	< ==	
WB Right	112	1	1600	112/1,600= 0.07		
Sum of Critical V/C Ratios						0.838
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.938</b>
Level of Service (LOS) - Refer to table below						<b>E</b>

\* NOTES

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy PI

Scenario: Existing Conditions

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	29	1	1600	29/1,600= 0.02		
NB Thru	4	1	1600	4/1,600= ----		
NB Right	129	1	1600	129/1,600= 0.08	< ==	
SB Left	10	1	1600	10/1,600= 0.01		
SB Thru	5	1	1600	8/1,600= 0.01		
SB Right	3			----		
EB Left	2	1	1600	2/1,600= 0.00		
EB Thru	1938	3	4800	1,957/4,800= 0.41	< ==	
EB Right	19			----		
WB Left	27	1	1600	27/1,600= 0.02	< ==	
WB Thru	1201	2	3200	1,201/3,200= 0.38		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.512
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.612</b>
Level of Service (LOS) - Refer to table below						<b>B</b>




















\* NOTES

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a



































HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Existing Year 2021  
Timing Plan: PM Peak Hour

									
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations	 	  	  		 	 			
Traffic Volume (veh/h)	629	1577	1168	115	610	30			
Future Volume (veh/h)	629	1577	1168	115	610	30			
Number	5	2	6	16	7	14			
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	1863	1863	1900			
Adj Flow Rate, veh/h	629	1577	1168	115	638	0			
Adj No. of Lanes	2	3	3	1	2	1			
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	753	3714	2495	777	780	355			
Arrive On Green	0.22	0.73	0.16	0.16	0.22	0.00			
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615			
Grp Volume(v), veh/h	629	1577	1168	115	638	0			
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615			
Q Serve(g_s), s	21.0	14.6	25.0	7.5	20.5	0.0			
Cycle Q Clear(g_c), s	21.0	14.6	25.0	7.5	20.5	0.0			
Prop In Lane	1.00			1.00	1.00	1.00			
Lane Grp Cap(c), veh/h	753	3714	2495	777	780	355			
V/C Ratio(X)	0.84	0.42	0.47	0.15	0.82	0.00			
Avail Cap(c_a), veh/h	875	3714	2495	777	1020	464			
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	44.8	6.3	36.1	28.7	44.5	0.0			
Incr Delay (d2), s/veh	6.3	0.4	0.6	0.4	4.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	10.6	6.8	11.9	3.4	10.5	0.0			
LnGrp Delay(d),s/veh	51.1	6.7	36.7	29.1	48.6	0.0			
LnGrp LOS	D	A	D	C	D				
Approach Vol, veh/h		2206	1283		638				
Approach Delay, s/veh		19.3	36.0		48.6				
Approach LOS		B	D		D				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		91.1		28.9	28.7	62.4			
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5			
Max Green Setting (Gmax), s		77.5		32.5	28.5	43.5			
Max Q Clear Time (g_c+I1), s		16.6		22.5	23.0	27.0			
Green Ext Time (p_c), s		19.3		1.8	1.3	8.1			
<b>Intersection Summary</b>									
HCM 2010 Ctrl Delay			29.1						
HCM 2010 LOS			C						
<b>Notes</b>									

HCM 2010 Signalized Intersection Summary  
9: Western Ave & 190th St

Existing Year 2021  
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	 	  		 	  		 	  			 	  
Traffic Volume (veh/h)	423	1212	479	224	718	309	147	1346	197	3	139	1233
Future Volume (veh/h)	423	1212	479	224	718	309	147	1346	197	3	139	1233
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	423	1212	479	224	718	309	147	1346	197		139	1233
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	502	1725	653	337	1019	433	251	1988	774		248	1983
Arrive On Green	0.05	0.11	0.11	0.10	0.29	0.29	0.15	0.78	0.78		0.14	0.78
Sat Flow, veh/h	3442	5085	1583	3442	3501	1489	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	423	1212	479	224	695	332	147	1346	197		139	1233
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1600	1721	1695	1583		1721	1695
Q Serve(g_s), s	14.6	27.6	31.9	7.5	21.9	22.3	4.8	14.7	3.6		4.5	12.4
Cycle Q Clear(g_c), s	14.6	27.6	31.9	7.5	21.9	22.3	4.8	14.7	3.6		4.5	12.4
Prop In Lane	1.00		1.00	1.00		0.93	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	502	1725	653	337	987	466	251	1988	774		248	1983
V/C Ratio(X)	0.84	0.70	0.73	0.67	0.70	0.71	0.58	0.68	0.25		0.56	0.62
Avail Cap(c_a), veh/h	502	1801	676	416	1116	527	272	1988	774		445	1983
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	0.92	0.92	0.92		1.00	1.00
Uniform Delay (d), s/veh	55.7	47.5	40.4	52.2	37.9	38.0	49.5	9.6	6.0		49.6	9.4
Incr Delay (d2), s/veh	12.3	1.2	4.0	2.8	1.7	3.7	2.5	1.7	0.7		2.0	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
%ile BackOfQ(50%),veh/ln	7.9	13.1	14.7	3.7	10.5	10.4	2.3	6.8	1.7		2.2	5.7
LnGrp Delay(d),s/veh	68.1	48.6	44.4	55.0	39.6	41.8	52.1	11.3	6.7		51.5	10.9
LnGrp LOS	E	D	D	D	D	D	D	B	A		D	B
Approach Vol, veh/h		2114			1251			1690				1739
Approach Delay, s/veh		51.6			42.9			14.3				13.3
Approach LOS		D			D			B				B
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	11.2	50.4	14.2	44.2	11.3	50.3	20.0	38.4				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	33.5	12.5	40.5	7.5	39.5	15.5	37.5				
Max Q Clear Time (g_c+I1), s	6.5	16.7	9.5	33.9	6.8	14.4	16.6	24.3				
Green Ext Time (p_c), s	0.2	9.6	0.2	4.8	0.0	11.9	0.0	5.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			30.9									
HCM 2010 LOS			C									
<b>Notes</b>												





















HCM 2010 Signalized Intersection Summary  
 9: Western Ave & 190th St

Existing Year 2021  
 Timing Plan: PM Peak Hour

Movement	SBR
Left Configurations	7
Traffic Volume (veh/h)	367
Future Volume (veh/h)	367
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	367
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	848
Arrive On Green	0.78
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	367
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	8.7
Cycle Q Clear(g_c), s	8.7
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	848
V/C Ratio(X)	0.43
Avail Cap(c_a), veh/h	848
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	5.4
Incr Delay (d2), s/veh	1.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.9
LnGrp Delay(d),s/veh	7.0
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St






















Existing Year 2021  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1431	208	49	1041	3	216	2	105	24	10	34
Future Volume (veh/h)	3	1431	208	49	1041	3	216	2	105	24	10	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	1431	208	49	1041	3	217	0	105	24	10	34
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	409	2744	399	101	3646	11	406	0	272	43	18	61
Arrive On Green	0.61	0.61	0.61	0.06	0.70	0.70	0.11	0.00	0.11	0.07	0.07	0.07
Sat Flow, veh/h	538	4486	652	1774	5235	15	3548	0	1583	594	248	842
Grp Volume(v), veh/h	3	1081	558	49	674	370	217	0	105	68	0	0
Grp Sat Flow(s),veh/h/ln	538	1695	1748	1774	1695	1860	1774	0	1583	1684	0	0
Q Serve(g_s), s	0.2	16.4	16.4	2.4	6.8	6.8	5.2	0.0	5.3	3.5	0.0	0.0
Cycle Q Clear(g_c), s	0.2	16.4	16.4	2.4	6.8	6.8	5.2	0.0	5.3	3.5	0.0	0.0
Prop In Lane	1.00		0.37	1.00		0.01	1.00		1.00	0.35		0.50
Lane Grp Cap(c), veh/h	409	2073	1069	101	2361	1295	406	0	272	122	0	0
V/C Ratio(X)	0.01	0.52	0.52	0.48	0.29	0.29	0.53	0.00	0.39	0.56	0.00	0.00
Avail Cap(c_a), veh/h	409	2073	1069	207	2361	1295	1084	0	574	159	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.8	10.0	10.0	41.2	5.2	5.2	37.6	0.0	33.1	40.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	1.3	3.6	0.3	0.6	1.1	0.0	0.9	3.9	0.0	0.0
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	0.0	7.7	8.1	1.3	3.2	3.6	2.6	0.0	2.4	1.8	0.0	0.0
LnGrp Delay(d),s/veh	6.9	10.7	11.3	44.7	5.5	5.7	38.7	0.0	34.0	44.3	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		1642			1093			322			68	
Approach Delay, s/veh		10.9			7.3			37.1			44.3	
Approach LOS		B			A			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		13.8	7.6	58.5		10.0		66.2				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	8.5	28.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		7.3	4.4	18.4		5.5		8.8				
Green Ext Time (p_c), s		1.0	0.0	7.2		0.0		8.3				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			13.1									
HCM 2010 LOS			B									
<b>Notes</b>												

























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Existing Year 2021  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	1421	173	130	903	350	100	870	100	94	654	315
Future Volume (veh/h)	350	1421	173	130	903	350	100	870	100	94	654	315
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	350	1421	173	130	903	350	100	870	100	94	654	315
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	450	1931	235	170	948	366	126	961	111	201	1049	871
Arrive On Green	0.25	0.42	0.42	0.10	0.26	0.26	0.07	0.30	0.30	0.07	0.30	0.30
Sat Flow, veh/h	1774	4595	559	1774	3611	1396	1774	3200	368	1774	3539	1583
Grp Volume(v), veh/h	350	1048	546	130	848	405	100	481	489	94	654	315
Grp Sat Flow(s),veh/h/ln	1774	1695	1764	1774	1695	1616	1774	1770	1798	1774	1770	1583
Q Serve(g_s), s	22.0	31.1	31.2	8.6	29.5	29.6	6.7	31.3	31.3	4.3	19.1	2.5
Cycle Q Clear(g_c), s	22.0	31.1	31.2	8.6	29.5	29.6	6.7	31.3	31.3	4.3	19.1	2.5
Prop In Lane	1.00		0.32	1.00		0.86	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	450	1425	741	170	890	424	126	532	540	201	1049	871
V/C Ratio(X)	0.78	0.74	0.74	0.76	0.95	0.96	0.80	0.90	0.90	0.47	0.62	0.36
Avail Cap(c_a), veh/h	450	1425	741	170	890	424	126	538	547	208	1077	883
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	41.6	29.2	29.2	52.9	43.5	43.6	54.9	40.3	40.3	30.4	36.4	6.2
Incr Delay (d2), s/veh	8.4	3.4	6.4	18.5	20.7	33.8	28.9	18.7	18.5	1.7	1.1	0.3
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	11.8	15.2	16.5	5.1	16.3	17.2	4.3	18.0	18.3	2.2	9.5	3.6
LnGrp Delay(d),s/veh	50.1	32.6	35.6	71.4	64.2	77.3	83.8	59.0	58.8	32.1	37.5	6.4
LnGrp LOS	D	C	D	E	E	E	F	E	E	C	D	A
Approach Vol, veh/h		1944			1383			1070			1063	
Approach Delay, s/veh		36.6			68.7			61.2			27.8	
Approach LOS		D			E			E			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	11.5	39.6	15.0	53.9	12.0	39.1	33.9	35.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	6.5	34.5	9.5	47.5	6.5	34.5	27.5	29.5				
Max Q Clear Time (g_c+I1), s	6.3	33.3	10.6	33.2	8.7	21.1	24.0	31.6				
Green Ext Time (p_c), s	0.0	0.7	0.0	9.2	0.0	4.7	0.4	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			47.8									
HCM 2010 LOS			D									























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Existing Year 2021  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	2	31	27	2	35	13	1659	7	22	1918	31
Future Volume (veh/h)	77	2	31	27	2	35	13	1659	7	22	1918	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	77	2	31	27	2	35	13	1659	7	22	1918	31
Adj No. of Lanes	0	1	1	0	1	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	59	1	482	58	2	482	50	2963	923	60	2992	931
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.06	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	8	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	79	0	31	29	0	35	13	1659	7	22	1918	31
Grp Sat Flow(s),veh/h/ln	3	0	1583	8	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.7	0.0	0.0	1.9	0.8	0.0	0.0	1.4	0.0	0.0
Cycle Q Clear(g_c), s	36.5	0.0	1.7	36.5	0.0	1.9	0.8	0.0	0.0	1.4	0.0	0.0
Prop In Lane	0.97		1.00	0.93		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	482	60	0	482	50	2963	923	60	2992	931
V/C Ratio(X)	1.32	0.00	0.06	0.48	0.00	0.07	0.26	0.56	0.01	0.36	0.64	0.03
Avail Cap(c_a), veh/h	60	0	482	60	0	482	140	2963	923	140	2992	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	0.73	0.73	0.73
Uniform Delay (d), s/veh	59.5	0.0	29.6	57.1	0.0	29.7	55.4	0.0	0.0	54.7	0.0	0.0
Incr Delay (d2), s/veh	222.0	0.0	0.1	5.8	0.0	0.1	1.9	0.5	0.0	2.7	0.8	0.0
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	5.7	0.0	0.7	1.1	0.0	0.8	0.4	0.1	0.0	0.7	0.2	0.0
LnGrp Delay(d),s/veh	281.5	0.0	29.7	63.0	0.0	29.8	57.3	0.5	0.0	57.4	0.8	0.0
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		110			64			1679			1971	
Approach Delay, s/veh		210.5			44.8			1.0			1.4	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	73.4		40.0	5.9	74.1		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	7.5	62.5		34.5	7.5	62.5		34.5				
Max Q Clear Time (g_c+I1), s	3.4	2.0		38.5	2.8	2.0		38.5				
Green Ext Time (p_c), s	0.0	21.1		0.0	0.0	27.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			8.0									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Existing Year 2021  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	644	153	301	14	46	37	101	1186	17	40	1708	517
Future Volume (veh/h)	644	153	301	14	46	37	101	1186	17	40	1708	517
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	398	497	301	14	46	37	101	1186	17	40	1708	517
Adj No. of Lanes	1	1	1	0	1	0	1	2	1	1	3	0
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	451	473	402	20	65	52	92	2050	917	230	2259	666
Arrive On Green	0.25	0.25	0.25	0.08	0.08	0.08	0.58	0.58	0.58	0.39	0.39	0.39
Sat Flow, veh/h	1774	1863	1581	250	822	661	172	3539	1583	463	3900	1150
Grp Volume(v), veh/h	398	497	301	97	0	0	101	1186	17	40	1479	746
Grp Sat Flow(s),veh/h/ln	1774	1863	1581	1734	0	0	172	1770	1583	463	1695	1660
Q Serve(g_s), s	25.9	30.5	21.0	6.5	0.0	0.0	22.2	25.5	0.5	8.3	45.3	47.3
Cycle Q Clear(g_c), s	25.9	30.5	21.0	6.5	0.0	0.0	69.5	25.5	0.5	33.8	45.3	47.3
Prop In Lane	1.00		1.00	0.14		0.38	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	451	473	402	137	0	0	92	2050	917	230	1963	961
V/C Ratio(X)	0.88	1.05	0.75	0.71	0.00	0.00	1.10	0.58	0.02	0.17	0.75	0.78
Avail Cap(c_a), veh/h	451	473	402	137	0	0	92	2050	917	230	1963	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.89	0.89	0.89
Uniform Delay (d), s/veh	43.0	44.8	41.2	53.9	0.0	0.0	56.1	16.0	10.7	36.0	29.3	29.9
Incr Delay (d2), s/veh	18.2	55.0	7.6	15.3	0.0	0.0	123.4	1.2	0.0	1.5	2.4	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	22.9	10.0	3.7	0.0	0.0	6.2	12.7	0.3	1.2	21.9	23.1
LnGrp Delay(d),s/veh	61.2	99.8	48.8	69.2	0.0	0.0	179.6	17.2	10.8	37.4	31.7	35.4
LnGrp LOS	E	F	D	E			F	B	B	D	C	D
Approach Vol, veh/h		1196			97			1304			2265	
Approach Delay, s/veh		74.1			69.2			29.7			33.0	
Approach LOS		E			E			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.0		34.0		73.0		13.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		67.5		28.5		67.5		7.5				
Max Q Clear Time (g_c+I1), s		71.5		32.5		49.3		8.5				
Green Ext Time (p_c), s		0.0		0.0		15.0		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			43.0									
HCM 2010 LOS			D									
<b>Notes</b>												

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Intersection Analysis Worksheets**

- Year 2023 Without Project Conditions (Ambient Growth and Cumulative Projects)


























190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **AM Peak Hour**


















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	373	74	167	1131	126	127	973	74	82	995	201
Future Volume (veh/h)	86	373	74	167	1131	126	127	973	74	82	995	201
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	86	373	74	167	1131	126	127	973	74	82	995	201
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	163	1415	278	439	1697	759	177	1636	732	171	1636	732
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.15	0.15	0.15	0.46	0.46	0.46
Sat Flow, veh/h	440	2950	580	939	3539	1583	466	3539	1583	537	3539	1583
Grp Volume(v), veh/h	86	222	225	167	1131	126	127	973	74	82	995	201
Grp Sat Flow(s),veh/h/ln	440	1770	1760	939	1770	1583	466	1770	1583	537	1770	1583
Q Serve(g_s), s	22.3	9.0	9.1	15.5	29.3	5.4	30.2	30.7	4.8	17.2	25.2	9.4
Cycle Q Clear(g_c), s	51.7	9.0	9.1	24.6	29.3	5.4	55.5	30.7	4.8	47.9	25.2	9.4
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	848	844	439	1697	759	177	1636	732	171	1636	732
V/C Ratio(X)	0.53	0.26	0.27	0.38	0.67	0.17	0.72	0.59	0.10	0.48	0.61	0.27
Avail Cap(c_a), veh/h	178	907	902	470	1814	811	177	1636	732	171	1636	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
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	43.6	18.6	18.6	26.0	23.9	17.7	64.6	40.4	29.4	44.7	24.1	19.9
Incr Delay (d2), s/veh	2.6	0.2	0.2	0.5	0.9	0.1	21.8	1.6	0.3	9.4	1.7	0.9
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	2.8	4.4	4.5	4.1	14.5	2.4	5.3	15.5	2.2	3.0	12.7	4.3
LnGrp Delay(d),s/veh	46.3	18.8	18.8	26.5	24.8	17.8	86.5	42.0	29.7	54.1	25.8	20.8
LnGrp LOS	D	B	B	C	C	B	F	D	C	D	C	C
Approach Vol, veh/h		533			1424			1174			1278	
Approach Delay, s/veh		23.2			24.3			46.0			26.9	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		49.5		59.5		49.5		59.5				
Max Q Clear Time (g_c+I1), s		57.5		53.7		49.9		31.3				
Green Ext Time (p_c), s		0.0		1.9		0.0		11.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				30.7								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 without Project  
Timing Plan: AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	991	203	1161	315	29	1313		
Future Volume (veh/h)	991	203	1161	315	29	1313		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1180	0	1161	315	29	1313		
Adj No. of Lanes	2	1	2	1	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	1303	593	1620	1306	379	2963		
Arrive On Green	0.37	0.00	0.92	0.92	0.21	1.00		
Sat Flow, veh/h	3548	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	1180	0	1161	315	29	1313		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	37.8	0.0	9.7	1.1	0.8	0.0		
Cycle Q Clear(g_c), s	37.8	0.0	9.7	1.1	0.8	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1303	593	1620	1306	379	2963		
V/C Ratio(X)	0.91	0.00	0.72	0.24	0.08	0.44		
Avail Cap(c_a), veh/h	1375	626	1620	1306	379	2963		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.0	0.0	3.2	0.3	10.1	0.0		
Incr Delay (d2), s/veh	8.6	0.0	2.8	0.4	0.4	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	20.1	0.0	4.5	1.4	0.4	0.1		
LnGrp Delay(d),s/veh	44.6	0.0	5.9	0.7	10.5	0.5		
LnGrp LOS	D		A	A	B	A		
Approach Vol, veh/h	1180		1476			1342		
Approach Delay, s/veh	44.6		4.8			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.0	58.4				73.4		46.6
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	50.5				65.5		44.5
Max Q Clear Time (g_c+I1), s	2.8	11.7				2.0		39.8
Green Ext Time (p_c), s	0.0	13.1				14.2		2.2
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			15.2					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 Without Project

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	105	2	2880	105/2,880= 0.04	< ==	
NB Thru	409	2	3200	409/3,200= 0.13		
NB Right	194	1	1600	194/1,600= 0.12		
SB Left	101	1	1600	101/1,600= 0.06		0.268
SB Thru	728	2	3200	728/3,200= 0.23	< ==	
SB Right**	397	1	1840	397/1,840= 0.22		
EB Left	114	1	1600	114/1,600= 0.07	< ==	
EB Thru	1437	3	4800	1,437/4,800= 0.30		
EB Right	166	1	1600	166/1,600= 0.10		
WB Left	159	1	1600	159/1,600= 0.10		0.470
WB Thru	1276	2	3200	1,276/3,200= 0.40	< ==	
WB Right	79	1	1600	79/1,600= 0.05		
Sum of Critical V/C Ratios						0.738
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.838</b>
Level of Service (LOS) - Refer to table below						<b>D</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a



## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: 2023 Without Project

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	8	1	1600	8/1,600= 0.01		
NB Thru	5	1	1600	5/1,600= ----		
NB Right	41	1	1600	41/1,600= 0.03	< ==	
SB Left	3	1	1600	3/1,600= 0.00		
SB Thru		1	1600	0/1,600= ----		
SB Right				----		
EB Left		1	1600	0/1,600= ----		
EB Thru	1688	3	4800	1,714/4,800= 0.36		
EB Right	26			----		
WB Left	110	1	1600	110/1,600= 0.07		
WB Thru	1604	2	3200	1,604/3,200= 0.50	< ==	
WB Right		1	1600	0/1,600= ----		
Sum of Critical V/C Ratios						0.529
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.629</b>
Level of Service (LOS) - Refer to table below						<b>B</b>





















**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a
























HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 without Project  
Timing Plan: AM Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	 	  	  		 	  		
Traffic Volume (veh/h)	894	799	1547	145	611	132		
Future Volume (veh/h)	894	799	1547	145	611	132		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	894	799	1547	145	734	0		
Adj No. of Lanes	2	3	3	1	2	1		
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	1045	3588	1902	592	808	368		
Arrive On Green	0.30	0.71	0.37	0.37	0.23	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	894	799	1547	145	734	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	22.0	4.9	24.6	5.7	18.1	0.0		
Cycle Q Clear(g_c), s	22.0	4.9	24.6	5.7	18.1	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1045	3588	1902	592	808	368		
V/C Ratio(X)	0.86	0.22	0.81	0.24	0.91	0.00		
Avail Cap(c_a), veh/h	1128	3588	1902	592	808	368		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	29.5	4.6	25.3	19.4	33.8	0.0		
Incr Delay (d2), s/veh	6.3	0.1	3.9	1.0	14.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.3	2.3	12.2	2.6	10.4	0.0		
LnGrp Delay(d),s/veh	35.7	4.8	29.3	20.4	47.9	0.0		
LnGrp LOS	D	A	C	C	D			
Approach Vol, veh/h		1693	1692		734			
Approach Delay, s/veh		21.1	28.5		47.9			
Approach LOS		C	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		67.0		23.0	29.8	37.2		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		61.5		18.5	27.5	29.5		
Max Q Clear Time (g_c+I1), s		6.9		20.1	24.0	26.6		
Green Ext Time (p_c), s		6.8		0.0	1.3	2.4		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			28.9					
HCM 2010 LOS			C					
<b>Notes</b>								





















HCM 2010 Signalized Intersection Summary  
 9: Western Ave & 190th St

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	728	501	320	1044	136	161	1116	104	197	1513	490
Future Volume (veh/h)	172	728	501	320	1044	136	161	1116	104	197	1513	490
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	172	728	501	320	1044	136	161	1116	104	197	1513	490
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	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	283	1589	623	416	1600	208	278	1917	788	309	1963	741
Arrive On Green	0.08	0.31	0.31	0.12	0.35	0.35	0.03	0.12	0.12	0.12	0.51	0.51
Sat Flow, veh/h	3442	5085	1583	3442	4556	593	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	172	728	501	320	776	404	161	1116	104	197	1513	490
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1758	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	5.8	13.8	33.7	10.8	23.1	23.2	5.5	24.9	5.7	6.5	28.8	26.6
Cycle Q Clear(g_c), s	5.8	13.8	33.7	10.8	23.1	23.2	5.5	24.9	5.7	6.5	28.8	26.6
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	283	1589	623	416	1191	617	278	1917	788	309	1963	741
V/C Ratio(X)	0.61	0.46	0.80	0.77	0.65	0.65	0.58	0.58	0.13	0.64	0.77	0.66
Avail Cap(c_a), veh/h	330	1589	623	416	1191	617	387	1917	788	416	1963	741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	0.93	0.93	0.93	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	33.1	32.3	51.1	32.8	32.8	56.4	43.6	23.3	51.0	24.9	19.1
Incr Delay (d2), s/veh	2.4	0.2	7.6	7.9	1.2	2.3	1.8	1.2	0.3	2.2	3.0	4.6
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	2.8	6.5	16.0	5.6	11.0	11.6	2.7	11.9	2.6	3.2	13.8	12.4
LnGrp Delay(d),s/veh	55.6	33.3	39.9	59.1	33.9	35.1	58.2	44.8	23.6	53.2	27.9	23.7
LnGrp LOS	E	C	D	E	C	D	E	D	C	D	C	C
Approach Vol, veh/h		1401			1500			1381			2200	
Approach Delay, s/veh		38.4			39.6			44.8			29.2	
Approach LOS		D			D			D			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	13.3	48.7	17.0	41.0	12.2	49.8	12.4	45.6				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	12.5	39.5	12.5	35.5	11.5	40.5	9.5	38.5				
Max Q Clear Time (g_c+I1), s	8.5	26.9	12.8	35.7	7.5	30.8	7.8	25.2				
Green Ext Time (p_c), s	0.2	6.5	0.0	0.0	0.2	7.5	0.1	6.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			36.9									
HCM 2010 LOS			D									
<b>Notes</b>												






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	804	120	102	1609	7	148	11	45	0	0	4
Future Volume (veh/h)	30	804	120	102	1609	7	148	11	45	0	0	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	30	804	120	102	1609	7	156	0	45	0	0	4
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	280	2874	426	167	3995	17	328	0	295	0	0	42
Arrive On Green	0.64	0.64	0.64	0.09	0.76	0.76	0.09	0.00	0.09	0.00	0.00	0.03
Sat Flow, veh/h	312	4473	663	1774	5226	23	3548	0	1583	0	0	1583
Grp Volume(v), veh/h	30	608	316	102	1044	572	156	0	45	0	0	4
Grp Sat Flow(s),veh/h/ln	312	1695	1746	1774	1695	1859	1774	0	1583	0	0	1583
Q Serve(g_s), s	3.4	7.0	7.1	5.0	9.4	9.4	3.8	0.0	2.1	0.0	0.0	0.2
Cycle Q Clear(g_c), s	3.4	7.0	7.1	5.0	9.4	9.4	3.8	0.0	2.1	0.0	0.0	0.2
Prop In Lane	1.00		0.38	1.00		0.01	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	280	2178	1122	167	2592	1421	328	0	295	0	0	42
V/C Ratio(X)	0.11	0.28	0.28	0.61	0.40	0.40	0.48	0.00	0.15	0.00	0.00	0.10
Avail Cap(c_a), veh/h	280	2178	1122	227	2592	1421	1084	0	633	0	0	150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.93	0.93	0.93	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	7.0	7.0	39.2	3.6	3.6	38.8	0.0	30.6	0.0	0.0	42.8
Incr Delay (d2), s/veh	0.7	0.3	0.6	3.3	0.4	0.8	1.1	0.0	0.2	0.0	0.0	1.0
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	0.3	3.4	3.6	2.6	4.5	5.1	1.9	0.0	1.0	0.0	0.0	0.1
LnGrp Delay(d),s/veh	7.0	7.3	7.6	42.5	4.0	4.4	39.8	0.0	30.9	0.0	0.0	43.7
LnGrp LOS	A	A	A	D	A	A	D		C			D
Approach Vol, veh/h		954			1718			201				4
Approach Delay, s/veh		7.4			6.4			37.8				43.7
Approach LOS		A			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		11.8	11.0	61.3		5.9		72.3				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	9.5	27.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		5.8	7.0	9.1		2.2		11.4				
Green Ext Time (p_c), s		0.6	0.0	6.7		0.0		14.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			9.0									
HCM 2010 LOS			A									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	858	183	80	1103	56	104	609	94	190	766	760
Future Volume (veh/h)	162	858	183	80	1103	56	104	609	94	190	766	760
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	162	858	183	80	1103	56	104	609	94	190	766	760
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	220	1274	270	130	1250	63	156	1329	205	438	1542	886
Arrive On Green	0.12	0.30	0.30	0.07	0.25	0.25	0.09	0.43	0.43	0.09	0.44	0.44
Sat Flow, veh/h	1774	4204	892	1774	4957	251	1774	3075	474	1774	3539	1583
Grp Volume(v), veh/h	162	691	350	80	754	405	104	350	353	190	766	760
Grp Sat Flow(s),veh/h/ln	1774	1695	1705	1774	1695	1818	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	10.6	21.4	21.6	5.3	25.7	25.7	6.8	16.8	16.9	6.9	18.7	48.8
Cycle Q Clear(g_c), s	10.6	21.4	21.6	5.3	25.7	25.7	6.8	16.8	16.9	6.9	18.7	48.8
Prop In Lane	1.00		0.52	1.00		0.14	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	220	1027	517	130	855	459	156	765	769	438	1542	886
V/C Ratio(X)	0.74	0.67	0.68	0.62	0.88	0.88	0.67	0.46	0.46	0.43	0.50	0.86
Avail Cap(c_a), veh/h	466	1342	675	200	862	462	170	765	769	476	1542	886
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	50.7	36.6	36.7	54.0	43.1	43.2	53.0	24.1	24.1	16.8	24.4	22.4
Incr Delay (d2), s/veh	4.7	0.9	1.8	4.7	10.5	17.8	8.5	2.0	2.0	0.7	1.1	10.5
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	5.5	10.1	10.5	2.7	13.3	15.2	3.7	8.6	8.7	3.4	9.4	23.7
LnGrp Delay(d),s/veh	55.4	37.5	38.5	58.6	53.7	61.0	61.6	26.1	26.1	17.5	25.5	32.9
LnGrp LOS	E	D	D	E	D	E	E	C	C	B	C	C
Approach Vol, veh/h		1203			1239			807			1716	
Approach Delay, s/veh		40.2			56.4			30.7			27.9	
Approach LOS		D			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	13.5	55.4	11.3	39.9	13.1	55.8	17.4	33.8				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	11.5	30.5	11.5	45.5	9.5	32.5	29.5	28.5				
Max Q Clear Time (g_c+I1), s	8.9	18.9	7.3	23.6	8.8	50.8	12.6	27.7				
Green Ext Time (p_c), s	0.1	3.4	0.1	7.5	0.0	0.0	0.4	0.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			38.4									
HCM 2010 LOS			D									























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	0	20	5	0	3	35	1467	18	28	2215	93
Future Volume (veh/h)	33	0	20	5	0	3	35	1467	18	28	2215	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	33	0	20	5	0	3	35	1467	18	28	2215	93
Adj No. of Lanes	0	1	1	0	1	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	64	0	481	62	0	481	94	2883	898	89	2869	893
Arrive On Green	0.30	0.00	0.30	0.30	0.00	0.30	0.04	0.38	0.38	0.05	0.56	0.56
Sat Flow, veh/h	13	0	1583	5	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	33	0	20	5	0	3	35	1467	18	28	2215	93
Grp Sat Flow(s),veh/h/ln	13	0	1583	5	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.3	0.0	1.1	0.1	0.0	0.2	2.3	26.6	0.9	1.8	40.4	3.3
Cycle Q Clear(g_c), s	36.5	0.0	1.1	36.5	0.0	0.2	2.3	26.6	0.9	1.8	40.4	3.3
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	64	0	481	62	0	481	94	2883	898	89	2869	893
V/C Ratio(X)	0.52	0.00	0.04	0.08	0.00	0.01	0.37	0.51	0.02	0.32	0.77	0.10
Avail Cap(c_a), veh/h	64	0	482	62	0	482	155	2883	898	155	2869	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.66	0.66	0.66	0.57	0.57	0.57
Uniform Delay (d), s/veh	60.0	0.0	29.4	60.0	0.0	29.1	55.9	24.4	16.4	55.0	20.2	12.1
Incr Delay (d2), s/veh	6.9	0.0	0.0	0.6	0.0	0.0	1.6	0.4	0.0	1.1	1.2	0.1
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	1.2	0.0	0.5	0.2	0.0	0.1	1.2	12.6	0.4	0.9	19.2	1.5
LnGrp Delay(d),s/veh	66.9	0.0	29.5	60.5	0.0	29.1	57.6	24.8	16.4	56.2	21.4	12.2
LnGrp LOS	E		C	E		C	E	C	B	E	C	B
Approach Vol, veh/h		53			8			1520			2336	
Approach Delay, s/veh		52.8			48.8			25.5			21.4	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	71.5		40.0	8.8	71.2		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	61.5		34.5	8.5	61.5		34.5				
Max Q Clear Time (g_c+I1), s	3.8	28.6		38.5	4.3	42.4		38.5				
Green Ext Time (p_c), s	0.0	14.2		0.0	0.0	15.7		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			23.5									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 without Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	312	20	78	35	150	60	125	1422	10	17	1530	973
Future Volume (veh/h)	312	20	78	35	150	60	125	1422	10	17	1530	973
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	326	0	78	35	150	60	125	1422	10	17	1530	973
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	467	0	208	24	104	42	149	2425	1085	236	2323	1085
Arrive On Green	0.13	0.00	0.13	0.10	0.10	0.10	0.69	0.69	0.69	1.00	1.00	1.00
Sat Flow, veh/h	3548	0	1583	253	1086	434	130	3539	1583	372	3390	1583
Grp Volume(v), veh/h	326	0	78	245	0	0	125	1422	10	17	1530	973
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1773	0	0	130	1770	1583	372	1695	1583
Q Serve(g_s), s	10.5	0.0	5.4	11.5	0.0	0.0	82.2	25.4	0.2	1.8	0.0	0.0
Cycle Q Clear(g_c), s	10.5	0.0	5.4	11.5	0.0	0.0	82.2	25.4	0.2	27.2	0.0	0.0
Prop In Lane	1.00		1.00	0.14		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	467	0	208	170	0	0	149	2425	1085	236	2323	1085
V/C Ratio(X)	0.70	0.00	0.37	1.44	0.00	0.00	0.84	0.59	0.01	0.07	0.66	0.90
Avail Cap(c_a), veh/h	872	0	389	170	0	0	149	2425	1085	236	2323	1085
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	49.8	0.0	47.6	54.3	0.0	0.0	30.6	9.9	6.0	4.2	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	1.1	228.7	0.0	0.0	40.1	1.0	0.0	0.5	1.2	9.5
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	5.3	0.0	2.4	16.4	0.0	0.0	5.8	12.6	0.1	0.2	0.4	2.9
LnGrp Delay(d),s/veh	51.7	0.0	48.7	283.0	0.0	0.0	70.7	11.0	6.0	4.7	1.2	9.5
LnGrp LOS	D		D	F			E	B	A	A	A	A
Approach Vol, veh/h		404			245			1557			2520	
Approach Delay, s/veh		51.1			283.0			15.8			4.4	
Approach LOS		D			F			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		85.7		19.3		85.7		15.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		66.5		27.5		66.5		9.5				
Max Q Clear Time (g_c+I1), s		84.2		12.5		29.2		13.5				
Green Ext Time (p_c), s		0.0		1.2		29.8		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			26.6									
HCM 2010 LOS			C									
<b>Notes</b>												

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**





























➤ **MD Peak Hour**




















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Opening Year 2023 without Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (veh/h)	165	452	95	107	320	81	124	1056	127	69	1020	124
Future Volume (veh/h)	165	452	95	107	320	81	124	1056	127	69	1020	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	165	452	95	107	320	81	124	1056	127	69	1020	124
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	303	922	192	222	1119	500	292	2214	991	355	2214	991
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	1.00	1.00	1.00	0.63	0.63	0.63
Sat Flow, veh/h	980	2916	609	856	3539	1583	490	3539	1583	472	3539	1583
Grp Volume(v), veh/h	165	273	274	107	320	81	124	1056	127	69	1020	124
Grp Sat Flow(s),veh/h/ln	980	1770	1755	856	1770	1583	490	1770	1583	472	1770	1583
Q Serve(g_s), s	18.3	15.0	15.2	13.9	8.2	4.4	12.4	0.0	0.0	7.7	18.2	3.8
Cycle Q Clear(g_c), s	26.4	15.0	15.2	29.1	8.2	4.4	30.6	0.0	0.0	7.7	18.2	3.8
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	559	555	222	1119	500	292	2214	991	355	2214	991
V/C Ratio(X)	0.54	0.49	0.49	0.48	0.29	0.16	0.42	0.48	0.13	0.19	0.46	0.13
Avail Cap(c_a), veh/h	340	627	622	255	1253	561	292	2214	991	355	2214	991
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
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	40.8	33.2	33.3	45.0	30.9	29.6	3.7	0.0	0.0	9.9	11.8	9.1
Incr Delay (d2), s/veh	1.5	0.7	0.7	1.6	0.1	0.2	4.5	0.7	0.3	1.2	0.7	0.3
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	5.1	7.4	7.5	3.4	4.0	2.0	2.0	0.2	0.1	1.1	9.0	1.7
LnGrp Delay(d),s/veh	42.3	33.8	33.9	46.6	31.0	29.7	8.2	0.7	0.3	11.1	12.5	9.4
LnGrp LOS	D	C	C	D	C	C	A	A	A	B	B	A
Approach Vol, veh/h		712			508			1307			1213	
Approach Delay, s/veh		35.8			34.1			1.4			12.1	
Approach LOS		D			C			A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		78.6		41.4		78.6		41.4				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		68.5		40.5		68.5		40.5				
Max Q Clear Time (g_c+I1), s		32.6		28.4		20.2		31.1				
Green Ext Time (p_c), s		26.5		5.7		32.6		4.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				15.9								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 without Project  
Timing Plan: MD Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	660	220	1086	366	61	1112		
Future Volume (veh/h)	660	220	1086	366	61	1112		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	440	456	1086	366	61	1112		
Adj No. of Lanes	1	1	2	1	1	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	0	2	2	2	2		
Cap, veh/h	547	498	1932	1352	392	3263		
Arrive On Green	0.31	0.31	1.00	1.00	0.15	1.00		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	440	456	1086	366	61	1112		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	27.4	32.7	0.0	0.0	1.5	0.0		
Cycle Q Clear(g_c), s	27.4	32.7	0.0	0.0	1.5	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	547	498	1932	1352	392	3263		
V/C Ratio(X)	0.80	0.92	0.56	0.27	0.16	0.34		
Avail Cap(c_a), veh/h	554	505	1932	1352	400	3263		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	38.2	40.0	0.0	0.0	7.5	0.0		
Incr Delay (d2), s/veh	8.3	21.3	1.2	0.5	0.2	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	14.7	17.5	0.3	0.2	0.7	0.1		
LnGrp Delay(d),s/veh	46.5	61.3	1.2	0.5	7.7	0.3		
LnGrp LOS	D	E	A	A	A	A		
Approach Vol, veh/h	896		1452			1173		
Approach Delay, s/veh	54.0		1.0			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.5	69.0				80.5		39.5
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	7.5	62.5				74.5		35.5
Max Q Clear Time (g_c+I1), s	3.5	2.0				2.0		34.7
Green Ext Time (p_c), s	0.0	35.0				38.3		0.4
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			14.4					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 Without Project

Analyst: AGA

Peak Hr: MD

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	73	2	2880	73/2,880= 0.03		
NB Thru	382	2	3200	382/3,200= 0.12	< ==	
NB Right	199	1	1600	199/1,600= 0.12		
SB Left	107	1	1600	107/1,600= 0.07	< ==	
SB Thru	413	2	3200	413/3,200= 0.13		
SB Right**	151	1	1840	151/1,840= 0.08		
EB Left	108	1	1600	108/1,600= 0.07		
EB Thru	1253	3	4800	1,253/4,800= 0.26	< ==	
EB Right	114	1	1600	114/1,600= 0.07		
WB Left	119	1	1600	119/1,600= 0.07	< ==	
WB Thru	752	2	3200	752/3,200= 0.24		
WB Right	132	1	1600	132/1,600= 0.08		
Sum of Critical V/C Ratios						0.522
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.622</b>
Level of Service (LOS) - Refer to table below						<b>B</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: 2023 Without Project

Analyst: AGA

Peak Hr: MD

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	14	1	1600	14/1,600= 0.01		
NB Thru	6	1	1600	6/1,600= ----		
NB Right	71	1	1600	71/1,600= 0.04	< ==	
SB Left	5	1	1600	5/1,600= 0.00		
SB Thru	4	1	1600	6/1,600= 0.00		
SB Right	2			----		
EB Left	8	1	1600	8/1,600= 0.01		
EB Thru	1443	3	4800	1,458/4,800= 0.30	< ==	
EB Right	15			----		
WB Left	72	1	1600	72/1,600= 0.05	< ==	
WB Thru	918	2	3200	918/3,200= 0.29		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.396
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.496</b>
Level of Service (LOS) - Refer to table below						<b>A</b>



















**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 without Project  
Timing Plan: MD Peak Hour

									
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations	 	  	  		  				
Traffic Volume (veh/h)	798	752	925	215	395	79			
Future Volume (veh/h)	798	752	925	215	395	79			
Number	5	2	6	16	7	14			
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	1863	1863	1900			
Adj Flow Rate, veh/h	798	752	925	215	469	0			
Adj No. of Lanes	2	3	3	1	2	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	2	2	2	0			
Cap, veh/h	1166	3825	1961	610	643	293			
Arrive On Green	0.34	0.75	0.39	0.39	0.18	0.00			
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615			
Grp Volume(v), veh/h	798	752	925	215	469	0			
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615			
Q Serve(g_s), s	18.0	3.9	12.3	8.7	11.2	0.0			
Cycle Q Clear(g_c), s	18.0	3.9	12.3	8.7	11.2	0.0			
Prop In Lane	1.00			1.00	1.00	1.00			
Lane Grp Cap(c), veh/h	1166	3825	1961	610	643	293			
V/C Ratio(X)	0.68	0.20	0.47	0.35	0.73	0.00			
Avail Cap(c_a), veh/h	1166	3825	1961	610	887	404			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	25.6	3.2	20.8	19.7	34.8	0.0			
Incr Delay (d2), s/veh	3.3	0.1	0.8	1.6	1.9	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.1	1.9	5.9	4.0	5.6	0.0			
LnGrp Delay(d),s/veh	28.9	3.4	21.6	21.3	36.7	0.0			
LnGrp LOS	C	A	C	C	D				
Approach Vol, veh/h		1550	1140		469				
Approach Delay, s/veh		16.5	21.5		36.7				
Approach LOS		B	C		D				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		71.2		18.8	33.0	38.2			
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5			
Max Green Setting (Gmax), s		59.5		20.5	28.5	26.5			
Max Q Clear Time (g_c+I1), s		5.9		13.2	20.0	14.3			
Green Ext Time (p_c), s		20.8		1.1	2.2	8.8			
<b>Intersection Summary</b>									
HCM 2010 Ctrl Delay			21.3						
HCM 2010 LOS			C						
<b>Notes</b>									

HCM 2010 Signalized Intersection Summary  
9: Western Ave & 190th St






















Opening Year 2023 without Project  
Timing Plan: MD Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	213	576	342	125	454	247	163	960	174	2	190	1140
Future Volume (veh/h)	213	576	342	125	454	247	163	960	174	2	190	1140
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	213	576	342	125	454	247	163	960	174		190	1140
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	321	1449	575	234	880	411	269	2348	839		294	2385
Arrive On Green	0.09	0.28	0.28	0.07	0.26	0.26	0.16	0.92	0.92		0.17	0.94
Sat Flow, veh/h	3442	5085	1583	3442	3390	1583	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	213	576	342	125	454	247	163	960	174		190	1140
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1695	1583		1721	1695
Q Serve(g_s), s	7.2	11.0	21.1	4.2	13.7	16.4	5.3	2.8	1.1		6.2	3.0
Cycle Q Clear(g_c), s	7.2	11.0	21.1	4.2	13.7	16.4	5.3	2.8	1.1		6.2	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	321	1449	575	234	880	411	269	2348	839		294	2385
V/C Ratio(X)	0.66	0.40	0.60	0.53	0.52	0.60	0.61	0.41	0.21		0.65	0.48
Avail Cap(c_a), veh/h	330	1759	671	272	1116	521	330	2348	839		330	2385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	0.95	0.95	0.95		1.00	1.00
Uniform Delay (d), s/veh	52.6	34.6	31.1	54.1	38.0	39.0	48.9	2.6	1.9		48.1	2.1
Incr Delay (d2), s/veh	4.8	0.2	1.1	1.8	0.5	1.4	2.1	0.5	0.5		3.7	0.7
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
%ile BackOfQ(50%),veh/ln	3.6	5.1	9.3	2.1	6.5	7.4	2.6	1.2	0.5		3.1	1.4
LnGrp Delay(d),s/veh	57.3	34.8	32.1	55.9	38.4	40.3	51.0	3.1	2.5		51.8	2.8
LnGrp LOS	E	C	C	E	D	D	D	A	A		D	A
Approach Vol, veh/h		1131			826			1297				1748
Approach Delay, s/veh		38.2			41.6			9.0				8.2
Approach LOS		D			D			A				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	12.7	58.9	10.7	37.7	11.9	59.8	13.7	34.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	9.5	43.5	7.5	39.5	9.5	43.5	9.5	37.5				
Max Q Clear Time (g_c+I1), s	8.2	4.8	6.2	23.1	7.3	5.4	9.2	18.4				
Green Ext Time (p_c), s	0.1	26.7	0.0	9.1	0.1	26.3	0.0	10.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			20.7									
HCM 2010 LOS			C									
<b>Notes</b>												

Movement	SBR
Left Configurations	7
Traffic Volume (veh/h)	418
Future Volume (veh/h)	418
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	418
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	890
Arrive On Green	0.94
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	418
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	3.4
Cycle Q Clear(g_c), s	3.4
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	890
V/C Ratio(X)	0.47
Avail Cap(c_a), veh/h	890
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	1.4
Incr Delay (d2), s/veh	1.8
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	1.6
LnGrp Delay(d),s/veh	3.2
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St






















Opening Year 2023 without Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	786	183	81	670	6	286	7	130	8	3	26
Future Volume (veh/h)	19	786	183	81	670	6	286	7	130	8	3	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	19	786	183	81	670	6	291	0	130	8	3	26
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	514	2362	545	142	3534	32	486	0	344	24	9	77
Arrive On Green	0.57	0.57	0.57	0.08	0.68	0.68	0.14	0.00	0.14	0.07	0.07	0.07
Sat Flow, veh/h	760	4131	954	1774	5198	47	3548	0	1583	355	133	1153
Grp Volume(v), veh/h	19	644	325	81	437	239	291	0	130	37	0	0
Grp Sat Flow(s),veh/h/ln	760	1695	1694	1774	1695	1855	1774	0	1583	1641	0	0
Q Serve(g_s), s	1.0	9.0	9.2	4.0	4.3	4.3	6.9	0.0	6.3	1.9	0.0	0.0
Cycle Q Clear(g_c), s	1.0	9.0	9.2	4.0	4.3	4.3	6.9	0.0	6.3	1.9	0.0	0.0
Prop In Lane	1.00		0.56	1.00		0.03	1.00		1.00	0.22		0.70
Lane Grp Cap(c), veh/h	514	1938	969	142	2305	1261	486	0	344	109	0	0
V/C Ratio(X)	0.04	0.33	0.34	0.57	0.19	0.19	0.60	0.00	0.38	0.34	0.00	0.00
Avail Cap(c_a), veh/h	514	1938	969	246	2305	1261	1163	0	646	155	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.5	10.2	10.2	39.9	5.3	5.3	36.5	0.0	30.0	40.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.8	3.5	0.2	0.3	1.2	0.0	0.7	1.8	0.0	0.0
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	0.2	4.3	4.5	2.1	2.1	2.3	3.5	0.0	2.8	0.9	0.0	0.0
LnGrp Delay(d),s/veh	8.6	10.6	11.1	43.4	5.5	5.6	37.7	0.0	30.7	41.9	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		988			757			421				37
Approach Delay, s/veh		10.7			9.6			35.6				41.9
Approach LOS		B			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		15.8	9.7	55.0		9.5		64.7				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		27.5	10.5	24.5		6.5		39.5				
Max Q Clear Time (g_c+I1), s		8.9	6.0	11.2		3.9		6.3				
Green Ext Time (p_c), s		1.4	0.1	8.6		0.0		14.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				15.6								
HCM 2010 LOS				B								
<b>Notes</b>												

























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 without Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	333	939	154	83	679	197	66	622	86	162	443	317
Future Volume (veh/h)	333	939	154	83	679	197	66	622	86	162	443	317
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	333	939	154	83	679	197	66	622	86	162	443	317
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	389	1533	251	134	802	229	113	1165	161	375	1402	974
Arrive On Green	0.22	0.35	0.35	0.08	0.20	0.20	0.06	0.37	0.37	0.09	0.40	0.40
Sat Flow, veh/h	1774	4406	720	1774	3931	1124	1774	3125	431	1774	3539	1583
Grp Volume(v), veh/h	333	722	371	83	584	292	66	352	356	162	443	317
Grp Sat Flow(s),veh/h/ln	1774	1695	1736	1774	1695	1664	1774	1770	1787	1774	1770	1583
Q Serve(g_s), s	21.7	21.2	21.3	5.4	19.9	20.3	4.3	18.7	18.7	6.4	10.4	11.6
Cycle Q Clear(g_c), s	21.7	21.2	21.3	5.4	19.9	20.3	4.3	18.7	18.7	6.4	10.4	11.6
Prop In Lane	1.00		0.41	1.00		0.68	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	389	1179	604	134	692	340	113	660	666	375	1402	974
V/C Ratio(X)	0.86	0.61	0.61	0.62	0.84	0.86	0.58	0.53	0.53	0.43	0.32	0.33
Avail Cap(c_a), veh/h	495	1229	629	214	692	340	182	660	666	434	1402	974
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	45.0	32.4	32.5	53.8	45.9	46.1	54.6	29.5	29.5	20.6	25.0	11.1
Incr Delay (d2), s/veh	11.4	0.8	1.7	4.6	9.4	19.3	4.7	3.1	3.1	0.8	0.6	0.9
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	11.9	10.1	10.5	2.8	10.2	11.1	2.3	9.7	9.8	3.1	5.2	5.3
LnGrp Delay(d),s/veh	56.4	33.3	34.1	58.5	55.3	65.4	59.3	32.5	32.6	21.4	25.6	12.0
LnGrp LOS	E	C	C	E	E	E	E	C	C	C	C	B
Approach Vol, veh/h		1426			959			774			922	
Approach Delay, s/veh		38.9			58.7			34.8			20.2	
Approach LOS		D			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	14.0	48.2	12.5	45.2	11.2	51.0	29.8	28.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	12.5	31.5	12.5	41.5	10.3	33.7	31.5	22.5				
Max Q Clear Time (g_c+I1), s	8.4	20.7	7.4	23.3	6.3	13.6	23.7	22.3				
Green Ext Time (p_c), s	0.1	6.1	0.1	12.5	0.0	8.9	0.7	0.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			38.5									
HCM 2010 LOS			D									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 without Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	2	26	10	0	10	24	1330	15	24	1236	57
Future Volume (veh/h)	73	2	26	10	0	10	24	1330	15	24	1236	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	73	2	26	10	0	10	24	1330	15	24	1236	57
Adj No. of Lanes	0	1	1	0	1	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	59	1	475	60	0	475	62	2979	928	62	2979	928
Arrive On Green	0.30	0.30	0.30	0.30	0.00	0.30	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	75	0	26	10	0	10	24	1330	15	24	1236	57
Grp Sat Flow(s),veh/h/ln	3	0	1583	0	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.5	1.6	0.0	0.0	1.6	0.0	0.0
Cycle Q Clear(g_c), s	36.0	0.0	1.4	36.0	0.0	0.5	1.6	0.0	0.0	1.6	0.0	0.0
Prop In Lane	0.97		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	475	60	0	475	62	2979	928	62	2979	928
V/C Ratio(X)	1.25	0.00	0.05	0.17	0.00	0.02	0.39	0.45	0.02	0.39	0.41	0.06
Avail Cap(c_a), veh/h	60	0	475	60	0	475	126	2979	928	155	2979	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.88	0.88	0.88	0.87	0.87	0.87
Uniform Delay (d), s/veh	59.5	0.0	29.9	60.0	0.0	29.6	54.6	0.0	0.0	54.6	0.0	0.0
Incr Delay (d2), s/veh	197.3	0.0	0.0	1.3	0.0	0.0	3.4	0.4	0.0	3.4	0.4	0.1
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	5.3	0.0	0.6	0.4	0.0	0.2	0.8	0.1	0.0	0.8	0.1	0.0
LnGrp Delay(d),s/veh	256.8	0.0	29.9	61.3	0.0	29.6	58.0	0.4	0.0	58.0	0.4	0.1
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		101			20			1369			1317	
Approach Delay, s/veh		198.4			45.4			1.4			1.4	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	73.8		39.5	6.7	73.8		39.5				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	62.0		34.0	6.5	64.0		34.0				
Max Q Clear Time (g_c+I1), s	3.6	2.0		38.0	3.6	2.0		38.0				
Green Ext Time (p_c), s	0.0	38.7		0.0	0.0	39.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			8.8									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 without Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	39	177	12	42	42	128	1047	17	26	1258	368
Future Volume (veh/h)	292	39	177	12	42	42	128	1047	17	26	1258	368
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	320	0	177	12	42	42	128	1047	17	26	1258	368
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	540	0	241	15	53	53	258	2440	1092	355	2695	787
Arrive On Green	0.15	0.00	0.15	0.07	0.07	0.07	0.69	0.69	0.69	0.92	0.92	0.92
Sat Flow, veh/h	3548	0	1583	215	752	752	309	3539	1583	528	3909	1142
Grp Volume(v), veh/h	320	0	177	96	0	0	128	1047	17	26	1091	535
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1719	0	0	309	1770	1583	528	1695	1661
Q Serve(g_s), s	10.1	0.0	12.8	6.6	0.0	0.0	30.4	15.7	0.4	1.6	5.6	5.6
Cycle Q Clear(g_c), s	10.1	0.0	12.8	6.6	0.0	0.0	36.0	15.7	0.4	17.3	5.6	5.6
Prop In Lane	1.00		1.00	0.12		0.44	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	540	0	241	122	0	0	258	2440	1092	355	2337	1145
V/C Ratio(X)	0.59	0.00	0.73	0.79	0.00	0.00	0.50	0.43	0.02	0.07	0.47	0.47
Avail Cap(c_a), veh/h	872	0	389	122	0	0	258	2440	1092	355	2337	1145
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	47.4	0.0	48.5	54.9	0.0	0.0	13.1	8.2	5.9	4.4	1.8	1.8
Incr Delay (d2), s/veh	1.0	0.0	4.3	28.3	0.0	0.0	6.7	0.6	0.0	0.4	0.6	1.3
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	5.0	0.0	5.9	4.1	0.0	0.0	3.0	7.7	0.2	0.3	2.7	2.8
LnGrp Delay(d),s/veh	48.4	0.0	52.8	83.2	0.0	0.0	19.8	8.8	5.9	4.8	2.4	3.1
LnGrp LOS	D		D	F			B	A	A	A	A	A
Approach Vol, veh/h		497			96			1192			1652	
Approach Delay, s/veh		50.0			83.2			9.9			2.7	
Approach LOS		D			F			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		86.2		21.8		86.2		12.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		69.5		27.5		69.5		6.5				
Max Q Clear Time (g_c+I1), s		38.0		14.8		19.3		8.6				
Green Ext Time (p_c), s		27.2		1.5		40.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			14.3									
HCM 2010 LOS			B									
<b>Notes</b>												




























190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **PM Peak Hour**


















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Opening Year 2023 without Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	147	991	87	101	733	67	138	1197	274	59	992	152
Future Volume (veh/h)	147	991	87	101	733	67	138	1197	274	59	992	152
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	147	991	87	101	733	67	138	1197	274	59	992	152
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	240	1299	114	150	1396	625	248	1868	836	183	1868	836
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	677	3292	289	521	3539	1583	490	3539	1583	358	3539	1583
Grp Volume(v), veh/h	147	533	545	101	733	67	138	1197	274	59	992	152
Grp Sat Flow(s),veh/h/ln	677	1770	1812	521	1770	1583	490	1770	1583	358	1770	1583
Q Serve(g_s), s	19.1	23.5	23.5	12.0	14.2	2.4	23.2	21.7	8.9	12.7	16.6	4.5
Cycle Q Clear(g_c), s	33.3	23.5	23.5	35.5	14.2	2.4	39.7	21.7	8.9	34.4	16.6	4.5
Prop In Lane	1.00		0.16	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	698	715	150	1396	625	248	1868	836	183	1868	836
V/C Ratio(X)	0.61	0.76	0.76	0.67	0.53	0.11	0.56	0.64	0.33	0.32	0.53	0.18
Avail Cap(c_a), veh/h	240	698	715	150	1396	625	248	1868	836	183	1868	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	33.5	23.6	23.6	40.9	20.8	17.2	27.0	15.2	12.1	27.4	13.9	11.1
Incr Delay (d2), s/veh	4.5	5.0	4.9	11.4	0.4	0.1	8.7	1.7	1.0	4.6	1.1	0.5
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	3.9	12.4	12.6	3.0	7.0	1.1	3.7	10.9	4.1	1.5	8.3	2.1
LnGrp Delay(d),s/veh	38.1	28.6	28.5	52.2	21.2	17.3	35.7	16.9	13.2	32.1	15.0	11.6
LnGrp LOS	D	C	C	D	C	B	D	B	B	C	B	B
Approach Vol, veh/h		1225			901			1609			1203	
Approach Delay, s/veh		29.7			24.4			17.8			15.4	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.0		39.0		51.0		39.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		45.5		33.5		45.5		33.5				
Max Q Clear Time (g_c+I1), s		41.7		35.3		36.4		37.5				
Green Ext Time (p_c), s		3.0		0.0		5.4		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				21.4								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 without Project  
Timing Plan: PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	702	223	1592	661	54	1131		
Future Volume (veh/h)	702	223	1592	661	54	1131		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	462	480	1592	661	54	1131		
Adj No. of Lanes	1	1	2	1	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	579	527	1977	1401	184	3173		
Arrive On Green	0.33	0.33	0.74	0.74	0.04	0.62		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	462	480	1592	661	54	1131		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	28.5	34.2	34.5	7.6	1.4	12.9		
Cycle Q Clear(g_c), s	28.5	34.2	34.5	7.6	1.4	12.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	579	527	1977	1401	184	3173		
V/C Ratio(X)	0.80	0.91	0.81	0.47	0.29	0.36		
Avail Cap(c_a), veh/h	599	545	1977	1401	290	3173		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.8	38.8	11.3	0.7	17.2	10.9		
Incr Delay (d2), s/veh	7.3	19.3	3.6	1.1	0.9	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	15.2	18.0	17.5	12.7	0.8	6.1		
LnGrp Delay(d),s/veh	44.2	58.0	14.9	1.9	18.0	11.2		
LnGrp LOS	D	E	B	A	B	B		
Approach Vol, veh/h	942		2253			1185		
Approach Delay, s/veh	51.2		11.1			11.5		
Approach LOS	D		B			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.8	70.5				78.4		41.6
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	56.5				71.5		38.5
Max Q Clear Time (g_c+I1), s	3.4	36.5				14.9		36.2
Green Ext Time (p_c), s	0.0	14.8				11.1		0.9
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			19.8					
HCM 2010 LOS			B					
<b>Notes</b>								

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 Without Project

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	178	2	2880	178/2,880= 0.06		
NB Thru	896	2	3200	896/3,200= 0.28	< ==	
NB Right	228	1	1600	228/1,600= 0.14		
SB Left	97	1	1600	97/1,600= 0.06	< ==	
SB Thru	515	2	3200	515/3,200= 0.16		
SB Right**	190	1	1840	190/1,840= 0.10		
EB Left	255	1	1600	255/1,600= 0.16	< ==	
EB Thru	1600	3	4800	1,600/4,800= 0.33		
EB Right	145	1	1600	145/1,600= 0.09		
WB Left	78	1	1600	78/1,600= 0.05		
WB Thru	1100	2	3200	1,100/3,200= 0.34	< ==	
WB Right	113	1	1600	113/1,600= 0.07		
Sum of Critical V/C Ratios						0.844
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.944</b>
Level of Service (LOS) - Refer to table below						<b>E</b>

\* NOTES

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy PI

Scenario: 2023 Without Project

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	29	1	1600	29/1,600= 0.02		
NB Thru	4	1	1600	4/1,600= ----		
NB Right	130	1	1600	130/1,600= 0.08	< ==	
SB Left	10	1	1600	10/1,600= 0.01		
SB Thru	5	1	1600	8/1,600= 0.01		
SB Right	3			----		
EB Left	2	1	1600	2/1,600= 0.00		
EB Thru	1958	3	4800	1,977/4,800= 0.41	< ==	
EB Right	19			----		
WB Left	27	1	1600	27/1,600= 0.02	< ==	
WB Thru	1213	2	3200	1,213/3,200= 0.38		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.516
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.616</b>
Level of Service (LOS) - Refer to table below						<b>B</b>

\* NOTES




















Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

























HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 without Project  
Timing Plan: PM Peak Hour

									
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations	 	  	  		 	 			
Traffic Volume (veh/h)	635	1539	1180	116	616	30			
Future Volume (veh/h)	635	1539	1180	116	616	30			
Number	5	2	6	16	7	14			
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	1863	1863	1900			
Adj Flow Rate, veh/h	635	1539	1180	116	644	0			
Adj No. of Lanes	2	3	3	1	2	1			
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	758	3705	2479	772	785	358			
Arrive On Green	0.22	0.73	0.16	0.16	0.22	0.00			
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615			
Grp Volume(v), veh/h	635	1539	1180	116	644	0			
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615			
Q Serve(g_s), s	21.2	14.1	25.3	7.6	20.7	0.0			
Cycle Q Clear(g_c), s	21.2	14.1	25.3	7.6	20.7	0.0			
Prop In Lane	1.00			1.00	1.00	1.00			
Lane Grp Cap(c), veh/h	758	3705	2479	772	785	358			
V/C Ratio(X)	0.84	0.42	0.48	0.15	0.82	0.00			
Avail Cap(c_a), veh/h	875	3705	2479	772	1020	464			
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	44.7	6.3	36.4	29.0	44.4	0.0			
Incr Delay (d2), s/veh	6.4	0.3	0.7	0.4	4.2	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	10.7	6.7	12.0	3.4	10.7	0.0			
LnGrp Delay(d),s/veh	51.2	6.7	37.1	29.4	48.6	0.0			
LnGrp LOS	D	A	D	C	D				
Approach Vol, veh/h		2174	1296		644				
Approach Delay, s/veh		19.7	36.4		48.6				
Approach LOS		B	D		D				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		90.9		29.1	28.9	62.0			
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5			
Max Green Setting (Gmax), s		77.5		32.5	28.5	43.5			
Max Q Clear Time (g_c+I1), s		16.1		22.7	23.2	27.3			
Green Ext Time (p_c), s		18.5		1.8	1.3	8.1			
<b>Intersection Summary</b>									
HCM 2010 Ctrl Delay			29.5						
HCM 2010 LOS			C						
<b>Notes</b>									

HCM 2010 Signalized Intersection Summary  
9: Western Ave & 190th St





















Opening Year 2023 without Project  
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	427	1224	484	226	725	312	148	1359	199	3	140	1246
Future Volume (veh/h)	427	1224	484	226	725	312	148	1359	199	3	140	1246
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	427	1224	484	226	725	312	148	1359	199		140	1246
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	502	1731	655	339	1026	436	252	1977	771		249	1972
Arrive On Green	0.05	0.11	0.11	0.10	0.29	0.29	0.15	0.78	0.78		0.14	0.78
Sat Flow, veh/h	3442	5085	1583	3442	3501	1489	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	427	1224	484	226	702	335	148	1359	199		140	1246
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1600	1721	1695	1583		1721	1695
Q Serve(g_s), s	14.8	27.9	32.2	7.6	22.1	22.5	4.8	15.3	3.8		4.5	12.9
Cycle Q Clear(g_c), s	14.8	27.9	32.2	7.6	22.1	22.5	4.8	15.3	3.8		4.5	12.9
Prop In Lane	1.00		1.00	1.00		0.93	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	502	1731	655	339	993	469	252	1977	771		249	1972
V/C Ratio(X)	0.85	0.71	0.74	0.67	0.71	0.72	0.59	0.69	0.26		0.56	0.63
Avail Cap(c_a), veh/h	502	1801	677	416	1116	527	272	1977	771		445	1972
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	0.91	0.91	0.91		1.00	1.00
Uniform Delay (d), s/veh	55.8	47.5	40.5	52.2	37.8	37.9	49.5	9.9	6.1		49.5	9.7
Incr Delay (d2), s/veh	13.1	1.2	4.2	2.8	1.7	3.8	2.6	1.8	0.7		2.0	1.6
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
%ile BackOfQ(50%),veh/ln	8.0	13.3	14.9	3.7	10.6	10.5	2.4	7.1	1.7		2.2	6.0
LnGrp Delay(d),s/veh	68.9	48.7	44.6	55.0	39.5	41.8	52.1	11.7	6.8		51.5	11.2
LnGrp LOS	E	D	D	E	D	D	D	B	A		D	B
Approach Vol, veh/h		2135			1263			1706				1757
Approach Delay, s/veh		51.8			42.9			14.6				13.6
Approach LOS		D			D			B				B
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	11.2	50.1	14.3	44.4	11.3	50.0	20.0	38.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	33.5	12.5	40.5	7.5	39.5	15.5	37.5				
Max Q Clear Time (g_c+I1), s	6.5	17.3	9.6	34.2	6.8	14.9	16.8	24.5				
Green Ext Time (p_c), s	0.2	9.5	0.2	4.7	0.0	11.9	0.0	5.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			31.1									
HCM 2010 LOS			C									
<b>Notes</b>												

Movement	SBR
Left Configurations	7
Traffic Volume (veh/h)	371
Future Volume (veh/h)	371
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	371
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	845
Arrive On Green	0.78
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	371
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	9.0
Cycle Q Clear(g_c), s	9.0
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	845
V/C Ratio(X)	0.44
Avail Cap(c_a), veh/h	845
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	5.6
Incr Delay (d2), s/veh	1.7
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	4.2
LnGrp Delay(d),s/veh	7.2
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Opening Year 2023 without Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1446	210	50	1052	3	218	2	106	24	10	34
Future Volume (veh/h)	3	1446	210	50	1052	3	218	2	106	24	10	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	1446	210	50	1052	3	219	0	106	24	10	34
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	405	2738	397	102	3643	10	408	0	274	43	18	61
Arrive On Green	0.61	0.61	0.61	0.06	0.70	0.70	0.12	0.00	0.12	0.07	0.07	0.07
Sat Flow, veh/h	533	4487	651	1774	5235	15	3548	0	1583	594	248	842
Grp Volume(v), veh/h	3	1092	564	50	681	374	219	0	106	68	0	0
Grp Sat Flow(s),veh/h/ln	533	1695	1748	1774	1695	1860	1774	0	1583	1684	0	0
Q Serve(g_s), s	0.2	16.7	16.7	2.5	6.9	6.9	5.2	0.0	5.3	3.5	0.0	0.0
Cycle Q Clear(g_c), s	0.2	16.7	16.7	2.5	6.9	6.9	5.2	0.0	5.3	3.5	0.0	0.0
Prop In Lane	1.00		0.37	1.00		0.01	1.00		1.00	0.35		0.50
Lane Grp Cap(c), veh/h	405	2069	1067	102	2359	1294	408	0	274	122	0	0
V/C Ratio(X)	0.01	0.53	0.53	0.49	0.29	0.29	0.54	0.00	0.39	0.56	0.00	0.00
Avail Cap(c_a), veh/h	405	2069	1067	207	2359	1294	1084	0	575	159	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.9	10.1	10.1	41.1	5.2	5.2	37.6	0.0	33.0	40.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	1.4	3.6	0.3	0.6	1.1	0.0	0.9	3.9	0.0	0.0
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	0.0	7.9	8.4	1.3	3.3	3.7	2.6	0.0	2.4	1.8	0.0	0.0
LnGrp Delay(d),s/veh	6.9	10.8	11.5	44.7	5.5	5.8	38.6	0.0	33.9	44.3	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		1659			1105			325				68
Approach Delay, s/veh		11.0			7.4			37.1				44.3
Approach LOS		B			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		13.9	7.7	58.4		10.0		66.1				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	8.5	28.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		7.3	4.5	18.7		5.5		8.9				
Green Ext Time (p_c), s		1.0	0.0	7.1		0.0		8.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				13.1								
HCM 2010 LOS				B								
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 without Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	354	1436	175	131	912	354	101	879	101	95	661	318
Future Volume (veh/h)	354	1436	175	131	912	354	101	879	101	95	661	318
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	354	1436	175	131	912	354	101	879	101	95	661	318
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	447	1923	234	170	947	367	126	966	111	200	1055	871
Arrive On Green	0.25	0.42	0.42	0.10	0.26	0.26	0.07	0.30	0.30	0.07	0.30	0.30
Sat Flow, veh/h	1774	4594	560	1774	3609	1398	1774	3200	368	1774	3539	1583
Grp Volume(v), veh/h	354	1059	552	131	857	409	101	486	494	95	661	318
Grp Sat Flow(s),veh/h/ln	1774	1695	1764	1774	1695	1616	1774	1770	1798	1774	1770	1583
Q Serve(g_s), s	22.4	31.7	31.7	8.7	29.9	30.0	6.7	31.7	31.7	4.3	19.3	2.5
Cycle Q Clear(g_c), s	22.4	31.7	31.7	8.7	29.9	30.0	6.7	31.7	31.7	4.3	19.3	2.5
Prop In Lane	1.00		0.32	1.00		0.86	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	447	1419	738	170	890	424	126	534	543	200	1055	871
V/C Ratio(X)	0.79	0.75	0.75	0.77	0.96	0.96	0.80	0.91	0.91	0.47	0.63	0.37
Avail Cap(c_a), veh/h	447	1419	738	170	890	424	126	538	547	207	1077	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	41.9	29.5	29.5	53.0	43.7	43.7	54.9	40.3	40.3	30.4	36.4	6.2
Incr Delay (d2), s/veh	9.4	3.6	6.8	19.2	22.4	35.7	30.3	19.5	19.3	1.7	1.1	0.3
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	12.1	15.6	16.9	5.2	16.8	17.6	4.4	18.4	18.7	2.2	9.6	3.6
LnGrp Delay(d),s/veh	51.3	33.1	36.3	72.2	66.0	79.4	85.2	59.9	59.6	32.1	37.5	6.5
LnGrp LOS	D	C	D	E	E	E	F	E	E	C	D	A
Approach Vol, veh/h		1965			1397			1081			1074	
Approach Delay, s/veh		37.3			70.5			62.1			27.8	
Approach LOS		D			E			E			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	11.5	39.7	15.0	53.7	12.0	39.3	33.7	35.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	6.5	34.5	9.5	47.5	6.5	34.5	27.5	29.5				
Max Q Clear Time (g_c+I1), s	6.3	33.7	10.7	33.7	8.7	21.3	24.4	32.0				
Green Ext Time (p_c), s	0.0	0.5	0.0	9.0	0.0	4.7	0.4	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			48.7									
HCM 2010 LOS			D									























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 without Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	2	31	27	2	35	13	1676	7	22	1938	31
Future Volume (veh/h)	77	2	31	27	2	35	13	1676	7	22	1938	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	77	2	31	27	2	35	13	1676	7	22	1938	31
Adj No. of Lanes	0	1	1	0	1	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	59	1	482	58	2	482	50	2963	923	60	2992	931
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.06	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	8	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	79	0	31	29	0	35	13	1676	7	22	1938	31
Grp Sat Flow(s),veh/h/ln	3	0	1583	8	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.7	0.0	0.0	1.9	0.8	0.0	0.0	1.4	0.0	0.0
Cycle Q Clear(g_c), s	36.5	0.0	1.7	36.5	0.0	1.9	0.8	0.0	0.0	1.4	0.0	0.0
Prop In Lane	0.97		1.00	0.93		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	482	60	0	482	50	2963	923	60	2992	931
V/C Ratio(X)	1.32	0.00	0.06	0.48	0.00	0.07	0.26	0.57	0.01	0.36	0.65	0.03
Avail Cap(c_a), veh/h	60	0	482	60	0	482	140	2963	923	140	2992	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.69	0.69	0.69	0.72	0.72	0.72
Uniform Delay (d), s/veh	59.5	0.0	29.6	57.1	0.0	29.7	55.4	0.0	0.0	54.7	0.0	0.0
Incr Delay (d2), s/veh	222.0	0.0	0.1	5.8	0.0	0.1	1.8	0.5	0.0	2.6	0.8	0.0
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	5.7	0.0	0.7	1.1	0.0	0.8	0.4	0.1	0.0	0.7	0.2	0.0
LnGrp Delay(d),s/veh	281.5	0.0	29.7	63.0	0.0	29.8	57.2	0.5	0.0	57.3	0.8	0.0
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		110			64			1696			1991	
Approach Delay, s/veh		210.5			44.8			1.0			1.4	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	73.4		40.0	5.9	74.1		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	7.5	62.5		34.5	7.5	62.5		34.5				
Max Q Clear Time (g_c+I1), s	3.4	2.0		38.5	2.8	2.0		38.5				
Green Ext Time (p_c), s	0.0	21.5		0.0	0.0	28.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			7.9									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 without Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	651	155	304	14	46	37	102	1198	17	40	1725	522
Future Volume (veh/h)	651	155	304	14	46	37	102	1198	17	40	1725	522
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	403	502	304	14	46	37	102	1198	17	40	1725	522
Adj No. of Lanes	1	1	1	0	1	0	1	2	1	1	3	0
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	451	473	402	20	65	52	90	2050	917	227	2260	665
Arrive On Green	0.25	0.25	0.25	0.08	0.08	0.08	0.58	0.58	0.58	0.39	0.39	0.39
Sat Flow, veh/h	1774	1863	1583	250	822	661	168	3539	1583	458	3902	1148
Grp Volume(v), veh/h	403	502	304	97	0	0	102	1198	17	40	1492	755
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1734	0	0	168	1770	1583	458	1695	1660
Q Serve(g_s), s	26.3	30.5	21.3	6.5	0.0	0.0	21.5	25.8	0.5	8.4	45.8	48.0
Cycle Q Clear(g_c), s	26.3	30.5	21.3	6.5	0.0	0.0	69.5	25.8	0.5	34.3	45.8	48.0
Prop In Lane	1.00		1.00	0.14		0.38	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	451	473	402	137	0	0	90	2050	917	227	1963	961
V/C Ratio(X)	0.89	1.06	0.76	0.71	0.00	0.00	1.13	0.58	0.02	0.18	0.76	0.78
Avail Cap(c_a), veh/h	451	473	402	137	0	0	90	2050	917	227	1963	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	43.2	44.8	41.3	53.9	0.0	0.0	56.4	16.1	10.7	36.3	29.5	30.1
Incr Delay (d2), s/veh	19.8	58.3	7.9	15.3	0.0	0.0	134.8	1.2	0.0	1.5	2.5	5.7
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	15.4	23.3	10.2	3.7	0.0	0.0	6.4	12.8	0.3	1.2	22.1	23.6
LnGrp Delay(d),s/veh	63.0	103.0	49.3	69.2	0.0	0.0	191.2	17.3	10.8	37.8	32.0	35.8
LnGrp LOS	E	F	D	E			F	B	B	D	C	D
Approach Vol, veh/h		1209			97			1317			2287	
Approach Delay, s/veh		76.2			69.2			30.7			33.4	
Approach LOS		E			E			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.0		34.0		73.0		13.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		67.5		28.5		67.5		7.5				
Max Q Clear Time (g_c+I1), s		71.5		32.5		50.0		8.5				
Green Ext Time (p_c), s		0.0		0.0		14.5		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			43.9									
HCM 2010 LOS			D									
<b>Notes</b>												

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Intersection Analysis Worksheets**

- Year 2023 With Project Conditions (Ambient Growth and Cumulative Projects Plus Project)

































190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **AM Peak Hour**


















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (veh/h)	86	373	77	170	1131	126	132	984	79	82	1017	201
Future Volume (veh/h)	86	373	77	170	1131	126	132	984	79	82	1017	201
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	86	373	77	170	1131	126	132	984	79	82	1017	201
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	163	1404	287	437	1697	759	172	1636	732	167	1636	732
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.15	0.15	0.15	0.46	0.46	0.46
Sat Flow, veh/h	440	2928	599	937	3539	1583	456	3539	1583	529	3539	1583
Grp Volume(v), veh/h	86	224	226	170	1131	126	132	984	79	82	1017	201
Grp Sat Flow(s),veh/h/ln	440	1770	1757	937	1770	1583	456	1770	1583	529	1770	1583
Q Serve(g_s), s	22.3	9.0	9.2	15.9	29.3	5.4	29.4	31.1	5.2	17.6	26.0	9.4
Cycle Q Clear(g_c), s	51.6	9.0	9.2	25.1	29.3	5.4	55.5	31.1	5.2	48.7	26.0	9.4
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	849	843	437	1697	759	172	1636	732	167	1636	732
V/C Ratio(X)	0.53	0.26	0.27	0.39	0.67	0.17	0.77	0.60	0.11	0.49	0.62	0.27
Avail Cap(c_a), veh/h	178	907	901	468	1814	811	172	1636	732	167	1636	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
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	43.6	18.6	18.7	26.2	23.9	17.7	66.1	40.5	29.5	45.1	24.4	19.9
Incr Delay (d2), s/veh	2.6	0.2	0.2	0.6	0.9	0.1	27.4	1.6	0.3	9.9	1.8	0.9
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	2.8	4.5	4.5	4.2	14.5	2.4	5.7	15.7	2.3	3.0	13.1	4.3
LnGrp Delay(d),s/veh	46.3	18.8	18.8	26.7	24.7	17.8	93.5	42.2	29.8	55.1	26.1	20.8
LnGrp LOS	D	B	B	C	C	B	F	D	C	E	C	C
Approach Vol, veh/h		536			1427			1195			1300	
Approach Delay, s/veh		23.2			24.4			47.0			27.1	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		49.5		59.5		49.5		59.5				
Max Q Clear Time (g_c+I1), s		57.5		53.6		50.7		31.3				
Green Ext Time (p_c), s		0.0		1.9		0.0		11.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				31.1								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 with Project  
Timing Plan: AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	998	203	1182	326	29	1341		
Future Volume (veh/h)	998	203	1182	326	29	1341		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1187	0	1182	326	29	1341		
Adj No. of Lanes	2	1	2	1	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	1308	595	1615	1306	372	2956		
Arrive On Green	0.37	0.00	0.91	0.91	0.21	1.00		
Sat Flow, veh/h	3548	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	1187	0	1182	326	29	1341		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	38.1	0.0	10.5	1.2	0.8	0.0		
Cycle Q Clear(g_c), s	38.1	0.0	10.5	1.2	0.8	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1308	595	1615	1306	372	2956		
V/C Ratio(X)	0.91	0.00	0.73	0.25	0.08	0.45		
Avail Cap(c_a), veh/h	1375	626	1615	1306	372	2956		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	35.9	0.0	3.3	0.3	10.2	0.0		
Incr Delay (d2), s/veh	8.8	0.0	3.0	0.5	0.4	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	20.2	0.0	4.9	1.6	0.4	0.1		
LnGrp Delay(d),s/veh	44.7	0.0	6.3	0.8	10.7	0.5		
LnGrp LOS	D		A	A	B	A		
Approach Vol, veh/h	1187		1508			1370		
Approach Delay, s/veh	44.7		5.1			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.0	58.3				73.3		46.7
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	50.5				65.5		44.5
Max Q Clear Time (g_c+I1), s	2.8	12.5				2.0		40.1
Green Ext Time (p_c), s	0.0	13.4				14.7		2.2
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			15.2					
HCM 2010 LOS			B					
<b>Notes</b>								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Western Ave & project dwy

Opening Year 2023 with Project  
Timing Plan: AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑↗		
Traffic Volume (veh/h)	0	113	0	1456	2175	60	
Future Volume (Veh/h)	0	113	0	1456	2175	60	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	113	0	1456	2175	60	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)				377	587		
pX, platoon unblocked	0.90	0.85	0.85				
vC, conflicting volume	2690	755	2235				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1401	111	1845				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	86	100				
cM capacity (veh/h)	119	786	278				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	113	485	485	485	870	870	495
Volume Left	0	0	0	0	0	0	0
Volume Right	113	0	0	0	0	0	60
cSH	786	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.14	0.29	0.29	0.29	0.51	0.51	0.29
Queue Length 95th (ft)	13	0	0	0	0	0	0
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.3	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay	0.3						
Intersection Capacity Utilization	57.0%			ICU Level of Service	B		
Analysis Period (min)	15						

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 With Project

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	105	2	2880	105/2,880= 0.04	< ==	
NB Thru	409	2	3200	409/3,200= 0.13		
NB Right	201	1	1600	201/1,600= 0.13		
SB Left	104	1	1600	104/1,600= 0.07		
SB Thru	728	2	3200	728/3,200= 0.23	< ==	
SB Right**	397	1	1840	397/1,840= 0.22		
EB Left	114	1	1600	114/1,600= 0.07	< ==	
EB Thru	1448	3	4800	1,448/4,800= 0.30		
EB Right	166	1	1600	166/1,600= 0.10		
WB Left	165	1	1600	165/1,600= 0.10		
WB Thru	1286	2	3200	1,286/3,200= 0.40	< ==	
WB Right	83	1	1600	83/1,600= 0.05		
Sum of Critical V/C Ratios						0.741
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.841</b>
Level of Service (LOS) - Refer to table below						<b>D</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: 2023 With Project

Analyst: AGA

Peak Hr: AM

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	8	1	1600	8/1,600= 0.01		
NB Thru	5	1	1600	5/1,600= ----		
NB Right	48	1	1600	48/1,600= 0.03	< ==	
SB Left	3	1	1600	3/1,600= 0.00		
SB Thru		1	1600	0/1,600= ----		
SB Right				----		
EB Left		1	1600	0/1,600= ----		
EB Thru	1709	3	4800	1,735/4,800= 0.36		
EB Right	26			----		
WB Left	116	1	1600	116/1,600= 0.07		
WB Thru	1624	2	3200	1,624/3,200= 0.51	< ==	
WB Right		1	1600	0/1,600= ----		
Sum of Critical V/C Ratios						0.540
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.640</b>
Level of Service (LOS) - Refer to table below						<b>B</b>




















**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 with Project  
Timing Plan: AM Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	 	  	  		 	 		
Traffic Volume (veh/h)	894	827	1573	151	618	132		
Future Volume (veh/h)	894	827	1573	151	618	132		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	894	827	1573	151	741	0		
Adj No. of Lanes	2	3	3	1	2	1		
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	1045	3588	1902	592	808	368		
Arrive On Green	0.30	0.71	0.37	0.37	0.23	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	894	827	1573	151	741	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	22.0	5.1	25.2	5.9	18.3	0.0		
Cycle Q Clear(g_c), s	22.0	5.1	25.2	5.9	18.3	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1045	3588	1902	592	808	368		
V/C Ratio(X)	0.86	0.23	0.83	0.25	0.92	0.00		
Avail Cap(c_a), veh/h	1128	3588	1902	592	808	368		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	29.5	4.7	25.5	19.5	33.9	0.0		
Incr Delay (d2), s/veh	6.3	0.2	4.3	1.0	15.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.3	2.4	12.6	2.8	10.7	0.0		
LnGrp Delay(d),s/veh	35.7	4.8	29.8	20.5	49.1	0.0		
LnGrp LOS	D	A	C	C	D			
Approach Vol, veh/h		1721	1724		741			
Approach Delay, s/veh		20.9	29.0		49.1			
Approach LOS		C	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		67.0		23.0	29.8	37.2		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		61.5		18.5	27.5	29.5		
Max Q Clear Time (g_c+I1), s		7.1		20.3	24.0	27.2		
Green Ext Time (p_c), s		7.2		0.0	1.3	1.9		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			29.2					
HCM 2010 LOS			C					
<b>Notes</b>								

HCM Unsignalized Intersection Capacity Analysis  
 7: 190th St & W project dwy

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR				
Lane Configurations										
Traffic Volume (veh/h)	62	1383	1706	24	57	34				
Future Volume (Veh/h)	62	1383	1706	24	57	34				
Sign Control		Free	Free		Stop					
Grade		0%	0%		0%					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				
Hourly flow rate (vph)	62	1383	1706	24	57	34				
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type		None	TWLTL							
Median storage (veh)			2							
Upstream signal (ft)		262	415							
pX, platoon unblocked	0.86				0.88	0.86				
vC, conflicting volume	1730				2303	438				
vC1, stage 1 conf vol					1718					
vC2, stage 2 conf vol					585					
vCu, unblocked vol	1016				1398	0				
tC, single (s)	4.1				6.8	6.9				
tC, 2 stage (s)					5.8					
tF (s)	2.2				3.5	3.3				
p0 queue free %	89				77	96				
cM capacity (veh/h)	581				249	929				
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2
Volume Total	62	461	461	461	487	487	487	268	57	34
Volume Left	62	0	0	0	0	0	0	0	57	0
Volume Right	0	0	0	0	0	0	0	24	0	34
cSH	581	1700	1700	1700	1700	1700	1700	1700	249	929
Volume to Capacity	0.11	0.27	0.27	0.27	0.29	0.29	0.29	0.16	0.23	0.04
Queue Length 95th (ft)	9	0	0	0	0	0	0	0	21	3
Control Delay (s)	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.7	9.0
Lane LOS	B								C	A
Approach Delay (s)	0.5				0.0				18.2	
Approach LOS									C	
Intersection Summary										
Average Delay			0.7							
Intersection Capacity Utilization			41.9%	ICU Level of Service					A	
Analysis Period (min)			15							



HCM Unsignalized Intersection Capacity Analysis  
 8: 190th St & E project dwy




































Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations		↑↑↑	↑↑↑			↗			
Traffic Volume (veh/h)	0	1457	1712	97	0	23			
Future Volume (Veh/h)	0	1457	1712	97	0	23			
Sign Control		Free	Free		Stop				
Grade		0%	0%		0%				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly flow rate (vph)	0	1457	1712	97	0	23			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type		TWLTL	TWLTL						
Median storage (veh)		2	2						
Upstream signal (ft)		463	214						
pX, platoon unblocked	0.81				0.83	0.81			
vC, conflicting volume	1809				2246	476			
vC1, stage 1 conf vol					1760				
vC2, stage 2 conf vol					486				
vCu, unblocked vol	849				1168	0			
tC, single (s)	4.1				6.8	6.9			
tC, 2 stage (s)					5.8				
tF (s)	2.2				3.5	3.3			
p0 queue free %	100				100	97			
cM capacity (veh/h)	638				310	882			
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1	
Volume Total	486	486	486	489	489	489	342	23	
Volume Left	0	0	0	0	0	0	0	0	
Volume Right	0	0	0	0	0	0	97	23	
cSH	1700	1700	1700	1700	1700	1700	1700	882	
Volume to Capacity	0.29	0.29	0.29	0.29	0.29	0.29	0.20	0.03	
Queue Length 95th (ft)	0	0	0	0	0	0	0	2	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	
Lane LOS								A	
Approach Delay (s)	0.0			0.0				9.2	
Approach LOS								A	
Intersection Summary									
Average Delay			0.1						
Intersection Capacity Utilization			36.4%	ICU Level of Service					A
Analysis Period (min)			15						

HCM 2010 Signalized Intersection Summary  
9: Western Ave & 190th St





















Opening Year 2023 with Project  
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	 	  		 	  		 	  			  	  
Traffic Volume (veh/h)	195	741	512	320	1078	136	222	1090	104	34	231	1539
Future Volume (veh/h)	195	741	512	320	1078	136	222	1090	104	34	231	1539
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	195	741	512	320	1078	136	222	1090	104		231	1539
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	304	1589	650	416	1578	199	338	1870	773		341	1874
Arrive On Green	0.09	0.31	0.31	0.12	0.34	0.34	0.03	0.12	0.12		0.13	0.49
Sat Flow, veh/h	3442	5085	1583	3442	4575	576	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	195	741	512	320	799	415	222	1090	104		231	1539
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1761	1721	1695	1583		1721	1695
Q Serve(g_s), s	6.6	14.1	33.8	10.8	24.2	24.3	7.7	24.3	5.7		7.7	31.0
Cycle Q Clear(g_c), s	6.6	14.1	33.8	10.8	24.2	24.3	7.7	24.3	5.7		7.7	31.0
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	304	1589	650	416	1169	607	338	1870	773		341	1874
V/C Ratio(X)	0.64	0.47	0.79	0.77	0.68	0.68	0.66	0.58	0.13		0.68	0.82
Avail Cap(c_a), veh/h	330	1589	650	416	1169	607	387	1870	773		416	1874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33		1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	0.93	0.93	0.93		1.00	1.00
Uniform Delay (d), s/veh	52.8	33.2	30.8	51.1	33.7	33.7	56.1	44.0	23.9		50.3	27.2
Incr Delay (d2), s/veh	3.7	0.2	6.4	7.9	1.5	2.9	3.1	1.2	0.3		3.3	4.2
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
%ile BackOfQ(50%),veh/ln	3.3	6.6	15.9	5.6	11.6	12.3	3.8	11.7	2.6		3.8	15.2
LnGrp Delay(d),s/veh	56.5	33.4	37.2	59.0	35.2	36.6	59.1	45.3	24.2		53.6	31.4
LnGrp LOS	E	C	D	E	D	D	E	D	C		D	C
Approach Vol, veh/h		1448			1534			1416				2260
Approach Delay, s/veh		37.9			40.6			45.9				32.4
Approach LOS		D			D			D				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	14.4	47.6	17.0	41.0	14.3	47.7	13.1	44.9				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	12.5	39.5	12.5	35.5	11.5	40.5	9.5	38.5				
Max Q Clear Time (g_c+I1), s	9.7	26.3	12.8	35.8	9.7	33.0	8.6	26.3				
Green Ext Time (p_c), s	0.2	6.6	0.0	0.0	0.1	6.1	0.1	6.4				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			38.3									
HCM 2010 LOS			D									
<b>Notes</b>												

Movement	SBR
Left Configurations	7
Traffic Volume (veh/h)	490
Future Volume (veh/h)	490
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	490
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	724
Arrive On Green	0.49
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	490
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	27.7
Cycle Q Clear(g_c), s	27.7
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	724
V/C Ratio(X)	0.68
Avail Cap(c_a), veh/h	724
HCM Platoon Ratio	1.33
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	20.4
Incr Delay (d2), s/veh	5.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	12.9
LnGrp Delay(d),s/veh	25.4
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	832	124	102	1639	7	152	11	45	0	0	4
Future Volume (veh/h)	30	832	124	102	1639	7	152	11	45	0	0	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	30	832	124	102	1639	7	160	0	45	0	0	4
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	274	2868	425	167	3989	17	332	0	297	0	0	42
Arrive On Green	0.64	0.64	0.64	0.09	0.76	0.76	0.09	0.00	0.09	0.00	0.00	0.03
Sat Flow, veh/h	303	4473	663	1774	5227	22	3548	0	1583	0	0	1583
Grp Volume(v), veh/h	30	629	327	102	1063	583	160	0	45	0	0	4
Grp Sat Flow(s),veh/h/ln	303	1695	1746	1774	1695	1859	1774	0	1583	0	0	1583
Q Serve(g_s), s	3.6	7.4	7.4	5.0	9.7	9.7	3.9	0.0	2.1	0.0	0.0	0.2
Cycle Q Clear(g_c), s	3.6	7.4	7.4	5.0	9.7	9.7	3.9	0.0	2.1	0.0	0.0	0.2
Prop In Lane	1.00		0.38	1.00		0.01	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	274	2174	1120	167	2587	1419	332	0	297	0	0	42
V/C Ratio(X)	0.11	0.29	0.29	0.61	0.41	0.41	0.48	0.00	0.15	0.00	0.00	0.10
Avail Cap(c_a), veh/h	274	2174	1120	227	2587	1419	1084	0	633	0	0	150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	0.93	0.93	0.93	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	7.1	7.1	39.2	3.7	3.7	38.7	0.0	30.6	0.0	0.0	42.8
Incr Delay (d2), s/veh	0.7	0.3	0.6	3.3	0.5	0.8	1.1	0.0	0.2	0.0	0.0	1.0
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	0.3	3.5	3.7	2.6	4.6	5.2	1.9	0.0	1.0	0.0	0.0	0.1
LnGrp Delay(d),s/veh	7.1	7.4	7.7	42.5	4.1	4.5	39.8	0.0	30.8	0.0	0.0	43.7
LnGrp LOS	A	A	A	D	A	A	D		C			D
Approach Vol, veh/h		986			1748			205				4
Approach Delay, s/veh		7.5			6.5			37.8				43.7
Approach LOS		A			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		11.9	11.0	61.2		5.9		72.2				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	9.5	27.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		5.9	7.0	9.4		2.2		11.7				
Green Ext Time (p_c), s		0.6	0.0	6.9		0.0		14.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	872	190	80	1125	56	108	609	94	190	766	764
Future Volume (veh/h)	169	872	190	80	1125	56	108	609	94	190	766	764
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	169	872	190	80	1125	56	108	609	94	190	766	764
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	227	1291	280	130	1259	63	160	1311	202	434	1515	880
Arrive On Green	0.13	0.31	0.31	0.07	0.25	0.25	0.09	0.43	0.43	0.09	0.43	0.43
Sat Flow, veh/h	1774	4186	907	1774	4962	247	1774	3075	474	1774	3539	1583
Grp Volume(v), veh/h	169	705	357	80	768	413	108	350	353	190	766	764
Grp Sat Flow(s),veh/h/ln	1774	1695	1703	1774	1695	1819	1774	1770	1779	1774	1770	1583
Q Serve(g_s), s	11.0	21.8	22.0	5.3	26.2	26.3	7.1	17.0	17.0	6.9	19.0	49.7
Cycle Q Clear(g_c), s	11.0	21.8	22.0	5.3	26.2	26.3	7.1	17.0	17.0	6.9	19.0	49.7
Prop In Lane	1.00		0.53	1.00		0.14	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	227	1046	525	130	860	461	160	754	758	434	1515	880
V/C Ratio(X)	0.74	0.67	0.68	0.62	0.89	0.89	0.67	0.46	0.47	0.44	0.51	0.87
Avail Cap(c_a), veh/h	466	1342	674	200	862	462	170	754	758	470	1515	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	50.4	36.2	36.3	54.0	43.2	43.2	52.9	24.6	24.6	17.2	25.1	22.9
Incr Delay (d2), s/veh	4.8	0.9	1.9	4.7	11.7	19.5	9.4	2.0	2.0	0.7	1.2	11.3
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	5.7	10.3	10.6	2.7	13.7	15.7	3.9	8.7	8.8	3.4	9.5	24.3
LnGrp Delay(d),s/veh	55.2	37.1	38.2	58.6	54.9	62.7	62.2	26.7	26.7	17.9	26.3	34.1
LnGrp LOS	E	D	D	E	D	E	E	C	C	B	C	C
Approach Vol, veh/h		1231			1261			811			1720	
Approach Delay, s/veh		39.9			57.7			31.4			28.8	
Approach LOS		D			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	13.5	54.7	11.3	40.5	13.3	54.9	17.9	33.9				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	11.5	30.5	11.5	45.5	9.5	32.5	29.5	28.5				
Max Q Clear Time (g_c+I1), s	8.9	19.0	7.3	24.0	9.1	51.7	13.0	28.3				
Green Ext Time (p_c), s	0.1	3.4	0.1	7.6	0.0	0.0	0.4	0.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			39.2									
HCM 2010 LOS			D									























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	0	20	5	0	8	35	1498	18	33	2242	93
Future Volume (veh/h)	33	0	20	5	0	8	35	1498	18	33	2242	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	33	0	20	5	0	8	35	1498	18	33	2242	93
Adj No. of Lanes	0	1	1	0	1	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	64	0	481	62	0	481	94	2875	895	91	2869	893
Arrive On Green	0.30	0.00	0.30	0.30	0.00	0.30	0.04	0.38	0.38	0.05	0.56	0.56
Sat Flow, veh/h	12	0	1583	5	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	33	0	20	5	0	8	35	1498	18	33	2242	93
Grp Sat Flow(s),veh/h/ln	12	0	1583	5	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.3	0.0	1.1	0.1	0.0	0.4	2.3	27.4	0.9	2.2	41.2	3.3
Cycle Q Clear(g_c), s	36.5	0.0	1.1	36.5	0.0	0.4	2.3	27.4	0.9	2.2	41.2	3.3
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	64	0	481	62	0	481	94	2875	895	91	2869	893
V/C Ratio(X)	0.52	0.00	0.04	0.08	0.00	0.02	0.37	0.52	0.02	0.36	0.78	0.10
Avail Cap(c_a), veh/h	64	0	482	62	0	482	155	2875	895	155	2869	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.65	0.65	0.65	0.53	0.53	0.53
Uniform Delay (d), s/veh	60.0	0.0	29.4	60.0	0.0	29.2	55.9	24.7	16.5	55.0	20.4	12.1
Incr Delay (d2), s/veh	7.1	0.0	0.0	0.6	0.0	0.0	1.6	0.4	0.0	1.3	1.2	0.1
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	1.2	0.0	0.5	0.2	0.0	0.2	1.2	13.0	0.4	1.1	19.4	1.5
LnGrp Delay(d),s/veh	67.1	0.0	29.5	60.5	0.0	29.2	57.5	25.1	16.5	56.3	21.6	12.2
LnGrp LOS	E		C	E		C	E	C	B	E	C	B
Approach Vol, veh/h		53			13			1551			2368	
Approach Delay, s/veh		52.9			41.3			25.8			21.7	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	71.3		40.0	8.8	71.2		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	61.5		34.5	8.5	61.5		34.5				
Max Q Clear Time (g_c+I1), s	4.2	29.4		38.5	4.3	43.2		38.5				
Green Ext Time (p_c), s	0.0	14.5		0.0	0.0	15.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			23.7									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 with Project  
 Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	20	78	35	150	62	125	1441	10	22	1538	987
Future Volume (veh/h)	321	20	78	35	150	62	125	1441	10	22	1538	987
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	335	0	78	35	150	62	125	1441	10	22	1538	987
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	476	0	212	24	103	43	147	2415	1081	230	2314	1081
Arrive On Green	0.13	0.00	0.13	0.10	0.10	0.10	0.68	0.68	0.68	1.00	1.00	1.00
Sat Flow, veh/h	3548	0	1583	251	1076	445	127	3539	1583	365	3390	1583
Grp Volume(v), veh/h	335	0	78	247	0	0	125	1441	10	22	1538	987
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1772	0	0	127	1770	1583	365	1695	1583
Q Serve(g_s), s	10.8	0.0	5.4	11.5	0.0	0.0	81.9	26.2	0.2	2.5	0.0	0.0
Cycle Q Clear(g_c), s	10.8	0.0	5.4	11.5	0.0	0.0	81.9	26.2	0.2	28.7	0.0	0.0
Prop In Lane	1.00		1.00	0.14		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	476	0	212	170	0	0	147	2415	1081	230	2314	1081
V/C Ratio(X)	0.70	0.00	0.37	1.45	0.00	0.00	0.85	0.60	0.01	0.10	0.66	0.91
Avail Cap(c_a), veh/h	872	0	389	170	0	0	147	2415	1081	230	2314	1081
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	49.7	0.0	47.3	54.3	0.0	0.0	31.5	10.2	6.1	4.6	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	1.1	234.3	0.0	0.0	42.6	1.1	0.0	0.7	1.2	10.8
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	5.4	0.0	2.4	16.7	0.0	0.0	5.9	13.0	0.1	0.3	0.4	3.2
LnGrp Delay(d),s/veh	51.6	0.0	48.4	288.5	0.0	0.0	74.1	11.3	6.1	5.2	1.2	10.8
LnGrp LOS	D		D	F			E	B	A	A	A	B
Approach Vol, veh/h		413			247			1576			2547	
Approach Delay, s/veh		51.0			288.5			16.2			5.0	
Approach LOS		D			F			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		85.4		19.6		85.4		15.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		66.5		27.5		66.5		9.5				
Max Q Clear Time (g_c+I1), s		83.9		12.8		30.7		13.5				
Green Ext Time (p_c), s		0.0		1.3		29.2		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			27.3									
HCM 2010 LOS			C									
<b>Notes</b>												

190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**





























➤ **MD Peak Hour**




















HCM 2010 Signalized Intersection Summary  
 1: Western Ave & 182nd St

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (veh/h)	165	452	103	115	320	81	133	1107	136	69	1081	124
Future Volume (veh/h)	165	452	103	115	320	81	133	1107	136	69	1081	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	165	452	103	115	320	81	133	1107	136	69	1081	124
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	294	883	200	211	1089	487	279	2244	1004	343	2244	1004
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	1.00	1.00	1.00	0.63	0.63	0.63
Sat Flow, veh/h	980	2869	649	850	3539	1583	462	3539	1583	446	3539	1583
Grp Volume(v), veh/h	165	278	277	115	320	81	133	1107	136	69	1081	124
Grp Sat Flow(s),veh/h/ln	980	1770	1748	850	1770	1583	462	1770	1583	446	1770	1583
Q Serve(g_s), s	18.5	15.5	15.7	15.4	8.3	4.5	16.1	0.0	0.0	8.0	19.3	3.7
Cycle Q Clear(g_c), s	26.8	15.5	15.7	31.1	8.3	4.5	35.4	0.0	0.0	8.0	19.3	3.7
Prop In Lane	1.00		0.37	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	544	538	211	1089	487	279	2244	1004	343	2244	1004
V/C Ratio(X)	0.56	0.51	0.52	0.55	0.29	0.17	0.48	0.49	0.14	0.20	0.48	0.12
Avail Cap(c_a), veh/h	340	627	619	250	1253	561	279	2244	1004	343	2244	1004
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
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	41.8	34.1	34.2	47.0	31.6	30.3	4.5	0.0	0.0	9.5	11.6	8.7
Incr Delay (d2), s/veh	1.7	0.7	0.8	2.2	0.1	0.2	5.8	0.8	0.3	1.3	0.7	0.3
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	5.1	7.7	7.7	3.8	4.1	2.0	2.4	0.2	0.1	1.1	9.5	1.7
LnGrp Delay(d),s/veh	43.5	34.9	35.0	49.2	31.8	30.5	10.2	0.8	0.3	10.8	12.3	9.0
LnGrp LOS	D	C	C	D	C	C	B	A	A	B	B	A
Approach Vol, veh/h		720			516			1376			1274	
Approach Delay, s/veh		36.9			35.4			1.6			11.9	
Approach LOS		D			D			A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		79.6		40.4		79.6		40.4				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		68.5		40.5		68.5		40.5				
Max Q Clear Time (g_c+I1), s		37.4		28.8		21.3		33.1				
Green Ext Time (p_c), s		13.2		3.4		13.0		1.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				16.0								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 with Project  
Timing Plan: MD Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	679	220	1155	388	61	1189		
Future Volume (veh/h)	679	220	1155	388	61	1189		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	450	466	1155	388	61	1189		
Adj No. of Lanes	1	1	2	1	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	554	504	1918	1352	374	3243		
Arrive On Green	0.31	0.31	1.00	1.00	0.15	1.00		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	450	466	1155	388	61	1189		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	28.0	33.5	0.0	0.0	1.5	0.0		
Cycle Q Clear(g_c), s	28.0	33.5	0.0	0.0	1.5	0.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	554	504	1918	1352	374	3243		
V/C Ratio(X)	0.81	0.92	0.60	0.29	0.16	0.37		
Avail Cap(c_a), veh/h	554	505	1918	1352	382	3243		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	38.0	39.9	0.0	0.0	7.7	0.0		
Incr Delay (d2), s/veh	8.9	22.8	1.4	0.5	0.2	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	15.1	18.2	0.4	0.2	0.7	0.1		
LnGrp Delay(d),s/veh	47.0	62.7	1.4	0.5	7.9	0.3		
LnGrp LOS	D	E	A	A	A	A		
Approach Vol, veh/h	916		1543			1250		
Approach Delay, s/veh	55.0		1.2			0.7		
Approach LOS	D		A			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.5	68.5				80.0		40.0
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	7.5	62.5				74.5		35.5
Max Q Clear Time (g_c+I1), s	3.5	2.0				2.0		35.5
Green Ext Time (p_c), s	0.0	14.9				12.2		0.0
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			14.3					
HCM 2010 LOS			B					
<b>Notes</b>								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Western Ave & project dwy

Opening Year 2023 with Project  
Timing Plan: MD Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (veh/h)	0	224	0	1558	1795	120	
Future Volume (Veh/h)	0	224	0	1558	1795	120	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	224	0	1558	1795	120	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage veh							
Upstream signal (ft)				377	587		
pX, platoon unblocked	0.92	0.89	0.89				
vC, conflicting volume	2374	658	1915				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1406	196	1604				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	69	100				
cM capacity (veh/h)	120	725	360				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	224	519	519	519	718	718	479
Volume Left	0	0	0	0	0	0	0
Volume Right	224	0	0	0	0	0	120
cSH	725	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.31	0.31	0.31	0.42	0.42	0.28
Queue Length 95th (ft)	33	0	0	0	0	0	0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.2	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay	0.7						
Intersection Capacity Utilization	57.9%			ICU Level of Service	B		
Analysis Period (min)	15						

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 With Project

Analyst: AGA

Peak Hr: MD

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	73	2	2880	73/2,880= 0.03		
NB Thru	382	2	3200	382/3,200= 0.12	< ==	
NB Right	180	1	1600	180/1,600= 0.11		
SB Left	99	1	1600	99/1,600= 0.06	< ==	
SB Thru	413	2	3200	413/3,200= 0.13		
SB Right**	151	1	1840	151/1,840= 0.08		
EB Left	108	1	1600	108/1,600= 0.07		
EB Thru	1223	3	4800	1,223/4,800= 0.26	< ==	
EB Right	114	1	1600	114/1,600= 0.07		
WB Left	101	1	1600	101/1,600= 0.06	< ==	
WB Thru	723	2	3200	723/3,200= 0.23		
WB Right	125	1	1600	125/1,600= 0.08		
Sum of Critical V/C Ratios						0.500
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.600</b>
Level of Service (LOS) - Refer to table below						<b>A</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy Pl

Scenario: 2023 With Project

Analyst: AGA

Peak Hr: MD

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	14	1	1600	14/1,600= 0.01		
NB Thru	6	1	1600	6/1,600= ----		
NB Right	91	1	1600	91/1,600= 0.06	< ==	
SB Left	5	1	1600	5/1,600= 0.00		
SB Thru	4	1	1600	6/1,600= 0.00		
SB Right	2			----		
EB Left	8	1	1600	8/1,600= 0.01		
EB Thru	1500	3	4800	1,515/4,800= 0.32	< ==	
EB Right	15			----		
WB Left	91	1	1600	91/1,600= 0.06	< ==	
WB Thru	972	2	3200	972/3,200= 0.30		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.433
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.533</b>
Level of Service (LOS) - Refer to table below						<b>A</b>













**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

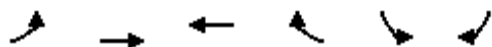
HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 with Project  
Timing Plan: MD Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	798	829	998	233	414	79		
Future Volume (veh/h)	798	829	998	233	414	79		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	798	829	998	233	488	0		
Adj No. of Lanes	2	3	3	1	2	1		
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	1166	3799	1934	602	661	301		
Arrive On Green	0.34	0.75	0.38	0.38	0.19	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	798	829	998	233	488	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	18.0	4.4	13.6	9.6	11.7	0.0		
Cycle Q Clear(g_c), s	18.0	4.4	13.6	9.6	11.7	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	1166	3799	1934	602	661	301		
V/C Ratio(X)	0.68	0.22	0.52	0.39	0.74	0.00		
Avail Cap(c_a), veh/h	1166	3799	1934	602	887	404		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	25.6	3.4	21.5	20.3	34.5	0.0		
Incr Delay (d2), s/veh	3.3	0.1	1.0	1.9	2.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	9.1	2.1	6.6	4.5	5.9	0.0		
LnGrp Delay(d),s/veh	28.9	3.6	22.5	22.1	36.8	0.0		
LnGrp LOS	C	A	C	C	D			
Approach Vol, veh/h		1627	1231		488			
Approach Delay, s/veh		16.0	22.4		36.8			
Approach LOS		B	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		70.7		19.3	33.0	37.7		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		59.5		20.5	28.5	26.5		
Max Q Clear Time (g_c+I1), s		6.4		13.7	20.0	15.6		
Green Ext Time (p_c), s		7.2		1.1	2.2	5.7		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			21.4					
HCM 2010 LOS			C					
<b>Notes</b>								

HCM Unsignalized Intersection Capacity Analysis  
7: 190th St & W project dwy

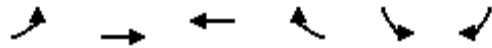
Opening Year 2023 with Project  
Timing Plan: MD Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR				
Lane Configurations										
Traffic Volume (veh/h)	120	1123	1175	48	112	67				
Future Volume (Veh/h)	120	1123	1175	48	112	67				
Sign Control		Free	Free		Stop					
Grade		0%	0%		0%					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				
Hourly flow rate (vph)	120	1123	1175	48	112	67				
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type		None	TWLTL							
Median storage (veh)			2							
Upstream signal (ft)		262	415							
pX, platoon unblocked					0.96					
vC, conflicting volume	1223				1813	318				
vC1, stage 1 conf vol					1199					
vC2, stage 2 conf vol					614					
vCu, unblocked vol	1223				1700	318				
tC, single (s)	4.1				6.8	6.9				
tC, 2 stage (s)					5.8					
tF (s)	2.2				3.5	3.3				
p0 queue free %	79				49	90				
cM capacity (veh/h)	566				219	678				
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2
Volume Total	120	374	374	374	336	336	336	216	112	67
Volume Left	120	0	0	0	0	0	0	0	112	0
Volume Right	0	0	0	0	0	0	0	48	0	67
cSH	566	1700	1700	1700	1700	1700	1700	1700	219	678
Volume to Capacity	0.21	0.22	0.22	0.22	0.20	0.20	0.20	0.13	0.51	0.10
Queue Length 95th (ft)	20	0	0	0	0	0	0	0	66	8
Control Delay (s)	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.5	10.9
Lane LOS	B								E	B
Approach Delay (s)	1.3				0.0				27.5	
Approach LOS									D	
Intersection Summary										
Average Delay			2.5							
Intersection Capacity Utilization			40.7%		ICU Level of Service				A	
Analysis Period (min)			15							

HCM Unsignalized Intersection Capacity Analysis  
 8: 190th St & E project dwy

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑			↗
Traffic Volume (veh/h)	0	1250	1181	188	0	45
Future Volume (Veh/h)	0	1250	1181	188	0	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1250	1181	188	0	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)		463	214			
pX, platoon unblocked					0.97	
vC, conflicting volume	1369				1692	389
vC1, stage 1 conf vol					1275	
vC2, stage 2 conf vol					417	
vCu, unblocked vol	1369				1619	389
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	93
cM capacity (veh/h)	497				216	609























Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1
Volume Total	417	417	417	337	337	337	357	45
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	188	45
cSH	1700	1700	1700	1700	1700	1700	1700	609
Volume to Capacity	0.25	0.25	0.25	0.20	0.20	0.20	0.21	0.07
Queue Length 95th (ft)	0	0	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4
Lane LOS								B
Approach Delay (s)	0.0			0.0				11.4
Approach LOS								B

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization	30.3%		ICU Level of Service A
Analysis Period (min)	15		



HCM 2010 Signalized Intersection Summary  
 9: Western Ave & 190th St





















Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	258	612	364	125	548	247	281	937	174	69	257	1211
Future Volume (veh/h)	258	612	364	125	548	247	281	937	174	69	257	1211
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	258	612	364	125	548	247	281	937	174		257	1211
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	330	1347	571	234	822	360	330	2397	854		330	2397
Arrive On Green	0.10	0.26	0.26	0.07	0.24	0.24	0.19	0.94	0.94		0.19	0.94
Sat Flow, veh/h	3442	5085	1583	3442	3468	1517	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	258	612	364	125	535	260	281	937	174		257	1211
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1595	1721	1695	1583		1721	1695
Q Serve(g_s), s	8.8	12.1	22.9	4.2	17.2	17.8	9.5	2.0	0.8		8.5	3.1
Cycle Q Clear(g_c), s	8.8	12.1	22.9	4.2	17.2	17.8	9.5	2.0	0.8		8.5	3.1
Prop In Lane	1.00		1.00	1.00		0.95	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	330	1347	571	234	804	378	330	2397	854		330	2397
V/C Ratio(X)	0.78	0.45	0.64	0.53	0.67	0.69	0.85	0.39	0.20		0.78	0.51
Avail Cap(c_a), veh/h	330	1759	699	272	1116	525	330	2397	854		330	2397
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	0.94	0.94	0.94		1.00	1.00
Uniform Delay (d), s/veh	53.0	36.9	31.8	54.1	41.5	41.7	47.7	1.9	1.4		47.3	1.9
Incr Delay (d2), s/veh	11.5	0.2	1.4	1.8	0.9	2.1	18.0	0.5	0.5		11.3	0.8
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
%ile BackOfQ(50%),veh/ln	4.7	5.7	10.2	2.1	8.1	8.1	5.3	0.8	0.4		4.5	1.3
LnGrp Delay(d),s/veh	64.6	37.1	33.2	55.9	42.4	43.9	65.6	2.3	1.9		58.6	2.7
LnGrp LOS	E	D	C	E	D	D	E	A	A		E	A
Approach Vol, veh/h		1234			920			1392				1886
Approach Delay, s/veh		41.7			44.7			15.1				10.4
Approach LOS		D			D			B				B
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	14.0	60.1	10.7	35.3	14.0	60.1	14.0	31.9				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	9.5	43.5	7.5	39.5	9.5	43.5	9.5	37.5				
Max Q Clear Time (g_c+I1), s	10.5	4.0	6.2	24.9	11.5	5.2	10.8	19.8				
Green Ext Time (p_c), s	0.0	9.0	0.0	4.9	0.0	14.2	0.0	5.1				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			24.5									
HCM 2010 LOS			C									
<b>Notes</b>												

Movement	SBR
Line Configurations	
Traffic Volume (veh/h)	418
Future Volume (veh/h)	418
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	418
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	898
Arrive On Green	0.94
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	418
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	3.2
Cycle Q Clear(g_c), s	3.2
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	898
V/C Ratio(X)	0.47
Avail Cap(c_a), veh/h	898
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	1.3
Incr Delay (d2), s/veh	1.7
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	1.6
LnGrp Delay(d),s/veh	3.0
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	867	193	81	753	6	297	7	130	8	3	26
Future Volume (veh/h)	19	867	193	81	753	6	297	7	130	8	3	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	19	867	193	81	753	6	302	0	130	8	3	26
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	480	2369	525	142	3521	28	497	0	349	24	9	77
Arrive On Green	0.57	0.57	0.57	0.08	0.68	0.68	0.14	0.00	0.14	0.07	0.07	0.07
Sat Flow, veh/h	703	4167	923	1774	5204	41	3548	0	1583	355	133	1153
Grp Volume(v), veh/h	19	704	356	81	490	269	302	0	130	37	0	0
Grp Sat Flow(s),veh/h/ln	703	1695	1700	1774	1695	1855	1774	0	1583	1641	0	0
Q Serve(g_s), s	1.1	10.2	10.3	4.0	4.9	4.9	7.2	0.0	6.3	1.9	0.0	0.0
Cycle Q Clear(g_c), s	1.1	10.2	10.3	4.0	4.9	4.9	7.2	0.0	6.3	1.9	0.0	0.0
Prop In Lane	1.00		0.54	1.00		0.02	1.00		1.00	0.22		0.70
Lane Grp Cap(c), veh/h	480	1927	966	142	2293	1255	497	0	349	109	0	0
V/C Ratio(X)	0.04	0.37	0.37	0.57	0.21	0.21	0.61	0.00	0.37	0.34	0.00	0.00
Avail Cap(c_a), veh/h	480	1927	966	246	2293	1255	1163	0	646	155	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.6	10.6	10.6	39.9	5.5	5.5	36.4	0.0	29.8	40.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.5	1.0	3.5	0.2	0.4	1.2	0.0	0.7	1.8	0.0	0.0
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	0.2	4.8	5.0	2.1	2.3	2.6	3.6	0.0	2.8	0.9	0.0	0.0
LnGrp Delay(d),s/veh	8.7	11.1	11.6	43.4	5.7	5.9	37.6	0.0	30.5	41.9	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		1079			840			432				37
Approach Delay, s/veh		11.2			9.4			35.4				41.9
Approach LOS		B			A			D				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		16.1	9.7	54.7		9.5		64.4				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		27.5	10.5	24.5		6.5		39.5				
Max Q Clear Time (g_c+I1), s		9.2	6.0	12.3		3.9		6.9				
Green Ext Time (p_c), s		1.4	0.1	5.7		0.0		5.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				15.4								
HCM 2010 LOS				B								
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	346	994	167	83	740	197	77	622	86	162	443	328
Future Volume (veh/h)	346	994	167	83	740	197	77	622	86	162	443	328
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	346	994	167	83	740	197	77	622	86	162	443	328
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	401	1558	261	134	819	216	126	1139	157	369	1351	963
Arrive On Green	0.23	0.35	0.35	0.08	0.20	0.20	0.07	0.36	0.36	0.09	0.38	0.38
Sat Flow, veh/h	1774	4388	736	1774	4010	1056	1774	3125	431	1774	3539	1583
Grp Volume(v), veh/h	346	768	393	83	624	313	77	352	356	162	443	328
Grp Sat Flow(s),veh/h/ln	1774	1695	1733	1774	1695	1676	1774	1770	1787	1774	1770	1583
Q Serve(g_s), s	22.5	22.7	22.7	5.4	21.6	21.9	5.1	18.9	19.0	6.5	10.6	12.3
Cycle Q Clear(g_c), s	22.5	22.7	22.7	5.4	21.6	21.9	5.1	18.9	19.0	6.5	10.6	12.3
Prop In Lane	1.00		0.42	1.00		0.63	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	401	1204	615	134	692	342	126	645	651	369	1351	963
V/C Ratio(X)	0.86	0.64	0.64	0.62	0.90	0.91	0.61	0.55	0.55	0.44	0.33	0.34
Avail Cap(c_a), veh/h	495	1229	628	214	692	342	182	645	651	426	1351	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	44.6	32.3	32.3	53.8	46.6	46.7	54.1	30.3	30.3	21.4	26.2	11.6
Incr Delay (d2), s/veh	12.4	1.1	2.1	4.6	15.1	28.0	4.7	3.3	3.3	0.8	0.6	1.0
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	12.4	10.7	11.2	2.8	11.5	12.8	2.6	9.8	10.0	3.2	5.3	5.6
LnGrp Delay(d),s/veh	57.0	33.3	34.4	58.5	61.7	74.7	58.8	33.6	33.6	22.3	26.9	12.6
LnGrp LOS	E	C	C	E	E	E	E	C	C	C	C	B
Approach Vol, veh/h		1507			1020			785			933	
Approach Delay, s/veh		39.1			65.4			36.0			21.1	
Approach LOS		D			E			D			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	14.1	47.2	12.5	46.1	12.1	49.3	30.6	28.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	12.5	31.5	12.5	41.5	10.3	33.7	31.5	22.5				
Max Q Clear Time (g_c+I1), s	8.5	21.0	7.4	24.7	7.1	14.3	24.5	23.9				
Green Ext Time (p_c), s	0.1	3.3	0.1	7.4	0.0	4.0	0.6	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			40.9									
HCM 2010 LOS			D									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	2	26	10	0	19	24	1417	15	33	1317	57
Future Volume (veh/h)	73	2	26	10	0	19	24	1417	15	33	1317	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	73	2	26	10	0	19	24	1417	15	33	1317	57
Adj No. of Lanes	0	1	1	0	1	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	59	1	475	60	0	475	62	2955	920	70	2979	928
Arrive On Green	0.30	0.30	0.30	0.30	0.00	0.30	0.07	1.00	1.00	0.08	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	0	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	75	0	26	10	0	19	24	1417	15	33	1317	57
Grp Sat Flow(s),veh/h/ln	3	0	1583	0	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	1.0	1.6	0.0	0.0	2.1	0.0	0.0
Cycle Q Clear(g_c), s	36.0	0.0	1.4	36.0	0.0	1.0	1.6	0.0	0.0	2.1	0.0	0.0
Prop In Lane	0.97		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	475	60	0	475	62	2955	920	70	2979	928
V/C Ratio(X)	1.25	0.00	0.05	0.17	0.00	0.04	0.39	0.48	0.02	0.47	0.44	0.06
Avail Cap(c_a), veh/h	60	0	475	60	0	475	126	2955	920	155	2979	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.86	0.86	0.86	0.82	0.82	0.82
Uniform Delay (d), s/veh	59.5	0.0	29.9	60.0	0.0	29.8	54.6	0.0	0.0	54.0	0.0	0.0
Incr Delay (d2), s/veh	197.3	0.0	0.0	1.3	0.0	0.0	3.3	0.5	0.0	3.9	0.4	0.1
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	5.3	0.0	0.6	0.4	0.0	0.5	0.8	0.1	0.0	1.1	0.1	0.0
LnGrp Delay(d),s/veh	256.8	0.0	29.9	61.3	0.0	29.8	57.9	0.5	0.0	57.9	0.4	0.1
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		101			29			1456			1407	
Approach Delay, s/veh		198.4			40.7			1.4			1.7	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	73.2		39.5	6.7	73.8		39.5				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	8.5	62.0		34.0	6.5	64.0		34.0				
Max Q Clear Time (g_c+I1), s	4.1	2.0		38.0	3.6	2.0		38.0				
Green Ext Time (p_c), s	0.0	16.1		0.0	0.0	14.6		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			8.6									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 with Project  
 Timing Plan: MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	39	177	12	42	49	128	1102	17	35	1303	395
Future Volume (veh/h)	316	39	177	12	42	49	128	1102	17	35	1303	395
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	344	0	177	12	42	49	128	1102	17	35	1303	395
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	3	0
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	543	0	242	14	49	58	243	2438	1091	335	2669	807
Arrive On Green	0.15	0.00	0.15	0.07	0.07	0.07	0.69	0.69	0.69	0.92	0.92	0.92
Sat Flow, veh/h	3548	0	1583	199	697	813	288	3539	1583	501	3875	1172
Grp Volume(v), veh/h	344	0	177	103	0	0	128	1102	17	35	1140	558
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1709	0	0	288	1770	1583	501	1695	1656
Q Serve(g_s), s	10.9	0.0	12.8	7.1	0.0	0.0	34.8	16.9	0.4	2.5	6.1	6.2
Cycle Q Clear(g_c), s	10.9	0.0	12.8	7.1	0.0	0.0	41.0	16.9	0.4	19.4	6.1	6.2
Prop In Lane	1.00		1.00	0.12		0.48	1.00		1.00	1.00		0.71
Lane Grp Cap(c), veh/h	543	0	242	121	0	0	243	2438	1091	335	2335	1141
V/C Ratio(X)	0.63	0.00	0.73	0.85	0.00	0.00	0.53	0.45	0.02	0.10	0.49	0.49
Avail Cap(c_a), veh/h	872	0	389	121	0	0	243	2438	1091	335	2335	1141
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	47.7	0.0	48.5	55.1	0.0	0.0	14.2	8.4	5.9	4.9	1.8	1.8
Incr Delay (d2), s/veh	1.2	0.0	4.2	40.5	0.0	0.0	7.9	0.6	0.0	0.6	0.7	1.4
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	5.4	0.0	5.9	4.7	0.0	0.0	3.3	8.3	0.2	0.4	2.8	3.0
LnGrp Delay(d),s/veh	48.9	0.0	52.7	95.6	0.0	0.0	22.1	9.0	5.9	5.5	2.5	3.3
LnGrp LOS	D		D	F			C	A	A	A	A	A
Approach Vol, veh/h		521			103			1247			1733	
Approach Delay, s/veh		50.2			95.6			10.3			2.8	
Approach LOS		D			F			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		86.2		21.8		86.2		12.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		69.5		27.5		69.5		6.5				
Max Q Clear Time (g_c+I1), s		43.0		14.8		21.4		9.1				
Green Ext Time (p_c), s		13.2		1.6		20.6		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			14.9									
HCM 2010 LOS			B									
<b>Notes</b>												
























190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **PM Peak Hour**



HCM 2010 Signalized Intersection Summary  
1: Western Ave & 182nd St
















Opening Year 2023 with Project  
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	991	92	106	733	67	144	1212	280	59	1023	152
Future Volume (veh/h)	147	991	92	106	733	67	144	1212	280	59	1023	152
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	147	991	92	106	733	67	144	1212	280	59	1023	152
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	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	240	1292	120	148	1396	625	240	1868	836	179	1868	836
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	677	3275	304	519	3539	1583	475	3539	1583	351	3539	1583
Grp Volume(v), veh/h	147	535	548	106	733	67	144	1212	280	59	1023	152
Grp Sat Flow(s),veh/h/ln	677	1770	1809	519	1770	1583	475	1770	1583	351	1770	1583
Q Serve(g_s), s	19.1	23.6	23.7	11.8	14.2	2.4	26.0	22.1	9.1	13.1	17.3	4.5
Cycle Q Clear(g_c), s	33.3	23.6	23.7	35.5	14.2	2.4	43.3	22.1	9.1	35.2	17.3	4.5
Prop In Lane	1.00		0.17	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	698	714	148	1396	625	240	1868	836	179	1868	836
V/C Ratio(X)	0.61	0.77	0.77	0.71	0.53	0.11	0.60	0.65	0.34	0.33	0.55	0.18
Avail Cap(c_a), veh/h	240	698	714	148	1396	625	240	1868	836	179	1868	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	33.5	23.7	23.7	41.2	20.8	17.2	28.5	15.3	12.2	27.9	14.1	11.1
Incr Delay (d2), s/veh	4.5	5.1	5.0	15.1	0.4	0.1	10.7	1.8	1.1	4.9	1.2	0.5
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	3.9	12.4	12.7	3.2	7.0	1.1	4.1	11.2	4.2	1.5	8.7	2.1
LnGrp Delay(d),s/veh	38.1	28.8	28.7	56.3	21.2	17.3	39.2	17.0	13.3	32.8	15.3	11.6
LnGrp LOS	D	C	C	E	C	B	D	B	B	C	B	B
Approach Vol, veh/h		1230			906			1636			1234	
Approach Delay, s/veh		29.9			25.0			18.3			15.7	
Approach LOS		C			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.0		39.0		51.0		39.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		45.5		33.5		45.5		33.5				
Max Q Clear Time (g_c+I1), s		45.3		35.3		37.2		37.5				
Green Ext Time (p_c), s		0.2		0.0		5.1		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				21.7								
HCM 2010 LOS				C								



HCM 2010 Signalized Intersection Summary  
2: Western Ave & I-405 NB

Opening Year 2023 with Project  
Timing Plan: PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			  		
Traffic Volume (veh/h)	711	223	1619	676	54	1172		
Future Volume (veh/h)	711	223	1619	676	54	1172		
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	1900	1863	1863	1863	1863		
Adj Flow Rate, veh/h	467	484	1619	676	54	1172		
Adj No. of Lanes	1	1	2	1	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	582	530	1971	1401	180	3164		
Arrive On Green	0.33	0.33	0.74	0.74	0.04	0.62		
Sat Flow, veh/h	1774	1615	3632	1583	1774	5253		
Grp Volume(v), veh/h	467	484	1619	676	54	1172		
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	1774	1695		
Q Serve(g_s), s	28.8	34.5	36.4	8.0	1.4	13.6		
Cycle Q Clear(g_c), s	28.8	34.5	36.4	8.0	1.4	13.6		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	582	530	1971	1401	180	3164		
V/C Ratio(X)	0.80	0.91	0.82	0.48	0.30	0.37		
Avail Cap(c_a), veh/h	599	545	1971	1401	285	3164		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.8	38.7	11.6	0.7	18.3	11.1		
Incr Delay (d2), s/veh	7.6	19.7	4.0	1.2	0.9	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	15.4	18.3	18.5	13.5	0.9	6.4		
LnGrp Delay(d),s/veh	44.4	58.4	15.6	1.9	19.2	11.5		
LnGrp LOS	D	E	B	A	B	B		
Approach Vol, veh/h	951		2295			1226		
Approach Delay, s/veh	51.5		11.6			11.8		
Approach LOS	D		B			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.8	70.3				78.2		41.8
Change Period (Y+Rc), s	4.5	5.5				5.5		4.5
Max Green Setting (Gmax), s	10.5	56.5				71.5		38.5
Max Q Clear Time (g_c+I1), s	3.4	38.4				15.6		36.5
Green Ext Time (p_c), s	0.0	13.9				11.7		0.8
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			20.1					
HCM 2010 LOS			C					
<b>Notes</b>								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Western Ave & project dwy

Opening Year 2023 with Project  
Timing Plan: PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↗		↑↑↑	↑↑↑	↘	
Traffic Volume (veh/h)	0	155	0	2141	1722	87	
Future Volume (Veh/h)	0	155	0	2141	1722	87	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly flow rate (vph)	0	155	0	2141	1722	87	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)				377	587		
pX, platoon unblocked	0.82	0.90	0.90				
vC, conflicting volume	2479	618	1809				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1187	176	1503				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	79	100				
cM capacity (veh/h)	148	751	397				
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	155	714	714	714	689	689	431
Volume Left	0	0	0	0	0	0	0
Volume Right	155	0	0	0	0	0	87
cSH	751	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.21	0.42	0.42	0.42	0.41	0.41	0.25
Queue Length 95th (ft)	19	0	0	0	0	0	0
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.0	0.0					0.0
Approach LOS	B						
<b>Intersection Summary</b>							
Average Delay	0.4						
Intersection Capacity Utilization	51.5%			ICU Level of Service	A		
Analysis Period (min)	15						

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Van Ness Ave

Scenario: 2023 With Project

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	178	2	2880	178/2,880= 0.06		
NB Thru	896	2	3200	896/3,200= 0.28	< ==	
NB Right	237	1	1600	237/1,600= 0.15		
SB Left	101	1	1600	101/1,600= 0.06	< ==	
SB Thru	515	2	3200	515/3,200= 0.16		
SB Right**	190	1	1840	190/1,840= 0.10		
EB Left	255	1	1600	255/1,600= 0.16	< ==	
EB Thru	1615	3	4800	1,615/4,800= 0.34		
EB Right	145	1	1600	145/1,600= 0.09		
WB Left	86	1	1600	86/1,600= 0.05		
WB Thru	1114	2	3200	1,114/3,200= 0.35	< ==	
WB Right	117	1	1600	117/1,600= 0.07		
Sum of Critical V/C Ratios						0.850
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.950</b>
Level of Service (LOS) - Refer to table below						<b>E</b>

**\* NOTES**

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 \*\*Right Turn Overlap, Increased right turn capacity by 15%  
 Existing volumes have the PHF factored in.

LOS	Maximum
	V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

## INTERSECTION CAPACITY UTILIZATION

Intersection: 190th St at Gramercy PI

Scenario: 2023 With Project

Peak Hr: PM

Analyst: AGA

Agency: City of Torrance

Movement	Volume	No. of Lanes	Capacity*	V/C Ratio	Critical V/C	Total
NB Left	29	1	1600	29/1,600= 0.02		
NB Thru	4	1	1600	4/1,600= ----		
NB Right	139	1	1600	139/1,600= 0.09	< ==	
SB Left	10	1	1600	10/1,600= 0.01		
SB Thru	5	1	1600	8/1,600= 0.01		
SB Right	3			----		
EB Left	2	1	1600	2/1,600= 0.00		
EB Thru	1986	3	4800	2,005/4,800= 0.42	< ==	
EB Right	19			----		
WB Left	35	1	1600	35/1,600= 0.02	< ==	
WB Thru	1239	2	3200	1,239/3,200= 0.39		
WB Right	3	1	1600	3/1,600= 0.00		
Sum of Critical V/C Ratios						0.533
Adjustment for Lost Time						0.100
Intersection Capacity Utilization (ICU)						<b>0.633</b>
Level of Service (LOS) - Refer to table below						<b>B</b>













\* NOTES

Per-lane Capacity = 1,600 vehicles/hour  
 dual left turn lane capacity = 2,880 vph  
 Existing volumes have the PHF factored in.

LOS	Maximum V/C
A	0.60
B	0.70
C	0.80
D	0.90
E	1.00
F	n/a

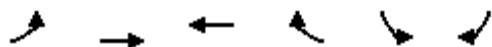
HCM 2010 Signalized Intersection Summary  
6: 190th St & I-405 SB

Opening Year 2023 with Project  
Timing Plan: PM Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	635	1630	1214	124	625	30		
Future Volume (veh/h)	635	1630	1214	124	625	30		
Number	5	2	6	16	7	14		
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	1863	1863	1900		
Adj Flow Rate, veh/h	635	1630	1214	124	653	0		
Adj No. of Lanes	2	3	3	1	2	1		
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	758	3693	2467	768	794	361		
Arrive On Green	0.22	0.73	0.16	0.16	0.22	0.00		
Sat Flow, veh/h	3442	5253	5253	1583	3548	1615		
Grp Volume(v), veh/h	635	1630	1214	124	653	0		
Grp Sat Flow(s),veh/h/ln	1721	1695	1695	1583	1774	1615		
Q Serve(g_s), s	21.2	15.5	26.1	8.1	21.0	0.0		
Cycle Q Clear(g_c), s	21.2	15.5	26.1	8.1	21.0	0.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	758	3693	2467	768	794	361		
V/C Ratio(X)	0.84	0.44	0.49	0.16	0.82	0.00		
Avail Cap(c_a), veh/h	875	3693	2467	768	1020	464		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	44.7	6.6	36.9	29.3	44.3	0.0		
Incr Delay (d2), s/veh	6.4	0.4	0.7	0.5	4.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	10.7	7.2	12.4	3.7	10.7	0.0		
LnGrp Delay(d),s/veh	51.2	7.0	37.6	29.8	48.6	0.0		
LnGrp LOS	D	A	D	C	D			
Approach Vol, veh/h		2265	1338		653			
Approach Delay, s/veh		19.4	36.9		48.6			
Approach LOS		B	D		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		90.6		29.4	28.9	61.7		
Change Period (Y+Rc), s		5.5		4.5	4.5	5.5		
Max Green Setting (Gmax), s		77.5		32.5	28.5	43.5		
Max Q Clear Time (g_c+I1), s		17.5		23.0	23.2	28.1		
Green Ext Time (p_c), s		20.4		1.8	1.3	8.1		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			29.4					
HCM 2010 LOS			C					
<b>Notes</b>								

HCM Unsignalized Intersection Capacity Analysis  
7: 190th St & W project dwy

Opening Year 2023 with Project  
Timing Plan: PM Peak Hour

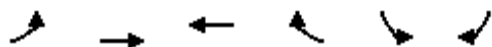


Movement	EBL	EBT	WBT	WBR	SBL	SBR				
Lane Configurations										
Traffic Volume (veh/h)	86	2169	1306	33	77	46				
Future Volume (Veh/h)	86	2169	1306	33	77	46				
Sign Control		Free	Free		Stop					
Grade		0%	0%		0%					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				
Hourly flow rate (vph)	86	2169	1306	33	77	46				
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type		None	TWLTL							
Median storage (veh)			2							
Upstream signal (ft)		262	415							
pX, platoon unblocked					0.86					
vC, conflicting volume	1339				2218	343				
vC1, stage 1 conf vol					1322					
vC2, stage 2 conf vol					895					
vCu, unblocked vol	1339				1849	343				
tC, single (s)	4.1				6.8	6.9				
tC, 2 stage (s)					5.8					
tF (s)	2.2				3.5	3.3				
p0 queue free %	83				60	93				
cM capacity (veh/h)	511				194	653				
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2
Volume Total	86	723	723	723	373	373	373	220	77	46
Volume Left	86	0	0	0	0	0	0	0	77	0
Volume Right	0	0	0	0	0	0	0	33	0	46
cSH	511	1700	1700	1700	1700	1700	1700	1700	194	653
Volume to Capacity	0.17	0.43	0.43	0.43	0.22	0.22	0.22	0.13	0.40	0.07
Queue Length 95th (ft)	15	0	0	0	0	0	0	0	44	6
Control Delay (s)	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.2	10.9
Lane LOS	B								E	B
Approach Delay (s)	0.5				0.0				26.1	
Approach LOS									D	
Intersection Summary										
Average Delay			1.2							
Intersection Capacity Utilization			52.8%		ICU Level of Service				A	
Analysis Period (min)			15							

# HCM Unsignalized Intersection Capacity Analysis

## 8: 190th St & E project dwy























Opening Year 2023 with Project  
Timing Plan: PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		↑↑↑	↑↑↑					↑
Traffic Volume (veh/h)	0	2272	1299	138	0	31		
Future Volume (Veh/h)	0	2272	1299	138	0	31		
Sign Control		Free	Free		Stop			
Grade		0%	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly flow rate (vph)	0	2272	1299	138	0	31		
<b>Pedestrians</b>								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type		TWLTL	TWLTL					
Median storage (veh)		2	2					
Upstream signal (ft)		463	214					
pX, platoon unblocked					0.86			
vC, conflicting volume	1437				2125	394		
vC1, stage 1 conf vol					1368			
vC2, stage 2 conf vol					757			
vCu, unblocked vol	1437				1746	394		
tC, single (s)	4.1				6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)	2.2				3.5	3.3		
p0 queue free %	100				100	95		
cM capacity (veh/h)	468				192	605		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1
Volume Total	757	757	757	371	371	371	324	31
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	138	31
cSH	1700	1700	1700	1700	1700	1700	1700	605
Volume to Capacity	0.45	0.45	0.45	0.22	0.22	0.22	0.19	0.05
Queue Length 95th (ft)	0	0	0	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3
Lane LOS								B
Approach Delay (s)	0.0			0.0				11.3
Approach LOS								B
<b>Intersection Summary</b>								
Average Delay			0.1					
Intersection Capacity Utilization			47.2%	ICU Level of Service	A			
Analysis Period (min)			15					

HCM 2010 Signalized Intersection Summary  
9: Western Ave & 190th St

Opening Year 2023 with Project  
Timing Plan: PM Peak Hour





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	458	1241	499	226	774	312	233	1322	199	49	186	1280
Future Volume (veh/h)	458	1241	499	226	774	312	233	1322	199	49	186	1280
Number	7	4	14	3	8	18	5	2	12		1	6
Initial Q (Qb), veh	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	
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	458	1241	499	226	774	312	233	1322	199		186	1280
Adj No. of Lanes	2	3	1	2	3	0	2	3	1		2	3
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2		2	2
Cap, veh/h	502	1744	668	339	1056	422	272	1897	746		295	1930
Arrive On Green	0.05	0.11	0.11	0.10	0.30	0.30	0.16	0.75	0.75		0.17	0.76
Sat Flow, veh/h	3442	5085	1583	3442	3573	1428	3442	5085	1583		3442	5085
Grp Volume(v), veh/h	458	1241	499	226	734	352	233	1322	199		186	1280
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1611	1721	1695	1583		1721	1695
Q Serve(g_s), s	15.9	28.2	32.9	7.6	23.4	23.6	7.9	16.5	4.3		6.0	14.7
Cycle Q Clear(g_c), s	15.9	28.2	32.9	7.6	23.4	23.6	7.9	16.5	4.3		6.0	14.7
Prop In Lane	1.00		1.00	1.00		0.89	1.00		1.00		1.00	
Lane Grp Cap(c), veh/h	502	1744	668	339	1002	476	272	1897	746		295	1930
V/C Ratio(X)	0.91	0.71	0.75	0.67	0.73	0.74	0.86	0.70	0.27		0.63	0.66
Avail Cap(c_a), veh/h	502	1801	686	416	1116	530	272	1897	746		445	1930
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	2.00	2.00	2.00		2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	0.91	0.91	0.91		1.00	1.00
Uniform Delay (d), s/veh	56.4	47.5	39.9	52.2	38.0	38.1	49.8	11.6	7.3		48.0	10.7
Incr Delay (d2), s/veh	21.0	1.3	4.4	2.8	2.1	4.6	20.8	2.0	0.8		2.2	1.8
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
%ile BackOfQ(50%),veh/ln	9.1	13.5	15.2	3.7	11.2	11.1	4.5	7.7	1.9		2.9	7.0
LnGrp Delay(d),s/veh	77.4	48.8	44.3	55.0	40.1	42.7	70.6	13.6	8.0		50.2	12.6
LnGrp LOS	E	D	D	E	D	D	E	B	A		D	B
Approach Vol, veh/h		2198			1312			1754				1837
Approach Delay, s/veh		53.7			43.4			20.5				15.4
Approach LOS		D			D			C				B
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	12.8	48.3	14.3	44.7	12.0	49.0	20.0	39.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	33.5	12.5	40.5	7.5	39.5	15.5	37.5				
Max Q Clear Time (g_c+I1), s	8.0	18.5	9.6	34.9	9.9	16.7	17.9	25.6				
Green Ext Time (p_c), s	0.3	8.8	0.2	4.2	0.0	11.8	0.0	5.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			33.7									
HCM 2010 LOS			C									
<b>Notes</b>												



Movement	SBR
Line Configurations	
Traffic Volume (veh/h)	371
Future Volume (veh/h)	371
Number	16
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1863
Adj Flow Rate, veh/h	371
Adj No. of Lanes	1
Peak Hour Factor	1.00
Percent Heavy Veh, %	2
Cap, veh/h	832
Arrive On Green	0.76
Sat Flow, veh/h	1583
Grp Volume(v), veh/h	371
Grp Sat Flow(s),veh/h/ln	1583
Q Serve(g_s), s	9.8
Cycle Q Clear(g_c), s	9.8
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	832
V/C Ratio(X)	0.45
Avail Cap(c_a), veh/h	832
HCM Platoon Ratio	2.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	6.2
Incr Delay (d2), s/veh	1.7
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	4.3
LnGrp Delay(d),s/veh	7.9
LnGrp LOS	A
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	






















HCM 2010 Signalized Intersection Summary  
 10: Harborage Wy & 190th St

Opening Year 2023 with Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1483	215	50	1095	3	224	2	106	24	10	34
Future Volume (veh/h)	3	1483	215	50	1095	3	224	2	106	24	10	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	1483	215	50	1095	3	225	0	106	24	10	34
Adj No. of Lanes	1	3	0	1	3	0	2	0	1	0	1	0
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	392	2735	396	102	3639	10	411	0	275	43	18	61
Arrive On Green	0.61	0.61	0.61	0.06	0.69	0.69	0.12	0.00	0.12	0.07	0.07	0.07
Sat Flow, veh/h	511	4488	650	1774	5236	14	3548	0	1583	594	248	842
Grp Volume(v), veh/h	3	1120	578	50	709	389	225	0	106	68	0	0
Grp Sat Flow(s),veh/h/ln	511	1695	1748	1774	1695	1860	1774	0	1583	1684	0	0
Q Serve(g_s), s	0.2	17.3	17.4	2.5	7.3	7.3	5.4	0.0	5.3	3.5	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.3	17.4	2.5	7.3	7.3	5.4	0.0	5.3	3.5	0.0	0.0
Prop In Lane	1.00		0.37	1.00		0.01	1.00		1.00	0.35		0.50
Lane Grp Cap(c), veh/h	392	2066	1065	102	2356	1293	411	0	275	122	0	0
V/C Ratio(X)	0.01	0.54	0.54	0.49	0.30	0.30	0.55	0.00	0.39	0.56	0.00	0.00
Avail Cap(c_a), veh/h	392	2066	1065	207	2356	1293	1084	0	575	159	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.71	0.71	0.71	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.9	10.2	10.3	41.1	5.3	5.3	37.6	0.0	32.9	40.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	1.4	3.6	0.3	0.6	1.1	0.0	0.9	3.9	0.0	0.0
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	0.0	8.3	8.8	1.3	3.5	3.9	2.7	0.0	2.4	1.8	0.0	0.0
LnGrp Delay(d),s/veh	6.9	11.0	11.7	44.7	5.6	5.9	38.7	0.0	33.8	44.3	0.0	0.0
LnGrp LOS	A	B	B	D	A	A	D		C	D		
Approach Vol, veh/h		1701			1148			331			68	
Approach Delay, s/veh		11.2			7.4			37.1			44.3	
Approach LOS		B			A			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		13.9	7.7	58.4		10.0		66.0				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5		5.5				
Max Green Setting (Gmax), s		25.5	8.5	28.5		6.5		41.5				
Max Q Clear Time (g_c+I1), s		7.4	4.5	19.4		5.5		9.3				
Green Ext Time (p_c), s		1.0	0.0	6.8		0.0		8.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			13.2									
HCM 2010 LOS			B									
<b>Notes</b>												























HCM 2010 Signalized Intersection Summary  
 11: Normandie Ave & 190th St

Opening Year 2023 with Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	359	1463	180	131	943	354	107	879	101	95	661	324
Future Volume (veh/h)	359	1463	180	131	943	354	107	879	101	95	661	324
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	359	1463	180	131	943	354	107	879	101	95	661	324
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	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	447	1921	236	170	957	359	126	966	111	200	1055	871
Arrive On Green	0.25	0.42	0.42	0.10	0.26	0.26	0.07	0.30	0.30	0.07	0.30	0.30
Sat Flow, veh/h	1774	4589	564	1774	3645	1366	1774	3200	368	1774	3539	1583
Grp Volume(v), veh/h	359	1081	562	131	877	420	107	486	494	95	661	324
Grp Sat Flow(s),veh/h/ln	1774	1695	1763	1774	1695	1622	1774	1770	1798	1774	1770	1583
Q Serve(g_s), s	22.8	32.6	32.7	8.7	30.9	30.9	7.2	31.7	31.7	4.3	19.3	2.6
Cycle Q Clear(g_c), s	22.8	32.6	32.7	8.7	30.9	30.9	7.2	31.7	31.7	4.3	19.3	2.6
Prop In Lane	1.00		0.32	1.00		0.84	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	447	1419	738	170	890	426	126	534	543	200	1055	871
V/C Ratio(X)	0.80	0.76	0.76	0.77	0.99	0.99	0.85	0.91	0.91	0.47	0.63	0.37
Avail Cap(c_a), veh/h	447	1419	738	170	890	426	126	538	547	207	1077	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	42.1	29.8	29.8	53.0	44.0	44.0	55.1	40.3	40.3	30.4	36.4	6.2
Incr Delay (d2), s/veh	10.2	3.9	7.3	19.2	26.8	40.5	39.6	19.5	19.3	1.7	1.1	0.3
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	12.4	15.9	17.4	5.2	17.8	18.7	4.9	18.4	18.7	2.2	9.6	3.8
LnGrp Delay(d),s/veh	52.3	33.7	37.1	72.2	70.9	84.5	94.7	59.9	59.6	32.1	37.5	6.5
LnGrp LOS	D	C	D	E	E	F	F	E	E	C	D	A
Approach Vol, veh/h		2002			1428			1087			1080	
Approach Delay, s/veh		38.0			75.0			63.2			27.7	
Approach LOS		D			E			E			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	11.5	39.7	15.0	53.7	12.0	39.3	33.7	35.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	6.5	34.5	9.5	47.5	6.5	34.5	27.5	29.5				
Max Q Clear Time (g_c+I1), s	6.3	33.7	10.7	34.7	9.2	21.3	24.8	32.9				
Green Ext Time (p_c), s	0.0	0.5	0.0	8.7	0.0	4.8	0.3	0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				50.3								
HCM 2010 LOS				D								























HCM 2010 Signalized Intersection Summary  
 12: Western Ave & 195th St

Opening Year 2023 with Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	2	31	27	2	41	13	1720	7	28	1973	31
Future Volume (veh/h)	77	2	31	27	2	41	13	1720	7	28	1973	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	77	2	31	27	2	41	13	1720	7	28	1973	31
Adj No. of Lanes	0	1	1	0	1	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	59	1	482	58	2	482	50	2948	918	65	2992	931
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.06	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	0	3	1583	0	8	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	79	0	31	29	0	41	13	1720	7	28	1973	31
Grp Sat Flow(s),veh/h/ln	3	0	1583	8	0	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	1.7	0.0	0.0	2.2	0.8	0.0	0.0	1.8	0.0	0.0
Cycle Q Clear(g_c), s	36.5	0.0	1.7	36.5	0.0	2.2	0.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.97		1.00	0.93		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	482	60	0	482	50	2948	918	65	2992	931
V/C Ratio(X)	1.32	0.00	0.06	0.48	0.00	0.09	0.26	0.58	0.01	0.43	0.66	0.03
Avail Cap(c_a), veh/h	60	0	482	60	0	482	140	2948	918	140	2992	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.67	0.67	0.67	0.68	0.68	0.68
Uniform Delay (d), s/veh	59.5	0.0	29.6	57.1	0.0	29.8	55.4	0.0	0.0	54.4	0.0	0.0
Incr Delay (d2), s/veh	222.0	0.0	0.1	5.8	0.0	0.1	1.8	0.6	0.0	3.0	0.8	0.0
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	5.7	0.0	0.7	1.1	0.0	1.0	0.4	0.2	0.0	0.9	0.2	0.0
LnGrp Delay(d),s/veh	281.5	0.0	29.7	63.0	0.0	29.9	57.2	0.6	0.0	57.4	0.8	0.0
LnGrp LOS	F		C	E		C	E	A	A	E	A	A
Approach Vol, veh/h		110			70			1740			2032	
Approach Delay, s/veh		210.5			43.6			1.0			1.6	
Approach LOS		F			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	73.1		40.0	5.9	74.1		40.0				
Change Period (Y+Rc), s	4.5	5.5		5.5	4.5	5.5		5.5				
Max Green Setting (Gmax), s	7.5	62.5		34.5	7.5	62.5		34.5				
Max Q Clear Time (g_c+I1), s	3.8	2.0		38.5	2.8	2.0		38.5				
Green Ext Time (p_c), s	0.0	22.6		0.0	0.0	29.1		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			7.9									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary  
 13: Western Ave & Del Amo Blvd

Opening Year 2023 with Project  
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	663	155	304	14	46	40	102	1226	17	46	1735	541
Future Volume (veh/h)	663	155	304	14	46	40	102	1226	17	46	1735	541
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	409	511	304	14	46	40	102	1226	17	46	1735	541
Adj No. of Lanes	1	1	1	0	1	0	1	2	1	1	3	0
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	451	473	402	19	63	55	88	2050	917	219	2244	678
Arrive On Green	0.25	0.25	0.25	0.08	0.08	0.08	0.58	0.58	0.58	0.39	0.39	0.39
Sat Flow, veh/h	1774	1863	1583	242	795	691	163	3539	1583	446	3875	1171
Grp Volume(v), veh/h	409	511	304	100	0	0	102	1226	17	46	1511	765
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1729	0	0	163	1770	1583	446	1695	1656
Q Serve(g_s), s	26.8	30.5	21.3	6.8	0.0	0.0	20.4	26.8	0.5	10.1	46.7	49.1
Cycle Q Clear(g_c), s	26.8	30.5	21.3	6.8	0.0	0.0	69.5	26.8	0.5	36.9	46.7	49.1
Prop In Lane	1.00		1.00	0.14		0.40	1.00		1.00	1.00		0.71
Lane Grp Cap(c), veh/h	451	473	402	137	0	0	88	2050	917	219	1963	959
V/C Ratio(X)	0.91	1.08	0.76	0.73	0.00	0.00	1.16	0.60	0.02	0.21	0.77	0.80
Avail Cap(c_a), veh/h	451	473	402	137	0	0	88	2050	917	219	1963	959
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	43.4	44.8	41.3	54.0	0.0	0.0	56.8	16.3	10.7	37.7	29.7	30.5
Incr Delay (d2), s/veh	21.9	64.4	7.9	18.0	0.0	0.0	146.3	1.3	0.0	1.9	2.6	6.1
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	15.9	24.1	10.2	3.9	0.0	0.0	6.5	13.3	0.3	1.4	22.5	24.1
LnGrp Delay(d),s/veh	65.2	109.1	49.3	72.0	0.0	0.0	203.1	17.6	10.8	39.6	32.4	36.6
LnGrp LOS	E	F	D	E			F	B	B	D	C	D
Approach Vol, veh/h		1224			100			1345			2322	
Approach Delay, s/veh		79.6			72.0			31.5			33.9	
Approach LOS		E			E			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.0		34.0		73.0		13.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		67.5		28.5		67.5		7.5				
Max Q Clear Time (g_c+I1), s		71.5		32.5		51.1		8.8				
Green Ext Time (p_c), s		0.0		0.0		13.9		0.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.2									
HCM 2010 LOS			D									
<b>Notes</b>												

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **California Manual on Uniform Traffic Control Devices – Traffic Signal Warrant Guidelines**
- **190<sup>th</sup> Street/West Project Driveway Traffic Signal Level-of-Service Analysis Worksheets**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **California Manual on Uniform Traffic Control  
Devices – Traffic Signal Warrant Guidelines**



## CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

### Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

#### Standard:

**01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.**

**01a On State highways, the engineering study shall include consideration of a roundabout (yield control). If a roundabout is determined to provide a viable and practical solution, it shall be studied in lieu of, or in addition to a traffic control signal.**

#### *Guidance:*

*01b On local streets and highways, the engineering study should include consideration of a roundabout (yield control). If a roundabout is determined to provide a viable and practical solution, it should be studied in lieu of, or in addition to a traffic control signal.*

#### *Support:*

*01c Refer to Caltrans' website (<http://www.dot.ca.gov/hq/traffops/liaisons/ice.html>) for more information on the Traffic Operations Policy Directive 13-02, Intersection Control Evaluation (ICE), and other resources for the evaluation of intersection traffic control strategies.*

**02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:**

**Warrant 1, Eight-Hour Vehicular Volume**

**Warrant 2, Four-Hour Vehicular Volume**

**Warrant 3, Peak Hour**

**Warrant 4, Pedestrian Volume**

**Warrant 5, School Crossing**

**Warrant 6, Coordinated Signal System**

**Warrant 7, Crash Experience**

**Warrant 8, Roadway Network**

**Warrant 9, Intersection Near a Grade Crossing**

**03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.**

#### *Support:*

*04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/ or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.*

#### *Guidance:*

*05 A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*

*06 A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*

*07 A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*

*08 The study should consider the effects of the right-turn vehicles from the minor-street approaches.*

*Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*

*09 Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The*



*approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*

*10 Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*

*11 At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*

*12 For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

*13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume. ~~volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major street" volume.~~*

*14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.*

*15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.*

Support:

*16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.*

Option:

*17 Engineering study data may include the following:*

- A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
- B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
- C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
- D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
- E. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the uncontrolled approaches to the location.
- F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions,

pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.

G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

<sup>18</sup> The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:

A. Vehicle-hours of stopped time delay determined separately for each approach.

B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.

C. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.

D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.

E. Queue length on stop-controlled approaches.

**Standard:**

<sup>19</sup> **Delay, congestion, approach conditions, driver confusion, future land use or other evidence of the need for right of way assignment beyond that which could be provided by stop sign shall be demonstrated.**

Support:

<sup>20</sup> Figure 4C-101(CA) and 4C-103(CA) are examples of warrant sheets.

Guidance:

<sup>21</sup> *Figure 4C-103(CA) should be used only for new intersections or other locations where it is not reasonable to count actual traffic volumes.*

**Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume**

Support:

<sup>01</sup> The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

<sup>02</sup> The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

<sup>03</sup> It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

**Standard:**

<sup>04</sup> **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

**A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or**

**B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.**

**In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.**

Option:

<sup>05</sup> If the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

<sup>06</sup> *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

**Standard:**

**07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and**
- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.**

**These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.**

**Option:**

**08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.**

**Section 4C.03 Warrant 2, Four-Hour Vehicular Volume**

**Support:**

**01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.**

**Standard:**

**02 The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

**Option:**

**03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.**

**Section 4C.04 Warrant 3, Peak Hour**

**Support:**

**01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.**

**Standard:**

**02 This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**

**03 The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:**

- 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and**
- 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and**

**3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.**

**B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.**

Option:

<sup>04</sup> If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

<sup>05</sup> If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

*Guidance:*

<sup>06</sup> *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

### **Section 4C.05 Warrant 4, Pedestrian Volume**

Support:

<sup>01</sup> The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

**Standard:**

<sup>02</sup> **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**

**A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or**

**B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.**

Option:

<sup>03</sup> If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

**Standard:**

<sup>04</sup> **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

<sup>05</sup> **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

*Guidance:*

<sup>06</sup> *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

*A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*

*B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site*

*accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*

*C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

Option:

07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

#### **Section 4C.06 Warrant 5, School Crossing**

Support:

01 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students.

**Standard:**

02 **The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.**

03 **Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.**

04 **The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

Guidance:

05 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

*A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*

*B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*

*C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

#### **Section 4C.07 Warrant 6, Coordinated Signal System**

Support:

01 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

**Standard:**

02 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:**

**A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.**

**B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.**

*Guidance:*

*03 The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.*

### **Section 4C.08 Warrant 7, Crash Experience**

**Support:**

01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

**Standard:**

02 **The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:**

- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and**
- B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and**
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.**

**Option:**

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

### **Section 4C.09 Warrant 8, Roadway Network**

**Support:**

01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

**Standard:**

02 **The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:**

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or**
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).**

03 **A major route as used in this signal warrant shall have at least one of the following characteristics:**

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.**
- B. It includes rural or suburban highways outside, entering, or traversing a city.**
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.**

### **Section 4C.10 Warrant 9, Intersection Near a Grade Crossing**

**Support:**

01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a

grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

*Guidance:*

<sup>02</sup> *This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing.*

*Among the alternatives that should be considered or tried are:*

- A. Providing additional pavement that would enable vehicles to clear the track or that would provide space for an evasive maneuver, or*
- B. Reassigning the stop controls at the intersection to make the approach across the track a non-stopping approach.*

**Standard:**

<sup>03</sup> **The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:**

- A. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and**
- B. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13.**

*Guidance:*

<sup>04</sup> *The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:*

- A. Figure 4C-9 should be used if there is only one lane approaching the intersection at the track crossing location and Figure 4C-10 should be used if there are two or more lanes approaching the intersection at the track crossing location.*
- B. After determining the actual distance D, the curve for the distance D that is nearest to the actual distance D should be used. For example, if the actual distance D is 95 feet, the plotted point should be compared to the curve for D = 90 feet.*
- C. If the rail traffic arrival times are unknown, the highest traffic volume hour of the day should be used.*

**Option:**

<sup>05</sup> The minor-street approach volume may be multiplied by up to three adjustment factors as provided in Paragraphs 6 through 8.

<sup>06</sup> Because the curves are based on an average of four occurrences of rail traffic per day, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-2 for the appropriate number of occurrences of rail traffic per day.

<sup>07</sup> Because the curves are based on typical vehicle occupancy, if at least 2% of the vehicles crossing the track are buses carrying at least 20 people, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-3 for the appropriate percentage of high-occupancy buses.

<sup>08</sup> Because the curves are based on tractor-trailer trucks comprising 10% of the vehicles crossing the track, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-4 for the appropriate distance and percentage of tractor-trailer trucks.

**Standard:**

<sup>09</sup> **If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, then:**

- A. The traffic control signal shall have actuation on the minor street;**
- B. Preemption control shall be provided in accordance with Sections 4D.27, 8C.09, and 8C.10; and**
- C. The grade crossing shall have flashing-light signals (see Chapter 8C).**

*Guidance:*

<sup>10</sup> *If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, the grade crossing should have automatic gates (see Chapter 8C).*

### **Section 4C.101(CA) Criterion for School Crossing Traffic Signals**

**01 Standard:**

- A. The signal shall be designed for full-time operation.**
- B. Pedestrian signal faces of the International Symbol type shall be installed at all marked crosswalks at signalized intersections along the "Suggested Route to School."**
- C. If an intersection is signalized under this guideline for school pedestrians, the entire intersection shall be signalized.**
- D. School area traffic signals shall be traffic actuated type with push buttons or other detectors for pedestrians.**

**Option:**

- 02 Non-intersection school pedestrian crosswalk locations may be signalized when justified.**

### **Section 4C.102(CA) Bicycle Signal Warrant**

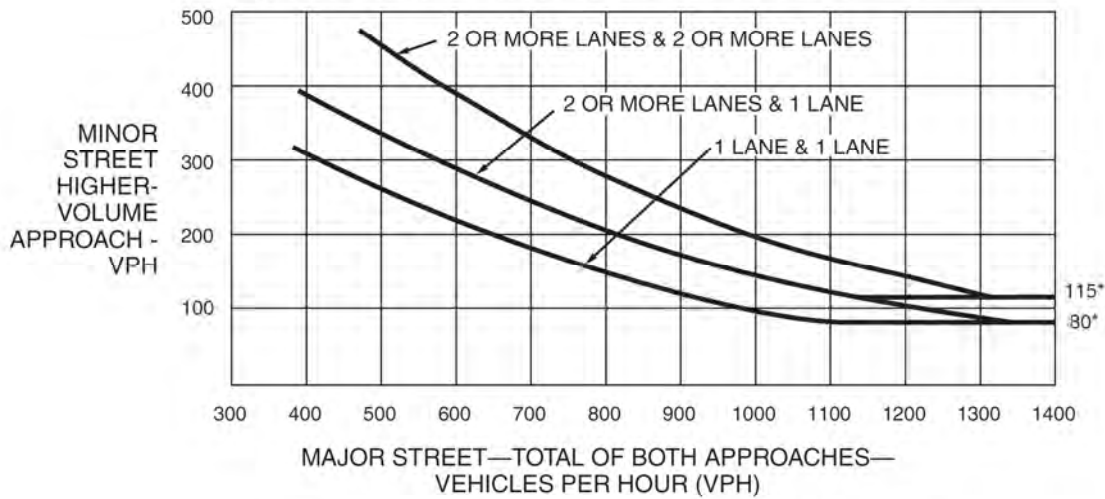
**Guidance:**

*01 A bicycle signal should be considered for use only when the volume and collision or volume and geometric warrants have been met:*

- 1. Volume; When  $W = B \times V$  and  $W \geq 50,000$  and  $B \geq 50$ .**  
*Where: W is the volume warrant. B is the number of bicycles at the peak hour entering the intersection. V is the number of vehicles at the peak hour entering the intersection. B and V shall use the same peak hour.*
- 2. Collision; When 2 or more bicycle/vehicle collisions of types susceptible to correction by a bicycle signal have occurred over a 12-month period and the responsible public works official determines that a bicycle signal will reduce the number of collisions.**
- 3. Geometric;**
  - (a) Where a separate bicycle/ multi use path intersects a roadway.*
  - (b) At other locations to facilitate a bicycle movement that is not permitted for a motor vehicle.*



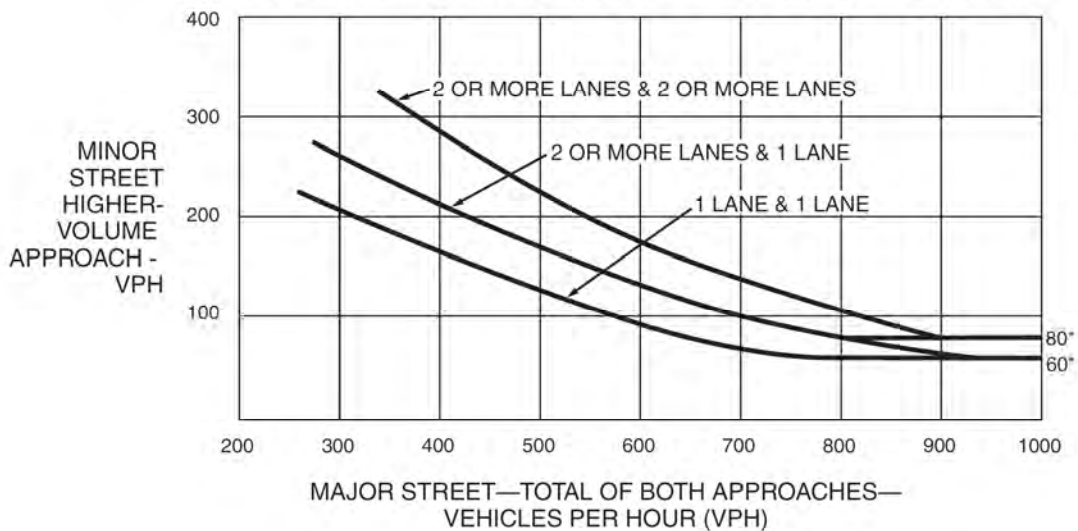
**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

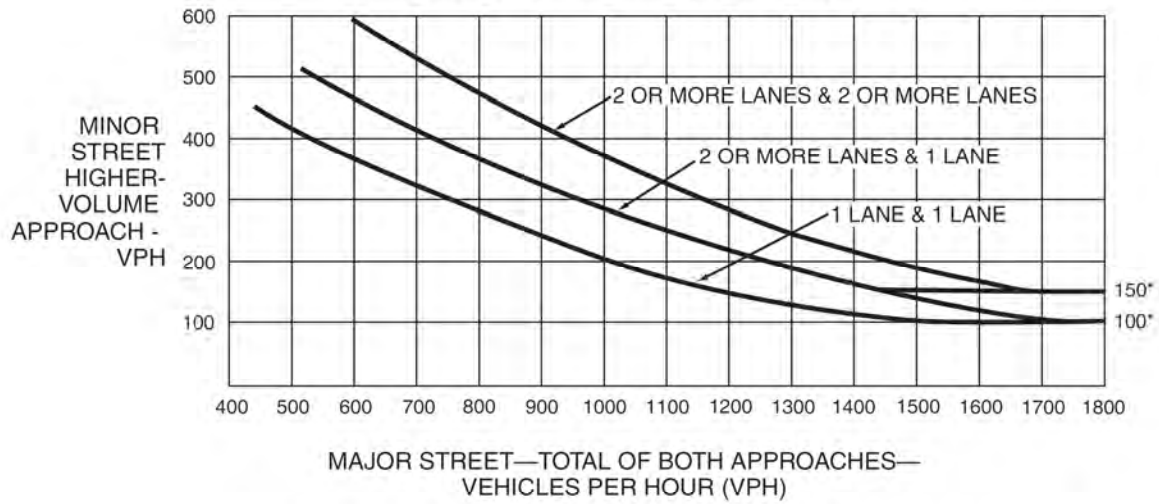
**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

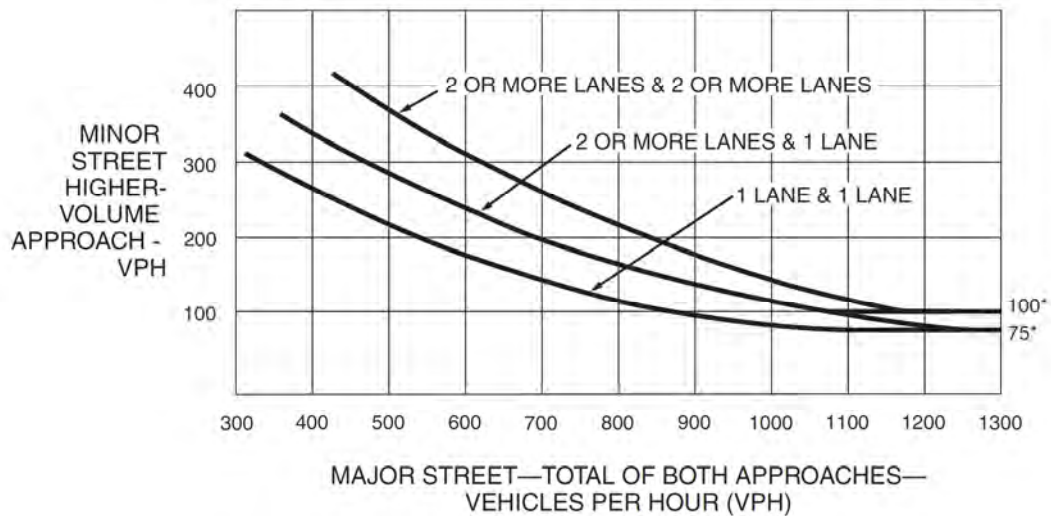
**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

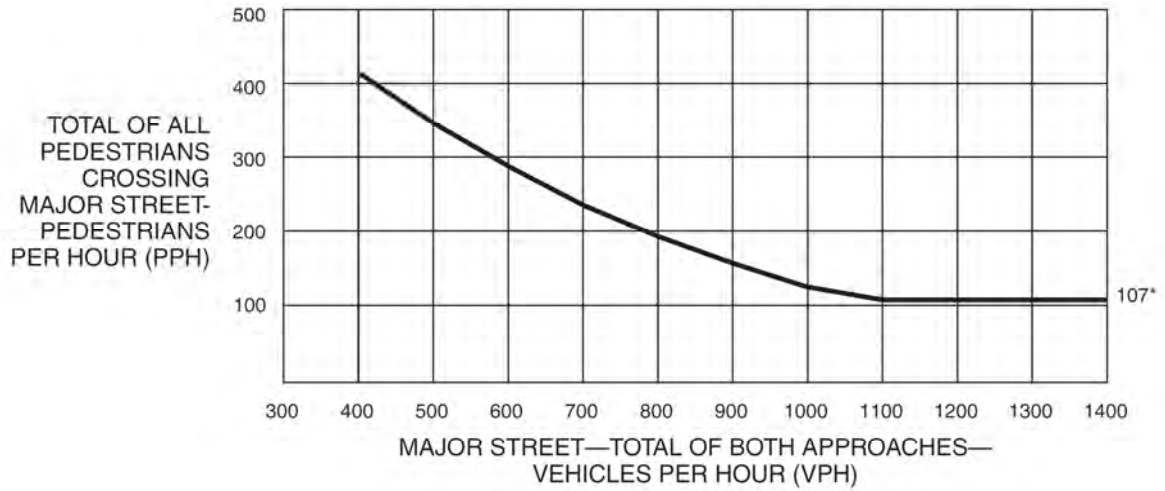
**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



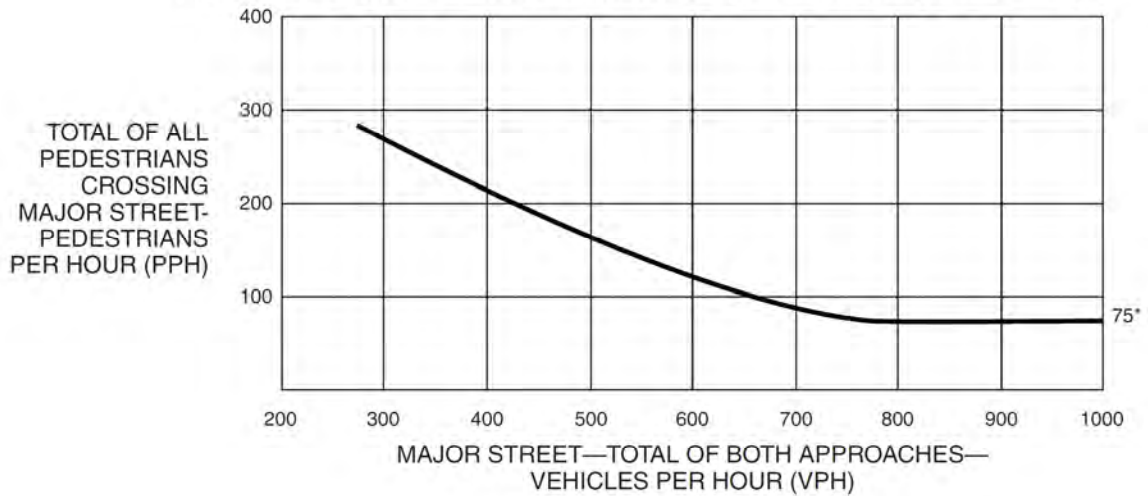
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume**



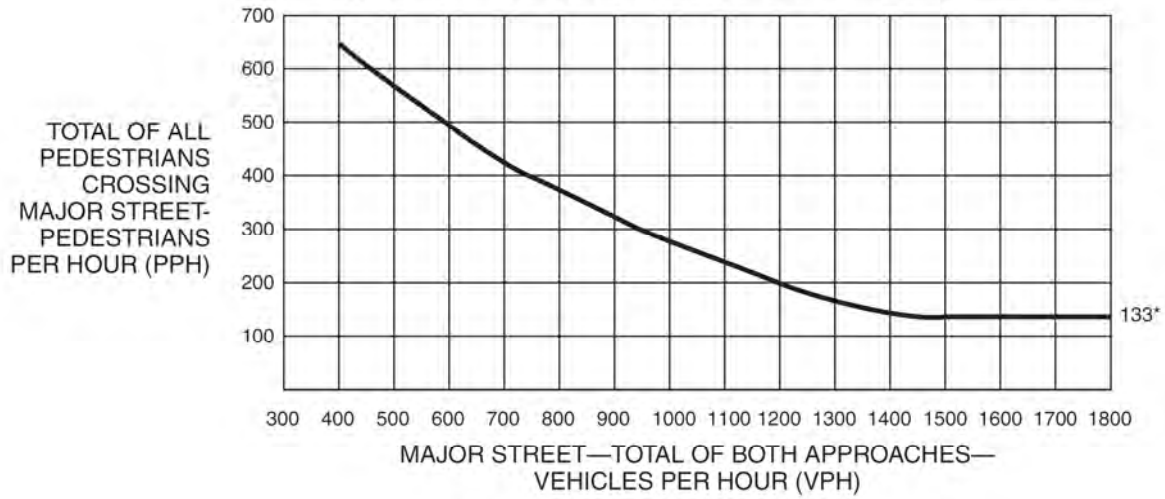
\*Note: 107 pph applies as the lower threshold volume.

**Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)**



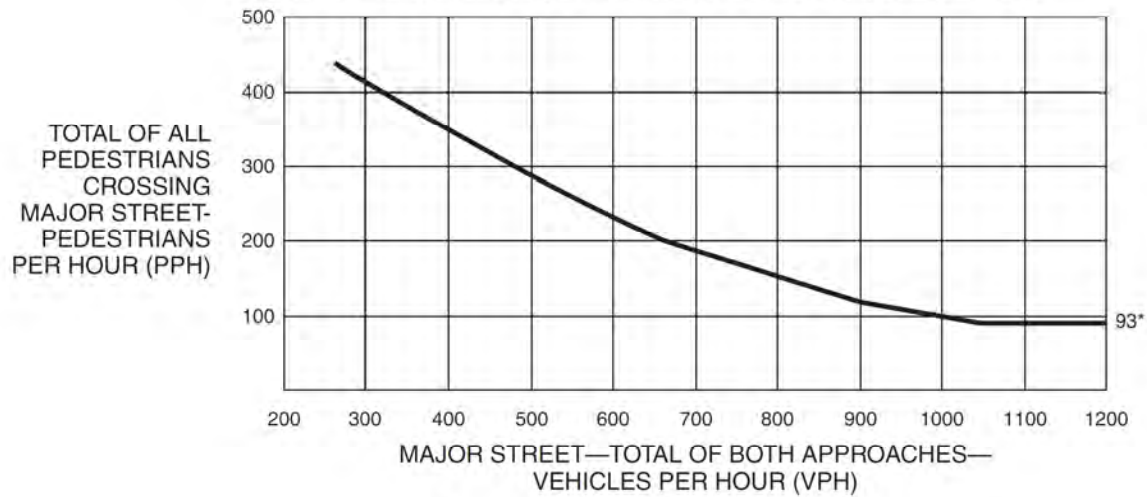
\*Note: 75 pph applies as the lower threshold volume.

**Figure 4C-7. Warrant 4, Pedestrian Peak Hour**



\*Note: 133 pph applies as the lower threshold volume.

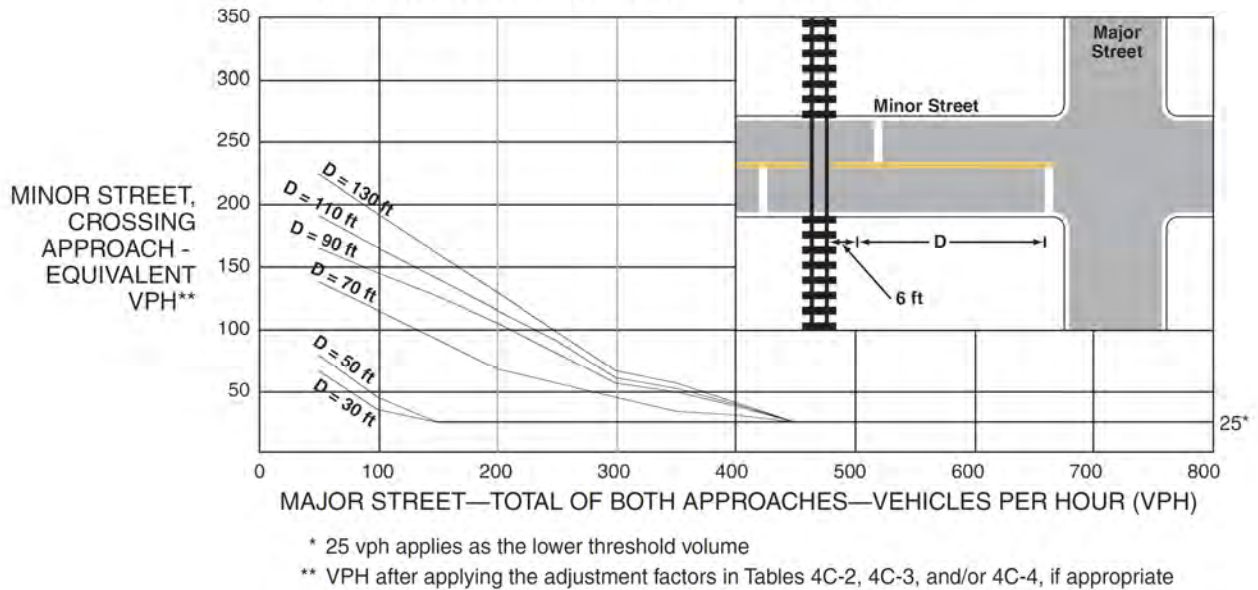
**Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)**



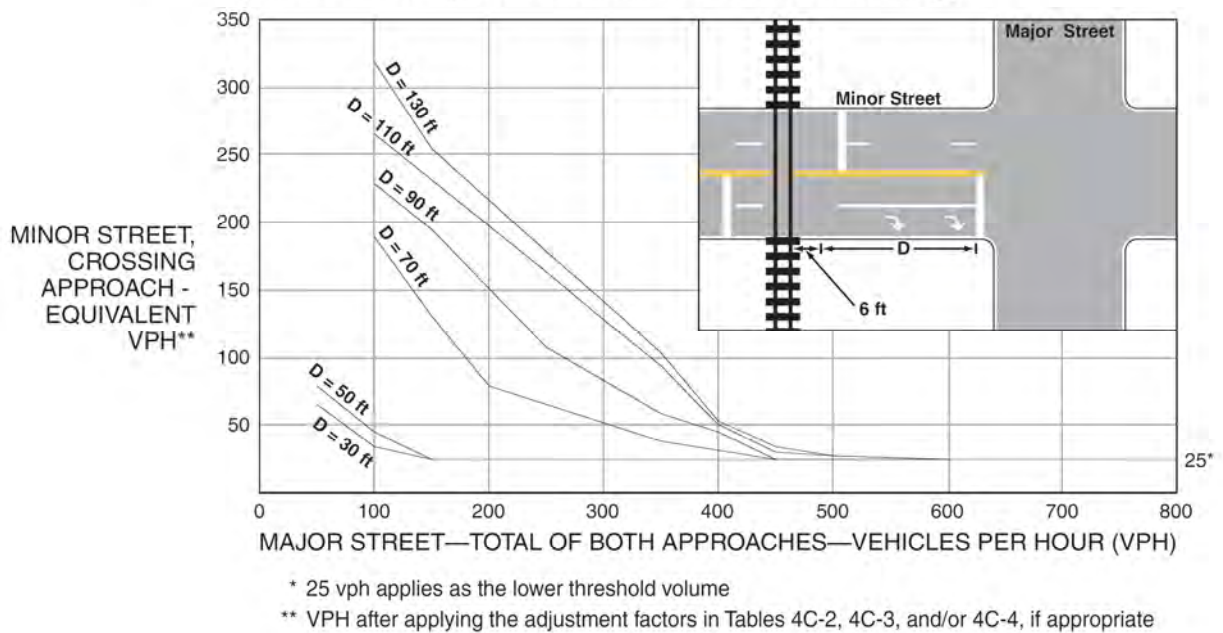
\*Note: 93 pph applies as the lower threshold volume.



**Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing  
 (One Approach Lane at the Track Crossing)**



**Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing  
 (Two or More Approach Lanes at the Track Crossing)**



**Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 1 of 5)**

COUNT DATE \_\_\_\_\_

CALC \_\_\_\_\_ DATE \_\_\_\_\_

CHK \_\_\_\_\_ DATE \_\_\_\_\_

DIST \_\_\_\_\_ CO \_\_\_\_\_ RTE \_\_\_\_\_ PM \_\_\_\_\_

Major St: \_\_\_\_\_ Critical Approach Speed \_\_\_\_\_ mph

Minor St: \_\_\_\_\_ Critical Approach Speed \_\_\_\_\_ mph

Speed limit or critical speed on major street traffic > 40 mph.....  or  } **RURAL (R)**

In built up area of isolated community of < 10,000 population.....  } **URBAN (U)**

**WARRANT 1 - Eight Hour Vehicular Volume** SATISFIED YES  NO   
 (Condition A or Condition B or combination of A and B must be satisfied)

**Condition A - Minimum Vehicle Volume** 100% SATISFIED YES  NO

**80% SATISFIED YES  NO**

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													
	U	R	U	R										
	1		2 or More		/ / / / / / / / / /									
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)										
Highest Approach Minor Street	150 (120)	105 (84)	200 (160)	140 (112)										

**Condition B - Interruption of Continuous Traffic** 100% SATISFIED YES  NO

**80% SATISFIED YES  NO**

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													
	U	R	U	R										
	1		2 or More		/ / / / / / / / / /									
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)										
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)										

**Combination of Conditions A & B** SATISFIED YES  NO

REQUIREMENT	CONDITION	✓	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME		Yes <input type="checkbox"/> No <input type="checkbox"/>
	AND, B. INTERRUPTION OF CONTINUOUS TRAFFIC		
AND, AN ADEQUATE TRIAL OF OTHER ALTERNATIVES THAT COULD CAUSE LESS DELAY AND INCONVENIENCE TO TRAFFIC HAS FAILED TO SOLVE THE TRAFFIC PROBLEMS			Yes <input type="checkbox"/> No <input type="checkbox"/>

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

**Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)**

**WARRANT 2 - Four Hour Vehicular Volume** **SATISFIED\*** YES  NO

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	/	/	/	/	Hour
Both Approaches - Major Street							
Higher Approach - Minor Street							

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes <input type="checkbox"/> No <input type="checkbox"/>
<u>OR</u> , All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes <input type="checkbox"/> No <input type="checkbox"/>

**WARRANT 3 - Peak Hour** **SATISFIED** YES  NO   
 (Part A or Part B must be satisfied)

**PART A** **SATISFIED** YES  NO   
 (All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <b>AND</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <b>AND</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes <input type="checkbox"/> No <input type="checkbox"/>

**PART B** **SATISFIED** YES  NO

APPROACH LANES	One	2 or More	/	/	/	Hour
Both Approaches - Major Street						
Higher Approach - Minor Street						

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes <input type="checkbox"/> No <input type="checkbox"/>
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes <input type="checkbox"/> No <input type="checkbox"/>

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.



**Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 3 of 5)**

**WARRANT 4 - Pedestrian Volume  
 (Parts 1 and 2 Must Be Satisfied)**

SATISFIED YES  NO

**Part 1 (Parts A or B must be satisfied)**

Hours -->

A.	Vehicles per hour for any 4 hours				
	Pedestrians per hour for any 4 hours				

Figure 4C-5 or Figure 4C-6  
 SATISFIED YES  NO

Hours -->

B.	Vehicles per hour for any 1 hour				
	Pedestrians per hour for any 1 hour				

Figure 4C-7 or Figure 4C-8  
 SATISFIED YES  NO

**Part 2**

SATISFIED YES  NO

<u>AND</u> , The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , The proposed traffic signal will not restrict progressive traffic flow along the major street.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

**WARRANT 5 - School Crossing  
 (Parts A and B Must Be Satisfied)**

SATISFIED YES  NO

**Part A  
 Gap/Minutes and # of Children**

SATISFIED YES  NO

Gaps vs Minutes	Minutes Children Using Crossing		Hour
	Number of Adequate Gaps		
School Age Pedestrians Crossing Street / hr			

Gaps < Minutes YES  NO

AND Children > 20/hr YES  NO

<u>AND</u> , Consideration has been given to less restrictive remedial measures.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
--	------------------------------	-----------------------------

**Part B**

SATISFIED YES  NO

The distance to the nearest traffic signal along the major street is greater than 300 ft	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>OR</u> , The proposed signal will not restrict the progressive movement of traffic.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.



**Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 4 of 5)**

**WARRANT 6 - Coordinated Signal System  
 (All Parts Must Be Satisfied)**

**SATISFIED YES  NO**

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	Yes <input type="checkbox"/> No <input type="checkbox"/>
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.		Yes <input type="checkbox"/> No <input type="checkbox"/>
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

**WARRANT 7 - Crash Experience Warrant  
 (All Parts Must Be Satisfied)**

**SATISFIED YES  NO**

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency.		Yes <input type="checkbox"/> No <input type="checkbox"/>
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash.	Yes <input type="checkbox"/> No <input type="checkbox"/>
5 OR MORE		
REQUIREMENTS	CONDITIONS	✓
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	Yes <input type="checkbox"/> No <input type="checkbox"/>
	OR, Warrant 1, Condition B - Interruption of Continuous Traffic	
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8	

**WARRANT 8 - Roadway Network  
 (All Parts Must Be Satisfied)**

**SATISFIED YES  NO**

MINIMUM VOLUME REQUIREMENTS	ENTERING VOLUMES - ALL APPROACHES	✓	FULFILLED
1000 Veh/Hr	During Typical Weekday Peak Hour _____ Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.		Yes <input type="checkbox"/> No <input type="checkbox"/>
	OR During Each of Any 5 Hrs. of a Sat. or Sun _____ Veh/Hr		
CHARACTERISTICS OF MAJOR ROUTES		MAJOR ROUTE A	MAJOR ROUTE B
Hwy. System Serving as Principal Network for Through Traffic			
Rural or Suburban Highway Outside Of, Entering, or Traversing a City			
Appears as Major Route on an Official Plan			
Any Major Route Characteristics Met, Both Streets			Yes <input type="checkbox"/> No <input type="checkbox"/>

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

**Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 5 of 5)**

**WARRANT 9 - Intersection Near a Grade Crossing  
 (Both Parts A and B Must Be Satisfied)**

**SATISFIED YES  NO**

<p><b>PART A</b></p> <p>A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach. Track Center Line to Limit Line _____ ft</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p><b>PART B</b></p> <p><b>There is one minor street approach lane at the track crossing</b> - During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-9.</p> <p>Major Street - Total of both approaches: _____ VPH                  Minor Street - Crosses the track (one direction only, approaching the intersection):                  _____ VPH X AF (Use Tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p><b>OR, There are two or more minor street approach lanes at the track crossing</b> - During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-10.</p> <p>Major Street - Total of both approaches : _____ VPH                  Minor Street - Crosses the track (one direction only, approaching the intersection):                  _____ VPH X AF (Use Tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>

The minor street approach volume may be multiplied by up to three following adjustment factors (AF) as described in Section 4C.10.

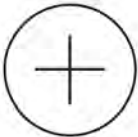
1- Number of Rail Traffic per Day \_\_\_\_\_ Adjustment factor from table 4C-2 \_\_\_\_\_

2- Percentage of High-Occupancy Buses on Minor Street Approach \_\_\_\_\_ Adjustment factor from table 4C-3 \_\_\_\_\_

3- Percentage of Tractor-Trailer Trucks on Minor Street Approach \_\_\_\_\_ Adjustment factor from table 4C-4 \_\_\_\_\_

NOTE: If no data is available or known, then use AF = 1 (no adjustment)

**Figure 4C-102 (CA). Traffic Count Worksheet**



Insert North Point

**Not to Scale**

Number of Lanes _____	
Pedestrians	
Total*	Peak
AM Peak	PM Peak
Total*	Total*

Number of Lanes					
Pedestrians					
Total*					
	AM Peak	PM Peak	Total*	( )	( )
	( )	( )	( )	( )	( )
	( )	( )	( )	( )	( )

AM Peak	PM Peak	Total*
( )	( )	( )
( )	( )	( )
( )	( )	( )

Number of Lanes					
Pedestrians					
Total*					
	AM Peak	PM Peak	Total*	( )	( )
	( )	( )	( )	( )	( )
	( )	( )	( )	( )	( )

**\*Entire Count Period**

Pedestrians	
Total*	Peak
AM Peak	PM Peak
Total*	Total*

Number of Lanes \_\_\_\_\_

**DIRECTIONAL TRAFFIC COUNT**

Dist \_\_\_\_\_ Co \_\_\_\_\_ Rte \_\_\_\_\_ PM \_\_\_\_\_

Intersection Give Name \_\_\_\_\_

City \_\_\_\_\_

Day \_\_\_\_\_ Date \_\_\_\_\_

Hour \_\_\_\_\_ to Hour \_\_\_\_\_

Total Volume \_\_\_\_\_

AM Peak \_\_\_\_\_

Hour \_\_\_\_\_ Volume \_\_\_\_\_

PM Peak \_\_\_\_\_

Hour \_\_\_\_\_ Volume \_\_\_\_\_



**Figure 4C-103 (CA). Traffic Signal Warrants Worksheet  
 (Average Traffic Estimate Form)**

COUNT DATE \_\_\_\_\_  
 CALC \_\_\_\_\_ DATE \_\_\_\_\_  
 CHK \_\_\_\_\_ DATE \_\_\_\_\_

DIST \_\_\_\_\_ CO \_\_\_\_\_ RTE \_\_\_\_\_ PM \_\_\_\_\_

Major St: \_\_\_\_\_ Critical Approach Speed \_\_\_\_\_ mph  
 Minor St: \_\_\_\_\_ Critical Approach Speed \_\_\_\_\_ mph

Speed limit or critical speed on major street traffic > 40 mph.....  }  
 or  } **RURAL (R)**  
 In built up area of isolated community of < 10,000 population.....  }  
 **URBAN (U)**

**(Based on Estimated Average Daily Traffic - See Note)**

URBAN..... RURAL.....		Minimum Requirements EADT			
<b>CONDITION A - Minimum Vehicular Volume</b>		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied _____					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Major Street	Minor Street				
1.....	1.....	8,000	5,600	2,400	1,680
2 or More.....	1.....	9,600	6,720	2,400	1,680
2 or More.....	2 or More.....	9,600	6,720	3,200	2,240
1.....	2 or More.....	8,000	5,600	3,200	2,240
<b>CONDITION B - Interruption of Continuous Traffic</b>		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied _____ Not Satisfied _____					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Major Street	Minor Street				
1.....	1.....	12,000	8,400	1,200	850
2 or More.....	1.....	14,400	10,080	1,200	850
2 or More.....	2 or More.....	14,400	10,080	1,600	1,120
1.....	2 or More.....	12,000	8,400	1,600	1,120
<b>Combination of CONDITIONS A + B</b>		2 CONDITIONS 80%		2 CONDITIONS 80%	
Satisfied _____ Not Satisfied _____					
No one condition satisfied, but following conditions fulfilled 80% or more..... A _____ B _____					

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**  
**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

<sup>a</sup> Basic minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

<sup>c</sup> May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

**Table 4C-2. Warrant 9, Adjustment Factor for Daily Frequency of Rail Traffic**

Rail Traffic per Day	Adjustment Factor
1	0.67
2	0.91
3 to 5	1.00
6 to 8	1.18
9 to 11	1.25
12 or more	1.33

**Table 4C-3. Warrant 9, Adjustment Factor for Percentage of High-Occupancy Buses**

% of High-Occupancy Buses* on Minor-Street Approach	Adjustment Factor
0%	1.00
2%	1.09
4%	1.19
6% or more	1.32

\* A high-occupancy bus is defined as a bus occupied by at least 20 people.

**Table 4C-4. Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks**

% of Tractor-Trailer Trucks on Minor-Street Approach	Adjustment Factor	
	D less than 70 feet	D of 70 feet or more
0% to 2.5%	0.50	0.50
2.6% to 7.5%	0.75	0.75
7.6% to 12.5%	1.00	1.00
12.6% to 17.5%	2.30	1.15
17.6% to 22.5%	2.70	1.35
22.6% to 27.5%	3.28	1.64
More than 27.5%	4.18	2.09

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

- **190<sup>th</sup> Street/West Project Driveway Traffic  
Signal Level-of-Service Analysis Worksheets**



190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**












➤ **AM Peak Hour**





HCM 2010 Signalized Intersection Summary  
7: 190th St & W project dwy

Opening Year 2023 with Project  
Timing Plan: AM Peak Hour

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	62	1383	1706	24	57	34		
Future Volume (veh/h)	62	1383	1706	24	57	34		
Number	5	2	6	16	7	14		
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	62	1383	1706	24	57	34		
Adj No. of Lanes	1	3	4	0	1	1		
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	305	4466	5761	81	113	100		
Arrive On Green	1.00	1.00	1.00	1.00	0.06	0.06		
Sat Flow, veh/h	279	5253	6821	92	1774	1583		
Grp Volume(v), veh/h	62	1383	1250	480	57	34		
Grp Sat Flow(s),veh/h/ln	279	1695	1602	1846	1774	1583		
Q Serve(g_s), s	0.0	0.0	0.0	0.0	3.7	2.5		
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	3.7	2.5		
Prop In Lane	1.00			0.05	1.00	1.00		
Lane Grp Cap(c), veh/h	305	4466	4221	1622	113	100		
V/C Ratio(X)	0.20	0.31	0.30	0.30	0.51	0.34		
Avail Cap(c_a), veh/h	305	4466	4221	1622	325	290		
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.83	0.83	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	54.4	53.8		
Incr Delay (d2), s/veh	1.2	0.1	0.2	0.5	3.5	2.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.1	0.2	1.9	1.1		
LnGrp Delay(d),s/veh	1.2	0.1	0.2	0.5	57.9	55.8		
LnGrp LOS	A	A	A	A	E	E		
Approach Vol, veh/h		1445	1730		91			
Approach Delay, s/veh		0.2	0.3		57.1			
Approach LOS		A	A		E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		109.4		10.6		109.4		
Change Period (Y+Rc), s		6.0		5.0		6.0		
Max Green Setting (Gmax), s		89.0		20.0		89.0		
Max Q Clear Time (g_c+I1), s		2.0		5.7		2.0		
Green Ext Time (p_c), s		20.1		0.2		21.8		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			1.8					
HCM 2010 LOS			A					
















190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **MD Peak Hour**



HCM 2010 Signalized Intersection Summary  
7: 190th St & W project dwy

Opening Year 2023 with Project  
Timing Plan: MD Peak Hour

									
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations		  	  						
Traffic Volume (veh/h)	120	1123	1175	48	112	67			
Future Volume (veh/h)	120	1123	1175	48	112	67			
Number	5	2	6	16	7	14			
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	120	1123	1175	48	112	67			
Adj No. of Lanes	1	3	4	0	1	1			
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	444	4297	5377	219	171	153			
Arrive On Green	1.00	1.00	1.00	1.00	0.10	0.10			
Sat Flow, veh/h	454	5253	6624	259	1774	1583			
Grp Volume(v), veh/h	120	1123	887	336	112	67			
Grp Sat Flow(s),veh/h/ln	454	1695	1602	1817	1774	1583			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.3	4.8			
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.3	4.8			
Prop In Lane	1.00			0.14	1.00	1.00			
Lane Grp Cap(c), veh/h	444	4297	4061	1535	171	153			
V/C Ratio(X)	0.27	0.26	0.22	0.22	0.65	0.44			
Avail Cap(c_a), veh/h	444	4297	4061	1535	303	270			
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	52.3	51.1			
Incr Delay (d2), s/veh	1.4	0.1	0.1	0.3	4.2	2.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.2	0.1	0.0	0.1	3.8	2.2			
LnGrp Delay(d),s/veh	1.4	0.1	0.1	0.3	56.4	53.1			
LnGrp LOS	A	A	A	A	E	D			
Approach Vol, veh/h		1243	1223		179				
Approach Delay, s/veh		0.3	0.2		55.2				
Approach LOS		A	A		E				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4		6			
Phs Duration (G+Y+Rc), s		104.9		15.1		104.9			
Change Period (Y+Rc), s		5.5		5.5		5.5			
Max Green Setting (Gmax), s		90.5		18.5		90.5			
Max Q Clear Time (g_c+I1), s		2.0		9.3		2.0			
Green Ext Time (p_c), s		15.1		0.3		11.8			
<b>Intersection Summary</b>									
HCM 2010 Ctrl Delay			3.9						
HCM 2010 LOS			A						

















190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
**Traffic Circulation Analysis (TCA)**

➤ **PM Peak Hour**



HCM 2010 Signalized Intersection Summary  
 7: 190th St & W project dwy

Opening Year 2023 with Project  
 Timing Plan: PM Peak Hour

									
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations		  	   						
Traffic Volume (veh/h)	86	2169	1306	33	77	46			
Future Volume (veh/h)	86	2169	1306	33	77	46			
Number	5	2	6	16	7	14			
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	86	2169	1306	33	77	46			
Adj No. of Lanes	1	3	4	0	1	1			
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	422	4529	5767	146	135	121			
Arrive On Green	1.00	1.00	1.00	1.00	0.08	0.08			
Sat Flow, veh/h	407	5253	6737	163	1774	1583			
Grp Volume(v), veh/h	86	2169	969	370	77	46			
Grp Sat Flow(s),veh/h/ln	407	1695	1602	1834	1774	1583			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	5.0	3.3			
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	5.0	3.3			
Prop In Lane	1.00			0.09	1.00	1.00			
Lane Grp Cap(c), veh/h	422	4529	4280	1633	135	121			
V/C Ratio(X)	0.20	0.48	0.23	0.23	0.57	0.38			
Avail Cap(c_a), veh/h	422	4529	4280	1633	310	277			
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00			
Upstream Filter(I)	0.82	0.82	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	53.5	52.7			
Incr Delay (d2), s/veh	0.9	0.3	0.1	0.3	3.7	2.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.0	0.1	2.6	1.5			
LnGrp Delay(d),s/veh	0.9	0.3	0.1	0.3	57.3	54.7			
LnGrp LOS	A	A	A	A	E	D			
Approach Vol, veh/h		2255	1339		123				
Approach Delay, s/veh		0.3	0.2		56.3				
Approach LOS		A	A		E				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4		6			
Phs Duration (G+Y+Rc), s		108.9		11.1		108.9			
Change Period (Y+Rc), s		4.0		4.0		4.0			
Max Green Setting (Gmax), s		93.0		19.0		93.0			
Max Q Clear Time (g_c+I1), s		2.0		7.0		2.0			
Green Ext Time (p_c), s		46.2		0.2		13.7			
<b>Intersection Summary</b>									
HCM 2010 Ctrl Delay			2.1						
HCM 2010 LOS			A						

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Queuing Studies**

➤ **Drive-Through Queuing Study**

- **Panera Bread at 8900 Apollo Wy,  
Downey, CA**
- **Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA**
- **Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA – Sales Percentages**
- **Shake Shack at 2171 Rosecrans Ave, El  
Segundo, CA**



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Queuing Studies**

- **Drive-Through Queuing Study**
  - **Panera Bread at 8900 Apollo Wy,  
Downey, CA**

Prepared by National Data & Surveying Services

## Queue Study

**Location:** Panera Bread-8900 Apollo Way

**City:** Downey,CA

**Date:** 10/24/2019

**Day:** Thursday

Time	Max Queue
11:00 AM	2
11:05 AM	1
11:10 AM	2
11:15 AM	0
11:20 AM	0
11:25 AM	2
11:30 AM	5
11:35 AM	1
11:40 AM	1
11:45 AM	2
11:50 AM	3
11:55 AM	5
12:00 PM	4
12:05 PM	6
12:10 PM	7
12:15 PM	7
12:20 PM	7
12:25 PM	2
12:30 PM	2
12:35 PM	3
12:40 PM	3
12:45 PM	3
12:50 PM	3
12:55 PM	3
1:00 PM	4
1:05 PM	4
1:10 PM	5
1:15 PM	6
1:20 PM	8
1:25 PM	6
1:30 PM	5
1:35 PM	4
1:40 PM	2
1:45 PM	3
1:50 PM	5
1:55 PM	4



**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

## **Queuing Studies**

### **➤ Drive-Through Queuing Study**

- Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA**
  - 2019 City-Provided Driveway  
Counts**
  - 2020 Driveway and Pick-Up  
Window Queue Analysis**

**Chick-fil-A (18200 Hawthorne Blvd) Driveway Count Survey  
Peak Hour Traffic Volumes**

Count Date/ Time Period	Driveway 1			Driveway 2			Total of All Driveways		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
March 2019 (see Appendix B)									
Midday Peak Hour	126	63	189	87	145	232	213	208	421
PM Peak Hour	97	57	154	71	108	179	168	165	333
2019 Total MD+PM									754
October 2020 (see 10/01/20 Driveway Volume Study)									
Midday Peak Hour	86	119	205	81	40	121	167	159	326
PM Peak Hour	58	102	160	53	11	64	111	113	224
2020 Total MD+PM									550

**Change in Driveway Counts (March 2019 vs Oct 2020)**

MD&PM Peak: **-27%**

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Queuing Studies**

➤ **Drive-Through Queuing Study**

- **Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA**
  - **2019 City-Provided Driveway  
Counts**

**TABLE 1**  
**CHICK-FIL-A DRIVEWAYS TURNING MOVEMENT COUNTS**

Time	Driveway 1			Driveway 2			Total of all Driveways		
	Enter	Exit	total	Enter	Exit	total	Enter	Exit	total
7:00 AM	10	6	16	4	8	12	14	14	28
7:15 AM	12	7	19	7	11	18	19	18	37
7:30 AM	17	8	25	9	14	23	26	22	48
7:45 AM	9	8	17	10	10	20	19	18	37
8:00 AM	15	11	26	7	13	20	22	24	46
8:15 AM	11	8	19	9	8	17	20	16	36
8:30 AM	22	13	35	5	19	24	27	32	59
8:45 AM	17	12	29	9	13	22	26	25	51
<b>AM Peak Hour</b>	<b>65</b>	<b>44</b>	<b>109</b>	<b>30</b>	<b>53</b>	<b>83</b>	<b>95</b>	<b>97</b>	<b>192</b>
11:00 AM	29	19	48	6	23	29	35	42	77
11:15 AM	30	17	47	11	15	26	41	32	73
11:30 AM	38	16	54	12	28	40	50	44	94
11:45 AM	38	15	53	12	32	44	50	47	97
12:00 PM	28	21	49	22	24	46	50	45	95
12:15 PM	26	13	39	24	32	56	50	45	95
12:30 PM	19	12	31	30	28	58	49	40	89
12:45 PM	26	17	43	14	42	56	40	59	99
<b>Midday Peak Hour</b>	<b>130</b>	<b>65</b>	<b>195</b>	<b>70</b>	<b>116</b>	<b>186</b>	<b>200</b>	<b>181</b>	<b>381</b>
4:00 PM	22	13	35	10	31	41	32	44	76
4:15 PM	23	16	39	10	25	35	33	41	74
4:30 PM	22	16	38	18	13	31	40	29	69
4:45 PM	28	8	36	18	28	46	46	36	82
5:00 PM	29	24	53	8	20	28	37	44	81
5:15 PM	27	14	41	14	18	32	41	32	73
5:30 PM	24	15	39	17	17	34	41	32	73
5:45 PM	24	10	34	14	30	44	38	40	78
<b>PM Peak Hour</b>	<b>108</b>	<b>61</b>	<b>169</b>	<b>57</b>	<b>83</b>	<b>140</b>	<b>165</b>	<b>144</b>	<b>309</b>

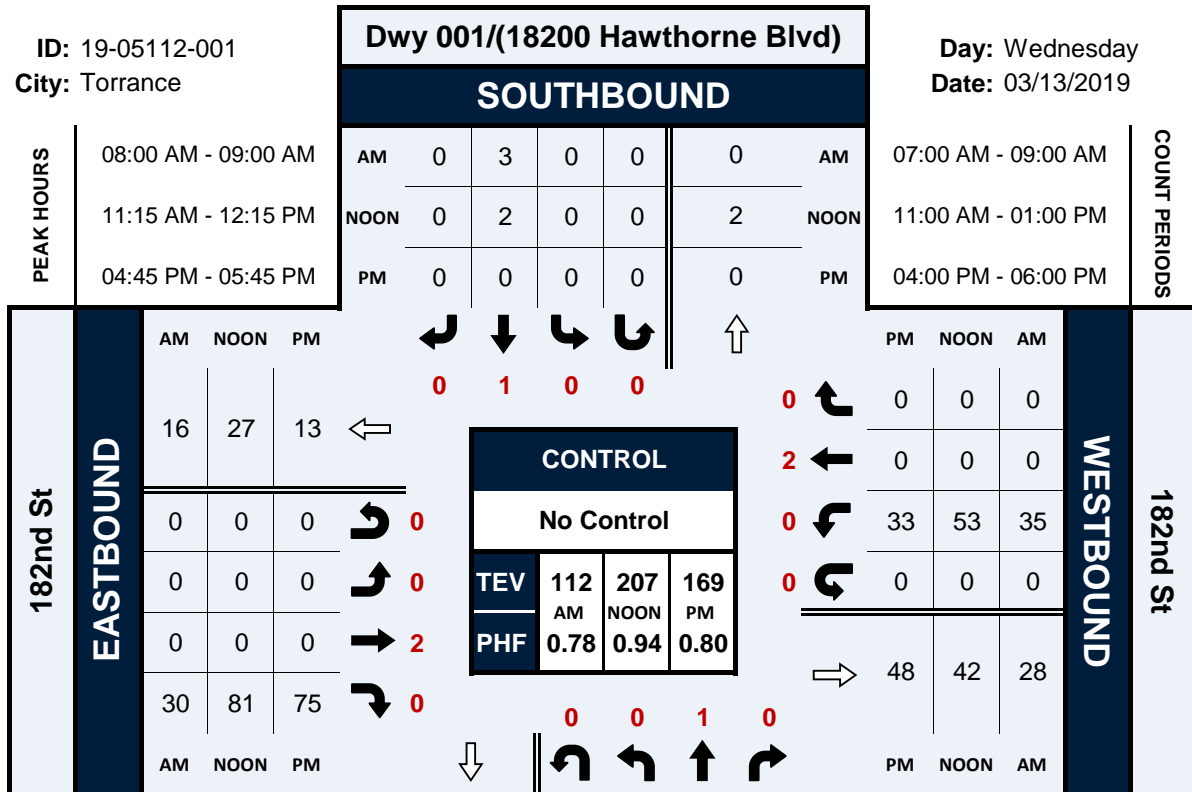
= AM/Midday/PM peak hour turning movement counts conducted in March 2019.

# Dwy 001/(18200 Hawthorne Blvd) & 182nd St

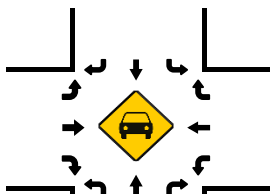
## Peak Hour Turning Movement Count

ID: 19-05112-001  
City: Torrance

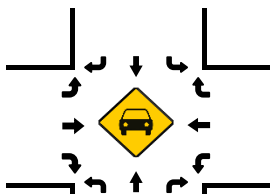
Day: Wednesday  
Date: 03/13/2019



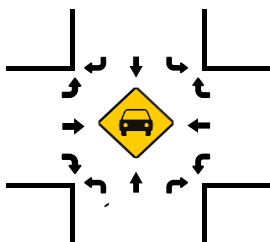
Total Vehicles (AM)



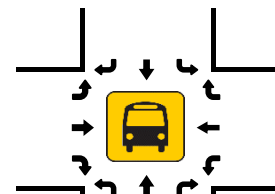
Total Vehicles (NOON)



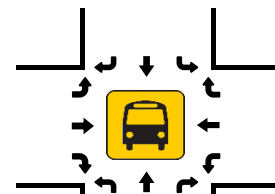
Total Vehicles (PM)



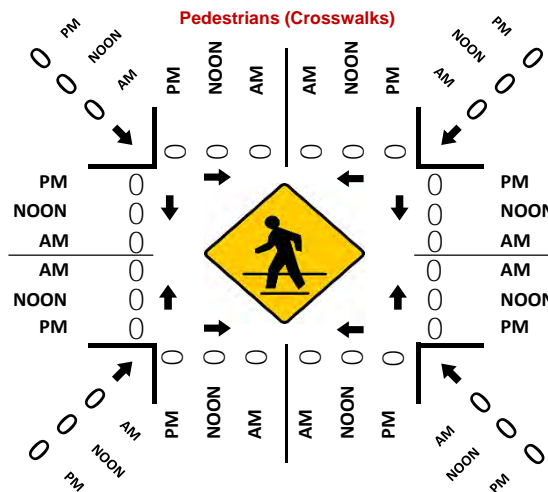
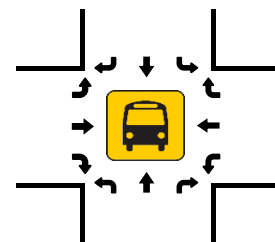
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Dwy 001/(18200 Hawthorne Blvd) & 182nd St  
 City: Torrance  
 Control: No Control

Project ID: 19-05112-001  
 Date: 3/13/2019

### Total

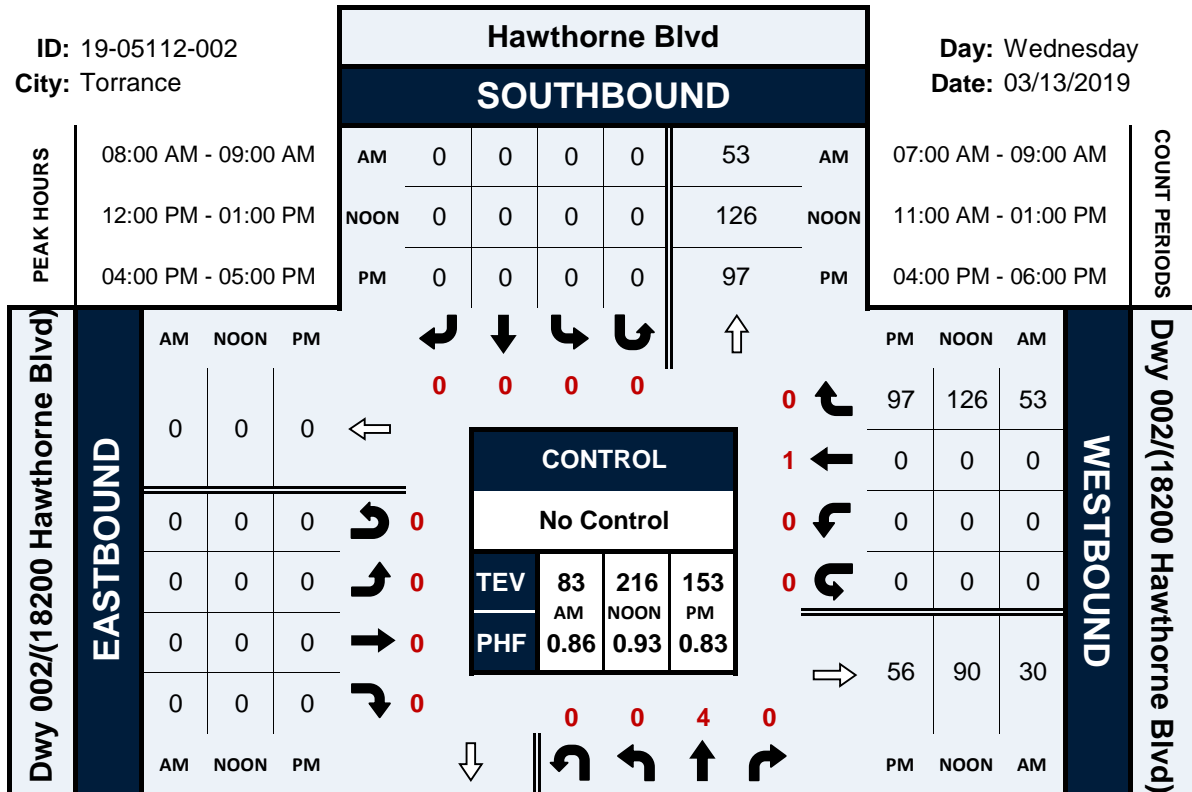
NS/EW Streets:	Dwy 001/(18200 Hawthorne Blvd)				Dwy 001/(18200 Hawthorne Blvd)				182nd St				182nd St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	2	0	4	0	0	0	0	0	0	0	7	0	3	0	0	0	16
7:15 AM	3	0	4	0	0	0	0	0	0	0	7	0	5	0	0	0	19
7:30 AM	4	1	4	0	0	0	0	0	0	0	6	0	11	0	0	0	26
7:45 AM	3	0	5	0	0	1	0	0	0	0	5	0	4	0	0	0	18
8:00 AM	6	0	5	0	0	1	0	0	0	0	5	0	10	0	0	0	27
8:15 AM	4	0	4	0	0	1	0	0	0	0	5	0	6	0	0	0	20
8:30 AM	3	0	10	0	0	1	0	0	0	0	9	0	13	0	0	0	36
8:45 AM	3	0	9	0	0	0	0	0	0	0	11	0	6	0	0	0	29
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	37.84%	1.35%	60.81%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	191
<b>PEAK HR :</b>	<b>08:00 AM - 09:00 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	16	0	28	0	0	3	0	0	0	0	30	0	35	0	0	0	112
<b>PEAK HR FACTOR :</b>	0.667	0.000	0.700	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.682	0.000	0.673	0.000	0.000	0.000	0.778
	0.846				0.750				0.682				0.673				
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
11:00 AM	4	0	15	0	0	1	0	0	0	0	13	0	16	0	0	0	49
11:15 AM	6	0	11	0	0	0	0	0	0	0	18	0	12	0	0	0	47
11:30 AM	7	1	9	0	0	0	0	0	0	0	21	0	17	0	0	0	55
11:45 AM	4	0	11	0	0	0	0	0	0	0	24	0	14	0	0	0	53
12:00 PM	10	1	11	0	0	2	0	0	0	0	18	0	10	0	0	0	52
12:15 PM	5	0	8	0	0	1	0	0	0	0	17	0	9	0	0	0	40
12:30 PM	5	0	7	0	0	0	0	0	0	0	10	0	9	0	0	0	31
12:45 PM	10	0	7	0	0	1	0	0	0	0	19	0	7	0	0	0	44
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	38.64%	1.52%	59.85%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	371
<b>PEAK HR :</b>	<b>11:15 AM - 12:15 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	27	2	42	0	0	2	0	0	0	0	81	0	53	0	0	0	207
<b>PEAK HR FACTOR :</b>	0.675	0.500	0.955	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.844	0.000	0.779	0.000	0.000	0.000	0.941
	0.807				0.250				0.844				0.779				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	8	2	5	0	0	0	0	0	0	0	16	0	6	0	0	0	37
4:15 PM	4	0	12	0	0	0	0	0	0	0	15	0	8	0	0	0	39
4:30 PM	8	0	8	0	0	0	0	0	0	0	14	0	8	0	0	0	38
4:45 PM	3	0	5	0	0	0	0	0	0	0	18	0	10	0	0	0	36
5:00 PM	4	0	20	0	0	0	0	0	0	0	17	0	12	0	0	0	53
5:15 PM	2	0	12	0	0	0	0	0	0	0	18	0	9	0	0	0	41
5:30 PM	4	0	11	0	0	0	0	0	0	0	22	0	2	0	0	0	39
5:45 PM	6	0	4	0	0	0	0	0	0	0	14	0	10	0	0	0	34
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
<b>APPROACH %'s :</b>	33.05%	1.69%	65.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	317
<b>PEAK HR :</b>	<b>04:45 PM - 05:45 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	13	0	48	0	0	0	0	0	0	0	75	0	33	0	0	0	169
<b>PEAK HR FACTOR :</b>	0.813	0.000	0.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.852	0.000	0.688	0.000	0.000	0.000	0.797
	0.635				0.852				0.688				0.688				

# Hawthorne Blvd & Dwy 002/(18200 Hawthorne Blvd)

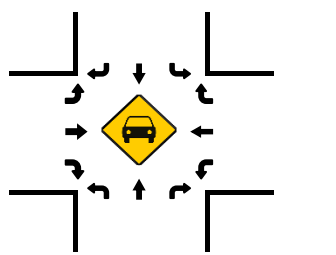
## Peak Hour Turning Movement Count

ID: 19-05112-002  
City: Torrance

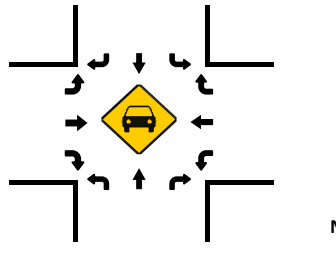
Day: Wednesday  
Date: 03/13/2019



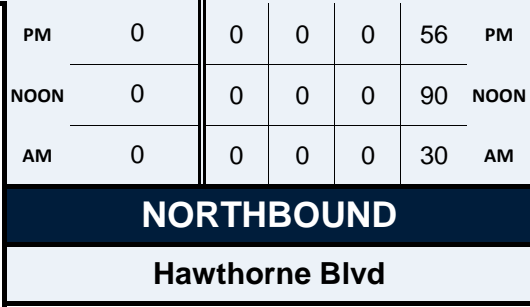
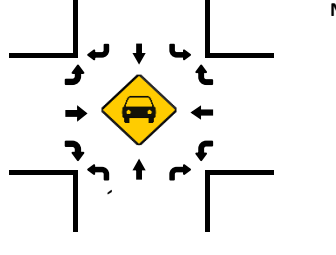
Total Vehicles (AM)



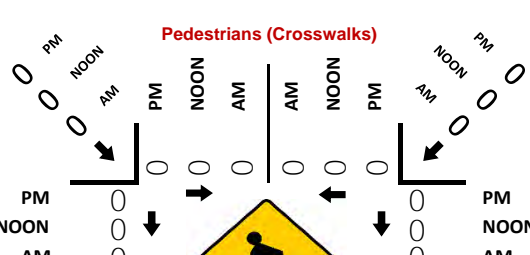
Total Vehicles (NOON)



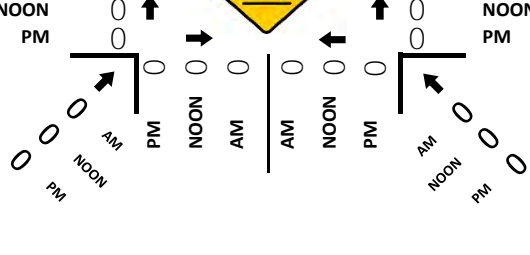
Total Vehicles (PM)



Total Vehicles (AM)

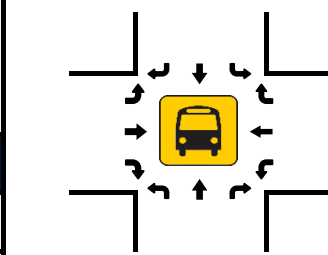


Total Vehicles (NOON)

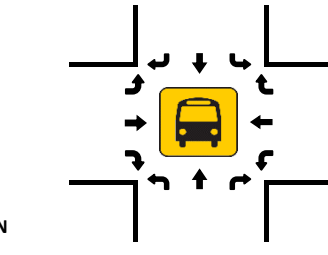


Total Vehicles (PM)

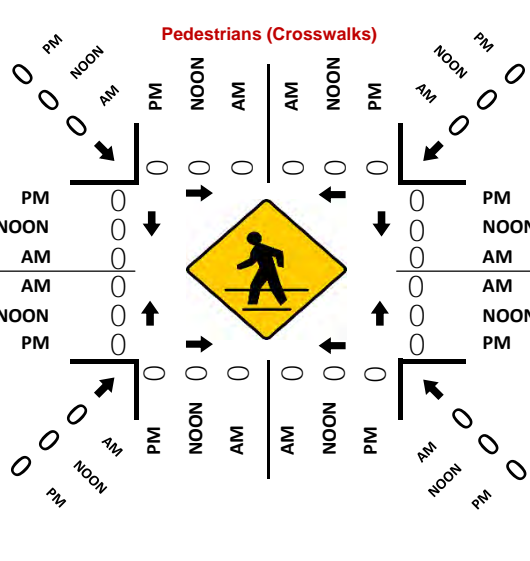
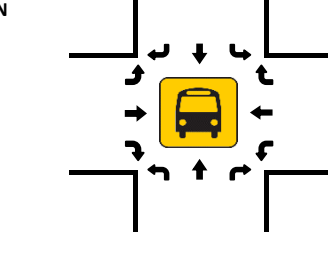
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Hawthorne Blvd & Dwy 002/(18200 Hawthorne Blvd)  
 City: Torrance  
 Control: No Control

Project ID: 19-05112-002  
 Date: 3/13/2019

### Total

NS/EW Streets:	Hawthorne Blvd				Hawthorne Blvd				Dwy 002/(18200 Hawthorne Blvd)				Dwy 002/(18200 Hawthorne Blvd)					
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU		
7:00 AM	0	0	4	0	0	0	0	0	0	0	0	0	0	0	8	0	12	
7:15 AM	0	0	7	0	0	0	0	0	0	0	0	0	0	0	11	0	18	
7:30 AM	0	0	9	0	0	0	0	0	0	0	0	0	0	0	14	0	23	
7:45 AM	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10	0	20	
8:00 AM	0	0	7	0	0	0	0	0	0	0	0	0	0	0	13	0	20	
8:15 AM	0	0	9	0	0	0	0	0	0	0	0	0	0	0	8	0	17	
8:30 AM	0	0	5	0	0	0	0	0	0	0	0	0	0	0	19	0	24	
8:45 AM	0	0	9	0	0	0	0	0	0	0	0	0	0	0	13	0	22	
<b>TOTAL VOLUMES :</b>	0	0	60	0	0	0	0	0	0	0	0	0	0	0	96	0	156	
<b>APPROACH %'s :</b>	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%		
<b>PEAK HR :</b>	<b>08:00 AM - 09:00 AM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL :</b>	0	0	30	0	0	0	0	0	0	0	0	0	0	0	53	0	83	
<b>PEAK HR FACTOR :</b>	0.000	0.000	0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.697	0.000	0.865	
	0.833																0.697	
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
11:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0		29
11:15 AM	0	0	6	0	0	0	0	0	0	0	0	0	0	0	23	0	26	
11:30 AM	0	0	11	0	0	0	0	0	0	0	0	0	0	0	15	0	40	
11:45 AM	0	0	12	0	0	0	0	0	0	0	0	0	0	0	28	0	44	
12:00 PM	0	0	12	0	0	0	0	0	0	0	0	0	0	0	32	0	44	
12:00 PM	0	0	22	0	0	0	0	0	0	0	0	0	0	0	24	0	46	
12:15 PM	0	0	24	0	0	0	0	0	0	0	0	0	0	0	32	0	56	
12:30 PM	0	0	30	0	0	0	0	0	0	0	0	0	0	0	28	0	58	
12:45 PM	0	0	14	0	0	0	0	0	0	0	0	0	0	0	42	0	56	
<b>TOTAL VOLUMES :</b>	0	0	131	0	0	0	0	0	0	0	0	0	0	0	224	0	355	
<b>APPROACH %'s :</b>	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%		
<b>PEAK HR :</b>	<b>12:00 PM - 01:00 PM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL :</b>	0	0	90	0	0	0	0	0	0	0	0	0	0	0	126	0	216	
<b>PEAK HR FACTOR :</b>	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.931	
	0.750																0.750	
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL	
4:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0		41
4:15 PM	0	0	10	0	0	0	0	0	0	0	0	0	0	0	31	0	35	
4:30 PM	0	0	10	0	0	0	0	0	0	0	0	0	0	0	25	0	31	
4:30 PM	0	0	18	0	0	0	0	0	0	0	0	0	0	0	13	0	31	
4:45 PM	0	0	18	0	0	0	0	0	0	0	0	0	0	0	28	0	46	
5:00 PM	0	0	8	0	0	0	0	0	0	0	0	0	0	0	20	0	28	
5:15 PM	0	0	14	0	0	0	0	0	0	0	0	0	0	0	18	0	32	
5:30 PM	0	0	17	0	0	0	0	0	0	0	0	0	0	0	17	0	34	
5:45 PM	0	0	14	0	0	0	0	0	0	0	0	0	0	0	30	0	44	
<b>TOTAL VOLUMES :</b>	0	0	109	0	0	0	0	0	0	0	0	0	0	0	182	0	291	
<b>APPROACH %'s :</b>	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%		
<b>PEAK HR :</b>	<b>04:00 PM - 05:00 PM</b>																<b>TOTAL</b>	
<b>PEAK HR VOL :</b>	0	0	56	0	0	0	0	0	0	0	0	0	0	0	97	0	153	
<b>PEAK HR FACTOR :</b>	0.000	0.000	0.778	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.782	0.000	0.832	
	0.778																0.782	



### IN & OUT

Dwy 001/(18200 Hawthorne Blvd) & 182nd St

Day: Wednesday  
Date: 3/13/2019

City: Torrance  
Project #: CA19\_5112\_001

DAILY TOTALS				IN	OUT					Total	
				1,422	809					2,231	
AM Period	IN	OUT		TOTAL	PM Period	IN	OUT		TOTAL		
0:00	1	4		5	12:00	30	22		52		
0:15	1	1		2	12:15	27	13		40		
0:30	0	0		0	12:30	19	12		31		
0:45	0	2	0	5	12:45	27	103	17	64	44	167
1:00	1	1		2	13:00	43	24		67		
1:15	0	0		0	13:15	27	12		39		
1:30	0	0		0	13:30	24	11		35		
1:45	0	1	0	1	13:45	32	126	16	63	48	189
2:00	0	0		0	14:00	21	16		37		
2:15	1	0		1	14:15	27	12		39		
2:30	0	0		0	14:30	25	14		39		
2:45	0	1	0	1	14:45	24	97	11	53	35	150
3:00	0	0		0	15:00	20	21		41		
3:15	0	0		0	15:15	24	13		37		
3:30	1	0		1	15:30	30	11		41		
3:45	0	1	0	1	15:45	22	96	8	53	30	149
4:00	0	0		0	16:00	22	15		37		
4:15	0	0		0	16:15	23	16		39		
4:30	1	0		1	16:30	22	16		38		
4:45	0	1	0	1	16:45	28	95	8	55	36	150
5:00	1	0		1	17:00	29	24		53		
5:15	3	0		3	17:15	27	14		41		
5:30	2	0		2	17:30	24	15		39		
5:45	2	8	1	1	17:45	24	104	10	63	34	167
6:00	2	2		4	18:00	24	16		40		
6:15	2	0		2	18:15	25	16		41		
6:30	11	5		16	18:30	21	18		39		
6:45	11	26	2	9	18:45	27	97	16	66	43	163
7:00	10	6		16	19:00	23	11		34		
7:15	12	7		19	19:15	25	9		34		
7:30	17	9		26	19:30	18	11		29		
7:45	10	49	8	30	19:45	19	85	12	43	31	128
8:00	16	11		27	20:00	20	7		27		
8:15	12	8		20	20:15	18	10		28		
8:30	23	13		36	20:30	24	16		40		
8:45	17	68	12	44	20:45	22	84	6	39	28	123
9:00	12	8		20	21:00	18	14		32		
9:15	15	9		24	21:15	15	6		21		
9:30	19	8		27	21:30	19	13		32		
9:45	16	62	3	28	21:45	15	67	17	50	32	117
10:00	15	13		28	22:00	10	7		17		
10:15	23	14		37	22:15	2	4		6		
10:30	24	13		37	22:30	4	4		8		
10:45	28	90	12	52	22:45	2	18	1	16	3	34
11:00	30	19		49	23:00	2	5		7		
11:15	30	17		47	23:15	0	0		0		
11:30	38	17		55	23:30	0	0		0		
11:45	38	136	15	68	23:45	3	5	1	6	4	11
<b>TOTALS</b>	<b>445</b>	<b>238</b>		<b>683</b>	<b>TOTALS</b>	<b>977</b>	<b>571</b>		<b>1548</b>		
<b>SPLIT %</b>	<b>65.2%</b>	<b>34.8%</b>		<b>30.6%</b>	<b>SPLIT %</b>	<b>63.1%</b>	<b>36.9%</b>		<b>69.4%</b>		

DAILY TOTALS				IN	OUT					Total
				1,422	809					2,231
AM Peak Hour	11:00	11:15		11:15	PM Peak Hour	13:00	12:15		13:00	
AM Pk Volume	136	71		207	PM Pk Volume	126	66		189	
Pk Hr Factor	0.895	0.807		0.941	Pk Hr Factor	0.733	0.688		0.705	
7 - 9 Volume	117	74		191	4 - 6 Volume	199	118		317	
7 - 9 Peak Hour	8:00	8:00		8:00	4 - 6 Peak Hour	16:45	16:15		16:45	
7 - 9 Pk Volume	68	44		112	4 - 6 Pk Volume	108	64		169	
Pk Hr Factor	0.739	0.846		0.778	Pk Hr Factor	0.931	0.667		0.797	

### IN & OUT

Hawthorne Blvd & Dwy 002/(18200 Hawthorne Blvd)

Day: Wednesday  
Date: 3/13/2019

City: Torrance  
Project #: CA19\_5112\_002

DAILY TOTALS				IN	OUT					Total
				848	1,461					2,309
AM Period	IN	OUT		TOTAL	PM Period	IN	OUT		TOTAL	
0:00	0	0		0	12:00	22	24		46	
0:15	2	4		6	12:15	24	32		56	
0:30	0	0		0	12:30	30	28		58	
0:45	0	2	0	4	12:45	14	90	42	126	
1:00	0	0		0	13:00	17	39		56	
1:15	1	1		2	13:15	21	28		49	
1:30	0	0		0	13:30	30	44		74	
1:45	0	1	0	1	13:45	19	87	34	145	
2:00	0	0		0	14:00	21	31		52	
2:15	0	0		0	14:15	17	32		49	
2:30	0	1		1	14:30	14	31		45	
2:45	0	0		1	14:45	17	69	31	125	
3:00	0	0		0	15:00	18	26		44	
3:15	0	0		0	15:15	16	19		35	
3:30	0	0		0	15:30	18	27		45	
3:45	0	0		0	15:45	14	66	31	103	
4:00	0	0		0	16:00	10	31		41	
4:15	0	1		1	16:15	10	25		35	
4:30	0	0		0	16:30	18	13		31	
4:45	0	0		1	16:45	18	56	28	97	
5:00	0	0		0	17:00	8	20		28	
5:15	0	1		1	17:15	14	18		32	
5:30	0	1		1	17:30	17	17		34	
5:45	0	0		2	17:45	14	53	30	85	
6:00	2	1		3	18:00	19	38		57	
6:15	0	0		0	18:15	21	23		44	
6:30	5	0		5	18:30	8	17		25	
6:45	5	12	10	11	18:45	11	59	22	100	
7:00	4	8		12	19:00	9	25		34	
7:15	7	11		18	19:15	16	19		35	
7:30	9	14		23	19:30	14	28		42	
7:45	10	30	10	43	19:45	18	57	18	90	
8:00	7	13		20	20:00	17	19		36	
8:15	9	8		17	20:15	16	34		50	
8:30	5	19		24	20:30	12	29		41	
8:45	9	30	13	53	20:45	12	57	22	104	
9:00	6	11		17	21:00	15	27		42	
9:15	7	18		25	21:15	14	24		38	
9:30	7	10		17	21:30	11	20		31	
9:45	10	30	10	49	21:45	14	54	24	95	
10:00	5	17		22	22:00	3	20		23	
10:15	7	17		24	22:15	6	17		23	
10:30	11	14		25	22:30	4	10		14	
10:45	16	39	21	69	22:45	1	14	7	54	
11:00	6	23		29	23:00	0	4		4	
11:15	11	15		26	23:15	1	1		2	
11:30	12	28		40	23:30	0	0		0	
11:45	12	41	32	98	23:45	0	1	0	5	
<b>TOTALS</b>	<b>185</b>	<b>332</b>		<b>517</b>	<b>TOTALS</b>	<b>663</b>	<b>1129</b>		<b>1792</b>	
<b>SPLIT %</b>	<b>35.8%</b>	<b>64.2%</b>		<b>22.4%</b>	<b>SPLIT %</b>	<b>37.0%</b>	<b>63.0%</b>		<b>77.6%</b>	

DAILY TOTALS				IN	OUT					Total
				848	1,461					2,309
AM Peak Hour	11:45	11:30		11:45	PM Peak Hour	13:15	12:45		12:45	
AM Pk Volume	88	116		204	PM Pk Volume	91	153		235	
Pk Hr Factor	0.733	0.906		0.879	Pk Hr Factor	0.758	0.869		0.794	
7 - 9 Volume	60	96		156	4 - 6 Volume	109	182		291	
7 - 9 Peak Hour	7:30	8:00		8:00	4 - 6 Peak Hour	16:30	16:00		16:00	
7 - 9 Pk Volume	35	53		83	4 - 6 Pk Volume	58	97		153	
Pk Hr Factor	0.875	0.697		0.865	Pk Hr Factor	0.806	0.782		0.832	

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

## **Queuing Studies**

### **➤ Drive-Through Queuing Study**

- Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA**
  - 2020 Driveway and Pick-Up  
Window Queue Analysis**

**Chick-fil-A**

18200 Hawthorne Blvd  
 Torrance, CA 90504  
 Thursday, 10/01/20

**QUEUE STUDY**

Prepared by:  
 AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	From Order Board to Pick-Up	Queue 1 to Order Board	Queue 2 to Order Board	Total Queue	Volume leaving the Pick-Up Window
11:00 AM	6	4	4	14	6
11:05 AM	6	4	5	15	12
11:10 AM	6	3	5	14	10
11:15 AM	5	3	5	13	10
11:20 AM	7	4	8	19	12
11:25 AM	6	4	6	16	7
11:30 AM	6	3	2	11	7
11:35 AM	6	4	3	13	11
11:40 AM	7	4	5	16	9
11:45 AM	6	4	4	14	13
11:50 AM	6	4	8	18	11
11:55 AM	5	2	4	11	7
12:00 PM	6	3	4	13	7
12:05 PM	5	4	5	14	13
12:10 PM	6	4	5	15	8
12:15 PM	7	4	5	16	11
12:20 PM	6	5	4	15	10
12:25 PM	6	6	6	18	5
12:30 PM	7	6	8	21	12
12:35 PM	6	8	9	23	12
12:40 PM	6	7	7	20	12
12:45 PM	6	9	6	21	14
12:50 PM	6	4	5	15	7
12:55 PM	7	4	4	15	8
1:00 PM	4	1	3	8	7
1:05 PM	6	3	2	11	5
1:10 PM	6	4	6	16	7
1:15 PM	6	4	5	15	13
1:20 PM	6	4	4	14	10
1:25 PM	3	3	4	10	4
1:30 PM	6	5	5	16	12
1:35 PM	6	1	2	9	6
1:40 PM	6	2	2	10	5
1:45 PM	5	6	9	20	7
1:50 PM	6	8	10	24	12
1:55 PM	6	4	6	16	10
2:00 PM	6	5	6	17	9

# Chick-fil-A

18200 Hawthorne Blvd  
Torrance, CA 90504  
Thursday, 10/01/20

## QUEUE STUDY

Prepared by:  
AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	From Order Board to Pick-Up	Queue 1 to Order Board	Queue 2 to Order Board	Total Queue	Volume leaving the Pick-Up Window
4:00 PM	6	4	8	18	8
4:05 PM	6	2	5	13	6
4:10 PM	6	4	6	16	9
4:15 PM	6	5	7	18	5
4:20 PM	5	4	8	17	6
4:25 PM	5	3	9	17	7
4:30 PM	5	3	7	15	5
4:35 PM	6	4	6	16	3
4:40 PM	6	3	6	15	9
4:45 PM	6	5	8	19	8
4:50 PM	5	4	6	15	5
4:55 PM	4	4	6	14	4
5:00 PM	6	4	8	18	7
5:05 PM	5	7	10	22	6
5:10 PM	6	6	12	24	7
5:15 PM	6	5	10	21	9
5:20 PM	5	3	13	21	7
5:25 PM	6	4	10	20	9
5:30 PM	6	6	8	20	11
5:35 PM	6	5	7	18	8
5:40 PM	6	8	7	21	3
5:45 PM	5	6	8	19	8
5:50 PM	6	5	9	20	3
5:55 PM	7	5	9	21	5
6:00 PM	6	6	19	31	11
6:05 PM	6	6	15	27	7
6:10 PM	6	6	21	33	10
6:15 PM	5	13	15	33	8
6:20 PM	6	15	13	34	4
6:25 PM	6	11	11	28	7
6:30 PM	6	8	12	26	10
6:35 PM	6	9	7	22	10
6:40 PM	6	8	6	20	7
6:45 PM	6	9	7	22	11
6:50 PM	7	7	6	20	11
6:55 PM	6	5	6	17	12
7:00 PM	6	8	5	19	10

**Chick-fil-A**

18200 Hawthorne Blvd  
 Torrance, CA 90504  
 Thursday, 10/01/20

**Driveway Enter/Exit Volume Study**

Prepared by:  
 AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	Driveway 1 (Hawthorne)		Combined (Driveway 1)	Driveway 2		Combined (Driveway 2)			
	Enter	Exit		Enter	Exit		Enter	Exit	Total
11:00 AM	19	30	49	19	7	26			
11:15 AM	24	29	53	20	7	27	Pk Hour		
11:30 AM	21	22	43	13	13	26			
11:45 AM	21	30	51	24	12	36	Enter	Exit	Total
12:00 PM	20	38	58	24	8	32	167	159	326
12:15 PM	23	30	53	10	2	12			
12:30 PM	18	40	58	17	3	20			
12:45 PM	15	26	41	17	5	22			
1:00 PM	21	24	45	19	8	27			
1:15 PM	13	24	37	14	13	27			
1:30 PM	17	18	35	18	9	27			
1:45 PM	9	30	39	17	5	22			
4:00 PM	12	21	33	11	7	18			
4:15 PM	6	11	17	15	8	23			
4:30 PM	14	17	31	7	5	12			
4:45 PM	20	16	36	14	6	20			
5:00 PM	11	26	37	12	3	15			
5:15 PM	16	22	38	12	4	16	Pk Hour		
5:30 PM	9	25	34	19	5	24			
5:45 PM	18	27	45	13	1	14	Enter	Exit	Total
6:00 PM	15	28	43	9	1	10	111	113	224
6:15 PM	15	23	38	12	0	12			
6:30 PM	13	32	45	17	0	17			
6:45 PM	8	25	33	17	1	18			

**Chick-fil-A**

18200 Hawthorne Blvd

Torrance, CA 90504

Saturday, 10/17/20

**QUEUE STUDY**

Prepared by:

AimTD LLC

[cs@aimtd.com](mailto:cs@aimtd.com)

Time	From Order Board to Pick-Up	Queue 1 to Order Board	Queue 2 to Order Board	Total Queue	Volume leaving the Pick-Up Window
11:00 AM	6	9	8	23	4
11:05 AM	7	7	6	20	7
11:10 AM	6	7	7	20	12
11:15 AM	5	5	4	14	6
11:20 AM	6	4	4	14	7
11:25 AM	7	5	4	16	6
11:30 AM	6	4	3	13	9
11:35 AM	6	3	4	13	8
11:40 AM	6	6	5	17	4
11:45 AM	7	5	3	15	8
11:50 AM	5	3	4	12	12
11:55 AM	4	3	2	9	8
12:00 PM	6	5	4	15	6
12:05 PM	7	7	6	20	3
12:10 PM	7	12	8	27	9
12:15 PM	6	10	6	22	12
12:20 PM	7	9	7	23	11
12:25 PM	5	12	6	23	12
12:30 PM	6	11	7	24	4
12:35 PM	6	10	8	24	8
12:40 PM	7	10	11	28	11
12:45 PM	6	6	9	21	9
12:50 PM	6	9	6	21	11
12:55 PM	6	7	8	21	11
1:00 PM	7	11	12	30	9
1:05 PM	6	12	13	31	8
1:10 PM	6	10	11	27	10
1:15 PM	7	9	8	24	11
1:20 PM	7	8	9	24	8
1:25 PM	7	10	11	28	5
1:30 PM	6	11	12	29	13
1:35 PM	7	11	9	27	6
1:40 PM	6	10	8	24	11
1:45 PM	6	11	9	26	9
1:50 PM	7	12	11	30	9
1:55 PM	7	14	7	28	5
2:00 PM	6	15	8	29	11

# Chick-fil-A

18200 Hawthorne Blvd  
Torrance, CA 90504  
Saturday, 10/17/20

## QUEUE STUDY

Prepared by:  
AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	From Order Board to Pick-Up	Queue 1 to Order Board	Queue 2 to Order Board	Total Queue	Volume leaving the Pick-Up Window
4:30 PM	5	5	4	14	1
4:35 PM	5	7	5	17	6
4:40 PM	6	9	6	21	9
4:45 PM	6	7	6	19	8
4:50 PM	6	10	7	23	7
4:55 PM	5	8	9	22	10
5:00 PM	6	11	8	25	5
5:05 PM	6	9	6	21	11
5:10 PM	6	5	5	16	10
5:15 PM	7	8	7	22	11
5:20 PM	6	7	9	22	7
5:25 PM	6	10	8	24	7
5:30 PM	6	6	7	19	5
5:35 PM	7	5	6	18	9
5:40 PM	6	5	6	17	9
5:45 PM	7	7	6	20	10
5:50 PM	7	6	7	20	8
5:55 PM	6	9	7	22	8
6:00 PM	6	8	7	21	4
6:05 PM	6	10	8	24	9
6:10 PM	6	9	6	21	10
6:15 PM	5	11	7	23	9
6:20 PM	6	9	8	23	8
6:25 PM	7	8	6	21	11
6:30 PM	6	6	4	16	7
6:35 PM	6	5	4	15	5
6:40 PM	6	4	8	18	12
6:45 PM	5	7	6	18	8
6:50 PM	6	11	7	24	7
6:55 PM	6	12	9	27	6
7:00 PM	6	11	9	26	12
7:05 PM	6	7	7	20	11
7:10 PM	6	9	10	25	10
7:15 PM	6	8	12	26	7
7:20 PM	7	13	9	29	6
7:25 PM	6	14	9	29	13
7:30 PM	6	13	8	27	5



**Chick-fil-A**

18200 Hawthorne Blvd  
 Torrance, CA 90504  
 Saturday, 10/17/20

**Driveway Enter/Exit Volume Study**

Prepared by:  
 AimTD LLC  
[cs@aimtd.com](mailto:cs@aimtd.com)

Time	Driveway 1 (Hawthorne)		Combined (Driveway 1)	Driveway 2		Combined (Driveway 2)			
	Enter	Exit		Enter	Exit		Enter	Exit	Total
11:00 AM	15	23	38	12	16	28			
11:15 AM	16	19	35	19	18	37	Pk Hour		
11:30 AM	18	17	35	21	11	32			
11:45 AM	10	22	32	14	21	35	Enter	Exit	Total
12:00 PM	21	18	39	28	11	39	147	137	284
12:15 PM	25	37	62	16	7	23			
12:30 PM	20	30	50	23	4	27			
12:45 PM	19	33	52	21	4	25			
1:00 PM	22	29	51	14	7	21			
1:15 PM	16	25	41	16	10	26			
1:30 PM	21	37	58	30	10	40			
1:45 PM	19	28	47	21	5	26			
4:30 PM	18	16	34	13	6	19			
4:45 PM	14	27	41	22	10	32			
5:00 PM	14	26	40	8	8	16			
5:15 PM	15	17	32	19	9	28			
5:30 PM	12	20	32	16	9	25			
5:45 PM	21	22	43	18	10	28			
6:00 PM	13	21	34	14	5	19			
6:15 PM	15	30	45	28	7	35	Pk Hour		
6:30 PM	12	28	40	18	12	30			
6:45 PM	19	25	44	27	10	37	Enter	Exit	Total
7:00 PM	13	30	43	17	10	27	149	152	301
7:15 PM	25	30	55	18	8	26			

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Queuing Studies**

➤ **Drive-Through Queuing Study**

- **Chick-fil-A at 18200 Hawthorne Blvd,  
Torrance, CA – Sales Percentages**

**Pre-COVID-19 Sales Percentages**

<b>Monthend Date</b>	<b>Dine In</b>	<b>To Go</b>	<b>Drive Thru</b>
March 2019	20.6%	31.1%	48.3%
April 2019	20.6%	29.8%	49.6%
May 2019	19.4%	30.6%	50.0%
June 2019	20.8%	32.0%	47.2%
July 2019	21.5%	30.4%	48.1%
August 2019	20.9%	31.6%	47.5%
September 2019	19.8%	32.9%	47.3%
October 2019	20.4%	29.0%	50.6%
November 2019	20.5%	28.9%	50.6%
December 2019	20.0%	30.3%	49.7%
January 2020	20.6%	29.0%	50.4%
February 2020	19.9%	30.1%	50.0%
<b>Grand Total</b>	<b>20.4%</b>	<b>30.5%</b>	<b>49.1%</b>

**50.9%**

**Post-COVID-19 Sales Percentages**

<b>Monthend Date</b>	<b>Dine In</b>	<b>To Go/Pick-UP</b>	<b>Drive Thru</b>
April 2020	0.0%	26.8%	73.2%
May 2020	0.2%	22.2%	77.5%
June 2020	0.3%	24.1%	75.6%
July 2020	0.5%	25.1%	74.4%
August 2020	0.1%	26.2%	73.7%
September 2020	0.0%	29.4%	70.5%
<b>Grand Total</b>	<b>0.2%</b>	<b>25.6%</b>	<b>74.2%</b>

**190<sup>th</sup> Street and Western Avenue  
Redevelopment Project  
Traffic Circulation Analysis (TCA)**

**Queuing Studies**

➤ **Drive-Through Queuing Study**

- **Shake Shack at 2171 Rosecrans Ave, El Segundo, CA**

### Shake Shack Survey - Weekday Afternoon

2171 Rosecrans Ave  
El Segundo, CA 90245

6/30/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
11:00 AM	3	1	0	0	2	1	0	0	1(2), 3(1)
11:15 AM	1	4	1	0	1	0	0	0	1(3), 2(2), 1(2)
11:30 AM	12	4	1	0	16	3	1	0	3(2), 10(1), 1(3)
11:45 AM	11	2	1	0	3	2	1	0	1(3), 4(1), 2(2)
12:00 PM	8	2	1	1(4)	5	2	0	0	3(1), 1(4), 1(3)
12:15 PM	8	1	4	0	5	2	2	0	6(1), 1(2), 1(3)
12:30 PM	13	1	0	0	12	2	1	1(4)	6(1), 1(2)
12:45 PM	8	4	2	0	5	5	3	0	4(1), 2(2), 2(3)
1:00 PM	13	3	0	1(4)	7	4	3	0	5(1), 1(4), 3(2)
1:15 PM	13	4	0	1(4), 1(5)	20	1	1	0	6(1), 3(2), 1(3), 1(4)
1:30 PM	12	2	0	2(4)	20	4	2	1(4)	5(1), 2(2), 1(3), 2(4)
1:45 PM	2	2	0	1(9)	11	1	0	1(5)	2(4), 2(2), 3(1)
TOTAL	104	30	10	7	107	27	14	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
4	3			4	
6	1			4	
17	20			14	
14	6	41	30	7	29
12	7	49	34	5	30
13	9	56	42	8	34
14	16	53	38	7	27
14	13	53	45	8	28
17	14	58	52	9	32
19	22	64	65	11	35
16	27	66	76	10	38
5	13	57	76	7	37

assume enter = exit (50/50)

Prepared by AimTD LLC  
714.253.7888  
cs@aimtd.com

NOTES: 4 people were inside of the restaurant before 11 AM

	Pk Hr		Total
	Enter	Exit	
<b>Pk Hr Total Entering and Exiting</b>	<b>66</b>	<b>76</b>	<b>142</b>
<b>Pk Hr from Veh Parking</b>	<b>38</b>	<b>38</b>	<b>76</b>
<b>Difference Pk Hr (A-C, B-C) = Walk-Ins</b>	<b>28</b>	<b>38</b>	<b>66</b>

### Shake Shack Survey - Weekday PM

2171 Rosecrans Ave  
El Segundo, CA 90245

6/30/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	Group of 4/5 Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4/5 Exit	Vehicles parked for Shake Shack and (# of people)
4:00 PM	10	1	2	0	9	1	0	0	1(3), 5(1), 1(2)
4:15 PM	2	2	0	1(4)	5	4	0	0	1(2), 1(1)
4:30 PM	4	2	1	0	5	2	1	0	1(3), 2(2), 3(1)
4:45 PM	3	2	2	0	6	0	1	0	1(3), 1(2)
5:00 PM	7	2	2	0	8	1	1	1(4)	4(1), 1(2), 1(3)
5:15 PM	5	2	0	0	4	1	2	0	3(1), 2(2)
5:30 PM	7	4	1	0	6	3	0	0	5(1), 3(2), 1(3)
5:45 PM	11	1	2	0	9	2	1	0	7(1), 2(2)
6:00 PM	4	4	1	0	4	3	1	0	2(1), 2(2), 1(3)
6:15 PM	8	0	1	1(5)	7	3	1	0	6(1), 1(3)
6:30 PM	11	4	1	1(7)	12	3	1	0	3(3), 2(2), 1(4), 5(1)
6:45 PM	9	2	2	2	10	2	2	1(7)	4(1), 2(2), 2(3), 2(4)
<b>TOTAL</b>	<b>81</b>	<b>26</b>	<b>15</b>	<b>6</b>	<b>85</b>	<b>25</b>	<b>11</b>	<b>1</b>	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
13	10			7	
5	9			2	
7	8			6	
7	7	32	34	2	17
11	11	30	35	6	16
7	7	32	33	5	19
12	9	37	34	9	22
14	12	44	39	9	29
9	8	42	36	5	28
10	11	45	40	7	30
17	16	50	47	11	32
15	15	<b>51</b>	<b>50</b>	10	<b>33</b>

assume enter = exit (50/50)

Prepared by AimTD LLC  
sc@aimtd.com

	Pk Hr		Total
	Enter	Exit	
<b>Pk Hr Total Entering and Exiting</b>	<b>51</b>	<b>50</b>	<b>101</b>
<b>Pk Hr from Veh Parking</b>	<b>33</b>	<b>33</b>	<b>66</b>
<b>Difference Pk Hr (A-C, B-C) = Walk-Ins</b>	<b>18</b>	<b>17</b>	<b>35</b>

### Shake Shack Survey - Saturday Afternoon

2171 Rosecrans Ave  
El Segundo, CA 90245

7/10/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
11:00 AM	5	0	1	0	1	0	0	0	6(1), 1(3)
11:15 AM	5	0	0	1(5)	6	0	0	0	5(1), 1(5)
11:30 AM	6	8	0	1(4)	8	0	0	0	6(1), 1(4), 6(2)
11:45 AM	12	1	2	0	6	3	2	1(4)	11(1), 1(2), 2(3)
12:00 PM	4	6	4	0	8	4	3	0	4(1), 6(2), 4(3)
12:15 PM	7	3	2	1(5)	9	4	2	1(4)	7(1), 3(2), 2(3)
12:30 PM	8	1	2	2(4)	11	3	0	0	8(1), 1(2), 2(3), 2(4)
12:45 PM	4	1	2	0	6	3	1	0	4(1), 1(2), 2(3)
1:00 PM	8	3	2	0	6	3	3	1(4)	8(1), 3(2), 2(3)
1:15 PM	4	3	2	0	5	3	2	1(4)	4(1), 3(2),
1:30 PM	11	1	1	1(4)	4	5	2	0	10(1), 1(2), 1(3)
1:45 PM	5	3	0	1(4)	3	2	1	0	5(1), 3(2), 1(4)
TOTAL	79	30	18	7	73	30	16	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
6	1			7	
6	6			6	
15	8			13	
15	12	42	27	14	40
14	15	50	41	14	47
13	16	57	51	12	53
13	14	55	57	13	53
7	10	47	55	7	46
13	13	46	53	13	45
9	11	42	48	7	40
14	11	43	45	12	39
9	6	45	41	9	41

assume enter = exit (50/50)

Prepared by AimTD LLC  
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	Pk Hr		
	Enter	Exit	Total
<b>Pk Hr Total Entering and Exiting</b>	<b>55</b>	<b>57</b>	<b>112</b>
<b>Pk Hr from Veh Parking</b>	<b>53</b>	<b>53</b>	<b>106</b>
<b>Difference Pk Hr (A-C, B-C) = Walk-Ins</b>	<b>2</b>	<b>4</b>	<b>6</b>

### Shake Shack Survey - Saturday PM

2171 Rosecrans Ave  
El Segundo, CA 90245

7/10/2021	Door Counts				Parking Counts				(C) Vehicles/People Parked to go to Shake Shack (included in (A) and (B))
	(A) Entering Shake Shack				(B) Exiting Shake Shack				
TIME	1 Person Enter	Group of 2 Enter	Group of 3 Enter	4 + Enter	1 Person Exit	Group of 2 Exit	Group of 3 Exit	Group of 4 + Exit	Vehicles parked for Shake Shack and (# of people)
4:00 PM	2	2	2	0	1	1	1	1(4)	2(1), 2(2), 2(3)
4:15 PM	3	2	1	1(4)	1	1	0	0	3(1), 2(2), 1(3)
4:30 PM	5	2	1	1(4)	7	2	3	0	5(1), 2(1), 1(3), 1(4)
4:45 PM	11	0	0	0	8	3	1	0	7(1)
5:00 PM	9	4	1	4(4)	12	3	1	0	9(1), 4(2), 1(3), 3(4)
5:15 PM	9	4	0	1(5)	2	2	1	1(4)	8(1), 4(2), 1(5)
5:30 PM	8	0	1	1(4)	7	3	2	1(4)	8(1), 1(3), 1(4)
5:45 PM	4	2	0	2(4)	10	2	1	3(4)	4(1), 2(2), 2(4)
6:00 PM	8	2	2	1(4)	5	2	1	1(5)	7(1), 2(2), 2(3), 1(4)
6:15 PM	3	1	1	2(4)	8	3	1	4(4)	2(1), 1(2), 1(3), 2(4)
6:30 PM	5	2	3	0	7	4	0	3(4)	4(1), 2(2), 3(3)
6:45 PM	5	5	1	1(4)	6	4	4	0	5(1), 5(2), 1(3), 1(4)
TOTAL	72	26	13	7	74	30	16	3	

(A) and (B) # of Groups				(C) # of Groups by Vehicles Parked	
15 min		Pk Hr		(C) Parked/Enterd	
(A) Enter	(B) Exit	(A) Enter	(B) Exit	15 min	Pk Hr
6	4			6	
7	2			6	
9	12			9	
11	12	33	30	7	28
18	16	45	42	17	39
14	6	52	46	13	46
10	13	53	47	10	47
8	16	50	51	8	48
13	9	45	44	12	43
7	16	38	54	6	36
10	14	38	55	9	35
12	14	42	53	12	39

assume enter = exit (50/50)

Prepared by AimTD LLC  
714.253.7888  
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	Pk Hr		
	Enter	Exit	Total
<b>Pk Hr Total Entering and Exiting</b>	<b>50</b>	<b>51</b>	<b>101</b>
<b>Pk Hr from Veh Parking</b>	<b>48</b>	<b>48</b>	<b>96</b>
<b>Difference Pk Hr (A-C, B-C) = Walk-Ins</b>	<b>2</b>	<b>3</b>	<b>5</b>