Park Boulevard Bikeway

Traffic and Safety Impact Assessment

Final Report

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Executive Summary

This Traffic and Safety Impact Assessment (TSIA) analyzes the potential impacts of the Park Boulevard Bikeway ("proposed project") to vehicular traffic operations and to safety for people who walk and bike. Preparation of this TSIA is required before the San Diego Association of Governments (SANDAG), the project's lead agency, can determine whether the proposed project is exempt from the California Environmental Quality Act (CEQA) under Public Resources Code Section 21080.20.5.

The proposed project will make it easier and safer for people of all ages and abilities to walk and bike within San Diego's Uptown and North Park communities and provide a safe and comfortable connection to Balboa Park. It will provide a key connection between the Uptown Bikeways and the North Park-Mid City Bikeways, which will provide 25 miles of high-quality bikeways connecting the Downtown, Uptown, Old Town, North Park, and Mid City communities and Balboa Park. The Park Boulevard Bikeway project is consistent with plans to provide an enhanced bicycle facility along Park Boulevard. Both the North Park and Uptown Community Plans (2016) specify an enhanced bikeway on Park Boulevard between Robinson Avenue and Upas Street, and the project is recommended in the SANDAG Regional Bike Plan Early Action Program (2013) (Project #7). The proposed project includes design elements and traffic safety measures that will enhance the experience for people biking and walking, make streets safer for all users, and benefit people who live, recreate, work, and do business in the neighborhoods served by the proposed project.

The Park Boulevard Bikeway runs along Park Boulevard from Robinson Avenue to Upas Street. It connects to the Eastern Hillcrest Bikeways to the west and the Robinson Avenue Bikeway to the east. The bikeway consists of a bike lane in each direction with buffers between the driving lane and parking lane between Robinson Avenue and Myrtle Avenue. The project will be achieved by repurposing one northbound through lane between Robinson Avenue and Cypress Avenue into a northbound bike lane and restriping the existing bike lanes through the rest of the study area to provide space for the extra buffer. The bikeway is enhanced by treatments such as a modified protected intersection at the Park Boulevard / Robinson Avenue / Indiana Street intersection. The typical section of the proposed project generally includes one travel lane in each direction, a center left-turn lane, two double-buffered bike lanes, and two parallel parking lanes.

OTHER IMPROVEMENTS

In addition to the buffered bike lanes and modified protected intersection, the project proposes several other treatments to facilitate the safe and comfortable movement of people walking, biking, and driving along the corridor. Other improvements that may be installed as part of the proposed project could include the following: new high-visibility "continental" crosswalks, directional curb ramps replacing diagonal curb ramps, bike boxes and two-stage turn queue boxes, leading pedestrian intervals (LPIs) for people walking and biking, a new northbound left-turn lane, protected north and southbound left-turn phasing, sidewalk enhancements, modifications to existing curbs, gutters and drainage inlets, colored concrete and/or colored pavement, bicycle intersection crossing (or "conflict") markings, new signage, re-striping of travel lanes, landscaping or other measures to treat storm water, relocating existing utilities, and similar minor physical improvements.

SAFETY IMPACTS FOR PEOPLE WHO WALK AND BIKE

The TSIA concludes that the proposed project will result in potential safety benefits for people that walk and bike in the project area. The proposed project will decrease the level of traffic stress for people biking

along and across roadways in the project area by installing double-buffered bike lanes, a modified protected intersection, modifying traffic signal phasing, repurposing a northbound travel lane, and other measures to help calm motor vehicle traffic. Therefore, the proposed project will not result in any adverse safety impacts for people who walk and bike, and consequently, no additional related safety mitigation measures beyond the project features are needed.

VEHICULAR TRAFFIC IMPACTS

The TSIA also concludes that the study area roadway segment and intersection will meet the City of San Diego's criteria for vehicular traffic conditions with implementation of the proposed project. Traffic impacts are analyzed in Sections 3.2 and 4.2 of this report.

SUMMARY OF CHANGES

- Safety for people who walk and bike along the corridor will improve with the proposed project;
- In proposing a doubled-buffered Class II bikeway, the proposed project is consistent with City plans to provide an enhanced bicycle facility along the corridor; and
- Under both existing and near-term (project opening day) analysis conditions, the one study intersection and one study roadway segment will operate at the City of San Diego's standards without and with the proposed project.

1.0 PROJECT DESCRIPTION

This chapter discusses the objectives of the proposed Park Boulevard Bikeway project, its design features and related physical improvements, and its anticipated safety features and potential safety benefits. This project is designed to increase safety and comfort for all roadway users by slowing vehicle traffic, providing designated space for people biking that is separate from where people drive, highlighting the presence of people who walk and bike, and enhancing safety at street crossings. The bikeway will link key origins and destinations including businesses, residences, schools, parks, and transit, in addition to providing a desired connection through the Hillcrest and North Park neighborhoods.

1.1 PROJECT OBJECTIVES

The proposed project is part of the San Diego Association of Governments (SANDAG) Regional Bike Plan Early Action Program (EAP), a 10-year effort to expand the regional bike network and complete high-priority bikeway projects approved in *Riding to 2050: The San Diego Regional Bike Plan* (Regional Bike Plan). The Regional Bike Plan and EAP are part of larger goals for the region to increase transportation choices and to make biking a viable, attractive transportation choice.

The project is also consistent with local plans to provide an enhanced bicycle facility along Park Boulevard. Both the Uptown and North Park Community Plans specify an enhanced bikeway on Park Boulevard from Upas Street to Robinson Avenue.

In addition to closing gaps within the larger bikeway network that is being planned throughout the region, one of the objectives of the proposed project is to create connections between the Uptown and North Park communities and Balboa Park, and to create safe operating space and improve safety for all roadway users, including people who walk, bike, take transit, and drive. The proposed project will achieve this through the implementation of Class II double-buffered bike lanes (made possible by repurposing of a travel lane), a modified protected intersection, traffic calming, shortened street crossing distances, realigned curb ramps, improved sight distances, and a traffic signal modification.

There is clear and consistent policy direction on the local, regional, and state levels to enhance safe and connected infrastructure that supports biking and walking as viable choices for everyday trips and to reduce greenhouse gas and other air pollutant emissions, including but not limited to:

- *Uptown Community Plan (2016)*
- *North Park Community Plan (2016)*
- *The City of San Diego Bicycle Master Plan (2013)*
- *The City of San Diego Climate Action Plan (2015)*
- *The SANDAG Regional Bike Plan (2010)*
- *San Diego Forward: The Regional Plan (2015)*
- *The SANDAG Climate Action Strategy (2010)*
- *Vision Zero San Diego (2015)*

Analysis of ninety large American cities confirmed a positive correlation between how many people ride bikes and the supply of bike paths and lanes, even when controlling for other factors such as city size, climate, topography, vehicle ownership, income, and student population (Buehler 2012). Building facilities for people that walk and bike enhances safety for all roadway users (FHWA 2015). A major reason existing

ridership levels in the region are not higher is due to high levels of perceived and actual risks associated with riding a bike on the street (SANDAG 2010). Based on case studies nationwide, a large percentage of the population currently "interested in biking, but concerned about safety," is expected to begin to ride and to ride more often, when served by a network of safe bikeways and low stress streets (NITC 2014).

Based on factors such as its already high numbers of people walking and biking, connectivity to destinations, facility gaps, incidence of collisions, and public comments related to problem areas, the Park Boulevard corridor was identified by SANDAG as an area where investments in bikeway infrastructure will yield substantial benefits. As a result, the proposed project is ranked as a "high-priority project" in the Regional Bike Plan (SANDAG 2010).

Described in greater detail, the purpose of this particular project is to provide livable, complete streets that serve people of all ages and abilities, and to design innovative facilities with appropriate separation from vehicular traffic, traffic calming elements, and end-of-trip facilities. The Park Boulevard Bikeway will improve, and complete, overall bicycle travel within and between the Uptown and North Park communities of San Diego by creating inviting and convenient bikeways that connect key community destinations, including schools, parks, transit stops, and commercial centers. In addition to enhancing mobility for people riding bikes, some of the improved locations will include pedestrian enhancements, as well as new opportunities for landscaped areas, resulting in multi-modal benefits to the overall circulation network, including enhanced safety.

The design features of the proposed project include:

- Double-buffered bike lanes
- A modified protected intersection
- High-visibility "continental" crosswalks
- Directional curb ramps replacing diagonal curb ramps
- Bike boxes and two-stage turn queue boxes
- Leading Pedestrian Intervals (LPIs) for people walking and biking
- A northbound left-turn lane
- Protected left-turn phasing (NB and SB)
- Colored and / or textured concrete / pavement
- Intersection crossing (or "conflict") markings
- No-Right-Turn-On Red signs for the eastbound and southbound approaches to the Robinson Avenue intersection

These features are described in detail in **Sections 1.2** and **1.3**.

1.2 PROJECT SAFETY AND POTENTIAL SAFETY BENEFITS

One of the major goals of the proposed project is to improve safety for all roadway users in the project area, including people of all ages and abilities who walk, bike, and drive. The proposed project aims to improve safety with double- buffered bike lanes, which provide dedicated space – along the roadway – for people who bike. The project also will improve conditions at intersections to enhance safety for people who walk, bike, and drive. These facilities provide varying degrees of perceived and actual safety desired by people who are interested in biking for transportation but are concerned about the safety of riding on streets with higher levels of traffic stress.

The following facility type is proposed as part of this project:

Class II Bike Lanes Including Buffered Bike Lanes – Class II bike lanes are facilities located in roadway right-of-way and separated from vehicle lanes with a painted stripe, and in this case two, two-foot buffers (also called double-buffered bike lanes). The double-buffered bike lanes include a buffer between the bike lane and both the parking lane and the through travel lane. These facilities have lower traffic stress by providing designated space and buffers, by way of striping, for people riding bikes. The parked car "door zone" buffer between the bike lane and the parking lane provides separation between people biking and drivers opening parked car doors that traditional buffered bike lanes do not provide.

TRAFFIC CALMING AND OTHER PROJECT FEATURES

Several traffic calming measures will be implemented as part of the proposed project, including a modified protected intersection and narrowing the road through repurposing a travel lane for a bikeway. These measures will encourage safe vehicle speeds, shorten crossing distances and exposure for people walking and biking, and increase the visibility of people walking and biking, thereby improving safety for people biking, walking, and driving. These features also will generally promote efficient travel for people who bike, walk, and drive.

Encouraging safe driving speeds through traffic calming helps attract a greater number of people to walk and bike. In addition, scientific studies have shown that when people walking or biking are involved in a collision with someone driving a vehicle, there is a significantly lower chance that they will be killed or suffer a serious injury when driving speeds on streets are maintained at less than 25 to 30 mph (Department for Transport 2010). For example, as shown in **Figure 1**, someone who is walking and is hit by a vehicle traveling at 20 mph has a 90 percent chance of survival, but the likelihood of survival decreases to 60 percent if the driver is traveling at 30 mph, and decreases further to 20 percent if the driver is traveling at 40 mph (SFMTA 2014). Each of the traffic calming treatments listed above is briefly described in the following paragraphs.

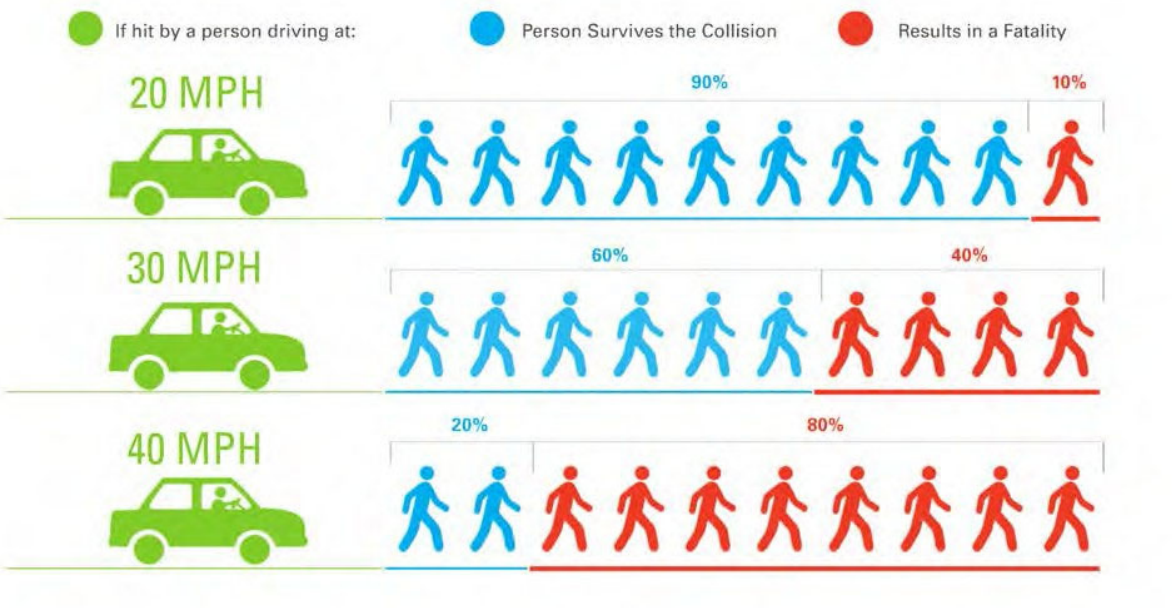

Figure 1 Pedestrian Survival Rate by Vehicle Speed (SFMTA 2014)

Protected Intersection

A protected intersection is a combination of curb extensions and bicycle lanes. This feature directs people biking onto a large curb extension, out of the intersection, so that they are physically separated from vehicles and more visible to drivers making right-turns. In some cases, people biking would cross during a protected bike phase using bike-specific signal heads during which no right-turns are allowed. The feature provides space for vehicles to yield to people walking and/or people riding bikes across the side streets without blocking traffic on the main street. Protected intersections also provide shorter crossing distances for people walking and help to define distinct travel ways for each mode (e.g., through pavement markings, colored material, or other treatment). Curb extensions, also known as bulb-outs, are extensions of the curb line into the roadway. They are common where on-street parking is available on a roadway. Bulb-outs are intended to be used for both pedestrian safety and traffic calming purposes. The extension of the curb provides a shorter length of roadway for people walking to cross. In the event a driver needs to make a turn, the shape of the bulb-out forces drivers to make a tighter turn, which encourages safer speeds.

Lane Repurposing and Roadway Narrowing

When a lane is repurposed, space is reallocated so the street functions more equitably and safely. In this project, space will be reallocated from a vehicular travel lane to infrastructure for biking. The reallocated space benefits those who live, work, and shop in the corridor, as well as those traveling through the area. Studies across the country have shown that lane repurposing can help to reduce speeding and increase safety (Florida Department of Transportation 2014).

Enhanced Crossings for People Walking

Crossings for people walking can be enhanced using a variety of treatments including high-visibility "continental" crosswalks, signing, curb extensions, an LPI, and other traffic control devices to increase driver awareness of people who walk across the vehicular travel way. A Leading Pedestrian/Bicyclist Interval provides people walking and biking a few seconds of lead time to enter an intersection prior to the corresponding vehicle green phase. This increases driver awareness to yield to people walking in the crosswalk, enhancing safety.

Bike Box

A bike box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase. Bike boxes increase visibility of bicyclists, facilitate bicyclist left-turn positioning at intersections during red signal indication, help prevent conflicts with right-turning vehicles at the start of the green signal, and group bicyclists together to clear an intersection quickly, minimizing impediment to transit or other traffic. Pedestrians also benefit from reduced vehicle encroachment into the crosswalk (NACTO 2014).

Two-Stage Turn Queue Box

Two-stage turn queue boxes offer bicyclists a safe way to make left turns at signalized intersections from a right-side cycle track or bike lane. Cycle track design often prevents bicyclists from merging into traffic to turn. This makes the provision of two-stage turns critical for basic transportation function. The same principles for two-stage turns apply to bike lanes as well (NACTO 2014).

1.3 DESCRIPTION OF DESIGN FEATURES AND RELATED PHYSICAL IMPROVEMENTS

The Park Boulevard Bikeway will improve north-south bicycle travel through the Uptown and North Park communities by creating an inviting and convenient bikeway that connects key community destinations, including schools, parks, transit stops, and commercial areas. **Figure 2** shows the bikeway alignment along Park Boulevard.

For the purposes of this analysis, the Park Boulevard Bikeway comprises the following street segments:

- Park Boulevard from Robinson Avenue to Cypress Avenue
- Park Boulevard from Cypress Avenue to 200 feet south of Myrtle Avenue

The Park Boulevard Bikeway officially extends to Upas Street. However, since the segment between Myrtle Avenue and Upas Street is a transition zone to existing conditions, it was not included in the analysis. The conceptual layout plans of the proposed bikeway and improvements are shown in **Appendix A.** The following description is based on the proposed project's current level of design and will be finalized during the final engineering design phase before construction.

Park Boulevard between Robinson Avenue and Cypress Avenue
In this segment, the project will repurpose a northbound through lane to provide double buffered bike lanes on both sides of the street. Parallel parking will remain on both sides of Park Boulevard, in between the curb and buffered bike lane. At the Park Boulevard / Robinson Avenue / Indiana Street intersection, a modified protected intersection will be implemented with a new exclusive northbound left-turn lane, protected left-turn phasing for the northbound and southbound approaches, high-visibility "continental" crosswalks, bike boxes, two-stage turn queue boxes, LPIs across all signalized legs, and green bike conflict markings across the north, south, east, and southeast legs of the intersection. The southbound left-turn lane will be restriped to provide 150 feet of storage, and the new northbound left-turn lane will provide approximately 190 feet of storage.

Park Boulevard between Cypress Avenue and Myrtle Avenue
Between Cypress Avenue and Myrtle Avenue, the proposed project will maintain the existing roadway configuration of a signal vehicle travel lane in each direction with a center left-turn lane, and will enhance the existing buffered bike lanes to include double buffers. The additional buffer will provide separation between people riding in the bike lane and parked vehicles to the right (in the "door zone"). Additionally, striped green bike crossings will be installed along Park Boulevard across the Myrtle Avenue, Brookes Avenue, and Cypress Avenue intersections.

Other Improvements
In addition to the improvements described in the preceding paragraphs, the proposed project proposes several other treatments to facilitate the safe and comfortable movement of people walking, biking, and driving along Park Boulevard. Other improvements that may be installed as part of the proposed project could include the following: new high-visibility "continental" crosswalks, directional curb ramps replacing diagonal curb ramps, sidewalk enhancements, modifications to existing curbs, gutters and drainage inlets, colored concrete and/or colored pavement, new signage, re-striping of travel lanes, landscaping or other measures to treat storm water, relocating existing utilities, and similar minor physical improvements.

Figure 3.1 and **3.2** show the existing and proposed project improvements on Park Boulevard.

Park Boulevard Bikeway
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Figure 2
Project Alignment and Proposed Improvements

FIGURE 3.1

PARK BOULEVARD BETWEEN ROBINSON AVENUE AND CYPRESS AVENUE

EXISTING AND PROPOSED CONDITIONS

EXISTING ISSUES

Because the intersection has five legs, there is significantly more space in the intersection that people must navigate through. The presence of a fifth leg also introduces confusion related to where people are intending to go.

There is no accommodation for people biking at the intersection.

The sidewalk is cluttered and poorly defined in this location, creating a poor walking environment.

The existing marked crossings are long. The long length and high traffic volumes can make the intersection uncomfortable to cross, especially for people who walk more slowly, like children or older adults.

The unprotected left turn is a difficult maneuver for people driving because of the street's unique geometry.

There is no marked space for people walking to cross Pennsylvania Avenue. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

The existing northbound bike facility on Park Blvd transitions from a buffered bike lane to a shared lane at Cypress Avenue. This creates an uncomfortable situation for people biking. The Level of Traffic Stress (LTS) for people biking increases from 2 to 4 - a level of stress acceptable only to the "strong and fearless."

There is no marked space for people walking to cross Cypress Avenue. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

PROPOSED BENEFITS

Curb extensions shorten crossing distances, making the intersection more comfortable to cross for people walking and biking.

Bike lanes that approach the intersection will be ramped up to the same height as the sidewalk to separate people biking from cars, creating a modified protected intersection.

Bike boxes and two-stage left-turn queue boxes at this signal-controlled intersection will provide a designated area at the head of the traffic lane for people biking, increasing the visibility of people biking while facilitating lefts turns and prioritizing bike through movements.

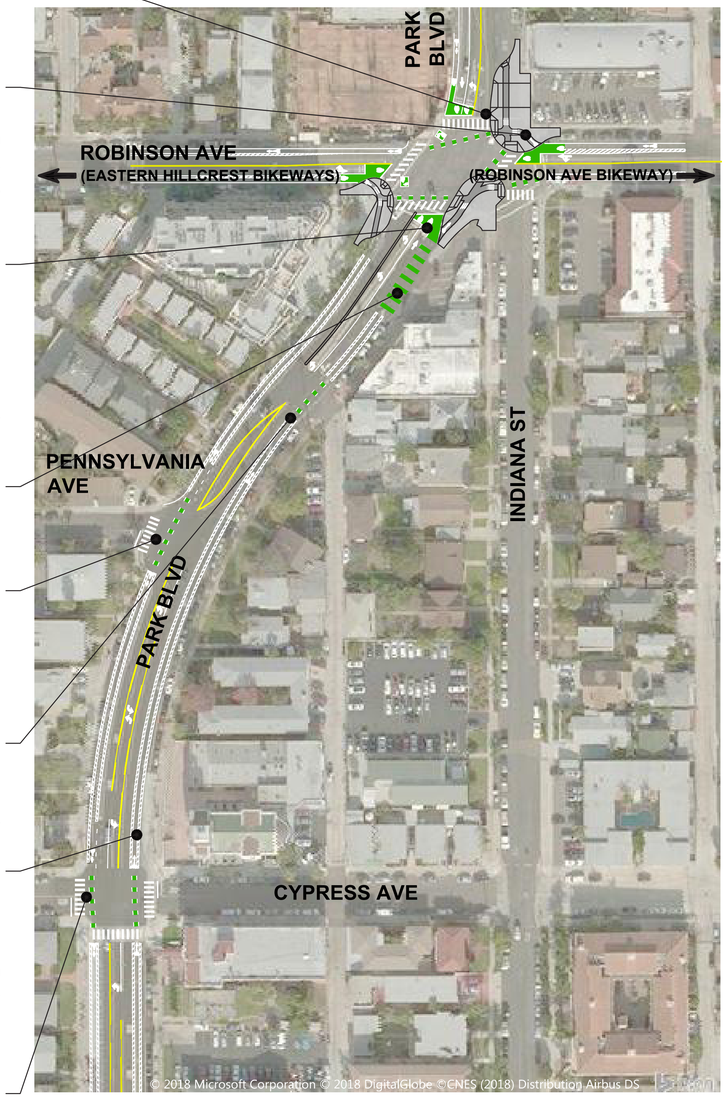
Green paint will increase the visibility of people biking crossing driveways and side streets.

Marked crossing spaces for people walking and people biking will create a safer and more comfortable crossing across Pennsylvania Avenue.

The bicycle crossing will guide people biking and help alert people driving that people may be bicycling across the alley.

A buffer between the traffic lane and the bike lane will help people biking feel more comfortable by giving them a dedicated space to ride. Additionally, a buffer between the parking lane and the bike lane will help people riding bikes stay clear of the "door zone."

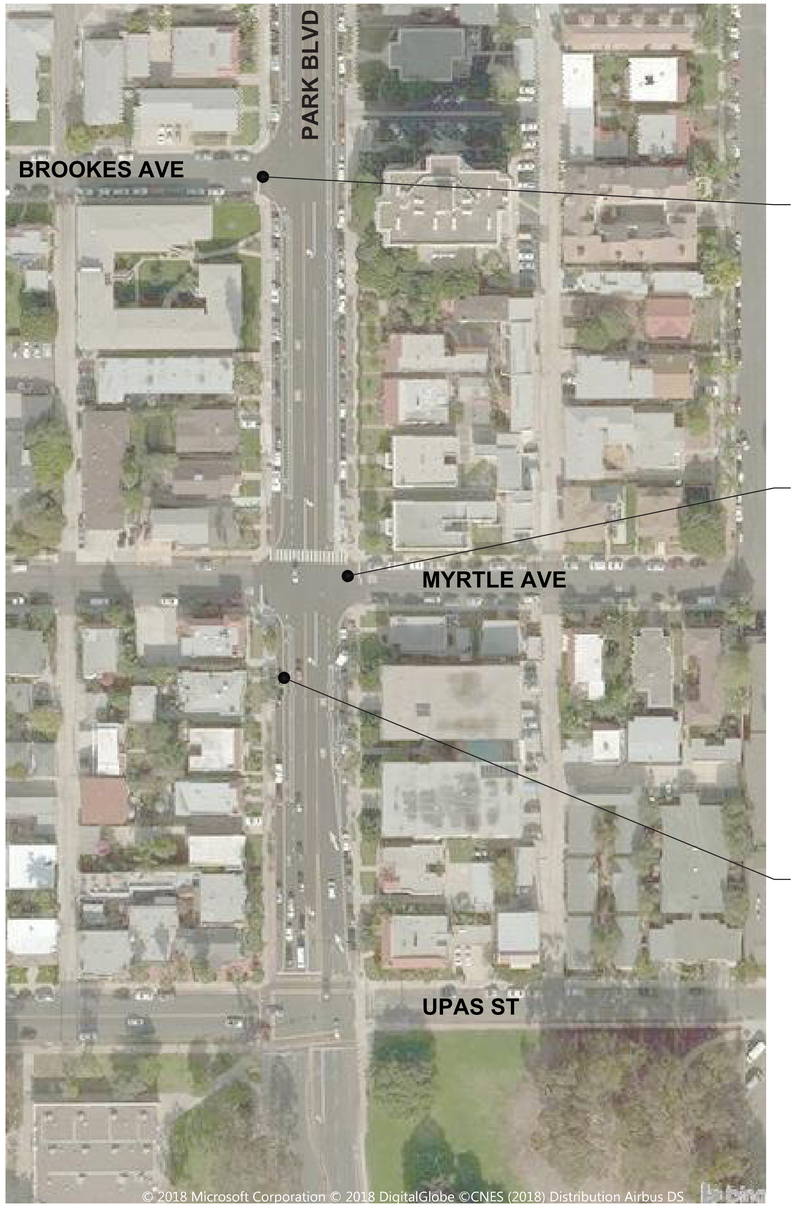
Marked crossing spaces for people walking and people biking will create a safer and more comfortable crossing across Cypress Avenue.



PARK BOULEVARD BETWEEN CYPRESS AVENUE AND MYRTLE AVENUE

EXISTING AND PROPOSED CONDITIONS

EXISTING ISSUES



There is no marked space for people walking or biking to cross Brookes Avenue. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking and people riding bikes than if there were marked crossings.

There is no marked space for people walking or biking to cross Myrtle Avenue. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking and people riding bikes than if there were marked crossings.

The existing buffered bike lanes on Park Blvd have a buffer between the traffic lane and the bike lane. However, there is no buffer between the parking lane and the bike lane to remind people biking to stay out of the "door zone."

PROPOSED BENEFITS

Marked crossing spaces for people walking and people biking will create a safer and more comfortable crossing across Brookes Avenue.

A buffer between the traffic lane and the bike lane will help people biking feel more comfortable by giving them a dedicated space to ride. Additionally, a buffer between the parking lane and the bike lane will help people biking stay clear of the "door zone."

Marked crossing spaces for people walking and people biking will create a safer and more comfortable crossing across Myrtle Avenue.

2.0 TRAFFIC AND SAFETY IMPACT ASSESSMENT METHODOLOGY

This assessment of safety for people riding bikes and vehicular traffic conditions is based on the Level of Traffic Stress (LTS) methodology described in the *Mineta Transportation Institute (MTI) Report 11-19: Low-Stress Bicycling and Network Connectivity* (2012), the *City of San Diego Traffic Impact Manual* (1998), and *City of San Diego Significance Determination Thresholds, Development Services Department* (2011).

2.1 METHODOLOGY FOR ANALYZING SAFETY FOR PEOPLE WHO BIKE

The approach outlined in the MTI report uses roadway network data, including posted speed limit, number of travel lanes, and presence and character of bicycle lanes, as a proxy for the comfort level of people who bike. For this analysis, *roadway segments, intersection crossings,* and *intersection approaches* (for people riding bikes) are classified into one of four levels of traffic stress (LTS 1-4) to characterize the actual and perceived safety of roadways for people biking. The lowest level of traffic stress, LTS 1, is assigned to roads that will be tolerable for most children to ride, as well as multi-use trails or physically separated bicycle facilities that are restricted for vehicle traffic use. LTS 2 roads are those that could be comfortably ridden by the mainstream adult population. The higher levels of traffic stress, LTS 3 and 4, correspond to roads typically only used voluntarily by types of cyclists who will tolerate higher vehicle traffic volumes and speeds (Geller 2005). LTS 3 is the level assigned to roads that will be acceptable for current "enthused and confident" cyclists and LTS 4 is assigned to segments that are only acceptable to "strong and fearless" people who bike. To support use of regional bikeways by people of all ages and abilities, including the Park Boulevard Bikeway, the SANDAG bikeway program strives to achieve LTS 1 and LTS 2 with its projects, wherever possible.

Table 1 and **Table 2** identify the LTS criteria for roadway segments with and without bikeways or bike lanes, respectively. To evaluate the level of traffic stress for people biking along roadway segments, the analysis considers several factors, including the presence or absence of bikeways or bike lanes, the presence or absence of physical separation between a bikeway and the roadway, the presence or absence of a parking lane, the number of travel lanes, the width of bike lanes and parking lanes, the speed limit, and how often a bike lane is blocked.

It is important to note that while LTS is a helpful tool in providing a general understanding of conditions for people who bike and in determining project impacts, it does not provide a detailed understanding of some of the benefits of the project's unique design features and also lacks the nuance to paint a clear picture of what it is like to bike along the project corridor. For example, LTS does not account for protected intersections, unique crossing improvements, double bike lane buffers, pavement conditions, etc. Therefore, it is likely that the project features would provide an even more comfortable environment than LTS suggests.

Table 1 Level of Traffic Stress Criteria for Roadway Segments with Bikeways or Bike Lanes

Criteria	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Physically Separated Bikeway				
Physical Separation Present	Yes	N/A	N/A	N/A
Bike Lanes Alongside Parking Lanes				
Through Lanes Per Direction	1	N/A	2+	N/A
Bike & Parking Lane Combined Width (feet)	≥ 15	14 to 14.5	≤ 13	N/A
Speed Limit (mph)	≤ 25	30	35	≥ 40
Bike Lane Blockage	Rare	N/A	Frequent	N/A
Bike Lanes Not Alongside Parking Lanes				
Through Lanes Per Direction	1	2 with median	≥ 2, 2 without median	N/A
Bike Lane Width (feet)	≥ 6	≤ 5.5	N/A	N/A

Source: MTI, 2012

Table 2 Level of Traffic Stress Criteria for Roadway Segments Without Bikeways or Bike Lanes

Speed Limit (mph)	2 – 3 Lanes	4 – 5 Lanes	≥ 6 Lanes
≤ 25	LTS 1 or 2[1]	LTS 3	LTS 4
30	LTS 2 or 3[1]	LTS 4	LTS 4
≥ 35	LTS 4	LTS 4	LTS 4

Source: MTI, 2012

Note:
1. The lower LTS values are assigned to residential streets with no centerline striping.

LTS criteria for intersection crossings relates to uncontrolled crossings only. All bikeway intersection crossings for the proposed project are controlled. Therefore, intersection crossing LTS is not evaluated. Similarly, LTS criteria for intersection approaches relates to intersection approaches with right-turn lanes. Since there are no existing or proposed right-turn lanes, intersection approach LTS is not evaluated.

COLLISIONS INVOLVING PEOPLE BIKING

Collisions involving people walking or biking were assessed as a part of the analysis of the Existing Conditions Without the Project scenario. Collision data was collected from the Statewide Integrated Traffic Records System (SWITRS) of the State of California, maintained by the California Highway Patrol. Collision data was assessed for the streets and intersections along the project corridor from 2013 to 2017, the most recent data available. Collisions being assessed included collisions involving people who walk and bike that resulted in injuries and fatalities.

2.2 VEHICULAR TRAFFIC METHODOLOGY

The vehicular traffic operations study methodology and analysis are consistent with the *City of San Diego Traffic Impact Study Manual*, 1998 and *City of San Diego Significance Determination Thresholds*, 2011.

Four study scenarios were analyzed. Intersections were analyzed for the morning peak period (7:00 AM to 9:00 AM) and evening peak period (4:00 PM to 6:00 PM). The intersection analysis is based on the busiest one hour of traffic during each peak period. The four scenarios assessed are:

- Existing Conditions without the Project ("Existing Without Project")
- Existing Conditions with the Project ("Existing With Project")
- Near-Term (2021, Project Opening Day) Conditions without the Project ("Near-Term Without Project")
- Near-Term (2021, Project Opening Day) Conditions with the Project ("Near-Term With Project")

The methodologies used to calculate roadway segment and intersection traffic operations are described in **Section 2.3,** and the process by which intersections and roadway segments were selected for vehicular traffic analysis is described in **Section 2.4**. A field review was also conducted to determine the existing intersection and roadway segment capacities. The field review identified existing intersection geometry, traffic control devices, and traffic signal phasing. Traffic signal timing sheets were obtained from the City of San Diego.

2.3 METHODOLOGIES FOR INTERSECTION AND ROADWAY SEGMENT CAPACITY ANALYSIS

The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. The methodology for signalized and unsignalized intersection analysis is described below.

INTERSECTION AND ROADWAY COUNT METHODOLOGY

Roadway segment and daily and peak hour turning movements counts were conducted in May 2018 for Park Boulevard between Robinson Avenue and Cypress Avenue and for the Park Boulevard / Robinson Avenue / Indiana Street intersection. These traffic counts were compared to the counts conducted between January 2015 and March 2015 for the Uptown Bikeways Segments 1-4 TSIA. For a conservative analysis, the highest traffic counts between the two count sources were utilized in this TSIA. All traffic count worksheets are provided in **Appendix B**.

Intersection turning movement counts involved the use of video/human counters to determine the total number of vehicles entering and exiting an intersection by movement (e.g., turning, through) during the weekday morning peak period from 7:00 AM to 9:00 AM and evening peak period from 4:00 PM to 6:00 PM. Segment counts involved laying tubes across roadway segments to count the number of vehicles during a 24-hour cycle. As noted in Section 2.2 above, the highest intersections and roadway segment counts were utilized in this TSIA.

METHODOLOGIES FOR INTERSECTION CAPACITY AND ROADWAY SEGMENT ANALYSIS

The analysis of intersection operations performed for this study is based upon procedures presented in the *2000 Highway Capacity Manual (HCM)*, published by the Transportation Research Board. Due to the HCM 2010's limitations with unique signal phasing and timing (e.g. five-legged intersections, etc.), the HCM 2000 methodology was applied for the signalized Park Boulevard / Robinson Avenue / Indiana Street intersection. Consistent with City of San Diego guidelines, LOS A through LOS D conditions meet the operational criteria (*Traffic Impact Study Manual, City of San Diego*, July 1998).

The City's standard for intersection operations is *not* met if implementation of the proposed project results in one of the following:

1. An intersection operating at LOS D or better under existing or future conditions without the project worsens to LOS E or F with the proposed project, or
2. The delay at an intersection operating at LOS E or F without the proposed project increases by more than 2.0 and 1.0 seconds, respectively, because of the proposed project.

Signalized Intersections

The signalized study intersection was analyzed according to the method described in the *2000 HCM*. This LOS method analyzes a signalized intersection's operation based on average control delay per vehicle (seconds/vehicle). Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using the *Synchro 10.0 (2000 HCM methodology)* traffic analysis software (by Trafficware, 2011).

The LOS criteria used for the analysis are described in **Table 3**, identifying the thresholds of control delays and the associated LOS.

Table 3 Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay (Seconds/vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	< 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10 - 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20 - 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35 - 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences	> 55 - 80
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80

Source: Highway Capacity Manual, Transportation Research Board (2010)

Roadway Segment Analysis

The roadway segment capacity analysis identifies the LOS scores for each roadway segment in the project corridor. It does so by comparing the design capacity of each roadway as determined by the City of San Diego planning documents with the existing or future traffic volumes that occur or are expected to occur on that roadway segment. This volume-to-capacity (V/C) analysis then uses City of San Diego criteria to determine the LOS score for each roadway segment based on the comparison of volume to capacity. City of San Diego roadway segment daily capacity and level of service standards are provided in **Appendix C**. A two-part analysis is performed to determine whether the proposed project meets City of San Diego criteria for traffic conditions on roadway segments.

Roadway Segment Analysis: Part 1

The V/C analysis is performed to determine whether the proposed project will result in:

- Traffic conditions on any roadway segment to worsen from LOS D or better without the proposed project to LOS E or LOS F with the proposed project.
- A V/C ratio of more than 0.02 for LOS E roadway segments or 0.01 for LOS F roadway segments.

If a proposed project does not result in one of the above scenarios, then traffic conditions along the roadway meet the City of San Diego standards and no further analysis is required.

2.4 INTERSECTION AND ROADWAY SEGMENT STUDY LOCATIONS

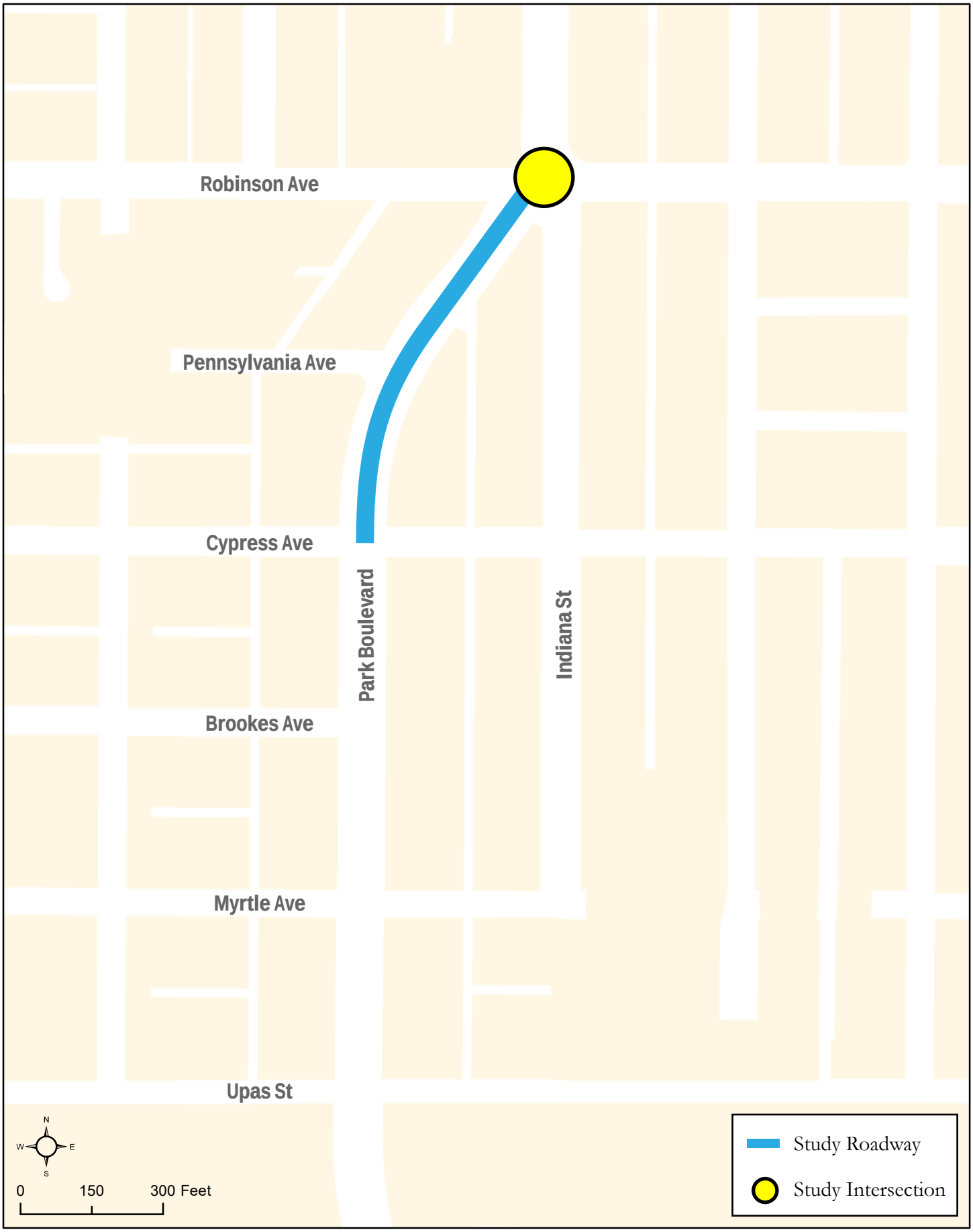
Study area roadway segments and intersections were selected for analysis based on the following criteria:

- Roadway – Segments where the proposed project modifies the existing roadway configurations (such as travel lanes, median treatment, etc.) which would result in roadway capacity changes;
- Intersection – A Mobility Element roadway crosses another Mobility Element roadway within the project study area.

The following segment and intersection were selected for analysis based on these criteria:

- Segment: Park Boulevard between Robinson Avenue and Cypress Avenue
- Intersection: Park Boulevard / Robinson Avenue / Indiana Street intersection

Figure 4 shows the location of the intersection and roadway segment analyzed in this TSIA. While the Park Boulevard Bikeway project extends beyond the identified study facilities, there are no capacity or operational changes within the non-studied segment (i.e. between Cypress Avenue and Myrtle Avenue), so no traffic operations analyses were conducted.



Park Boulevard Bikeway
Traffic and Safety Impact Assessment
CHEN RYAN

Figure 4
Study Locations

3.0 EXISTING CONDITIONS WITHOUT AND WITH THE PROJECT

This chapter describes safety conditions for people who walk and bike as well as the vehicle traffic conditions (at roadway segments and intersections) under the Existing Conditions Without the Project and Existing Conditions With the Project scenarios.

3.1 EXISTING CONDITIONS WITHOUT THE PROJECT

This section describes existing conditions for intersections and roadway segments in the project corridor, including existing facilities and collision history for people who walk and bike, and vehicular traffic conditions including volumes, intersection turning movements, roadway classifications, and traffic control devices (e.g., traffic signals, stop signs).

BICYCLE FACILITIES AND COLLISION HISTORY

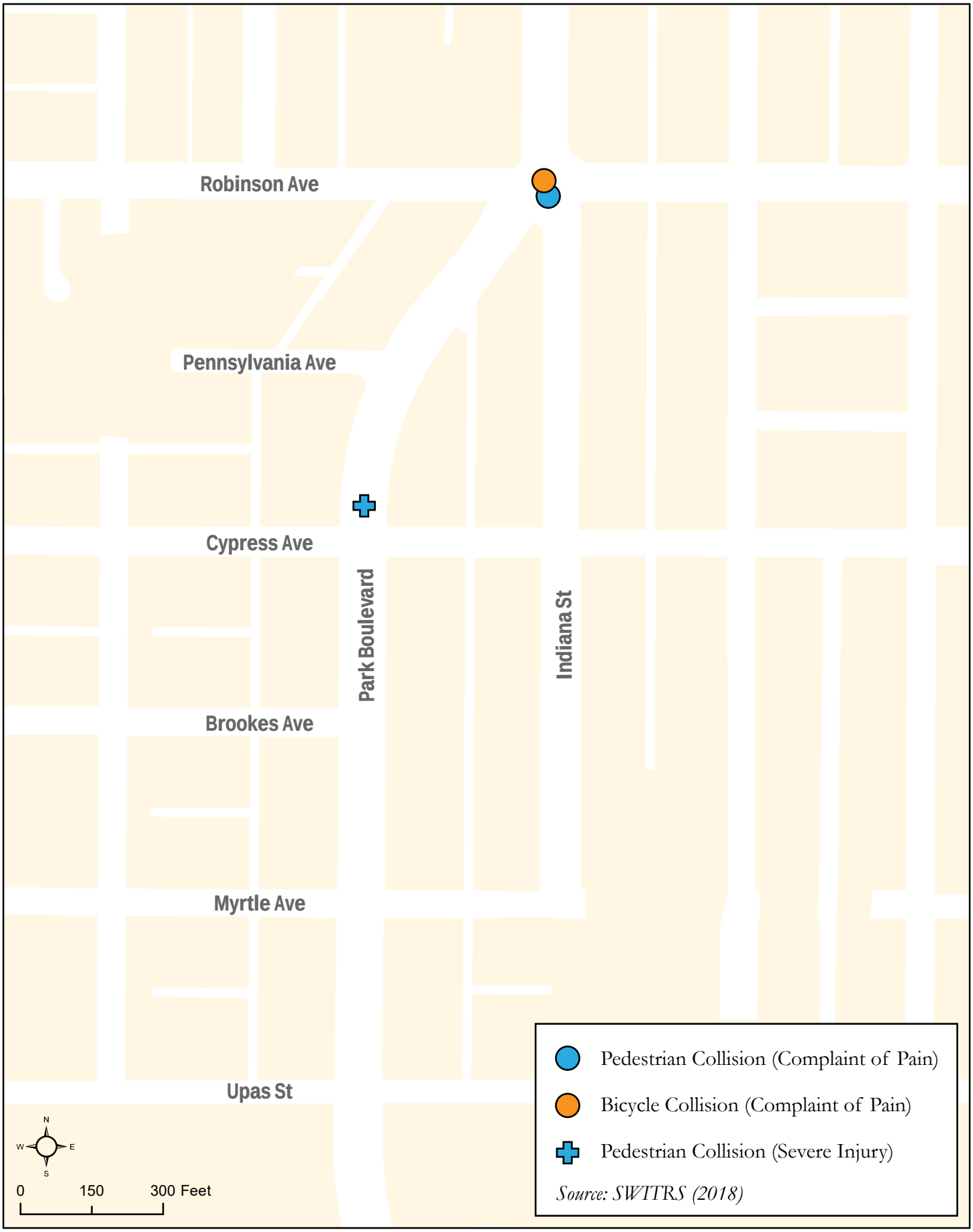
Between Robinson Boulevard and Cypress Avenue, a Buffered Class II bike lane exists in the southbound direction, and there are Class III sharrows in the northbound direction. Buffered Class II bike lanes currently exist in both directions between Cypress Avenue and Myrtle Avenue. The existing bike lane buffers separate the bike lane and the travel lane, but there is no buffer for the "door zone" for parked vehicles.

The Park Boulevard / Robinson Avenue / Indiana Street intersection is confusing for people walking, biking, and driving, but it is particularly challenging for people riding bikes. There are only Class 3 bike facilities along the approaches to this intersection, which are not adequate given the speeds and volumes along the adjacent streets. Because the intersection has five legs, there is significantly more space in the intersection that people must navigate through. The presence of a fifth leg also introduces confusion related to where people are intending to go.

Under existing conditions, the level of stress for the Park Boulevard Bikeway project corridor is classified as LTS 4 between Robinson Avenue and Cypress Avenue and LTS 2 between Cypress Avenue and Myrtle Avenue based on the information in Table 1. The roadway is posted with a 30-mph speed limit and includes a two- to four-lane cross-section.

Collisions Involving People on Bikes

Data from the Statewide Integrated Traffic Records System (SWITRS) was obtained to assess the collision history within the corridor. SWITRS is a database that serves to collect and process data gathered from a collision scene. Within the Park Boulevard project corridor, a total of one (1) collision involving people on bikes occurred during the five-year period from 2013 to 2017, which is the latest year for which complete SWITRS data are available. This total resulted in an average of 0.2 collisions each year along Park Boulevard between Robinson Avenue and Myrtle Avenue. **Figure 5** shows the location of bicycle collision along the project corridor.



Park Boulevard Bikeway
Traffic and Safety Impact Assessment

CHEN RYAN

Figure 5
Bicycle and Pedestrian Collisions (2013-2018)

WALKING FACILITIES AND COLLISION HISTORY

Sidewalks, Curb Ramps, Crosswalks, and Curb Extensions

Existing conditions without the proposed Park Boulevard Bikeway project in place were assessed for the presence of connected and continuous well-maintained sidewalks, curb ramps, and street crossings. Continuous sidewalks exist along the full study corridor of Park Boulevard between Robinson Avenue and Upas Street. Well maintained curb ramps exist at all intersections along the corridor. These curb ramps include a mix of diagonal and directional ramps.

Additionally, enhanced crossings are provided for people walking across Park Boulevard on the southern leg of the Cypress Avenue intersection and the northern leg of the Myrtle Avenue intersection. The enhanced crossing at Cypress Avenue includes pedestrian activated warning beacons and in-roadway warning lights. These warning beacons and lights use irregular light-emitting diode (LED) flash patterns similar to emergency vehicles that are triggered by people walking and biking using push buttons to activate the call. This crosswalk also provides curb extensions at the enhanced crosswalk to reduce the crossing distance.

The enhanced crosswalk at Myrtle Avenue includes a high-visibility crosswalk marking, as well as warning signage at and in advance of the intersection.

Collisions Involving People Walking

A total of two (2) collisions involving people walking occurred along the Park Boulevard project corridor during the five-year period from 2013 to 2017 (the latest data available), which equates to an average of 0.4 collisions each year. Locations of pedestrian collisions along the project corridor are also displayed in Figure 5.

VEHICULAR TRAFFIC CONDITIONS

This section describes the study area roadway characteristics, intersections along the project bikeway, including existing vehicle traffic volumes and levels of service, intersection turning movements, and traffic control devices (e.g. traffic signals, stop signs).

Roadway Network

The study roadways included in the vehicular operations analysis are described briefly below. The description includes the existing physical characteristics, adjacent land uses, and traffic control devices along these roadways.

Park Boulevard is a north-south roadway that connects Adams Avenue in the north to Harbor Drive in the south. Within the vicinity of the project bikeway, Park Boulevard functions as a two-lane collector with a center left-turn lane; however, Park Boulevard widens to three lanes (two northbound and one southbound lane) between Robinson Avenue and Cypress Avenue. Through the extent of the project alignment, Park Boulevard serves primarily residential uses with driveways to these units along the roadway and parking allowed on both sides of the street. It also serves commercial uses closer to Robinson Avenue. In the northbound direction, it has Class III sharrows between Robinson Avenue and Cypress Avenue and buffered bike lanes between Cypress Avenue and Myrtle Avenue. In the southbound direction, Park Boulevard has buffered bike lanes between Robinson Avenue and Myrtle Avenue. The posted speed is 30 miles per hour (mph).

Robinson Avenue is an east-west roadway that functions as a two-lane collector and extends from Florida Street in the east to Curlew Street in the west. Within the vicinity of the project bikeway, Robinson Avenue primarily serves single family residences with driveways and parking provided on both sides of the roadway. It has existing curbs, sidewalks, and a Class III bicycle facility. The posted speed limit is 25 mph.

Indiana Street is a north-south local roadway that extends from Robinson Avenue in the north to Myrtle Avenue in the south. The northern segment of Indiana Street between Robinson Avenue and Cypress Street is a one-way southbound road with angled parking on the west side and parallel parking on the east side. South of Cypress Avenue to Myrtle Avenue, Indiana Street converts to a two-lane roadway with parallel parking provided on both sides of the road.

Intersection Level of Service

Existing Without Project morning and evening peak period LOS for the one (1) intersection in the project area is shown in **Table 4**. The analysis worksheets are provided in **Appendix D**. As shown in Table 4, the study area intersection currently operates at an acceptable LOS B.

Table 4 Peak Hour Intersection Level of Service (LOS) Results for Existing Conditions Without Project

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS
Park Blvd / Robinson Ave / Indiana St	Signal	12.3	B	18.3	B

Source: Chen Ryan Associates; August 2018

Existing Roadway Segment Level of Service Without the Project

Existing Without Project LOS for the roadway segment along the project corridor are shown in **Table 5.** The assessment was based upon existing roadway geometry and the daily traffic volumes for the segments. As shown in the table, the Park Boulevard segment between Robinson Avenue and Cypress Avenue currently operates at LOS C.

Table 5 Roadway Segment Level of Service (LOS) for Existing Conditions Without Project

Roadway Segment	Functional Classification	Capacity[1]	Daily Traffic	V/C[2]	LOS
Park Blvd, from Robinson Ave to Cypress Ave	3C w/ CLTL[3]	22,500	11,610	0.52	C

Source: Chen Ryan Associates; August 2018

Notes:
1. Capacity = LOS E.
2. Volume-to-Capacity Ratio.
3. CLTL = Center Left-Turn Lane.

3.2 EXISTING CONDITIONS WITH THE PROJECT

This section analyzes how existing conditions for people who walk, bike, and drive the project corridor would be affected if the proposed project were implemented.

CONDITIONS FOR PEOPLE WALKING AND BIKING

The proposed improvements along Park Boulevard are designed to enhance safety for people walking and biking within the physical constraints of the roadway. Both people walking and biking will benefit from safe speeds along Park Boulevard through implementation of traffic calming devices including lane repurposing and curb extensions.

Park Boulevard between Robinson Avenue and Cypress Avenue
In this segment, the project will repurpose a northbound through lane into double buffered bike lanes on both sides of the street. At the Park Boulevard / Robinson Avenue / Indiana Street intersection, a modified protected intersection will be implemented with a new exclusive northbound left-turn lane, protected left-turn phasing for the north and south approaches, bike boxes, two-stage turn queue boxes, LPIs across all the signalized legs, and green bike conflict markings across the north, south, east, and southeast legs of the intersection. New pedestrian ramps, high-visibility "continental" crosswalks, and curb extensions at the Park Boulevard / Robinson Avenue / Indiana Street intersection will increase the visibility of people walking to drivers and enhance ADA accessibility.

Park Boulevard between Cypress Avenue and Myrtle Avenue
Between Cypress Avenue and Myrtle Avenue, the proposed project will enhance the existing buffered bike lanes to include double buffers. The additional buffer will provide separation between people traveling in the bike lane and parked vehicles to the right (the "door zone"). Striped green bike crossings may be installed along Park Boulevard across the Pennsylvania Avenue, Cypress Avenue, Brookes Avenue, and Myrtle Avenue intersections.

LEVEL OF TRAFFIC STRESS ALONG ROADWAY SEGMENTS

The LTS for roadway segments in the project area was assessed based on criteria identified in the tables in Section 2.1**. Table 6** compares the level of traffic stress along roadway segments on the project bikeway for Existing Without and With Project Conditions.

With the implementation of the project, the level of traffic stress will improve to an LTS 2 along the project corridor. The project achieves LTS 2 ("comfortable for mainstream adults") and is therefore consistent with best practices in low-stress network design (MTI 2012). It should be noted that the project would

achieve LTS 1 if the speed limit was 25 mph instead of 30 mph. It should also be noted that the project provides for a 16.5-foot parking and bike lane combined width, 1.5 feet more than the minimum width for LTS 1.

Table 6 Roadway Segment Level of Traffic Stress for Existing Conditions Without and With Project

Roadway Segment	Existing Without Project		Existing With Project		
	Bicycle Facilities	Traffic Stress	Bicycle Facilities	Potential Safety Benefits	Traffic Stress
Park Boulevard					
Robinson Ave to Cypress Ave	Southbound buffered bike lanes and northbound shared lane markings	High (4)	Double-Buffered bike lanes (both directions)	Painted buffers provide separation between people biking and both the travel lane and the parking lane door zone	Low (2)
Cypress Avenue to Myrtle Avenue	Buffered Bike Lanes (both directions)	Low (2)	Double-buffered bike lanes (both directions)	Painted buffers provide separation between people biking and both the travel lane and the parking lane door zone	Low (2)

Source: Chen Ryan Associates; August 2018

Level of Traffic Stress for Intersection Crossings and Approaches

LTS criteria for intersection crossings relates to uncontrolled crossings only. All bikeway intersection crossings for the proposed project are controlled. Therefore, intersection crossing LTS is not evaluated. Similarly, LTS criteria for intersection approaches relates to intersection approaches with right-turn lanes. Since there are no existing or proposed right-turn lanes, intersection approach LTS is not evaluated.

VEHICULAR TRAFFIC CONDITIONS

The Existing With the Project Conditions examines how implementation of the proposed project will affect vehicle traffic conditions along roadway segments and at intersections in the project area. The results for the roadway capacity and intersection capacity analyses are provided below.

Proposed Changes to Roadway Segment and Intersection Capacity

With implementation of the proposed project, Existing With Project Conditions traffic operational analysis assumes repurposing of a through lane along portions of the project corridor into bikeway facilities will reduce the roadway capacity for vehicular traffic. This reconfiguration of Park Boulevard is consistent with the *Uptown Community Plan* (2016) and *North Park Community Plan* (2016). The roadway and intersection operational modifications are:

- One northbound lane will be repurposed into Class II double buffered bike lanes on Park Boulevard between Robinson Avenue and Cypress Avenue
- The Park Boulevard / Robinson Avenue / Indiana Street intersection will be modified to:
  - Convert the northbound through-left lane into a separate northbound left-turn lane and change the southbound and northbound left-turn signal phasing to protected
  - Repurpose the eastbound left-turn lane into Class II bike lanes on Robinson Avenue and convert the eastbound through lane to a left-thru-right shared lane

- Include "No Right-Turn on Red" for eastbound and southbound right-turns
- Include "Leading Pedestrian Intervals" (LPI's) for all crosswalks

Roadway Capacity Analysis

As shown in **Table 7**, Park Boulevard between Robinson Avenue and Cypress Avenue will operate at LOS D with the removal of a northbound travel lane, which meets the City of San Diego's standards.

Table 7 Roadway Segment Level of Service (LOS) for Existing Conditions Without and With Project

Roadway Segment	Existing Without Project					Existing With Project					Δ V/C[4]
	Roadway Class[1]	Capacity[1]	Daily Traffic	V/C[2]	LOS	Roadway Class[1]	Capacity[1]	Daily Traffic	V/C[2]	LOS	
Park Blvd, from Robinson Ave to Cypress Ave	3C w/ CLTL[3]	22,500	11,610	0.52	C	2C w/ CLTL[3]	15,000	11,610	0.74	D	0.22

Source: Chen Ryan Associates; August 2018

Notes:
1. Capacity = LOS E.
2. Volume-to-Capacity Ratio.
3. CLTL = Center Left-Turn Lane.
4. Δ = Change in V/C Ratio.

Intersection Analysis

The results of the operational analysis under both Existing Without and With Project Conditions are presented in **Table 8**. Appendix D includes the corresponding LOS worksheets for the study intersection.

Table 8 Peak Hour Intersection Level of Service (LOS) Results for Existing Conditions Without and With Project

Intersection	Control Type	Existing Without Project				Existing With Project				Δ in Delay (sec)	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	AM Peak	PM Peak
Park Blvd/Robinson Ave/Indiana St	Signal	12.3	B	18.3	B	19.2	B	45.9	D	6.9	27.6

Source: Chen Ryan Associates; December 2018

As shown in Table 8, the study intersection will meet the City's minimum operating standard at LOS D or better with the implementation of the proposed project.

Vehicle Queueing

Given the intersection reconfiguration and the prohibition of right-turns on red along the southbound and eastbound approaches, a queueing analysis was conducted to assess any potential overflow issues into adjacent access and intersections. **Table 9** displays the intersection queuing analysis during the AM/PM peak hours under the Existing With Project condition. The Synchro intersection queuing reports are provided in Appendix D.

Table 9 Peak Hour Queuing Results for Existing Conditions With Project

Intersection	Turning Movement	Storage Length (ft)	95% Queue			50% Queue		
			Queue Length (ft) (AM/PM)	Excess Queue (ft) (AM/PM)	Exceed Storage?	Queue Length (ft) (AM/PM)	Excess Queue (ft) (AM/PM)	Exceed Storage?
Park Blvd/Robinson Ave/Indiana St	SBL	150	19/90	0/0	No	6/45	0/0	No
	SBTR	625	219/322	0/0	No	140/220	0/0	No
	NBL	190	102/186	0/0	No	39/105	0/0	No
	NBTR	1,500	164/637	0/0	No	59/417	0/0	No
	EBLTR	460	82/694	0/234	**Yes**	39/453	0/0	No
	WBLTR	330	193/149	0/0	No	108/92	0/0	No

*Source: Chen Ryan Associates; **December** 2018*

Note:
Through movement storage length are measured to the nearest upstream controlled intersection.

As shown in the table above, the eastbound movement is anticipated to have queue length that exceeds the storage length (Robinson Avenue, between Centre Street and Park Boulevard) at the most congested point of the PM peak hour (95th percentile queue). The overflow could affect the traffic operations at the intersection of Robinson Avenue / Centre Street. However, the 95th percentile queue is anticipated to occur very seldomly throughout the peak hour since the Robinson Avenue/Centre Street is an all-way stop controlled intersection, and the eastbound stop sign should have a metering effect to control traffic arriving at the eastbound approach of the Park Boulevard/Robinson Avenue intersection. None of the other movements are anticipated to have queues (95th percentile and 50th percentile) exceeding their storage capacity during the peak hours.

4.0 NEAR-TERM CONDITIONS WITHOUT AND WITH THE PROJECT

This chapter describes safety conditions for people who walk and bike as well as the vehicle traffic conditions (at roadway segments and intersections) under the Near-Term Conditions Without the Project and Near-Term Conditions With the Project scenarios.

4.1 NEAR-TERM CONDITIONS WITHOUT THE PROJECT (YEAR 2021)

This section describes Near-Term (2021, project opening year) forecasted conditions for intersections and roadway segments in the project corridor, including walking and biking facilities, vehicular traffic conditions such as daily traffic volumes, intersection turning movements, roadway classifications, and traffic control devices (e.g. traffic signals, stop signs, etc.)

WALKING AND BIKING CONDITIONS

Without the proposed project, this study assumes that walking and biking safety conditions in 2021 will remain substantially the same as the existing conditions described in **Section 3.1**.

VEHICULAR TRAFFIC CONDITIONS

Traffic volumes for the Near-Term (2021, Project Opening Day) Conditions without and with the Project were forecasted by applying an average yearly growth rate to those utilized in the Existing Conditions analysis. This average yearly growth rate was derived from the Uptown, North Park, and Golden Hill Community Plan Update (CPU) Traffic Impact Study (TIS), also referred to as the Cluster CPU EIR. Based on comparing the Base Year 2012 and Future Year 2035 traffic volumes from the Cluster CPU EIR, an average annual growth rate of approximately one (1) percent was applied to the study area roadway segment and intersection. Traffic volume development worksheets are provided in Appendix B.

The Near-Term Conditions Without the Project scenario examines traffic operations along the segment of Park Boulevard and at the study intersection. The results of the roadway capacity and intersection capacity analyses are provided below.

Proposed Changes to Roadway and Intersection Capacity
No roadway or intersection capacity changes are anticipated for the Near-Term without the proposed project. As such, the roadway and intersection geometrics for Near-Term Without Project scenario are assumed to be the same as those utilized under the Existing Without Project scenario described in Section 3.1**.**

4.2 NEAR-TERM CONDITIONS WITH THE PROJECT (YEAR 2021)

Near-Term With Project Conditions represent the conditions of the roadways and intersections within the project area in the year 2021 if the proposed project were implemented.

WALKING AND BIKING CONDITIONS

The walking and biking safety assessment for these travel modes is expected to be the same for the Near-Term with Project Conditions as the Existing With Project Conditions (See **Chapter 3** for this information). Safety for people who bike or walk is expected to be enhanced and the number and severity of collisions is expected to decline with the project in place. On parallel facilities, collisions could also be reduced in number and severity as people who bike may shift to the Park Boulevard instead of traveling on streets with higher vehicle speeds and no bicycle facilities. As additional connections are constructed for people who walk and bike, more people will likely use the Park Boulevard for non-motorized travel. Larger numbers of people walking and biking along the corridor will further increase the safety along the corridor as people driving develop an increased awareness of people walking or biking.

VEHICULAR TRAFFIC CONDITIONS

The Near-Term Conditions With Project scenario examines how implementation of the proposed project will affect vehicle traffic conditions along roadway segments and at intersections in the project area. The results of the roadway and intersection analyses are provided below.

Proposed Changes to Roadway and Intersection Capacity

No roadway and intersection capacity changes are anticipated by the year 2021, except for the changes proposed by the proposed project. Therefore, the Near-Term With Project scenario assumes the same roadway and intersection geometrics as those identified under the Existing With Project scenario described in Section 3.2**.**

Roadway Capacity Analysis

Table 10 shows the results of the roadway segment analysis. As shown, Park Boulevard between Robinson Avenue and Cypress Avenue will operate at LOS D with the removal of a northbound travel lane, which meets the City of San Diego's standards.

Table 10 Roadway Segment Analysis for Near-Term Conditions Without and With the Project

Roadway Segment		Near-Term Without Project					Near-Term With Project					Δ V/C[4]
		Roadway Class[1]	Capacity[1]	Daily Traffic	V/C[2]	LOS	Roadway Class[1]	Capacity[1]	Daily Traffic	V/C[2]	LOS	
Park Blvd	Robinson Ave to Cypress Ave	3C w/ CLTL	22,500	12,010	0.53	C	2C w/ CLTL	15,000	12,010	0.80	D	0.27

Source: Chen Ryan Associates; August 2018

Notes:
1. Capacity = LOS E.
2. Volume-to-Capacity Ratio.
3. CLTL = Center Left-Turn Lane.
4. Δ = Change in V/C Ratio.

Intersection Analysis

The results of the operations analysis under the Near-Term Without and With Project Conditions are presented in **Table 11**. The analysis assumes optimization of signal timing (i.e. cycle length and splits) as part of the project implementation. **Appendix E** includes the corresponding LOS worksheets for the study intersection.

Table 11 Peak Hour Intersection Level of Service (LOS) Results for Near-Term Conditions Without and With the Project

Intersection	Control Type	Near-Term Without Project				Near-Term With Project				Δ in Delay (sec)	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	AM Peak	PM Peak
1. Park Blvd/Robinson Ave/Indiana St	Signal	14.2	B	21.2	C	24.2	C	54.9	D	10.0	33.7

Source: Chen Ryan Associates; December 2018

As shown in Table 11, the study intersection will meet the City's minimum operating standard at LOS D or better with the implementation of the proposed project.

Vehicle Queuing

Given the intersection reconfiguration and the prohibition of right-turns on red along the southbound and eastbound approaches, a queueing analysis was conducted to assess any potential overflow issues into adjacent access and intersections. **Table 12** displays the intersection queuing analysis during the AM/PM peak hours under the Existing With Project condition. The Synchro intersection queuing reports are provided in Appendix E.

Table 12 Peak Hour Queuing Results for Near-Term Conditions With Project

Intersection	Turning Movement	Storage Length (ft)	95% Queue			50% Queue		
			Queue Length (ft) (AM/PM)	Excess Queue (ft) (AM/PM)	Exceed Storage?	Queue Length (ft) (AM/PM)	Excess Queue (ft) (AM/PM)	Exceed Storage?
1. Park Blvd/Robinson Ave/Indiana St	SBL	150	36/104	0/0	No	12/54	0/0	No
	SBTR	625	208/346	0/0	No	152/239	0/0	No
	NBL	190	148/215	0/25	**Yes**	52/116	0/0	No
	NBTR	1,500	170/690	0/0	No	115/450	0/0	No
	EBLTR	460	96/775	0/315	**Yes**	45/516	0/56	**Yes**
	WBLTR	330	254/167	0/0	No	123/104	0/0	No

Source: Chen Ryan Associates; December 2018

Note:
Through movement storage length are measured to the nearest upstream controlled intersection.

As shown in the table above, the northbound left-turn movement is anticipated to have a 95th percentile queue length that exceeds the storage length during the PM peak hour, however this overflow is anticipated to occur very seldomly since the 95th percentile queue length will be slightly over (by 25 feet) the storage length. In addition, the eastbound movement at this intersection is also anticipated to have 95th percentile and 50th percentile queue length that exceeds the storage length during the PM peak hour. This overflow could result in some queuing at the intersection of Robinson Avenue / Centre Street given the fact that the Robinson Avenue/Centre Street is an all-way stop controlled intersection, and the eastbound stop sign should have a metering effect to control traffic arriving at the eastbound approach of the Park Boulevard/Robinson Avenue intersection.

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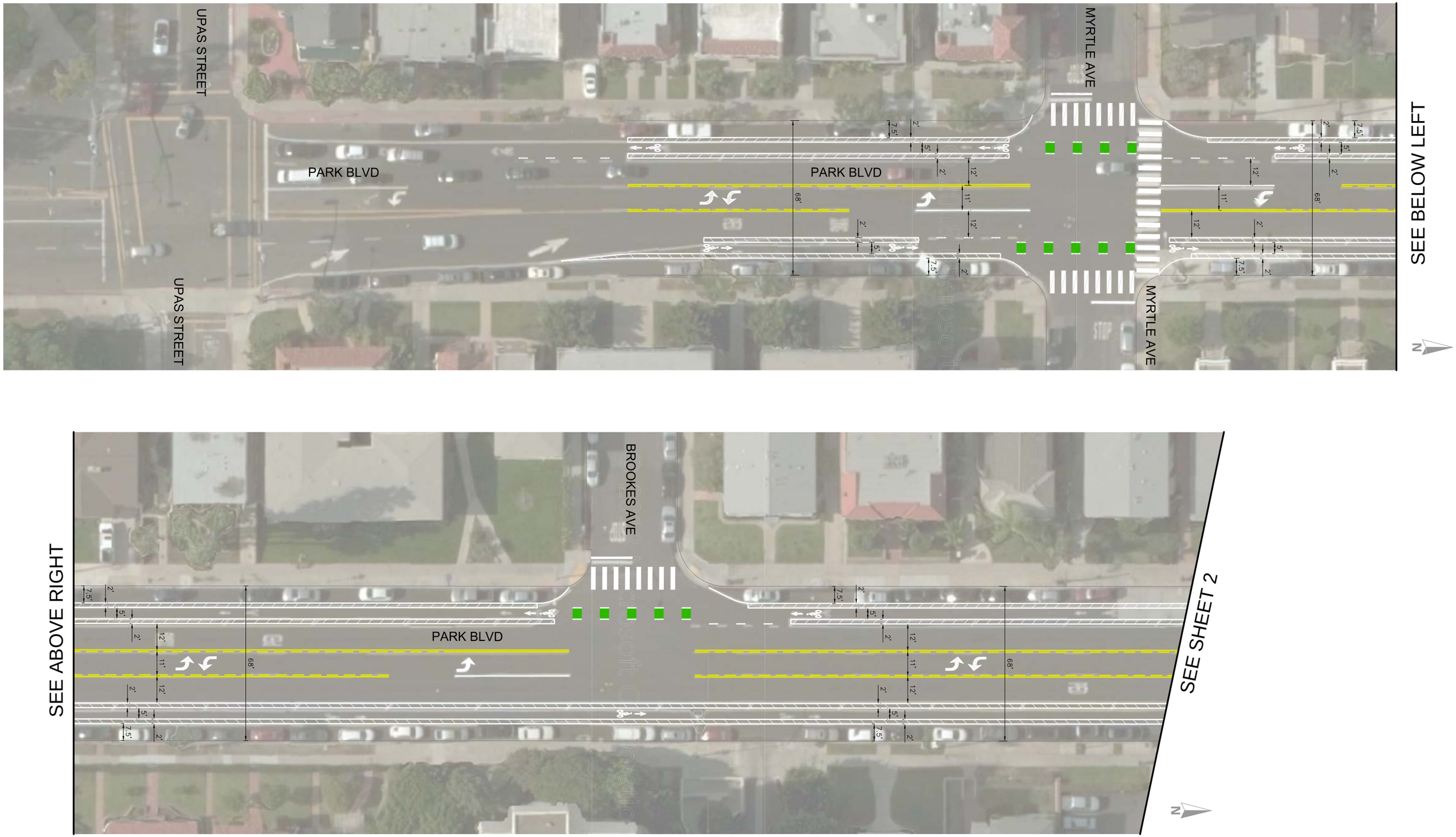
Appendix A
Conceptual Layout Plans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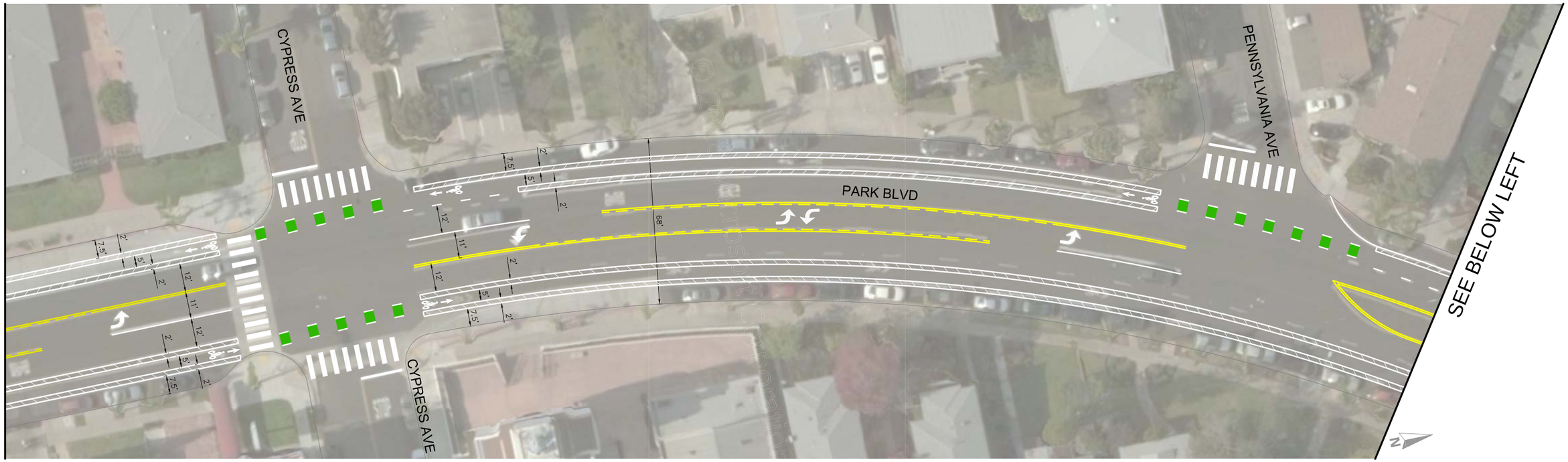
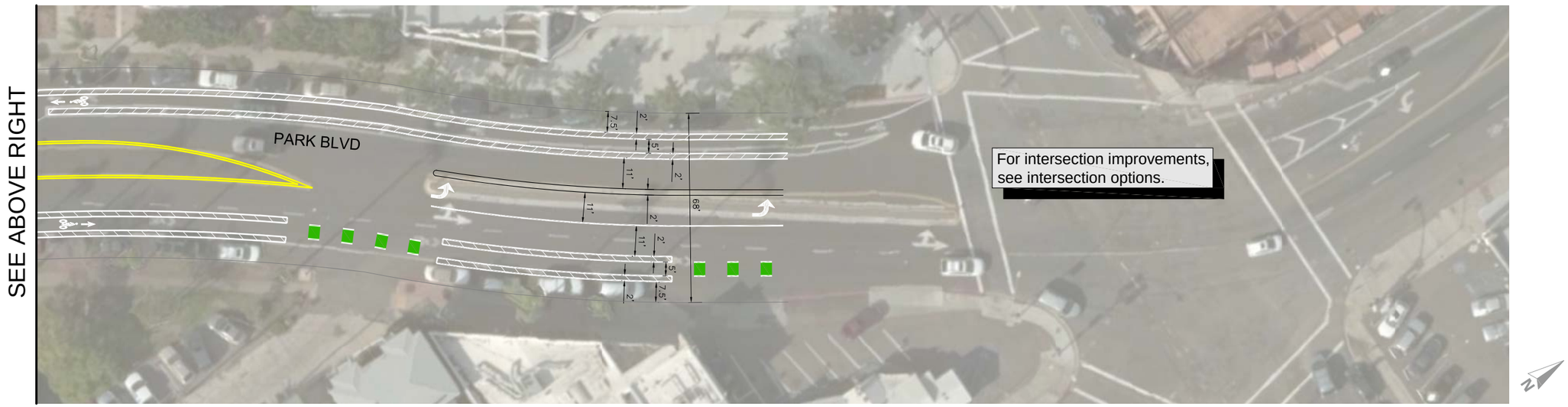
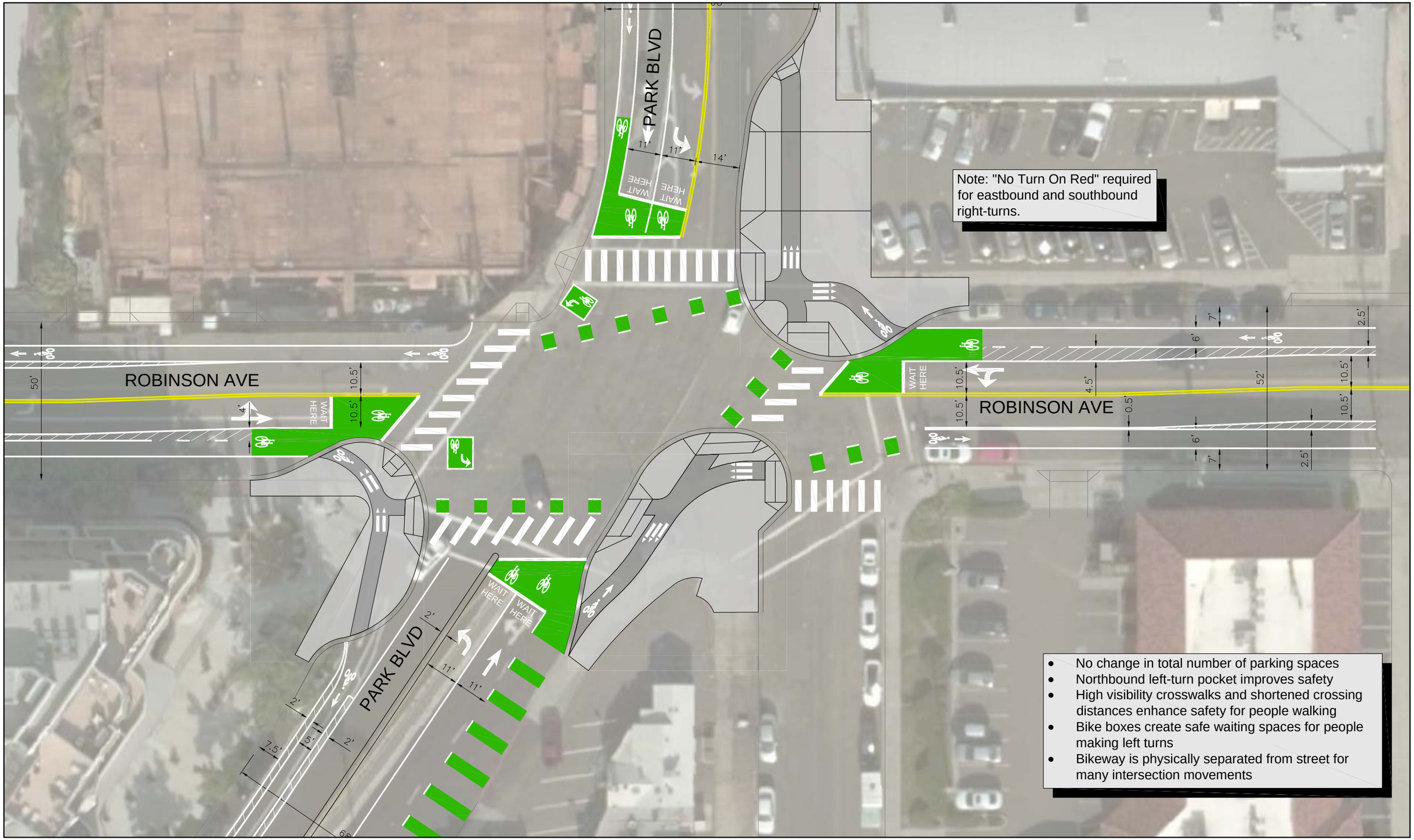
SEE ABOVE RIGHT
SEE SHEET 2
UPAS STREET
UPAS STREET
PARK BLVD
PARK BLVD
PARK BLVD
MYRTLE AVE
MYRTLE AVE
BROOKES AVE
68'
12'
11'
2'
5'
7.5'


SEE SHEET 1
CYPRESS AVE
PARK BLVD
PENNSYLVANIA AVE
CYPRESS AVE
SEE BELOW LEFT
7.5'
5'
2'
12'
11'
68'


SEE ABOVE RIGHT
PARK BLVD
For intersection improvements, see intersection options.
7.5'
5'
2'
11'
68'


PARK BLVD
11'
11'
14'
WAIT HERE
WAIT HERE
Note: "No Turn On Red" required for eastbound and southbound right-turns.
ROBINSON AVE
50'
10.5'
4'
WAIT HERE
10.5'
WAIT HERE
10.5'
4.5'
52'
0.5'
6'
7'
2.5'
10.5'
10.5'
10.5'
ROBINSON AVE
6'
7'
2.5'
PARK BLVD
2'
11'
11'
2'
7.5'
5'
2'
WAIT HERE
WAIT HERE
No change in total number of parking spaces
Northbound left-turn pocket improves safety
High visibility crosswalks and shortened crossing distances enhance safety for people walking
Bike boxes create safe waiting spaces for people making left turns
Bikeway is physically separated from street for many intersection movements

Appendix B
Traffic Counts & Near-term Traffic Volume Development

2015 Intersection and Roadway Counts

THURSDAY, JANUARY 22ND, 2015 CITY: SAN DIEGO PROJECT: PTD15-0123-01

PARK BTN ROBINSON & UPASS

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	8		6					12:00	104		93				
00:15	5		7					12:15	78		110				
00:30	7		8					12:30	111		65				
00:45	9	29	7	28			57	12:45	115	408	86	354			762
01:00	0		4					13:00	86		93				
01:15	6		4					13:15	97		99				
01:30	5		6					13:30	110		88				
01:45	7	18	3	17			35	13:45	107	400	76	356			756
02:00	2		3					14:00	107		63				
02:15	4		2					14:15	111		105				
02:30	5		3					14:30	189		99				
02:45	3	14	4	12			26	14:45	97	504	77	344			848
03:00	2		3					15:00	118		82				
03:15	2		3					15:15	132		62				
03:30	3		3					15:30	157		83				
03:45	2	9	3	12			21	15:45	130	537	90	317			854
04:00	0		3					16:00	219		98				
04:15	1		4					16:15	206		102				
04:30	5		11					16:30	189		87				
04:45	5	11	10	28			39	16:45	202	816	107	394			1210
05:00	5		15					17:00	185		110				
05:15	9		17					17:15	170		80				
05:30	18		37					17:30	137		95				
05:45	18	50	41	110			160	17:45	107	599	86	371			970
06:00	34		36					18:00	111		87				
06:15	37		57					18:15	90		82				
06:30	37		70					18:30	66		75				
06:45	49	157	80	243			400	18:45	76	343	67	311			654
07:00	86		159					19:00	54		68				
07:15	121		166					19:15	58		57				
07:30	88		84					19:30	51		45				
07:45	66	361	95	504			865	19:45	45	208	44	214			422
08:00	65		84					20:00	41		38				
08:15	68		74					20:15	40		20				
08:30	67		86					20:30	53		40				
08:45	73	273	90	334			607	20:45	64	198	37	135			333
09:00	62		107					21:00	52		42				
09:15	59		94					21:15	54		39				
09:30	62		67					21:30	39		33				
09:45	56	239	101	369			608	21:45	33	178	23	137			315
10:00	57		79					22:00	36		28				
10:15	54		71					22:15	30		31				
10:30	56		81					22:30	23		18				
10:45	81	248	84	315			563	22:45	17	106	20	97			203
11:00	85		84					23:00	17		15				
11:15	83		75					23:15	18		12				
11:30	83		77					23:30	10		7				
11:45	103	354	79	315			669	23:45	18	63	16	50			113
Total Vol.		1763		2287			**4050**		4360		3080				**7440**

	Daily Totals				
	NB	SB	EB	WB	Combined
	6123	5367			**11490**

	AM			PM		
Split %	43.5%	56.5%	**35.2%**	58.6%	41.4%	**64.8%**
Peak Hour	11:45	07:00	**07:00**	16:00	16:15	**16:00**
Volume	396	504	**865**	816	406	**1210**
P.H.F.	0.89	0.76	**0.75**	0.92	0.92	**0.95**

PACIFIC TECHNICAL DATA

KOA CORPORATION

24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Robinson Ave, btwn 5th Ave and 6th Ave

Orientation: *East-West*

Date of Count: *Tuesday, February 10, 2015*

Analysts: *DASH*

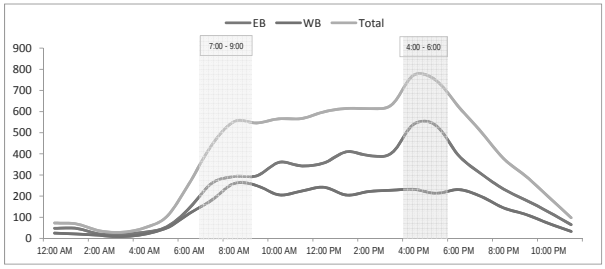
Weather: *Sunny*

AVC Proj. No: *15-0308*

24 Hour Segment Volume ***9,362***

Time	Hourly Volume EB	WB	Total	Time	Hourly Volume EB	WB	Total
12:00 AM - 1:00 AM	48	25	73	12:00 PM - 1:00 PM	357	242	599
1:00 AM - 2:00 AM	47	21	68	1:00 PM - 2:00 PM	410	205	615
2:00 AM - 3:00 AM	21	15	36	2:00 PM - 3:00 PM	392	222	614
3:00 AM - 4:00 AM	21	8	29	3:00 PM - 4:00 PM	403	228	631
4:00 AM - 5:00 AM	29	21	50	4:00 PM - 5:00 PM	541	232	773
5:00 AM - 6:00 AM	55	49	104	5:00 PM - 6:00 PM	533	213	746
6:00 AM - 7:00 AM	143	118	261	6:00 PM - 7:00 PM	391	231	622
7:00 AM - 8:00 AM	261	181	442	7:00 PM - 8:00 PM	305	198	503
8:00 AM - 9:00 AM	293	260	553	8:00 PM - 9:00 PM	233	144	377
9:00 AM - 10:00 AM	296	250	546	9:00 PM - 10:00 PM	180	113	293
10:00 AM - 11:00 AM	360	206	566	10:00 PM - 11:00 PM	125	71	196
11:00 AM - 12:00 PM	343	224	567	11:00 PM - 12:00 AM	65	33	98
Total	**1,917**	**1,378**	**3,295**	**Total**	**3,935**	**2,132**	**6,067**

24-Hour EB Volume 5,852 ***24-Hour WB Volume 3,510***



KOA CORPORATION

24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Robinson Ave, btwn 8th Ave and 10th Ave

Orientation: *East-West*

Date of Count: *Tuesday, February 10, 2015*

Analysts: *DASH*

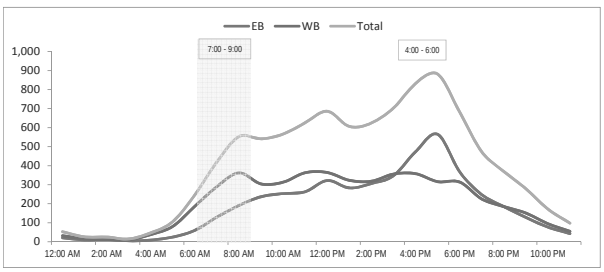
Weather: *Sunny*

AVC Proj. No: *15-0308*

24 Hour Segment Volume ***9,630***

Time	Hourly Volume EB	WB	Total	Time	Hourly Volume EB	WB	Total
12:00 AM - 1:00 AM	21	32	53	12:00 PM - 1:00 PM	322	364	686
1:00 AM - 2:00 AM	10	16	26	1:00 PM - 2:00 PM	283	323	606
2:00 AM - 3:00 AM	12	13	25	2:00 PM - 3:00 PM	306	318	624
3:00 AM - 4:00 AM	5	10	15	3:00 PM - 4:00 PM	347	356	703
4:00 AM - 5:00 AM	9	38	47	4:00 PM - 5:00 PM	473	358	831
5:00 AM - 6:00 AM	25	81	106	5:00 PM - 6:00 PM	565	316	881
6:00 AM - 7:00 AM	60	187	247	6:00 PM - 7:00 PM	368	314	682
7:00 AM - 8:00 AM	130	290	420	7:00 PM - 8:00 PM	248	225	473
8:00 AM - 9:00 AM	191	362	553	8:00 PM - 9:00 PM	185	185	370
9:00 AM - 10:00 AM	237	304	541	9:00 PM - 10:00 PM	128	151	279
10:00 AM - 11:00 AM	253	313	566	10:00 PM - 11:00 PM	77	95	172
11:00 AM - 12:00 PM	263	363	626	11:00 PM - 12:00 AM	43	55	98
Total	**1,216**	**2,009**	**3,225**	**Total**	**3,345**	**3,060**	**6,405**

24-Hour EB Volume 4,561 ***24-Hour WB Volume 5,069***



THURSDAY, JANUARY 22ND, 2015 CITY: SAN DIEGO PROJECT: PTD15-0123-01

ROBINSON BTN 10TH & RICHMOND

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00					16	12		12:00					80	91	
00:15					8	8		12:15					63	76	
00:30					8	3		12:30					69	91	
00:45					3	35	4 27 62	12:45					73 285	71 329	614
01:00					9	3		13:00					66	75	
01:15					8	3		13:15					82	66	
01:30					3	5		13:30					85	99	
01:45					4	24	6 17 41	13:45					66 299	72 312	611
02:00					3	3		14:00					78	89	
02:15					6	3		14:15					88	76	
02:30					1	5		14:30					76	109	
02:45					2	12	2 13 25	14:45					70 312	94 368	680
03:00					0	2		15:00					73	98	
03:15					4	2		15:15					81	87	
03:30					3	1		15:30					91	100	
03:45					5	12	3 8 20	15:45					89 334	97 382	716
04:00					2	3		16:00					87	97	
04:15					3	3		16:15					109	117	
04:30					0	13		16:30					111	100	
04:45					2	7	3 22 29	16:45					121 428	100 414	842
05:00					10	7		17:00					128	111	
05:15					7	9		17:15					128	94	
05:30					10	28		17:30					138	101	
05:45					16	43	23 67 110	17:45					117 511	89 395	906
06:00					15	32		18:00					109	78	
06:15					27	49		18:15					106	85	
06:30					30	46		18:30					87	67	
06:45					24	96	76 203 299	18:45					77 379	78 308	687
07:00					31	81		19:00					71	66	
07:15					41	115		19:15					60	56	
07:30					26	110		19:30					68	55	
07:45					33	131	101 407 538	19:45					58 257	50 227	484
08:00					40	85		20:00					50	36	
08:15					29	112		20:15					62	42	
08:30					48	117		20:30					55	51	
08:45					51	168	113 427 595	20:45					46 213	38 167	380
09:00					42	95		21:00					48	54	
09:15					65	80		21:15					55	31	
09:30					52	70		21:30					37	27	
09:45					53	212	80 325 537	21:45					27 167	21 133	300
10:00					46	71		22:00					36	18	
10:15					61	77		22:15					35	27	
10:30					62	83		22:30					29	22	
10:45					54	223	81 312 535	22:45					29 129	24 91	220
11:00					48	72		23:00					17	20	
11:15					69	64		23:15					12	7	
11:30					62	86		23:30					16	9	
11:45					54	233	72 294 527	23:45					13 58	11 47	105
Total Vol.					1196	2122	**3318**						3372	3173	**6545**

	Daily Totals				
	NB	SB	EB	WB	Combined
			4568	5295	**9863**

	AM			PM		
Split %	36.0%	64.0%	**33.6%**	51.5%	48.5%	**66.4%**
Peak Hour	11:45	08:15	**08:30**	16:45	16:15	**16:45**
Volume	266	437	**611**	515	428	**921**
P.H.F.	0.83	0.93	**0.93**	0.93	0.91	**0.96**

PACIFIC TECHNICAL DATA

KOA CORPORATION

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

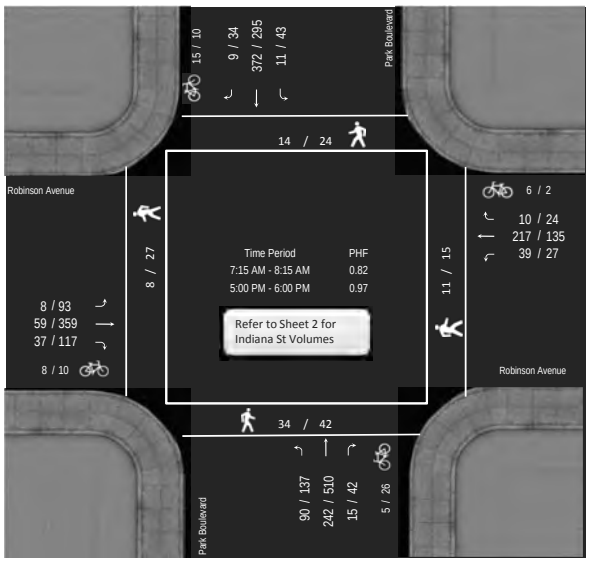
Location: Robinson Avenue @ Park Boulevard

Date of Count: *Thursday, March 19, 2015*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *15-0330*



KOA CORPORATION

Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Robinson Avenue @ Park Boulevard

AM Period (7:00 AM - 9:00 AM)

	Southbound			Westbound			Northbound			Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	TOTAL
7:00 AM	1	33	0	0	27	5	5	30	8	28	10	1	148
7:15 AM	0	121	2	4	54	19	4	84	21	10	17	2	338
7:30 AM	2	75	2	2	53	9	6	70	25	8	11	1	264
7:45 AM	0	93	1	0	58	7	3	48	21	10	15	3	259
8:00 AM	7	83	6	4	52	4	2	40	23	9	16	2	248
8:15 AM	1	62	2	3	56	5	2	35	17	8	28	2	221
8:30 AM	9	74	6	7	68	6	5	39	15	9	24	5	267
8:45 AM	6	75	4	3	37	5	6	36	29	11	10	3	225
Total	26	616	23	23	405	60	33	382	159	93	131	19	1,970

AM Intersection Peak Hour : **7:15 AM - 8:15 AM** Intersection PHF : **0.82**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	9	372	11	10	217	39	15	242	90	37	59	8	1,109
PHF	0.32	0.77	0.46	0.63	0.94	0.51	0.63	0.72	0.90	0.93	0.87	0.67	0.82
Movement PHF		0.80			0.86			0.80			0.90		0.82

PM Period (4:00 PM - 6:00 PM)

	Southbound			Westbound			Northbound			Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	TOTAL
4:00 PM	4	58	6	8	36	5	8	133	32	19	70	10	389
4:15 PM	2	64	12	16	25	4	6	132	27	24	80	9	401
4:30 PM	7	65	9	11	34	5	9	125	23	32	69	15	404
4:45 PM	7	58	6	4	27	6	13	123	30	34	80	14	402
5:00 PM	12	91	12	8	27	7	17	118	37	23	82	24	458
5:15 PM	9	59	5	6	36	8	5	144	30	26	104	25	457
5:30 PM	4	72	8	2	39	4	13	138	37	38	92	19	466
5:45 PM	9	73	18	8	33	8	7	110	33	30	81	25	435
Total	54	540	76	63	257	47	78	1,023	249	226	658	141	3,412

PM Intersection Peak Hour : **5:00 PM - 6:00 PM** Intersection PHF : **0.97**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	34	295	43	24	135	27	42	510	137	117	359	93	1816
PHF	0.71	0.81	0.597	0.75	0.865	0.844	0.618	0.885	0.926	0.77	0.863	0.93	0.97
Movement PHF		0.81			0.93			0.92			0.92		0.97

KOA CORPORATION

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Robinson Avenue @ Indiana Street

Date of Count: *Thursday, March 19, 2015*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *15-0330*

KOA CORPORATION

Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Robinson Avenue @ Indiana Street

AM Period (7:00 AM - 9:00 AM)

	Southbound			Westbound			Northbound			Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	R (Park)	Thru	R (Robinson)	TOTAL
7:00 AM	0	0	0	0	0	2	0	0	0	3	0	0	5
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
8:15 AM	0	0	0	0	0	2	0	0	0	1	0	4	7
8:30 AM	0	1	0	0	0	1	0	0	0	4	0	0	6
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	2
Total	0	1	0	0	0	5	0	0	0	9	0	9	24

AM Intersection Peak Hour : **8:00 AM - 9:00 AM** Intersection PHF : **0.57**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	R (Park)	Thru	R (Robinson)	
Volume	0	1	0	0	0	3	0	0	0	6	0	6	16
PHF	#####	0.25	#####	#####	#####	0.38	#####	#####	#####	0.38	#####	0.38	0.57
Movement PHF		0.25			0.38			#DIV/0!			0.60		0.57

PM Period (4:00 PM - 6:00 PM)

	Southbound			Westbound			Northbound			Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	R (Park)	Thru	R (Robinson)	TOTAL
4:00 PM	0	1	0	0	0	3	0	0	0	1	0	11	16
4:15 PM	0	3	0	0	0	0	0	0	0	1	0	9	13
4:30 PM	0	2	0	0	0	1	0	0	0	1	0	5	9
4:45 PM	0	2	0	0	0	1	0	0	0	0	0	5	8
5:00 PM	0	3	0	0	0	0	0	0	0	2	0	13	18
5:15 PM	0	4	0	0	0	2	0	0	0	4	0	10	20
5:30 PM	0	4	0	0	0	1	0	0	0	1	0	12	18
5:45 PM	0	4	0	0	0	2	0	0	0	2	0	12	20
Total	0	23	0	0	0	10	0	0	0	12	0	77	122

PM Intersection Peak Hour : **5:00 PM - 6:00 PM** Intersection PHF : **0.95**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	R (Park)	Thru	R (Robinson)	
Volume	0	15	0	0	0	5	0	0	0	9	0	47	76
PHF	#####	0.938	#####	#####	#####	0.625	#####	#####	#####	0.5625	#####	0.904	0.95
Movement PHF		0.94			0.63			#DIV/0!			0.93		0.95

2018 Intersection and Roadway Counts

National Data & Surveying Services

Intersection Turning Movement Count

Location: Park Blvd/Indiana St & Robinson Ave
City: San Diego
Control: Signalized

Project ID: 18-04156-001
Date: 5/2/2018

Total

NS/EW Streets:	Park Blvd/Indiana St					Park Blvd/Indiana St					Robinson Ave					Robinson Ave					
AM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					
	0.5	1.5	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
7:00 AM	31	43	11	1	2	2	85	3	0	2	2	6	9	0	2	12	43	5	0	0	259
7:15 AM	28	93	14	0	0	3	108	4	0	2	4	17	14	1	2	30	67	3	0	1	391
7:30 AM	36	84	7	1	0	3	79	2	0	0	1	10	12	0	4	10	51	8	0	0	308
7:45 AM	31	73	7	0	0	3	63	5	0	1	5	8	12	0	3	6	71	6	0	1	295
8:00 AM	39	49	1	0	1	3	69	1	0	5	3	10	9	0	1	4	48	10	0	0	253
8:15 AM	28	45	2	0	0	6	65	6	0	2	8	15	10	0	1	9	52	12	0	0	261
8:30 AM	30	43	2	1	0	4	63	4	0	3	8	9	11	0	2	6	43	5	0	0	234
8:45 AM	34	35	2	0	0	10	58	12	1	1	9	24	8	1	1	4	45	9	0	0	254
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
TOTAL VOLUMES :	257	465	46	3	3	34	590	37	1	16	40	99	85	2	16	81	420	58	0	2	2255
APPROACH %'s :	33.20%	60.08%	5.94%	0.39%	0.39%	5.01%	87.02%	5.46%	0.15%	2.36%	16.53%	40.91%	35.12%	0.83%	6.61%	14.44%	74.87%	10.34%	0.00%	0.36%	
PEAK HR :	07:00 AM - 08:00 AM																				TOTAL
PEAK HR VOL :	126	293	39	2	2	11	335	14	0	5	12	41	47	1	11	58	232	22	0	2	1253
PEAK HR FACTOR :	0.875	0.788	0.696	0.500	0.250	0.917	0.775	0.700	0.000	0.625	0.600	0.603	0.839	0.250	0.688	0.483	0.817	0.688	0.000	0.500	0.801
			0.856					0.780					0.737					0.777			

PM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					
	0.5	1.5	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
4:30 PM	35	93	6	1	3	10	66	6	0	7	19	60	23	0	8	5	27	9	0	0	378
4:45 PM	42	87	5	0	4	9	50	7	0	2	10	62	30	0	10	1	28	3	0	1	351
5:00 PM	24	94	6	0	2	14	74	5	0	4	11	62	15	0	7	4	25	8	0	1	356
5:15 PM	29	103	7	0	1	10	64	8	0	6	16	57	25	0	8	5	34	7	0	0	380
5:30 PM	40	97	5	0	3	9	50	7	0	9	9	67	29	0	9	3	26	10	0	1	374
5:45 PM	26	69	10	0	2	6	56	7	0	2	14	64	29	0	12	3	25	8	0	0	333
6:00 PM	28	79	4	1	3	5	56	5	0	11	14	62	21	0	8	5	30	5	0	0	337
6:15 PM	21	80	8	0	3	9	50	13	0	3	14	40	26	0	9	1	22	6	0	1	306
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
TOTAL VOLUMES :	245	702	51	2	21	72	466	58	0	44	107	474	198	0	71	27	217	56	0	4	2815
APPROACH %'s :	24.00%	68.76%	5.00%	0.20%	2.06%	11.25%	72.81%	9.06%	0.00%	6.88%	12.59%	55.76%	23.29%	0.00%	8.35%	8.88%	71.38%	18.42%	0.00%	1.32%	
PEAK HR :	04:30 PM - 05:30 PM																				TOTAL
PEAK HR VOL :	130	377	24	1	10	43	254	26	0	19	56	241	93	0	33	15	114	27	0	2	1465
PEAK HR FACTOR :	0.774	0.915	0.857	0.250	0.625	0.768	0.858	0.813	0.000	0.679	0.737	0.972	0.775	0.000	0.825	0.750	0.838	0.750	0.000	0.500	0.964
			0.968					0.881					0.944					0.859			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Park Blvd/Indiana St & Robinson Ave
City: San Diego
Control: Signalized

Project ID: 18-04156-001
Date: 5/2/2018

Bikes

NS/EW Streets:	Park Blvd/Indiana St					Park Blvd/Indiana St					Robinson Ave					Robinson Ave					
AM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					
	0.5	1.5	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
7:00 AM	0	1	0	0	0	0	4	0	0	0	0	0	1	0	0	0	1	0	0	0	7
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	6
7:45 AM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	6
8:00 AM	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	4
8:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	3
8:30 AM	0	0	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	7
8:45 AM	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	1	0	0	0	5
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
TOTAL VOLUMES :	0	2	4	0	0	0	23	0	0	0	1	0	2	0	0	2	4	0	0	0	38
APPROACH %'s :	0.00%	33.33%	66.67%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	33.33%	0.00%	66.67%	0.00%	0.00%	33.33%	66.67%	0.00%	0.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																				TOTAL
PEAK HR VOL :	0	2	3	0	0	0	9	0	0	0	0	0	1	0	0	2	2	0	0	0	19
PEAK HR FACTOR :	0.000	0.500	0.250	0.000	0.000	0.000	0.563	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.500	0.000	0.000	0.000	0.679
			0.417					0.563					0.250					0.500			

PM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					
	0.5	1.5	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
4:30 PM	0	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	6
4:45 PM	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	5
5:00 PM	1	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5
5:15 PM	0	4	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	8
5:30 PM	0	2	0	0	0	0	1	0	0	0	1	2	1	0	0	1	0	0	0	0	8
5:45 PM	1	4	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	9
6:00 PM	0	3	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	7
6:15 PM	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4
	NL	NT	NR	NU	NR2	SL	ST	SR	SU	SL2	EL	ET	ER	EU	ET2	WL	WT	WR	WU	WU2	TOTAL
TOTAL VOLUMES :	3	22	1	0	1	0	6	2	0	1	2	6	6	0	0	1	1	0	0	0	52
APPROACH %'s :	11.11%	81.48%	3.70%	0.00%	3.70%	0.00%	66.67%	22.22%	0.00%	11.11%	14.29%	42.86%	42.86%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																				TOTAL
PEAK HR VOL :	1	12	1	0	0	0	4	2	0	0	1	1	1	0	0	0	1	0	0	0	24
PEAK HR FACTOR :	0.25	0.750	0.250	0.000	0.000	0.000	0.333	0.250	0.000	0.000	0.250	0.250	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.750
			0.875					0.500					0.750					0.250			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Park Blvd/Indiana St & Robinson Ave
City: San Diego
Project ID: 18-04156-001
Date: 5/2/2018

Pedestrians (Crosswalks)

NS/EW Streets:	Park Blvd/Indiana St		Park Blvd/Indiana St		Robinson Ave		Robinson Ave				
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		EAST LEG 2		
	EB	WB	EB	WB	NB	SB	NB	SB	NB	SB	TOTAL
7:00 AM	1	3	2	0	1	2	6	4	2	0	21
7:15 AM	2	3	1	2	2	1	4	7	2	2	26
7:30 AM	3	3	0	0	4	3	0	2	0	0	15
7:45 AM	0	2	0	2	2	1	1	1	2	2	13
8:00 AM	2	2	0	0	1	1	2	7	0	2	17
8:15 AM	1	5	0	0	0	0	4	3	0	0	13
8:30 AM	4	2	1	1	1	5	5	3	0	0	22
8:45 AM	0	2	2	0	2	2	3	6	1	0	18
	EB	WB	EB	WB	NB	SB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	13	22	6	5	13	15	25	33	7	6	145
APPROACH %'s :	37.14%	62.86%	54.55%	45.45%	46.43%	53.57%	43.10%	56.90%	53.85%	46.15%	
PEAK HR :	07:00 AM - 08:00 AM										TOTAL
PEAK HR VOL :	6	11	3	4	9	7	11	14	6	4	75
PEAK HR FACTOR :	0.500	0.917	0.375	0.500	0.563	0.583	0.458	0.500	0.750	0.500	0.721
	0.708		0.583		0.571		0.568		0.625		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		EAST LEG 2		
	EB	WB	EB	WB	NB	SB	NB	SB	NB	SB	TOTAL
4:30 PM	4	4	1	2	1	1	3	1	2	1	20
4:45 PM	3	3	1	5	0	2	5	6	0	4	29
5:00 PM	2	6	1	1	1	4	4	4	1	1	25
5:15 PM	9	5	1	1	4	8	4	5	4	2	43
5:30 PM	6	2	2	4	3	5	2	2	6	3	35
5:45 PM	7	6	5	7	4	1	12	11	3	5	61
6:00 PM	8	2	0	7	2	1	15	2	6	1	44
6:15 PM	3	6	6	2	5	0	18	10	6	1	57
	EB	WB	EB	WB	NB	SB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	42	34	17	29	20	22	63	41	28	18	314
APPROACH %'s :	55.26%	44.74%	36.96%	63.04%	47.62%	52.38%	60.58%	39.42%	60.87%	39.13%	
PEAK HR :	04:30 PM - 05:30 PM										TOTAL
PEAK HR VOL :	18	18	4	9	6	15	16	16	7	8	117
PEAK HR FACTOR :	0.500	0.750	1.000	0.450	0.375	0.469	0.800	0.667	0.438	0.500	0.680
	0.643		0.542		0.438		0.727		0.625		

Prepared by National Data & Surveying Services

Park Blvd/Indiana St & Robinson Ave

Peak Hour Turning Movement Count

ID: 18-04156-001
City: San Diego

Day: Wednesday
Date: 05/02/2018

PEAK HOURS	COUNT PERIODS
07:00 AM - 08:00 AM	07:00 AM - 09:00 AM
NONE	NONE
04:30 PM - 05:30 PM	04:30 PM - 06:30 PM

Park Blvd/Indiana St — SOUTHBOUND

AM	14	335	11	0	327	AM
NOON	0	0	0	0	0	NOON
PM	26	254	43	0	460	PM

Robinson Ave — EASTBOUND

AM	NOON	PM		
373	0	270	⇦	
1	0	0	↶	0
12	0	56	↱	1
41	0	241	→	1
47	0	93	↳	0
AM	NOON	PM		

WESTBOUND — Robinson Ave

PM	NOON	AM		
27	0	22	↰	0
114	0	232	←	1
15	0	58	↲	0
0	0	0	↩	0
308	0	91	⇨	
PM	NOON	AM		

	AM	NOON	PM
	0	1	1	0
	0	0.5	1.5	0

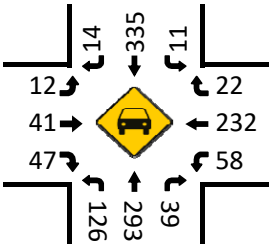
CONTROL: Signalized

TEV	1233 AM	0 NOON	1401 PM
PHF	0.80		0.96

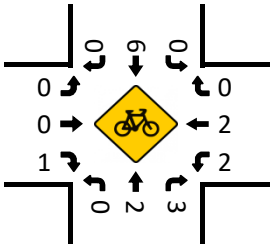
Park Blvd/Indiana St — NORTHBOUND

PM	363	1	130	377	24	PM
NOON	0	0	0	0	0	NOON
AM	442	2	126	293	39	AM

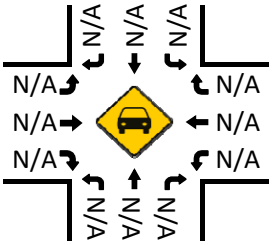
Total Vehicles (AM)



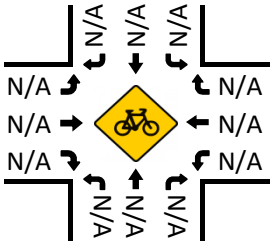
Bikes (AM)



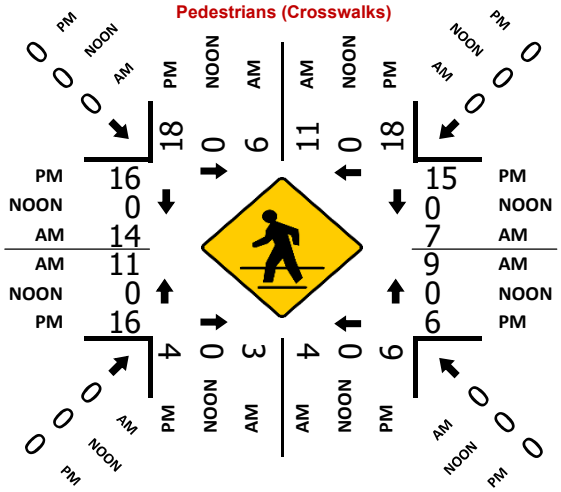
Total Vehicles (Noon)



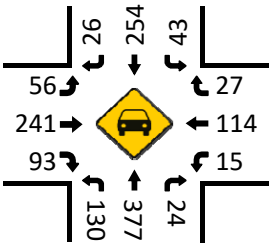
Bikes (NOON)



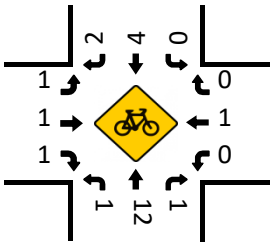
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by NDS/ATD

VOLUME

Park Blvd Bet. Robinson Ave & Cypress Ave

Day: Tuesday
Date: 5/1/2018

City: San Diego
Project #: CA18_4157_001

DAILY TOTALS	NB	SB	EB	WB	Total
	6,143	5,972	0	0	12,115

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	4		5				9		12:00	83		118				201	
00:15	12		9				21		12:15	85		97				182	
00:30	1		4				5		12:30	118		103				221	
00:45	5	22	3	21			8	43	12:45	94	380	113	431			207	811
01:00	4		4				8		13:00	108		95				203	
01:15	6		3				9		13:15	114		131				245	
01:30	2		2				4		13:30	187		136				323	
01:45	2	14	1	10			3	24	13:45	124	533	101	463			225	996
02:00	3		2				5		14:00	99		92				191	
02:15	3		1				4		14:15	121		99				220	
02:30	3		1				4		14:30	136		102				238	
02:45	0	9	3	7			3	16	14:45	124	480	93	386			217	866
03:00	0		2				2		15:00	116		91				207	
03:15	3		2				5		15:15	132		84				216	
03:30	4		4				8		15:30	124		90				214	
03:45	2	9	5	13			7	22	15:45	159	531	97	362			256	893
04:00	4		1				5		16:00	155		114				269	
04:15	1		3				4		16:15	160		106				266	
04:30	5		8				13		16:30	161		97				258	
04:45	10	20	9	21			19	41	16:45	137	613	110	427			247	1040
05:00	5		11				16		17:00	163		108				271	
05:15	12		22				34		17:15	180		107				287	
05:30	13		19				32		17:30	161		107				268	
05:45	16	46	36	88			52	134	17:45	86	590	116	438			202	1028
06:00	29		38				67		18:00	113		104				217	
06:15	25		57				82		18:15	78		100				178	
06:30	40		79				119		18:30	85		84				169	
06:45	58	152	97	271			155	423	18:45	60	336	79	367			139	703
07:00	88		130				218		19:00	81		63				144	
07:15	154		138				292		19:15	51		55				106	
07:30	108		109				217		19:30	48		36				84	
07:45	87	437	103	480			190	917	19:45	33	213	57	211			90	424
08:00	94		99				193		20:00	57		46				103	
08:15	81		113				194		20:15	60		46				106	
08:30	83		92				175		20:30	51		33				84	
08:45	72	330	92	396			164	726	20:45	53	221	38	163			91	384
09:00	69		109				178		21:00	46		35				81	
09:15	58		111				169		21:15	39		35				74	
09:30	77		95				172		21:30	28		28				56	
09:45	70	274	117	432			187	706	21:45	28	141	29	127			57	268
10:00	85		105				190		22:00	15		19				34	
10:15	58		82				140		22:15	24		31				55	
10:30	63		95				158		22:30	12		25				37	
10:45	65	271	89	371			154	642	22:45	14	65	24	99			38	164
11:00	91		86				177		23:00	13		21				34	
11:15	104		76				180		23:15	9		16				25	
11:30	119		82				201		23:30	3		12				15	
11:45	107	421	89	333			196	754	23:45	10	35	6	55			16	90
TOTALS		2005		2443				**4448**	**TOTALS**		4138		3529				**7667**
SPLIT %		45.1%		54.9%				**36.7%**	**SPLIT %**		54.0%		46.0%				**63.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	6,143	5,972	0	0	12,115

AM Peak Hour	07:15	07:00				**07:00**	**PM Peak Hour**	16:30	12:45				**16:45**
AM Pk Volume	443	480				**917**	**PM Pk Volume**	641	475				**1073**
Pk Hr Factor	0.719	0.870				**0.785**	**Pk Hr Factor**	0.890	0.873				**0.935**
7 - 9 Volume	767	876	0	0		**1643**	**4 - 6 Volume**	1203	865	0	0		**2068**
7 - 9 Peak Hour	07:15	07:00				**07:00**	**4 - 6 Peak Hour**	16:30	17:00				**16:45**
7 - 9 Pk Volume	443	480	0	0		**917**	**4 - 6 Pk Volume**	641	438	0	0		**1073**
Pk Hr Factor	0.719	0.870	0.000	0.000		**0.785**	**Pk Hr Factor**	0.890	0.944	0.000	0.000		**0.935**

Prepared by NDS/ATD

VOLUME

Park Blvd Bet. Robinson Ave & Cypress Ave

Day: Wednesday
Date: 5/2/2018

City: San Diego
Project #: CA18_4157_001

DAILY TOTALS	NB	SB	EB	WB	Total
	5,986	5,624	0	0	11,610

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	13		9				22		12:00	95		94				189	
00:15	6		6				12		12:15	81		102				183	
00:30	5		6				11		12:30	90		67				157	
00:45	6	30	4	25			10	55	12:45	89	355	83	346			172	701
01:00	3		7				10		13:00	115		83				198	
01:15	7		2				9		13:15	94		78				172	
01:30	5		2				7		13:30	102		102				204	
01:45	1	16	1	12			2	28	13:45	96	407	96	359			192	766
02:00	6		5				11		14:00	92		76				168	
02:15	1		1				2		14:15	113		98				211	
02:30	4		1				5		14:30	185		111				296	
02:45	2	13	3	10			5	23	14:45	161	551	113	398			274	949
03:00	0		3				3		15:00	136		83				219	
03:15	2		4				6		15:15	122		121				243	
03:30	4		3				7		15:30	186		108				294	
03:45	1	7	0	10			1	17	15:45	147	591	109	421			256	1012
04:00	0		3				3		16:00	147		102				249	
04:15	3		5				8		16:15	172		86				258	
04:30	6		12				18		16:30	139		90				229	
04:45	13	22	17	37			30	59	16:45	152	610	97	375			249	985
05:00	5		11				16		17:00	132		91				223	
05:15	11		16				27		17:15	158		88				246	
05:30	13		29				42		17:30	151		95				246	
05:45	15	44	34	90			49	134	17:45	114	555	96	370			210	925
06:00	23		33				56		18:00	107		86				193	
06:15	32		68				100		18:15	115		83				198	
06:30	27		45				72		18:30	70		83				153	
06:45	61	143	94	240			155	383	18:45	64	356	86	338			150	694
07:00	73		112				185		19:00	60		64				124	
07:15	129		141				270		19:15	65		48				113	
07:30	122		114				236		19:30	59		56				115	
07:45	110	434	90	457			200	891	19:45	56	240	66	234			122	474
08:00	85		86				171		20:00	46		48				94	
08:15	75		87				162		20:15	56		55				111	
08:30	83		85				168		20:30	42		41				83	
08:45	59	302	78	336			137	638	20:45	45	189	45	189			90	378
09:00	69		106				175		21:00	45		38				83	
09:15	61		141				202		21:15	45		42				87	
09:30	63		101				164		21:30	30		35				65	
09:45	69	262	82	430			151	692	21:45	34	154	34	149			68	303
10:00	48		80				128		22:00	18		19				37	
10:15	57		83				140		22:15	24		20				44	
10:30	60		81				141		22:30	16		17				33	
10:45	63	228	93	337			156	565	22:45	17	75	13	69			30	144
11:00	102		87				189		23:00	16		20				36	
11:15	83		65				148		23:15	11		16				27	
11:30	75		98				173		23:30	5		13				18	
11:45	93	353	82	332			175	685	23:45	17	49	11	60			28	109
TOTALS		1854		2316				**4170**	**TOTALS**		4132		3308				**7440**
SPLIT %		44.5%		55.5%				**35.9%**	**SPLIT %**		55.5%		44.5%				**64.1%**

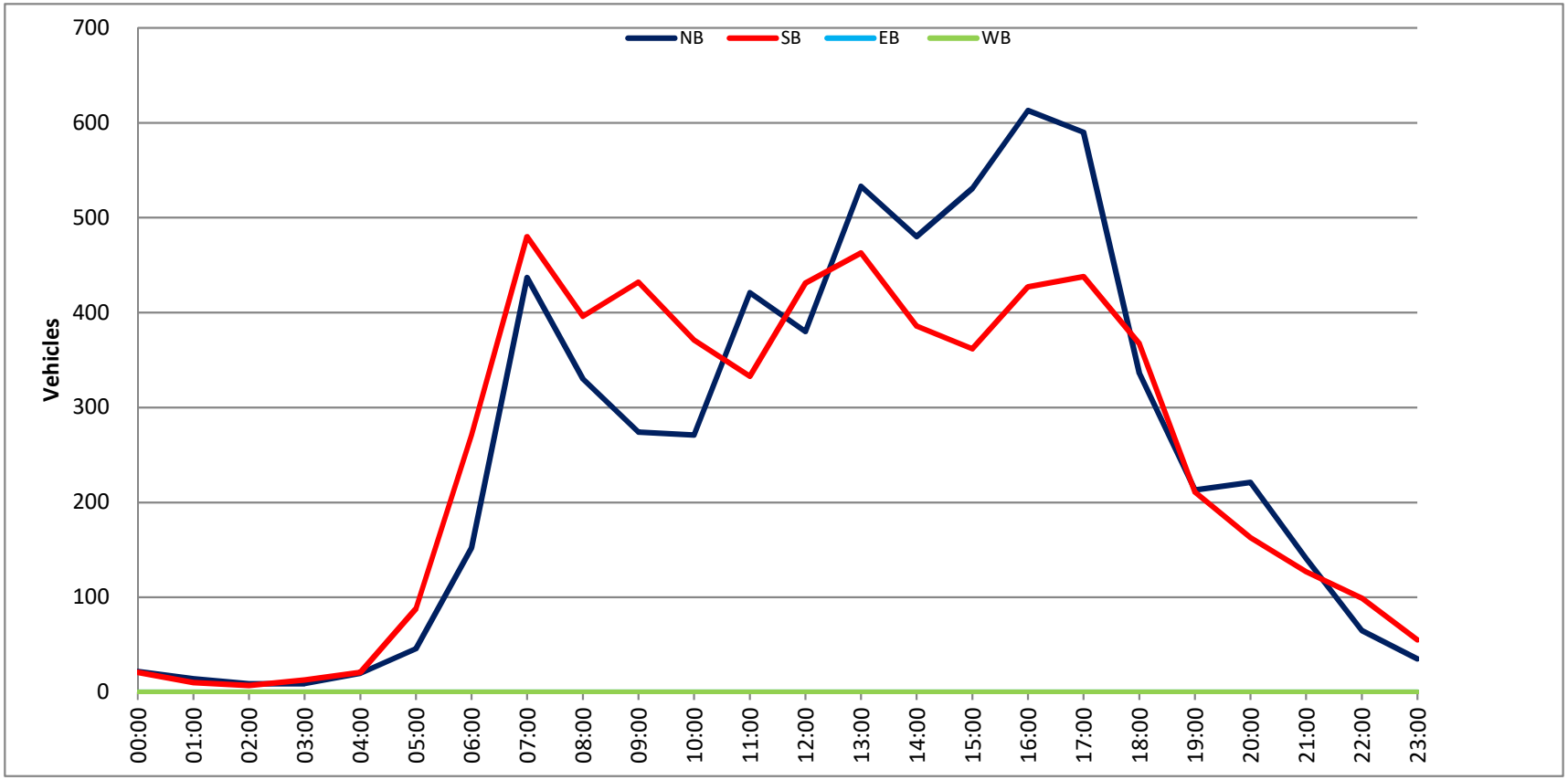
DAILY TOTALS	NB	SB	EB	WB	Total
	5,986	5,624	0	0	11,610

AM Peak Hour	07:15	06:45				**07:00**	**PM Peak Hour**	15:30	15:15				**15:30**
AM Pk Volume	446	461				**891**	**PM Pk Volume**	652	440				**1057**
Pk Hr Factor	0.864	0.817				**0.825**	**Pk Hr Factor**	0.876	0.909				**0.899**
7 - 9 Volume	736	793	0	0		**1529**	**4 - 6 Volume**	1165	745	0	0		**1910**
7 - 9 Peak Hour	07:15	07:00				**07:00**	**4 - 6 Peak Hour**	16:00	16:00				**16:00**
7 - 9 Pk Volume	446	457	0	0		**891**	**4 - 6 Pk Volume**	610	375	0	0		**985**
Pk Hr Factor	0.864	0.810	0.000	0.000		**0.825**	**Pk Hr Factor**	0.887	0.919	0.000	0.000		**0.954**

Prepared by NDS/ATD

Project #: CA18_4157_001 **City:** San Diego

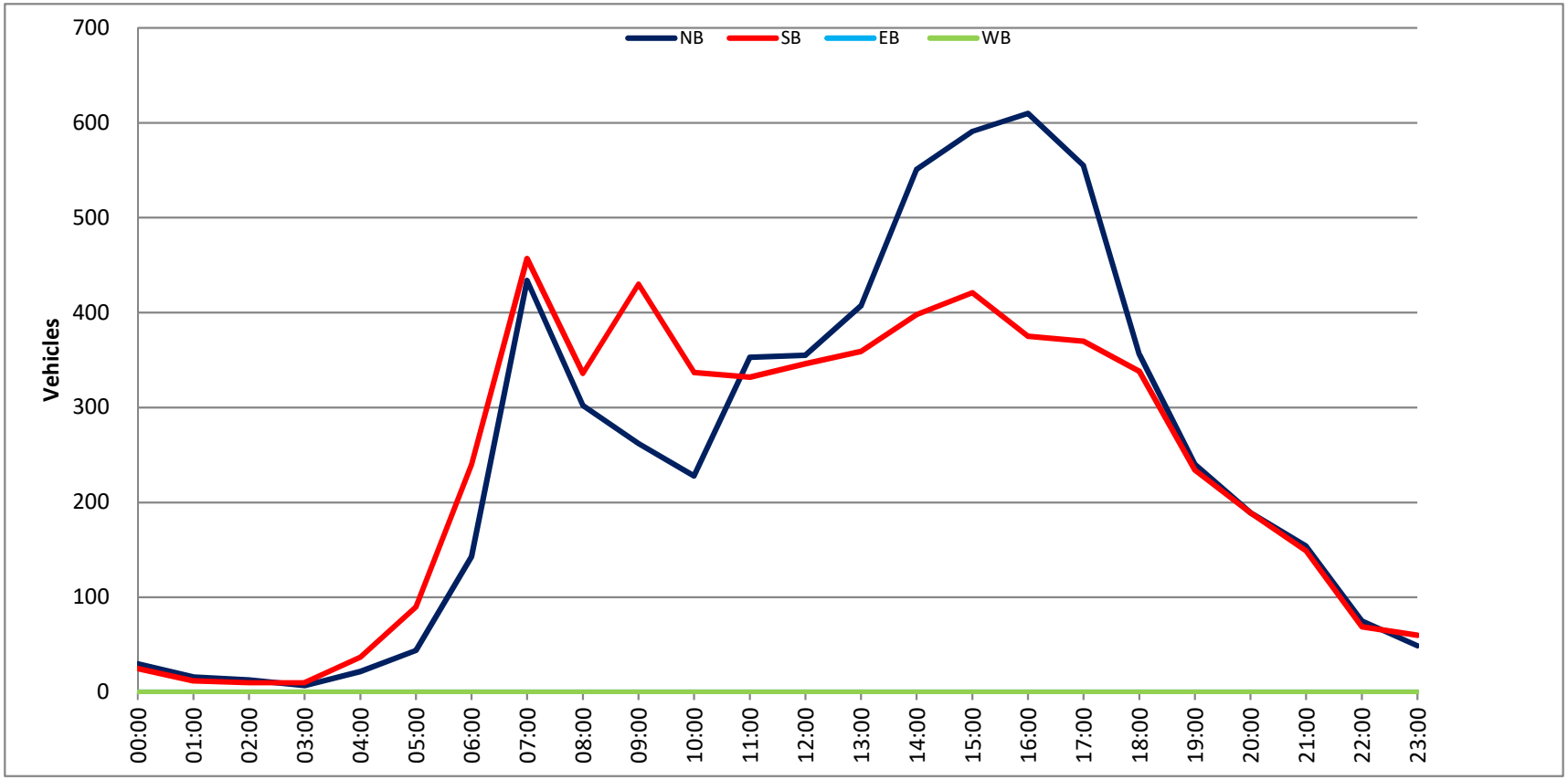
Location: Park Blvd Bet. Robinson Ave & Cypress Ave **Date:** 5/1/2018



Prepared by NDS/ATD

Project #: CA18_4157_001 **City:** San Diego

Location: Park Blvd Bet. Robinson Ave & Cypress Ave **Date:** 5/2/2018



Near-term (2021) Traffic Volumes Development

Turning Movement Count		2021 Traffic Volumes - AM																
60 Minute Counts																		
DATE	TIME	INTID	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR
7/26/2017	1700	1	100	260	20	10	20	10	390	10	10	70	10	40	10	50	230	20
Growth Years =	3																	
GROWTH RATE PER KHA's UPTOWN AND NP COMMUNITY PLAN (CIRCULATION ELEMENT)																		
Roadway	**2013**	**2035**	**CAGR**															
Park Blvd	13807	17700	**1.14%**															

Turning Movement Count				2015 Traffic Volumes - AM														
60 Minute Counts																		
DATE	TIME	INTID	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR
########	1700	1	90	242	15	6	11	1	372	9	8	59	6	37	3	39	217	10

Turning Movement Count				2021 Traffic Volumes - PM													
60 Minute Counts																	
DATE	TIME	INTID	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR
########	1700	1	150	530	50	10	50	20	310	40	100	380	50	130	10	30	140	30
Growth Yea	3																	
GROWTH RATE PER KHA's UPTOWN AND NP COMMUNITY PLAN (CIRCULATION ELEMENT)																		
Roadway	**2013**	**2035**	**CAGR**															
Park Blvd	13807	17700	**1.14%**															

Turning Movement Count				2015 Traffic Volumes - PM														
60 Minute Counts																		
DATE	TIME	INTID	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR
########	1700	1	137	510	42	9	43	15	295	34	93	359	47	117	5	27	135	24

Appendix C
City of San Diego Roadway Segment Daily Capacity and Level of Service Standards

CITY OF SAN DIEGO ROADWAY SEGMENT DAILY CAPACITY AND LEVEL OF SERVICE STANDARDS

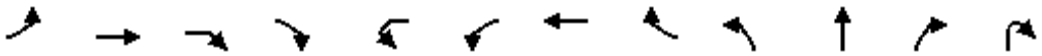
Roadway Functional Classification	Level of Service				
	A	B	C	D	E
Expressway (6-lane)	< 30,000	< 42,000	< 60,000	**< 70,000**	< 80,000
Prime Arterial (6-lane)	< 25,000	< 35,000	< 50,000	**< 55,000**	< 60,000
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	**< 45,000**	< 50,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	**< 35,000**	< 40,000
Collector (4-lane w/ center left-turn lane)	< 10,000	< 14,000	< 20,000	**< 25,000**	< 30,000
Collector (3-lane w/ center left-turn lane)	< 7,500	< 10,500	< 15,000	**< 19,000**	< 22,500
Collector (4-lane w/o center lane)	< 5,000	< 7,000	< 10,000	**< 13,000**	< 15,000
Collector (2-lane w/ center left-turn lane)					
Collector (2-lane no fronting property)	< 4,000	< 5,500	< 7,500	**< 9,000**	< 10,000
Collector (2-lane w/ commercial fronting)	< 2,500	< 3,500	< 5,000	**< 6,500**	< 8,000
Collector (2-lane multi-family)					
Sub-Collector (2-lane single-family)	-	-	< 2,200	**-**	-

Source: City of San Diego Traffic Impact Study Manual (1998)

Notes:
Bold numbers indicate the ADT thresholds for acceptable LOS.

Appendix D
Peak Hour Intersection Capacity and Queuing Analysis Worksheets – Existing Without and With the Project

Existing Without The Project – Intersection Capacity Analysis Worksheet



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	8	59	6	37	3	39	217	10	90	242	15	6
Future Volume (vph)	8	59	6	37	3	39	217	10	90	242	15	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9					5.9			5.9		
Lane Util. Factor	1.00	1.00					1.00			0.95		
Frpb, ped/bikes	1.00	0.96					1.00			0.99		
Flpb, ped/bikes	1.00	1.00					0.99			1.00		
Frt	1.00	0.94					1.00			0.99		
Flt Protected	0.95	1.00					0.99			0.99		
Satd. Flow (prot)	1761	1684					1826			3433		
Flt Permitted	0.53	1.00					0.93			0.71		
Satd. Flow (perm)	985	1684					1705			2466		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	10	72	7	45	4	48	265	12	110	295	18	7
RTOR Reduction (vph)	0	0	0	0	0	0	1	0	0	1	0	0
Lane Group Flow (vph)	10	124	0	0	0	0	328	0	0	429	0	0
Confl. Peds. (#/hr)	14		10	34	10	34		25	8		45	44
Confl. Bikes (#/hr)			8	8				6			5	5
Parking (#/hr)												
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		4					8			2		
Permitted Phases	4				8	8			2			
Actuated Green, G (s)	15.5	15.5					15.5			23.2		
Effective Green, g (s)	15.5	15.5					15.5			23.2		
Actuated g/C Ratio	0.31	0.31					0.31			0.46		
Clearance Time (s)	5.9	5.9					5.9			5.9		
Vehicle Extension (s)	2.0	2.0					2.0			3.6		
Lane Grp Cap (vph)	302	516					523			1132		
v/s Ratio Prot		0.07										
v/s Ratio Perm	0.01						c0.19			0.17		
v/c Ratio	0.03	0.24					0.63			0.38		
Uniform Delay, d1	12.3	13.1					15.0			8.9		
Progression Factor	1.00	1.00					1.00			1.00		
Incremental Delay, d2	0.0	0.1					1.7			0.3		
Delay (s)	12.3	13.2					16.7			9.2		
Level of Service	B	B					B			A		
Approach Delay (s)		13.1					16.7			9.2		
Approach LOS		B					B			A		

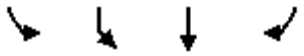
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	11.8
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	11	1	372	9
Future Volume (vph)	11	1	372	9
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	1.00	
Flpb, ped/bikes		0.99	1.00	
Frt		1.00	1.00	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1744	1668	
Flt Permitted		0.50	1.00	
Satd. Flow (perm)		921	1668	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	1	454	11
RTOR Reduction (vph)	0	0	1	0
Lane Group Flow (vph)	0	14	464	0
Confl. Peds. (#/hr)	11	10		22
Confl. Bikes (#/hr)				15
Parking (#/hr)			0	0
Turn Type	Perm	Perm	NA	
Protected Phases			6	
Permitted Phases	6	6		
Actuated Green, G (s)		23.2	23.2	
Effective Green, g (s)		23.2	23.2	
Actuated g/C Ratio		0.46	0.46	
Clearance Time (s)		5.9	5.9	
Vehicle Extension (s)		4.5	4.5	
Lane Grp Cap (vph)		423	766	
v/s Ratio Prot			c0.28	
v/s Ratio Perm		0.02		
v/c Ratio		0.03	0.61	
Uniform Delay, d1		7.5	10.2	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.1	1.8	
Delay (s)		7.5	12.0	
Level of Service		A	B	
Approach Delay (s)			11.9	
Approach LOS			B	

Intersection Summary

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	93	359	47	117	5	27	135	24	137	510	42	9
Future Volume (vph)	93	359	47	117	5	27	135	24	137	510	42	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9					5.9			5.9		
Lane Util. Factor	1.00	1.00					1.00			0.95		
Frpb, ped/bikes	1.00	0.96					0.99			0.98		
Flpb, ped/bikes	0.99	1.00					0.99			1.00		
Frt	1.00	0.95					0.98			0.99		
Flt Protected	0.95	1.00					0.99			0.99		
Satd. Flow (prot)	1743	1709					1796			3389		
Flt Permitted	0.66	1.00					0.80			0.75		
Satd. Flow (perm)	1209	1709					1454			2552		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	96	370	48	121	5	28	139	25	141	526	43	9
RTOR Reduction (vph)	0	0	0	0	0	0	4	0	0	1	0	0
Lane Group Flow (vph)	96	539	0	0	0	0	193	0	0	718	0	0
Confl. Peds. (#/hr)	24		15	42	15	42		39	27		57	57
Confl. Bikes (#/hr)			10	10				2			26	26
Parking (#/hr)												
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		4					8			2		
Permitted Phases	4				8	8			2			
Actuated Green, G (s)	29.6	29.6					29.6			29.9		
Effective Green, g (s)	29.6	29.6					29.6			29.9		
Actuated g/C Ratio	0.42	0.42					0.42			0.42		
Clearance Time (s)	5.9	5.9					5.9			5.9		
Vehicle Extension (s)	2.0	2.0					2.0			3.6		
Lane Grp Cap (vph)	501	709					603			1070		
v/s Ratio Prot		c0.32										
v/s Ratio Perm	0.08						0.13			c0.28		
v/c Ratio	0.19	0.76					0.32			0.67		
Uniform Delay, d1	13.2	17.8					14.1			16.7		
Progression Factor	1.00	1.00					1.00			1.00		
Incremental Delay, d2	0.1	4.3					0.1			1.8		
Delay (s)	13.3	22.2					14.2			18.5		
Level of Service	B	C					B			B		
Approach Delay (s)		20.8					14.2			18.5		
Approach LOS		C					B			B		

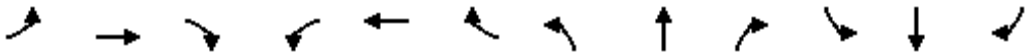
Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	11.8
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	43	15	295	34
Future Volume (vph)	43	15	295	34
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1739	1634	
Flt Permitted		0.31	1.00	
Satd. Flow (perm)		574	1634	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	15	304	35
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	59	334	0
Confl. Peds. (#/hr)	15	15		51
Confl. Bikes (#/hr)				10
Parking (#/hr)			0	0
Turn Type	Perm	Perm	NA	
Protected Phases			6	
Permitted Phases	6	6		
Actuated Green, G (s)		29.9	29.9	
Effective Green, g (s)		29.9	29.9	
Actuated g/C Ratio		0.42	0.42	
Clearance Time (s)		5.9	5.9	
Vehicle Extension (s)		4.5	4.5	
Lane Grp Cap (vph)		240	685	
v/s Ratio Prot			0.20	
v/s Ratio Perm		0.10		
v/c Ratio		0.25	0.49	
Uniform Delay, d1		13.4	15.1	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.9	0.9	
Delay (s)		14.3	16.1	
Level of Service		B	B	
Approach Delay (s)			15.8	
Approach LOS			B	

Intersection Summary

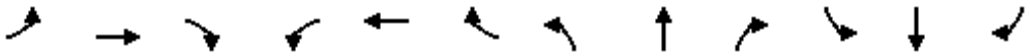
Existing with The Project
– Intersection Capacity Analysis Worksheet



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	65	37	42	217	10	90	242	21	12	372	9
Future Volume (vph)	8	65	37	42	217	10	90	242	21	12	372	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9			5.9		3.0	5.9		3.0	5.9	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1723			1825		1770	1822		1770	1853	
Flt Permitted		0.97			0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1670			1700		1770	1822		1770	1853	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	10	79	45	51	265	12	110	295	26	15	454	11
RTOR Reduction (vph)	0	0	0	0	1	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	134	0	0	327	0	110	317	0	15	465	0
Confl. Peds. (#/hr)	14		34	34		25			45			22
Confl. Bikes (#/hr)			8			6			5			15
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		16.2			16.2		6.9	27.4		2.0	22.5	
Effective Green, g (s)		16.2			16.2		6.9	27.4		2.0	22.5	
Actuated g/C Ratio		0.27			0.27		0.11	0.45		0.03	0.37	
Clearance Time (s)		5.9			5.9		3.0	5.9		3.0	5.9	
Vehicle Extension (s)		2.0			2.0		3.0	3.6		3.0	4.5	
Lane Grp Cap (vph)		447			455		202	826		58	690	
v/s Ratio Prot							c0.06	0.17		0.01	c0.25	
v/s Ratio Perm		0.08			c0.19							
v/c Ratio		0.30			0.72		0.54	0.38		0.26	0.67	
Uniform Delay, d1		17.6			20.0		25.3	10.9		28.5	15.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			4.5		3.0	0.4		2.4	3.1	
Delay (s)		17.7			24.5		28.2	11.3		30.8	19.0	
Level of Service		B			C		C	B		C	B	
Approach Delay (s)		17.7			24.5			15.6			19.3	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	406	117	32	135	24	137	510	51	58	295	34
Future Volume (vph)	93	406	117	32	135	24	137	510	51	58	295	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9			5.9		4.5	5.9		4.5	5.9	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.98		1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1738			1794		1770	1785		1770	1796	
Flt Permitted		0.91			0.84		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1598			1524		1770	1785		1770	1796	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	96	419	121	33	139	25	141	526	53	60	304	35
RTOR Reduction (vph)	0	0	0	0	6	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	636	0	0	191	0	141	575	0	60	339	0
Confl. Peds. (#/hr)	24		42	42		39			57			51
Confl. Bikes (#/hr)			10			2			26			10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		49.9			49.9		13.9	44.1		7.0	37.2	
Effective Green, g (s)		49.9			49.9		13.9	44.1		7.0	37.2	
Actuated g/C Ratio		0.43			0.43		0.12	0.38		0.06	0.32	
Clearance Time (s)		5.9			5.9		4.5	5.9		4.5	5.9	
Vehicle Extension (s)		2.0			2.0		3.0	3.6		3.0	4.5	
Lane Grp Cap (vph)		679			648		209	671		105	569	
v/s Ratio Prot							c0.08	c0.32		0.03	0.19	
v/s Ratio Perm		c0.40			0.13							
v/c Ratio		0.94			0.30		0.67	0.86		0.57	0.60	
Uniform Delay, d1		32.2			22.1		49.5	33.7		53.7	33.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		20.1			0.1		8.3	13.3		7.3	4.5	
Delay (s)		52.3			22.2		57.8	47.0		61.0	38.3	
Level of Service		D			C		E	D		E	D	
Approach Delay (s)		52.3			22.2			49.1			41.7	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	117.3	Sum of lost time (s)	20.3
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Existing with The Project – Queuing Analysis Worksheet

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	328	110	321	15	465
v/c Ratio	0.29	0.70	0.50	0.38	0.10	0.66
Control Delay	21.2	30.1	39.2	13.4	30.1	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	30.1	39.2	13.4	30.1	21.2
Queue Length 50th (ft)	39	108	39	59	6	140
Queue Length 95th (ft)	82	193	#102	164	19	219
Internal Link Dist (ft)	480	132		782		654
Turn Bay Length (ft)			190		117	
Base Capacity (vph)	641	656	227	1178	143	1055
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.50	0.48	0.27	0.10	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

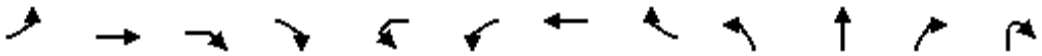
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	636	197	141	579	60	339
v/c Ratio	0.93	0.30	0.72	0.85	0.48	0.59
Control Delay	53.7	22.3	70.7	48.0	65.6	39.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	22.3	70.7	48.0	65.6	39.0
Queue Length 50th (ft)	453	92	105	417	45	220
Queue Length 95th (ft)	#694	149	#186	#637	90	322
Internal Link Dist (ft)	480	132		782		654
Turn Bay Length (ft)			190		150	
Base Capacity (vph)	704	678	217	679	141	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.29	0.65	0.85	0.43	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

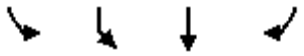
Appendix E
Peak Hour Intersection Capacity and Queuing Analysis Worksheets – Near-Term Without and With the Project

Near-term without The Project – Intersection Capacity Analysis Worksheet



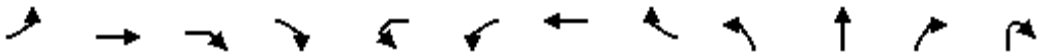
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	10	70	10	40	10	50	230	20	100	260	20	10
Future Volume (vph)	10	70	10	40	10	50	230	20	100	260	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9					5.9			5.9		
Lane Util. Factor	1.00	1.00					1.00			0.95		
Frpb, ped/bikes	1.00	0.96					1.00			0.99		
Flpb, ped/bikes	1.00	1.00					0.99			1.00		
Frt	1.00	0.94					0.99			0.99		
Flt Protected	0.95	1.00					0.99			0.99		
Satd. Flow (prot)	1761	1681					1810			3411		
Flt Permitted	0.48	1.00					0.90			0.67		
Satd. Flow (perm)	886	1681					1650			2312		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	85	12	49	12	61	280	24	122	317	24	12
RTOR Reduction (vph)	0	0	0	0	0	0	2	0	0	2	0	0
Lane Group Flow (vph)	12	146	0	0	0	0	375	0	0	473	0	0
Confl. Peds. (#/hr)	14		10	34	10	34		25	8		45	44
Confl. Bikes (#/hr)			8	8				6			5	5
Parking (#/hr)												
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		4					8			2		
Permitted Phases	4				8	8			2			
Actuated Green, G (s)	19.0	19.0					19.0			26.9		
Effective Green, g (s)	19.0	19.0					19.0			26.9		
Actuated g/C Ratio	0.33	0.33					0.33			0.47		
Clearance Time (s)	5.9	5.9					5.9			5.9		
Vehicle Extension (s)	2.0	2.0					2.0			3.6		
Lane Grp Cap (vph)	291	553					543			1077		
v/s Ratio Prot		0.09										
v/s Ratio Perm	0.01						c0.23			0.20		
v/c Ratio	0.04	0.26					0.69			0.44		
Uniform Delay, d1	13.2	14.2					16.8			10.3		
Progression Factor	1.00	1.00					1.00			1.00		
Incremental Delay, d2	0.0	0.1					3.1			0.4		
Delay (s)	13.2	14.3					19.9			10.7		
Level of Service	B	B					B			B		
Approach Delay (s)		14.2					19.9			10.7		
Approach LOS		B					B			B		

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	11.8
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



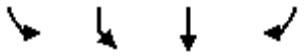
Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	20	10	390	10
Future Volume (vph)	20	10	390	10
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	1.00	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	1.00	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1742	1668	
Flt Permitted		0.48	1.00	
Satd. Flow (perm)		880	1668	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	12	476	12
RTOR Reduction (vph)	0	0	1	0
Lane Group Flow (vph)	0	36	487	0
Confl. Peds. (#/hr)	11	10		22
Confl. Bikes (#/hr)				15
Parking (#/hr)			0	0
Turn Type	Perm	Perm	NA	
Protected Phases			6	
Permitted Phases	6	6		
Actuated Green, G (s)		26.9	26.9	
Effective Green, g (s)		26.9	26.9	
Actuated g/C Ratio		0.47	0.47	
Clearance Time (s)		5.9	5.9	
Vehicle Extension (s)		4.5	4.5	
Lane Grp Cap (vph)		410	777	
v/s Ratio Prot			c0.29	
v/s Ratio Perm		0.04		
v/c Ratio		0.09	0.63	
Uniform Delay, d1		8.6	11.6	
Progression Factor		1.00	1.00	
Incremental Delay, d2		0.2	2.0	
Delay (s)		8.7	13.6	
Level of Service		A	B	
Approach Delay (s)			13.3	
Approach LOS			B	

Intersection Summary



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	100	380	50	130	10	30	140	30	150	530	50	10
Future Volume (vph)	100	380	50	130	10	30	140	30	150	530	50	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9					5.9			5.9		
Lane Util. Factor	1.00	1.00					1.00			0.95		
Frpb, ped/bikes	1.00	0.96					0.99			0.98		
Flpb, ped/bikes	0.98	1.00					0.99			1.00		
Frt	1.00	0.95					0.98			0.99		
Flt Protected	0.95	1.00					0.99			0.99		
Satd. Flow (prot)	1741	1700					1787			3368		
Flt Permitted	0.63	1.00					0.71			0.72		
Satd. Flow (perm)	1155	1700					1284			2436		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	392	52	134	10	31	144	31	155	546	52	10
RTOR Reduction (vph)	0	0	0	0	0	0	5	0	0	1	0	0
Lane Group Flow (vph)	103	578	0	0	0	0	211	0	0	762	0	0
Confl. Peds. (#/hr)	24		15	42	15	42		39	27		57	57
Confl. Bikes (#/hr)			10	10				2			26	26
Parking (#/hr)												
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		4					8			2		
Permitted Phases	4				8	8			2			
Actuated Green, G (s)	34.9	34.9					34.9			33.2		
Effective Green, g (s)	34.9	34.9					34.9			33.2		
Actuated g/C Ratio	0.44	0.44					0.44			0.42		
Clearance Time (s)	5.9	5.9					5.9			5.9		
Vehicle Extension (s)	2.0	2.0					2.0			3.6		
Lane Grp Cap (vph)	504	742					560			1012		
v/s Ratio Prot		c0.34										
v/s Ratio Perm	0.09						0.16			c0.31		
v/c Ratio	0.20	0.78					0.38			0.75		
Uniform Delay, d1	13.9	19.2					15.2			19.9		
Progression Factor	1.00	1.00					1.00			1.00		
Incremental Delay, d2	0.1	4.7					0.2			3.3		
Delay (s)	14.0	23.9					15.3			23.2		
Level of Service	B	C					B			C		
Approach Delay (s)		22.4					15.3			23.2		
Approach LOS		C					B			C		

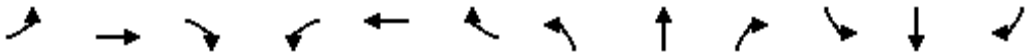
Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.9	Sum of lost time (s)	11.8
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	50	20	310	40
Future Volume (vph)	50	20	310	40
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1740	1629	
Flt Permitted		0.28	1.00	
Satd. Flow (perm)		513	1629	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	21	320	41
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	73	356	0
Confl. Peds. (#/hr)	15	15		51
Confl. Bikes (#/hr)				10
Parking (#/hr)			0	0
Turn Type	Perm	Perm	NA	
Protected Phases			6	
Permitted Phases	6	6		
Actuated Green, G (s)		33.2	33.2	
Effective Green, g (s)		33.2	33.2	
Actuated g/C Ratio		0.42	0.42	
Clearance Time (s)		5.9	5.9	
Vehicle Extension (s)		4.5	4.5	
Lane Grp Cap (vph)		213	676	
v/s Ratio Prot			0.22	
v/s Ratio Perm		0.14		
v/c Ratio		0.34	0.53	
Uniform Delay, d1		15.9	17.5	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.7	1.2	
Delay (s)		17.6	18.7	
Level of Service		B	B	
Approach Delay (s)			18.5	
Approach LOS			B	

Intersection Summary

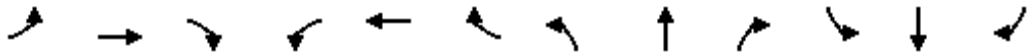
Near-term with The Project
– Intersection Capacity Analysis Worksheet



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	80	40	60	230	20	100	260	30	30	390	10
Future Volume (vph)	10	80	40	60	230	20	100	260	30	30	390	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9			5.9		3.0	5.9		3.0	5.9	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Frt		0.96			0.99		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1733			1810		1770	1810		1770	1853	
Flt Permitted		0.96			0.90		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1672			1651		1770	1810		1770	1853	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	98	49	73	280	24	122	317	37	37	476	12
RTOR Reduction (vph)	0	0	0	0	3	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	159	0	0	374	0	122	347	0	37	488	0
Confl. Peds. (#/hr)	14		34	34		25			45			22
Confl. Bikes (#/hr)			8			6			5			15
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.5			18.5		5.0	20.8		7.5	23.3	
Effective Green, g (s)		18.5			18.5		5.0	20.8		7.5	23.3	
Actuated g/C Ratio		0.30			0.30		0.08	0.34		0.12	0.38	
Clearance Time (s)		5.9			5.9		3.0	5.9		3.0	5.9	
Vehicle Extension (s)		2.0			2.0		3.0	3.6		3.0	4.5	
Lane Grp Cap (vph)		502			495		143	611		215	700	
v/s Ratio Prot							c0.07	0.19		0.02	c0.26	
v/s Ratio Perm		0.10			c0.23							
v/c Ratio		0.32			0.76		0.85	0.57		0.17	0.70	
Uniform Delay, d1		16.7			19.5		27.9	16.7		24.3	16.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			5.8		36.0	1.4		0.4	3.5	
Delay (s)		16.8			25.3		63.9	18.1		24.6	19.7	
Level of Service		B			C		E	B		C	B	
Approach Delay (s)		16.8			25.3			29.8			20.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	18.8
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	430	130	40	140	30	150	530	60	70	310	40
Future Volume (vph)	100	430	130	40	140	30	150	530	60	70	310	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9			5.9		4.5	5.9		4.5	5.9	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.98		1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1734			1785		1770	1775		1770	1788	
Flt Permitted		0.90			0.79		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1578			1418		1770	1775		1770	1788	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	443	134	41	144	31	155	546	62	72	320	41
RTOR Reduction (vph)	0	0	0	0	6	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	680	0	0	210	0	155	604	0	72	361	0
Confl. Peds. (#/hr)	24		42	42		39			57			51
Confl. Bikes (#/hr)			10			2			26			10
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		51.3			51.3		14.4	44.2		7.3	37.1	
Effective Green, g (s)		51.3			51.3		14.4	44.2		7.3	37.1	
Actuated g/C Ratio		0.43			0.43		0.12	0.37		0.06	0.31	
Clearance Time (s)		5.9			5.9		4.5	5.9		4.5	5.9	
Vehicle Extension (s)		2.0			2.0		3.0	3.6		3.0	4.5	
Lane Grp Cap (vph)		679			610		214	658		108	556	
v/s Ratio Prot							c0.09	c0.34		0.04	0.20	
v/s Ratio Perm		c0.43			0.15							
v/c Ratio		1.00			0.34		0.72	0.92		0.67	0.65	
Uniform Delay, d1		33.9			22.7		50.4	35.7		54.7	35.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		34.9			0.1		11.5	19.8		14.5	5.8	
Delay (s)		68.8			22.8		61.9	55.5		69.2	41.2	
Level of Service		E			C		E	E		E	D	
Approach Delay (s)		68.8			22.8			56.8			45.8	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	119.1	Sum of lost time (s)	20.3
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Near-term with The Project – Queuing Analysis Worksheet

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	377	122	354	37	488
v/c Ratio	0.32	0.75	1.01	0.57	0.16	0.69
Control Delay	20.4	32.6	123.9	21.8	27.0	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	32.6	123.9	21.8	27.0	21.5
Queue Length 50th (ft)	45	123	~52	115	12	152
Queue Length 95th (ft)	96	#254	#148	170	36	208
Internal Link Dist (ft)	480	132		782		654
Turn Bay Length (ft)			190		117	
Base Capacity (vph)	555	553	121	1122	232	1086
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.68	1.01	0.32	0.16	0.45

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	680	216	155	608	72	361
v/c Ratio	1.00	0.35	0.77	0.91	0.56	0.64
Control Delay	67.7	23.4	75.8	55.5	69.9	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	23.4	75.8	55.5	69.9	41.4
Queue Length 50th (ft)	~516	104	116	450	54	239
Queue Length 95th (ft)	#775	167	#215	#690	104	346
Internal Link Dist (ft)	480	132		782		654
Turn Bay Length (ft)			190		150	
Base Capacity (vph)	683	621	214	666	139	561
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.35	0.72	0.91	0.52	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.