Grantville Focused Plan Amendment Draft EIR

Appendix B

Transportation Impact Study

Prepared by Linscott Law & Greenspan

July 18, 2014

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engineers

TRANSPORTATION IMPACT STUDY

GRANTVILLE FOCUSED PLAN AMENDMENT EIR

San Diego, California
July 18, 2014

LLG Ref. 3-11-2076

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TRANSPORTATION IMPACT STUDY

GRANTVILLE FOCUSED PLAN AMENDMENT EIR

San Diego, California
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1.0 INTRODUCTION

This transportation impact study has been conducted to evaluate the potential traffic impacts associated with Alternative D of the Grantville Focused Plan Amendment Project to Grantville Sub Area A in the City of San Diego. The Grantville area of the Navajo community was established as a Redevelopment Project area in May 2005.

The Grantville area of the Navajo community is located in close proximity to Mission Valley, Mission Trails Park and San Diego State University in the City of San Diego. The redevelopment area consists of three Subareas, A, B and C. This transportation impact study focuses on Subarea A only. ***Figure 1–1*** depicts the project vicinity.

Subarea A includes parcels north of I-8 on both sides of Fairmount Avenue and Mission Gorge Road. The northern boundary includes parcels on both sides of Friars Road from Fairmount Avenue to the four corners of Zion Avenue and Mission Gorge Road. The eastern boundary includes parcels on both sides of Mission Gorge Road from Zion Avenue in the north to Mission Gorge Place in the south, along with the parcels on both sides of Mission Gorge Place and portions of Adobe Falls Road. ***Figure 1–2*** depicts the project location and boundary.

The following items are included in this traffic analysis:

- Project Description
- Existing Conditions Description
- Analysis Approach, and Methodology
- Significance Criteria
- Analysis of Existing Conditions
- Trip Generation
- Analysis of Long-Term Scenarios
- Significant Impacts & Mitigation Measures
- Post-Mitigation Analysis
- Conclusion

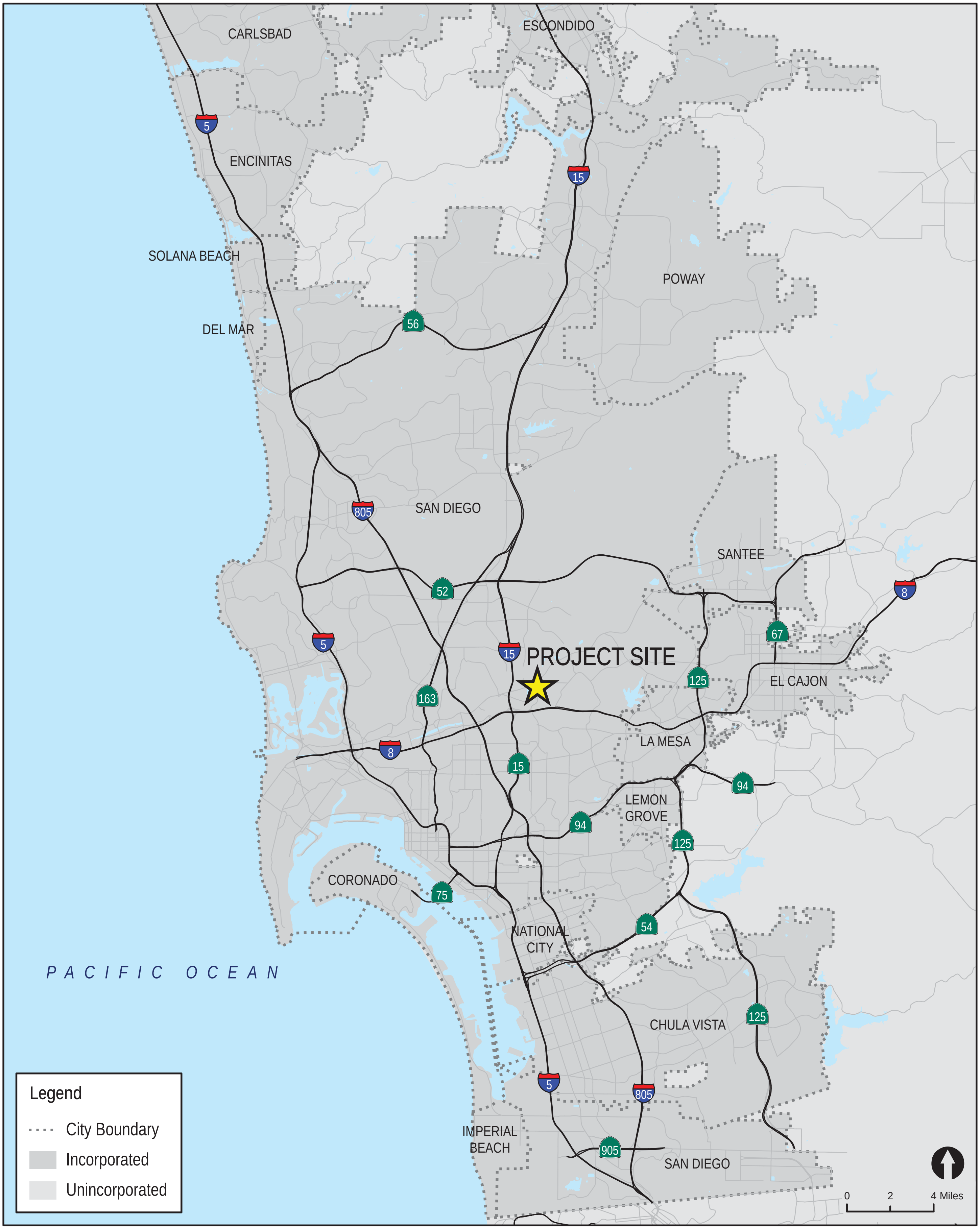

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Figure 1-1

Vicinity Map

GRANTVILLE REDEVELOPMENT PROJECT

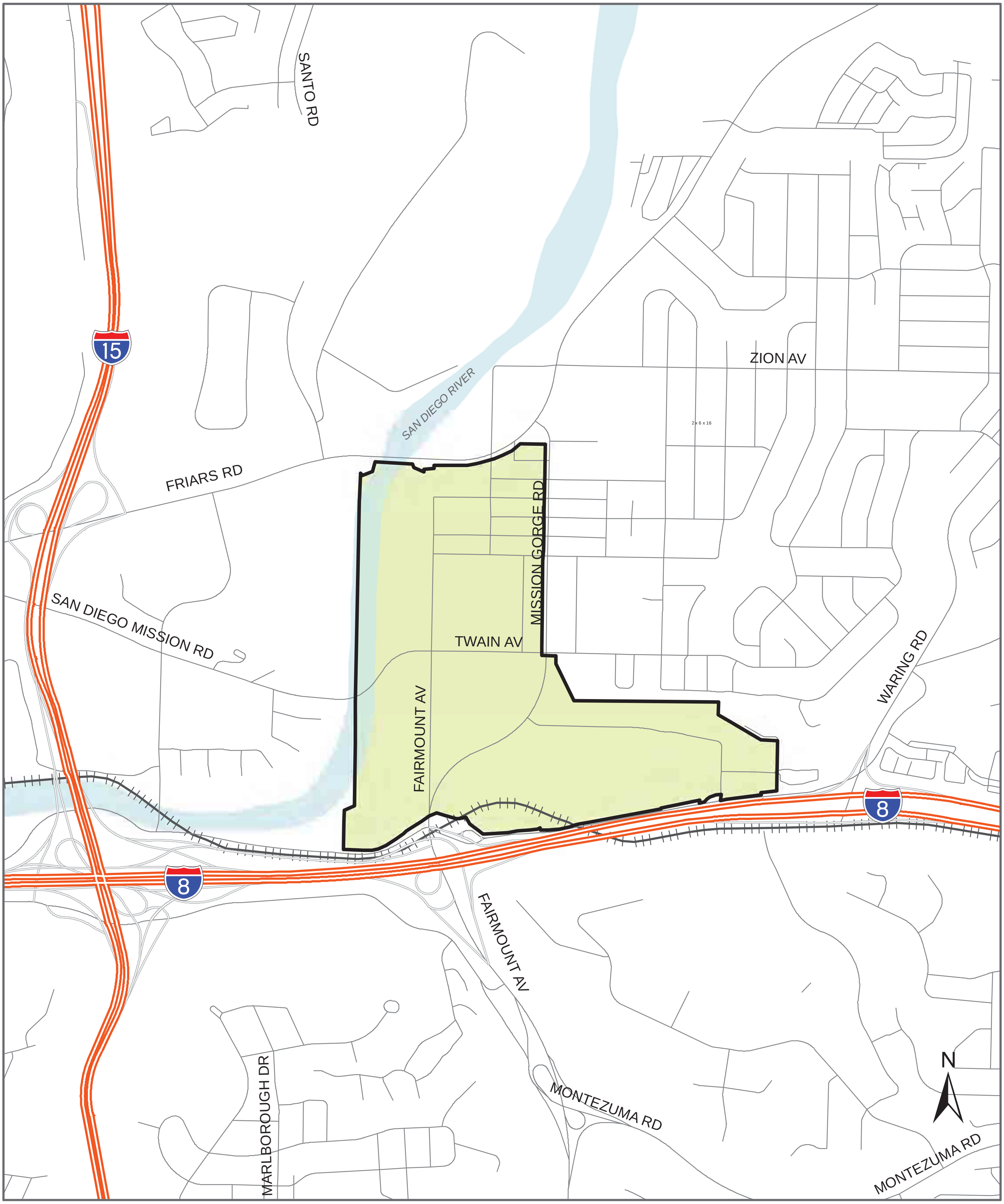

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Figure 1-2

Study Area Map

GRANTVILLE REDEVELOPMENT PROJECT

2.0 PROJECT DESCRIPTION

The project location, referred to as "Subarea A," is located within the former Grantville Redevelopment Project Area, within the eastern portion of the City of San Diego, in San Diego County. The City of San Diego is located adjacent to the United States International Border with Mexico and approximately 130 miles south of Los Angeles. Subarea A is a 379-acre area comprised of commercial, office, industrial, public facility, park and open space uses located immediately north of Interstate 8 along both sides of Fairmount Avenue, Friars Road and Mission Gorge Road north to Zion Avenue (and including several parcels north of Zion Avenue). The southeast portion of Subarea A also includes the first seven parcels on the southern side of Adobe Falls Road (starting at Waring Road). Subarea A was formerly addressed by the Program EIR for the Grantville Redevelopment Project (March 2005, SCH #2004071122) prepared for the City of San Diego Redevelopment Agency.

The Grantville Focused Plan Amendment consists of three components: (1) a focused amendment to the Navajo Community Plan, (2) the processing of rezones, and (3) an update to the Navajo Public Facilities Finance Plan (PFFP). The Focused Plan Amendment and rezones would introduce residential and mixed-use development to the Grantville neighborhood, currently comprised of predominately industrial and commercial uses. The proposal was developed through a series of design charrettes and several years of monthly stakeholder meetings. Through an extensive public meeting process the Grantville Stakeholders Committee has recommended Alternative D as the CEQA project to be analyzed in the Program level Environmental Impact Report. Alternative D would result in a net increase of approximately 8,275 residential dwelling units over what would be allowed by the existing community plan. The Grantville Focused Amendment to the Navajo Community Plan will set out the long-range vision and comprehensive policy framework for how Subarea A could develop over the next 20 to 30 years. The Amendment will provide policy direction for future development and has been guided by the City of Villages growth strategy and citywide policy direction contained within the City of San Diego's General Plan (2008).

The proposed project would rezone Subarea A from predominately single-use commercial and industrial zones to multiple-use zones which promote transit-oriented development. Alternative D would be implemented through the adoption of three new zones: 1). CC-3-6, a community commercial zone which will emphasize pedestrian orientation and allow up to 44 dwelling units per acre. 2). CC-3-8, a community commercial zone which will emphasize pedestrian orientation and allow up to 73 dwelling units per acre. 3). RM-3-7, a multiple dwelling unit residential zone which will allow for limited commercial uses and allow up to 44 dwelling units per acre. The application of these zones, together with the adoption of a new Community Plan Implementation Overlay Zone (CPIOZ), will serve as the implementation tools to achieve the proposed land use amendments associated with Alternative D. The proposed CPIOZ, referred to as the "Grantville TOD CPIOZ", will promote mixed-use, transit-oriented development with pedestrian and bicycle orientation, and allow for increased density in the area surrounding the Grantville Light Rail Trolley Station, up to 109 dwelling-units per acre, when certain criteria are met.

The project transportation improvements identified in this study are consistent with the current Navajo community plan and the Navajo public facilities financing plan. Project improvement features are included in Section 8.1, project’s mitigation measures and the recommended roadway improvements are in included in Section 9.2 and the project’s recommended alternative transportation improvements are included in Section 10.0. ***Figure 2–1*** contains the proposed land use plan associated with Alternative D of the Grantville Focused Plan Amendment Project.

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Figure 2-1

Proposed Land Use Plan

GRANTVILLE REDEVELOPMENT PROJECT

3.0 EXISTING CONDITIONS

Effective evaluation of the traffic impacts associated with the proposed Grantville Focused Plan Amendment project requires an understanding of the existing transportation system within the project area. ***Figure 3–1*** shows an existing conditions diagram, including signalized intersections and lane configurations.

3.1 Existing Street Network

The following is a description of the existing street network in the study area.

Friars Road is classified as a six-lane Primary Arterial in the Navajo Community Plan. Friars Road is currently built as a six-lane undivided roadway with an additional westbound auxiliary lane from the I-15 NB off-ramp to the I-15 SB on-ramp. From the I-15 NB Ramps to Santo Road, Friars Road is a six-lane roadway with a striped median and an additional westbound right-turn only lane onto the I-15 NB ramp. Friars Road, from Santo Road to Mission Gorge Road is a divided roadway with six-lanes. Bike lanes are provided and parking is restricted along both sides of the roadway. There are no bus stops along this segment. The posted speed limit is 45 mph.

Mission Gorge Road is classified in the Navajo Community Plan as a six-lane Major Street from Jackson Drive to Princess View Drive, a six-lane Primary Arterial from Princess View Drive to Friars Road, and a four-lane Major Street from Friars Road to Fairmount Avenue.

Mission Gorge Road is a six-lane divided roadway with left turn pockets starting at Jackson Drive and then transitions into five lanes approaching Princess View Drive. Jackson Drive transitions again shortly west of Katelyn Court from five lanes to four lanes. From Old Cliffs Road to Friars, Mission Gorge Road is a six-lane roadway. The posted speed limit is 45-55 mph.

From Friars Road to Fairmount Avenue, Mission Gorge Road is currently constructed as a four-lane roadway with a two-way left-turn lane. The posted speed limit is 30 mph.

Parking is intermittently permitted on Mission Gorge Road within the study limits. Along Mission Gorge Road, bus stops are provided from Zion Avenue to Fairmount Avenue and bike lanes are provided from Jackson Drive to Friars Road.

Fairmount Avenue is classified in the Navajo Community Plan as a two-lane Local Collector from Vandever Avenue to Mission Gorge Road, and a six-lane Major Street from Mission Gorge Road to the I-8 EB Ramps. From Vandever Avenue to Twain Avenue, Fairmount Avenue is currently built as a two-lane undivided roadway with a posted speed limit of 30 mph. Parking is provided on both sides of the roadway. Bus stops and bike lanes are not provided. From Twain Avenue, Mission Gorge Road is a two-lane roadway with a two-way left turn lane that ends at Mission Gorge Road. Parking is permitted on the west side of Fairmount Avenue. Bus stop and bike lanes are not provided. From Mission Gorge Road to the I-8 EB Ramps, Fairmount Avenue is a four-lane divided roadway with a posted speed limit of 35 mph. Bus stops are not provided and parking is not permitted along this segment. Bike lanes are provided south of the I-8 EB Ramps.

Vandever Avenue is classified as a two-lane Local Collector in the Navajo Community Plan. Vandever Avenue is currently constructed as a two-lane undivided roadway from Riverdale Road to Mission Gorge Road with no posted speed limit. Parking is permitted on both sides of the segment. Bike lanes and bus stops are not provided.

Twain Avenue is classified as a two-lane Local Collector in the Navajo Community Plan. From Fairmount Avenue to Mission Gorge Road, Twain Avenue is a two-lane undivided roadway with a posted speed limit of 25 mph. Street parking is intermittently available. Bus stops and bike lanes are not provided

San Diego Mission Road is classified as a four-lane Major Street in the Navajo Community Plan west of Rancho Mission Road and a four-lane Local Collector from Rancho Mission Road to Fairmount Avenue. West of Rancho Mission Road, San Diego Mission Road is a four-lane undivided roadway. Parking is prohibited and bus stop and bike lanes are not provided. From Rancho Mission Road to Fairmount Avenue, San Diego Mission Road is a two-lane roadway with a two way left turn lane. Parking is available on the south side of San Diego Mission Road and bike lanes are provided. There are no bus stops along this segment. The posted speed limit is 35-40 mph.

Waring Road is classified as four-lane Major Street in the Navajo Community Plan. Waring Road is currently built as a four-lane divided roadway from Princess View Drive to Zion Road with parking available on both sides and bus stops provided. Bike lanes are not provided along this segment. From Zion Avenue to Orcutt Avenue, Waring Road is a four-lane roadway with a two way left turn lane. Bus stops and bike lanes are not provided and parking is permitted on both sides. The posted speed limit on Waring Road is 35 mph.

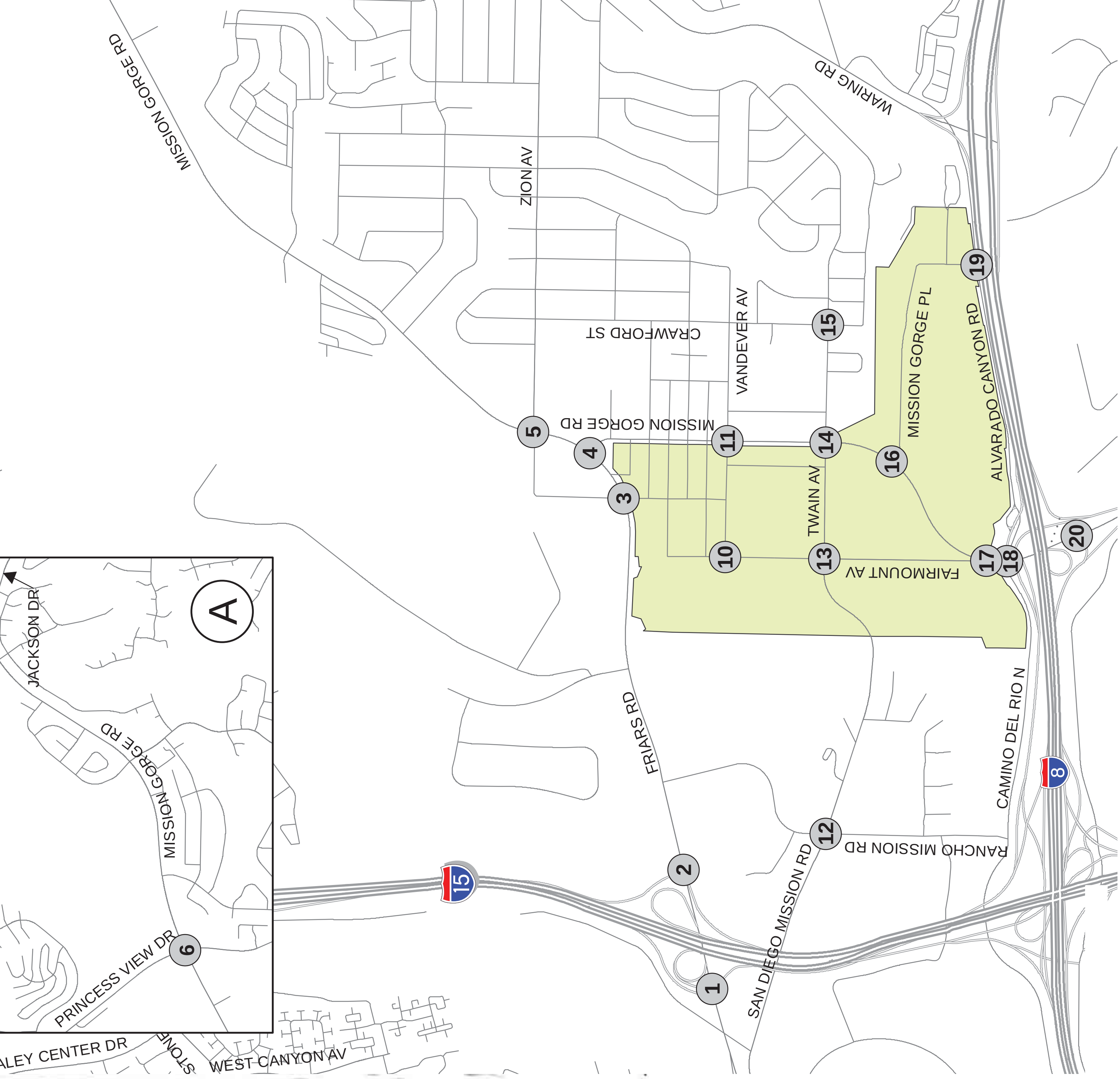
Zion Avenue is classified as a four-lane Major Street in the Navajo Community Plan. From Mission Gorge Road to Waring Road, Zion Avenue is currently built as a two-lane roadway with a two way left turn lane and a posted speed limit of 30 mph. Along this segment bus stops are provided. Bike lanes and parking are intermittently available.

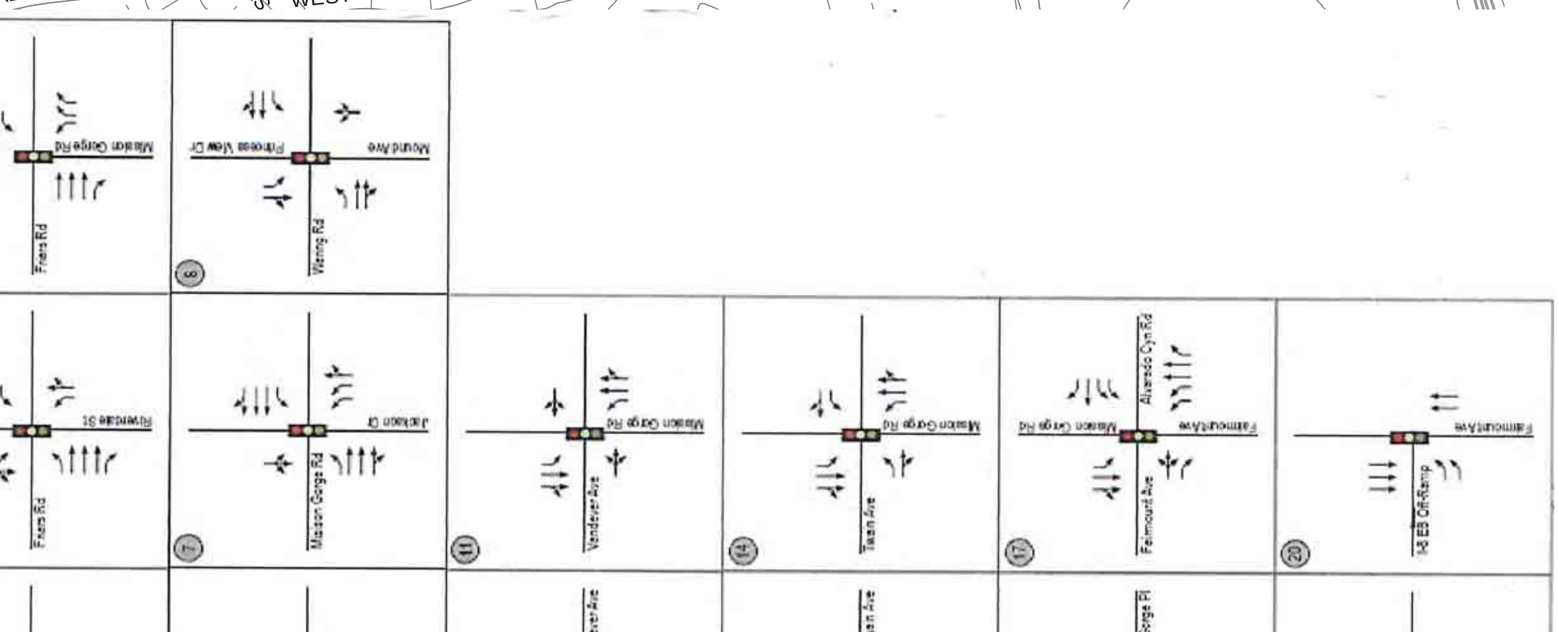
Princess View Drive is classified as a four-lane Major Street. Princess View Drive is currently constructed as a four-lane undivided roadway from Waring Road to Fontaine Street. North of Fontaine Street, Princess View Drive transitions to a four-lane roadway with a two-way left-turn lane up to its northern terminus at Mission Gorge Road. Bus stops and bike lanes are not provided. Parking is permitted on both sides of Princess View Drive and the posted speed limit is 35 mph.

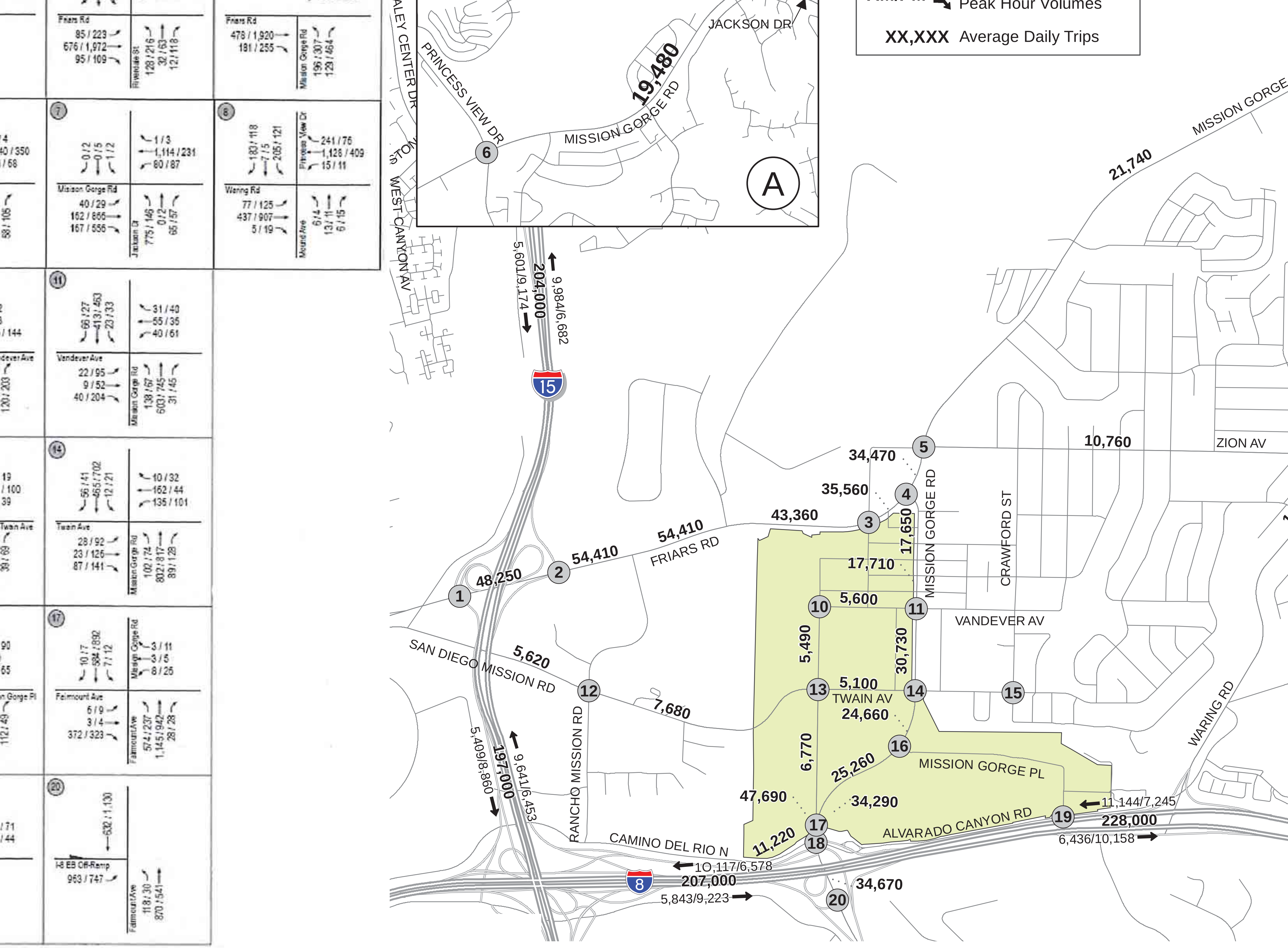
Camino Del Rio North is classified as a four-lane major street in the Navajo Community Plan. Camino Del Rio North is currently a four-lane roadway with two-way left-turn lane. The posted speed limit is 45 mph. Parking is prohibited. Bus stops and bike lanes are provided.

3.2 Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes and average daily traffic (ADT) volume counts for City streets were conducted in October 2013. Freeway ADT and peak-hour volumes were obtained from Caltrans' traffic database. ***Appendix A*** contains the manual count sheets. ***Figure 3–2*** shows the existing traffic volumes.


MISSION GORGE RD
WARING RD
ZION AV
CRAWFORD ST
VANDEVER AV
MISSION GORGE PL
ALVARADO CANYON RD
MISSION GORGE RD
TWAIN AV
FAIRMOUNT AV
FRIARS RD
CAMINO DEL RIO N
RANCHO MISSION RD
SAN DIEGO MISSION RD
JACKSON DR
MISSION GORGE RD
PRINCESS VIEW DR
WEST CANYON AV
A
15
8
1
2
3
4
5
6
10
11
12
13
14
15
16
17
18
19
20





Peak Hour Volumes
XX,XXX Average Daily Trips
A
JACKSON DR
19,480
MISSION GORGE RD
PRINCESS VIEW DR
WEST CANYON AV
MISSION GORGE
21,740
10,760
ZION AV
CRAWFORD ST
VANDEVER AV
MISSION GORGE RD
WARING RD
TWAIN AV
MISSION GORGE PL
ALVARADO CANYON RD
FRIARS RD
SAN DIEGO MISSION RD
RANCHO MISSION RD
CAMINO DEL RIO N
9,984/6,682
204,000
5,601/9,174
34,470
35,560
43,360
54,410
54,410
48,250
17,650
17,710
5,600
30,730
5,490
5,100
24,660
25,260
6,770
34,290
47,690
11,220
5,620
7,680
9,641/6,453
197,000
5,409/8,860
10,117/6,578
207,000
5,843/9,223
34,670
11,144/7,245
228,000
6,436/10,158
Friars Rd
85 / 223
676 / 1,972
95 / 109
Riverdale St
128 / 216
32 / 63
12 / 118
Friars Rd
478 / 1,920
181 / 255
Mission Gorge Rd
196 / 307
129 / 464
Mission Gorge Rd
40 / 29
162 / 866
167 / 556
0 / 2
0 / 5
1 / 2
1 / 3
1,114 / 231
80 / 87
Jackson Dr
775 / 146
0 / 2
65 / 57
Waring Rd
77 / 125
437 / 907
5 / 19
183 / 118
7 / 5
205 / 121
Princess View Dr
241 / 76
1,128 / 409
15 / 11
Mound Ave
6 / 4
13 / 11
6 / 15
Vandever Ave
22 / 95
9 / 52
40 / 204
68 / 27
413 / 463
23 / 33
31 / 40
55 / 35
40 / 61
Mission Gorge Rd
138 / 67
603 / 745
31 / 45
Twain Ave
28 / 92
23 / 126
87 / 141
56 / 41
465 / 702
12 / 21
10 / 32
162 / 44
135 / 101
Mission Gorge Rd
102 / 74
832 / 817
89 / 128
Fairmount Ave
6 / 9
3 / 4
372 / 323
10 / 7
584 / 892
7 / 12
Mission Gorge Rd
3 / 11
3 / 5
8 / 26
Fairmount Ave
574 / 237
1,145 / 942
28 / 28
I-8 EB Off-Ramp
963 / 747
632 / 1,130
Fairmount Ave
118 / 30
870 / 541

4.0 ANALYSIS APPROACH AND METHODOLOGY

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

4.1 Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM)*, with the assistance of the *Synchro* (version 7) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection LOS.

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and Levels of Service (LOS) was determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM)*, with the assistance of the *Synchro* (version 7) computer software.

4.2 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Diego's *Roadway Classification, LOS, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The City of San Diego's *Roadway Classification, LOS, and ADT Table* is attached in ***Appendix B***.

4.3 Freeway Segments

Freeway segments were analyzed during the AM and PM peak hours based on the methodologies developed by Caltrans District 11. The assessment of key freeway segments is necessary to satisfy the requirement of the CMP, as outlined later in the report. Freeway segment LOS is based on the volume to capacity ratio on the freeway.

The analysis of freeway segment LOS is based on the procedure developed by Caltrans District 11 based on methods described in the *2000 Highway Capacity Manual*. The procedure involves comparing the peak hour volume of the mainline segment to the theoretical capacity of the roadway (V/C). The procedure for calculating freeway LOS involves the estimation of volume to capacity (V/C) ratio using the following equation:

*V/C = (Daily Volume * Peak Hour Percent * Directional Factor * Truck Factor) / Capacity*

Daily Volume = Average Daily Traffic (ADT)
Peak Hour Percent = Percentage of ADT occurring during the peak hour.
Directional Factor = Percentage of peak hour traffic occurring in peak direction.
Truck Factor = Truck/terrain factor to represent influence of heavy vehicles & grades.
Capacity = 2,000 vehicles/lane/hour/lane for mainline, and 1,200 for auxiliary lanes.

The resulting V/C is then compared to accepted ranges of V/C values corresponding to the various Levels of Service for each facility classification, as shown in ***Table 4–1***. The corresponding LOS represents an approximation of existing or anticipated future freeway operating condition in the peak direction of travel during the peak hour.

TABLE 4–1
CALTRANS DISTRICT 11
FREEWAY SEGMENT LEVEL OF SERVICE DEFINITIONS

LOS	V/C	Congestion/Delay	Traffic Description
Used for freeways, expressways and conventional highways			
A	<0.41	None	Free flow
B	0.42-0.62	None	Free to stable flow, light to moderate volumes.
C	0.63-0.80	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted
D	0.81-0.92	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
E	0.93-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
Used for freeways and expressways			
F(0)	1.01-1.25	Considerable 0-1 hour delay	Forced flow, heavy congestion, long queues form behind breakdown points, stop and go.
F(l)	1.26-1.35	Severe 1-2 hour delay	Very heavy congestion, very long queues.
F(2)	1.36-1.45	Very Severe 2-3 hour delay	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods.
F(3)	>1.46	Extremely Severe 3+ hours of delay	Gridlock

4.4 Freeway Ramp Meters

There are two methods currently accepted by the City to calculate ramp delays and queues, a *fixed rate* approach and a uniform *15-minute maximum delay* approach. The fixed rate approach is based solely on the specific time intervals at which the ramp meter is programmed to release traffic. The uniform 15-minute approach is based on the assumption that any demand exceeding 15-minutes will seek an alternative route or will choose to use the ramp during a less busy time period. Effectively, this approach considers the ramp demand to spread out spatially and temporally if the calculated meter delay is greater than 15-minutes.

The fixed rate approach, used in this report, generally tends to produce unrealistic queue lengths and delays. The results are theoretical and based on Caltrans' most restrictive ramp meter rate. Because ramp meter rates are not constant, even within the peak hours, the analysis was conducted using the most restrictive meter rates. The meter rates dynamically adjust based on the level of traffic on the freeway mainlines. The meter rates were obtained from Caltrans. Field observations further validate variable ramp meter rates. Furthermore, the fixed rate approach does not take into account driver behavior such as "ramp shopping" or trip diversion.

5.0 SIGNIFICANCE CRITERIA

5.1 City of San Diego Significance Criteria

According to the City of San Diego's *Significance Determination Thresholds* dated January 2007, a project is considered to have a significant impact if project traffic would decrease the operations of surrounding roadways by a defined threshold. For projects deemed complete on or after January 1, 2007, the City defined thresholds are shown in ***Table 5–1***.

The impact is designated either a "direct" or "cumulative" impact. According to the City's *Significance Determination Thresholds*,

> "*Direct* traffic impacts are those projected to occur at the time a proposed development becomes operational, including other developments not presently operational but which are anticipated to be operational at that time (near term)."
>
> "*Cumulative* traffic impacts are those projected to occur at some point after a proposed development becomes operational, such as during subsequent phases of a project and when additional proposed developments in the area become operational (short-term cumulative) or when affected community plan area reaches full planned buildout (long-term cumulative)."
>
> It is possible that a project's near term (direct) impacts may be reduced in the long term, as future projects develop and provide additional roadway improvements (for instance, through implementation of traffic phasing plans). In such a case, the project may have direct impacts but not contribute considerably to a cumulative impact."
>
> For intersections and roadway segments affected by a project, LOS D or better is considered acceptable under both direct and cumulative conditions."

If the project exceeds the thresholds in *Table 5–1*, then the project is considered to have a significant "direct" or "cumulative" project impact. A significant impact can also occur if a project causes the LOS to degrade from D to E, even if the allowable increases in *Table 5–1* are not exceeded. A feasible mitigation measure will need to be identified to return the impact within the City thresholds, or the impact will be considered significant and unmitigated.

TABLE 5–1
CITY OF SAN DIEGO
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project[b]	Allowable Increase Due to Project Impacts[a]					
	Freeways		Roadway Segments		Intersections	Ramp Metering[c]
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
E	0.010	1.0	0.02	1.0	2.0	2.0
F	0.005	0.5	0.01	0.5	1.0	1.0

Footnotes:

a. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. The project applicant shall then identify feasible improvements (within the Traffic Impact Study) that will restore/and maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note b), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating the project's direct significant and/or cumulatively considerable traffic impacts.

b. All LOS measurements are based upon Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments are estimated on an ADT/24-hour traffic volume basis (using Table 2 of the City's Traffic Impact Study Manual). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped locations). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

c. The allowable increase in delay at a ramp meter with more than 15 minutes delay and freeway LOS E is 2 minutes. The allowable increase in delay at a ramp meter with more than 15 minutes delay and freeway LOS F is 1 minute.

General Notes:

1. Delay = Average control delay per vehicle measured in seconds for intersections or minutes for ramp meters
2. LOS = Level of Service
3. V/C = Volume to Capacity ratio
4. Speed = Arterial speed measured in miles per hour

5.2 Caltrans Significance Criteria

A project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds shown in ***Table 5–2*** below for freeway segments, roadway segments, intersections, and ramp meter facilities are based on published San Diego Traffic Engineers' Council (SANTEC) guidelines. If the project exceeds the thresholds in *Table 5–2*, then the project may be considered to have a significant project impact. A feasible mitigation measure will need to be identified to return the impact within the thresholds (pre-project + allowable increase) or the impact will be considered significant and unmitigated.

TABLE 5–2
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project[a]	**Allowable Increase Due to Project Impacts**[b]					
	Freeways		**Roadway Segments**		**Intersections**	**Ramp Metering**
	V/C	**Speed (mph)**	**V/C**	**Speed (mph)**	**Delay (sec.)**	**Delay (min.)**
D, E & F (*or ramp meter delays above 15 minutes*)	0.01	1	0.02	1	2	2[c]

Footnotes:

a. All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

c. The impact is only considered significant if the total delay exceeds 15 minutes.

General Notes:

1. V/C = Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
4. LOS = Level of Service

6.0 ANALYSIS OF EXISTING CONDITIONS

The analysis of existing conditions includes the assessment of the study area intersections, street segments, ramp meters, and freeways using the methodologies described in *Section 4.0.*

6.1 Intersection Operations

Table 6-1 summarizes the peak intersection operations for existing conditions. As seen in *Table 6-1*, all intersections are calculated to currently operate at LOS D or better during both the AM and PM peak hours, except at the following locations:

- Friars Road / I-15 SB Ramps (LOS E during the AM and LOS F during the PM peak hours);
- Friars Road / Riverdale Street (LOS E during the PM peak hour);
- Mission Gorge Road / Zion Avenue (LOS F during the AM peak hour); and
- Fairmount Avenue / Alvarado Road / I-8 WB Off-Ramp / Camino Del Rio N. (LOS E during the AM and LOS F during the PM peak hours).

Appendix C contains the existing intersection analysis calculation worksheets.

6.2 Segment Operations

Table 6-2 summarizes the existing roadway segment operations. As seen in *Table 6-2,* the study area segments are calculated to currently operate at LOS D or better, except at the following locations:

- Mission Gorge Road: Vandever Avenue to Twain Avenue (LOS F);
- Mission Gorge Road: Mission Gorge Place to Fairmount Avenue (LOS E); and
- Fairmount Avenue: Alvarado Canyon Road to I-8 WB Ramps (LOS F).

6.3 Mainline Freeway Operations

Table 6-3 summarizes the existing freeway operations. As seen in *Table 6–3*, the study area freeway segments are calculated to currently operate at LOS D or better, except at the following locations:

- I-15 NB: Aero Drive to Friars Road (LOS F(0) during the AM peak hour);
- I-15 NB: Friars Road to I-8 (LOS E during the AM peak hour);
- I-8 EB: I-15 to Fairmount Avenue (LOS F(0) during the PM peak hour); and
- I-8 WB: Fairmount Avenue to Waring Road (LOS E during the AM peak hour).

6.4 Ramp Meter Operations

Table 6–4 summarizes the existing ramp meter operations using the fixed rate approach. As seen in *Table 6–4*, the study area ramp meters are calculated to operate at an acceptable LOS (delay of 15 minutes or less), except at the following location:

- Friars Road to Northbound I-15 (PM peak hour).

TABLE 6–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. Friars Road / I-15 SB Ramps	Signal	AM PM	**76.8** **90.8**	**E** **F**
2. Friars Road / I-15 NB Ramps	Signal	AM PM	24.0 22.0	C C
3. Friars Road / Riverdale Street	Signal	AM PM	33.1 **57.8**	C **E**
4. Friars Road / Mission Gorge Road	Signal	AM PM	18.5 29.0	B C
5. Mission Gorge Road / Zion Avenue	Signal	AM PM	**>100** 52.1	**F** D
6. Mission Gorge Road / Princess View Drive	Signal	AM PM	51.0 20.5	D C
7. Mission Gorge Road / Jackson Drive	Signal	AM PM	32.9 21.0	C C
8. Waring Road / Princess View Drive	Signal	AM PM	24.2 11.9	C B
9. Waring Road / Zion Avenue	Signal	AM PM	41.9 47.5	D D
10. Fairmount Avenue / Vandever Avenue	AWSC[c]	AM PM	12.7 9.0	B A
11. Mission Gorge Road / Vandever Avenue	Signal	AM PM	18.1 32.1	B C
12. San Diego Mission Road / Rancho Mission Road	Signal	AM PM	24.4 21.9	C C
13. Fairmount Avenue / Twain Avenue	Signal	AM PM	20.8 20.6	C C
14. Mission Gorge Road / Twain Avenue	Signal	AM PM	25.8 28.8	C C
15. Twain Avenue / Crawford Street	AWSC[c]	AM PM	9.2 8.9	A A
16. Mission Gorge Road / Mission Gorge Place	Signal	AM PM	12.6 14.1	B B

TABLE 6–1 (*CONTINUED*)
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
17. Fairmount Avenue / Mission Gorge Place	Signal	AM PM	31.8 31.8	C C
18. Fairmount Avenue / Alvarado Canyon Road / I-8 WB Off-Ramp / Camino Del Rio N.	Signal	AM PM	**72.8** **>100**	**E** **F**
19. Alvarado Canyon Road / Mission Gorge Place	AWSC[c]	AM PM	10.3 12.8	B B
20. Fairmount Avenue / I-8 EB Off-Ramp	Signal	AM PM	25.4 14.9	C B

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. AWSC – All-Way Stop Controlled intersection. Minor street left turn delay is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 6–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Classification	Capacity (LOS E) [a]	ADT [b]	LOS [c]	V/C [d]
Friars Road					
I-15 SB Ramps to I-15 NB Ramps	6-Lane Primary Arterial	60,000	48,250	C	0.804
I-15 NB Ramps to Rancho Mission Rd	7-Lane Primary Arterial	65,000	54,410	D	0.837
Rancho Mission Rd to Santo Rd	7-Lane Primary Arterial	65,000	54,410	D	0.837
Santo Rd to Riverdale Rd	6-Lane Primary Arterial	60,000	43,360	C	0.723
Riverdale Rd to Mission Gorge Rd	6-Lane Primary Arterial	60,000	35,560	C	0.593
Mission Gorge Road					
Jackson Dr to Princess View Dr	6-Lane Major Street	50,000	19,480	A	0.390
Princess View Dr to Zion Ave	6-Lane Primary Arterial	60,000	21,740	A	0.362
Zion Ave to Friars Rd	6-Lane Primary Arterial	60,000	37,470	C	0.625
Friars Rd to Rainier Ave	4-Lane Collector Street	30,000	17,650	C	0.588
Rainier Ave to Vandever Ave	4-Lane Collector Street	30,000	17,710	C	0.590
Vandever Ave to Twain Ave	4-Lane Collector Street	30,000	**30,730**	**F**	**1.024**
Twain Ave to Mission Gorge Pl	4-Lane Collector Street	30,000	24,660	D	0.822
Mission Gorge Pl to Fairmount Ave	4-Lane Collector Street	30,000	**25,260**	**E**	**0.842**
Fairmount Avenue					
Vandever Ave to Twain Ave	2-Lane Local Collector Street	8,000	5,490	D	0.686
Twain Ave to Mission Gorge Rd	2-Lane Local Collector with TWLTL[e]	15,000	6,770	B	0.451
Mission Gorge Rd to Alvarado Canyon Rd	4-Lane Major Street	40,000	34,290	D	0.857
Alvarado Canyon Rd to I-8 WB Ramps	4-Lane Major Street	40,000	**47,690**	**F**	**1.192**
I-8 WB Ramps to I-8 EB Ramps	4-Lane Major Street	40,000	34,670	D	0.867
Vandever Avenue					
Riverdale St to Mission Gorge Rd	2-Lane Local Collector Street	8,000	5,600	D	0.700
Twain Avenue					
Fairmount Ave to Mission Gorge Rd	2-Lane Local Collector Street	8,000	5,100	D	0.638
San Diego Mission Road					
West of Rancho Mission Rd	4-Lane Major Street	40,000	5,620	A	0.141
Rancho Mission Rd to Fairmount Ave	2-Lane Local Collector Street	15,000	7,680	C	0.512
Waring Road					
Princess View Dr to Zion Ave	4-Lane Major Street	40,000	16,360	B	0.409
Zion Ave to Orcutt Ave	4-Lane Major Street	40,000	16,630	B	0.416
Zion Avenue					
Mission Gorge Rd to Waring Rd	2-Lane Local Collector with TWLTL	15,000	10,760	D	0.717
Princess View Drive					
Mission Gorge Rd to Waring Rd	4-Lane Major Street	40,000	4,740	A	0.119

TABLE 6–2 (*CONTINUED*)
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Classification	Capacity (LOS E) [a]	ADT [b]	LOS [c]	V/C [d]
Camino Del Rio North					
Fairmount Ave to Ward Rd	4-Lane Collector Street	30,000	11,220	B	0.374

Footnotes:

a. Capacities based on City of San Diego Roadway Classification Table.
b. Average Daily Traffic Volumes.
c. Level of Service.
d. Volume to Capacity.
e. Two-way left-turn lane

TABLE 6–3
EXISTING FREEWAY SEGMENT OPERATIONS

Freeway and Segment	Dir.	Number of Lanes[a]	Hourly Capacity	ADT[b]	AM			PM		
					Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS
Interstate 15										
Aero Drive to Friars Road	NB	4M+ 1A	9,200	204,000	**9,984**	**1.085**	**F(0)**	6,682	0.726	C
	SB	4M+ 2A	10,400		5,601	0.539	B	9,174	0.882	D
Friars Road to I-8	NB	4M+ 2A	10,400	197,000	**9,641**	**0.927**	**E**	6,453	0.620	C
	SB	4M+2CD+1A	13,200		5,409	0.410	B	8,860	0.671	C
Interstate 8										
Interstate 15 to Fairmount Avenue	EB	4M	8,000	207,000	5,843	0.730	C	**9,223**	**1.153**	**F(0)**
	WB	4M+2CD	12,000		10,117	0.843	D	6,578	0.548	B
Fairmount Avenue to Waring Road	EB	4M+1CD+1A	11,200	228,000	6,436	0.575	B	10,158	0.907	D
	WB	5M+ 1A	11,200		**11,144**	**0.995**	**E**	7,245	0.647	C

Footnotes:

a. Capacity calculated at 2000 ADT per lane and 1200 ADT per aux lane (M: Mainline, CD: Collector Distributor, A: Auxiliary Lane, HOV: High Occupancy Vehicle Lane).
Example: 4M+2A=4 Mainlines + 2 Auxiliary Lanes)-

b. Existing ADT Volumes from CALTRANS online Traffic Data Branch, 2013.

General Notes:

a. See ***Appendix D*** for calculation sheets

TABLE 6–4
EXISTING RAMP METER OPERATIONS

Location/ Condition	Minimum/ Maximum Rate	Peak Hour Demand	Peak Hour Demand/ Lane	Meter Flow Rate (Veh/hr/lane)	Excess Demand (Veh/hr/lane)	Delay (min)	Queue (ft)
I-15 / Friars Road Interchange							
Northbound Ramp (AM Peak Hour)							
Existing	Min	1237	578	516	62	7	145
	Max	1237	578	600	0	0	0
I-15/I-8 Southbound Ramp (AM Peak Hour)							
Existing	Min	632	632	660	0	0	0
	Max	632	632	996	0	0	0
I-15/Southbound Ramp (AM Peak Hour)							
Existing	Min	260	260	660	0	0	0
	Max	260	260	996	0	0	0
Northbound Ramp (PM Peak Hour)							
Existing	Min	1347	630	386	244	38	758
	Max	1347	630	672	0	0	0
I-15/I-8 Southbound Ramp (PM Peak Hour)							
Existing	Min	571	571	660	0	0	0
	Max	571	571	996	0	0	0
I-15 Southbound Ramp (PM Peak Hour)							
Existing	Min	369	369	660	0	0	0
	Max	369	369	996	0	0	0
I-8 / Fairmount Avenue Interchange							
Eastbound Ramp (AM Peak Hour) - Fairmount Avenue SB							
Existing	Min	232	232	516	0	0	0
	Max	232	232	600	0	0	0
Eastbound Ramp (PM Peak Hour) - Fairmount Avenue SB							
Existing	Min	510	510	660	0	0	0
	Max	510	510	996	0	0	0

Footnotes:
a. Meter Rates obtained from CALTRANS (***Appendix E***).
b. Delay expressed in minutes.
c. Queue

7.0 TRIP GENERATION

The project trip generation was estimated based on *The City of San Diego Trip Generation Rate Summary Table, May 2003*. Since the project site offers mixed-use and transit opportunities, mixed-use and transit adjustments were applied to the trip generation calculations, where applicable. The project site currently generates traffic due to the various existing land uses, which was taken into account in the project trip generation calculations.

Table 7–1 tabulates the resultant project traffic generation. The project is calculated to generate approximately 27,360 new ADT with the reduction of 400 inbound trips and the addition of 2,573 outbound trips during the AM peak hour and the addition of 2,201 inbound trips and the reduction of 53 outbound trips during the PM peak hour.

GRANTVILLE ALTERNATIVE D TRIP GENERATION SUMMARY

City of SD Land Use Classification	Quantity			Daily Trip Ends (ADT) [a]		AM Peak Hour						
	Existing Size	Total Proposed Size	Delta	Rate [b]	Volume	% of ADT	Total	In:Out Split	In	Out	% of ADT	Tot
ulti - Over 20 DU/Acre	0 DU	6,174 DU	6,174 DU	6 /DU	37,040	8%	2,963	20:80	593	2,370	9%	3,33
	Residential Mixed Use Reduction (10%ADT, 8%AM, 10%PM)				-3,700		-237		-47	-190		-33
	Residential Transit Reduction (5%ADT, 9%AM, 6%PM)				-1,670		-245		-49	-196		-18
				Subtotal	31,670		2,481		497	1,984		2,82
Commercial Office	174.90 KSF	560.00 KSF	385.1 KSF	12.15 /KSF	4,680	13%	608	90:10	547	61	14%	65
	Office Mixed Use Reduction (3%ADT, 5%AM, 4%PM)				-140		-30		-27	-3		-2
	Office Transit Reduction (3%ADT, 5.5%AM, 2%PM)				-140		-32		-29	-3		-1
				Subtotal	4,400		546		491	55		61
Strip Commercial	209.20 KSF	80.00 KSF	-129.20 KSF	40 /KSF	-5,170	4%	-207	60:40	-124	-83	11%	-56
Industrial Park	764.7 KSF	0 KSF	-764.7 KSF	15 /KSF	-11,470	11%	-1,262	90:10	-1,136	-126	12%	-1,3
ulti - Over 20 DU/Acre	0 DU	1,396 DU	1,396 DU	6 /DU	8,380	8%	670	20:80	134	536	9%	75
ulti - Under 20 DU/Acre	4 DU	307 DU	303 DU	8 /DU	2,420	8%	194	20:80	39	155	10%	24
	Residential Mixed Use Reduction (10%ADT, 8%AM, 10%PM)				-1,080		-69		-14	-55		-10
				Subtotal	9,720		795		159	636		89
Commercial Office	142.9 KSF	309.0 KSF	166.1 KSF	14.93 /KSF	2,480	13%	322	90:10	290	32	14%	34
	Office Mixed Use Reduction (3%ADT, 5%AM, 4%PM)				-70		-16		-14	-2		-1
				Subtotal	2,410		306		276	30		33
Strip Commercial	413.10 KSF	394.40 KSF	-18.70 KSF	40 /KSF	-750	4%	-30	60:40	-18	-12	11%	-8
Industrial Park	626.8 KSF	250 KSF	-376.8 KSF	15 /KSF	-5,650	11%	-622	90:10	-560	-62	12%	-67
ulti - Over 20 DU/Acre	97 DU	499 DU	402 DU	6 /DU	2,410	8%	193	20:80	39	154	9%	21
Commercial Office	72.5 KSF	57.5 KSF	-15.0 KSF	14 /KSF	-210	13%	-27	90:10	-24	-3	14%	-2
Gross Total					**34,160**		**2,802**		**-220**	**3,022**		**2,8**
Mixed Use Reduction					-4,990		-352		-102	-250		-47
Transit Reduction					-1,810		-277		-78	-199		-19
Net Total					**27,360**		**2,173**		**-400**	**2,573**		**2,1**

ip Generation Manual

8.0 ANALYSIS OF LONG-TERM SCENARIOS

8.1 Year 2030 Street Network

For the purposes of this traffic study, the following project features were included in the Year 2030 with Project analysis:

- **Alvarado Canyon Road Realignment**: Realign Alvarado Canyon Road to connect with the Fairmount Avenue / Mission Gorge Road intersection from the east. ***Figure 8–1*** illustrates the assumed intersection configuration. This feature is identified as project #T12 in the Navajo PFFP.
- **Mission Gorge Place Extension**: Extend Mission Gorge Place from Mission Gorge Road to the west 680 feet to Fairmount Avenue as a two-lane collector street. This feature is identified as project #T21 in the Navajo PFFP.

Figure 8–1 shows the assumed Year 2030 with Project conditions utilized in the analysis.

8.2 Year 2030 with Project Analysis

8.2.1 *Year 2030 with Project Traffic Volumes*

The future traffic volumes presented in this report are based on output from the SANDAG Regional Series 11 Traffic Model. The traffic model provided forecasted ADT volumes for the Alternative D scenario. Land Use assumptions contained in the SANDAG Model within the study area were reviewed and were updated as required before running the model. Land use and network assumptions outside of subarea A were consistent with the approved Series 11 land use and network assumptions.

These forecast ADT volumes were used to calculate peak hour volumes based primarily on the existing relationship between ADT and peak hour volumes. The forecast volumes were checked for consistency between intersections, where no driveways or roadways exist between intersections, and they were compared to existing volumes. Several other Traffic Engineering principles and factors, such as the peak hour factor and directional factor, were also considered in the analysis.

Figure 8–2 shows the Year 2030 with Project traffic volumes. ***Appendix F*** contains the SANDAG Series 11 Traffic Model plots and other traffic engineering principles utilized for traffic forecasting.

8.2.2 *Intersection Analysis*

Table 8–1 summarizes the peak hour intersection operations for the Year 2030 with Project scenario. As seen in *Table 8–1*, the following intersections are calculated to operate at LOS E or F during either the AM or PM peak hours:

- Friars Road / I-15 SB Ramps (LOS F during the AM and the PM peak hours);
- Friars Road / Riverdale Street (LOS F during the AM and the PM peak hours);
- Mission Gorge Road / Zion Avenue (LOS F during the AM and the PM peak hours);
- Mission Gorge Road / Princess View Drive (LOS F during the AM peak hour);
- Waring Road / Princess View Drive (LOS E during the AM peak hour);

- Waring Road / Zion Avenue (LOS F during the AM peak hour and LOS E during the PM peak hour);
- Fairmount Avenue / Mission Gorge Road (LOS E during the AM and PM peak hours);
- Fairmount Avenue / Alvarado Canyon Road/ I-8 WB Off-Ramp / Camino Del Rio N. (LOS F during the AM and PM peak hours); and
- Alvarado Canyon Road / Mission Gorge Place (LOS F during the AM and PM peak hours).

Appendix G contains the Year 2030 with Project peak hour intersection analysis worksheets.

8.2.3 *Segment Operations*

Table 8–2 summarizes the roadway segment operations for the Year 2030 with Project scenario. As seen in *Table 8–2*, the following study area segments are calculated to operate at LOS E or F:

- Friars Road: I-15 NB Ramps to Rancho Mission Road (LOS F);
- Friars Road: Rancho Mission Road to Santo Road (LOS F);
- Friars Road: Santo Road to Riverdale Street (LOS F);
- Mission Gorge Road: Rainier Avenue to Vandever Avenue (LOS E);
- Mission Gorge Road: Vandever Avenue to Twain Avenue (LOS F);
- Mission Gorge Road: Twain Avenue to Mission Gorge Place (LOS E);
- Mission Gorge Road: Mission Gorge Place to Fairmount Avenue (LOS F);
- Fairmount Avenue: Vandever Avenue to Twain Avenue (LOS F);
- Fairmount Avenue: Mission Gorge Road to Alvarado Canyon Road (LOS F);
- Fairmount Avenue: Alvarado Canyon Road to I-8 WB Ramps (LOS F);
- Fairmount Avenue: I-8 WB Ramps to I-8 EB Ramps (LOS F);
- Vandever Avenue: Riverdale Street to Mission Gorge Road (LOS E);
- Twain Avenue: Fairmount Avenue to Mission Gorge Road (LOS F);
- San Diego Mission Road: Rancho Mission Road to Fairmount Avenue (LOS F); and
- Zion Avenue: Mission Gorge Road to Waring Road (LOS F).

8.2.4 *Mainline Freeway Operations*

Table 8–3 summarizes the freeway operations for the Year 2030 with Project scenario. As seen in *Table 8–3*, all of the study area freeway segments are calculated to operate at LOS E or F in the Year 2030 with Project scenario.

8.2.5 *Ramp Meter Operations*

Table 8–4 summarizes the ramp meter operations for the Year 2030 with Project scenario using the fixed rate approach. As seen in *Table 8–4*, the study area ramp meters are calculated to operate at an acceptable LOS (delay of 15 minutes or less), except at the following location:

- Friars Road to Northbound I-15 (AM and PM peak hours).

TABLE 8–1
LONG-TERM INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Year 2030 With Project		Delay Increase	Sig?[c]
		Delay[a]	LOS[b]	Delay	LOS		
1. Friars Road / I-15 SB Ramps	AM PM	**76.8** **90.8**	**E** **F**	**>100** **95.7**	**F** **F**	**<10** **4.90**	**Yes** **Yes**
2. Friars Road / I-15 NB Ramps	AM PM	24.0 22.0	C C	35.2 25.0	D C	<10 3.00	No No
3. Friars Road / Riverdale Street	AM PM	**33.1** **57.8**	**C** **E**	**>100** **>100**	**F** **F**	**<10** **<10**	**Yes** **Yes**
4. Friars Road / Mission Gorge Road	AM PM	18.5 29.1	B C	42.3 53.9	D D	<10 <10	No No
5. Mission Gorge Road / Zion Avenue	AM PM	**>100** **52.1**	**F** **D**	**>100** **>100**	**F** **F**	**<10** **<10**	**Yes** **Yes**
6. Mission Gorge Road / Princess View Drive	AM PM	**51.0** 20.5	**D** C	**97.0** 25.8	**F** C	**<10** 5.30	**Yes** No
7. Mission Gorge Road / Jackson Drive	AM PM	32.9 21.0	C C	41.7 23.6	D C	8.80 2.60	No No
8. Waring Road / Princess View Drive	AM PM	**24.2** 11.9	**C** B	**77.9** 19.1	**E** B	**<10** 7.20	**Yes** No
9. Waring Road / Zion Avenue	AM PM	**41.9** **47.5**	**D** **D**	**>100** **73.5**	**F** **E**	**<10** **<10**	**Yes** **Yes**
10. Fairmount Avenue / Vandever Avenue	AM PM	12.7 9.0	B A	14.2 9.4	B A	1.50 0.40	No No
11. Mission Gorge Road / Vandever Avenue	AM PM	18.1 32.1	B C	18.6 33.0	B C	0.50 0.90	No No
12. San Diego Mission Road / Rancho Mission Road	AM PM	24.4 21.9	C C	29.7 26.8	C C	5.30 4.90	No No
13. Fairmount Avenue / Twain Avenue	AM PM	20.8 20.6	C C	35.5 23.7	D C	<10 3.10	No No

TABLE 8–1 (CONTINUED)
LONG-TERM INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Year 2030 With Project		Delay Increase	Sig?[c]
		Delay[a]	LOS[b]	Delay	LOS		
14. Mission Gorge Road / Twain Avenue	AM PM	25.8 28.8	C C	34.7 38.4	C D	8.90 9.60	No No
15. Twain Avenue / Crawford Street	AM PM	9.2 8.9	A A	10.6 9.2	B A	1.40 0.30	No No
16. Mission Gorge Road / Mission Gorge Place	AM PM	12.6 14.1	B B	49.1 38.6	D D	<10 <10	No No
17. Fairmount Avenue / Mission Gorge Place	AM PM	**31.8** 31.8	**C** C	**60.1** 45.7	**E** D	**<10** <10	**Yes** No
18. Fairmount Avenue / Alvarado Canyon / I-8 WB Off-Ramp Road / Camino Del Rio N.	AM PM	**72.8** **>100**	**E** **F**	**>100** **>100**	**F** **F**	**<10** **<10**	**Yes** **Yes**
19. Alvarado Canyon Road / mission Gorge Place	AM PM	**10.3** **12.8**	**B** **B**	**62.7** **>100**	**F** **F**	**<10** **<10**	**Yes** **Yes**
20. Fairmount Avenue / I-8 EB Off-Ramp	AM PM	25.4 14.9	C B	36.9 19.2	D B	<10 4.30	No No

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Sig = Significant project impacts based on Significance Criteria.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 8–2
LONG-TERM STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E) [a]	Existing			Year 2030 + Project Capacity (LOS E)	Year 2030 With Project			Δ [e]	Sig? [f]
		ADT [b]	LOS [c]	V/C [d]		ADT	LOS	V/C		
Friars Road										
I-15 SB Ramps to I-15 NB Ramps	60,000	48,250	C	0.804	60,000	54,700	D	0.912	0.108	No
I-15 NB Ramps to Rancho Mission Rd	65,000	**54,410**	**D**	**0.837**	**65,000**	**75,200**	**F**	**1.157**	**0.320**	**Yes**
Rancho Mission Rd to Santo Rd	65,000	**54,410**	**D**	**0.837**	**65,000**	**70,200**	**F**	**1.080**	**0.243**	**Yes**
Santo Rd to Riverdale Rd	60,000	**43,360**	**C**	**0.723**	**60,000**	**64,100**	**F**	**1.068**	**0.346**	**Yes**
Riverdale Rd to Mission Gorge Rd	60,000	35,560	C	0.593	60,000	48,700	C	0.812	0.219	No
Mission Gorge Road										
Jackson Dr to Princess View Dr	50,000	19,480	A	0.390	50,000	27,500	B	0.550	0.160	No
Princess View Dr to Zion Ave	60,000	21,740	A	0.362	60,000	44,900	C	0.748	0.386	No
Zion Ave to Friars Rd	60,000	37,470	C	0.625	60,000	50,200	D	0.837	0.212	No
Friars Rd to Rainier Ave	30,000	17,650	C	0.588	30,000	22,100	D	0.737	0.148	No
Rainier Ave to Vandever Ave	30,000	**17,710**	**C**	**0.590**	**30,000**	**27,900**	**E**	**0.930**	**0.340**	**Yes**
Vandever Ave to Twain Ave	30,000	**30,730**	**F**	**1.024**	**30,000**	**34,600**	**F**	**1.153**	**0.129**	**Yes**
Twain Ave to Mission Gorge Pl	30,000	**24,660**	**D**	**0.822**	**30,000**	**28,900**	**E**	**0.963**	**0.141**	**Yes**
Mission Gorge Pl to Fairmount Ave	30,000	**25,260**	**E**	**0.842**	**30,000**	**38,200**	**F**	**1.273**	**0.431**	**Yes**
Fairmount Avenue										
Vandever Ave to Twain Ave	8,000	**5,490**	**D**	**0.686**	**8,000**	**11,700**	**F**	**1.463**	**0.776**	**Yes**
Twain Ave to Mission Gorge Rd	15,000	6,770	B	0.451	15,000	11,000	D	0.733	0.282	No
Mission Gorge Rd to Alvarado Canyon Rd	40,000	**34,290**	**D**	**0.857**	**40,000**	**55,800**	**F**	**1.395**	**0.538**	**Yes**
Alvarado Canyon Rd to I-8 WB Ramps	40,000	**47,690**	**F**	**1.192**	**40,000**	**64,300**	**F**	**1.608**	**0.415**	**Yes**
I-8 WB Ramps to I-8 EB Ramps	40,000	**34,670**	**D**	**0.867**	**40,000**	**51,900**	**F**	**1.298**	**0.431**	**Yes**
Vandever Avenue										
Riverdale St to Mission Gorge Rd	8,000	**5,600**	**D**	**0.700**	**8,000**	**6,700**	**E**	**0.838**	**0.138**	**Yes**
Twain Avenue										
Fairmount Ave to Mission Gorge Rd	8,000	**5,100**	**D**	**0.638**	**8,000**	**9,700**	**F**	**1.213**	**0.575**	**Yes**

Table 8–2 (*Continued*)
Long-Term Street Segment Operations

Street Segment	Existing Capacity (LOS E) [a]	Existing			Year 2030 + Project Capacity (LOS E)	Year 2030 With Project			Δ [e]	Sig? [f]
		ADT [b]	LOS [c]	V/C [d]		ADT	LOS	V/C		
San Diego Mission Road										
West of Rancho Mission Rd	40,000	5,620	A	0.141	40,000	17,000	B	0.425	0.285	No
Rancho Mission Rd to Fairmount Ave	15,000	**7,680**	**C**	**0.512**	**15,000**	**17,000**	**F**	**1.133**	**0.621**	**Yes**
Waring Road										
Princess View Dr to Zion Ave	40,000	16,360	B	0.409	40,000	31,700	D	0.793	0.384	No
Zion Ave to Orcutt Ave	40,000	16,630	B	0.416	40,000	26,300	C	0.658	0.242	No
Zion Avenue										
Mission Gorge Rd to Waring Rd	15,000	**10,760**	**D**	**0.717**	**15,000**	**19,000**	**F**	**1.297**	**0.549**	**Yes**
Princess View Drive										
Mission Gorge Rd to Waring Rd	40,000	4,740	A	0.119	40,000	13,000	A	0.325	0.207	No
Camino Del Rio North										
Fairmount Ave to Ward Rd	30,000	11,220	B	0.374	30,000	16,200	C	0.540	0.166	No

Footnotes:

b. Capacity based on roadway classification operating at LOS E.

c. Average Daily Traffic.

d. Level of Service.

e. Volume to Capacity.

f. Δ denotes a project-induced increase in the Volume to Capacity (V/C) ratio.

g. Sig = Significant project impact based on Significance Criteria.

Table 8–3
Long-Term Mainline Freeway Operations

Freeway and Segment	Dir.	Number of Lanes[a]	Hourly Capacity	Existing							Year 2030 + Project						
				Existing	AM			PM			Year 2030 + Project ADT[b]	AM			PM		
					Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS		Peak Hour Volume	V/C	LOS	Peak Hour Volume	V/C	LOS
Interstate 15																	
Aero Drive to Friars Road	NB	4M+ 1A	9,200	204,000	**9,984**	**1.085**	**F(0)**	6,682	0.726	C	313,000	**15,318**	**1.665**	**F(3)**	**10,252**	**1.114**	**F(0)**
	SB	4M+ 2A	10,400		5,601	0.539	B	9,174	0.882	D		8,594	0.826	D	**14,076**	**1.353**	**F(2)**
Friars Road to I-8	NB	4M+ 2A	10,400	197,000	**9,641**	**0.927**	**E**	6,453	0.620	C	316,000	**15,465**	**1.487**	**F(3)**	**10,350**	**0.995**	**E**
	SB	4M+2CD+1A	13,200		5,409	0.410	B	8,860	0.671	C		8,676	0.657	C	**14,211**	**1.077**	**F(0)**
Interstate 8																	
I-15 to Fairmount Avenue	EB	4M	8,000	207,000	5,843	0.730	C	**9,223**	**1.153**	**F(0)**	278,000	**7,847**	**0.981**	**E**	**12,386**	**1.548**	**F(3)**
	WB	4M+2CD	12,000		10,117	0.843	D	6,578	0.548	B		**13,588**	**1.132**	**F(0)**	8,834	0.736	C
Fairmount Avenue to Waring Road	EB	4M+1CD+1A	11,200	228,000	6,436	0.575	B	10,158	0.907	D	305,000	8,609	0.769	C	**13,589**	**1.213**	**F(0)**
	WB	5M+ 1A	11,200		**11,144**	**0.995**	**E**	7,245	0.647	C		**14,907**	**1.331**	**F(1)**	9,692	0.865	D

Footnotes:

a. Capacity calculated at 2000 ADT per lane and 1200 ADT per aux lane (M: Mainline, CD: Collector Distributor, A: Auxiliary Lane, HOV/ML: High Occupancy Vehicle Lane/Managed Lanes).
Example: 4M+2A=4 Mainlines + 2 Auxiliary Lanes.

b. ADT obtained from the SANDAG Series 11 Model.

General Notes:

1. See *Appendix D* for calculation sheets

LOS	V/C	LOS	V/C
A	<0.41	F(0)	1.25
B	0.62	F(1)	1.35
C	0.8	F(2)	1.45
D	0.92	F(3)	>1.46
E	1		

TABLE 8–4
LONG-TERM RAMP METER OPERATIONS

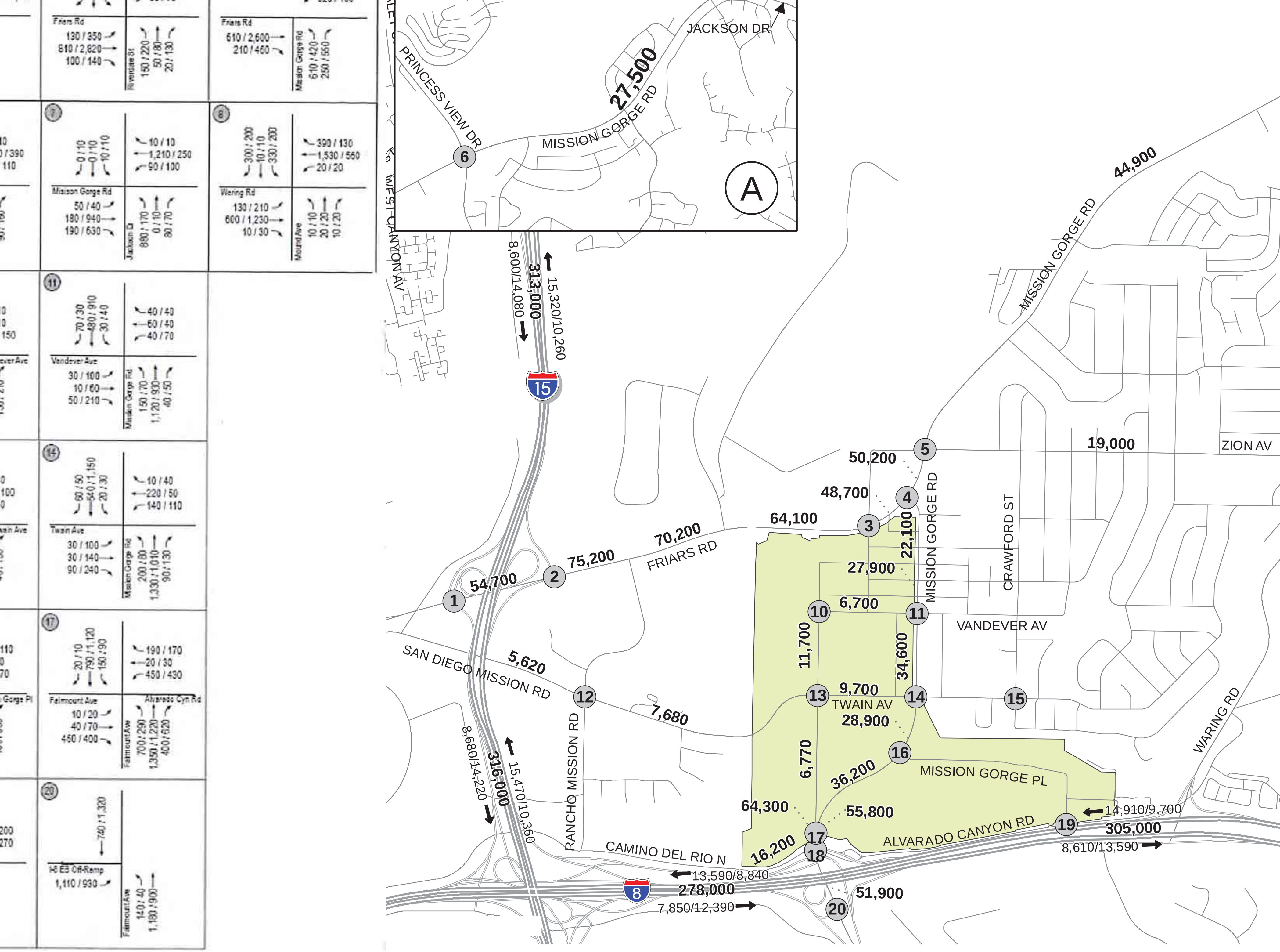
Location/Condition	Min/ Max Rate	Peak Hour Demand	Peak Hour Demand/Lane	Meter Flow Rate (Veh/hr/lane)	Excess Demand (Veh/hr/lane)	Delay (min)	Queue (ft)
I-15 / Friars Road Interchange							
Northbound Ramp (AM Peak Hour)							
Existing	Min	1237	578	516	62	7	145
	Max	1237	578	600	0	0	0
Year 2030 + Project	Min	1610	753	516	237	28	550
	Max	1610	753	600	153	15	305
Project Increase	Min	373	174	NA	174	20	406
	Max	373	174	NA	153	15	305
I-15/I-8 Southbound Ramp (AM Peak Hour)							
Existing	Min	632	632	660	0	0	0
	Max	632	632	996	0	0	0
Year 2030 + Project	Min	790	790	660	130	12	236
	Max	790	790	996	0	0	0
Project Increase	Min	158	158	NA	130	12	236
	Max	158	158	NA	0	0	0
I-15 Southbound Ramp (AM Peak Hour)							
Existing	Min	260	260	660	0	0	0
	Max	260	260	996	0	0	0
Year 2030 + Project	Min	260	260	660	0	0	0
	Max	260	260	996	0	0	0
Project Increase	Min	0	0	NA	0	0	0
	Max	0	0	NA	0	0	0
Northbound Ramp (PM Peak Hour)							
Existing	Min	1347	630	386	244	38	758
	Max	1347	630	672	0	0	0
Year 2030 + Project	Min	1770	827	386	441	69	1372
	Max	1770	827	672	155	14	278
Project Increase	Min	423	198	NA	198	31	615
	Max	423	198	NA	155	14	278
I-15/I-8 Southbound Ramp (PM Peak Hour)							
Existing	Min	571	571	660	0	0	0
	Max	571	571	996	0	0	0
Year 2030 + Project	Min	710	710	660	50	5	91
	Max	710	710	996	0	0	0
Project Increase	Min	139	139	NA	50	5	91
	Max	139	139	NA	0	0	0
I-15 Southbound Ramp (AM Peak Hour)							
Existing	Min	369	369	660	0	0	0
	Max	369	369	996	0	0	0
Year 2030 + Project	Min	370	370	660	0	0	0
	Max	370	370	996	0	0	0
Project Increase	Min	1	1	NA	0	0	0
	Max	1	1	NA	0	0	0

TABLE 8–4 (CONTINUED)
LONG-TERM RAMP METER OPERATIONS

Location/Condition	Min/ Max Rate	Peak Hour Demand	Peak Hour Demand/Lane	Meter Flow Rate (Veh/hr/lane)	Excess Demand (Veh/hr/lane)	Delay (min)	Queue (ft)
I-8 / Fairmount Avenue Interchange							
Eastbound Ramp (AM Peak Hour) - Fairmount Avenue SB							
Existing	Min	232	232	516	0	0	0
	Max	232	232	600	0	0	0
Year 2030 + Project	Min	280	280	516	0	0	0
	Max	280	280	600	0	0	0
Project Increase	Min	48	48	NA	0	0	0
	Max	48	48	NA	0	0	0
Eastbound Ramp (PM Peak Hour) - Fairmount Avenue SB							
Existing	Min	510	510	660	0	0	0
	Max	510	510	996	0	0	0
Year 2030 + Project	Min	713	713	660	53	5	96
	Max	713	713	996	0	0	0
Project Increase	Min	203	203	NA	53	5	96
	Max	203	203	NA	0	0	0

Footnotes:
a. Meter Rates obtained from CALTRANS (*Appendix E*).
b. Delay expressed in minutes.
c. Queue

MISSION GORGE RD
WARING RD
ZION AV
CRAWFORD ST
VANDEVER AV
MISSION GORGE PL
ALVARADO CANYON RD
TWAIN AV
FAIRMOUNT AV
FRIARS RD
CAMINO DEL RIO N
RANCHO MISSION RD
SAN DIEGO MISSION RD
JACKSON DR
PRINCESS VIEW DR
WEST CANYON AV
A
15
8
1
2
3
4
5
6
7
8
10
11
12
13
14
15
16
17
18
19
20
Friars Rd
Mission Gorge Rd
Riverdale St
Jackson Dr
Waring Rd
Princess View Dr
Mound Ave
Vandever Ave
Twain Ave
Fairmount Ave
Alvarado Cyn Rd
I-8 EB Off-Ramp


A
JACKSON DR
27,500
MISSION GORGE RD
PRINCESS VIEW DR
6
WEST CANYON AV
44,900
MISSION GORGE RD
19,000
ZION AV
5
50,200
48,700
4
3
64,100
70,200
FRIARS RD
75,200
2
54,700
1
22,100
MISSION GORGE RD
CRAWFORD ST
27,900
6,700
10
11
VANDEVER AV
11,700
34,600
5,620
SAN DIEGO MISSION RD
12
7,680
13
9,700
TWAIN AV
14
15
28,900
16
MISSION GORGE PL
6,770
36,200
WARING RD
64,300
55,800
17
18
16,200
ALVARADO CANYON RD
19
14,910/9,700
305,000
8,610/13,590
CAMINO DEL RIO N
13,590/8,840
278,000
7,850/12,390
51,900
20
RANCHO MISSION RD
15,320/10,260
313,000
8,600/14,080
15,470/10,360
316,000
8,680/14,220
15
8
Friars Rd
Riverdale St
Mission Gorge Rd
Jackson Dr
Waring Rd
Mound Ave
Vandever Ave
Twain Ave
Fairmount Ave
Alvarado Cyn Rd
I-8 EB Off-Ramp

9.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

9.1 Significance of Impacts

Following the direction of the City staff, the project impacts were assessed based on a comparison between the Year 2030 with Project conditions and the existing conditions. Per the City's significance threshold and the analysis methodology presented in this report, the following cumulative impacts were determined:

Intersections (I):

I-3 Friars Road / Riverdale Street
I-5 Mission Gorge Road / Zion Avenue
I-6 Mission Gorge Road / Princess View Drive
I-8 Waring Road / Princess View Drive
I-9 Waring Road / Zion Avenue
I-17 Fairmount Avenue / Mission Gorge Road
I-19 Alvarado Canyon Road / Mission Gorge Place

Segments (S):

S-1 Friars Road: I-15 NB Ramps to Rancho Mission Road
S-2 Friars Road: Rancho Mission Road to Santo Road
S-3 Friars Road: Santo Road to Riverdale Street
S-4 Mission Gorge Road: Rainier Avenue to Vandever Avenue
S-5 Mission Gorge Road: Vandever Avenue to Twain Avenue
S-6 Mission Gorge Road: Twain Avenue to Mission Gorge Place
S-7 Mission Gorge Road: Mission Gorge Place to Fairmount Avenue
S-8 Fairmount Avenue: Vandever Avenue to Twain Avenue
S-9 Fairmount Avenue: Mission Gorge Road to Alvarado Canyon Road
S-10 Fairmount Avenue: Alvarado Canyon Road to I-8 WB Ramps
S-11 Fairmount Avenue: I-8 WB Ramps to I-8 EB Ramps
S-12 Vandever Avenue: Riverdale Street to Mission Gorge Road
S-13 Twain Avenue: Fairmount Avenue to Mission Gorge Road
S-14 San Diego Mission Road: Rancho Mission Road to Fairmount Avenue
S-15 Zion Avenue: Mission Gorge Road to Waring Road

Mainline Freeway Segments (M):

M-1 I-15 NB: Aero Drive to Friars Road
M-2 I-15 SB: Aero Drive to Friars Road
M-3 I-15NB: Friars Road to I-8
M-4 I-15 SB: Friars Road to I-8
M-5 I-8 EB: I-15 to Fairmount Avenue
M-6 I-8 WB: I-15 to Fairmount Avenue

M-7 I-8 EB: Fairmount Avenue to Waring Road
M-8 I-8 WB: Fairmount Avenue to Waring Road

<u>Freeway Interchanges (Ramps (R) and Intersections (I)):</u>

I-15 and Friars Road Interchange

R-1 Friars Road to Northbound I-15
I-1 Friars Road / I-15 SB Ramps

I-8 and Fairmount Avenue Interchange

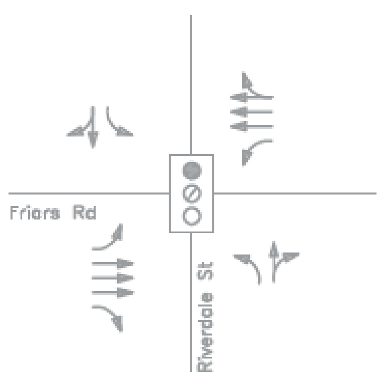
I-18 Fairmount Avenue / Alvarado Canyon Road / I-8 WB Off-Ramp / Camino Del Rio N

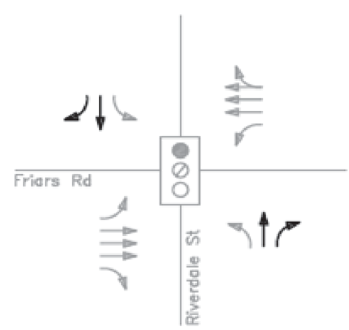
9.2 Mitigation Measures

The following mitigation measures are recommended for the impacted locations. Mitigation measures identified below should be constructed per the City of San Diego's public road standards and as depicted in the feasibility sketches.

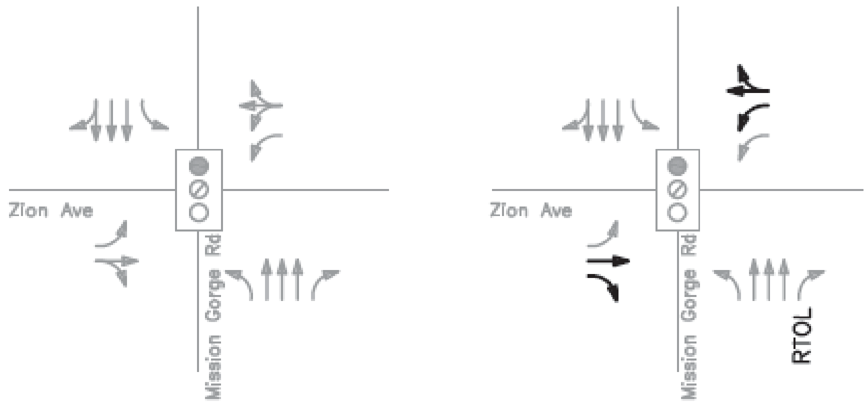
<u>Intersections:</u>

I-3 **Friars Road / Riverdale Street:** Restripe northbound and southbound approaches to provide one left-turn lane, one through lane, and one right-turn lane. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of these mitigation measures. This proposed intersection improvement project is identified in the Navajo PFFP (#T22).

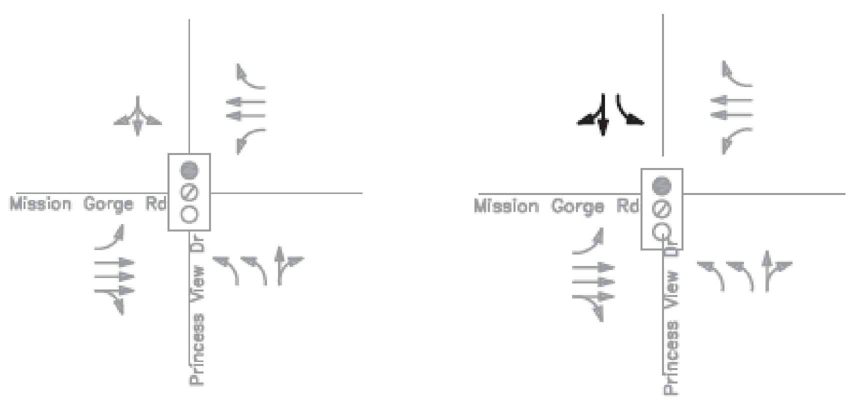




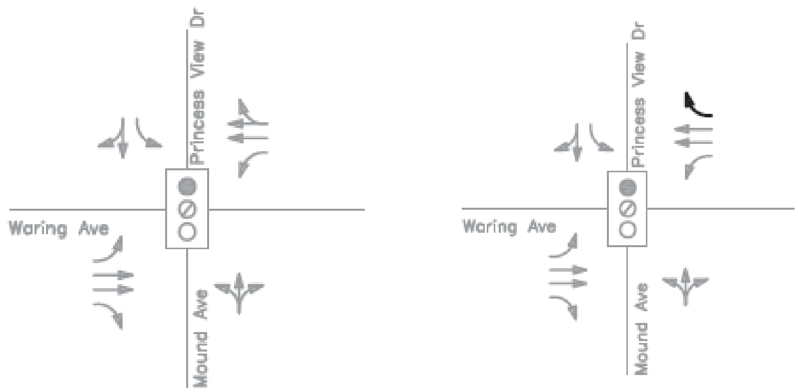
I-5 **Mission Gorge Road / Zion Avenue:** Restripe westbound approach to provide dual left-turn lanes and a through/right-turn lane. Restripe eastbound approach to provide a dedicated right-turn lane. Also, remove the east-west split phase to provide protected left-turn phases. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of these mitigation measures. This proposed intersection improvement project is identified in the Navajo PFFP (#T23).



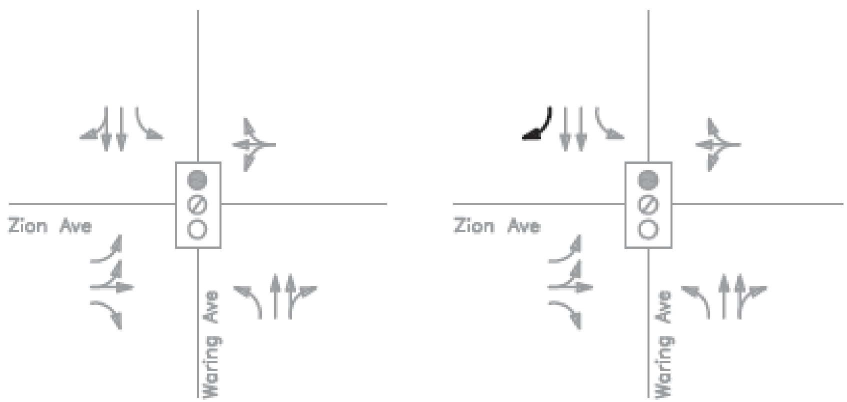
I-6 **Mission Gorge Road / Princess View Drive:** Restripe southbound approach to provide a dedicated left-turn lane and a shared right-turn/through lane. Also, remove the split phase and provided protected left-turn phases. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of these mitigation measures. This proposed intersection improvement project is identified in the Navajo PFFP (#T24).



I-8 **Waring Road / Princess View Drive:** Restripe westbound approach to provide a dedicated right-turn lane. Prohibit street parking along the westbound approach. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of this mitigation measure. This proposed intersection improvement project is identified in the Navajo PFFP (#T25).



I-9 **Waring Road / Zion Avenue:** Restripe southbound approach to provide a dedicated right-turn lane. Prohibit street parking along the southbound approach. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of this mitigation measure. This proposed intersection improvement project is identified in the Navajo PFFP (#T26).



I-17 **Fairmount Avenue / Mission Gorge Road:** Widen the northbound approach to provide an additional (third) through lane. Provide a northbound right-turn overlap phase. Widen the southbound approach to provide three through lanes and a dedicated right-turn lane. Widen the eastbound approach to provide one left-turn lane, one through lane, and two right-turn lanes with overlap phasing. Also, remove the east-west split phase to provide protected left-turn phases. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of these mitigation measures. The Alvarado Canyon Road Realignment Project proposed at this location is identified in the Navajo PFFP (#T12).

I-19 **Alvarado Canyon Road / Mission Gorge Place:** Install a traffic signal at this intersection once it is warranted. Widen the westbound approach to provide an exclusive right-turn lane. Widen the eastbound approach to provide a dedicated left-turn lane. Grantville Focused Plan significant traffic impact to this intersection would be fully mitigated with the implementation of these mitigation measures. This proposed intersection improvement project is identified in the Navajo PFFP (#T27).

Segments:

S-1 **Friars Road from I-15 NB Ramps to Rancho Mission Road:** Widen the roadway to 8-Lane Prime Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be partially mitigated with the implementation of this mitigation measure. This improvement project is not currently included in the Mission Valley PFFP and; therefore, Grantville Focused Plan significant traffic impact to this roadway segment would remain significant and unmitigated.

S-2 **Friars Road from Rancho Mission Road to Santo Road:** Widen the roadway to 8-Lane Prime Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be partially mitigated with the implementation of this mitigation measure. This improvement project is not currently included in the Mission Valley PFFP and; therefore, Grantville Focused Plan significant traffic impact to this roadway segment would remain significant and unmitigated.

S-3 **Friars Road: Santo Road to Riverdale Street:** This roadway segment is currently built to its ultimate classification per Mission Valley and Navajo Community Plans. No mitigation measures have been identified for this location. As a result, Grantville Focused Plan significant traffic impact to this roadway segment would remain significant and unmitigated.

S-4 **Mission Gorge Road from Rainier Avenue to Vandever Avenue:** Widen the roadway to 4-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. The Mission Gorge Road Improvement Project is identified in the Navajo PFFP (#T19).

S-5 **Mission Gorge Road from Vandever Avenue to Twain Avenue:** Widen the roadway to 4-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. The Mission Gorge Road Improvements Project is identified in the Navajo PFFP (#T19).

S-6 **Mission Gorge Road from Twain Avenue to Mission Gorge Place:** Widen the roadway to 4-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. The Mission Gorge Road Improvements Project is identified in the Navajo PFFP (#T19).

S-7 **Mission Gorge Road from Mission Gorge Place to Fairmount Avenue:** Widen the roadway to 6-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. The Mission Gorge Road Improvements Project is identified in the Navajo PFFP (#T16).

S-8 **Fairmount Avenue from Vandever Avenue to Twain Avenue:** Provide a continuous two-way left-turn lane. Retain the street parking along both sides of the roadway. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. This roadway improvement project is identified in the Navajo PFFP (#T20).

S-9 **Fairmount Avenue from Mission Gorge Road to Alvarado Canyon Road:** Widen the roadway to a 6-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be partially mitigated with the implementation of this mitigation measure. The Fairmount Avenue Widening Project is identified in the Navajo PFFP (#T12).

S-10 **Fairmount Avenue from Alvarado Canyon Road to I-8 WB Ramps:** Widen the roadway to 6-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be partially mitigated with the implementation of this mitigation measure. The Fairmount Avenue Widening Project is identified in the Navajo PFFP (#T12).

S-11 **Fairmount Avenue from I-8 WB Ramps to I-8 EB Ramps:** Widen the roadway to 6-Lane Major Arterial. Grantville Focused Plan significant traffic impact to this roadway segment would be partially mitigated with the implementation of this mitigation measure. The Fairmount Avenue Widening Project is identified in the Navajo PFFP (#T12).

S-12 **Vandever Avenue from Riverdale Street to Mission Gorge Road:** Restripe to provide a continuous two-way left-turn lane. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. This roadway improvement project is identified in the Navajo PFFP (#T28).

S-13 **Twain Avenue from Fairmount Avenue to Mission Gorge Road:** Restripe to provide a continuous two-way left-turn lane. Grantville Focused Plan significant traffic impact to this roadway segment would be fully mitigated with the implementation of this mitigation measure. This roadway improvement project is identified in the Navajo PFFP (#T29).

S-14 **San Diego Mission Road from Rancho Mission Road to Fairmount Avenue:** Widen the roadway to 4-Lane Collector Street would mitigate Grantville Focused Plan significant impact to San Diego Mission Road. However, widening of this roadway to 4-Lane Collector would require bridge widening over the San Diego River which is not included in any Public Facilities Financing Plan or funded Capital Improvement Program. Development project review would address significance of impacts on a project-level basis. Therefore, Grantville Focused Plan significant traffic impact to this roadway segment would remain significant and unmitigated.

S-15 **Zion Avenue from Mission Gorge Road to Waring Road:** Widen the roadway to 4-Lane Major Street would mitigate Grantville Focused Plan significant impact to Zion Avenue. Widening of this roadway would impact surrounding residential properties, community character and on-street parking that is heavily utilized in this area. Therefore widening of this roadway segment is not recommended and Grantville Focused Plan significant traffic impact to this roadway segment would remain significant and unmitigated.

Mainline Freeways Segments:

M-1 thru M-4

I-15 NB & SB: Aero Drive to I-8: San Diego Association of Governments (SANDAG) 2050 Revenue Constrained Regional Transportation Plan (RTP) proposes the construction of 2 managed lanes along I-15 between I-8 and SR-163. Project is expected to be built by Year 2020. This measure provides partial mitigation since it reduces the traffic demand on the freeway general purpose lane; however, even with this improvement, the FPA traffic impact to this roadway segment is significant.

M-5 thru M-8

I-8 EB & WB: I-15 to Waring Road: SANDAG 2050 Revenue Constraint RTP includes operational improvements along I-8 between I-15 and SR-125. Project is expected to be built by Year 2040. This measure provides partial mitigation since it improves freeway operation in the vicinity of the project; however, even with this improvement, the FPA traffic impact to this roadway segment is significant.

Freeway Interchanges (Ramps (R) and Intersections (I)):

I-15/Friars Road Interchange

R-1 **Friars Road to Northbound I-15:** No mitigation measures have been identified for this location. As a result, Grantville Focused Plan significant traffic impact to this intersection would remain significant and unmitigated.

I-1 **Friars Road / I-15 SB Ramps:** No mitigation measures have been identified for this location. As a result, Grantville Focused Plan significant traffic impact to this intersection would remain significant and unmitigated.

I-8/Fairmount Avenue Interchange

I-18 **Fairmount Avenue / Alvarado Canyon Road / I-8 WB Off-Ramp / Camino Del Rio N.:** I-8/Fairmount Avenue interchange improvement project is included in the Navajo PFFP (# T12). This measure provides partial mitigation since it improves freeway and local roadway operation in the vicinity of the project. As a result, Grantville Focused Plan significant traffic impact to this freeway segment would remain significant and unmitigated.

10.0 POST-MITIGATION ANALYSIS

Table 10–1 summarizes the mitigated intersection analysis operations for the Year 2030 with Project scenario. ***Table 10–2*** summarizes the mitigated roadway segment analysis operations for the Year 2030 with Project scenario.

As shown in *Table 9–1*, all of the significant impacts at the study intersections are mitigated with the recommended intersection improvements. As shown in the *Table 9–2*, all of the significant impacts along the study segments are mitigated with the recommended roadway improvements.

Appendix H contains the peak hour intersection worksheets for the Year 2030 + Project with mitigation scenario.

TABLE 10–1
POST-MITIGATION INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Year 2030 With Project		Year 2030 with Project with Mitigation	
		Delay[a]	LOS[b]	Delay	LOS	Delay	LOS
3. Friars Road / Riverdale Street	AM PM	33.1 57.8	C E	150.2 172.8	F F	54.0 45.1	D D
5. Mission Gorge Road / Zion Avenue	AM PM	349.8 52.1	F D	507.0 108.1	F F	240.1 54.7	**F** D
6. Mission Gorge Road / Princess View Drive	AM PM	51.0 20.5	D C	97.0 25.8	F C	46.9 25.4	D C
8. Waring Road / Princess View Drive	AM PM	24.2 11.9	C B	77.9 19.1	E B	42.9 18.7	D B
9. Waring Road / Zion Avenue	AM PM	41.9 47.5	D D	126.3 73.5	F E	43.5 40.5	D D
17. Fairmount Avenue / Mission Gorge Road	AM PM	31.8 31.9	C C	60.1 45.7	E D	39.3 24.4	D C
19. Alvarado Canyon Road / Mission Gorge Place	AM PM	9.5 11.5	B B	62.7 192.9	F F	15.5 21.1	B C

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.

SIGNALIZED

DELAY/LOS THRESHOLDS

Delay	LOS
0.0 ≤ 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
≥ 80.1	F

Table 10–2
Post-Mitigation Segment Operations

Street Segment	Existing Capacity	Existing			Year 2030 + Project Capacity	Year 2030 + Project			Year 2030 + Project + Mitigation Capacity	Year 2030 + Project + Mitigation		
	(LOS E) [a]	ADT [b]	V/C [d]	LOS [c]	(LOS E) [a]	ADT [b]	V/C [d]	LOS [c]	(LOS E) [a]	ADT [b]	V/C [d]	LOS [c]
Mission Gorge Road												
Rainier Ave to Vandever Ave	30,000	17,710	0.59	C	30,000	27,900	0.93	E	40,000	27,900	0.6975	C
Vandever Ave to Twain Ave	30,000	30,730	1.024	F	30,000	34,600	1.153	F	40,000	34,600	0.865	D
Twain Ave to Mission Gorge Pl	30,000	24,660	0.822	D	30,000	28,900	0.963	E	40,000	28,900	0.7225	C
Mission Gorge Pl to Fairmount Ave	30,000	25,260	0.842	E	40,000	38,200	0.955	E	50,000	38,200	0.764	C
Fairmount Avenue												
Vandever Ave to Twain Ave	8,000	5,490	0.686	D	8,000	11,700	1.463	F	15,000	11,700	0.78	D
Mission Gorge Rd to Alvarado Canyon Rd	40,000	**34,290**	**0.857**	**D**	40,000	55,800	1.395	F	50,000	**55,800**	**1.116**	**F**
Alvarado Canyon Rd to I-8 WB Ramps	40,000	**47,690**	**1.192**	**F**	40,000	64,300	1.608	F	50,000	**64,300**	**1.286**	**F**
I-8 WB Ramps to I-8 EB Ramps	40,000	**34,670**	**0.867**	**D**	40,000	51,900	1.298	F	50,000	**51,900**	**1.038**	**F**
Vandever Avenue												
Riverdale St to Mission Gorge Rd	8,000	5,600	0.7	D	8,000	6,700	0.838	E	15,000	6,700	0.447	B
Twain Avenue												
Fairmount Ave to Mission Gorge Rd	8,000	5,100	0.638	D	8,000	9,700	1.213	F	15,000	9,700	0.647	C
San Diego Mission Road												
Rancho Mission Road to Fairmount Avenue	15,000	7,680	0.512	C	15,000	17,000	1.133	F	30,000	17,000	0.567	C
Zion Avenue												
Mission Gorge Road to Waring Road	15,000	10,760	0.717	D	15,000	19,000	1.267	F	40,000	19,000	0.475	B

Footnotes:
a. Capacity based on roadway classification operating at LOS E.
b. Average Daily Traffic
c. Level of Service
d. Volume to Capacity.

11.0 ALTERNATIVE TRANSPORTATION

11.1 Pedestrian Circulation Improvements

The following pedestrian-related improvements should be implemented:

a) Provide sidewalks, landscaping and pedestrian-supportive lighting on all new and major streets.

b) Create pedestrian friendly and walkable neighborhoods. A substantial portion of future residents should be located within walking distance from groceries, restaurants, and professional services.

c) All major crosswalks should be marked and enhanced crosswalk improvements such as pavement pattern, median refuge, curb extensions, countdown signals etc. should be considered.

d) Adequate pedestrian connectivity/access between various land uses should be provided. Provide pedestrian crossing on Friars Road at the Mission Gorge Road intersection.

e) Pedestrian connectivity to the San Diego River, the surrounding parks and the Grantville Trolley Station should be emphasized.

f) All sidewalks, crosswalks and access to the entrances should be American Disabilities Act (ADA) compliant. Construction of curb ramps, audible signals, installation of sidewalks, security lighting and other projects which will remove ADA barriers is identified in the Navajo PFFP (#T9).

g) Construction of needed curbs, gutters, alleys, and sidewalks that are not the responsibilities of private developments are is identified in the Navajo PFFP (#T8).

The pedestrian improvements within the study area should be consistent with the goals included in the City of San Diego Pedestrian Master Plan. ***Appendix I*** contains excerpts from the City of San Diego Pedestrian Master Plan.

11.2 Bicycle Circulation Improvements

The following bicycle-related improvements should be implemented:

a) Enhanced bike lanes and crossings should be provided between the proposed San Diego River bike path and the existing Fairmount Avenue bike path.

b) Improve the bike trail crosswalk at the Mission Gorge Road/Camino del Rio North intersection.

c) Bicycle connectivity to the San Diego River, the surrounding parks and transit should be emphasized.

d) Provide sufficient bicycle parking (lockers and U-loops).

e) Mission Trail Bike Path Feasibility Study to construct a Class I bike pass between Zion Avenue and Princess View Drive is identified in the Navajo PFFP (#T13).

f) Construction of bicycle routes throughout the Navajo Community is identified in the Navajo PFFP (#T14)

g) Per SANDAG's San Diego Regional Bicycle Plan, provide a Class I Bike Path along the San Diego River Bikeway Corridor.

h) City of San Diego Bicycle Master Plan recommends the following bicycle facilities be implemented:

- A Class II Bike Lane along Friars Road from I-15 SB Ramps to Mission Gorge Road
- A Class II Bike Lane along Mission Gorge Road from Jackson Drive to Friars Road
- A Class III Bike Route along Zion Avenue from Mission Gorge Road to Waring Avenue
- A Class II Bike Lane along San Diego Mission Road from Rancho Mission Road to Twain Avenue
- A Class II Bike Lane along Camino Del Rio North from east of Ward Street to Fairmount Avenue

Furthermore, the bicycle network improvements within the study area identified in the City of San Diego Bicycle Master Plan, SANDAG's San Diego Regional Bicycle Plan, and the Navajo Facilities Financing Plan should be implemented. ***Appendix J*** contains excerpts from the City of San Diego Bicycle Master Plan, the Navajo Facilities Financing Plan related to bicycle circulation improvements, and SANDAG's San Diego Regional Bicycle Plan.

11.3 Transit Improvements

The following transit-related improvements should be implemented:

a) Pedestrian and bicycle circulation improvements identified above should be considered to improve the internal pedestrian circulation within the study area, improve multimodal connectivity to the Grantville Transit Station and encourage the usage of public transportation. All streets and developments which are directly served by transit facilities should be designed or retrofitted to improve multimodal accessibility to better accommodate pedestrians and cyclists and shall be ADA compliant.

b) Bus Shelters should be provided at all bus stop locations in Sub Area A.

c) Transit Priority Signals should be installed on all Mission Gorge Road Signals (from Friars Road to Camino del Rio North).

d) Based on the future ridership, increasing the bus frequency during peak periods should be considered. Bus stops should be considered within ¼ mile radius for every land use in the Grantville area and bus routes should be reevaluated based on the proposed land uses.

11.4 Transportation Demand Management (TDM) Improvements

The following TDM-related improvements should be considered:

a) TDM principals such as peak hour trip reduction, staggered work hours, ride sharing, telecommunication and promoting the usage of transit facilities should be considered and promoted.

b) Intelligent Transportation System components should be utilized as appropriate.

c) Transit accommodation for individual projects should be considered including but not limited to transit pass subsidies, rideshare incentive programs, and bike parking facilities.

d) Transit service time (priority signalizing) and transit only lanes should be considered.

APPENDIX A

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS

Turn Count Summary

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

Location: Friars Rd @ I-15 SB Ramps

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*

Vehicular Count

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

Location: Friars Rd @ I-15 SB Ramps

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	126	0	108	72	215	145	0	0	0	49	119	72	906
7:15 AM	140	0	128	84	284	143	0	0	0	50	142	71	1,042
7:30 AM	175	0	128	92	356	106	0	0	0	71	138	76	1,142
7:45 AM	248	0	158	93	360	131	0	0	0	66	144	49	1,249
8:00 AM	169	0	141	86	436	49	0	0	0	32	137	66	1,116
8:15 AM	172	0	133	53	370	129	0	0	0	48	137	69	1,111
8:30 AM	133	0	123	46	244	127	0	0	0	59	152	57	941
8:45 AM	138	0	139	49	283	99	0	0	0	55	127	46	936
Total	1,301	0	1,058	575	2,548	929	0	0	0	430	1,096	506	8,443

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	764	0	560	324	1,522	415	0	0	0	217	556	260	4,618
PHF	0.77	#####	0.89	0.87	0.87	0.79	#####	#####	#####	0.76	0.97	0.86	0.92
Movement PHF		0.82			0.97			#DIV/0!			0.91		0.92

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	198	0	93	66	228	121	0	0	0	101	299	158	1,264
4:15 PM	259	0	94	68	242	62	0	0	0	71	330	125	1,251
4:30 PM	340	0	154	68	204	82	0	0	0	67	244	105	1,264
4:45 PM	270	0	200	61	255	85	0	0	0	62	357	100	1,390
5:00 PM	274	0	245	74	257	102	0	0	0	73	316	91	1,432
5:15 PM	316	0	217	73	236	59	0	0	0	85	369	81	1,436
5:30 PM	215	0	203	75	238	17	0	0	0	88	437	97	1,370
5:45 PM	307	2	138	47	197	79	0	0	0	74	286	120	1,250
Total	2179	2	1344	532	1,857	607	0	0	0	621	2,638	877	10,657

PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.98**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	1075	0	865	283	986	263	0	0	0	308	1479	369	5628
PHF	0.85	#####	0.883	0.943	0.959	0.645	#####	#####	#####	0.875	0.846	0.923	0.98
Movement PHF		0.91			0.88			#DIV/0!			0.87		0.98

Turn Count Summary

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

Location: Friars Rd @ I-15 NB Ramps

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*

Vehicular Count

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

Location: Friars Rd @ I-15 NB Ramps

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	0	93	0	339	231	0	0	0	77	255	0	995
7:15 AM	0	0	73	0	438	229	0	0	0	102	254	0	1,096
7:30 AM	0	0	85	0	469	227	0	0	0	114	283	0	1,178
7:45 AM	0	0	123	0	461	203	0	0	0	89	409	0	1,285
8:00 AM	0	0	102	0	469	205	0	0	0	92	323	0	1,191
8:15 AM	0	0	151	0	401	238	0	0	0	69	322	0	1,181
8:30 AM	0	0	129	0	288	211	0	0	0	87	242	0	957
8:45 AM	0	0	171	0	260	178	0	0	0	81	324	0	1,014
Total	0	0	927	0	3,125	1,722	0	0	0	711	2,412	0	8,897

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.94**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	461	0	1,800	873	0	0	0	364	1,337	0	4,835
PHF	#####	#####	0.76	#####	0.96	0.92	#####	#####	#####	0.80	0.82	#####	0.94
Movement PHF		0.76			0.96			#DIV/0!			0.85		0.94

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	0	163	0	252	199	0	0	0	124	602	0	1,340
4:15 PM	0	0	152	0	220	180	0	0	0	142	736	0	1,430
4:30 PM	0	0	133	0	221	206	0	0	0	137	675	0	1,372
4:45 PM	0	0	144	0	257	178	0	0	0	143	780	0	1,502
5:00 PM	0	0	163	0	270	214	0	0	0	123	742	0	1,512
5:15 PM	0	0	153	0	215	203	0	0	0	140	853	0	1,564
5:30 PM	0	0	140	0	190	188	0	0	0	158	775	0	1,451
5:45 PM	0	0	119	0	204	166	0	0	0	121	703	0	1,313
Total	0	0	1167	0	1,829	1,534	0	0	0	1,088	5,866	0	11,484

PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.96**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	600	0	932	783	0	0	0	564	3150	0	6029
PHF	#####	#####	0.92	#####	0.863	0.915	#####	#####	#####	0.892	0.923	#####	0.96
Movement PHF		0.92			0.89			#DIV/0!			0.94		0.96

Turn Count Summary

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

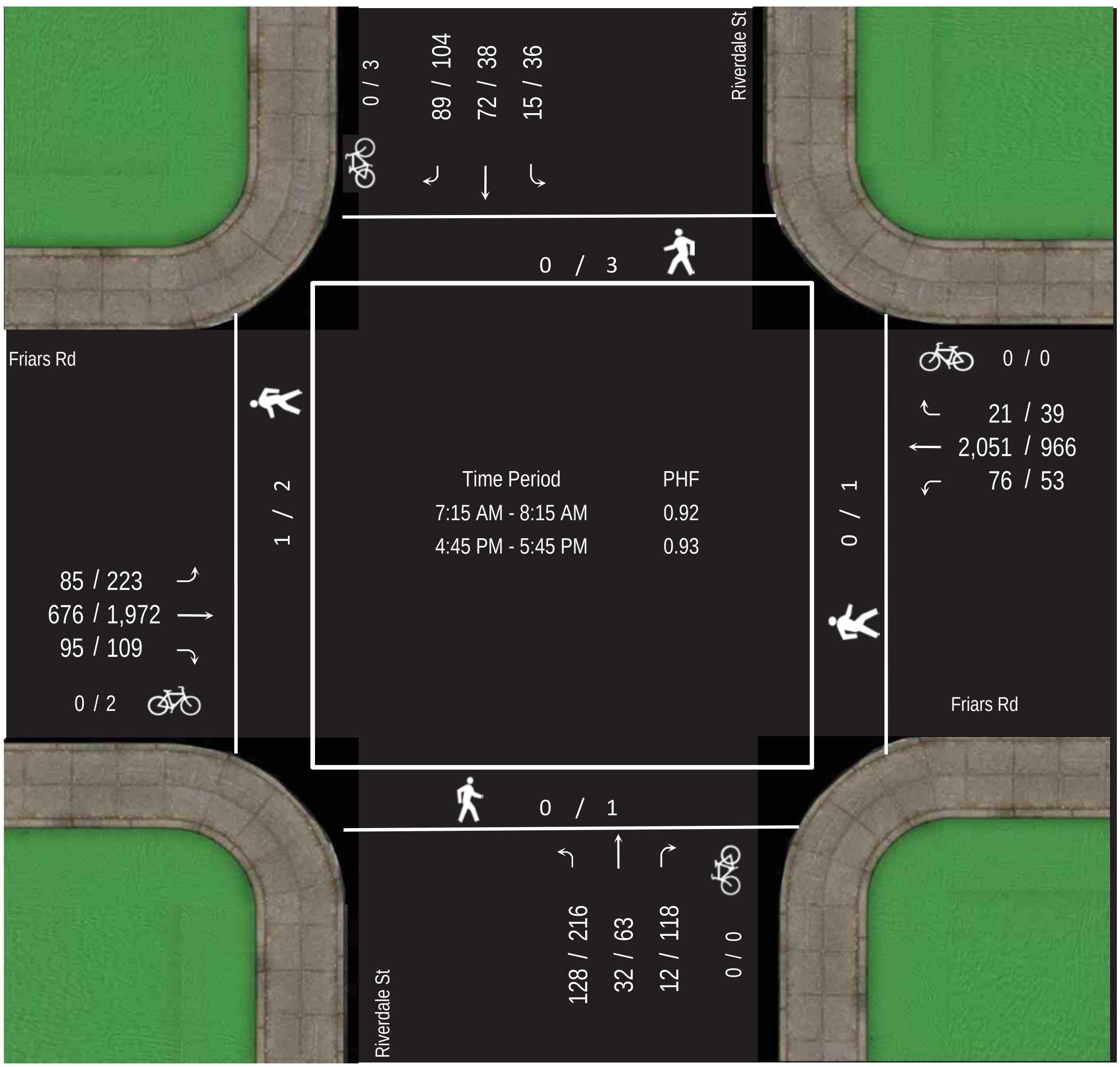
Location: Friars Rd @ Riverdale St

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Friars Rd @ Riverdale St

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	3	7	24	11	441	4	18	4	0	10	148	23	693
7:15 AM	4	7	16	14	595	6	28	8	3	16	156	20	873
7:30 AM	2	20	24	26	592	7	26	12	4	21	154	19	907
7:45 AM	4	30	26	25	460	4	33	7	2	27	196	28	842
8:00 AM	5	15	23	11	404	4	41	5	3	21	170	28	730
8:15 AM	3	12	22	30	402	1	30	6	10	26	158	27	727
8:30 AM	2	10	15	20	316	1	26	9	21	28	166	32	646
8:45 AM	8	6	28	13	291	4	29	4	6	31	151	29	600
Total	31	107	178	150	3,501	31	231	55	49	180	1,299	206	6,018

AM Intersection Peak Hour : **7:15 AM - 8:15 AM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	15	72	89	76	2,051	21	128	32	12	85	676	95	3,352
PHF	0.75	0.60	0.86	0.73	0.86	0.75	0.78	0.67	0.75	0.79	0.86	0.85	0.92
Movement PHF		0.73			0.86			0.88			0.85		0.92

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	9	8	19	10	253	5	56	11	29	31	382	34	847
4:15 PM	7	9	18	8	234	8	49	12	20	40	469	32	906
4:30 PM	11	9	29	12	239	7	73	17	30	54	388	23	892
4:45 PM	5	14	26	13	201	5	42	15	36	52	540	33	982
5:00 PM	10	7	28	12	301	10	78	19	33	61	475	23	1,057
5:15 PM	9	6	29	15	249	13	52	19	29	65	460	26	972
5:30 PM	12	11	21	13	215	11	44	10	20	45	497	27	926
5:45 PM	15	9	24	8	197	7	35	10	20	55	444	30	854
Total	78	73	194	91	1,889	66	429	113	217	403	3,655	228	7,436

PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	36	38	104	53	966	39	216	63	118	223	1972	109	3937
PHF	0.75	0.679	0.897	0.883	0.802	0.75	0.692	0.829	0.819	0.858	0.913	0.826	0.93
Movement PHF		0.99			0.82			0.76			0.92		0.93

Turn Count Summary

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

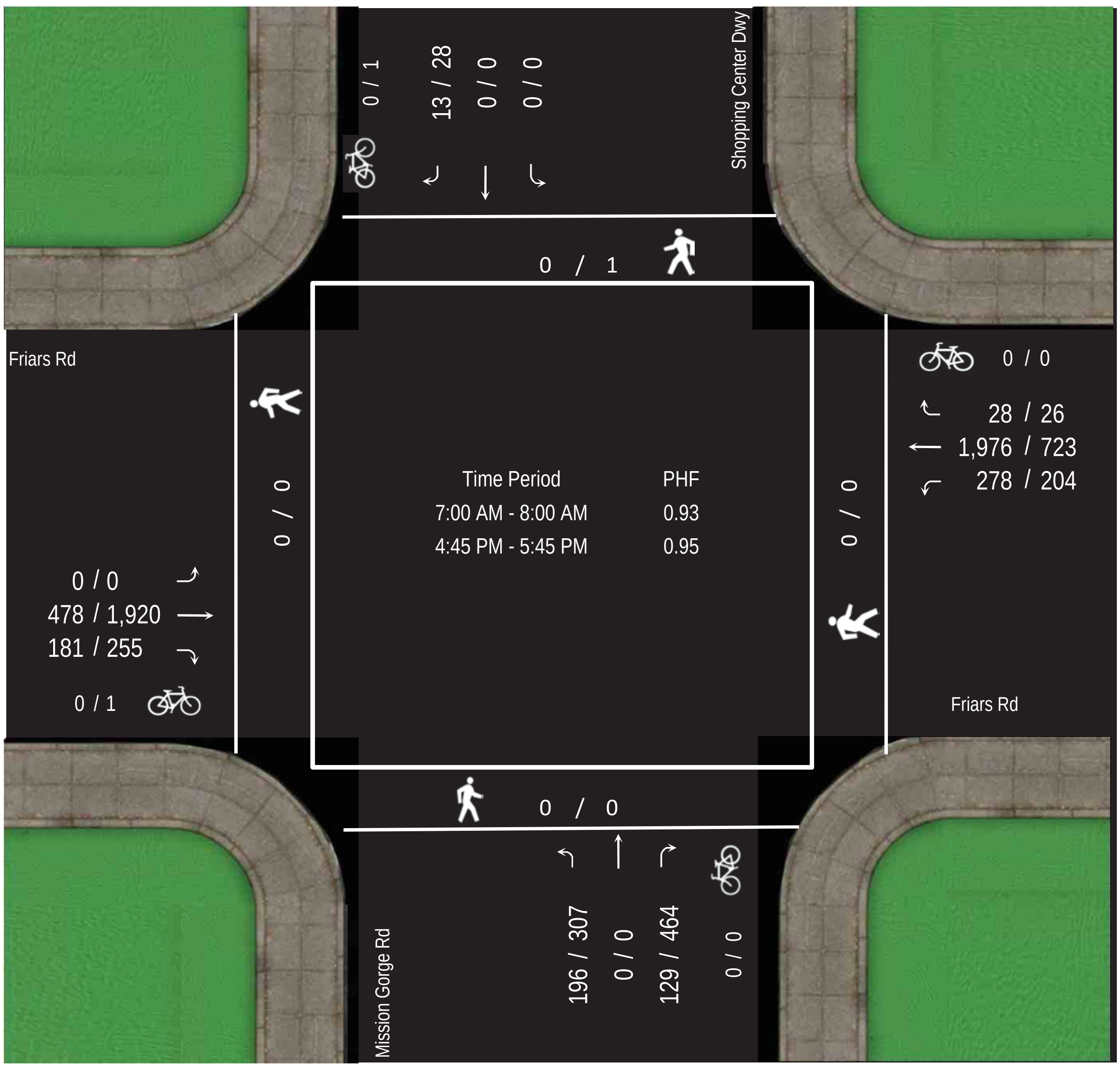
Location: Friars Rd @ Mission Gorge Rd

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

Location: Friars Rd @ Mission Gorge Rd

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	0	2	55	415	5	39	0	23	0	106	44	689
7:15 AM	0	0	4	66	564	7	47	0	29	0	118	37	872
7:30 AM	0	0	4	60	565	6	56	0	29	0	122	43	885
7:45 AM	0	0	3	97	432	10	54	0	48	0	132	57	833
8:00 AM	0	0	4	52	364	10	51	0	50	0	116	41	688
8:15 AM	0	0	3	61	374	12	56	0	65	0	128	39	738
8:30 AM	0	0	7	53	291	5	39	0	64	0	150	36	645
8:45 AM	0	0	3	49	261	6	44	0	60	0	112	41	576
Total	0	0	30	493	3,266	61	386	0	368	0	984	338	5,926

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	13	278	1,976	28	196	0	129	0	478	181	3,279
PHF	#####	#####	0.81	0.72	0.87	0.70	0.88	#####	0.67	#####	0.91	0.79	0.93
Movement PHF		0.81			0.90			0.80			0.87		0.93

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	0	4	62	198	4	66	0	95	0	332	69	830
4:15 PM	0	0	4	45	176	6	70	0	76	0	450	54	881
4:30 PM	0	0	3	58	154	11	101	0	126	0	360	50	863
4:45 PM	0	0	5	58	144	7	70	0	107	0	527	60	978
5:00 PM	0	0	6	54	215	8	102	0	120	0	466	60	1,031
5:15 PM	0	0	8	50	202	7	67	0	134	0	462	55	985
5:30 PM	0	0	9	42	162	4	68	0	103	0	465	80	933
5:45 PM	0	0	5	72	149	6	58	0	90	0	435	66	881
Total	0	0	44	441	1,400	53	602	0	851	0	3,497	494	7,382

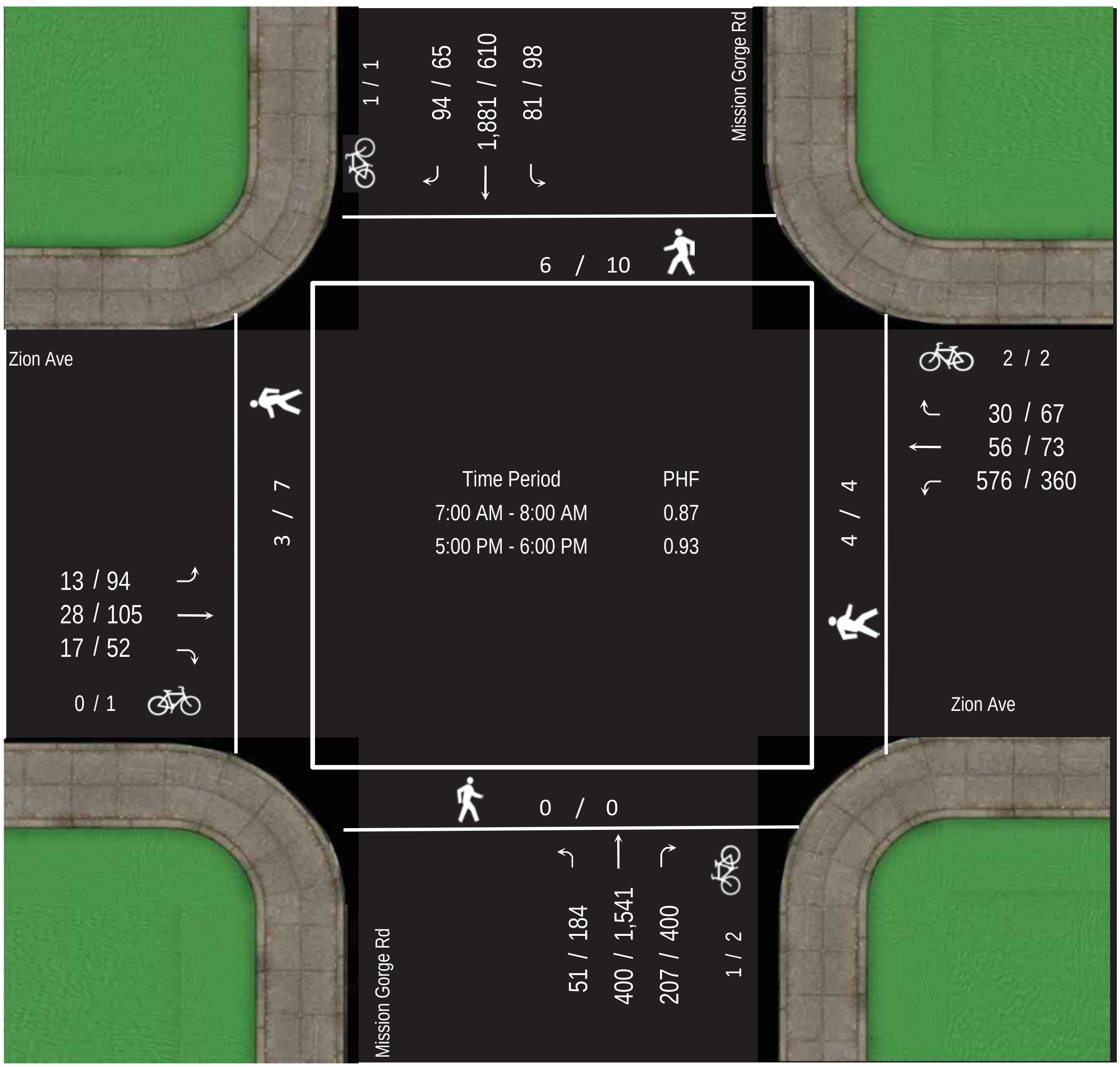
PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.95**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	28	204	723	26	307	0	464	0	1920	255	3927
PHF	#####	#####	0.778	0.879	0.841	0.813	0.752	#####	0.866	#####	0.911	0.797	0.95
Movement PHF		0.78			0.86			0.87			0.93		0.95

Turn Count Summary

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

Location:	Zion Ave	@	Mission Gorge Rd
Date of Count:	*Thursday, October 03, 2013*		
Analysts:	*LV/CD*		
Weather:	*Sunny*		
AVC Proj No:	*13-0106*		



LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

Location: Zion Ave @ Mission Gorge Rd

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	18	400	11	123	10	5	12	86	47	4	1	3	720
7:15 AM	20	521	20	141	11	6	11	104	47	2	8	6	897
7:30 AM	20	551	34	178	15	9	15	100	54	4	8	2	990
7:45 AM	23	409	29	134	20	10	13	110	59	3	11	6	827
8:00 AM	11	358	17	124	9	7	15	100	55	11	8	2	717
8:15 AM	21	335	14	101	13	4	16	129	59	3	4	5	704
8:30 AM	19	244	13	106	8	4	15	142	49	6	5	5	616
8:45 AM	14	254	19	69	14	10	27	108	55	9	5	4	588
Total	146	3,072	157	976	100	55	124	879	425	42	50	33	6,059

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.87**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	81	1,881	94	576	56	30	51	400	207	13	28	17	3,434
PHF	0.88	0.85	0.69	0.81	0.70	0.75	0.85	0.91	0.88	0.81	0.64	0.71	0.87
Movement PHF		0.85			0.82			0.90			0.73		0.87

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	20	148	5	86	8	12	30	308	91	19	19	5	751
4:15 PM	27	135	14	82	19	20	39	367	88	15	12	8	826
4:30 PM	27	139	11	95	15	12	47	338	73	28	21	7	813
4:45 PM	20	97	12	56	21	19	48	423	97	20	22	10	845
5:00 PM	24	174	17	101	20	12	42	402	93	21	32	15	953
5:15 PM	23	157	14	96	14	18	55	422	116	26	30	14	985
5:30 PM	19	138	8	80	13	17	46	395	89	22	20	8	855
5:45 PM	32	141	26	83	26	20	41	322	102	25	23	15	856
Total	192	1129	107	679	136	130	348	2,977	749	176	179	82	6,884

PM Intersection Peak Hour : **5:00 PM - 6:00 PM** Intersection PHF : **0.93**

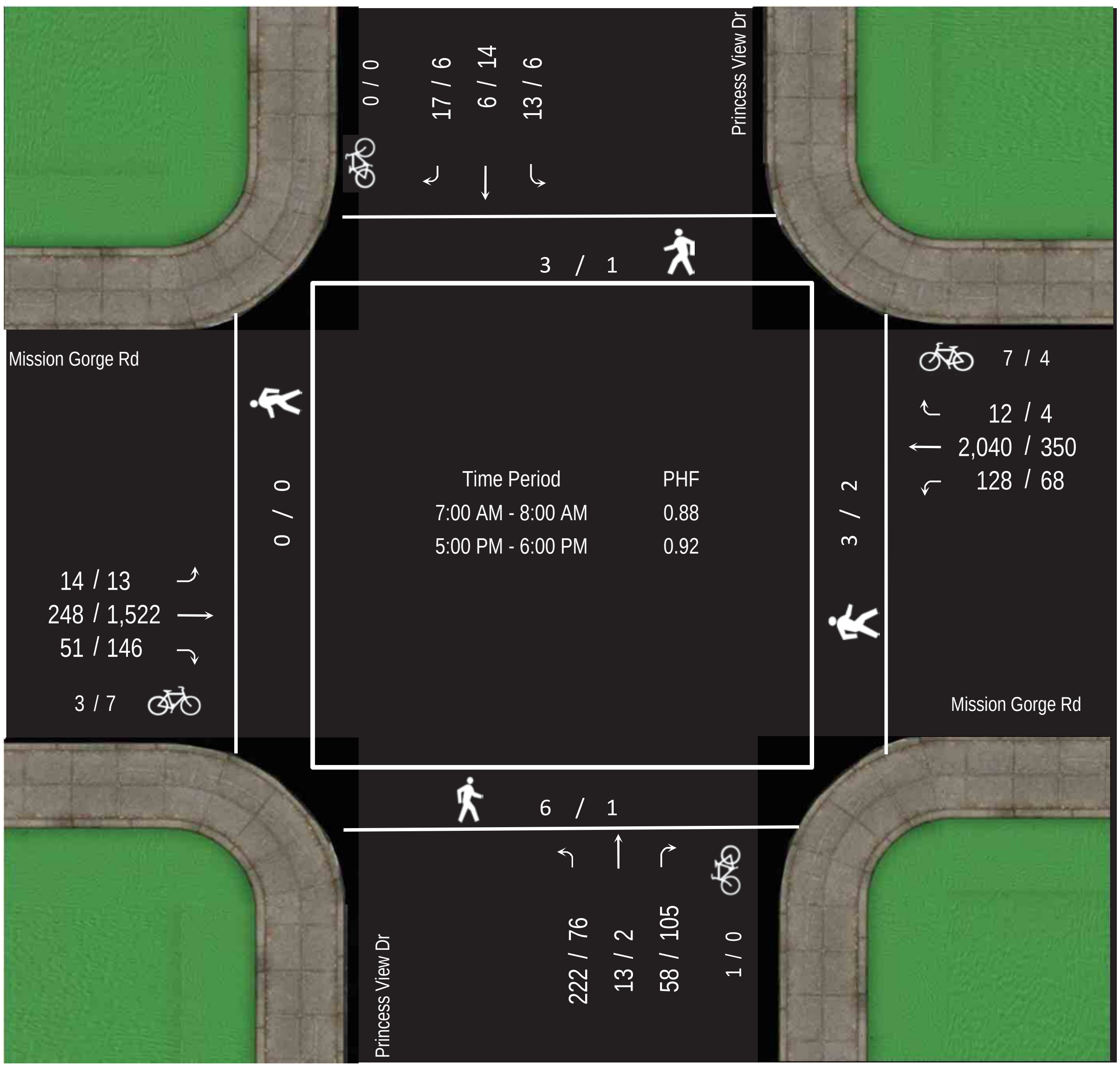
	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	98	610	65	360	73	67	184	1541	400	94	105	52	3649
PHF	0.77	0.876	0.625	0.891	0.702	0.838	0.836	0.913	0.862	0.904	0.82	0.867	0.93
Movement PHF		0.90			0.94			0.90			0.90		0.93

Turn Count Summary

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

LINSCOTT LAW & GREENSPAN engineers

Location:	Mission Gorge Rd	@	Princess View Dr
Date of Count:	*Tuesday, October 08, 2013*		
Analysts:	*LV/CD*		
Weather:	*Sunny*		
AVC Proj No:	*13-0106*		



Vehicular Count

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

Location: Mission Gorge Rd @ Princess View Dr

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	1	3	27	455	4	36	2	7	4	57	12	608
7:15 AM	3	2	4	43	543	2	91	6	28	3	65	11	801
7:30 AM	6	2	5	26	566	1	61	2	8	5	60	18	760
7:45 AM	4	1	5	32	476	5	34	3	15	2	66	10	653
8:00 AM	0	3	8	20	330	3	52	5	13	2	68	13	517
8:15 AM	3	3	5	24	300	0	26	4	11	3	60	16	455
8:30 AM	4	4	8	14	200	1	28	2	11	6	73	11	362
8:45 AM	2	1	10	21	155	3	27	1	10	4	85	12	331
Total	22	17	48	207	3,025	19	355	25	103	29	534	103	4,487

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.88**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	13	6	17	128	2,040	12	222	13	58	14	248	51	2,822
PHF	0.54	0.75	0.85	0.74	0.90	0.60	0.61	0.54	0.52	0.70	0.94	0.71	0.88
Movement PHF		0.69			0.92			0.59			0.94		0.88

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	6	2	6	11	73	0	24	2	21	7	259	30	441
4:15 PM	3	4	5	9	97	0	26	0	25	10	308	29	516
4:30 PM	1	3	4	14	88	1	13	0	24	4	360	26	538
4:45 PM	1	0	3	14	68	2	20	0	26	3	334	31	502
5:00 PM	1	8	1	14	83	3	20	0	23	7	428	39	627
5:15 PM	0	3	4	20	99	1	21	1	36	2	370	41	598
5:30 PM	3	3	1	11	77	0	21	1	31	3	375	32	558
5:45 PM	2	0	0	23	91	0	14	0	15	1	349	34	529
Total	17	23	24	116	676	7	159	4	201	37	2,783	262	4,309

PM Intersection Peak Hour : **5:00 PM - 6:00 PM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	6	14	6	68	350	4	76	2	105	13	1522	146	2312
PHF	0.50	0.438	0.375	0.739	0.884	0.333	0.905	0.5	0.729	0.464	0.889	0.89	0.92
Movement PHF		0.65			0.88			0.79			0.89		0.92

Turn Count Summary

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

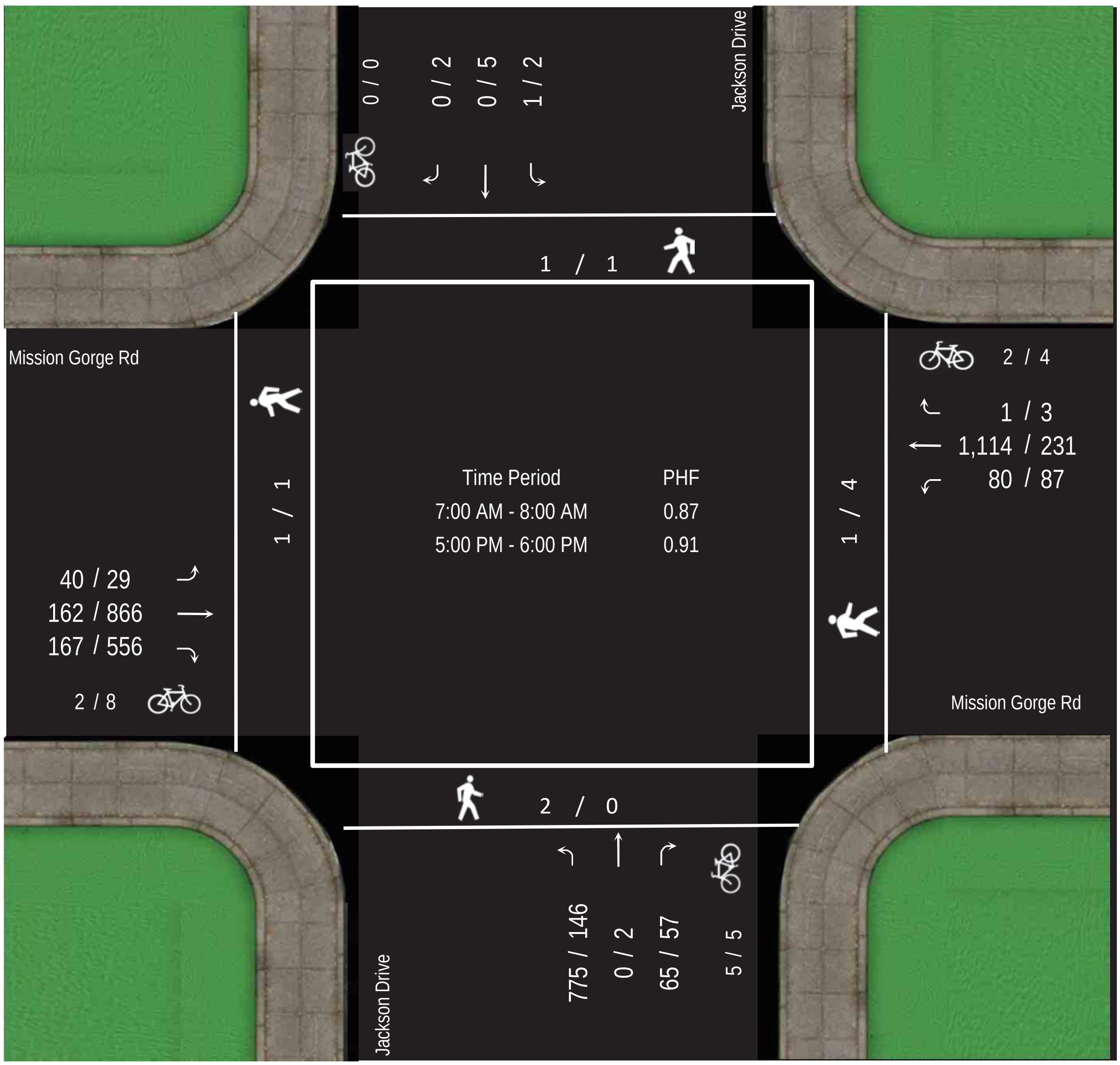
Location: Mission Gorge Rd @ Jackson Drive

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Mission Gorge Rd @ Jackson Drive

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	0	0	21	199	0	168	0	16	11	35	46	496
7:15 AM	1	0	0	18	338	1	227	0	9	9	45	44	692
7:30 AM	0	0	0	17	292	0	202	0	17	13	44	48	633
7:45 AM	0	0	0	24	285	0	178	0	23	7	38	29	584
8:00 AM	0	0	0	10	202	1	111	0	13	10	54	30	431
8:15 AM	0	0	0	16	145	0	100	1	11	10	43	21	347
8:30 AM	0	0	0	18	122	2	70	0	9	9	46	30	306
8:45 AM	0	0	1	19	79	0	61	0	16	4	49	20	249
Total	1	0	1	143	1,662	4	1,117	1	114	73	354	268	3,738

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.87**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	1	0	0	80	1,114	1	775	0	65	40	162	167	2,405
PHF	0.25	#####	#####	0.83	0.82	0.25	0.85	#####	0.71	0.77	0.90	0.87	0.87
Movement PHF		0.25			0.84			0.89			0.88		0.87

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	1	0	13	47	1	36	0	17	13	177	72	377
4:15 PM	0	2	0	25	62	1	34	0	8	13	174	109	428
4:30 PM	1	0	3	21	44	0	41	1	8	5	206	127	457
4:45 PM	0	1	1	25	50	0	34	0	14	7	175	125	432
5:00 PM	0	1	0	21	50	1	31	2	15	5	244	149	519
5:15 PM	0	2	1	25	62	0	48	0	18	10	229	150	545
5:30 PM	0	2	0	24	56	1	35	0	8	3	212	129	470
5:45 PM	2	0	1	17	63	1	32	0	16	11	181	128	452
Total	3	9	6	171	434	5	291	3	104	67	1,598	989	3,680

PM Intersection Peak Hour : **5:00 PM - 6:00 PM** Intersection PHF : **0.91**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	2	5	2	87	231	3	146	2	57	29	866	556	1986
PHF	0.25	0.625	0.5	0.87	0.917	0.75	0.76	0.25	0.792	0.659	0.887	0.927	0.91
Movement PHF		0.75			0.92			0.78			0.91		0.91

Linscott Law & Greenspan engineers

Turn Count Summary

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

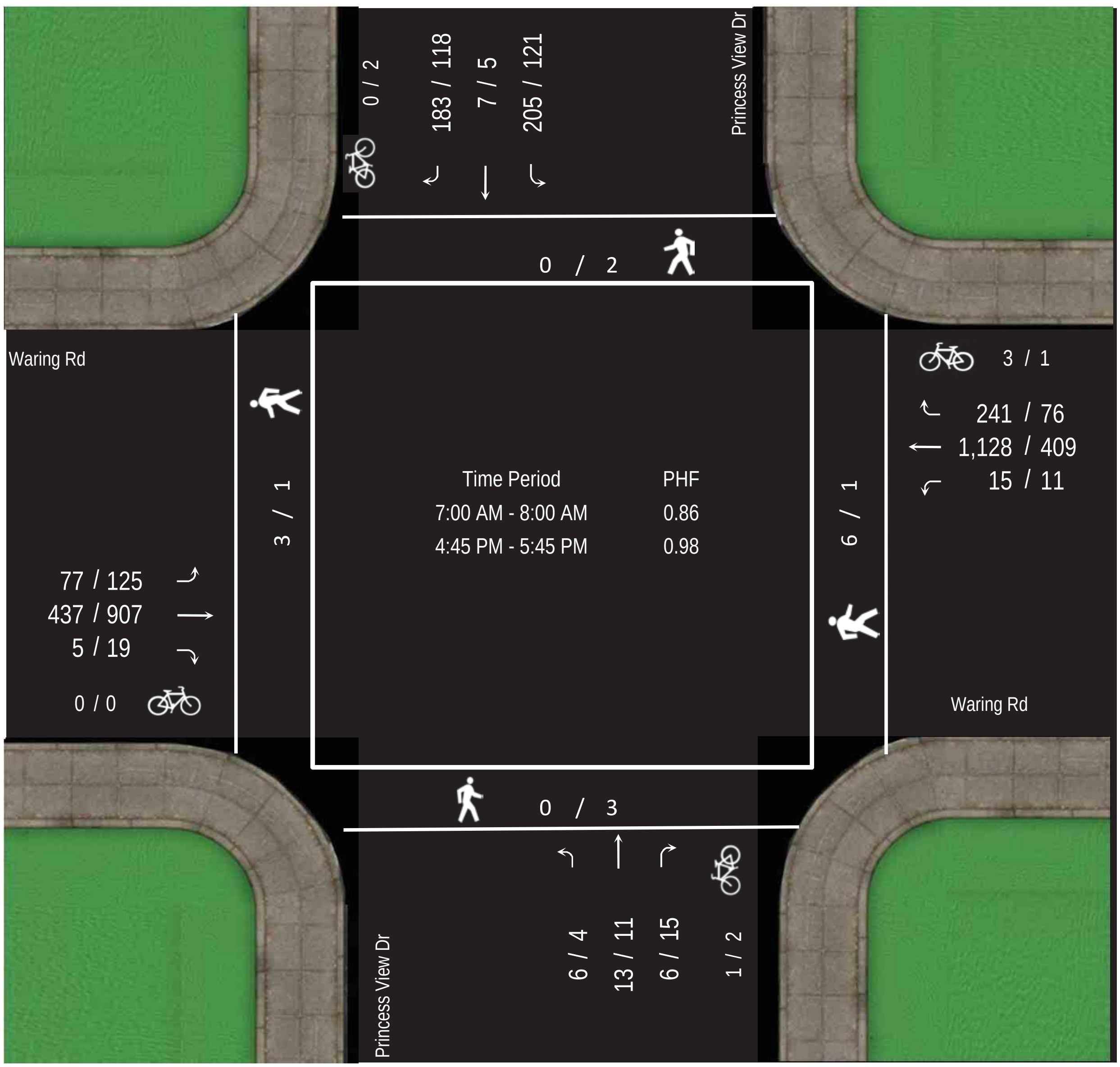
Location: Waring Rd @ Princess View Dr

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Waring Rd @ Princess View Dr

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	62	1	53	4	180	103	1	6	5	20	137	2	574
7:15 AM	95	3	53	6	285	77	0	2	0	25	127	0	673
7:30 AM	32	2	37	2	319	26	2	2	0	15	118	1	556
7:45 AM	16	1	40	3	344	35	3	3	1	17	55	2	520
8:00 AM	13	2	42	2	244	28	3	0	3	24	46	1	408
8:15 AM	16	2	22	2	194	22	2	0	2	25	53	0	340
8:30 AM	13	1	44	0	157	20	0	1	0	12	36	0	284
8:45 AM	9	2	30	1	131	15	1	1	2	17	59	0	268
Total	256	14	321	20	1,854	326	12	15	13	155	631	6	3,623

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.86**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	205	7	183	15	1,128	241	6	13	6	77	437	5	2,323
PHF	0.54	0.58	0.86	0.63	0.82	0.58	0.50	0.54	0.30	0.77	0.80	0.63	0.86
Movement PHF		0.65			0.91			0.52			0.82		0.86

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	23	4	30	4	87	23	0	2	0	33	199	1	406
4:15 PM	23	3	29	2	95	15	4	0	2	34	195	3	405
4:30 PM	34	1	27	2	86	27	4	4	2	26	189	5	407
4:45 PM	26	1	29	7	101	17	2	2	1	36	222	5	449
5:00 PM	32	0	34	2	96	22	1	5	6	33	227	7	465
5:15 PM	34	2	31	1	96	21	0	3	2	28	224	1	443
5:30 PM	29	2	24	1	116	16	1	1	6	28	234	6	464
5:45 PM	29	0	23	1	74	21	0	3	2	39	209	2	403
Total	230	13	227	20	751	162	12	20	21	257	1,699	30	3,442

PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.98**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	121	5	118	11	409	76	4	11	15	125	907	19	1821
PHF	0.89	0.625	0.868	0.393	0.881	0.864	0.5	0.55	0.625	0.868	0.969	0.679	0.98
Movement PHF		0.91			0.93			0.63			0.98		0.98

Turn Count Summary

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

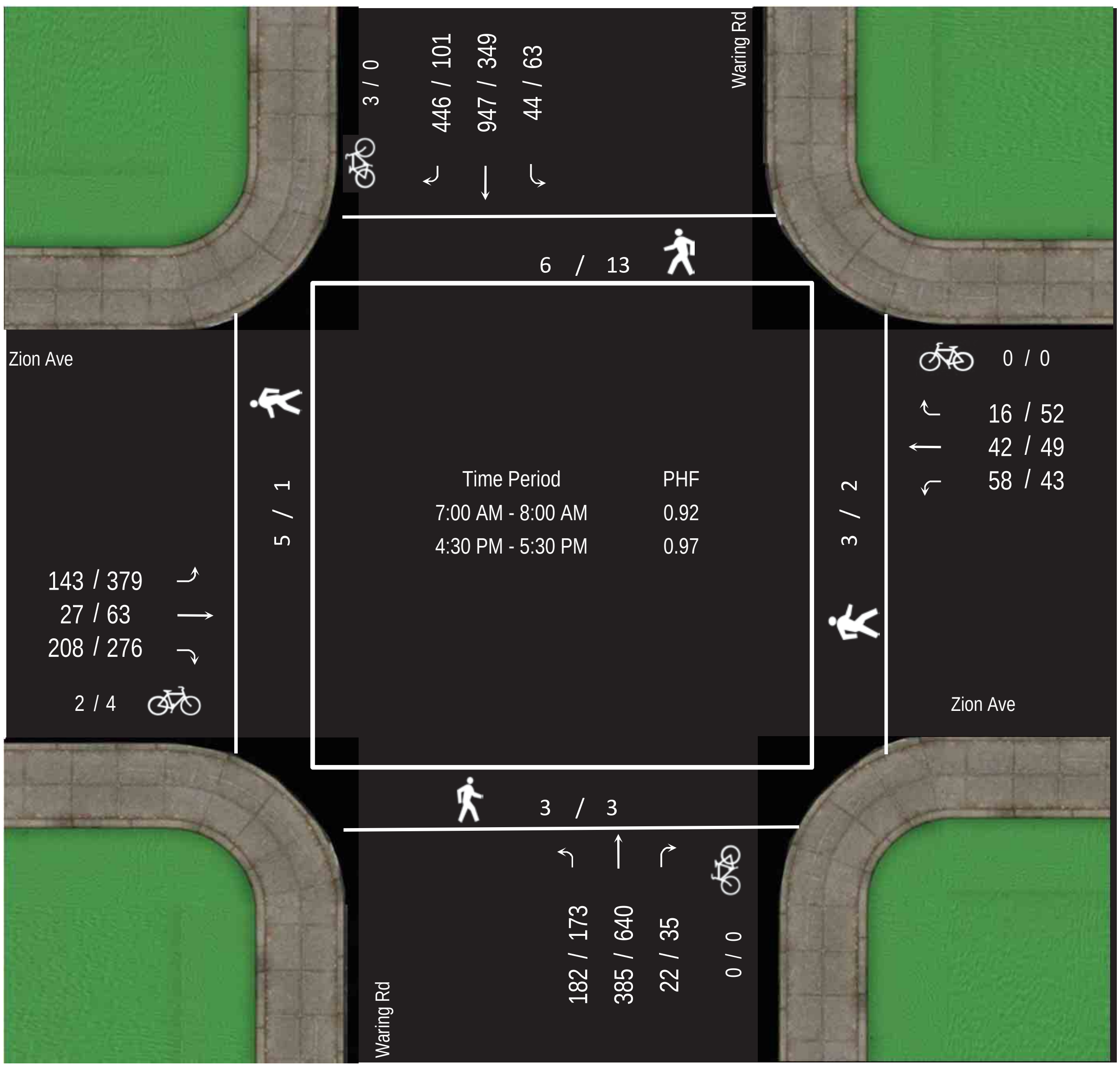
Location: Zion Ave @ Waring Rd

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Zion Ave @ Waring Rd

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	6	187	54	10	15	5	30	131	7	52	5	28	530
7:15 AM	9	239	112	26	12	3	64	115	6	27	5	64	682
7:30 AM	12	250	138	14	7	3	44	86	5	38	5	64	666
7:45 AM	17	271	142	8	8	5	44	53	4	26	12	52	642
8:00 AM	8	163	85	11	10	6	51	57	4	15	4	33	447
8:15 AM	9	150	94	7	9	9	41	52	4	17	1	32	425
8:30 AM	9	137	59	5	9	2	44	32	4	15	2	34	352
8:45 AM	5	107	42	6	10	7	33	61	2	12	7	33	325
Total	75	1,504	726	87	80	40	351	587	36	202	41	340	4,069

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	44	947	446	58	42	16	182	385	22	143	27	208	2,520
PHF	0.65	0.87	0.79	0.56	0.70	0.80	0.71	0.73	0.79	0.69	0.56	0.81	0.92
Movement PHF		0.84			0.71			0.80			0.88		0.92

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	13	91	25	10	14	15	41	145	9	80	18	67	528
4:15 PM	8	95	27	9	14	11	33	171	9	64	12	51	504
4:30 PM	19	82	22	13	17	5	40	168	9	84	16	74	549
4:45 PM	16	86	26	14	12	14	41	162	10	98	14	49	542
5:00 PM	15	91	23	8	10	16	52	159	5	98	8	86	571
5:15 PM	13	90	30	8	10	17	40	151	11	99	25	67	561
5:30 PM	10	90	34	5	9	12	30	161	4	106	15	63	539
5:45 PM	12	68	32	6	9	23	45	146	8	80	9	71	509
Total	106	693	219	73	95	113	322	1,263	65	709	117	528	4,303

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.97**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	63	349	101	43	49	52	173	640	35	379	63	276	2223
PHF	0.83	0.959	0.842	0.768	0.721	0.765	0.832	0.952	0.795	0.957	0.63	0.802	0.97
Movement PHF		0.96			0.90			0.98			0.93		0.97

Turn Count Summary

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

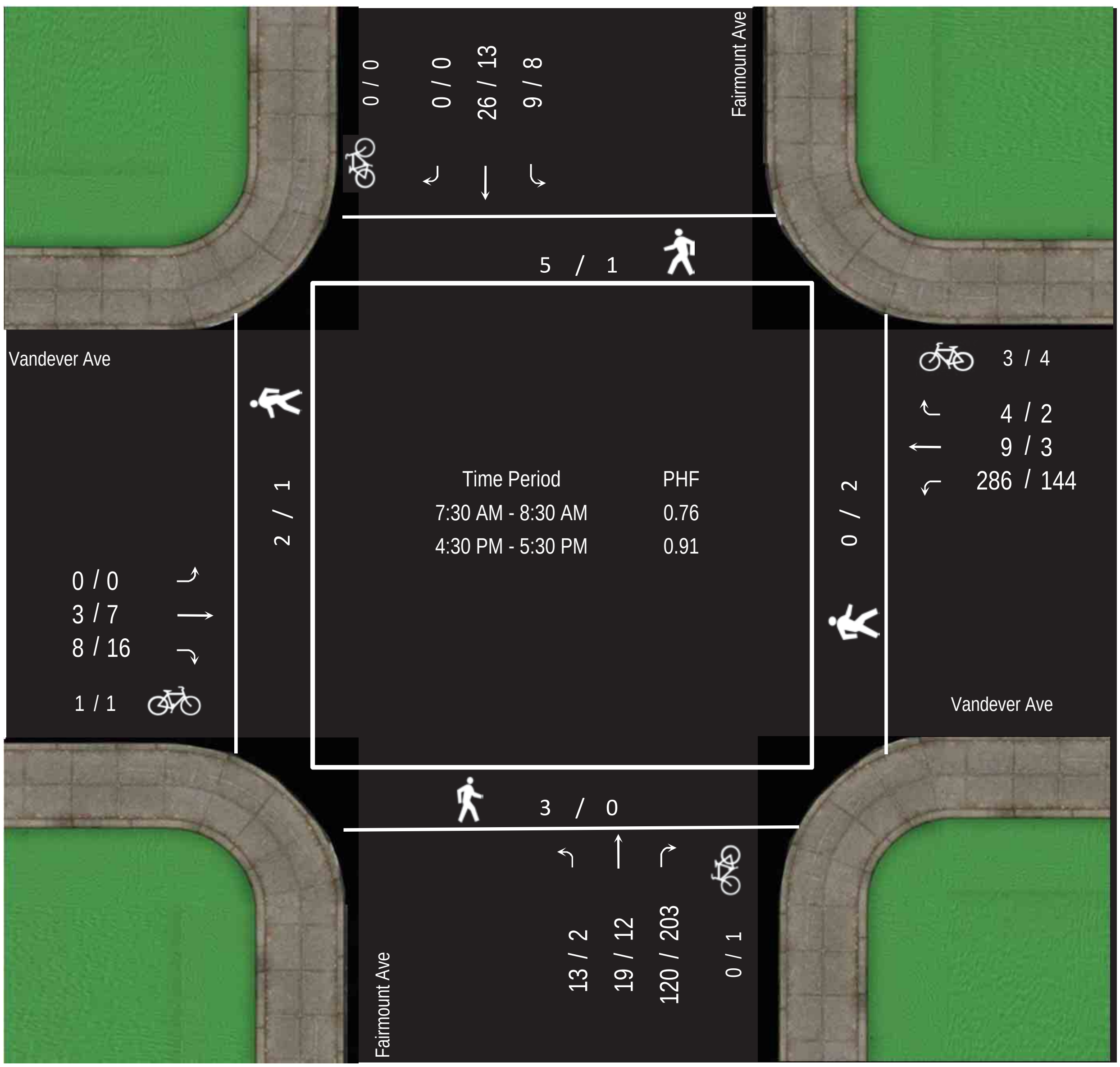
Location: Vandever Ave @ Fairmount Ave

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Vandever Ave @ Fairmount Ave

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	1	3	1	17	0	3	2	3	17	0	2	1	50
7:15 AM	4	2	0	22	3	4	2	7	22	0	2	1	69
7:30 AM	1	2	0	60	3	0	3	7	21	0	1	4	102
7:45 AM	1	5	0	124	3	0	3	1	24	0	1	1	163
8:00 AM	3	9	0	63	2	2	6	7	38	0	1	1	132
8:15 AM	4	10	0	39	1	2	1	4	37	0	0	2	100
8:30 AM	2	3	0	43	1	2	1	2	42	1	1	3	101
8:45 AM	1	3	0	45	1	1	0	0	29	0	2	0	82
Total	17	37	1	413	14	14	18	31	230	1	10	13	799

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.76**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	9	26	0	286	9	4	13	19	120	0	3	8	497
PHF	0.56	0.65	#####	0.58	0.75	0.50	0.54	0.68	0.79	#####	0.75	0.50	0.76
Movement PHF		0.63			0.59			0.75			0.55		0.76

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	2	4	0	32	0	0	0	0	37	0	3	3	81
4:15 PM	3	1	0	31	0	2	1	2	38	0	1	4	83
4:30 PM	2	5	0	34	1	0	0	5	56	0	2	5	110
4:45 PM	3	6	0	28	1	0	0	4	48	0	4	4	98
5:00 PM	1	1	0	50	0	1	2	0	52	0	1	5	113
5:15 PM	2	1	0	32	1	1	0	3	47	0	0	2	89
5:30 PM	2	2	0	36	0	2	0	0	34	0	0	0	76
5:45 PM	2	2	0	25	0	0	0	2	29	0	0	2	62
Total	17	22	0	268	3	6	3	16	341	0	11	25	712

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.91**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	8	13	0	144	3	2	2	12	203	0	7	16	410
PHF	0.67	0.542	#####	0.72	0.75	0.5	0.25	0.6	0.906	#####	0.438	0.8	0.91
Movement PHF		0.58			0.73			0.89			0.72		0.91

Turn Count Summary

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

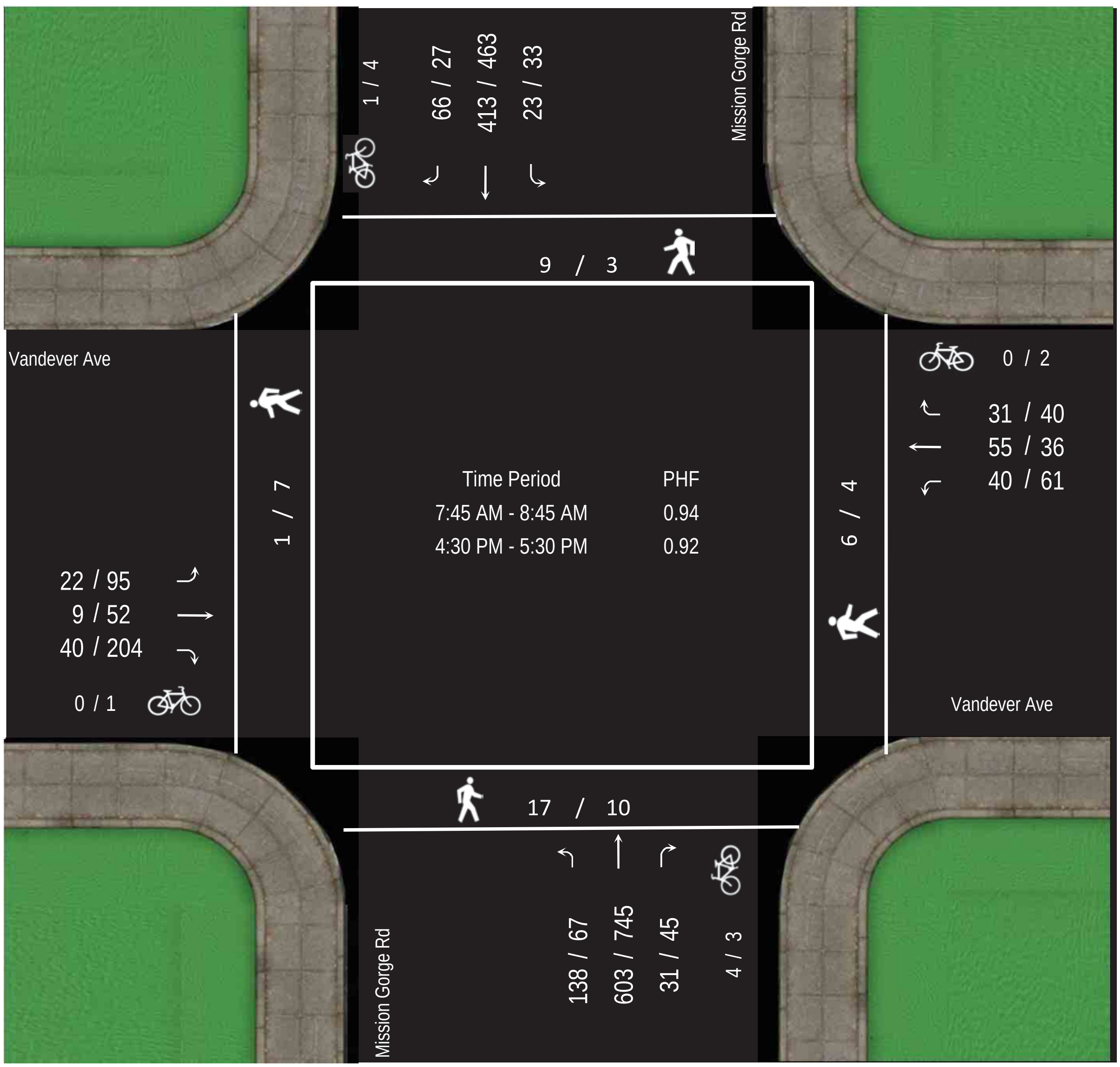
Location: Vandever Ave @ Mission Gorge Rd

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Vandever Ave @ Mission Gorge Rd

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	75	13	4	6	6	5	115	1	4	3	7	239
7:15 AM	4	101	7	4	5	7	12	152	5	3	2	16	318
7:30 AM	1	63	10	2	2	2	13	55	2	2	2	1	155
7:45 AM	6	134	30	9	15	4	23	134	10	3	5	10	383
8:00 AM	7	93	18	12	14	13	30	158	8	5	0	14	372
8:15 AM	6	107	8	9	16	7	44	171	8	6	1	7	390
8:30 AM	4	79	10	10	10	7	41	140	5	8	3	9	326
8:45 AM	4	90	8	10	13	2	38	139	6	10	2	19	341
Total	32	742	104	60	81	48	206	1,064	45	41	18	83	2,524

AM Intersection Peak Hour : **7:45 AM - 8:45 AM** Intersection PHF : **0.94**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	23	413	66	40	55	31	138	603	31	22	9	40	1,471
PHF	0.82	0.77	0.55	0.83	0.86	0.60	0.78	0.88	0.78	0.69	0.45	0.71	0.94
Movement PHF		0.74			0.81			0.87			0.89		0.94

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	9	112	6	12	7	11	36	156	8	20	12	39	428
4:15 PM	9	140	8	7	6	14	15	157	3	26	10	39	434
4:30 PM	8	107	4	16	7	11	13	198	17	32	9	54	476
4:45 PM	3	128	9	25	10	9	13	168	9	17	11	47	449
5:00 PM	12	140	5	10	7	11	22	198	5	20	19	57	506
5:15 PM	10	88	9	10	12	9	19	181	14	26	13	46	437
5:30 PM	9	128	6	13	5	11	12	163	18	17	10	38	430
5:45 PM	9	117	10	13	4	6	16	135	10	12	7	20	359
Total	69	960	57	106	58	82	146	1,356	84	170	91	340	3,519

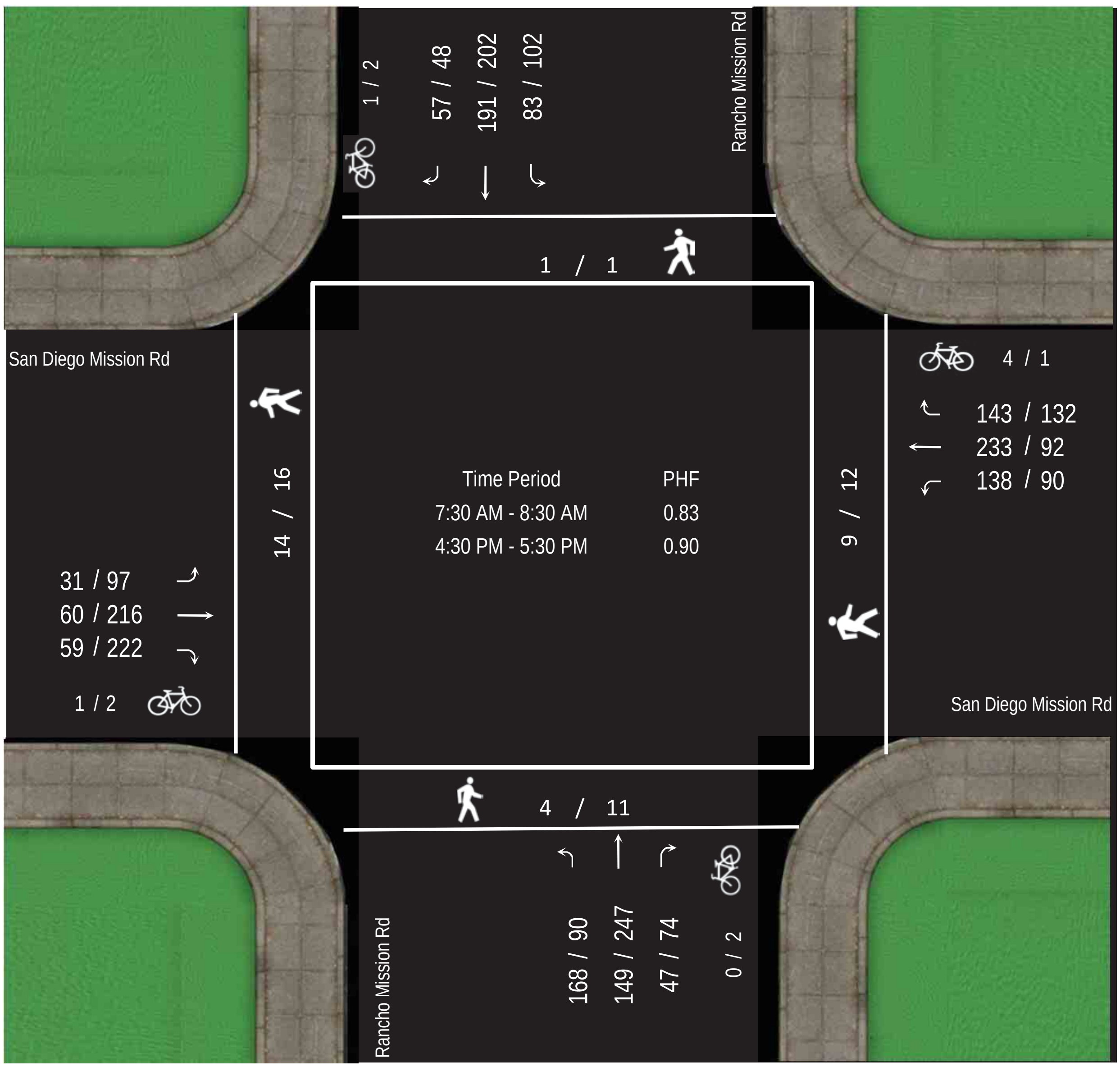
PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	33	463	27	61	36	40	67	745	45	95	52	204	1868
PHF	0.69	0.827	0.75	0.61	0.75	0.909	0.761	0.941	0.662	0.742	0.684	0.895	0.92
Movement PHF		0.83			0.78			0.94			0.91		0.92

Turn Count Summary

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

Location:	San Diego Mission Rd	@	Rancho Mission Rd
Date of Count:	*Tuesday, October 08, 2013*		
Analysts:	*LV/CD*		
Weather:	*Sunny*		
AVC Proj No:	*13-0106*		



Vehicular Count

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

Location: San Diego Mission Rd @ Rancho Mission Rd

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	17	28	4	9	19	25	31	33	15	7	12	14	214
7:15 AM	19	39	11	15	24	34	49	46	8	13	14	10	282
7:30 AM	19	38	9	36	62	30	37	43	13	10	10	16	323
7:45 AM	26	62	12	39	80	36	53	51	11	6	17	18	411
8:00 AM	24	48	18	43	51	33	41	23	10	6	17	11	325
8:15 AM	14	43	18	20	40	44	37	32	13	9	16	14	300
8:30 AM	18	39	20	23	30	25	30	35	12	7	21	15	275
8:45 AM	17	30	14	12	25	22	23	22	5	7	18	16	211
Total	154	327	106	197	331	249	301	285	87	65	125	114	2,341

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.83**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	83	191	57	138	233	143	168	149	47	31	60	59	1,359
PHF	0.80	0.77	0.79	0.80	0.73	0.81	0.79	0.73	0.90	0.78	0.88	0.82	0.83
Movement PHF		0.83			0.83			0.79			0.91		0.83

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	21	44	15	16	36	31	28	42	5	18	32	43	331
4:15 PM	17	50	17	11	17	25	16	37	8	13	29	30	270
4:30 PM	24	38	12	28	26	36	16	62	13	22	41	55	373
4:45 PM	33	51	12	19	20	28	26	46	18	21	47	49	370
5:00 PM	26	56	6	25	23	47	24	67	17	24	57	49	421
5:15 PM	19	57	18	18	23	21	24	72	26	30	71	69	448
5:30 PM	27	47	13	14	11	24	23	45	17	26	62	60	369
5:45 PM	26	33	14	17	23	21	10	51	22	21	48	41	327
Total	193	376	107	148	179	233	167	422	126	175	387	396	2,909

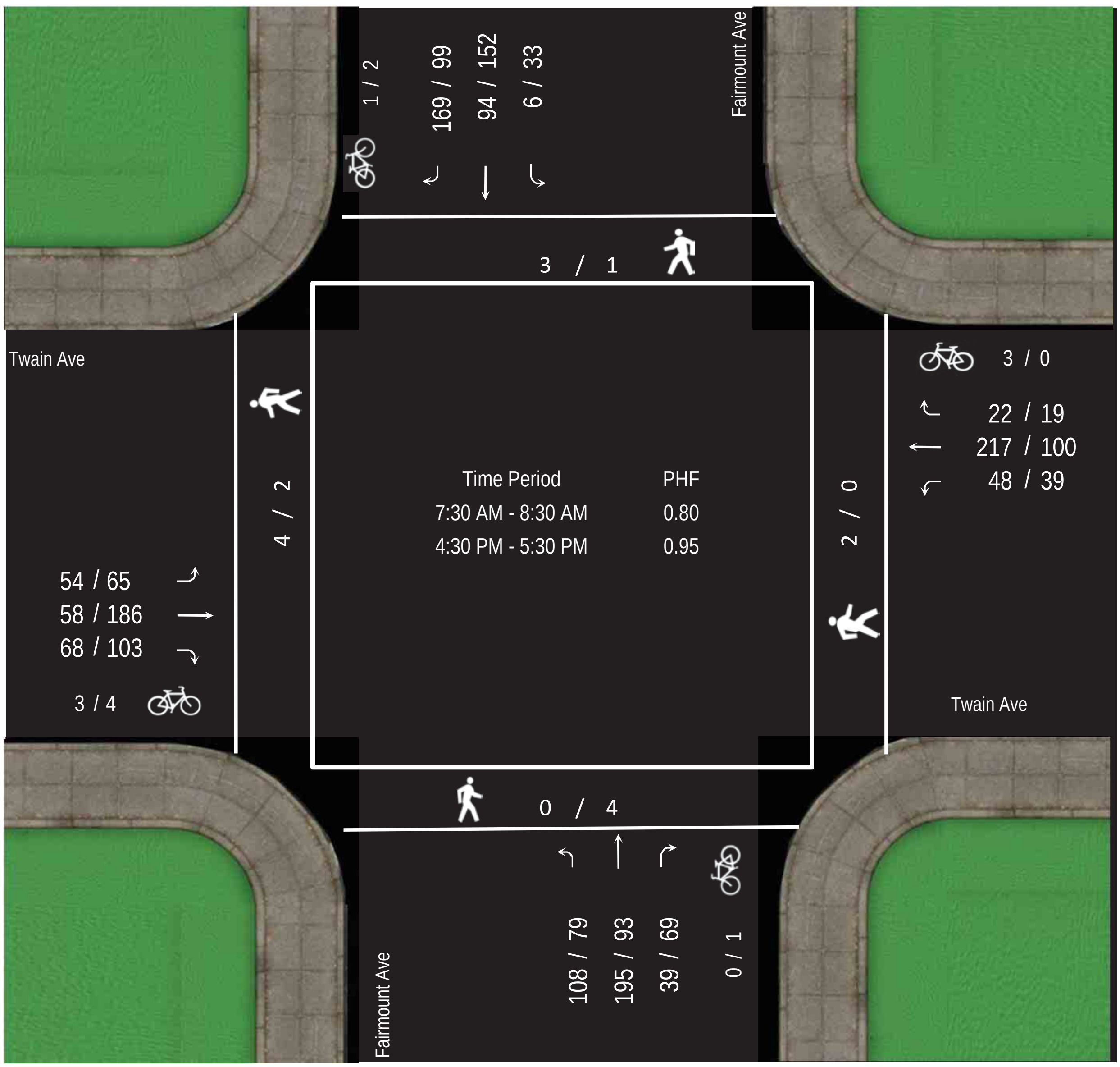
PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.90**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	102	202	48	90	92	132	90	247	74	97	216	222	1612
PHF	0.77	0.886	0.667	0.804	0.885	0.702	0.865	0.858	0.712	0.808	0.761	0.804	0.90
Movement PHF		0.92			0.83			0.84			0.79		0.90

Turn Count Summary

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

Location:	Twain Ave	@	Fairmount Ave
Date of Count:	*Tuesday, October 08, 2013*		
Analysts:	*LV/CD*		
Weather:	*Sunny*		
AVC Proj No:	*13-0106*		



Vehicular Count

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

Location: Twain Ave @ Fairmount Ave

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	2	11	7	5	15	4	19	22	7	11	14	12	129
7:15 AM	1	10	10	7	29	6	13	19	8	7	20	13	143
7:30 AM	0	15	36	9	63	1	33	30	4	12	17	11	231
7:45 AM	1	22	81	10	71	10	27	42	11	16	19	26	336
8:00 AM	2	36	32	13	44	6	21	70	12	13	15	19	283
8:15 AM	3	21	20	16	39	5	27	53	12	13	7	12	228
8:30 AM	0	22	23	13	25	8	23	44	9	10	19	12	208
8:45 AM	3	30	13	7	14	5	26	32	12	17	15	12	186
Total	12	167	222	80	300	45	189	312	75	99	126	117	1,744

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.80**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	6	94	169	48	217	22	108	195	39	54	58	68	1,078
PHF	0.50	0.65	0.52	0.75	0.76	0.55	0.82	0.70	0.81	0.84	0.76	0.65	0.80
Movement PHF		0.65			0.79			0.83			0.74		0.80

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	5	37	25	14	22	5	31	17	17	5	25	33	236
4:15 PM	2	32	20	5	21	5	14	20	15	7	28	10	179
4:30 PM	8	40	27	8	27	5	21	25	22	17	35	24	259
4:45 PM	8	32	18	11	28	5	17	26	21	15	48	24	253
5:00 PM	13	51	36	10	23	6	25	18	10	16	40	26	274
5:15 PM	4	29	18	10	22	3	16	24	16	17	63	29	251
5:30 PM	3	29	22	7	19	4	14	17	15	6	50	29	215
5:45 PM	2	23	18	4	17	1	18	15	9	12	47	22	188
Total	45	273	184	69	179	34	156	162	125	95	336	197	1,855

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.95**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	33	152	99	39	100	19	79	93	69	65	186	103	1037
PHF	0.63	0.745	0.688	0.886	0.893	0.792	0.79	0.894	0.784	0.956	0.738	0.888	0.95
Movement PHF		0.71			0.90			0.89			0.81		0.95

Turn Count Summary

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

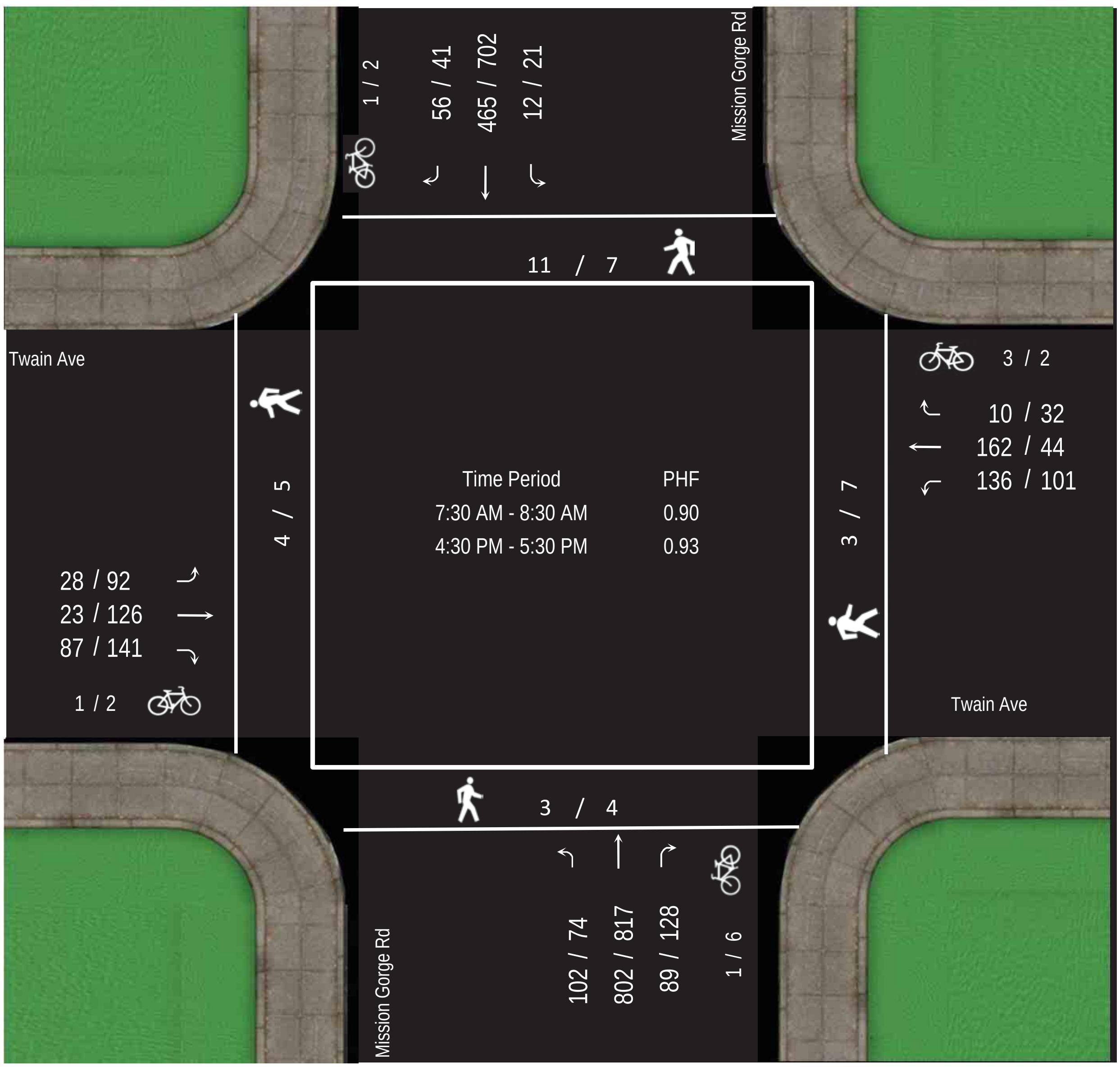
Location: Twain Ave @ Mission Gorge Rd

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



Vehicular Count

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

Location: Twain Ave @ Mission Gorge Rd

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	71	5	25	16	4	16	140	12	3	1	13	306
7:15 AM	0	107	5	30	21	7	15	171	17	9	3	9	394
7:30 AM	0	113	11	43	44	2	16	149	18	6	5	15	422
7:45 AM	4	131	20	41	55	1	32	200	29	7	7	19	546
8:00 AM	6	108	12	29	46	4	25	211	27	9	7	24	508
8:15 AM	2	113	13	23	17	3	29	242	15	6	4	29	496
8:30 AM	0	88	9	28	25	4	34	173	14	11	9	27	422
8:45 AM	1	97	12	22	22	2	22	205	9	9	8	20	429
Total	13	828	87	241	246	27	189	1,491	141	60	44	156	3,523

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.90**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	12	465	56	136	162	10	102	802	89	28	23	87	1,972
PHF	0.50	0.89	0.70	0.79	0.74	0.63	0.80	0.83	0.77	0.78	0.82	0.75	0.90
Movement PHF		0.86			0.79			0.87			0.86		0.90

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	5	188	13	16	9	7	18	178	20	18	29	19	520
4:15 PM	5	152	11	20	14	5	15	157	15	20	20	20	454
4:30 PM	6	168	13	34	7	10	20	216	25	25	29	29	582
4:45 PM	5	189	13	20	15	6	15	180	25	19	30	35	552
5:00 PM	4	198	8	25	11	4	25	214	41	20	30	43	623
5:15 PM	6	147	7	22	11	12	14	207	37	28	37	34	562
5:30 PM	4	164	12	16	11	6	18	163	31	26	22	20	493
5:45 PM	5	137	6	19	10	3	9	142	25	23	23	26	428
Total	40	1343	83	172	88	53	134	1,457	219	179	220	226	4,214

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	21	702	41	101	44	32	74	817	128	92	126	141	2319
PHF	0.88	0.886	0.788	0.743	0.733	0.667	0.74	0.946	0.78	0.821	0.851	0.82	0.93
Movement PHF		0.91			0.87			0.91			0.91		0.93

Turn Count Summary

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

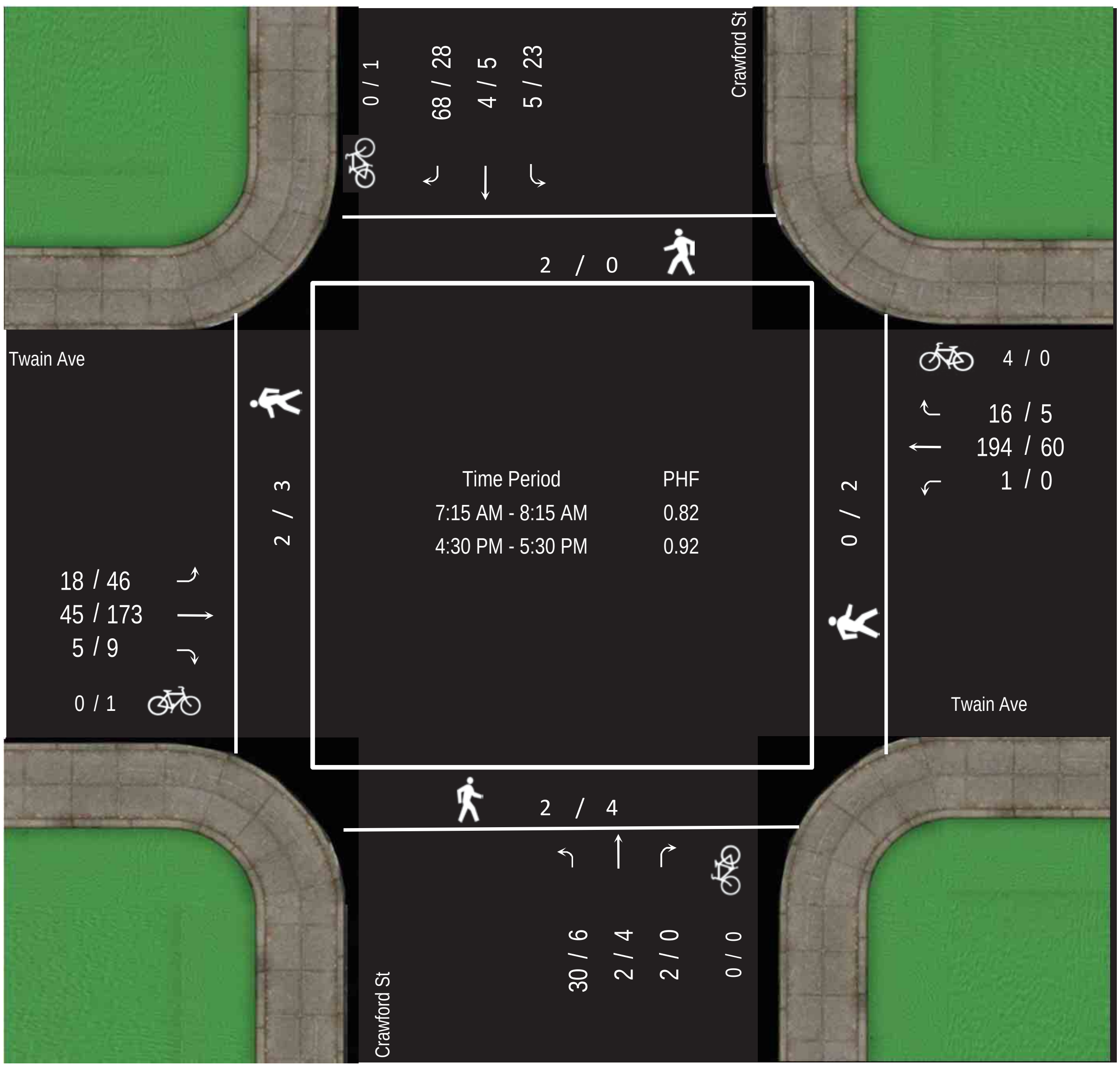
Location: Twain Ave @ Crawford St

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

Location: Twain Ave @ Crawford St

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	1	0	8	0	34	1	3	1	0	2	10	1	61
7:15 AM	1	0	13	1	29	4	7	1	0	5	13	4	78
7:30 AM	0	2	25	0	60	3	10	0	1	3	15	0	119
7:45 AM	1	1	20	0	68	5	7	1	1	2	7	1	114
8:00 AM	3	1	10	0	37	4	6	0	0	8	10	0	79
8:15 AM	2	0	8	0	26	2	5	0	1	4	5	1	54
8:30 AM	3	0	8	0	23	4	5	1	1	2	7	1	55
8:45 AM	0	1	6	0	26	0	5	0	0	6	15	2	61
Total	11	5	98	1	303	23	48	4	4	32	82	10	621

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

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	5	4	68	1	194	16	30	2	2	18	45	5	390
PHF	0.42	0.50	0.68	0.25	0.71	0.80	0.75	0.50	0.50	0.56	0.75	0.31	0.82
Movement PHF		0.71			0.72			0.77			0.77		0.82

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	3	1	14	0	6	4	3	1	1	14	31	5	83
4:15 PM	4	1	7	0	15	1	1	0	0	3	23	6	61
4:30 PM	4	0	7	0	14	1	2	0	0	13	41	1	83
4:45 PM	7	0	6	0	19	2	2	2	0	9	48	3	98
5:00 PM	9	1	7	0	15	1	2	2	0	10	37	1	85
5:15 PM	3	4	8	0	12	1	0	0	0	14	47	4	93
5:30 PM	4	0	8	0	16	2	1	1	1	11	35	3	82
5:45 PM	3	0	10	0	12	0	0	1	0	13	31	4	74
Total	37	7	67	0	109	12	11	7	2	87	293	27	659

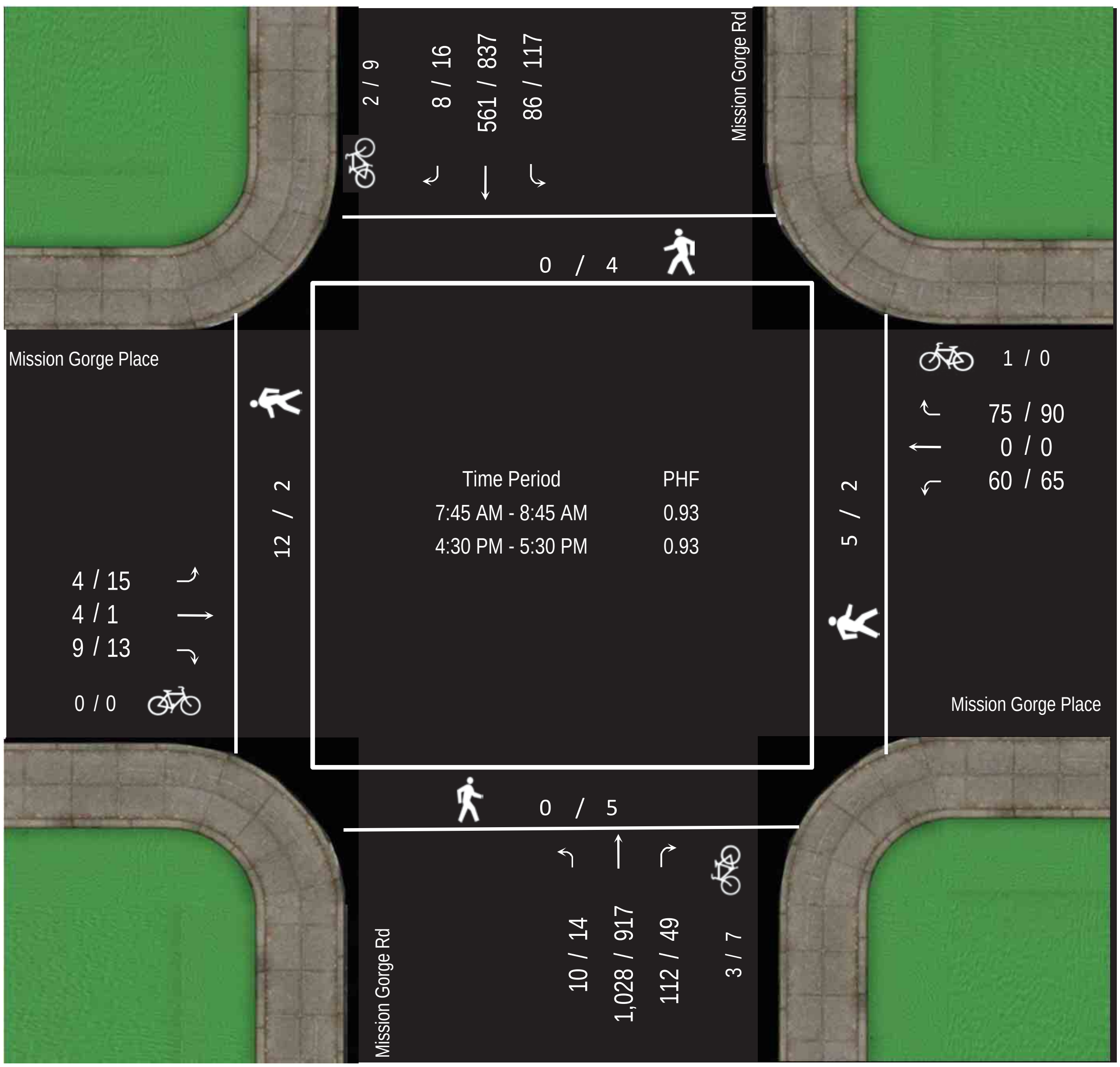
PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	23	5	28	0	60	5	6	4	0	46	173	9	359
PHF	0.64	0.313	0.875	#####	0.789	0.625	0.75	0.5	#####	0.821	0.901	0.563	0.92
Movement PHF		0.82			0.77			0.63			0.88		0.92

Turn Count Summary

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

Location:	Mission Gorge Place	@	Mission Gorge Rd
Date of Count:	*Thursday, October 03, 2013*		
Analysts:	*LV/CD*		
Weather:	*Sunny*		
AVC Proj No:	*13-0106*		



Vehicular Count

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

Location: Mission Gorge Place @ Mission Gorge Rd

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	13	93	0	7	0	5	0	167	15	1	0	1	302
7:15 AM	13	140	0	9	0	5	1	208	22	0	0	3	401
7:30 AM	16	147	4	4	0	8	1	187	17	0	0	1	385
7:45 AM	22	169	1	11	0	24	3	259	34	3	0	2	528
8:00 AM	17	142	2	11	0	16	2	279	20	0	1	2	492
8:15 AM	28	135	1	21	0	12	1	273	33	1	1	2	508
8:30 AM	19	115	4	17	0	23	4	217	25	0	2	3	429
8:45 AM	24	124	6	16	0	19	7	216	33	1	0	2	448
Total	152	1,065	18	96	0	112	19	1,806	199	6	4	16	3,493

AM Intersection Peak Hour : **7:45 AM - 8:45 AM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	86	561	8	60	0	75	10	1,028	112	4	4	9	1,957
PHF	0.77	0.83	0.50	0.71	#####	0.78	0.63	0.92	0.82	0.33	0.50	0.75	0.93
Movement PHF		0.85			0.84			0.94			0.85		0.93

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	31	210	1	15	3	23	4	192	26	0	0	2	507
4:15 PM	26	174	5	8	0	23	7	169	23	1	1	8	445
4:30 PM	26	199	2	23	0	27	3	223	14	4	0	2	523
4:45 PM	27	230	4	17	0	16	2	207	13	1	1	3	521
5:00 PM	40	213	5	21	0	24	5	242	14	5	0	2	571
5:15 PM	24	195	5	4	0	23	4	245	8	5	0	6	519
5:30 PM	21	178	3	14	0	8	7	200	15	3	0	3	452
5:45 PM	22	165	2	17	0	10	4	181	16	3	2	2	424
Total	217	1564	27	119	3	154	36	1,659	129	22	4	28	3,962

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	117	837	16	65	0	90	14	917	49	15	1	13	2134
PHF	0.73	0.91	0.8	0.707	#####	0.833	0.7	0.936	0.875	0.75	0.25	0.542	0.93
Movement PHF		0.93			0.78			0.94			0.66		0.93

Turn Count Summary

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

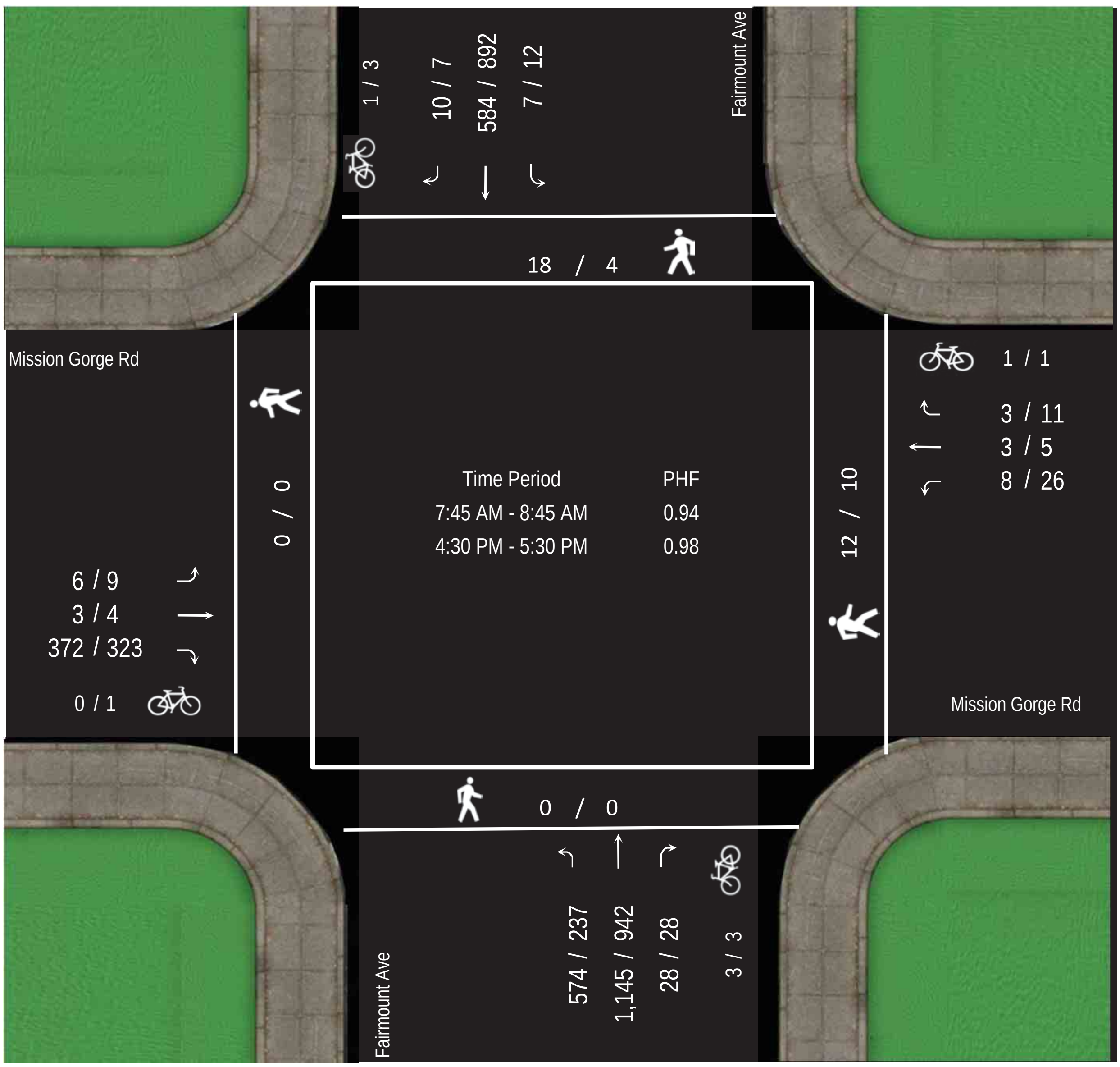
Location: Mission Gorge Rd @ Fairmount Ave

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

AVC

Location: Mission Gorge Rd @ Fairmount Ave

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	25	0	3	0	0	37	189	6	0	0	25	285
7:15 AM	2	146	2	4	0	0	87	223	6	1	0	68	539
7:30 AM	3	151	3	7	0	1	132	218	3	1	0	78	597
7:45 AM	2	162	5	0	1	0	152	304	3	1	0	100	730
8:00 AM	3	136	2	2	1	2	160	296	4	2	0	104	712
8:15 AM	1	145	3	3	0	0	139	310	15	3	2	74	695
8:30 AM	1	141	0	3	1	1	123	235	6	0	1	94	606
8:45 AM	1	130	5	3	0	0	118	270	5	3	0	99	634
Total	13	1,036	20	25	3	4	948	2,045	48	11	3	642	4,798

AM Intersection Peak Hour : **7:45 AM - 8:45 AM** Intersection PHF : **0.94**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	7	584	10	8	3	3	574	1,145	28	6	3	372	2,743
PHF	0.58	0.90	0.50	0.67	0.75	0.38	0.90	0.92	0.47	0.50	0.38	0.89	0.94
Movement PHF		0.89			0.70			0.94			0.90		0.94

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	3	170	0	9	0	0	63	215	6	3	1	71	541
4:15 PM	0	208	0	5	0	2	70	183	4	1	0	94	567
4:30 PM	4	228	4	5	0	1	64	230	4	4	1	81	626
4:45 PM	3	211	1	4	1	5	59	217	10	1	2	88	602
5:00 PM	2	223	1	10	3	0	59	251	6	3	0	78	636
5:15 PM	3	230	1	7	1	5	55	244	8	1	1	76	632
5:30 PM	2	237	3	9	1	2	49	212	8	2	0	76	601
5:45 PM	0	198	7	2	0	2	38	204	5	1	1	63	521
Total	17	1705	17	51	6	17	457	1,756	51	16	6	627	4,726

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.98**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	12	892	7	26	5	11	237	942	28	9	4	323	2496
PHF	0.75	0.97	0.438	0.65	0.417	0.55	0.926	0.938	0.7	0.563	0.5	0.918	0.98
Movement PHF		0.97			0.81			0.95			0.92		0.98

Turn Count Summary

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

Location: Camino Del Rio N. @ Fairmount Ave

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*

LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

Location: Camino Del Rio N. @ Fairmount Ave

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	6	152	34	110	81	80	64	169	27	48	3	65	839
7:15 AM	3	199	38	118	66	68	102	221	46	43	2	78	984
7:30 AM	5	203	55	114	118	82	84	239	41	43	7	68	1,059
7:45 AM	5	216	74	91	112	73	116	320	34	79	3	56	1,179
8:00 AM	3	223	56	110	100	83	103	330	37	51	5	68	1,169
8:15 AM	5	246	44	102	93	66	96	375	58	48	2	80	1,215
8:30 AM	8	207	54	107	82	94	82	250	41	27	3	57	1,012
8:45 AM	2	199	42	73	68	81	68	278	82	28	10	89	1,020
Total	37	1,645	397	825	720	627	715	2,182	366	367	35	561	8,477

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.95**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	18	888	229	417	423	304	399	1,264	170	221	17	272	4,622
PHF	0.90	0.90	0.77	0.91	0.90	0.92	0.86	0.84	0.73	0.70	0.61	0.85	0.95
Movement PHF		0.96			0.91			0.87			0.92		0.95

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

	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	3	287	11	182	30	51	58	205	49	26	26	142	1,070
4:15 PM	5	312	14	155	36	44	47	187	33	22	23	145	1,023
4:30 PM	2	323	13	167	28	65	67	213	43	24	21	143	1,109
4:45 PM	4	303	16	169	35	52	60	207	44	22	24	148	1,084
5:00 PM	0	338	10	157	39	56	66	223	45	44	25	132	1,135
5:15 PM	3	324	9	170	37	50	71	204	45	33	36	158	1,140
5:30 PM	1	308	20	120	31	49	57	183	24	34	21	173	1,021
5:45 PM	6	271	7	112	21	49	47	165	28	29	20	121	876
Total	24	2466	100	1,232	257	416	473	1,587	311	234	196	1,162	8,458

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.98**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	9	1288	48	663	139	223	264	847	177	123	106	581	4468
PHF	0.56	0.953	0.75	0.975	0.891	0.858	0.93	0.95	0.983	0.699	0.736	0.919	0.98
Movement PHF		0.97			0.99			0.96			0.89		0.98

Turn Count Summary

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

Location: Alvarado Cyn Rd @ Mission Gorge Place

Date of Count: *Tuesday, October 08, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*

Vehicular Count

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

Location: Alvarado Cyn Rd @ Mission Gorge Place

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

	Southbound		Westbound		Eastbound		
	Left	Right	Thru	Right	Left	Thru	TOTAL
7:00 AM	4	16	19	13	17	6	75
7:15 AM	7	13	41	19	20	3	103
7:30 AM	3	11	60	25	7	4	110
7:45 AM	9	9	60	49	20	2	149
8:00 AM	9	18	39	37	20	5	128
8:15 AM	11	10	31	30	21	8	111
8:30 AM	12	17	15	20	15	6	85
8:45 AM	12	19	10	23	20	6	90
Total	67	113	275	216	140	40	851

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.84**

	Southbound		Westbound		Eastbound		TOTAL
	Left	Right	Thru	Right	Left	Thru	
Volume	32	48	190	141	68	19	498
PHF	0.73	0.67	0.79	0.72	0.81	0.59	0.84
Movement PHF	0.74		0.76			0.75	0.84

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

	Southbound		Westbound		Eastbound		
	Left	Right	Thru	Right	Left	Thru	TOTAL
4:00 PM	37	26	8	25	23	25	144
4:15 PM	47	25	21	23	30	45	191
4:30 PM	67	55	9	17	25	46	219
4:45 PM	47	27	5	16	23	38	156
5:00 PM	61	44	9	15	15	46	190
5:15 PM	32	28	7	12	15	61	155
5:30 PM	29	29	9	8	14	41	130
5:45 PM	20	24	7	12	21	26	110
Total	340	258	75	128	166	328	1,295

PM Intersection Peak Hour : **4:15 PM - 5:15 PM** Intersection PHF : **0.86**

	Southbound		Westbound		Eastbound		TOTAL
	Left	Right	Thru	Right	Left	Thru	
Volume	222	151	44	71	93	175	756
PHF	0.83	0.686	0.524	0.772	0.775	0.951	0.86
Movement PHF	0.76		0.65			0.89	0.86

Turn Count Summary

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

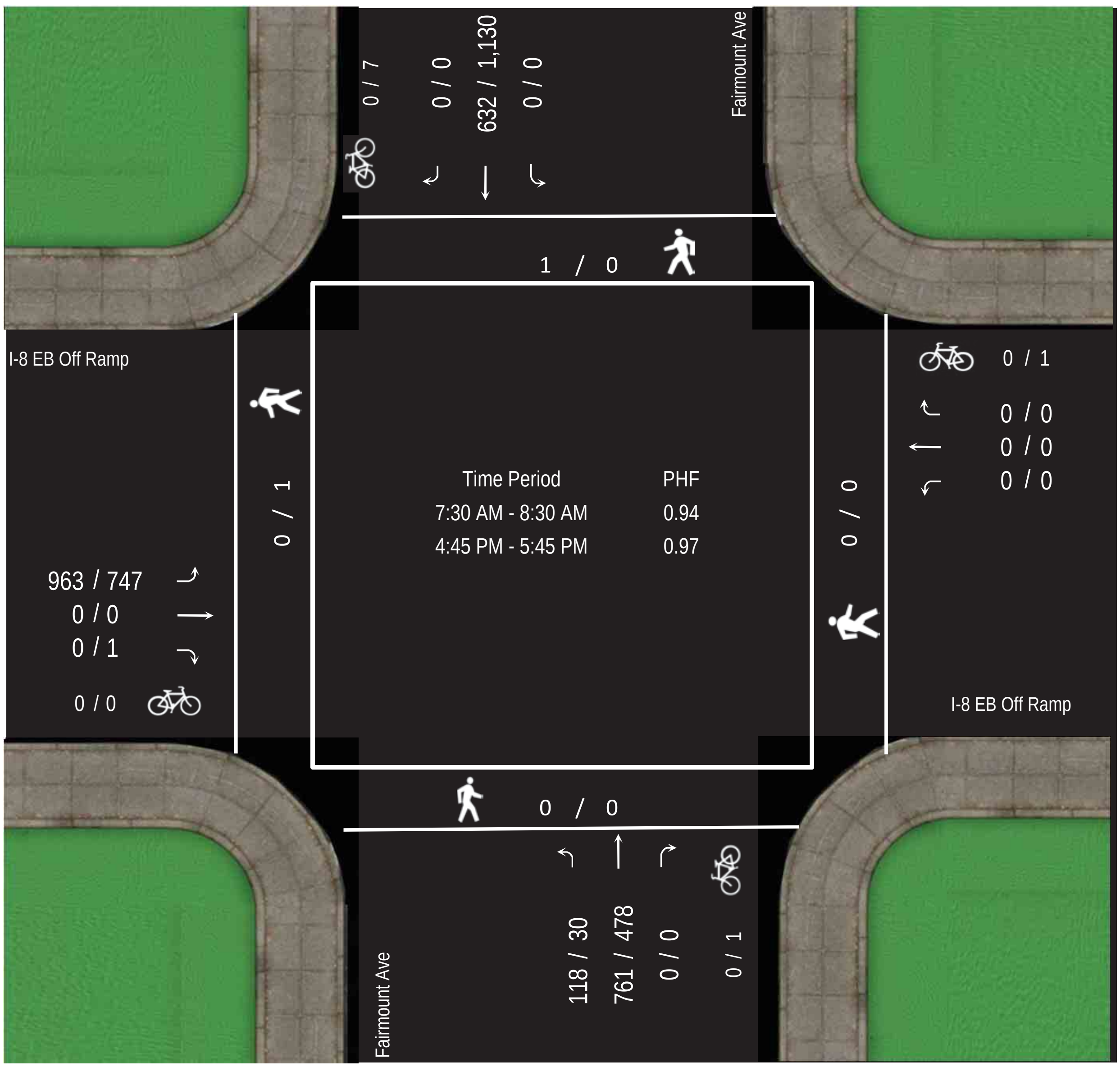
Location: I-8 EB Off Ramp @ Fairmount Ave

Date of Count: *Thursday, October 03, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0106*



LINSCOTT LAW & GREENSPAN engineers

Vehicular Count

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

Location: I-8 EB Off Ramp @ Fairmount Ave

AM Period (7:00 AM - 9:00 AM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	100	0	0	0	0	15	103	0	163	0	0	381
7:15 AM	0	143	0	0	0	0	26	140	0	198	0	0	507
7:30 AM	0	140	0	0	0	0	27	183	0	226	0	0	576
7:45 AM	0	142	0	0	0	0	37	215	0	230	0	0	624
8:00 AM	0	179	0	0	0	0	32	203	0	243	0	0	657
8:15 AM	0	171	0	0	0	0	22	160	0	264	0	0	617
8:30 AM	0	152	0	0	0	0	20	144	0	237	0	0	553
8:45 AM	0	135	0	0	0	0	20	159	0	238	0	0	552
Total	0	1,162	0	0	0	0	199	1,307	0	1,799	0	0	4,467

AM Intersection Peak Hour : **7:30 AM - 8:30 AM** Intersection PHF : **0.94**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	632	0	0	0	0	118	761	0	963	0	0	2,474
PHF	#####	0.88	#####	#####	#####	#####	0.80	0.88	#####	0.91	#####	#####	0.94
Movement PHF		0.88			#DIV/0!			0.87			0.91		0.94

PM Period (4:00 PM - 6:00 PM)	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	246	0	0	0	0	5	112	0	187	0	0	550
4:15 PM	0	297	0	0	0	0	8	113	0	173	0	0	591
4:30 PM	0	227	0	0	0	0	10	111	0	200	0	0	548
4:45 PM	0	279	0	0	0	0	4	121	0	196	0	0	600
5:00 PM	0	270	0	0	0	0	9	131	0	202	0	1	613
5:15 PM	0	295	0	0	0	0	8	137	0	163	0	0	603
5:30 PM	0	286	0	0	0	0	9	89	0	186	0	0	570
5:45 PM	0	235	0	0	0	0	8	89	0	160	0	0	492
Total	0	2135	0	0	0	0	61	903	0	1,467	0	1	4,567

PM Intersection Peak Hour : **4:45 PM - 5:45 PM** Intersection PHF : **0.97**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	1130	0	0	0	0	30	478	0	747	0	1	2386
PHF	#####	0.958	#####	#####	#####	#####	0.833	0.872	#####	0.925	#####	0.25	0.97
Movement PHF		0.96			#DIV/0!			0.88			0.92		0.97

APPENDIX B

CITY OF SAN DIEGO ROADWAY CLASSIFICATION TABLE

TABLE 2
Roadway Classifications, Levels of Service (LOS)
and Average Daily Traffic (ADT)

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Primary Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) continuous left-turn lane)	4 lanes 2 lanes	64/84 50/70	5,000	7,000	 10,000	13,000	15,000
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multifamily)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

<u>LEGEND</u>:

XXX/XXX = Curb to curb width (feet)/right-of-way width (feet): based on the City of San Diego Street Design. Manual

XX/XXX= Approximate recommended ADT based on the City of San Diego Street Design Manual.

<u>NOTES</u>:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

APPENDIX C

EXISTING PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

1: Friars Rd & I-15 SB Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	217	556	260	324	1522	415	0	0	0	764	0	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	7.0	7.0	4.2	7.0	4.6				5.1	5.1	5.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00				0.95	0.95	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	236	604	283	352	1654	451	0	0	0	830	0	609
RTOR Reduction (vph)	0	0	228	0	0	262	0	0	0	0	0	458
Lane Group Flow (vph)	236	604	55	352	1654	189	0	0	0	415	415	151
Turn Type	Prot		Perm	Prot		custom				Split		Perm
Protected Phases	5	2		1	6	7				4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	15.3	21.5	21.5	23.3	29.0	46.1				27.2	27.2	27.2
Effective Green, g (s)	15.3	21.5	21.5	23.3	29.0	46.1				27.2	27.2	27.2
Actuated g/C Ratio	0.14	0.20	0.20	0.21	0.26	0.42				0.25	0.25	0.25
Clearance Time (s)	4.7	7.0	7.0	4.2	7.0	4.6				5.1	5.1	5.1
Vehicle Extension (s)	2.0	2.0	2.0	1.0	2.0	3.0				1.0	1.0	1.0
Lane Grp Cap (vph)	246	994	309	375	1341	730				416	416	689
v/s Ratio Prot	c0.13	0.12		0.20	c0.33	c0.04				c0.25	0.25	
v/s Ratio Perm			0.03			0.08						0.05
v/c Ratio	0.96	0.61	0.18	0.94	1.23	0.26				1.00	1.00	0.22
Uniform Delay, d1	47.0	40.4	36.9	42.6	40.5	20.8				41.4	41.4	32.9
Progression Factor	1.00	1.00	1.00	0.74	0.62	0.11				1.00	1.00	1.00
Incremental Delay, d2	45.2	0.7	0.1	15.0	107.5	0.0				43.5	43.5	0.7
Delay (s)	92.3	41.1	37.0	46.7	132.8	2.4				84.9	84.9	33.7
Level of Service	F	D	D	D	F	A				F	F	C
Approach Delay (s)		50.8			96.5			0.0			63.2	
Approach LOS		D			F			A			E	

Intersection Summary			
HCM Average Control Delay	76.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.4
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2: Friars Rd & I-15 NB On Ramp

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	364	1337	1800	873	0	461
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.7	7.0	7.0		4.5
Lane Util. Factor	1.00	0.91	0.86	0.86		1.00
Frt	1.00	1.00	0.98	0.85		0.86
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	5085	4712	1362		1611
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1770	5085	4712	1362		1611
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	387	1422	1915	929	0	490
RTOR Reduction (vph)	0	0	16	256	0	303
Lane Group Flow (vph)	387	1422	2187	385	0	187
Turn Type	Prot			Perm		custom
Protected Phases	5	2	6			
Permitted Phases				6		4
Actuated Green, G (s)	24.9	85.1	53.4	53.4		14.7
Effective Green, g (s)	24.9	85.1	53.4	53.4		14.7
Actuated g/C Ratio	0.23	0.77	0.49	0.49		0.13
Clearance Time (s)	5.5	5.7	7.0	7.0		4.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0		3.0
Lane Grp Cap (vph)	401	3934	2287	661		215
v/s Ratio Prot	c0.22	0.28	c0.46			
v/s Ratio Perm				0.28		c0.12
v/c Ratio	0.97	0.36	0.96	0.58		0.87
Uniform Delay, d1	42.1	3.9	27.2	20.3		46.7
Progression Factor	1.23	0.16	0.47	0.53		1.00
Incremental Delay, d2	29.7	0.2	7.7	2.3		28.9
Delay (s)	81.7	0.8	20.6	13.0		75.6
Level of Service	F	A	C	B		E
Approach Delay (s)		18.1	18.9		75.6	
Approach LOS		B	B		E	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	676	95	76	2051	21	128	32	12	15	72	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.96		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5078		1770	1787		1770	1708	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.59	1.00		0.73	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5078		1096	1787		1352	1708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	735	103	83	2229	23	139	35	13	16	78	97
RTOR Reduction (vph)	0	0	55	0	1	0	0	9	0	0	41	0
Lane Group Flow (vph)	92	735	48	83	2251	0	139	39	0	16	134	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	7.5	51.7	51.7	8.2	52.2		35.1	35.1		35.1	35.1	
Effective Green, g (s)	7.5	51.7	51.7	8.2	52.2		35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.07	0.47	0.47	0.07	0.47		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	121	2390	744	132	2410		350	570		431	545	
v/s Ratio Prot	c0.05	0.14		0.05	c0.44			0.02			0.08	
v/s Ratio Perm			0.03				c0.13			0.01		
v/c Ratio	0.76	0.31	0.07	0.63	0.93		0.40	0.07		0.04	0.25	
Uniform Delay, d1	50.4	18.1	15.9	49.4	27.3		29.2	26.1		25.8	27.7	
Progression Factor	0.73	1.26	2.63	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.0	0.3	0.2	6.6	7.5		3.3	0.2		0.0	0.1	
Delay (s)	57.9	23.1	42.1	56.0	34.8		32.5	26.3		25.8	27.8	
Level of Service	E	C	D	E	C		C	C		C	C	
Approach Delay (s)		28.6			35.5			30.9			27.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	478	181	278	1976	196	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	4.4	5.8	4.4	4.4
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	2787
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	514	195	299	2125	211	139
RTOR Reduction (vph)	0	94	0	0	0	84
Lane Group Flow (vph)	514	101	299	2125	211	55
Turn Type		Perm	Prot			pt+ov
Protected Phases	2		1	6	3	3 1
Permitted Phases		2				
Actuated Green, G (s)	62.2	62.2	24.6	91.2	18.6	47.6
Effective Green, g (s)	62.2	62.2	24.6	91.2	18.6	47.6
Actuated g/C Ratio	0.52	0.52	0.21	0.76	0.16	0.40
Clearance Time (s)	5.8	5.8	4.4	5.8	4.4	
Vehicle Extension (s)	3.3	3.3	2.0	3.3	2.0	
Lane Grp Cap (vph)	2636	821	704	3865	274	1106
v/s Ratio Prot	0.10		0.09	c0.42	c0.12	0.02
v/s Ratio Perm		0.06				
v/c Ratio	0.19	0.12	0.42	0.55	0.77	0.05
Uniform Delay, d1	15.5	14.9	41.5	5.9	48.6	22.3
Progression Factor	1.00	1.00	0.37	2.62	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.0	0.1	11.5	0.0
Delay (s)	15.7	15.2	15.5	15.6	60.1	22.3
Level of Service	B	B	B	B	E	C
Approach Delay (s)	15.5			15.6	45.1	
Approach LOS	B			B	D	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Zion Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	28	17	576	56	30	51	400	207	81	1881	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.94		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1755		1681	1683		1770	5085	1583	1770	5049	
Flt Permitted	0.95	1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1755		1681	1683		1770	5085	1583	1770	5049	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	15	32	20	662	64	34	59	460	238	93	2162	108
RTOR Reduction (vph)	0	19	0	0	3	0	0	0	69	0	5	0
Lane Group Flow (vph)	15	33	0	377	380	0	59	460	169	93	2265	0
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases									2			
Actuated Green, G (s)	6.0	6.0		43.5	43.5		25.6	41.5	85.0	9.3	24.7	
Effective Green, g (s)	6.0	6.0		43.5	43.5		25.6	41.5	85.0	9.3	24.7	
Actuated g/C Ratio	0.05	0.05		0.36	0.36		0.21	0.35	0.71	0.08	0.21	
Clearance Time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	89	88		609	610		378	1759	1121	137	1039	
v/s Ratio Prot	0.01	c0.02		0.22	c0.23		0.03	c0.09	0.05	c0.05	c0.45	
v/s Ratio Perm									0.05			
v/c Ratio	0.17	0.38		0.62	0.62		0.16	0.26	0.15	0.68	2.18	
Uniform Delay, d1	54.6	55.2		31.4	31.5		38.4	28.2	5.7	53.9	47.6	
Progression Factor	1.00	1.00		1.00	1.00		0.74	0.63	8.97	1.00	1.00	
Incremental Delay, d2	0.3	1.0		4.7	4.8		0.9	0.4	0.3	10.0	534.3	
Delay (s)	54.9	56.2		36.1	36.3		29.1	18.2	51.5	63.9	581.9	
Level of Service	D	E		D	D		C	B	D	E	F	
Approach Delay (s)		55.9			36.2			29.5			561.5	
Approach LOS		E			D			C			F	

Intersection Summary			
HCM Average Control Delay	349.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.6
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Mission Gorge Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	248	51	128	2040	12	222	13	58	13	6	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00			1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88			0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1770	4955		1770	3539	1583	3433	1635			1715	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (perm)	1770	4955		1770	3539	1583	3433	1635			1715	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	16	282	58	145	2318	14	252	15	66	15	7	19
RTOR Reduction (vph)	0	16	0	0	0	2	0	58	0	0	18	0
Lane Group Flow (vph)	16	324	0	145	2318	12	252	23	0	0	23	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						
Actuated Green, G (s)	1.5	62.4		13.5	73.2	73.2	14.9	14.9			6.2	
Effective Green, g (s)	1.5	62.4		13.5	73.2	73.2	14.9	14.9			6.2	
Actuated g/C Ratio	0.01	0.53		0.11	0.62	0.62	0.13	0.13			0.05	
Clearance Time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Vehicle Extension (s)	2.0	5.3		2.0	5.3	5.3	2.0	2.0			2.0	
Lane Grp Cap (vph)	23	2634		204	2207	987	436	208			91	
v/s Ratio Prot	0.01	0.07		c0.08	c0.65		c0.07	0.01			c0.01	
v/s Ratio Perm						0.01						
v/c Ratio	0.70	0.12		0.71	1.05	0.01	0.58	0.11			0.25	
Uniform Delay, d1	57.7	13.8		50.1	22.1	8.4	48.3	45.4			53.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	54.1	0.0		9.3	34.0	0.0	1.2	0.1			0.5	
Delay (s)	111.8	13.8		59.4	56.1	8.4	49.4	45.5			53.9	
Level of Service	F	B		E	E	A	D	D			D	
Approach Delay (s)		18.2			56.0			48.5			53.9	
Approach LOS		B			E			D			D	

Intersection Summary			
HCM Average Control Delay	51.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	117.4	Sum of lost time (s)	21.6
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	162	167	80	1114	1	775	0	65	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.85			1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)	1770	4698		1770	5085		3433	1583			1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1770	4698		1770	5085		3433	1583			1770	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	46	186	192	92	1280	1	891	0	75	1	0	0
RTOR Reduction (vph)	0	129	0	0	0	0	0	50	0	0	0	0
Lane Group Flow (vph)	46	249	0	92	1281	0	891	25	0	0	1	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	3.1	29.1		4.3	29.5		29.6	29.6			4.2	
Effective Green, g (s)	3.1	29.1		4.3	29.5		29.6	29.6			4.2	
Actuated g/C Ratio	0.03	0.33		0.05	0.33		0.33	0.33			0.05	
Clearance Time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Vehicle Extension (s)	2.0	5.2		2.0	4.9		2.0	2.0			2.0	
Lane Grp Cap (vph)	62	1541		86	1691		1146	528			84	
v/s Ratio Prot	0.03	0.05		c0.05	c0.25		c0.26	0.02			c0.00	
v/s Ratio Perm												
v/c Ratio	0.74	0.16		1.07	0.76		0.78	0.05			0.01	
Uniform Delay, d1	42.4	21.1		42.2	26.4		26.6	20.0			40.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	33.7	0.1		117.3	2.4		3.1	0.0			0.0	
Delay (s)	76.1	21.3		159.5	28.8		29.7	20.0			40.3	
Level of Service	E	C		F	C		C	C			D	
Approach Delay (s)		27.2			37.5			28.9			40.3	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	15.6
Intersection Capacity Utilization	61.5%	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												
Volume (vph)	77	437	5	15	1128	241	6	13	6	205	7	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.97		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3533		1770	3446			1781		1770	1593	
Flt Permitted	0.95	1.00		0.95	1.00			0.92		0.74	1.00	
Satd. Flow (perm)	1770	3533		1770	3446			1664		1375	1593	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	90	508	6	17	1312	280	7	15	7	238	8	213
RTOR Reduction (vph)	0	1	0	0	17	0	0	5	0	0	95	0
Lane Group Flow (vph)	90	513	0	17	1575	0	0	24	0	238	126	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.7	49.3		0.7	44.2			18.2		18.1	18.1	
Effective Green, g (s)	5.7	49.3		0.7	44.2			18.2		18.1	18.1	
Actuated g/C Ratio	0.07	0.59		0.01	0.53			0.22		0.22	0.22	
Clearance Time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4			2.0		2.0	2.0	
Lane Grp Cap (vph)	122	2099		15	1835			365		300	347	
v/s Ratio Prot	c0.05	0.15		0.01	c0.46						0.08	
v/s Ratio Perm								0.01		c0.17		
v/c Ratio	0.74	0.24		1.13	0.86			0.06		0.79	0.36	
Uniform Delay, d1	37.9	8.0		41.1	16.7			25.7		30.7	27.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	18.0	0.1		279.2	4.3			0.0		12.6	0.2	
Delay (s)	55.9	8.1		320.3	21.0			25.7		43.3	27.8	
Level of Service	E	A		F	C			C		D	C	
Approach Delay (s)		15.2			24.2			25.7			35.8	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: Zion Ave & Waring Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	27	208	58	42	16	182	385	22	44	947	446
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1711	1583		1784		1770	3510		1770	3369	
Flt Permitted	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1711	1583		1784		1770	3510		1770	3369	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	29	226	63	46	17	198	418	24	48	1029	485
RTOR Reduction (vph)	0	0	200	0	4	0	0	2	0	0	31	0
Lane Group Flow (vph)	91	93	26	0	122	0	198	440	0	48	1483	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	12.6	12.6	12.6		13.8		12.9	59.3		6.0	51.7	
Effective Green, g (s)	12.6	12.6	12.6		13.8		12.9	59.3		6.0	51.7	
Actuated g/C Ratio	0.11	0.11	0.11		0.12		0.12	0.54		0.05	0.47	
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	
Lane Grp Cap (vph)	191	195	180		222		206	1879		96	1572	
v/s Ratio Prot	0.05	c0.05			c0.07		c0.11	0.13		0.03	c0.44	
v/s Ratio Perm			0.02									
v/c Ratio	0.48	0.48	0.14		0.55		0.96	0.23		0.50	0.94	
Uniform Delay, d1	46.0	46.0	44.2		45.6		48.7	13.7		50.9	28.1	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.7	0.1		1.5		51.1	0.3		1.5	12.7	
Delay (s)	46.7	46.7	44.4		47.1		99.8	14.0		52.4	40.8	
Level of Service	D	D	D		D		F	B		D	D	
Approach Delay (s)		45.4			47.1			40.5			41.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	19.8
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
10: Vandever Ave & Fairmount Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	3	8	286	9	4	13	19	120	9	26	0
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	0	4	11	376	12	5	17	25	158	12	34	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	393	200	46
Volume Left (vph)	0	376	17	12
Volume Right (vph)	11	5	158	0
Hadj (s)	-0.40	0.22	-0.42	0.09
Departure Headway (s)	4.6	4.7	4.6	5.3
Degree Utilization, x	0.02	0.52	0.25	0.07
Capacity (veh/h)	704	731	731	615
Control Delay (s)	7.7	12.7	9.1	8.7
Approach Delay (s)	7.7	12.7	9.1	8.7
Approach LOS	A	B	A	A

Intersection Summary			
Delay	11.2		
HCM Level of Service	B		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	9	40	40	55	31	138	603	31	23	413	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.97		1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695			1773		1770	3513		1770	3466	
Flt Permitted		0.87			0.89		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1493			1601		1770	3513		1770	3466	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	23	10	43	43	59	33	147	641	33	24	439	70
RTOR Reduction (vph)	0	37	0	0	12	0	0	2	0	0	6	0
Lane Group Flow (vph)	0	39	0	0	123	0	147	672	0	24	503	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		16.4			16.4		14.0	82.8		4.2	72.8	
Effective Green, g (s)		16.4			16.4		14.0	82.8		4.2	72.8	
Actuated g/C Ratio		0.14			0.14		0.12	0.71		0.04	0.63	
Clearance Time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Vehicle Extension (s)		2.0			2.0		2.0	3.1		2.0	3.2	
Lane Grp Cap (vph)		211			226		214	2508		64	2175	
v/s Ratio Prot							c0.08	c0.19		0.01	0.15	
v/s Ratio Perm		0.03			c0.08							
v/c Ratio		0.19			0.54		0.69	0.27		0.38	0.23	
Uniform Delay, d1		43.9			46.3		48.9	5.9		54.6	9.4	
Progression Factor		1.00			1.00		1.39	0.31		1.00	1.00	
Incremental Delay, d2		0.2			1.4		6.5	0.2		1.3	0.2	
Delay (s)		44.1			47.8		74.3	2.1		56.0	9.7	
Level of Service		D			D		E	A		E	A	
Approach Delay (s)		44.1			47.8			15.0			11.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	60	59	138	233	143	168	149	47	83	191	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3276		1770	3338		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3276		1770	3338		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	37	72	71	166	281	172	202	180	57	100	230	69
RTOR Reduction (vph)	0	57	0	0	113	0	0	0	42	0	0	54
Lane Group Flow (vph)	37	86	0	166	340	0	202	180	15	100	230	15
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	2.0	11.0		7.6	16.8		7.6	15.1	15.1	5.4	12.7	12.7
Effective Green, g (s)	2.0	11.0		7.6	16.8		7.6	15.1	15.1	5.4	12.7	12.7
Actuated g/C Ratio	0.03	0.19		0.13	0.29		0.13	0.26	0.26	0.09	0.22	0.22
Clearance Time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Vehicle Extension (s)	2.0	4.2		2.0	4.4		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	62	627		234	975		234	489	416	166	411	350
v/s Ratio Prot	0.02	0.03		c0.09	c0.10		c0.11	0.10		0.06	c0.12	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.60	0.14		0.71	0.35		0.86	0.37	0.04	0.60	0.56	0.04
Uniform Delay, d1	27.4	19.3		23.9	16.0		24.4	17.3	15.8	25.0	19.9	17.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.9	0.2		7.8	0.4		25.6	0.2	0.0	4.2	0.9	0.0
Delay (s)	37.2	19.5		31.7	16.4		50.1	17.5	15.8	29.2	20.9	17.6
Level of Service	D	B		C	B		D	B	B	C	C	B
Approach Delay (s)		23.1			20.5			32.3			22.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	13.1
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

13: Twain Ave & Fairmount Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	58	68	48	217	22	108	195	39	6	94	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.97		1.00	0.90	
Flt Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1819	1583		3469		1770	1816		1770	1684	
Flt Permitted		0.64	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1194	1583		3064		1770	1816		1770	1684	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	68	72	85	60	271	28	135	244	49	8	118	211
RTOR Reduction (vph)	0	0	67	0	9	0	0	8	0	0	95	0
Lane Group Flow (vph)	0	140	18	0	350	0	135	285	0	8	234	0
Turn Type	Perm		custom	Perm			Split			Split		
Protected Phases		2	2		6		8	8		4	4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		12.2	12.2		12.2		21.0	21.0		12.3	12.3	
Effective Green, g (s)		12.2	12.2		12.2		21.0	21.0		12.3	12.3	
Actuated g/C Ratio		0.21	0.21		0.21		0.36	0.36		0.21	0.21	
Clearance Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.8	2.8		2.8		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		247	327		634		630	646		369	351	
v/s Ratio Prot			0.01				0.08	c0.16		0.00	c0.14	
v/s Ratio Perm		c0.12			0.11							
v/c Ratio		0.57	0.05		0.55		0.21	0.44		0.02	0.67	
Uniform Delay, d1		21.0	18.8		21.0		13.2	14.5		18.6	21.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.7	0.1		1.0		0.8	2.2		0.0	3.7	
Delay (s)		23.8	18.8		21.9		14.0	16.7		18.6	25.2	
Level of Service		C	B		C		B	B		B	C	
Approach Delay (s)		21.9			21.9			15.8			25.0	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

14: Twain Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	23	87	136	162	10	102	802	89	12	465	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1642		1770	1847		1770	3486		1770	3482	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1642		1770	1847		1770	3486		1770	3482	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	26	97	151	180	11	113	891	99	13	517	62
RTOR Reduction (vph)	0	89	0	0	2	0	0	5	0	0	6	0
Lane Group Flow (vph)	31	34	0	151	189	0	113	985	0	13	573	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	10.0		16.8	21.3		11.7	69.8		2.2	60.3	
Effective Green, g (s)	4.4	10.0		16.8	21.3		11.7	69.8		2.2	60.3	
Actuated g/C Ratio	0.04	0.09		0.14	0.18		0.10	0.60		0.02	0.52	
Clearance Time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.1		2.0	2.9	
Lane Grp Cap (vph)	67	142		256	339		179	2098		34	1810	
v/s Ratio Prot	c0.02	0.02		c0.09	c0.10		c0.06	c0.28		0.01	0.16	
v/s Ratio Perm												
v/c Ratio	0.46	0.24		0.59	0.56		0.63	0.47		0.38	0.32	
Uniform Delay, d1	54.6	49.5		46.4	43.1		50.1	12.8		56.2	16.0	
Progression Factor	1.00	1.00		1.00	1.00		0.89	1.43		0.96	0.81	
Incremental Delay, d2	1.8	0.3		2.2	1.1		4.7	0.7		2.6	0.5	
Delay (s)	56.5	49.8		48.6	44.2		49.0	19.0		56.6	13.4	
Level of Service	E	D		D	D		D	B		E	B	
Approach Delay (s)		51.1			46.1			22.1			14.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	17.7
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
15: Twain Ave & Crawford St

Existing AM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	45	5	1	194	16	30	2	2	5	4	68
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	22	55	6	1	237	20	37	2	2	6	5	83

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	83	257	41	94
Volume Left (vph)	22	1	37	6
Volume Right (vph)	6	20	2	83
Hadj (s)	0.04	-0.01	0.18	-0.48
Departure Headway (s)	4.5	4.3	5.0	4.2
Degree Utilization, x	0.10	0.31	0.06	0.11
Capacity (veh/h)	757	803	669	776
Control Delay (s)	8.1	9.2	8.3	7.8
Approach Delay (s)	8.1	9.2	8.3	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.6		
HCM Level of Service	A		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
16: Mission Gorge Pl & Mission Gorge Rd

Existing AM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	9	60	0	75	10	1028	112	86	561	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1704		1770	1583		1770	3487		1770	3531	
Flt Permitted		0.94		0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1622		1389	1583		1770	3487		1770	3531	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	4	4	10	65	0	81	11	1105	120	92	603	9
RTOR Reduction (vph)	0	9	0	0	73	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	9	0	65	8	0	11	1220	0	92	612	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		11.5		11.5	11.5		1.3	81.2		10.4	90.3	
Effective Green, g (s)		11.5		11.5	11.5		1.3	81.2		10.4	90.3	
Actuated g/C Ratio		0.10		0.10	0.10		0.01	0.70		0.09	0.78	
Clearance Time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.2		2.0	4.2	
Lane Grp Cap (vph)		161		138	157		20	2441		159	2749	
v/s Ratio Prot					0.01		0.01	c0.35		c0.05	0.17	
v/s Ratio Perm		0.01		c0.05								
v/c Ratio		0.06		0.47	0.05		0.55	0.50		0.58	0.22	
Uniform Delay, d1		47.3		49.4	47.3		57.1	8.0		50.7	3.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.17	0.58	
Incremental Delay, d2		0.1		0.9	0.0		17.2	0.7		3.0	0.2	
Delay (s)		47.4		50.3	47.4		74.3	8.8		62.1	2.2	
Level of Service		D		D	D		E	A		E	A	
Approach Delay (s)		47.4			48.7			9.3			10.0	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	57.5%	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												
Volume (vph)	6	3	372	8	3	3	574	1145	28	7	584	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		4.4	4.9		4.4	4.9	
Lane Util. Factor		0.95	0.95		1.00		0.97	0.95		1.00	0.95	
Frt		0.86	0.85		0.97		1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1514	1504		1760		3433	3526		1770	3530	
Flt Permitted		1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1514	1504		1760		3433	3526		1770	3530	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	3	396	9	3	3	611	1218	30	7	621	11
RTOR Reduction (vph)	0	0	0	0	3	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	203	202	0	12	0	611	1247	0	7	631	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		16.1	16.1		7.2		31.0	71.8		0.8	41.6	
Effective Green, g (s)		16.1	16.1		7.2		31.0	71.8		0.8	41.6	
Actuated g/C Ratio		0.14	0.14		0.06		0.27	0.62		0.01	0.36	
Clearance Time (s)		4.9	4.9		4.9		4.4	4.9		4.4	4.9	
Vehicle Extension (s)		2.0	2.0		3.0		2.0	5.1		2.0	5.1	
Lane Grp Cap (vph)		212	211		110		925	2201		12	1277	
v/s Ratio Prot		0.13			c0.01		c0.18	c0.35		0.00	c0.18	
v/s Ratio Perm			c0.13									
v/c Ratio		0.96	0.96		0.11		0.66	0.57		0.58	0.49	
Uniform Delay, d1		49.1	49.1		50.9		37.3	12.6		56.9	28.5	
Progression Factor		1.00	1.00		1.00		0.96	0.63		1.00	1.00	
Incremental Delay, d2		48.9	49.0		0.4		0.7	0.5		38.9	1.4	
Delay (s)		98.0	98.1		51.3		36.5	8.5		95.9	29.9	
Level of Service		F	F		D		D	A		F	C	
Approach Delay (s)		98.1			51.3			17.7			30.6	
Approach LOS		F			D			B			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	55.8%	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												
Volume (vph)	221	17	272	417	423	304	399	1264	170	18	888	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.6		4.2	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00	0.91	0.86	0.91	1.00	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1697	1583	1610	3134	1441	1770	3476		3433	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1697	1583	1610	3134	1441	1770	3476		3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	233	18	286	439	445	320	420	1331	179	19	935	241
RTOR Reduction (vph)	0	0	223	0	0	0	0	8	0	0	0	98
Lane Group Flow (vph)	126	125	63	307	625	272	420	1502	0	19	935	143
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	12.9	12.9	12.9	28.2	28.2	28.2	16.1	51.5		4.4	39.8	39.8
Effective Green, g (s)	12.9	12.9	12.9	28.2	28.2	28.2	16.1	51.5		4.4	39.8	39.8
Actuated g/C Ratio	0.11	0.11	0.11	0.25	0.25	0.25	0.14	0.45		0.04	0.35	0.35
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.6		4.2	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0		1.0	2.0	2.0
Lane Grp Cap (vph)	189	190	178	395	769	353	248	1557		131	1225	548
v/s Ratio Prot	c0.07	0.07		0.19	c0.20		c0.24	c0.43		0.01	c0.26	
v/s Ratio Perm			0.04			0.19						0.09
v/c Ratio	0.67	0.66	0.35	0.78	0.81	0.77	1.69	0.96		0.15	0.76	0.26
Uniform Delay, d1	49.0	48.9	47.2	40.5	40.9	40.4	49.5	30.9		53.5	33.4	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.95	0.87	1.09
Incremental Delay, d2	6.7	6.1	0.4	8.5	6.2	9.1	328.9	15.9		0.2	3.9	1.0
Delay (s)	55.7	55.1	47.6	49.0	47.1	49.5	378.4	46.7		51.0	33.1	30.5
Level of Service	E	E	D	D	D	D	F	D		D	C	C
Approach Delay (s)		51.3			48.1			118.9			32.8	
Approach LOS		D			D			F			C	

Intersection Summary			
HCM Average Control Delay	72.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	22.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
19: Alvardo Canyon Rd & Mission Gorge Pl

Existing AM
1/10/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	68	19	190	141	32	48
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	81	23	226	168	38	57

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	104	394	38	57
Volume Left (vph)	81	0	38	0
Volume Right (vph)	0	168	0	57
Hadj (s)	0.19	-0.22	0.53	-0.67
Departure Headway (s)	4.7	4.1	6.1	4.9
Degree Utilization, x	0.14	0.44	0.06	0.08
Capacity (veh/h)	730	862	546	669
Control Delay (s)	8.5	10.3	8.3	7.1
Approach Delay (s)	8.5	10.3	7.6	
Approach LOS	A	B	A	

Intersection Summary			
Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Fairmount Avenue/Mission Gorge Rd & I-8 EB Off Ramp

Existing AM
5/2/2014

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	963	0	118	0	870	632	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2		4.6		5.5	4.0	
Lane Util. Factor	0.97		1.00		0.95	0.91	
Frt	1.00		1.00		1.00	1.00	
Flt Protected	0.95		0.95		1.00	1.00	
Satd. Flow (prot)	3433		1770		3539	5085	
Flt Permitted	0.95		0.95		1.00	1.00	
Satd. Flow (perm)	3433		1770		3539	5085	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1024	0	126	0	926	672	0
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1024	0	126	0	926	672	0
Turn Type	Prot	Perm	Prot		NA	NA	
Protected Phases	4		5		2	6	
Permitted Phases		4					
Actuated Green, G (s)	17.2		4.0		28.8	21.7	
Effective Green, g (s)	17.2		4.0		28.8	21.7	
Actuated g/C Ratio	0.31		0.07		0.52	0.39	
Clearance Time (s)	4.2		4.6		5.5	4.0	
Vehicle Extension (s)	1.0		2.0		2.0	1.0	
Lane Grp Cap (vph)	1060		127		1829	1981	
v/s Ratio Prot	c0.30		c0.07		c0.26	0.13	
v/s Ratio Perm							
v/c Ratio	0.97		0.99		0.51	0.34	
Uniform Delay, d1	19.0		25.8		8.8	12.0	
Progression Factor	1.00		1.00		1.00	1.00	
Incremental Delay, d2	19.6		77.1		1.0	0.5	
Delay (s)	38.6		102.9		9.8	12.4	
Level of Service	D		F		A	B	
Approach Delay (s)	38.6				21.0	12.4	
Approach LOS	D				C	B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	12.8
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

1: Friars Rd & I-15 SB Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	308	1479	369	283	986	263	0	0	0	1075	0	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	7.0	7.0	4.2	7.0	4.6				5.1	5.1	5.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00				0.95	0.95	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	314	1509	377	289	1006	268	0	0	0	1097	0	883
RTOR Reduction (vph)	0	0	113	0	0	168	0	0	0	0	0	588
Lane Group Flow (vph)	314	1509	264	289	1006	100	0	0	0	548	549	295
Turn Type	Prot		Perm	Prot		custom				Split		Perm
Protected Phases	5	2		1	6	7				4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	27.6	35.9	35.9	25.9	33.7	50.9				36.1	36.1	36.1
Effective Green, g (s)	27.6	35.9	35.9	25.9	33.7	50.9				36.1	36.1	36.1
Actuated g/C Ratio	0.20	0.26	0.26	0.19	0.25	0.37				0.27	0.27	0.27
Clearance Time (s)	4.7	7.0	7.0	4.2	7.0	4.6				5.1	5.1	5.1
Vehicle Extension (s)	2.0	2.0	2.0	1.0	2.0	3.0				1.0	1.0	1.0
Lane Grp Cap (vph)	359	1342	418	337	1260	646				446	446	740
v/s Ratio Prot	0.18	c0.30		c0.16	0.20	c0.02				0.33	c0.33	
v/s Ratio Perm			0.17			0.04						0.11
v/c Ratio	0.87	1.12	0.63	0.86	0.80	0.16				1.23	1.23	0.40
Uniform Delay, d1	52.5	50.0	44.2	53.3	48.0	28.3				50.0	50.0	41.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	19.8	66.2	2.3	18.3	3.4	0.0				121.3	122.2	1.6
Delay (s)	72.4	116.3	46.5	71.5	51.3	28.3				171.3	172.2	42.6
Level of Service	E	F	D	E	D	C				F	F	D
Approach Delay (s)		98.1			51.1			0.0			114.2	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	90.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	136.0	Sum of lost time (s)	20.9
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

2: Friars Rd & I-15 NB On Ramp

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	564	3150	932	783	0	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.7	7.0	7.0		4.5
Lane Util. Factor	1.00	0.91	0.86	0.86		1.00
Frt	1.00	1.00	0.96	0.85		0.86
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	5085	4593	1362		1611
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1770	5085	4593	1362		1611
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	588	3281	971	816	0	625
RTOR Reduction (vph)	0	0	81	279	0	517
Lane Group Flow (vph)	588	3281	1298	129	0	108
Turn Type	Prot			Perm		custom
Protected Phases	5	2	6			
Permitted Phases				6		4
Actuated Green, G (s)	30.2	63.7	26.7	26.7		10.7
Effective Green, g (s)	30.2	63.7	26.7	26.7		10.7
Actuated g/C Ratio	0.36	0.75	0.32	0.32		0.13
Clearance Time (s)	5.5	5.7	7.0	7.0		4.5
Vehicle Extension (s)	2.0	3.0	2.0	2.0		3.0
Lane Grp Cap (vph)	632	3829	1450	430		204
v/s Ratio Prot	0.33	c0.65	0.28			
v/s Ratio Perm				0.09		c0.07
v/c Ratio	0.93	0.86	0.89	0.30		0.53
Uniform Delay, d1	26.2	7.3	27.6	21.9		34.6
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	20.2	2.1	7.3	0.1		2.5
Delay (s)	46.4	9.3	34.9	22.0		37.1
Level of Service	D	A	C	C		D
Approach Delay (s)		15.0	32.0		37.1	
Approach LOS		B	C		D	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	10.2
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Friars Rd & Riverdale St

Existing PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	223	1972	109	53	966	39	216	63	118	36	38	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5056		1770	1681		1770	1658	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.63	1.00		0.57	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5056		1173	1681		1062	1658	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	240	2120	117	57	1039	42	232	68	127	39	41	112
RTOR Reduction (vph)	0	0	34	0	4	0	0	64	0	0	75	0
Lane Group Flow (vph)	240	2120	83	57	1077	0	232	131	0	39	78	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	7.0	48.1	48.1	6.8	47.7		35.1	35.1		35.1	35.1	
Effective Green, g (s)	7.0	48.1	48.1	6.8	47.7		35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.07	0.46	0.46	0.06	0.45		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	118	2329	725	115	2297		392	562		355	554	
v/s Ratio Prot	c0.14	c0.42		0.03	0.21			0.08			0.05	
v/s Ratio Perm			0.05				c0.20			0.04		
v/c Ratio	2.03	0.91	0.11	0.50	0.47		0.59	0.23		0.11	0.14	
Uniform Delay, d1	49.0	26.4	16.3	47.4	19.9		29.0	25.2		24.2	24.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	493.5	6.7	0.3	1.2	0.2		6.4	1.0		0.1	0.0	
Delay (s)	542.5	33.2	16.6	48.7	20.0		35.4	26.2		24.2	24.5	
Level of Service	F	C	B	D	C		D	C		C	C	
Approach Delay (s)		81.7			21.5			31.2			24.4	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM Average Control Delay	57.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Friars Rd & Mission Gorge Rd

Existing PM
1/10/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1920	255	204	723	307	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	4.4	5.8	4.4	4.4
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2021	268	215	761	323	488
RTOR Reduction (vph)	0	82	0	0	0	2
Lane Group Flow (vph)	2021	186	215	761	323	486
Turn Type		Perm	Prot			pt+ov
Protected Phases	2		1	6	3	3 1
Permitted Phases		2				
Actuated Green, G (s)	56.4	56.4	24.6	85.4	24.4	53.4
Effective Green, g (s)	56.4	56.4	24.6	85.4	24.4	53.4
Actuated g/C Ratio	0.47	0.47	0.21	0.71	0.20	0.44
Clearance Time (s)	5.8	5.8	4.4	5.8	4.4	
Vehicle Extension (s)	3.3	3.3	2.0	3.3	2.0	
Lane Grp Cap (vph)	2390	744	704	3619	360	1240
v/s Ratio Prot	c0.40		0.06	0.15	c0.18	c0.17
v/s Ratio Perm		0.12				
v/c Ratio	0.85	0.25	0.31	0.21	0.90	0.39
Uniform Delay, d1	28.0	19.1	40.5	5.9	46.6	22.4
Progression Factor	1.00	1.00	1.27	2.29	0.84	0.69
Incremental Delay, d2	3.9	0.8	0.1	0.1	21.7	0.1
Delay (s)	31.9	19.9	51.6	13.5	60.6	15.5
Level of Service	C	B	D	B	E	B
Approach Delay (s)	30.5			21.9	33.5	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.6
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

5: Zion Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	105	52	360	73	67	184	1541	400	98	610	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.95		1.00	0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1770		1681	1662		1770	5085	1583	1770	5012	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1770		1681	1662		1770	5085	1583	1770	5012	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	101	113	56	387	78	72	198	1657	430	105	656	70
RTOR Reduction (vph)	0	15	0	0	11	0	0	0	99	0	11	0
Lane Group Flow (vph)	101	154	0	271	255	0	198	1657	331	105	715	0
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases									2			
Actuated Green, G (s)	13.7	13.7		34.8	34.8		28.8	42.2	77.0	9.6	22.5	
Effective Green, g (s)	13.7	13.7		34.8	34.8		28.8	42.2	77.0	9.6	22.5	
Actuated g/C Ratio	0.11	0.11		0.29	0.29		0.24	0.35	0.64	0.08	0.19	
Clearance Time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	202	202		487	482		425	1788	1016	142	940	
v/s Ratio Prot	0.06	c0.09		c0.16	0.15		0.11	c0.33	0.09	0.06	c0.14	
v/s Ratio Perm									0.11			
v/c Ratio	0.50	0.76		0.56	0.53		0.47	0.93	0.33	0.74	0.76	
Uniform Delay, d1	49.9	51.6		36.1	35.7		39.0	37.4	9.7	54.0	46.2	
Progression Factor	1.00	1.00		1.00	1.00		1.43	1.49	1.88	1.00	1.00	
Incremental Delay, d2	0.7	14.1		4.5	4.1		2.3	6.7	0.5	15.8	3.8	
Delay (s)	50.6	65.7		40.6	39.9		58.1	62.4	18.9	69.8	50.0	
Level of Service	D	E		D	D		E	E	B	E	D	
Approach Delay (s)		60.1			40.2			53.8			52.5	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.2
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

6: Mission Gorge Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	1522	146	68	350	4	76	2	105	6	14	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)	1770	5018		1770	3539	1583	3433	1588			1781	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (perm)	1770	5018		1770	3539	1583	3433	1588			1781	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1654	159	74	380	4	83	2	114	7	15	7
RTOR Reduction (vph)	0	7	0	0	0	2	0	101	0	0	7	0
Lane Group Flow (vph)	14	1806	0	74	380	2	83	15	0	0	22	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						
Actuated Green, G (s)	0.6	43.0		6.1	47.3	47.3	9.9	9.9			5.7	
Effective Green, g (s)	0.6	43.0		6.1	47.3	47.3	9.9	9.9			5.7	
Actuated g/C Ratio	0.01	0.51		0.07	0.56	0.56	0.12	0.12			0.07	
Clearance Time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Vehicle Extension (s)	2.0	5.3		2.0	5.3	5.3	2.0	2.0			2.0	
Lane Grp Cap (vph)	12	2536		127	1967	880	399	185			119	
v/s Ratio Prot	0.01	c0.36		c0.04	0.11		c0.02	0.01			c0.01	
v/s Ratio Perm						0.00						
v/c Ratio	1.17	0.71		0.58	0.19	0.00	0.21	0.08			0.19	
Uniform Delay, d1	42.2	16.3		38.3	9.4	8.4	34.0	33.5			37.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	320.6	1.3		4.3	0.1	0.0	0.1	0.1			0.3	
Delay (s)	362.9	17.5		42.6	9.5	8.4	34.1	33.6			37.8	
Level of Service	F	B		D	A	A	C	C			D	
Approach Delay (s)		20.2			14.9			33.8			37.8	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	20.4
Intersection Capacity Utilization	56.6%	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												
Volume (vph)	29	866	556	87	231	3	146	2	57	2	5	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	4787		1770	5076		3433	1592			1787	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1770	4787		1770	5076		3433	1592			1787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	32	952	611	96	254	3	160	2	63	2	5	2
RTOR Reduction (vph)	0	67	0	0	0	0	0	55	0	0	2	0
Lane Group Flow (vph)	32	1496	0	96	257	0	160	10	0	0	7	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	2.2	41.5		8.5	47.0		10.9	10.9			4.8	
Effective Green, g (s)	2.2	41.5		8.5	47.0		10.9	10.9			4.8	
Actuated g/C Ratio	0.03	0.48		0.10	0.54		0.12	0.12			0.06	
Clearance Time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Vehicle Extension (s)	2.0	5.2		2.0	4.9		2.0	2.0			2.0	
Lane Grp Cap (vph)	45	2278		173	2736		429	199			98	
v/s Ratio Prot	0.02	c0.31		c0.05	0.05		c0.05	0.01			c0.00	
v/s Ratio Perm												
v/c Ratio	0.71	0.66		0.55	0.09		0.37	0.05			0.07	
Uniform Delay, d1	42.2	17.4		37.5	9.8		35.0	33.6			39.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	35.6	1.0		2.2	0.0		0.2	0.0			0.1	
Delay (s)	77.7	18.4		39.7	9.8		35.2	33.6			39.2	
Level of Service	E	B		D	A		D	C			D	
Approach Delay (s)		19.6			17.9			34.8			39.2	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	21.5
Intersection Capacity Utilization	58.7%	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												
Volume (vph)	125	907	19	11	409	76	4	11	15	121	5	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			0.93		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3529		1770	3456			1726		1770	1595	
Flt Permitted	0.95	1.00		0.95	1.00			0.95		0.74	1.00	
Satd. Flow (perm)	1770	3529		1770	3456			1654		1374	1595	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	128	926	19	11	417	78	4	11	15	123	5	120
RTOR Reduction (vph)	0	1	0	0	17	0	0	12	0	0	99	0
Lane Group Flow (vph)	128	944	0	11	478	0	0	18	0	123	26	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.3	27.8		0.5	21.9			9.1		9.0	9.0	
Effective Green, g (s)	6.3	27.8		0.5	21.9			9.1		9.0	9.0	
Actuated g/C Ratio	0.12	0.53		0.01	0.42			0.17		0.17	0.17	
Clearance Time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4			2.0		2.0	2.0	
Lane Grp Cap (vph)	214	1879		17	1450			288		237	275	
v/s Ratio Prot	c0.07	c0.27		0.01	0.14						0.02	
v/s Ratio Perm								0.01		c0.09		
v/c Ratio	0.60	0.50		0.65	0.33			0.06		0.52	0.09	
Uniform Delay, d1	21.8	7.8		25.8	10.2			18.0		19.6	18.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.3		49.2	0.2			0.0		0.8	0.1	
Delay (s)	24.7	8.0		75.0	10.4			18.0		20.4	18.2	
Level of Service	C	A		E	B			B		C	B	
Approach Delay (s)		10.0			11.8			18.0			19.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	9.4
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	379	63	276	43	49	52	173	640	35	63	349	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1708	1583		1746		1770	3512		1770	3420	
Flt Permitted	0.95	0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1708	1583		1746		1770	3512		1770	3420	
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)	391	65	285	44	51	54	178	660	36	65	360	104
RTOR Reduction (vph)	0	0	227	0	21	0	0	3	0	0	20	0
Lane Group Flow (vph)	227	229	58	0	128	0	178	693	0	65	444	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	17.0	17.0	17.0		12.7		5.8	30.8		4.3	28.6	
Effective Green, g (s)	17.0	17.0	17.0		12.7		5.8	30.8		4.3	28.6	
Actuated g/C Ratio	0.20	0.20	0.20		0.15		0.07	0.37		0.05	0.34	
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	
Lane Grp Cap (vph)	341	346	321		264		122	1289		91	1166	
v/s Ratio Prot	c0.14	0.13			c0.07		c0.10	c0.20		0.04	0.13	
v/s Ratio Perm			0.04									
v/c Ratio	0.67	0.66	0.18		0.48		1.46	0.54		0.71	0.38	
Uniform Delay, d1	30.8	30.8	27.7		32.6		39.1	20.9		39.2	20.9	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	3.7	0.1		0.5		245.9	1.6		19.7	0.9	
Delay (s)	34.6	34.5	27.8		33.1		285.0	22.6		58.9	21.9	
Level of Service	C	C	C		C		F	C		E	C	
Approach Delay (s)		31.9			33.1			76.0			26.4	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	47.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	14.2
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	7	16	144	3	2	2	12	203	8	13	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	8	18	158	3	2	2	13	223	9	14	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	25	164	238	23
Volume Left (vph)	0	158	2	9
Volume Right (vph)	18	2	223	0
Hadj (s)	-0.38	0.22	-0.53	0.11
Departure Headway (s)	4.3	4.7	3.9	4.7
Degree Utilization, x	0.03	0.21	0.26	0.03
Capacity (veh/h)	782	722	890	712
Control Delay (s)	7.4	9.0	8.2	7.9
Approach Delay (s)	7.4	9.0	8.2	7.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.4		
HCM Level of Service	A		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

11: Vandever Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	52	204	61	36	40	67	745	45	33	463	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1694			1751		1770	3509		1770	3510	
Flt Permitted		0.84			0.59		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1449			1064		1770	3509		1770	3510	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	57	222	66	39	43	73	810	49	36	503	29
RTOR Reduction (vph)	0	43	0	0	13	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	339	0	0	135	0	73	856	0	36	530	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.2			30.2		8.3	72.3		4.9	68.7	
Effective Green, g (s)		30.2			30.2		8.3	72.3		4.9	68.7	
Actuated g/C Ratio		0.25			0.25		0.07	0.60		0.04	0.57	
Clearance Time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Vehicle Extension (s)		2.0			2.0		2.0	3.1		2.0	3.2	
Lane Grp Cap (vph)		365			268		122	2114		72	2009	
v/s Ratio Prot							c0.04	c0.24		0.02	0.15	
v/s Ratio Perm		c0.23			0.13							
v/c Ratio		0.93			0.50		0.60	0.40		0.50	0.26	
Uniform Delay, d1		43.8			38.5		54.2	12.5		56.4	12.9	
Progression Factor		1.00			1.00		0.96	1.26		0.96	1.65	
Incremental Delay, d2		28.7			0.5		4.5	0.5		1.9	0.3	
Delay (s)		72.6			39.0		56.6	16.2		56.2	21.6	
Level of Service		E			D		E	B		E	C	
Approach Delay (s)		72.6			39.0			19.4			23.8	
Approach LOS		E			D			B			C	

Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

12: San Diego Mission Rd & Rancho Mission Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	216	222	90	92	132	90	247	74	102	202	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3270		1770	3226		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3270		1770	3226		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	108	240	247	100	102	147	100	274	82	113	224	53
RTOR Reduction (vph)	0	190	0	0	112	0	0	0	62	0	0	39
Lane Group Flow (vph)	108	297	0	100	137	0	100	274	20	113	224	14
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.3	14.1		6.4	14.4		6.1	15.2	15.2	7.2	16.1	16.1
Effective Green, g (s)	6.3	14.1		6.4	14.4		6.1	15.2	15.2	7.2	16.1	16.1
Actuated g/C Ratio	0.10	0.23		0.10	0.23		0.10	0.25	0.25	0.12	0.26	0.26
Clearance Time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Vehicle Extension (s)	2.0	4.2		2.0	4.4		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	182	752		185	758		176	462	393	208	489	416
v/s Ratio Prot	c0.06	c0.09		0.06	0.04		0.06	c0.15		c0.06	0.12	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.59	0.39		0.54	0.18		0.57	0.59	0.05	0.54	0.46	0.03
Uniform Delay, d1	26.3	20.0		26.1	18.7		26.3	20.3	17.6	25.5	18.9	16.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.5		1.7	0.2		2.5	1.4	0.0	1.6	0.2	0.0
Delay (s)	29.7	20.5		27.8	18.9		28.8	21.7	17.6	27.1	19.2	16.8
Level of Service	C	C		C	B		C	C	B	C	B	B
Approach Delay (s)		22.2			21.5			22.5			21.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	18.4
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	186	103	39	100	19	79	93	69	33	152	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.94		1.00	0.94	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1839	1583		3433		1770	1743		1770	1753	
Flt Permitted		0.87	1.00		0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1618	1583		2890		1770	1743		1770	1753	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	196	108	41	105	20	83	98	73	35	160	104
RTOR Reduction (vph)	0	0	81	0	15	0	0	32	0	0	34	0
Lane Group Flow (vph)	0	264	27	0	151	0	83	139	0	35	230	0
Turn Type	Perm		custom	Perm			Split			Split		
Protected Phases		2	2		6		8	8		4	4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		14.7	14.7		14.7		19.5	19.5		12.2	12.2	
Effective Green, g (s)		14.7	14.7		14.7		19.5	19.5		12.2	12.2	
Actuated g/C Ratio		0.25	0.25		0.25		0.33	0.33		0.20	0.20	
Clearance Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.8	2.8		2.8		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		397	388		709		576	567		361	357	
v/s Ratio Prot			0.02				0.05	c0.08		0.02	c0.13	
v/s Ratio Perm		c0.16			0.05							
v/c Ratio		0.66	0.07		0.21		0.14	0.24		0.10	0.64	
Uniform Delay, d1		20.4	17.3		18.0		14.3	14.8		19.4	21.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.0	0.1		0.1		0.5	1.0		0.0	3.0	
Delay (s)		24.4	17.4		18.1		14.8	15.8		19.4	24.8	
Level of Service		C	B		B		B	B		B	C	
Approach Delay (s)		22.4			18.1			15.5			24.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	92	126	141	101	44	32	74	817	128	21	702	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.94		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1715		1770	1745		1770	3467		1770	3510	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1715		1770	1745		1770	3467		1770	3510	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	99	135	152	109	47	34	80	878	138	23	755	44
RTOR Reduction (vph)	0	36	0	0	26	0	0	8	0	0	3	0
Lane Group Flow (vph)	99	251	0	109	55	0	80	1008	0	23	796	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.6	22.8		11.8	22.9		8.7	64.4		3.8	59.5	
Effective Green, g (s)	10.6	22.8		11.8	22.9		8.7	64.4		3.8	59.5	
Actuated g/C Ratio	0.09	0.19		0.10	0.19		0.07	0.54		0.03	0.50	
Clearance Time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.1		2.0	2.9	
Lane Grp Cap (vph)	156	326		174	333		128	1861		56	1740	
v/s Ratio Prot	0.06	c0.15		c0.06	0.03		c0.05	c0.29		0.01	0.23	
v/s Ratio Perm												
v/c Ratio	0.63	0.77		0.63	0.17		0.62	0.54		0.41	0.46	
Uniform Delay, d1	52.8	46.1		52.0	40.6		54.1	18.2		57.0	19.7	
Progression Factor	1.00	1.00		1.00	1.00		0.92	1.18		1.06	0.69	
Incremental Delay, d2	6.1	9.8		5.0	0.1		6.2	1.1		1.6	0.8	
Delay (s)	58.9	56.0		57.0	40.7		56.0	22.5		62.1	14.4	
Level of Service	E	E		E	D		E	C		E	B	
Approach Delay (s)		56.7			50.0			25.0			15.8	
Approach LOS		E			D			C			B	

Intersection Summary			
HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
15: Twain Ave & Crawford St

Existing PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	46	173	9	0	60	5	6	4	0	23	5	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	188	10	0	65	5	7	4	0	25	5	30

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	248	71	11	61
Volume Left (vph)	50	0	7	25
Volume Right (vph)	10	5	0	30
Hadj (s)	0.05	-0.01	0.15	-0.18
Departure Headway (s)	4.2	4.3	4.8	4.4
Degree Utilization, x	0.29	0.08	0.01	0.07
Capacity (veh/h)	841	799	688	748
Control Delay (s)	8.9	7.7	7.9	7.8
Approach Delay (s)	8.9	7.7	7.9	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
16: Mission Gorge Pl & Mission Gorge Rd

Existing PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	1	13	65	0	90	14	917	49	117	837	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.94		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1705		1770	1583		1770	3512		1770	3529	
Flt Permitted		0.83		0.85	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1452		1576	1583		1770	3512		1770	3529	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	16	1	14	70	0	97	15	986	53	126	900	17
RTOR Reduction (vph)	0	13	0	0	87	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	18	0	70	10	0	15	1037	0	126	916	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		12.0		12.0	12.0		2.6	82.3		12.8	92.5	
Effective Green, g (s)		12.0		12.0	12.0		2.6	82.3		12.8	92.5	
Actuated g/C Ratio		0.10		0.10	0.10		0.02	0.69		0.11	0.77	
Clearance Time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.2		2.0	4.2	
Lane Grp Cap (vph)		145		158	158		38	2409		189	2720	
v/s Ratio Prot					0.01		0.01	c0.30		c0.07	0.26	
v/s Ratio Perm		0.01		c0.04								
v/c Ratio		0.13		0.44	0.06		0.39	0.43		0.67	0.34	
Uniform Delay, d1		49.2		50.9	48.9		57.9	8.4		51.5	4.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.44	0.49	
Incremental Delay, d2		0.1		0.7	0.1		2.4	0.6		6.1	0.3	
Delay (s)		49.4		51.6	49.0		60.4	9.0		80.3	2.4	
Level of Service		D		D	D		E	A		F	A	
Approach Delay (s)		49.4			50.1			9.7			11.8	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	4	323	26	5	11	237	942	28	12	892	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9		4.4	4.9		4.4	4.9	
Lane Util. Factor		0.95	0.95		1.00		0.97	0.95		1.00	0.95	
Frt		0.86	0.85		0.97		1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1520	1504		1744		3433	3524		1770	3535	
Flt Permitted		1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1520	1504		1744		3433	3524		1770	3535	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	9	4	330	27	5	11	242	961	29	12	910	7
RTOR Reduction (vph)	0	0	0	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	171	172	0	33	0	242	989	0	12	916	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		19.2	19.2		10.7		35.2	79.2		1.8	45.8	
Effective Green, g (s)		19.2	19.2		10.7		35.2	79.2		1.8	45.8	
Actuated g/C Ratio		0.15	0.15		0.08		0.27	0.61		0.01	0.35	
Clearance Time (s)		4.9	4.9		4.9		4.4	4.9		4.4	4.9	
Vehicle Extension (s)		2.0	2.0		3.0		2.0	5.1		2.0	5.1	
Lane Grp Cap (vph)		224	222		144		930	2147		25	1245	
v/s Ratio Prot		0.11			c0.02		0.07	c0.28		0.01	c0.26	
v/s Ratio Perm			c0.11									
v/c Ratio		0.76	0.77		0.23		0.26	0.46		0.48	0.74	
Uniform Delay, d1		53.2	53.3		55.8		37.2	13.8		63.6	36.8	
Progression Factor		1.00	1.00		1.00		0.86	0.66		1.00	1.00	
Incremental Delay, d2		12.9	14.2		0.8		0.0	0.6		5.2	3.9	
Delay (s)		66.2	67.5		56.6		32.2	9.7		68.8	40.7	
Level of Service		E	E		E		C	A		E	D	
Approach Delay (s)		66.8			56.6			14.1			41.1	
Approach LOS		E			E			B			D	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.7
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	106	581	663	139	223	264	847	177	9	1288	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.6		4.2	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00	0.91	0.86	0.91	1.00	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1760	1583	1610	3078	1441	1770	3447		3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1760	1583	1610	3078	1441	1770	3447		3433	3539	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	126	108	593	677	142	228	269	864	181	9	1314	49
RTOR Reduction (vph)	0	0	197	0	0	0	0	11	0	0	0	13
Lane Group Flow (vph)	113	121	396	338	504	205	269	1034	0	9	1314	36
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	15.9	15.9	15.9	31.1	31.1	31.1	21.1	62.4		2.6	43.9	43.9
Effective Green, g (s)	15.9	15.9	15.9	31.1	31.1	31.1	21.1	62.4		2.6	43.9	43.9
Actuated g/C Ratio	0.12	0.12	0.12	0.24	0.24	0.24	0.16	0.48		0.02	0.34	0.34
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.6		4.2	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0		1.0	2.0	2.0
Lane Grp Cap (vph)	206	215	194	385	736	345	287	1655		69	1195	535
v/s Ratio Prot	0.07	0.07		c0.21	0.16		c0.15	0.30		0.00	c0.37	
v/s Ratio Perm			c0.25			0.14						0.02
v/c Ratio	0.55	0.56	2.04	0.88	0.88dl	0.59	0.94	0.62		0.13	1.10	0.07
Uniform Delay, d1	53.7	53.8	57.0	47.6	45.0	43.9	53.8	25.1		62.6	43.0	29.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.34	0.67	0.77
Incremental Delay, d2	1.6	2.0	485.0	19.1	2.1	1.8	36.0	1.8		0.3	55.8	0.2
Delay (s)	55.3	55.8	542.0	66.7	47.1	45.7	89.8	26.9		83.9	84.4	22.7
Level of Service	E	E	F	E	D	D	F	C		F	F	C
Approach Delay (s)		404.4			53.2			39.8			82.2	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM Average Control Delay	121.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	93	175	44	71	222	151
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	108	203	51	83	258	176

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	312	134	258	176
Volume Left (vph)	108	0	258	0
Volume Right (vph)	0	83	0	176
Hadj (s)	0.10	-0.34	0.53	-0.67
Departure Headway (s)	5.3	5.2	6.2	5.0
Degree Utilization, x	0.46	0.19	0.45	0.25
Capacity (veh/h)	648	647	557	684
Control Delay (s)	12.8	9.4	13.0	8.5
Approach Delay (s)	12.8	9.4	11.2	
Approach LOS	B	A	B	

Intersection Summary			
Delay	11.5		
HCM Level of Service	B		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	747	0	30	0	541	1130	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2		4.6		5.5	4.0	
Lane Util. Factor	0.97		1.00		0.95	0.91	
Frt	1.00		1.00		1.00	1.00	
Flt Protected	0.95		0.95		1.00	1.00	
Satd. Flow (prot)	3433		1770		3539	5085	
Flt Permitted	0.95		0.95		1.00	1.00	
Satd. Flow (perm)	3433		1770		3539	5085	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	770	0	31	0	558	1165	0
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	770	0	31	0	558	1165	0
Turn Type	Prot	Perm	Prot		NA	NA	
Protected Phases	4		5		2	6	
Permitted Phases		4					
Actuated Green, G (s)	14.4		1.9		30.5	25.5	
Effective Green, g (s)	14.4		1.9		30.5	25.5	
Actuated g/C Ratio	0.26		0.03		0.56	0.47	
Clearance Time (s)	4.2		4.6		5.5	4.0	
Vehicle Extension (s)	1.0		2.0		2.0	1.0	
Lane Grp Cap (vph)	905		61		1976	2374	
v/s Ratio Prot	c0.22		0.02		c0.16	c0.23	
v/s Ratio Perm							
v/c Ratio	0.85		0.51		0.28	0.49	
Uniform Delay, d1	19.1		25.9		6.3	10.1	
Progression Factor	1.00		1.00		1.00	1.00	
Incremental Delay, d2	7.5		2.4		0.4	0.7	
Delay (s)	26.5		28.3		6.7	10.8	
Level of Service	C		C		A	B	
Approach Delay (s)	26.5				7.8	10.8	
Approach LOS	C				A	B	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	12.8
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

FREEWAY ANALYSIS CALCULATIONS

2012 Traffic Volumes on California State Highways

Caltrans

Dist	Route	County		Postmile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak AADT	Ahead AADT
11	8	SD	T	0.407	SAN DIEGO, SUNSET CLIFFS BLVD				840	12500	11900
11	8	SD	T	0.466	NIMITZ BLVD	910	13500	12900	4000	48500	46000
11	8	SD	L	1.213	MIDWAY DRIVE	4000	48500	46000	8400	109000	100000
11	8	SD	L	2.379	JCT. RTE. 5 LT LANES	8400	109000	100000	10700	140000	128000
11	8	SD	R	0.364	SAN DIEGO, MORENA BOULEVARD	10700	140000	128000	15100	197000	184000
11	8	SD		0.946	HOTEL CIRCLE/TAYLOR STREET	15100	197000	184000	15600	202000	189000
11	8	SD		2.23	SAN DIEGO, HOTEL CIRCLE	15600	202000	189000	16100	213000	198000
11	8	SD		2.41	SAN DIEGO, JCT. RTE. 163	16100	213000	198000	16500	219000	204000
11	8	SD		3.04	SAN DIEGO, MISSION CENTER ROAD	16500	219000	204000	17700	234000	218000
11	8	SD		3.902	SAN DIEGO, TEXAS STREET	17700	234000	218000	15700	208000	193000
11	8	SD		4.378	SAN DIEGO, JCT. RTE. 805	15700	208000	193000	19000	239000	235000
11	8	SD		5.638	JCT. RTE. 15	19000	239000	235000	16100	211000	207000
11	8	SD		6.271	SAN DIEGO, FAIRMOUNT AVENUE	16100	211000	207000	18000	233000	228000
11	8	SD		7.06	SAN DIEGO, WARING ROAD	18000	233000	228000	18000	225000	218000
11	8	SD		8.336	COLLEGE AVENUE	18000	225000	218000	16000	190000	186000
11	8	SD		9.591	LA MESA, LAKE MURRAY BLVD	16000	190000	186000	14000	183000	179000
11	8	SD		10.57	FLETCHER PARKWAY	14400	188000	179000	12800	166000	164000
11	8	SD		10.967	SPRING STREET	12800	166000	164000	14400	185000	181000
11	8	SD		11.101	LA MESA, EL CAJON BOULEVARD	14400	185000	181000	15500	186000	182000
11	8	SD		11.764	JACKSON DRIVE	15500	186000	182000	14100	177000	173000
11	8	SD		12.24	LA MESA, JCT. RTE. 125 SOUTH	14100	177000	173000	17800	223000	214000
11	8	SD		12.654	LA MESA, SEVERIN/ FUERTE DRIVE	17800	223000	214000	18700	230000	224000
11	8	SD		13.658	EL CAJON, EL CAJON BOULEVARD	18700	230000	224000	15400	192000	170000
11	8	SD		14.594	WEST MAIN STREET	15400	192000	170000	13100	169000	165000
11	8	SD		15.3	EL CAJON, JOHNSON AVENUE	13100	169000	165000	11600	151000	147000
11	8	SD		15.8	EL CAJON, JCT. RTE. 67 NORTH	11600	151000	147000	9200	118000	115000
11	8	SD		16.467	EL CAJON, MOLLISON AVENUE	9200	118000	115000	7800	106000	100000
11	8	SD		17.36	EL CAJON, JCT. RTE. 54 S, SECOND ST	7800	106000	100000	5200	68000	65000
11	8	SD		17.829	EL CAJON, EAST MAIN STREET	5200	68000	65000	7300	96000	91000
11	8	SD	R	18.727	GREENFIELD DRIVE	7300	96000	91000	6700	81000	78000

Dist	Route	County		Postmile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak AADT	Ahead AADT
7	14	LA	R	77.008	AVE A, LOS ANGELES/KERN COUNTY LINE	3200	34500	33000			
6	14	KER	R	0	AVE A, LOS ANGELES/KERN COUNTY LINE				2900	30500	29500
6	14	KER	R	3.018	ROSAMOND BOULEVARD	2850	30700	29500	1700	16900	15900
6	14	KER	R	12.147	SILVER QUEEN ROAD	1700	16900	15900	1700	16900	15900
6	14	KER		16.07	JCT. RTE. 58	1800	17800	16900	1750	17200	16900
6	14	KER		19.239	MOJAVE, NORTH JCT. RTE. 58	1700	16800	16100	850	10900	9600
6	14	KER		21.29	RANDSBURG CUT-OFF, CALIF./BAKERSFIELD	850	10800	9600	800	7300	5950
6	14	KER		35.56	RANDSBURG ROAD	800	7300	5950	730	5500	4500
6	14	KER		57.767	FREEMAN JCT., JCT. RTE. 178 WEST	730	5500	4500	760	5900	5050
6	14	KER		60.571	HOMESTEAD S JCT., JCT. RTE. 178 EAST	790	5900	5050	600	3700	2750
6	14	KER		64.559	HOMESTEAD N JCT., JCT. RTE. 395	600	3700	2750			
11	15	SD		0.553	JCT. RTE. 5				9850	98500	95500
11	15	SD	R	0.588	SAN DIEGO, OCEANVIEW BLVD	9500	98000	96000	8100	109000	107000
11	15	SD		1.846	SAN DIEGO, MARKET STREET	8100	109000	107000	11600	117000	116000
11	15	SD		2.226	JCT. RTE. 94	11600	117000	116000	10200	113000	110000
11	15	SD	R	3.367	JCT. RTE. 805	10200	113000	110000	13200	161000	159000
11	15	SD	M	4.663	SAN DIEGO, UNIVERSITY AVENUE	13200	161000	159000	12700	158000	157000
11	15	SD	M	5.042	SAN DIEGO, EL CAJON BOULEVARD	12700	158000	157000	12600	156000	155000
11	15	SD	M	5.6	SAN DIEGO, ADAMS AVENUE	12600	156000	155000	14100	167000	162000
11	15	SD	R	6.132	JCT. RTE. 8	14100	167000	162000	16700	200000	197000
11	15	SD	R	6.817	SAN DIEGO, FRIARS ROAD	16700	200000	197000	16400	214000	204000
11	15	SD	R	8.366	SAN DIEGO, AERO DRIVE	16400	214000	204000	13900	180000	179000
11	15	SD	R	9.238	SAN DIEGO, BALBOA AVENUE	13900	180000	179000	12900	168000	166000
11	15	SD	R	9.995	CLAIREMONT MESA BOULEVARD	12900	168000	166000	13000	149000	148000
11	15	SD	R	10.58	JCT. RTE. 52	13000	149000	148000	13500	176000	174000
11	15	SD	M	12.002	ROUTE 15S HOV LANES	13500	176000	174000	13000	170000	169000
11	15	SD	M	12.124	JCT. RTE. 163	13000	170000	169000	25500	296000	293000
11	15	SD	M	13.334	SAN DIEGO, MIRAMAR WAY	25500	296000	293000	23800	298000	290000
11	15	SD	M	14.285	SAN DIEGO, MIRAMAR/POMERADO	23800	298000	290000	22300	279000	273000
11	15	SD	M	15	CARROLL CANYON ROAD	22300	279000	273000	21900	262000	260000

CALIFORNIA DEPARTMENT OF TRANSPORTATION

REPORT   : OTM32420

REPORT TITLE : PEAK HOUR VOLUME DATA

PARAMETERS

YEAR   : 2012

CALTRANS TRAFFIC VOLUMES
LATEST TRAFFIC YEAR SELECTED
PEAK HOUR VOLUME DATA

									AM PEAK								PM PEAK					
DI	RTE	CO	PRE	PM	CS	LEG	YR	Dir	1 WAY PHV	% K	% D	% KD	HR	DAY	MNTH	Dir	1 WAY PHV	% K	% D	% KD	HR	DAY	MNTH
02	005	SHA	R	7.8	239	B	12	N	2346	8.46	58.17	4.92	12	FRI	AUG	N	2688	9.46	59.59	5.64	16	FRI	MAY
02	005	SHA	R	19.40	312	B	12	S	1838	7.2	63.78	4.59	7	TUE	SEP	N	2069	9.27	55.74	5.17	16	THU	DEC
02	005	SHA	R	26.04	273	B	12	S	1183	12.17	50.82	6.19	12	SAT	JUL	S	1293	11.67	57.96	6.76	14	SAT	NOV
02	005	SHA		57.41	179	B	12	N	812	10.32	51.59	5.32	12	SUN	JUN	N	838	9.68	56.78	5.49	14	THU	JUN
02	005	SIS	R	11.17	310	O	11	N	1104	11.06	52.57	5.81	12	SUN	JUN	N	1265	12.58	52.95	6.66	15	MON	DEC
09	006	INY		0	944	A	12	S	236	9.22	73.52	6.78	7	TUE	APR	N	206	9.53	62.05	5.91	16	WED	FEB
11	007	IMP		1.188	401	A	12	N	254	6.12	70.36	4.31	6	MON	MAY	S	348	10.16	58.1	5.9	16	FRI	APR
11	007	IMP		6.718	402	B	12	N	254	6.97	62.41	4.35	8	FRI	FEB	S	356	9.62	63.35	6.09	17	FRI	MAR
11	008	SD	L	1.213	951	B	12	E	2302	8.43	59.32	5	7	TUE	MAR	W	2054	8.14	54.83	4.46	17	WED	SEP
11	008	SD	L	1.213	958	A	12	E	4397	7.51	58.52	4.4	7	TUE	OCT	W	4621	8.31	55.61	4.62	17	WED	MAY
11	008	SD	R	.023	859	A	12	W	7575	7.21	57.03	4.11	7	TUE	OCT	E	8119	8.02	55.02	4.41	16	TUE	APR
11	008	SD		.946	804	A	12	W	8063	7.26	58.63	4.25	7	THU	OCT	E	8394	7.86	56.34	4.43	16	MON	MAR
11	008	SD		5.638	953	B	12	W	11622	7.12	69.46	4.94	7	TUE	MAR	E	10850	7.91	58.37	4.62	16	WED	JAN
11	008	SD		8.336	807	B	12	W	11033	7.99	63.39	5.07	7	MON	FEB	E	10772	8.22	60.23	4.95	16	WED	OCT
11	008	SD		8.336	808	A	12	W	10130	8.02	67.98	5.45	7	WED	JAN	E	9532	8.3	61.83	5.13	16	WED	MAY
11	008	SD		11.76	810	B	12	W	8333	7.11	64.27	4.57	7	FRI	SEP	E	8677	8.51	55.89	4.76	16	WED	DEC
11	008	SD		14.59	806	B	12	W	7449	7.65	57.18	4.37	7	WED	AUG	E	8901	9.13	57.22	5.23	15	FRI	AUG
11	008	SD	R	20.04	888	B	12	W	3693	6.8	69.73	4.74	7	THU	SEP	E	3789	8.44	57.69	4.87	16	FRI	MAR
11	008	SD	R	37.83	811	A	12	E	1086	9.44	59.64	5.63	11	FRI	DEC	W	1314	11.11	61.32	6.81	14	MON	DEC
11	008	SD	R	65.90	981	A	12	E	921	11.98	58.07	6.96	12	SUN	JUL	W	1096	14.38	57.56	8.28	14	FRI	MAY
11	008	IMP	R	10.29	993	B	12	E	926	11.37	62.06	7.06	10	WED	NOV	W	1084	13.37	61.8	8.26	13	SAT	JUL
11	008	IMP	R	10.29	994	A	12	W	870	12.7	58.35	7.41	9	SUN	NOV	E	1018	14.51	59.78	8.67	17	WED	NOV
11	008	IMP	R	36.97	982	B	12	E	977	10.92	53.74	5.87	12	SAT	JUL	W	1109	10.56	63.05	6.66	13	SAT	JUN
11	008	IMP	R	40.94	638	B	12	W	1411	8.46	53.27	4.51	12	SAT	JUN	E	1728	9.27	59.55	5.52	14	MON	SEP
11	008	IMP	R	53.50	964	A	12	E	915	14.97	53.95	8.07	12	SAT	JUL	E	892	13.39	58.8	7.87	14	SUN	JUL

									AM PEAK								PM PEAK						
DI	RTE	CO	PRE	PM	CS	LEG	YR	Dir	1 WAY PHV	% K	% D	% KD	HR	DAY	MNTH	Dir	1 WAY PHV	% K	% D	% KD	HR	DAY	MNTH
04	012	SOL		26.28	317	B	11	W	839	7.54	62.66	4.73	7	MON	SEP	E	987	9.31	59.71	5.56	16	THU	SEP
04	013	ALA		4.262	27	A	12	N	2800	10.39	54.03	5.62	8	FRI	DEC	N	2572	7.68	67.19	5.16	17	THU	SEP
04	013	ALA		13.18	125	B	12	S	1890	12.75	64	8.16	8	THU	MAR	N	1538	11.06	60.06	6.64	16	TUE	MAR
04	013	ALA		13.91	240	B	12	S	1981	9.52	66.66	6.34	8	MON	DEC	N	1490	8.88	53.77	4.77	17	TUE	DEC
07	014	LA	R	26	779	A	12	S	8418	6.9	77.56	5.35	6	MON	APR	N	8178	7.77	66.86	5.2	17	WED	MAR
07	014	LA	R	32.24	403	B	10	S	6245	6.89	78.08	5.38	5	THU	APR	N	6115	7.78	67.72	5.27	16	THU	APR
07	014	LA	R	59.80	338	A	12	S	3092	6.92	52.39	3.62	7	WED	NOV	S	3931	8.21	56.11	4.61	17	WED	FEB
06	014	KER	L	16.87	912	O	11	S	853	8.78	60.37	5.3	12	FRI	FEB	N	1114	11.53	60.02	6.92	15	MON	FEB
06	014	KER		22.15	298	A	10	N	495	13.32	58.51	7.79	12	WED	DEC	S	797	15.85	79.15	12.55	16	SUN	NOV
06	014	KER		57.77	301	B	12	N	335	11.33	58.46	6.63	11	FRI	AUG	N	510	13.94	72.34	10.09	16	FRI	FEB
06	014	KER		57.77	302	A	12	S	351	12.68	61.8	7.83	11	SUN	JUL	S	524	14.68	79.64	11.69	13	SUN	JAN
06	014	KER		64.56	971	B	11	S	299	14.18	68.89	9.77	12	SUN	JUN	S	461	19.47	77.35	15.06	14	SUN	AUG
11	015	SD		.405	909	A	12	S	4581	7.79	61.42	4.79	6	WED	MAR	N	5063	9.34	56.66	5.29	15	THU	NOV
11	015	SD		2.226	836	B	12	S	5127	7.65	57.8	4.42	6	MON	APR	N	6114	9.55	55.24	5.27	15	MON	OCT
11	015	SD	R	3.367	910	A	12	N	7620	8.15	58.96	4.81	7	WED	MAR	N	6705	8.34	50.73	4.23	15	TUE	SEP
11	015	SD	R	6.132	813	B	12	N	8424	8.26	63.12	5.21	7	TUE	SEP	S	7924	8.21	59.71	4.9	17	THU	OCT
11	015	SD	R	6.132	911	A	12	N	10140	8.04	64.06	5.15	7	THU	AUG	S	9313	8.18	57.86	4.73	16	THU	MAR
11	015	SD	M	12.12	912	A	12	S	13040	6.9	64.39	4.44	10	THU	SEP	N	13723	7.69	60.81	4.68	17	TUE	SEP
11	015	SD	M	15	999	X	12	S	12257	8.26	59.37	4.91	7	THU	JUN	N	11543	8.14	56.74	4.62	16	WED	JUN
11	015	SD	M	15.92	913	B	12	S	12835	8.32	59.33	4.94	7	TUE	SEP	N	12247	8.4	56.1	4.71	17	TUE	SEP
11	015	SD	M	20.57	980	B	12	S	10265	7.99	57.7	4.61	7	MON	JUN	N	10216	8.28	55.46	4.59	16	THU	JUL
11	015	SD	M	26.03	934	B	12	S	9580	7.57	64.46	4.88	7	WED	JUL	N	9624	8.21	59.71	4.9	16	FRI	SEP
11	015	SD	R	30.63	918	B	12	S	8986	7.78	61.07	4.75	7	WED	SEP	N	9986	8.52	61.94	5.28	16	WED	AUG
11	015	SD	R	31.52	915	A	12	S	6684	6.68	78.26	5.22	6	WED	MAY	N	6943	8.22	66.04	5.43	16	THU	APR
11	015	SD	R	36.64	916	A	12	S	6888	7.4	78.74	5.82	6	THU	MAY	N	6731	8.89	64.05	5.69	16	FRI	FEB

2012

Annual Average Daily Truck Traffic on the California State Highway System

Compiled by
Traffic Data Branch

State of California
The Transportation Agency
Department of Transportation

Prepared in cooperation with the
U.S. Department of Transportation
Federal Highway Administration

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK AADT TOTAL By Axle 2	3	4	5+	% TRUCK AADT By Axle 2	3	4	5+	EAL 2-WAY (1000)	YEAR VER/ EST
008	11	SD	T.407	A	SAN DIEGO, SUNSET CLIFFS BOULEVARD	11900	119	1	98	9	3	9	82.3	7.4	2.9	7.4	8	78E
008	11	SD	L2.379	B	JCT RTE 5 LT LANES	100000	1200	1.2	1018	85	8	89	84.8	7.1	.7	7.4	75	78V
008	11	SD	L2.379	A	JCT RTE 5 LT LANES	128000	3584	2.8	2398	516	154	516	66.9	14.4	4.3	14.4	332	83V
008	11	SD	2.41	B	SAN DIEGO, JCT. RTE. 163	198000	5346	2.7	4138	577	134	497	77.4	10.8	2.5	9.3	389	83E
008	11	SD	2.41	A	SAN DIEGO, JCT. RTE. 163	204000	5712	2.8	4461	571	137	543	78.1	10	2.4	9.5	416	83E
008	11	SD	4.378	B	SAN DIEGO, JCT. RTE. 805	193000	6176	3.2	4638	611	210	716	75.1	9.9	3.4	11.6	496	83E
008	11	SD	5.638	B	JCT. RTE. 15	235000	7050	3	4124	895	296	1734	58.5	12.7	4.2	24.6	868	83V
008	11	SD	5.638	A	JCT. RTE. 15	207000	7245	3.5	4637	833	326	1449	64	11.5	4.5	20	787	84E
008	11	SD	10.57	B	FLETCHER PARKWAY	179000	6623	3.7	3961	841	232	1590	59.8	12.7	3.5	24	799	84V
008	11	SD	10.57	A	FLETCHER PARKWAY	164000	7216	4.4	4077	1111	368	1660	56.5	15.4	5.1	23	872	78V
008	11	SD	15.8	B	EL CAJON, JCT. RTE. 67 NORTH	147000	6909	4.7	3724	905	318	1962	53.9	13.1	4.6	28.4	937	78V
008	11	SD	15.8	A	EL CAJON, JCT. RTE. 67 NORTH	115000	3335	2.9	1848	377	117	994	55.4	11.3	3.5	29.8	459	78V
008	11	SD	R18.727	B	GREENFIELD DRIVE	91000	8245	9.06	6477	399	285	1083	78.56	4.84	3.46	13.14	679	12E
008	11	SD	R18.727	A	GREENFIELD DRIVE	78000	5382	6.9	2836	420	129	1997	52.7	7.8	2.4	37.1	846	86V
008	11	SD	R37.831	B	JCT. RTE. 79 NORTH, JAPATUL VALLEY ROAD	24600	2952	12	1160	174	89	1529	39.3	5.9	3	51.8	597	86E
008	11	SD	R37.831	A	JCT. RTE. 79 NORTH, JAPATUL VALLEY ROAD	19300	2625	13.6	853	205	76	1491	32.5	7.8	2.9	56.8	574	00E
008	11	SD	R51.98	B	CAMERON ROAD	15100	2011	13.32	813	102	42	1054	40.43	5.07	2.09	52.41	408	12V

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK AADT TOTAL By Axle 2	3	4	5+	% TRUCK AADT By Axle 2	3	4	5+	EAL 2-WAY (1000)	YEAR VER/ EST
015	11	SD	2.226	B	JCT. RTE. 94	116000	5916	5.1	3029	1006	296	1585	51.2	17	5	26.8	789	85V
015	11	SD	R3.367	B	JCT. RTE. 805	110000	5610	5.1	2872	954	281	1503	51.2	17	5	26.8	748	85E
015	11	SD	R3.367	A	JCT. RTE. 805	159000	3498	2.2	2526	357	108	507	72.2	10.2	3.1	14.5	312	85V
015	11	SD	R6.132	B	JCT. RTE. 8	162000	3564	2.2	2573	367	110	513	72.2	10.3	3.1	14.4	317	85E
015	11	SD	R6.132	A	JCT. RTE. 8	197000	9811	4.98	6126	701	231	2752	62.44	7.15	2.35	28.05	1262	07V
015	11	SD	R9.995	X	CLAIREMONT MESA BOULEVARD INTERCHANGE	148000	6852	4.63	3700	586	205	2361	54	8.55	2.99	34.46	1028	12E
015	11	SD	M12.124	A	JCT. RTE. 163	293000	10929	3.73	6715	787	302	3126	61.44	7.2	2.76	28.6	1430	07E
015	11	SD	M14.285	B	SAN DIEGO, MIRAMAR/ POMERADO ROADS	290000	10904	3.76	6699	785	301	3119	61.44	7.2	2.76	28.6	1427	07E
015	11	SD	M14.285	A	SAN DIEGO, MIRAMAR/ POMERADO ROADS	273000	10647	3.9	6239	1118	415	2875	58.6	10.5	3.9	27	1374	85V
015	11	SD	M18.176	B	SAN DIEGO, POWAY ROAD	238000	16898	7.1	8246	1909	946	5796	48.8	11.3	5.6	34.3	2603	96E
015	11	SD	M18.176	A	SAN DIEGO, POWAY ROAD	209000	14839	7.1	7241	1677	831	5090	48.8	11.3	5.6	34.3	2286	96E
015	11	SD	M27.65	A	ESCONDIDO, SOUTH JUNCTION OF CENTRE CITY PARKWAY	190000	13490	7.1	6583	1524	755	4627	48.8	11.3	5.6	34.3	2078	96E
015	11	SD	R30.627	B	VALLEY PARKWAY	189000	13419	7.1	6548	1516	751	4603	48.8	11.3	5.6	34.3	2067	96E
015	11	SD	R31.517	B	JCT. RTE. 78	203000	14413	7.1	7034	1629	807	4944	48.8	11.3	5.6	34.3	2220	96E
015	11	SD	R31.517	A	JCT. RTE. 78	128000	12928	10.1	5714	1112	672	5430	44.2	8.6	5.2	42	2274	80V
015	11	SD	R36.636	A	DEER SPRINGS ROAD	118000	15576	13.2	5498	1262	654	8162	35.3	8.1	4.2	52.4	3221	86V
015	11	SD	R46.491	B	JCT. RTE. 76	108000	11048	10.23	3515	878	377	6277	31.82	7.95	3.41	56.82	2425	00E

EXISTING FREEWAY SEGMENT OPERATIONS

AM Peak Hour

Freeway and Segment	Direction, Number of Lanes & Capacity			ADT	Peak Hour % (K) AM	Dir Split (D) AM	Truck Factor	Peak Hour Volume AM	V/C AM	LOS AM
Interstate 15										
Aero Drive to Friars Road	NB Mainlines	4M+ 1A	9,200	204,000	8.04%	64.06%	0.9502	9,984	1.085	F(0)
	SB Mainlines	4M+ 2A	10,400	204,000	8.04%	35.94%	0.9502	5,601	0.539	B
Friars Road to I-8	NB Mainlines	4M+ 2A	10,400	197,000	8.04%	64.06%	0.9502	9,641	0.927	E
	SB Mainlines	4M+2CD+1A	13,200	197,000	8.04%	35.94%	0.9502	5,409	0.410	B
Interstate 8										
Interstate 15 to Fairmount Avenue	EB Mainlines	4M	8,000	207,000	7.99%	36.61%	0.965	5,843	0.730	C
	WB Mainlines	4M+2CD	12,000	207,000	7.99%	63.39%	0.965	10,117	0.843	D
Fairmount Avenue to Waring Road	EB Mainlines	4M+1CD+1A	11,200	228,000	7.99%	36.61%	0.965	6,436	0.575	B
	WB Mainlines	5M+ 1A	11,200	228,000	7.99%	63.39%	0.965	11,144	0.995	E

EXISTING FREEWAY SEGMENT OPERATIONS

PM Peak Hour

Freeway and Segment	Direction, Number of Lanes & Capacity			ADT	Peak Hour % (K) PM	Dir Split (D) PM	Truck Factor	Peak Hour Volume PM	V/C PM	LOS PM
Interstate 15										
Aero Drive to Friars Road	NB Mainlines	4M+ 1A	9,200	204,000	8.18%	42.14%	0.9502	6,682	0.726	C
	SB Mainlines	4M+ 2A	10,400	204,000	8.18%	57.86%	0.9502	9,174	0.882	D
Friars Road to I-8	NB Mainlines	4M+ 2A	10,400	197,000	8.18%	42.14%	0.9502	6,453	0.620	C
	SB Mainlines	4M+2CD+1A	13,200	197,000	8.18%	57.86%	0.9502	8,860	0.671	C
Interstate 8										
Interstate 15 to Fairmount Avenue	EB Mainlines	4M	8,000	207,000	7.91%	58.37%	0.965	9,223	1.153	F(0)
	WB Mainlines	4M+2CD	12,000	207,000	7.91%	41.63%	0.965	6,578	0.548	B
Fairmount Avenue to Waring Road	EB Mainlines	4M+1CD+1A	11,200	228,000	7.91%	58.37%	0.965	10,158	0.907	D
	WB Mainlines	5M+ 1A	11,200	228,000	7.91%	41.63%	0.965	7,245	0.647	C

Linscott, Law & Greenspan, *engineers* 3-11-2076

Alternative D Freeway Operations

AM Peak Hour

Freeway and Segment	Direction, Number of Lanes & Capacity			Total ADT	Peak Hour % (K) AM	Dir Split (D) AM	Truck Factor	Total Peak Hour AM	V/C AM	LOS AM
Interstate 15										
Aero Drive to Friars Road	NB Mainlines	4M+ 1A	9,200	313,000	8.04%	64.06%	0.9502	15,320	1.665	F(3)
	SB Mainlines	4M+ 2A	10,400	313,000	8.04%	35.94%	0.9502	8,600	0.827	D
Friars Road to I-8	NB Mainlines	4M+ 2A	10,400	316,000	8.04%	64.06%	0.9502	15,470	1.488	F(3)
	SB Mainlines	4M+2CD+1A	13,200	316,000	8.04%	35.94%	0.9502	8,680	0.658	C
Interstate 8										
Interstate 15 to Fairmount Avenue	EB Mainlines	4M	8,000	278,000	7.99%	36.61%	0.965	7,850	0.981	E
	WB Mainlines	4M+2CD	12,000	278,000	7.99%	63.39%	0.965	13,590	1.133	F(0)
Fairmount Avenue to Waring Road	EB Mainlines	4M+1CD+1A	11,200	305,000	7.99%	36.61%	0.965	8,610	0.769	C
	WB Mainlines	5M+ 1A	11,200	305,000	7.99%	63.39%	0.965	14,910	1.331	F(1)

Alternative D Freeway Operations

PM Peak Hour

Freeway and Segment	Direction, Number of Lanes & Capacity			Total ADT	Peak Hour % (K) PM	Dir Split (D) PM	Truck Factor	Total Peak Hour PM	V/C PM	LOS PM
Interstate 15										
Aero Drive to Friars Road	NB Mainlines	4M+ 1A	9,200	313,000	0.0818	0.4214	0.9502	10,260	1.115	F(0)
	SB Mainlines	4M+ 2A	10,400	313,000	0.0818	0.5786	0.9502	14,080	1.354	F(2)
Friars Road to I-8	NB Mainlines	4M+ 2A	10,400	316,000	0.0818	0.4214	0.9502	10,360	0.996	E
	SB Mainlines	4M+2CD+1A	13,200	316,000	0.0818	0.5786	0.9502	14,220	1.077	F(0)
Interstate 8										
Interstate 15 to Fairmount Avenue	EB Mainlines	4M	8,000	278,000	0.0791	0.5837	0.965	12,390	1.549	F(3)
	WB Mainlines	4M+2CD	12,000	278,000	0.0791	0.4163	0.965	8,840	0.737	C
Fairmount Avenue to Waring Road	EB Mainlines	4M+1CD+1A	11,200	305,000	0.0791	0.5837	0.965	13,590	1.213	F(0)
	WB Mainlines	5M+ 1A	11,200	305,000	0.0791	0.4163	0.965	9,700	0.866	D

APPENDIX E

CALTRANS FREEWAY RAMP METER RATES

Location (I.D.)	Route	Dir	Period	Cars per green	Sec./ Cycle	(per lane) Veh./hr	Total # lanes	HOV
Fairmount Ave NB/SB (11308)	8	EB	1500 - 1900	2	7.2 - 13.3	996 - 493	2	No

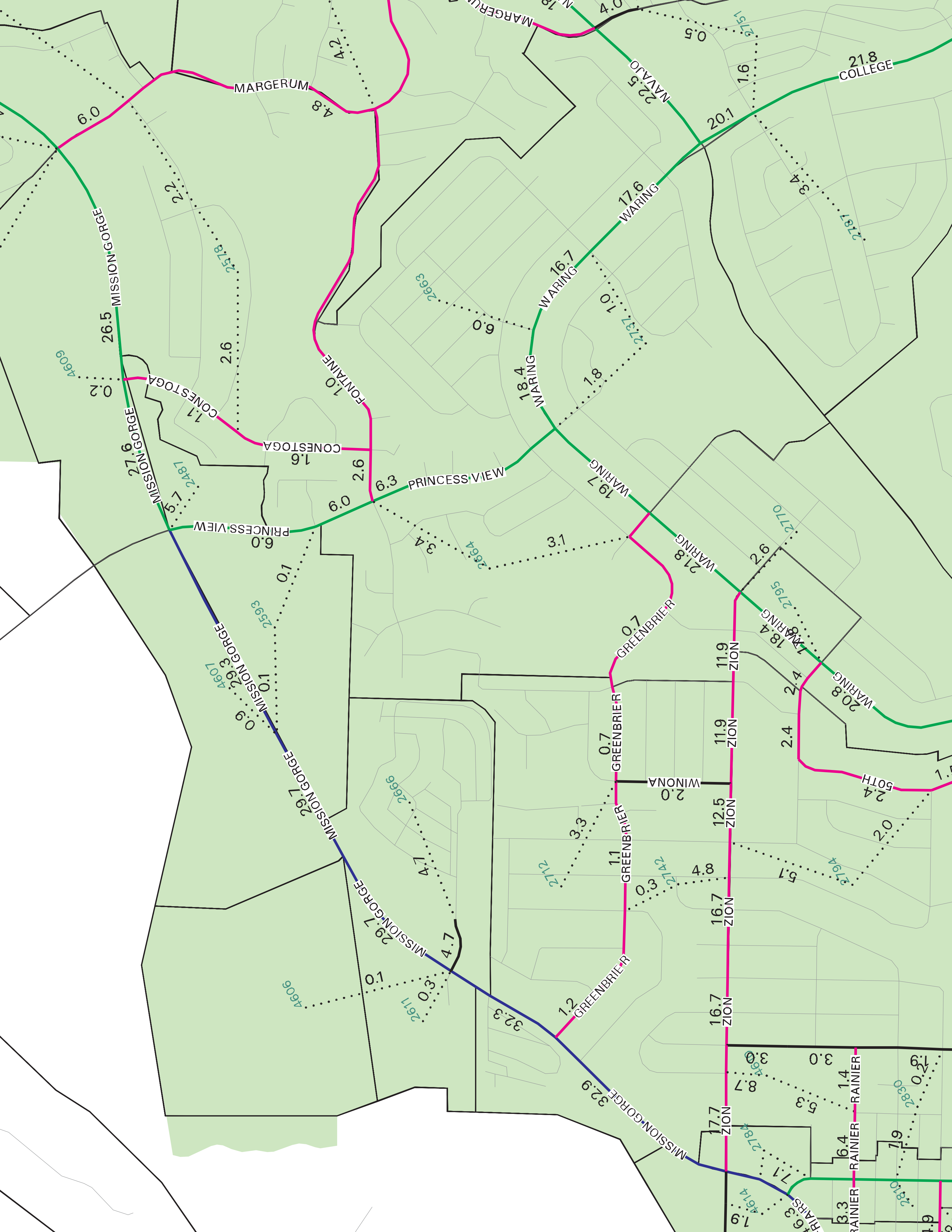
The meters normally operate in a traffic responsive mode.
There are 15 separate rates or steps between the slowest and the fastest discharge rate that depend on the mainlane volumes.

Location (I.D.)	Route	Dir	Period	Cars per green	Seconds/ Cycle	(per lane) Veh./Hr	Total # lanes	HOV
Friars Rd (11405)	15	NB	0530 - 0930	2	12.0 - 14.0	600 - 516	3	lt
	15	NB	1500 - 1900	2	10.7 - 18.6	672 - 386	3	lt
Friars Rd (11404)	15/8	SB	1500 - 1800	2	7.2 - 10.9	996 - 660	1	No
Friars Rd (11401)	15	SB	1500 - 1900	2	7.2	996	1	No

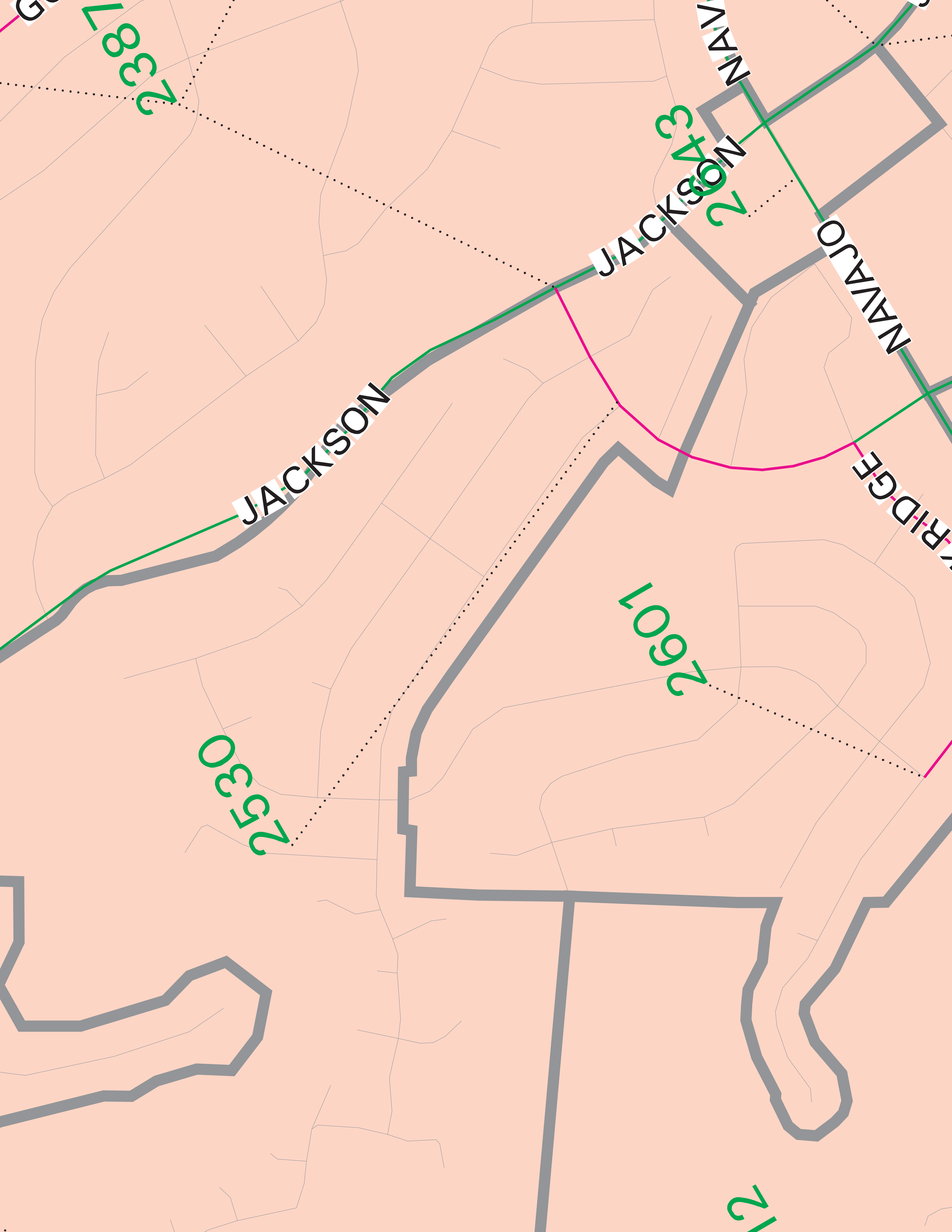
The meters normally operate in a traffic responsive mode.
There are 15 separate rates or steps between the slowest and the fastest discharge rate that depend on the mainlane volumes.

Appendix F

SANDAG Series 11 Model Plots



MARGERUM
MISSION GORGE
CONESTOGA
FONTAINE
PRINCESS VIEW
WARING
NAVAJO
COLLEGE
GREENBRIER
ZION
WINONA
50TH
RAINIER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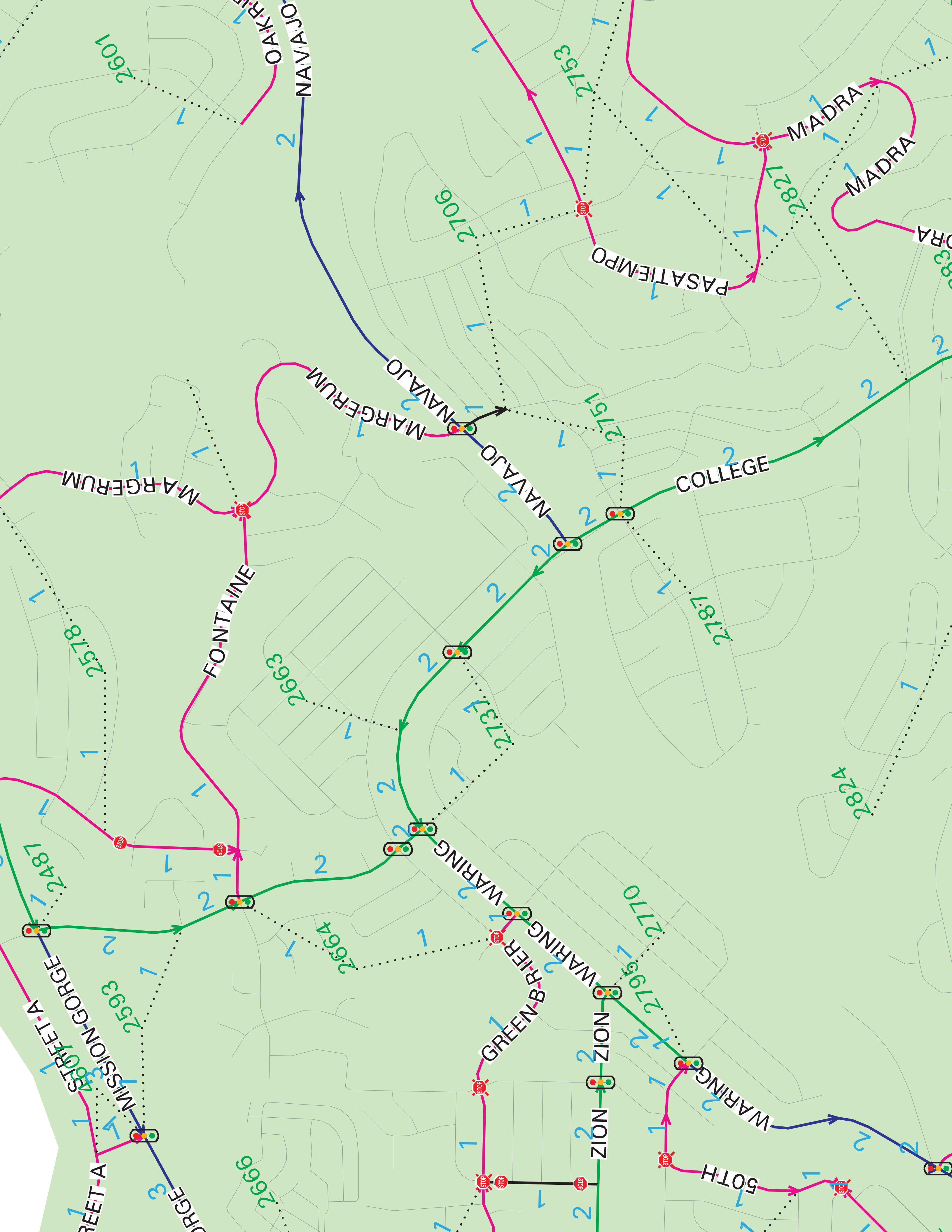
JACKSON
NAVAJO
RIDGE
2387
2643
2530
2601



NAVAJO
MADRA
MADRA
PASATIEMPO
MARGERUM
NAVAJO
MARGERUM
NAVAJO
COLLEGE
FONTAINE
WARING
WARING
WARING
WARING
GREENBRIER
ZION
ZION
50TH
STREET A
MISSION GORGE
2601
2753
2706
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2751
2787
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2663
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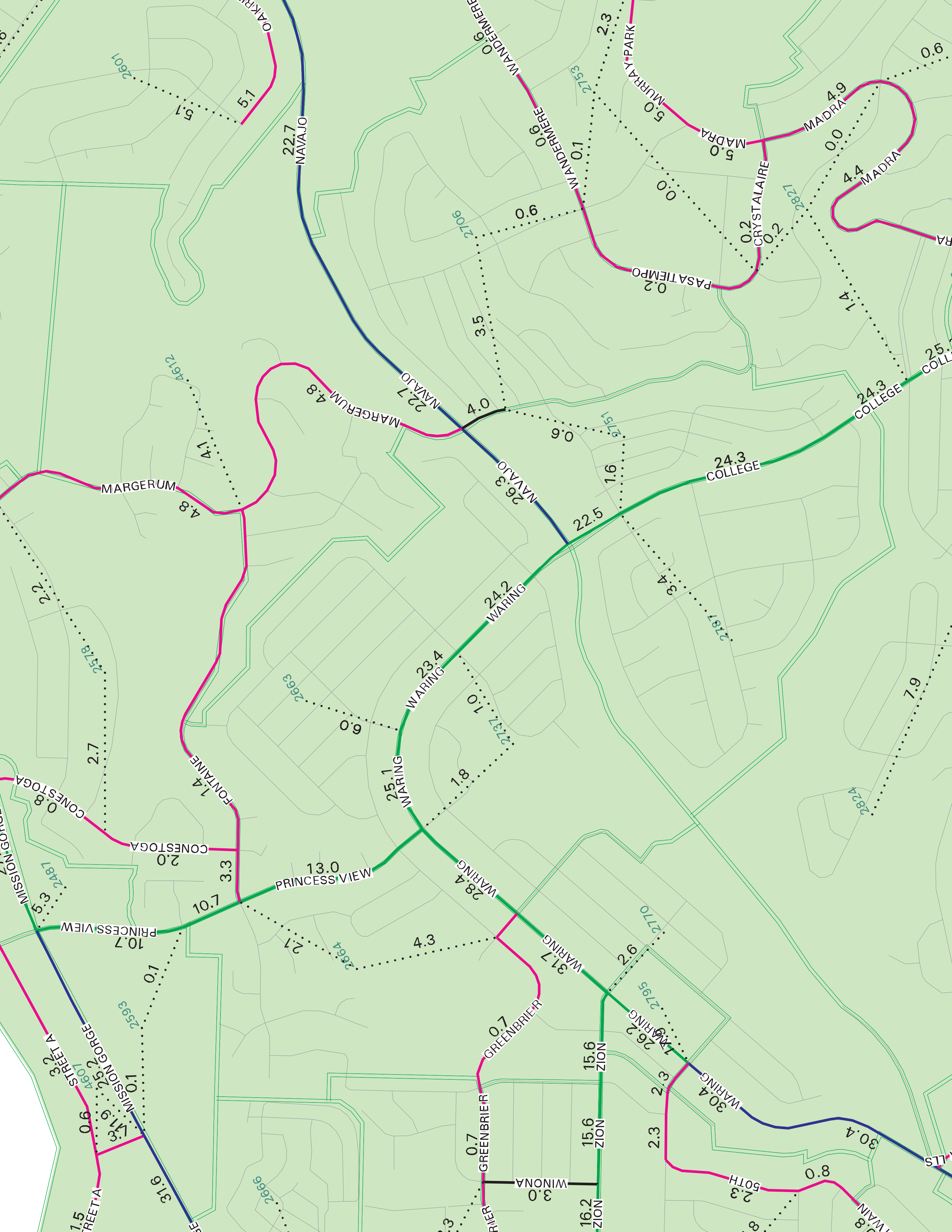
2770
2795
2593
2666



OAKRIDGE
5.1
5.1
2601
22.7
NAVAJO
0.6
WANDERMERE
WANDERMERE
0.6
0.1
WANDERMERE
2.3
2753
MURRAY PARK
5.0
MADRA
5.0
MADRA
4.9
0.6
0.0
0.0
CRYSTALAIRE
0.2
0.2
PASATIEMPO
0.2
2827
4.4
MADRA
1.4
2706
0.6
3.5
NAVAJO
22.7
MARGERUM
4.8
4.0
0.6
2751
4612
4.1
MARGERUM
4.8
NAVAJO
26.3
1.6
22.5
24.3
COLLEGE
24.3
COLLEGE
25.
COLLEGE
2.2
WARING
24.2
3.4
2187
2578
2663
0.9
23.4
WARING
1.0
2737
7.9
2.7
FONTAINE
1.4
CONESTOGA
0.8
1.8
WARING
25.1
2824
CONESTOGA
2.0
3.3
13.0
PRINCESS VIEW
WARING
28.4
2487
MISSION GORGE
5.3
10.7
PRINCESS VIEW
10.7
2.1
2664
4.3
2770
WARING
31.7
2.6
0.1
2593
0.7
GREENBRIER
2795
WARING
26.2
15.6
ZION
STREET A
3.2
4607
5.2
MISSION GORGE
0.1
1.9
0.6
3.7
WARING
30.4
2.3
GREENBRIER
0.7
15.6
ZION
2.3
30.4
0.8
50TH
2.3
WINONA
3.0
2666
31.6
STREET A
1.5
16.2
ZION

DEFINITIONS

Design-hour Factor (K-factor): The proportion of the 24-hour volume that occurs during the design hour.

Directional Distribution (D-factor): A characteristic of traffic, that volume may be greater in one direction than in the other during any particular hour on a highway.

High-occupancy vehicle (HOV): A vehicle with a defined minimum number of occupants (>1); HOV's often include buses, taxis and carpools, when a lane is reserved for their use.

Source: *Highway Capacity Manual, Transportation Research Board*

#	Intersection	Leg	Movement	Volumes AM	Volumes PM	Year 2003 ADT	Year 2030 Alt D ADT
1	Friars Road and I-15 SB Ramps	North Leg	SBR	560	865	17.3	21.2
			SBT	0	0		
			SBL	764	1075		
		East Leg	WBR	415	263	51.5	66.8
			WBT	1522	986		
			WBL	324	283		
		South Leg	NBR	0	0	13.0	10.2
			NBT	0	0		
			NBL	0	0		
		West Leg	EBR	260	369	55.0	61.9
			EBT	556	1479		
			EBL	217	308		
2	Friars Road and I-15 NB Ramps	North Leg	SBR	461	600	14.5	19.2
			SBT	0	0		
			SBL	0	0		
		East Leg	WBR	873	783	59.7	75.2
			WBT	1800	932		
			WBL	0	0		
		South Leg	NBR	0	0	1.0	1.0
			NBT	0	0		
			NBL	0	0		
		West Leg	EBR	0	0	41.0	53.5
			EBT	1337	3150		
			EBL	364	564		
3	Friars Road and Riverdale Street	North Leg	SBR	89	104	6.3	11.4
			SBT	72	38		
			SBL	15	36		
		East Leg	WBR	21	39	42.8	48.7
			WBT	2051	966		
			WBL	76	53		
		South Leg	NBR	12	118	8.6	10.7
			NBT	32	63		
			NBL	128	216		
		West Leg	EBR	95	109	48.9	61.0
			EBT	676	1972		
			EBL	85	223		
4	Friars Road and Mission Gorge Road	North Leg	SBR	0	0	1.0	1.0
			SBT	0	0		
			SBL	0	0		
		East Leg	WBR	0	0	44.1	50.1
			WBT	1976	723		
			WBL	278	204		
		South Leg	NBR	129	464	11.9	13.1
			NBT	0	0		
			NBL	196	307		
		West Leg	EBR	181	255	42.8	48.7
			EBT	478	1920		
			EBL	0	0		
5	Mission Gorge Road and Zion Avenue	North Leg	SBR	94	65	30.6	44.9
			SBT	1881	610		
			SBL	81	98		
		East Leg	WBR	30	67	15.9	18.5
			WBT	56	73		
			WBL	576	360		
		South Leg	NBR	207	400	40.0	49.0
			NBT	400	1541		
			NBL	51	184		
		West Leg	EBR	17	52	5.0	10.8
			EBT	28	105		
			EBL	13	94		

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Friars Road and I-15 SB Ramps	Sb	560	865	0	0	764	1075	660	1020	0	0	970	1460
	Wb	415	263	1522	986	324	283	530	340	2150	1350	340	300
	Nb	0	0	0	0	0	0	0	0	0	0	0	0
	Eb	260	369	556	1479	217	308	260	370	680	1800	260	370

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Friars Road and I-15 NB Ramps	Sb	461	600	0	0	0	0	610	790	0	0	0	0
	Wb	873	783	1800	932	0	0	1130	1020	2410	1200	0	0
	Nb	0	0	0	0	0	0	0	0	0	0	0	0
	Eb	0	0	1337	3150	364	564	0	0	1720	4240	480	750

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Friars Road and Riverdale Street	Sb	89	104	72	38	15	36	140	160	100	60	30	60
	Wb	21	39	2051	966	76	53	40	60	3090	1160	80	70
	Nb	12	118	32	63	128	216	20	130	50	80	150	220
	Eb	95	109	676	1972	85	223	100	140	810	2820	130	350

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Friars Road and Mission Gorge Road	Sb	0	0	0	0	0	0	0	0	0	0	0	0
	Wb	0	0	1976	723	278	204	0	0	2620	840	320	460
	Nb	129	464	0	0	196	307	250	550	0	0	610	420
	Eb	181	255	478	1920	0	0	210	460	610	2600	0	0

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Mission Gorge Road and Zion Avenue	Sb	94	65	1881	610	81	98	180	120	2440	880	110	130
	Wb	30	67	56	73	576	360	40	90	100	130	690	430
	Nb	207	400	400	1541	51	184	250	480	570	2080	90	320
	Eb	17	52	28	105	13	94	30	90	50	180	30	180

	Intersection			Volumes AM	Volumes PM	Year 2003 ADT	Year 2030 Alt D ADT
6	Mission Gorge Road and Princess View Drive	North Leg	SBR	17	6	1.0	1.0
			SBT	6	14		
			SBL	13	6		
		East Leg	WBR	12	4	24.0	27.2
			WBT	2040	350		
			WBL	128	68		
		South Leg	NBR	58	105	5.7	10.7
			NBT	13	2		
			NBL	222	76		
		West Leg	EBR	51	146	24.1	25.2
			EBT	248	1522		
			EBL	14	13		
7	Mission Gorge Road and Jackson Drive	North Leg	SBR	0	2	1.0	1.0
			SBT	0	5		
			SBL	1	2		
		East Leg	WBR	1	3	18.2	19.0
			WBT	1114	231		
			WBL	80	87		
		South Leg	NBR	65	57	7.8	8.9
			NBT	0	2		
			NBL	775	146		
		West Leg	EBR	167	556	22.5	25.1
			EBT	162	866		
			EBL	40	29		
8	Princess View Drive and Waring Road	North Leg	SBR	183	118	7.0	13.0
			SBT	7	5		
			SBL	205	121		
		East Leg	WBR	241	76	18.8	25.1
			WBT	1128	409		
			WBL	15	11		
		South Leg	NBR	6	15	1.0	1.0
			NBT	13	11		
			NBL	6	4		
		West Leg	EBR	5	19	20.7	28.4
			EBT	437	907		
			EBL	77	125		
9	Waring Road and Zion Avenue	North Leg	SBR	446	101	23.3	31.7
			SBT	947	349		
			SBL	44	63		
		East Leg	WBR	16	52	1.0	1.0
			WBT	42	49		
			WBL	58	43		
		South Leg	NBR	22	35	19.1	26.2
			NBT	385	640		
			NBL	182	173		
		West Leg	EBR	208	276	13.1	15.6
			EBT	27	63		
			EBL	143	379		
10	Fairmount Avenue and Vandever Avenue	North Leg	SBR	0	0	1.0	1.0
			SBT	26	13		
			SBL	9	8		
		East Leg	WBR	4	2	3.8	3.9
			WBT	9	3		
			WBL	286	144		
		South Leg	NBR	120	203	3.8	3.9
			NBT	19	12		
			NBL	13	2		
		West Leg	EBR	8	16	1.0	1.0
			EBT	3	7		
			EBL	0	0		

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Mission Gorge Road and Princess View Drive	Sb	17	6	6	14	13	6	20	10	10	30	20	10
	Wb	12	4	2040	350	128	68	20	10	2230	390	200	110
	Nb	58	105	13	2	222	76	90	160	20	10	330	120
	Eb	51	146	248	1522	14	13	80	220	280	1660	20	20

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Mission Gorge Road and Jackson Drive	Sb	0	2	0	5	1	2	0	10	0	10	10	10
	Wb	1	3	1114	231	80	87	10	10	1210	250	90	100
	Nb	65	57	0	2	775	146	80	70	0	10	880	170
	Eb	167	556	162	866	40	29	190	630	180	940	50	40

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Princess View Drive and Waring Road	Sb	183	118	7	5	205	121	300	200	10	10	330	200
	Wb	241	76	1128	409	15	11	390	130	1530	560	20	20
	Nb	6	15	13	11	6	4	10	20	20	20	10	10
	Eb	5	19	437	907	77	125	10	30	600	1230	130	210

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Waring Road and Zion Avenue	Sb	446	101	947	349	44	63	570	130	1300	480	60	80
	Wb	16	52	42	49	58	43	20	70	50	60	70	60
	Nb	22	35	385	640	182	173	30	50	530	880	240	230
	Eb	208	276	27	63	143	379	270	360	30	70	190	490

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Fairmount Avenue and Vandever Avenue	Sb	0	0	26	13	9	8	10	10	30	20	10	10
	Wb	4	2	9	3	286	144	10	10	10	10	300	150
	Nb	120	203	19	12	13	2	130	210	20	20	20	10
	Eb	8	16	3	7	0	0	10	20	20	10	10	10

#	Intersection	Leg	Movement	Volumes AM	Volumes PM	Year 2003 ADT	Year 2030 Alt D ADT
11	Misison Gorge Road	North Leg	SBR	66	27	29.5	27.9
	and		SBT	413	463		
	Vandever Avenue		SBL	23	33		
		East Leg	WBR	31	40	1.0	1.0
			WBT	55	36		
			WBL	40	61		
		South Leg	NBR	31	45	26.0	23.9
			NBT	603	745		
			NBL	138	67		
		West Leg	EBR	40	204	5.9	6.7
			EBT	9	52		
			EBL	22	95		
12	San Diego Mission Road	North Leg	SBR	57	48	7.1	8.5
	and		SBT	191	202		
	Rancho Mission Road		SBL	83	102		
		East Leg	WBR	143	132	9.8	16.6
			WBT	233	92		
			WBL	138	90		
		South Leg	NBR	47	74	15.0	16.7
			NBT	149	247		
			NBL	168	90		
		West Leg	EBR	59	222	14.0	16.9
			EBT	60	216		
			EBL	31	97		
13	Fairmount Avenue	North Leg	SBR	169	99	8.3	11.7
	and		SBT	94	152		
	Twain Avenue		SBL	6	33		
		East Leg	WBR	22	19	5.1	6.7
			WBT	217	100		
			WBL	48	39		
		South Leg	NBR	39	69	2.0	5.4
			NBT	195	93		
			NBL	108	79		
		West Leg	EBR	68	103	10.2	17.0
			EBT	58	186		
			EBL	54	65		
14	Mission Gorge Road	North Leg	SBR	56	41	26.0	23.9
	and		SBT	465	702		
	Twain Avenue		SBL	12	21		
		East Leg	WBR	10	32	4.3	3.0
			WBT	162	44		
			WBL	136	101		
		South Leg	NBR	89	128	29.0	26.8
			NBT	802	817		
			NBL	102	74		
		West Leg	EBR	87	141	8.6	9.6
			EBT	23	126		
			EBL	28	92		
15	Twain Avenue	North Leg	SBR	68	28	1.7	1.5
	and		SBT	4	5		
	Crawford Street		SBL	5	23		
		East Leg	WBR	16	5	2.9	1.9
			WBT	194	60		
			WBL	1	0		
		South Leg	NBR	2	0	1.0	1.0
			NBT	2	4		
			NBL	30	6		
		West Leg	EBR	5	9	4.3	3.0
			EBT	45	173		
			EBL	18	46		

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Misison Gorge Road	Sb	66	27	413	463	23	33	70	30	480	910	30	40
and	Wb	31	40	55	36	40	61	40	40	60	40	40	70
Vandever Avenue	Nb	31	45	603	745	138	67	40	50	1120	930	150	70
	Eb	40	204	9	52	22	95	50	210	10	60	30	100

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
San Diego Mission Road	Sb	57	48	191	202	83	102	70	60	230	240	120	150
and	Wb	143	132	233	92	138	90	210	200	340	140	200	130
Rancho Mission Road	Nb	47	74	149	247	168	90	70	110	180	290	200	110
	Eb	59	222	60	216	31	97	70	260	90	320	40	120

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Fairmount Avenue	Sb	169	99	94	152	6	33	250	100	180	160	10	40
and	Wb	22	19	217	100	48	39	30	30	320	100	90	50
Twain Avenue	Nb	39	69	195	93	108	79	40	130	210	160	240	180
	Eb	68	103	58	186	54	65	150	230	60	270	60	90

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Mission Gorge Road	Sb	56	41	465	702	12	21	60	50	540	1150	20	30
and	Wb	10	32	162	44	136	101	10	40	220	50	140	110
Twain Avenue	Nb	89	128	802	817	102	74	90	130	1330	1010	200	80
	Eb	87	141	23	126	28	92	90	240	30	140	30	100

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Twain Avenue	Sb	68	28	4	5	5	23	70	30	10	10	10	30
and	Wb	16	5	194	60	1	0	20	10	250	60	10	0
Crawford Street	Nb	2	0	2	4	30	6	10	0	10	10	30	10
	Eb	5	9	45	173	18	46	10	10	50	180	20	50

#	Intersection	Leg	Movement	Volumes AM	Volumes PM	Year 2003 ADT	Year 2030 Alt D ADT
16	Mission Gorge Road and Mission Gorge Place	North Leg	SBR	8	16	27.2	23.5
			SBT	561	837		
			SBL	86	117		
		East Leg	WBR	75	90	7.1	15.8
			WBT	10	10		
			WBL	60	65		
		South Leg	NBR	112	49	31.9	26.8
			NBT	1028	917		
			NBL	10	14		
		West Leg	EBR	9	13	1.0	4.6
			EBT	4	1		
			EBL	4	15		
17	Fairmount Avenue and Mission Gorge Road	North Leg	SBR	10	7	31.3	38.2
			SBT	584	892		
			SBL	7	12		
		East Leg	WBR	3	11	1.0	8.3
			WBT	3	5		
			WBL	8	26		
		South Leg	NBR	28	28	41.1	55.7
			NBT	1145	942		
			NBL	574	237		
		West Leg	EBR	372	323	10.1	10.9
			EBT	3	4		
			EBL	6	9		
18	Fairmount Avenue and Alvarado Canyon Road / Camino del	North Leg	SBR	229	48	41.1	55.7
			SBT	888	1288		
			SBL	18	9		
		East Leg	WBR	304	223	13.9	12.6
			WBT	423	139		
			WBL	417	663		
		South Leg	NBR	170	177	53.6	64.2
			NBT	1264	847		
			NBL	399	264		
		West Leg	EBR	272	581	14.4	16.2
			EBT	17	106		
			EBL	221	123		
19	Alvarado Canyon Road and Mission Gorge Place	North Leg	SBR	48	151	4.3	3.4
			SBT	0	0		
			SBL	32	222		
		East Leg	WBR	141	71	1.0	4.6
			WBT	190	44		
			WBL	0	0		
		South Leg	NBR	0	0	1.0	1.0
			NBT	0	0		
			NBL	0	0		
		West Leg	EBR	0	0	4.3	5.3
			EBT	19	175		
			EBL	68	93		
20	Fairmount Avenue and I-8 EB Off Ramp	North Leg	SBR	0	0	38.2	44.4
			SBT	632	1130		
			SBL	0	0		
		East Leg	WBR	0	0	1.0	1.0
			WBT	0	0		
			WBL	0	0		
		South Leg	NBR	0	0	26.2	30.7
			NBT	870	541		
			NBL	118	30		
		West Leg	EBR	0	0	12.0	13.7
			EBT	0	0		
			EBL	963	747		

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Mission Gorge Road and Mission Gorge Place	Sb	8	16	561	837	86	117	30	50	610	1120	90	340
	Wb	75	90	10	10	60	65	320	110	80	30	350	70
	Nb	112	49	1028	917	10	14	130	330	1390	1060	30	40
	Eb	9	13	4	1	4	15	30	40	20	60	20	50

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Fairmount Avenue and Mission Gorge Road	Sb	10	7	584	892	7	12	20	10	790	1120	150	90
	Wb	3	11	3	5	8	26	190	170	20	30	450	430
	Nb	28	28	1145	942	574	237	400	620	1350	1220	700	290
	Eb	372	323	3	4	6	9	460	400	40	70	10	20

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Fairmount Avenue and Alvarado Canyon Road /	Sb	229	48	888	1288	18	9	470	120	1410	1930	0	0
	Wb	304	223	423	139	417	663	310	230	430	140	420	670
	Nb	170	177	1264	847	399	264	0	0	1820	1520	470	310
	Eb	272	581	17	106	221	123	320	680	0	0	320	380

INTERSECTION	DIRECTION	EXISTING						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Alvarado Canyon Road and Mission Gorge Place	Sb	48	151	0	0	32	222	110	160	0	0	90	600
	Wb	141	71	190	44	0	0	330	200	360	270	0	0
	Nb	0	0	0	0	0	0	0	0	0	0	0	0
	Eb	0	0	19	175	68	93	0	0	260	380	70	100

INTERSECTION	DIRECTION	Existing						Alt D					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
Fairmount Avenue and I-8 EB Off Ramp	Sb	0	0	632	1130	0	0	0	0	740	1320	0	0
	Wb	0	0	0	0	0	0	0	0	0	0	0	0
	Nb	0	0	870	541	118	30	0	0	1180	900	140	40
	Eb	0	0	0	0	963	747	0	0	0	0	1110	930

APPENDIX G

YEAR 2030 WITH PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

1: Friars Rd & I-15 SB Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	680	260	340	2150	530	0	0	0	970	0	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	7.0	7.0	4.2	7.0	7.0				5.1	5.1	5.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00				0.95	0.95	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	739	283	370	2337	576	0	0	0	1054	0	717
RTOR Reduction (vph)	0	0	207	0	0	302	0	0	0	0	0	456
Lane Group Flow (vph)	283	739	76	370	2337	274	0	0	0	527	527	261
Turn Type	Prot		Perm	Prot		Perm				Split		Perm
Protected Phases	5	2		1	6					4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	15.2	23.7	23.7	21.0	29.0	29.0				27.3	27.3	27.3
Effective Green, g (s)	15.2	23.7	23.7	21.0	29.0	29.0				27.3	27.3	27.3
Actuated g/C Ratio	0.17	0.27	0.27	0.24	0.33	0.33				0.31	0.31	0.31
Clearance Time (s)	4.7	7.0	7.0	4.2	7.0	7.0				5.1	5.1	5.1
Vehicle Extension (s)	2.0	2.0	2.0	1.0	2.0	2.0				1.0	1.0	1.0
Lane Grp Cap (vph)	305	1365	425	421	1670	520				520	520	862
v/s Ratio Prot	c0.16	0.15		0.21	c0.46					c0.31	0.31	
v/s Ratio Perm			0.05			0.17						0.09
v/c Ratio	0.93	0.54	0.18	0.88	1.40	0.53				1.01	1.01	0.30
Uniform Delay, d1	36.0	27.6	24.8	32.4	29.6	24.1				30.5	30.5	23.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	32.5	0.2	0.1	17.9	183.4	0.4				42.9	42.9	0.9
Delay (s)	68.5	27.9	24.9	50.3	213.1	24.5				73.4	73.4	24.2
Level of Service	E	C	C	D	F	C				E	E	C
Approach Delay (s)		36.0			161.7			0.0			53.4	
Approach LOS		D			F			A			D	

Intersection Summary			
HCM Average Control Delay	105.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	16.8
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

2: Friars Rd & I-15 NB On Ramp

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	480	1720	2410	1130	0	610
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.7	7.0	7.0		4.0
Lane Util. Factor	1.00	0.91	0.86	0.86		1.00
Frt	1.00	1.00	0.98	0.85		0.86
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	5085	4717	1362		1611
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1770	5085	4717	1362		1611
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	511	1830	2564	1202	0	649
RTOR Reduction (vph)	0	0	19	38	0	0
Lane Group Flow (vph)	511	1830	2906	803	0	649
Turn Type	Prot			Perm		Free
Protected Phases	5	2	6			
Permitted Phases				6		Free
Actuated Green, G (s)	24.5	89.5	52.5	52.5		89.5
Effective Green, g (s)	24.5	89.5	52.5	52.5		89.5
Actuated g/C Ratio	0.27	1.00	0.59	0.59		1.00
Clearance Time (s)	5.5	5.7	7.0	7.0		
Vehicle Extension (s)	2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)	485	5085	2767	799		1611
v/s Ratio Prot	c0.29	0.36	c0.62			
v/s Ratio Perm				0.59		0.40
v/c Ratio	1.05	0.36	1.05	1.00		0.40
Uniform Delay, d1	32.5	0.0	18.5	18.5		0.0
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	55.7	0.2	32.2	33.1		0.8
Delay (s)	88.2	0.2	50.7	51.6		0.8
Level of Service	F	A	D	D		A
Approach Delay (s)		19.4	50.9		0.8	
Approach LOS		B	D		A	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

3: Friars Rd & Riverdale St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	810	100	80	3090	40	150	50	20	30	100	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.96		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5076		1770	1782		1770	1700	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.47	1.00		0.71	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5076		866	1782		1318	1700	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	880	109	87	3359	43	163	54	22	33	109	152
RTOR Reduction (vph)	0	0	58	0	1	0	0	14	0	0	46	0
Lane Group Flow (vph)	141	880	51	87	3401	0	163	62	0	33	215	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	7.8	51.5	51.5	8.4	51.9		35.1	35.1		35.1	35.1	
Effective Green, g (s)	7.8	51.5	51.5	8.4	51.9		35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.07	0.47	0.47	0.08	0.47		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	126	2381	741	135	2395		276	569		421	542	
v/s Ratio Prot	c0.08	0.17		0.05	c0.67			0.04			0.13	
v/s Ratio Perm			0.03				c0.19			0.03		
v/c Ratio	1.12	0.37	0.07	0.64	1.42		0.59	0.11		0.08	0.40	
Uniform Delay, d1	51.1	18.8	16.1	49.3	29.1		31.4	26.4		26.2	29.2	
Progression Factor	1.00	1.00	1.00	1.26	0.61		1.00	1.00		1.00	1.00	
Incremental Delay, d2	115.7	0.4	0.2	0.7	189.2		9.0	0.4		0.0	0.2	
Delay (s)	166.8	19.3	16.3	63.1	207.0		40.4	26.8		26.2	29.4	
Level of Service	F	B	B	E	F		D	C		C	C	
Approach Delay (s)		37.4			203.4			36.1			29.0	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM Average Control Delay	149.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

4: Friars Rd & Mission Gorge Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	610	210	320	2620	610	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	4.4	5.8	4.4	4.4
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	2787
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	656	226	344	2817	656	269
RTOR Reduction (vph)	0	148	0	0	0	68
Lane Group Flow (vph)	656	78	344	2817	656	201
Turn Type		Perm	Prot			pt+ov
Protected Phases	2		1	6	3	3 1
Permitted Phases		2				
Actuated Green, G (s)	38.1	38.1	17.6	60.1	39.7	61.7
Effective Green, g (s)	38.1	38.1	17.6	60.1	39.7	61.7
Actuated g/C Ratio	0.35	0.35	0.16	0.55	0.36	0.56
Clearance Time (s)	5.8	5.8	4.4	5.8	4.4	
Vehicle Extension (s)	3.3	3.3	2.0	3.3	2.0	
Lane Grp Cap (vph)	1761	548	549	2778	639	1563
v/s Ratio Prot	0.13		0.10	c0.55	c0.37	0.07
v/s Ratio Perm		0.05				
v/c Ratio	0.37	0.14	0.63	1.01	1.03	0.13
Uniform Delay, d1	27.0	24.7	43.1	24.9	35.1	11.4
Progression Factor	0.61	0.19	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.5	1.6	20.6	42.6	0.0
Delay (s)	17.2	5.3	44.7	45.6	77.7	11.4
Level of Service	B	A	D	D	E	B
Approach Delay (s)	14.1			45.5	58.4	
Approach LOS	B			D	E	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Zion Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	50	30	690	100	40	90	570	250	110	2440	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.94		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1758		1681	1688		1770	5085	1583	1770	5033	
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1758		1681	1688		1770	5085	1583	1770	5033	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	34	57	34	793	115	46	103	655	287	126	2805	207
RTOR Reduction (vph)	0	19	0	0	3	0	0	0	93	0	7	0
Lane Group Flow (vph)	34	72	0	476	475	0	103	655	194	126	3005	0
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases									2			
Actuated Green, G (s)	9.2	9.2		39.3	39.3		25.6	41.7	81.0	10.1	25.7	
Effective Green, g (s)	9.2	9.2		39.3	39.3		25.6	41.7	81.0	10.1	25.7	
Actuated g/C Ratio	0.08	0.08		0.33	0.33		0.21	0.35	0.68	0.08	0.21	
Clearance Time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	136	135		551	553		378	1767	1069	149	1078	
v/s Ratio Prot	0.02	c0.04		c0.28	0.28		0.06	c0.13	0.06	c0.07	c0.60	
v/s Ratio Perm									0.06			
v/c Ratio	0.25	0.53		0.86	0.86		0.27	0.37	0.18	0.85	2.79	
Uniform Delay, d1	52.2	53.3		37.8	37.8		39.4	29.3	7.2	54.2	47.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	2.0		16.4	15.9		1.8	0.6	0.4	32.2	807.0	
Delay (s)	52.5	55.3		54.2	53.7		41.2	29.9	7.6	86.4	854.1	
Level of Service	D	E		D	D		D	C	A	F	F	
Approach Delay (s)		54.6			53.9			24.9			823.3	
Approach LOS		D			D			C			F	

Intersection Summary			
HCM Average Control Delay	507.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.6
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Mission Gorge Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	280	80	200	2230	20	330	20	90	20	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00			1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88			0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1770	4916		1770	3539	1583	3433	1635			1726	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (perm)	1770	4916		1770	3539	1583	3433	1635			1726	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	318	91	227	2534	23	375	23	102	23	11	23
RTOR Reduction (vph)	0	31	0	0	0	2	0	86	0	0	18	0
Lane Group Flow (vph)	23	378	0	227	2534	21	375	39	0	0	39	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						
Actuated Green, G (s)	2.3	57.7		18.9	73.1	73.1	18.9	18.9			7.3	
Effective Green, g (s)	2.3	57.7		18.9	73.1	73.1	18.9	18.9			7.3	
Actuated g/C Ratio	0.02	0.47		0.15	0.59	0.59	0.15	0.15			0.06	
Clearance Time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Vehicle Extension (s)	2.0	5.3		2.0	5.3	5.3	2.0	2.0			2.0	
Lane Grp Cap (vph)	33	2302		272	2100	939	527	251			102	
v/s Ratio Prot	0.01	0.08		c0.13	c0.72		c0.11	0.02			c0.02	
v/s Ratio Perm						0.01						
v/c Ratio	0.70	0.16		0.83	1.21	0.02	0.71	0.15			0.38	
Uniform Delay, d1	60.1	18.9		50.6	25.1	10.3	49.6	45.2			55.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	40.8	0.1		18.5	97.8	0.0	3.8	0.1			0.9	
Delay (s)	100.9	18.9		69.2	122.8	10.3	53.3	45.3			56.7	
Level of Service	F	B		E	F	B	D	D			E	
Approach Delay (s)		23.3			117.5			51.3			56.7	
Approach LOS		C			F			D			E	

Intersection Summary			
HCM Average Control Delay	97.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	123.2	Sum of lost time (s)	21.6
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Mission Gorge Rd & Jackson Dr

Alternative D AM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	180	190	90	1210	10	880	0	80	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.85			1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)	1770	4694		1770	5079		3433	1583			1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1770	4694		1770	5079		3433	1583			1770	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	57	207	218	103	1391	11	1011	0	92	11	0	0
RTOR Reduction (vph)	0	144	0	0	1	0	0	61	0	0	0	0
Lane Group Flow (vph)	57	281	0	103	1401	0	1011	31	0	0	11	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	4.2	33.0		4.2	32.2		32.6	32.6			5.8	
Effective Green, g (s)	4.2	33.0		4.2	32.2		32.6	32.6			5.8	
Actuated g/C Ratio	0.04	0.34		0.04	0.33		0.34	0.34			0.06	
Clearance Time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Vehicle Extension (s)	2.0	5.2		2.0	4.9		2.0	2.0			2.0	
Lane Grp Cap (vph)	77	1595		77	1684		1153	531			106	
v/s Ratio Prot	0.03	0.06		c0.06	c0.28		c0.29	0.02			c0.01	
v/s Ratio Perm												
v/c Ratio	0.74	0.18		1.34	0.83		0.88	0.06			0.10	
Uniform Delay, d1	45.9	22.5		46.4	30.0		30.4	21.8			43.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	28.0	0.1		216.8	4.1		7.5	0.0			0.2	
Delay (s)	73.9	22.6		263.3	34.0		37.9	21.9			43.3	
Level of Service	E	C		F	C		D	C			D	
Approach Delay (s)		28.7			49.7			36.5			43.3	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	41.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	22.3
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Waring Rd & Princess View Dr

Alternative D AM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	600	10	20	1530	390	10	20	10	330	10	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3530		1770	3431			1776		1770	1593	
Flt Permitted	0.95	1.00		0.95	1.00			0.69		0.77	1.00	
Satd. Flow (perm)	1770	3530		1770	3431			1241		1432	1593	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	151	698	12	23	1779	453	12	23	12	384	12	349
RTOR Reduction (vph)	0	1	0	0	17	0	0	9	0	0	73	0
Lane Group Flow (vph)	151	709	0	23	2215	0	0	38	0	384	288	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.6	83.3		3.5	77.1			30.1		30.0	30.0	
Effective Green, g (s)	9.6	83.3		3.5	77.1			30.1		30.0	30.0	
Actuated g/C Ratio	0.07	0.63		0.03	0.59			0.23		0.23	0.23	
Clearance Time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4			2.0		2.0	2.0	
Lane Grp Cap (vph)	129	2233		47	2009			284		326	363	
v/s Ratio Prot	c0.09	0.20		0.01	c0.65						0.18	
v/s Ratio Perm								0.03		c0.27		
v/c Ratio	1.17	0.32		0.49	1.10			0.13		1.18	0.79	
Uniform Delay, d1	61.0	11.1		63.2	27.3			40.4		50.8	47.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	132.3	0.1		2.9	54.3			0.1		107.3	10.5	
Delay (s)	193.3	11.2		66.1	81.6			40.5		158.2	58.5	
Level of Service	F	B		E	F			D		F	E	
Approach Delay (s)		43.2			81.5			40.5			109.9	
Approach LOS		D			F			D			F	

Intersection Summary			
HCM Average Control Delay	77.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	131.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Alternative D AM
9: Zion Ave & Waring Road
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	30	270	70	50	20	240	530	30	60	1300	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1708	1583		1782		1770	3510		1770	3377	
Flt Permitted	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1708	1583		1782		1770	3510		1770	3377	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	33	293	76	54	22	261	576	33	65	1413	620
RTOR Reduction (vph)	0	0	256	0	4	0	0	2	0	0	28	0
Lane Group Flow (vph)	120	120	37	0	148	0	261	607	0	65	2005	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	14.4	14.4	14.4		15.3		12.8	58.4		6.7	51.6	
Effective Green, g (s)	14.4	14.4	14.4		15.3		12.8	58.4		6.7	51.6	
Actuated g/C Ratio	0.13	0.13	0.13		0.13		0.11	0.51		0.06	0.45	
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	
Lane Grp Cap (vph)	213	216	200		239		199	1800		104	1530	
v/s Ratio Prot	c0.07	0.07			c0.08		c0.15	0.17		0.04	c0.59	
v/s Ratio Perm			0.02									
v/c Ratio	0.56	0.56	0.19		0.62		1.31	0.34		0.62	1.31	
Uniform Delay, d1	46.8	46.7	44.5		46.5		50.6	16.3		52.4	31.2	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.8	0.2		3.3		171.4	0.5		8.1	144.4	
Delay (s)	48.8	48.5	44.7		49.9		221.9	16.9		60.5	175.5	
Level of Service	D	D	D		D		F	B		E	F	
Approach Delay (s)		46.5			49.9			78.4			172.0	
Approach LOS		D			D			E			F	

Intersection Summary

HCM Average Control Delay	126.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	113.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Alternative D AM
10: Vandever Ave & Fairmount Avenue
1/13/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	10	300	10	10	20	20	130	10	30	0
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	13	26	13	395	13	13	26	26	171	13	39	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	53	421	224	53
Volume Left (vph)	13	395	26	13
Volume Right (vph)	13	13	171	0
Hadj (s)	-0.07	0.20	-0.40	0.08
Departure Headway (s)	5.1	4.9	4.8	5.5
Degree Utilization, x	0.07	0.57	0.30	0.08
Capacity (veh/h)	634	709	692	578
Control Delay (s)	8.5	14.2	9.8	9.0
Approach Delay (s)	8.5	14.2	9.8	9.0
Approach LOS	A	B	A	A

Intersection Summary

Delay	12.1		
HCM Level of Service	B		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

11: Vandever Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	10	50	40	60	40	150	1120	40	30	480	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.96		1.00	0.99		1.00	0.98	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1696			1765		1770	3521		1770	3472	
Flt Permitted		0.77			0.86		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1324			1533		1770	3521		1770	3472	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	11	53	43	64	43	160	1191	43	32	511	74
RTOR Reduction (vph)	0	39	0	0	13	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	57	0	0	137	0	160	1233	0	32	579	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		17.6			17.6		16.1	95.0		4.8	83.5	
Effective Green, g (s)		17.6			17.6		16.1	95.0		4.8	83.5	
Actuated g/C Ratio		0.14			0.14		0.12	0.73		0.04	0.64	
Clearance Time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Vehicle Extension (s)		2.0			2.0		2.0	3.1		2.0	3.2	
Lane Grp Cap (vph)		179			208		219	2573		65	2230	
v/s Ratio Prot							c0.09	c0.35		0.02	0.17	
v/s Ratio Perm		0.04			c0.09							
v/c Ratio		0.32			0.66		0.73	0.48		0.49	0.26	
Uniform Delay, d1		50.8			53.3		54.9	7.2		61.4	10.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			5.6		10.3	0.6		2.1	0.3	
Delay (s)		51.2			59.0		65.1	7.9		63.5	10.3	
Level of Service		D			E		E	A		E	B	
Approach Delay (s)		51.2			59.0			14.5			13.0	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

12: San Diego Mission Rd & Rancho Mission Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	90	70	200	340	210	200	180	70	120	230	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3307		1770	3337		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3307		1770	3337		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	48	108	84	241	410	253	241	217	84	145	277	84
RTOR Reduction (vph)	0	67	0	0	99	0	0	0	63	0	0	64
Lane Group Flow (vph)	48	125	0	241	564	0	241	217	21	145	277	20
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	3.7	15.3		12.4	24.2		12.4	18.9	18.9	9.3	15.6	15.6
Effective Green, g (s)	3.7	15.3		12.4	24.2		12.4	18.9	18.9	9.3	15.6	15.6
Actuated g/C Ratio	0.05	0.21		0.17	0.33		0.17	0.25	0.25	0.13	0.21	0.21
Clearance Time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Vehicle Extension (s)	2.0	4.2		2.0	4.4		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	88	681		295	1087		295	474	403	222	391	332
v/s Ratio Prot	0.03	0.04		c0.14	c0.17		c0.14	c0.12		0.08	c0.15	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.55	0.18		0.82	0.52		0.82	0.46	0.05	0.65	0.71	0.06
Uniform Delay, d1	34.5	24.3		29.9	20.3		29.9	23.4	20.9	31.0	27.2	23.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.2		15.1	0.7		15.1	0.3	0.0	5.2	4.7	0.0
Delay (s)	38.1	24.5		45.0	21.0		45.0	23.6	21.0	36.1	32.0	23.5
Level of Service	D	C		D	C		D	C	C	D	C	C
Approach Delay (s)		27.3			27.4			32.7			31.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

13: Twain Ave & Fairmount Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	60	150	90	320	30	240	210	40	10	180	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.98		1.00	0.91	
Flt Protected		0.98	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817	1583		3467		1770	1818		1770	1700	
Flt Permitted		0.43	1.00		0.84		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		809	1583		2928		1770	1818		1770	1700	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	75	75	188	112	400	38	300	262	50	12	225	312
RTOR Reduction (vph)	0	0	144	0	8	0	0	9	0	0	66	0
Lane Group Flow (vph)	0	150	44	0	542	0	300	303	0	12	471	0
Turn Type	Perm		custom	Perm			Split			Split		
Protected Phases		2	2		6		8	8		4	4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		17.1	17.1		17.1		20.5	20.5		21.3	21.3	
Effective Green, g (s)		17.1	17.1		17.1		20.5	20.5		21.3	21.3	
Actuated g/C Ratio		0.24	0.24		0.24		0.28	0.28		0.29	0.29	
Clearance Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.8	2.8		2.8		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		191	374		692		501	515		521	500	
v/s Ratio Prot			0.03				c0.17	0.17		0.01	c0.28	
v/s Ratio Perm		c0.19			0.19							
v/c Ratio		0.79	0.12		0.78		0.60	0.59		0.02	0.94	
Uniform Delay, d1		25.9	21.7		25.9		22.4	22.3		18.2	25.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		18.6	0.1		5.7		5.2	4.9		0.0	26.2	
Delay (s)		44.5	21.9		31.6		27.6	27.2		18.2	51.2	
Level of Service		D	C		C		C	C		B	D	
Approach Delay (s)		31.9			31.6			27.4			50.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

14: Twain Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	30	90	140	220	10	200	1330	90	20	540	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1653		1770	1851		1770	3506		1770	3486	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1653		1770	1851		1770	3506		1770	3486	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	33	100	156	244	11	222	1478	100	22	600	67
RTOR Reduction (vph)	0	91	0	0	2	0	0	3	0	0	6	0
Lane Group Flow (vph)	33	42	0	156	253	0	222	1575	0	22	661	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.5	10.3		18.5	23.2		18.2	67.6		2.4	51.8	
Effective Green, g (s)	4.5	10.3		18.5	23.2		18.2	67.6		2.4	51.8	
Actuated g/C Ratio	0.04	0.09		0.16	0.20		0.16	0.58		0.02	0.45	
Clearance Time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.1		2.0	2.9	
Lane Grp Cap (vph)	69	147		282	370		278	2043		37	1557	
v/s Ratio Prot	c0.02	0.03		0.09	c0.14		c0.13	c0.45		0.01	0.19	
v/s Ratio Perm												
v/c Ratio	0.48	0.28		0.55	0.68		0.80	0.77		0.59	0.42	
Uniform Delay, d1	54.6	49.4		44.9	43.0		47.1	18.3		56.3	21.9	
Progression Factor	1.00	1.00		1.00	1.00		0.83	1.69		1.00	1.00	
Incremental Delay, d2	1.9	0.4		1.3	4.1		8.0	1.6		15.9	0.8	
Delay (s)	56.5	49.8		46.3	47.2		47.2	32.7		72.2	22.8	
Level of Service	E	D		D	D		D	C		E	C	
Approach Delay (s)		51.1			46.8			34.5			24.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	13.7
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
15: Twain Ave & Crawford St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	50	10	10	250	20	30	10	10	10	10	70
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	61	12	12	305	24	37	12	12	12	12	85

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	98	341	61	110
Volume Left (vph)	24	12	37	12
Volume Right (vph)	12	24	12	85
Hadj (s)	0.01	0.00	0.03	-0.41
Departure Headway (s)	4.7	4.4	5.1	4.6
Degree Utilization, x	0.13	0.42	0.09	0.14
Capacity (veh/h)	709	778	637	706
Control Delay (s)	8.4	10.6	8.6	8.4
Approach Delay (s)	8.4	10.6	8.6	8.4
Approach LOS	A	B	A	A

Intersection Summary			
Delay	9.7		
HCM Level of Service	A		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
16: Mission Gorge Pl & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	30	350	80	320	30	1390	130	90	610	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.94		1.00	0.88		1.00	0.99		1.00	0.99	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732		1770	1639		1770	3494		1770	3515	
Flt Permitted		0.34		0.70	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		591		1310	1639		1770	3494		1770	3515	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	22	32	376	86	344	32	1495	140	97	656	32
RTOR Reduction (vph)	0	23	0	0	124	0	0	5	0	0	3	0
Lane Group Flow (vph)	0	53	0	376	306	0	32	1630	0	97	685	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.7		24.7	24.7		3.6	67.7		10.7	74.8	
Effective Green, g (s)		24.7		24.7	24.7		3.6	67.7		10.7	74.8	
Actuated g/C Ratio		0.21		0.21	0.21		0.03	0.58		0.09	0.64	
Clearance Time (s)		4.3		4.3	4.3		4.0	4.6		4.0	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.2		2.0	4.2	
Lane Grp Cap (vph)		126		279	349		55	2039		163	2267	
v/s Ratio Prot					0.19		0.02	c0.47		c0.05	0.19	
v/s Ratio Perm		0.09		c0.29								
v/c Ratio		0.42		1.35	0.88		0.58	0.80		0.60	0.30	
Uniform Delay, d1		39.5		45.6	44.2		55.5	18.8		50.6	9.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.28	0.53	
Incremental Delay, d2		0.8		178.4	20.4		9.7	3.4		3.6	0.3	
Delay (s)		40.3		224.0	64.6		65.2	22.2		68.4	5.1	
Level of Service		D		F	E		E	C		E	A	
Approach Delay (s)		40.3			139.0			23.1			12.9	
Approach LOS		D			F			C			B	

Intersection Summary			
HCM Average Control Delay	49.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Alvarado Canyon Rd & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	40	460	450	20	190	700	1350	400	150	790	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Lane Util. Factor		0.95	0.95	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	
Frt		0.88	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1553	1504	3433	1863	1583	3433	3539	1583	1770	3526	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1553	1504	3433	1863	1583	3433	3539	1583	1770	3526	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	43	489	479	21	202	745	1436	426	160	840	21
RTOR Reduction (vph)	0	0	0	0	0	174	0	0	194	0	1	0
Lane Group Flow (vph)	0	274	269	479	21	28	745	1436	232	160	860	0
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)		21.1	21.1	16.2	16.2	16.2	26.5	47.7	47.7	10.9	32.1	
Effective Green, g (s)		21.1	21.1	16.2	16.2	16.2	26.5	47.7	47.7	10.9	32.1	
Actuated g/C Ratio		0.18	0.18	0.14	0.14	0.14	0.23	0.41	0.41	0.09	0.28	
Clearance Time (s)		4.9	4.9	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Vehicle Extension (s)		2.0	2.0	3.0	3.0	3.0	2.0	5.1	5.1	2.0	5.1	
Lane Grp Cap (vph)		285	276	484	262	223	791	1468	657	168	984	
v/s Ratio Prot		0.18		c0.14	0.01		0.22	c0.41		0.09	c0.24	
v/s Ratio Perm			c0.18			0.02			0.15			
v/c Ratio		0.96	0.97	0.99	0.08	0.13	0.94	0.98	0.35	0.95	0.87	
Uniform Delay, d1		46.5	46.7	49.3	42.9	43.2	43.5	33.1	23.1	51.8	39.5	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		42.4	46.6	37.8	0.1	0.3	19.0	18.8	1.5	54.8	10.6	
Delay (s)		89.0	93.3	87.1	43.1	43.5	62.5	52.0	24.6	106.6	50.2	
Level of Service		F	F	F	D	D	E	D	C	F	D	
Approach Delay (s)		91.1			73.2			50.5			59.0	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	60.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Camino del Rio & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	0	320	420	430	310	470	1820	0	0	1410	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Lane Util. Factor	0.97		1.00	0.97	0.95	0.95	1.00	0.95			0.95	1.00
Frt	1.00		0.85	1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		1583	3433	1752	1504	1770	3539			3539	1583
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583	3433	1752	1504	1770	3539			3539	1583
Peak-hour factor, PHF	0.95	0.92	0.95	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.95	0.95
Adj. Flow (vph)	337	0	337	457	467	337	495	1916	0	0	1484	495
RTOR Reduction (vph)	0	0	219	0	3	12	0	0	0	0	0	88
Lane Group Flow (vph)	337	0	118	457	498	291	495	1916	0	0	1484	407
Turn Type	Prot		custom	Split		Perm	Prot					Perm
Protected Phases	7		7	8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)	4.0		4.0	16.0	16.0	16.0	13.6	55.3			37.5	37.5
Effective Green, g (s)	4.0		4.0	16.0	16.0	16.0	13.6	55.3			37.5	37.5
Actuated g/C Ratio	0.04		0.04	0.18	0.18	0.18	0.15	0.62			0.42	0.42
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	1.0	2.0			2.0	2.0
Lane Grp Cap (vph)	154		71	618	315	271	271	2201			1493	668
v/s Ratio Prot	c0.10		0.07	0.13	c0.28		c0.28	0.54			c0.42	
v/s Ratio Perm						0.19						0.26
v/c Ratio	2.19		1.67	0.74	1.58	1.07	1.83	0.87			0.99	0.61
Uniform Delay, d1	42.5		42.5	34.5	36.5	36.5	37.7	13.8			25.6	20.0
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	555.5		353.6	4.6	275.8	75.3	386.1	5.1			21.9	4.1
Delay (s)	597.9		396.0	39.1	312.2	111.7	423.7	18.9			47.5	24.1
Level of Service	F		F	D	F	F	F	B			D	C
Approach Delay (s)		497.0			165.1			102.0			41.6	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	137.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	17.8
Intersection Capacity Utilization	117.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	70	260	360	330	90	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	283	391	359	98	120

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	359	750	98	120
Volume Left (vph)	76	0	98	0
Volume Right (vph)	0	359	0	120
Hadj (s)	0.08	-0.25	0.53	-0.67
Departure Headway (s)	5.6	4.9	7.6	6.4
Degree Utilization, x	0.56	1.03	0.21	0.21
Capacity (veh/h)	625	721	460	543
Control Delay (s)	15.6	62.7	11.4	9.9
Approach Delay (s)	15.6	62.7	10.6	
Approach LOS	C	F	B	

Intersection Summary			
Delay	41.4		
HCM Level of Service	E		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1110	0	140	0	1180	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2		4.6		5.5	4.0	
Lane Util. Factor	0.97		1.00		0.95	0.91	
Frt	1.00		1.00		1.00	1.00	
Flt Protected	0.95		0.95		1.00	1.00	
Satd. Flow (prot)	3433		1770		3539	5085	
Flt Permitted	0.95		0.95		1.00	1.00	
Satd. Flow (perm)	3433		1770		3539	5085	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1181	0	149	0	1255	787	0
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1181	0	149	0	1255	787	0
Turn Type	Prot		Prot		NA	NA	
Protected Phases	4		5		2	6	
Permitted Phases							
Actuated Green, G (s)	17.4		5.0		27.9	19.8	
Effective Green, g (s)	17.4		5.0		27.9	19.8	
Actuated g/C Ratio	0.32		0.09		0.51	0.36	
Clearance Time (s)	4.2		4.6		5.5	4.0	
Vehicle Extension (s)	1.0		2.0		2.0	1.0	
Lane Grp Cap (vph)	1086		160		1795	1830	
v/s Ratio Prot	c0.34		0.08		c0.35	0.15	
v/s Ratio Perm							
v/c Ratio	1.09		0.93		0.70	0.43	
Uniform Delay, d1	18.8		24.8		10.3	13.3	
Progression Factor	1.00		1.00		1.00	1.00	
Incremental Delay, d2	54.3		50.6		2.3	0.7	
Delay (s)	73.1		75.4		12.6	14.1	
Level of Service	E		E		B	B	
Approach Delay (s)	73.1				19.3	14.1	
Approach LOS	E				B	B	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	1800	370	300	1350	340	0	0	0	1460	0	1020
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	7.0	7.0	4.2	7.0	7.0				5.1	5.1	5.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00				0.95	0.95	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583				1681	1681	2787
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	378	1837	378	306	1378	347	0	0	0	1490	0	1041
RTOR Reduction (vph)	0	0	104	0	0	225	0	0	0	0	0	389
Lane Group Flow (vph)	378	1837	274	306	1378	122	0	0	0	745	745	652
Turn Type	Prot		Perm	Prot		Perm				Split		Perm
Protected Phases	5	2		1	6					4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	21.1	38.2	38.2	23.6	40.2	40.2				36.1	36.1	36.1
Effective Green, g (s)	21.1	38.2	38.2	23.6	40.2	40.2				36.1	36.1	36.1
Actuated g/C Ratio	0.18	0.33	0.33	0.21	0.35	0.35				0.32	0.32	0.32
Clearance Time (s)	4.7	7.0	7.0	4.2	7.0	7.0				5.1	5.1	5.1
Vehicle Extension (s)	2.0	2.0	2.0	1.0	2.0	2.0				1.0	1.0	1.0
Lane Grp Cap (vph)	327	1701	530	366	1790	557				531	531	881
v/s Ratio Prot	c0.21	c0.36		c0.17	0.27					c0.44	0.44	
v/s Ratio Perm			0.17			0.08						0.23
v/c Ratio	1.16	1.08	0.52	0.84	0.77	0.22				1.40	1.40	0.74
Uniform Delay, d1	46.5	38.0	30.6	43.4	32.9	26.0				39.0	39.0	34.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	99.1	46.9	0.4	14.5	1.9	0.1				192.5	192.5	5.5
Delay (s)	145.6	84.9	30.9	58.0	34.7	26.1				231.5	231.5	40.4
Level of Service	F	F	C	E	C	C				F	F	D
Approach Delay (s)		85.9			36.8			0.0			152.9	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	95.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	114.2	Sum of lost time (s)	21.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	750	4240	1200	1020	0	790
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.7	7.0	7.0		4.0
Lane Util. Factor	1.00	0.91	0.86	0.86		1.00
Frt	1.00	1.00	0.96	0.85		0.86
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	5085	4591	1362		1611
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1770	5085	4591	1362		1611
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	781	4417	1250	1062	0	823
RTOR Reduction (vph)	0	0	76	76	0	0
Lane Group Flow (vph)	781	4417	1705	455	0	823
Turn Type	Prot			Perm		Free
Protected Phases	5	2	6			
Permitted Phases				6		Free
Actuated Green, G (s)	27.3	60.0	20.2	20.2		60.0
Effective Green, g (s)	27.3	60.0	20.2	20.2		60.0
Actuated g/C Ratio	0.46	1.00	0.34	0.34		1.00
Clearance Time (s)	5.5	5.7	7.0	7.0		
Vehicle Extension (s)	2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)	805	5085	1546	459		1611
v/s Ratio Prot	0.44	c0.87	0.37			
v/s Ratio Perm				0.33		0.51
v/c Ratio	0.97	0.87	1.10	0.99		0.51
Uniform Delay, d1	16.0	0.0	19.9	19.8		0.0
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	24.4	1.8	56.6	39.7		1.2
Delay (s)	40.4	1.8	76.5	59.5		1.2
Level of Service	D	A	E	E		A
Approach Delay (s)		7.6	72.6		1.2	
Approach LOS		A	E		A	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Friars Rd & Riverdale St

Alternative D PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	2820	140	70	1160	60	220	80	130	60	60	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.91		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5048		1770	1690		1770	1660	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.51	1.00		0.53	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5048		954	1690		982	1660	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	376	3032	151	75	1247	65	237	86	140	65	65	172
RTOR Reduction (vph)	0	0	31	0	5	0	0	56	0	0	91	0
Lane Group Flow (vph)	376	3032	120	75	1307	0	237	170	0	65	146	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8			4		
Actuated Green, G (s)	7.0	47.5	47.5	7.4	47.7		35.1	35.1		35.1	35.1	
Effective Green, g (s)	7.0	47.5	47.5	7.4	47.7		35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.07	0.45	0.45	0.07	0.45		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	118	2300	716	125	2293		319	565		328	555	
v/s Ratio Prot	c0.21	c0.60		0.04	0.26			0.10			0.09	
v/s Ratio Perm			0.08				c0.25			0.07		
v/c Ratio	3.19	1.32	0.17	0.60	0.57		0.74	0.30		0.20	0.26	
Uniform Delay, d1	49.0	28.8	17.0	47.4	21.1		31.0	25.9		24.9	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1005.6	146.4	0.5	5.1	0.3		14.5	1.4		0.1	0.1	
Delay (s)	1054.6	175.1	17.5	52.4	21.4		45.4	27.2		25.0	25.6	
Level of Service	F	F	B	D	C		D	C		C	C	
Approach Delay (s)		261.4			23.1			36.6			25.5	
Approach LOS		F			C			D			C	

Intersection Summary			
HCM Average Control Delay	172.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Friars Rd & Mission Gorge Rd

Alternative D PM
1/10/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2600	460	460	840	420	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	4.4	5.8	4.4	4.4
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2737	484	484	884	442	579
RTOR Reduction (vph)	0	104	0	0	0	1
Lane Group Flow (vph)	2737	380	484	884	442	578
Turn Type		Perm	Prot			pt+ov
Protected Phases	2		1	6	3	3 1
Permitted Phases		2				
Actuated Green, G (s)	67.2	67.2	17.6	89.2	30.6	52.6
Effective Green, g (s)	67.2	67.2	17.6	89.2	30.6	52.6
Actuated g/C Ratio	0.52	0.52	0.14	0.69	0.24	0.40
Clearance Time (s)	5.8	5.8	4.4	5.8	4.4	
Vehicle Extension (s)	3.3	3.3	2.0	3.3	2.0	
Lane Grp Cap (vph)	2629	818	465	3489	417	1128
v/s Ratio Prot	c0.54		c0.14	0.17	c0.25	0.21
v/s Ratio Perm		0.24				
v/c Ratio	1.04	0.46	1.04	0.25	1.06	0.51
Uniform Delay, d1	31.4	20.0	56.2	7.7	49.7	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.4	1.9	52.8	0.2	60.8	0.2
Delay (s)	60.8	21.8	109.0	7.9	110.5	29.2
Level of Service	E	C	F	A	F	C
Approach Delay (s)	54.9			43.7	64.4	
Approach LOS	D			D	E	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.6
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	180	90	430	130	90	320	2080	480	130	880	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.95		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1770		1681	1669		1770	5085	1583	1770	4994	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1770		1681	1669		1770	5085	1583	1770	4994	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	194	194	97	462	140	97	344	2237	516	140	946	129
RTOR Reduction (vph)	0	15	0	0	12	0	0	0	60	0	15	0
Lane Group Flow (vph)	194	276	0	351	336	0	344	2237	456	140	1060	0
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases									2			
Actuated Green, G (s)	16.5	16.5		32.0	32.0		25.6	41.4	73.4	10.4	25.7	
Effective Green, g (s)	16.5	16.5		32.0	32.0		25.6	41.4	73.4	10.4	25.7	
Actuated g/C Ratio	0.14	0.14		0.27	0.27		0.21	0.34	0.61	0.09	0.21	
Clearance Time (s)	4.9	4.9		5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	243	243		448	445		378	1754	968	153	1070	
v/s Ratio Prot	0.11	c0.16		c0.21	0.20		0.19	c0.44	0.13	0.08	c0.21	
v/s Ratio Perm									0.16			
v/c Ratio	0.80	1.14		0.78	0.76		0.91	1.28	0.47	0.92	0.99	
Uniform Delay, d1	50.1	51.8		40.8	40.4		46.1	39.3	12.7	54.4	47.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	99.7		12.8	11.3		28.3	128.5	1.6	47.4	25.2	
Delay (s)	65.7	151.5		53.6	51.7		74.4	167.8	14.4	101.8	72.2	
Level of Service	E	F		D	D		E	F	B	F	E	
Approach Delay (s)		117.2			52.7			131.9			75.6	
Approach LOS		F			D			F			E	

Intersection Summary			
HCM Average Control Delay	108.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.2
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1660	220	110	390	10	120	10	160	10	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00			1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.86			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)	1770	4996		1770	3539	1583	3433	1600			1795	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (perm)	1770	4996		1770	3539	1583	3433	1600			1795	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1804	239	120	424	11	130	11	174	11	33	11
RTOR Reduction (vph)	0	11	0	0	0	5	0	153	0	0	8	0
Lane Group Flow (vph)	22	2032	0	120	424	6	130	32	0	0	47	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						
Actuated Green, G (s)	1.5	44.8		6.1	48.2	48.2	10.9	10.9			6.8	
Effective Green, g (s)	1.5	44.8		6.1	48.2	48.2	10.9	10.9			6.8	
Actuated g/C Ratio	0.02	0.50		0.07	0.54	0.54	0.12	0.12			0.08	
Clearance Time (s)	4.4	5.6		4.4	6.8	6.8	5.5	5.5			4.9	
Vehicle Extension (s)	2.0	5.3		2.0	5.3	5.3	2.0	2.0			2.0	
Lane Grp Cap (vph)	30	2515		121	1917	857	420	196			137	
v/s Ratio Prot	0.01	c0.41		c0.07	0.12		c0.04	0.02			c0.03	
v/s Ratio Perm						0.00						
v/c Ratio	0.73	0.81		0.99	0.22	0.01	0.31	0.16			0.34	
Uniform Delay, d1	43.6	18.5		41.4	10.6	9.4	35.6	35.0			39.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	56.2	2.3		78.9	0.1	0.0	0.2	0.1			0.5	
Delay (s)	99.7	20.8		120.3	10.8	9.4	35.8	35.1			39.5	
Level of Service	F	C		F	B	A	D	D			D	
Approach Delay (s)		21.7			34.4			35.4			39.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

7: Mission Gorge Rd & Jackson Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	940	630	100	250	10	170	10	70	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00			1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.87			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	4779		1770	5056		3433	1618			1750	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (perm)	1770	4779		1770	5056		3433	1618			1750	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	44	1033	692	110	275	11	187	11	77	11	11	11
RTOR Reduction (vph)	0	70	0	0	2	0	0	67	0	0	10	0
Lane Group Flow (vph)	44	1655	0	110	284	0	187	21	0	0	23	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Actuated Green, G (s)	3.6	42.7		8.4	46.7		11.6	11.6			6.5	
Effective Green, g (s)	3.6	42.7		8.4	46.7		11.6	11.6			6.5	
Actuated g/C Ratio	0.04	0.47		0.09	0.51		0.13	0.13			0.07	
Clearance Time (s)	4.4	5.9		4.4	6.7		6.3	6.3			4.9	
Vehicle Extension (s)	2.0	5.2		2.0	4.9		2.0	2.0			2.0	
Lane Grp Cap (vph)	70	2250		164	2603		439	207			125	
v/s Ratio Prot	0.02	c0.35		c0.06	0.06		c0.05	0.01			c0.01	
v/s Ratio Perm												
v/c Ratio	0.63	0.86dr		0.67	0.11		0.43	0.10			0.18	
Uniform Delay, d1	42.9	19.4		39.8	11.3		36.5	34.9			39.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	12.0	1.6		8.2	0.0		0.2	0.1			0.3	
Delay (s)	54.9	21.0		48.0	11.3		36.7	35.0			39.9	
Level of Service	D	C		D	B		D	D			D	
Approach Delay (s)		21.9			21.5			36.2			39.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	21.5
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

8: Waring Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	1230	30	20	560	130	10	20	20	200	10	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3439			1745		1770	1596	
Flt Permitted	0.95	1.00		0.95	1.00			0.93		0.72	1.00	
Satd. Flow (perm)	1770	3526		1770	3439			1632		1349	1596	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	214	1255	31	20	571	133	10	20	20	204	10	204
RTOR Reduction (vph)	0	2	0	0	25	0	0	15	0	0	155	0
Lane Group Flow (vph)	214	1284	0	20	679	0	0	35	0	204	59	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.0	29.8		0.6	21.3			14.3		14.2	14.2	
Effective Green, g (s)	9.0	29.8		0.6	21.3			14.3		14.2	14.2	
Actuated g/C Ratio	0.15	0.50		0.01	0.36			0.24		0.24	0.24	
Clearance Time (s)	4.4	5.5		4.4	5.6			4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4			2.0		2.0	2.0	
Lane Grp Cap (vph)	268	1766		18	1231			392		322	381	
v/s Ratio Prot	c0.12	c0.36		0.01	0.20						0.04	
v/s Ratio Perm								0.02		c0.15		
v/c Ratio	0.80	0.73		1.11	0.55			0.09		0.63	0.15	
Uniform Delay, d1	24.4	11.7		29.4	15.3			17.5		20.3	17.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	14.3	1.6		250.0	0.6			0.0		3.0	0.1	
Delay (s)	38.6	13.2		279.5	15.9			17.6		23.3	18.0	
Level of Service	D	B		F	B			B		C	B	
Approach Delay (s)		16.9			23.1			17.6			20.6	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	9.4
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: Zion Ave & Waring Road

Alternative D M
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	490	70	360	60	60	70	230	880	50	80	480	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1706	1583		1743		1770	3510		1770	3426	
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1706	1583		1743		1770	3510		1770	3426	
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)	505	72	371	62	62	72	237	907	52	82	495	134
RTOR Reduction (vph)	0	0	285	0	21	0	0	3	0	0	19	0
Lane Group Flow (vph)	288	289	86	0	175	0	237	956	0	82	610	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	20.6	20.6	20.6		15.0		5.8	28.2		5.6	27.3	
Effective Green, g (s)	20.6	20.6	20.6		15.0		5.8	28.2		5.6	27.3	
Actuated g/C Ratio	0.23	0.23	0.23		0.17		0.07	0.32		0.06	0.31	
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	
Lane Grp Cap (vph)	391	397	368		295		116	1118		112	1057	
v/s Ratio Prot	c0.17	0.17			c0.10		c0.13	c0.27		0.05	0.18	
v/s Ratio Perm			0.05									
v/c Ratio	0.74	0.73	0.23		0.59		2.04	0.85		0.73	0.58	
Uniform Delay, d1	31.4	31.4	27.6		33.9		41.4	28.2		40.7	25.7	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	5.6	0.1		2.1		498.0	8.4		19.0	2.3	
Delay (s)	37.6	36.9	27.7		36.1		539.4	36.6		59.7	28.0	
Level of Service	D	D	C		D		F	D		E	C	
Approach Delay (s)		33.5			36.1			136.3			31.7	
Approach LOS		C			D			F			C	

Intersection Summary			
HCM Average Control Delay	73.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	14.2
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

10: Vandever Ave & Fairmount Avenue

Alternative D M
1/13/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	10	20	150	10	10	10	20	210	10	20	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	11	11	22	165	11	11	11	22	231	11	22	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	44	187	264	44
Volume Left (vph)	11	165	11	11
Volume Right (vph)	22	11	231	11
Hadj (s)	-0.22	0.18	-0.48	-0.07
Departure Headway (s)	4.6	4.8	4.0	4.7
Degree Utilization, x	0.06	0.25	0.30	0.06
Capacity (veh/h)	712	703	846	708
Control Delay (s)	7.9	9.4	8.7	8.0
Approach Delay (s)	7.9	9.4	8.7	8.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
HCM Level of Service	A		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
11: Vandever Ave & Mission   orge Rd

Alternative D   M

1/13/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	60	210	70	40	40	70	930	50	40	910	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1697			1755		1770	3512		1770	3522	
Flt Permitted		0.83			0.53		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1427			954		1770	3512		1770	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	65	228	76	43	43	76	1011	54	43	989	33
RTOR Reduction (vph)	0	39	0	0	11	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	363	0	0	151	0	76	1062	0	43	1021	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.0			28.0		8.5	73.2		6.2	70.7	
Effective Green, g (s)		28.0			28.0		8.5	73.2		6.2	70.7	
Actuated g/C Ratio		0.23			0.23		0.07	0.61		0.05	0.59	
Clearance Time (s)		4.0			4.0		4.0	4.6		4.0	4.8	
Vehicle Extension (s)		2.0			2.0		2.0	3.1		2.0	3.2	
Lane Grp Cap (vph)		333			223		125	2142		91	2075	
v/s Ratio Prot							c0.04	c0.30		0.02	0.29	
v/s Ratio Perm		c0.25			0.16							
v/c Ratio		1.09			0.68		0.61	0.50		0.47	0.49	
Uniform Delay, d1		46.0			41.9		54.1	13.1		55.3	14.3	
Progression Factor		1.00			1.00		0.95	0.87		1.00	1.00	
Incremental Delay, d2		75.5			6.3		3.8	0.6		1.4	0.8	
Delay (s)		121.5			48.2		55.3	12.0		56.7	15.1	
Level of Service		F			D		E	B		E	B	
Approach Delay (s)		121.5			48.2			14.9			16.8	
Approach LOS		F			D			B			B	

Intersection Summary			
HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1 : San Diego Mission Rd & Ranc o Mission Rd

Alternative D   M

1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	320	260	130	140	200	110	290	110	150	240	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3301		1770	3227		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3301		1770	3227		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	356	289	144	156	222	122	322	122	167	267	67
RTOR Reduction (vph)	0	182	0	0	173	0	0	0	91	0	0	51
Lane Group Flow (vph)	133	463	0	144	205	0	122	322	31	167	267	16
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	8.4	16.0		6.3	14.1		8.0	16.1	16.1	7.3	15.2	15.2
Effective Green, g (s)	8.4	16.0		6.3	14.1		8.0	16.1	16.1	7.3	15.2	15.2
Actuated g/C Ratio	0.13	0.25		0.10	0.22		0.12	0.25	0.25	0.11	0.24	0.24
Clearance Time (s)	4.0	5.5		4.0	5.3		4.0	4.9	4.9	4.0	5.1	5.1
Vehicle Extension (s)	2.0	4.2		2.0	4.4		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	232	824		174	710		221	468	398	202	442	375
v/s Ratio Prot	0.08	c0.14		c0.08	0.06		0.07	c0.17		c0.09	0.14	
v/s Ratio Perm									0.02			0.01
v/c Ratio	0.57	0.56		0.83	0.29		0.55	0.69	0.08	0.83	0.60	0.04
Uniform Delay, d1	26.2	21.0		28.4	20.8		26.4	21.7	18.3	27.8	21.8	18.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	1.1		25.3	0.4		1.7	3.3	0.0	22.3	1.6	0.0
Delay (s)	28.3	22.1		53.7	21.2		28.1	25.1	18.4	50.1	23.4	18.9
Level of Service	C	C		D	C		C	C	B	D	C	B
Approach Delay (s)		23.2			30.2			24.3			31.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
13: Twain Ave & Fairmount Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	270	230	50	100	30	180	160	130	40	160	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	0.93		1.00	0.94	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1840	1583		3402		1770	1737		1770	1755	
Flt Permitted		0.86	1.00		0.72		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1603	1583		2496		1770	1737		1770	1755	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	284	242	53	105	32	189	168	137	42	168	105
RTOR Reduction (vph)	0	0	171	0	23	0	0	37	0	0	33	0
Lane Group Flow (vph)	0	379	71	0	167	0	189	268	0	42	240	0
Turn Type	Perm		custom	Perm			Split			Split		
Protected Phases		2	2		6		8	8		4	4	
Permitted Phases	2		2	6								
Actuated Green, G (s)		19.0	19.0		19.0		19.3	19.3		13.1	13.1	
Effective Green, g (s)		19.0	19.0		19.0		19.3	19.3		13.1	13.1	
Actuated g/C Ratio		0.29	0.29		0.29		0.30	0.30		0.20	0.20	
Clearance Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.8	2.8		2.8		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		469	463		731		526	517		357	354	
v/s Ratio Prot			0.04				0.11	c0.15		0.02	c0.14	
v/s Ratio Perm		c0.24			0.07							
v/c Ratio		0.81	0.15		0.23		0.36	0.52		0.12	0.68	
Uniform Delay, d1		21.3	17.0		17.4		17.9	18.9		21.2	24.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.8	0.1		0.1		1.9	3.7		0.1	4.0	
Delay (s)		31.0	17.1		17.5		19.8	22.6		21.2	28.0	
Level of Service		C	B		B		B	C		C	C	
Approach Delay (s)		25.6			17.5			21.6			27.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: Twain Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	140	240	110	50	40	80	1010	130	30	1150	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.93		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1686		1770	1739		1770	3479		1770	3517	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1686		1770	1739		1770	3479		1770	3517	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	108	151	258	118	54	43	86	1086	140	32	1237	54
RTOR Reduction (vph)	0	50	0	0	26	0	0	7	0	0	2	0
Lane Group Flow (vph)	108	359	0	118	71	0	86	1219	0	32	1289	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.0	29.7		12.4	34.0		9.0	57.4		3.3	51.7	
Effective Green, g (s)	7.0	29.7		12.4	34.0		9.0	57.4		3.3	51.7	
Actuated g/C Ratio	0.06	0.25		0.10	0.28		0.08	0.48		0.03	0.43	
Clearance Time (s)	4.0	4.6		4.0	5.7		4.0	4.6		4.0	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.1		2.0	2.9	
Lane Grp Cap (vph)	103	417		183	493		133	1664		49	1515	
v/s Ratio Prot	c0.06	c0.21		c0.07	0.04		c0.05	0.35		0.02	c0.37	
v/s Ratio Perm												
v/c Ratio	1.05	0.86		0.64	0.14		0.65	0.73		0.65	0.85	
Uniform Delay, d1	56.5	43.2		51.7	32.1		54.0	25.1		57.8	30.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.12	0.73	
Incremental Delay, d2	102.4	16.0		5.7	0.0		7.8	2.9		17.7	5.1	
Delay (s)	158.9	59.2		57.4	32.2		61.8	28.0		82.6	27.5	
Level of Service	F	E		E	C		E	C		F	C	
Approach Delay (s)		80.0			46.0			30.2			28.9	
Approach LOS		F			D			C			C	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	180	10	0	60	10	10	10	0	30	10	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	196	11	0	65	11	11	11	0	33	11	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	261	76	22	76
Volume Left (vph)	54	0	11	33
Volume Right (vph)	11	11	0	33
Hadj (s)	0.05	-0.05	0.13	-0.14
Departure Headway (s)	4.3	4.4	4.9	4.5
Degree Utilization, x	0.31	0.09	0.03	0.10
Capacity (veh/h)	823	786	679	729
Control Delay (s)	9.2	7.8	8.0	8.0
Approach Delay (s)	9.2	7.8	8.0	8.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.7		
HCM Level of Service	A		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	60	40	70	30	110	40	1060	330	340	1120	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.3		4.5	4.3		4.0	4.6		4.0	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.88		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1751		1770	1643		1770	3413		1770	3516	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1751		1770	1643		1770	3413		1770	3516	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	65	43	75	32	118	43	1140	355	366	1204	54
RTOR Reduction (vph)	0	21	0	0	107	0	0	23	0	0	2	0
Lane Group Flow (vph)	54	87	0	75	43	0	43	1472	0	366	1256	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	12.1		4.0	12.1		6.0	66.4		28.6	89.0	
Effective Green, g (s)	4.0	12.1		4.0	12.1		6.0	66.4		28.6	89.0	
Actuated g/C Ratio	0.03	0.09		0.03	0.09		0.05	0.52		0.22	0.69	
Clearance Time (s)	4.5	4.3		4.5	4.3		4.0	4.6		4.0	4.6	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	4.2		2.0	4.2	
Lane Grp Cap (vph)	55	165		55	155		83	1764		394	2435	
v/s Ratio Prot	0.03	c0.05		c0.04	0.03		0.02	c0.43		c0.21	0.36	
v/s Ratio Perm												
v/c Ratio	0.98	0.53		1.36	0.28		0.52	0.83		0.93	0.52	
Uniform Delay, d1	62.2	55.5		62.2	54.1		59.8	26.4		49.0	9.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	114.3	1.4		245.5	0.4		2.3	4.8		27.5	0.8	
Delay (s)	176.5	56.9		307.7	54.5		62.1	31.2		76.4	10.2	
Level of Service	F	E		F	D		E	C		E	B	
Approach Delay (s)		96.8			138.9			32.1			25.2	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	128.5	Sum of lost time (s)	17.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: Alvarado Canyon Rd & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	70	400	430	30	170	290	1220	620	90	1120	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Lane Util. Factor		0.95	0.95	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	
Frt		0.90	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1593	1504	3433	1863	1583	3433	3539	1583	1770	3535	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1593	1504	3433	1863	1583	3433	3539	1583	1770	3535	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	71	408	439	31	173	296	1245	633	92	1143	10
RTOR Reduction (vph)	0	0	0	0	0	147	0	0	279	0	1	0
Lane Group Flow (vph)	0	254	245	439	31	26	296	1245	354	92	1152	0
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)		24.0	24.0	19.8	19.8	19.8	14.7	57.9	57.9	9.2	52.4	
Effective Green, g (s)		24.0	24.0	19.8	19.8	19.8	14.7	57.9	57.9	9.2	52.4	
Actuated g/C Ratio		0.18	0.18	0.15	0.15	0.15	0.11	0.45	0.45	0.07	0.40	
Clearance Time (s)		4.9	4.9	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Vehicle Extension (s)		2.0	2.0	3.0	3.0	3.0	2.0	5.1	5.1	2.0	5.1	
Lane Grp Cap (vph)		294	278	523	284	241	388	1576	705	125	1425	
v/s Ratio Prot		0.16		c0.13	0.02		0.09	c0.35		0.05	c0.33	
v/s Ratio Perm			c0.16			0.02			0.22			
v/c Ratio		0.86	0.88	0.84	0.11	0.11	0.76	0.79	0.50	0.74	0.81	
Uniform Delay, d1		51.4	51.6	53.6	47.5	47.5	56.0	30.8	25.8	59.2	34.4	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		21.5	25.5	11.3	0.2	0.2	7.8	4.1	2.5	17.5	5.0	
Delay (s)		72.9	77.1	64.9	47.7	47.7	63.7	35.0	28.3	76.7	39.4	
Level of Service		E	E	E	D	D	E	C	C	E	D	
Approach Delay (s)		75.0			59.4			36.9			42.2	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.7
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Camino del Rio & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	0	680	670	140	230	310	1520	0	0	1930	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.6	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Lane Util. Factor	0.97		1.00	0.97	0.95	0.95	1.00	0.95			0.95	1.00
Frt	1.00		0.85	1.00	0.96	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		1583	3433	1694	1504	1770	3539			3539	1583
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583	3433	1694	1504	1770	3539			3539	1583
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	388	0	694	728	152	250	316	1551	0	0	1969	122
RTOR Reduction (vph)	0	0	288	0	10	164	0	0	0	0	0	19
Lane Group Flow (vph)	388	0	406	728	202	26	316	1551	0	0	1969	103
Turn Type	Prot		custom	Split		Perm	Prot					Perm
Protected Phases	7			8	8		5	2			6	
Permitted Phases			4			8						6
Actuated Green, G (s)	15.9		18.4	19.5	19.5	19.5	15.8	72.9			52.9	52.9
Effective Green, g (s)	15.9		18.4	19.5	19.5	19.5	15.8	72.9			52.9	52.9
Actuated g/C Ratio	0.11		0.13	0.13	0.13	0.13	0.11	0.50			0.36	0.36
Clearance Time (s)	4.6		4.6	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Vehicle Extension (s)	2.0		2.0	3.0	3.0	3.0	1.0	2.0			2.0	2.0
Lane Grp Cap (vph)	376		201	462	228	202	193	1779			1291	578
v/s Ratio Prot	c0.11			c0.21	0.12		c0.18	0.44			c0.56	
v/s Ratio Perm			c0.26			0.02						0.07
v/c Ratio	1.03		2.02	1.58	0.89	0.13	1.64	0.87			1.53	0.18
Uniform Delay, d1	64.5		63.3	62.8	61.7	55.3	64.6	31.9			46.0	31.3
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	54.9		475.8	269.3	31.2	0.3	309.0	6.2			240.3	0.7
Delay (s)	119.4		539.1	332.1	92.9	55.5	373.6	38.1			286.4	32.0
Level of Service	F		F	F	F	E	F	D			F	C
Approach Delay (s)		388.6			240.7			94.9			271.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	233.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	126.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	100	380	270	200	600	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	413	293	217	652	174

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	522	511	652	174
Volume Left (vph)	109	0	652	0
Volume Right (vph)	0	217	0	174
Hadj (s)	0.08	-0.22	0.53	-0.67
Departure Headway (s)	7.0	6.7	8.1	6.9
Degree Utilization, x	1.02	0.96	1.46	0.33
Capacity (veh/h)	522	528	449	518
Control Delay (s)	70.3	55.0	241.1	12.1
Approach Delay (s)	70.3	55.0	192.9	
Approach LOS	F	F	F	

Intersection Summary			
Delay	120.6		
HCM Level of Service	F		
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	930	0	40	0	900	1320	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2		4.6		5.5	4.0	
Lane Util. Factor	0.97		1.00		0.95	0.91	
Frt	1.00		1.00		1.00	1.00	
Flt Protected	0.95		0.95		1.00	1.00	
Satd. Flow (prot)	3433		1770		3539	5085	
Flt Permitted	0.95		0.95		1.00	1.00	
Satd. Flow (perm)	3433		1770		3539	5085	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	959	0	41	0	928	1361	0
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	959	0	41	0	928	1361	0
Turn Type	Prot		Prot		NA	NA	
Protected Phases	4		5		2	6	
Permitted Phases							
Actuated Green, G (s)	16.8		2.0		30.4	25.3	
Effective Green, g (s)	16.8		2.0		30.4	25.3	
Actuated g/C Ratio	0.30		0.04		0.53	0.44	
Clearance Time (s)	4.2		4.6		5.5	4.0	
Vehicle Extension (s)	1.0		2.0		2.0	1.0	
Lane Grp Cap (vph)	1013		62		1890	2260	
v/s Ratio Prot	c0.28		0.02		c0.26	c0.27	
v/s Ratio Perm							
v/c Ratio	0.95		0.66		0.49	0.60	
Uniform Delay, d1	19.6		27.1		8.4	12.0	
Progression Factor	1.00		1.00		1.00	1.00	
Incremental Delay, d2	16.6		18.6		0.9	1.2	
Delay (s)	36.2		45.7		9.3	13.2	
Level of Service	D		D		A	B	
Approach Delay (s)	36.2				10.8	13.2	
Approach LOS	D				B	B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	12.8
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX H

POST-MITIGATION PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	810	100	80	3090	40	150	50	20	30	100	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9	4.9	4.9	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5076		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.61	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5076		1133	1863	1583	1345	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	880	109	87	3359	43	163	54	22	33	109	152
RTOR Reduction (vph)	0	0	39	0	1	0	0	0	18	0	0	40
Lane Group Flow (vph)	141	880	70	87	3401	0	163	54	4	33	109	112
Turn Type	Prot		Perm	Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	4.6	96.9	96.9	11.4	103.5		26.7	26.7	26.7	26.7	26.7	26.7
Effective Green, g (s)	4.6	96.9	96.9	11.4	103.5		26.7	26.7	26.7	26.7	26.7	26.7
Actuated g/C Ratio	0.03	0.65	0.65	0.08	0.69		0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9	4.9	4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	54	3285	1023	135	3502		202	332	282	239	332	282
v/s Ratio Prot	c0.08	0.17		0.05	c0.67			0.03			0.06	
v/s Ratio Perm			0.04				c0.14		0.00	0.02		0.07
v/c Ratio	2.61	0.27	0.07	0.64	0.97		0.81	0.16	0.01	0.14	0.33	0.40
Uniform Delay, d1	72.7	11.4	9.8	67.3	21.8		59.2	52.2	50.8	52.0	53.8	54.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	775.5	0.2	0.1	7.7	9.5		28.1	1.1	0.1	0.1	0.2	0.3
Delay (s)	848.2	11.6	10.0	75.0	31.4		87.3	53.2	50.9	52.0	54.0	54.9
Level of Service	F	B	A	E	C		F	D	D	D	D	D
Approach Delay (s)		115.8			32.4			76.3			54.2	
Approach LOS		F			C			E			D	

Intersection Summary

HCM Average Control Delay	54.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.2
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Zion Ave & Mission Gorge Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	50	30	690	100	40	90	570	250	110	2440	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9	5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	1783		1770	5085	1583	1770	5033	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1783		1770	5085	1583	1770	5033	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	34	57	34	793	115	46	103	655	287	126	2805	207
RTOR Reduction (vph)	0	0	31	0	9	0	0	0	93	0	6	0
Lane Group Flow (vph)	34	57	3	793	152	0	103	655	194	126	3006	0
Turn Type	Prot		Perm	Prot			Prot		pm+ov	Prot		
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	6.4	13.2	13.2	36.3	43.1		25.6	61.6	97.9	14.2	49.7	
Effective Green, g (s)	6.4	13.2	13.2	36.3	43.1		25.6	61.6	97.9	14.2	49.7	
Actuated g/C Ratio	0.04	0.09	0.09	0.25	0.30		0.18	0.42	0.68	0.10	0.34	
Clearance Time (s)	4.9	4.9	4.9	5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	78	170	144	859	530		312	2160	1069	173	1725	
v/s Ratio Prot	0.02	0.03		c0.23	c0.09		c0.06	0.13	0.05	c0.07	c0.60	
v/s Ratio Perm			0.00						0.08			
v/c Ratio	0.44	0.34	0.02	0.92	0.29		0.33	0.30	0.18	0.73	1.74	
Uniform Delay, d1	67.5	61.8	60.0	53.0	39.1		52.2	27.5	8.7	63.5	47.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.4	0.0	16.9	1.4		2.8	0.4	0.4	12.2	336.6	
Delay (s)	69.0	62.2	60.0	69.9	40.5		55.0	27.9	9.1	75.7	384.3	
Level of Service	E	E	E	E	D		E	C	A	E	F	
Approach Delay (s)		63.5			64.9			25.4			371.9	
Approach LOS		E			E			C			F	

Intersection Summary			
HCM Average Control Delay	240.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	15.3
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Mission Gorge Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	280	80	200	2230	20	330	20	90	20	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4916		1770	3539	1583	3433	1635		1770	1674	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4916		1770	3539	1583	3433	1635		1770	1674	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	318	91	227	2534	23	375	23	102	23	11	23
RTOR Reduction (vph)	0	28	0	0	0	2	0	90	0	0	22	0
Lane Group Flow (vph)	23	381	0	227	2534	21	375	35	0	23	12	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	2.3	77.2		22.2	97.1	97.1	15.6	16.5		3.5	4.4	
Effective Green, g (s)	2.3	77.2		22.2	97.1	97.1	15.6	16.5		3.5	4.4	
Actuated g/C Ratio	0.02	0.56		0.16	0.71	0.71	0.11	0.12		0.03	0.03	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	30	2762		286	2501	1119	390	196		45	54	
v/s Ratio Prot	0.01	0.08		c0.13	c0.72		c0.11	c0.02		0.01	0.01	
v/s Ratio Perm						0.01						
v/c Ratio	0.77	0.14		0.79	1.01	0.02	0.96	0.18		0.51	0.22	
Uniform Delay, d1	67.3	14.3		55.4	20.2	6.0	60.6	54.4		66.1	64.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	72.7	0.1		14.0	21.3	0.0	35.4	0.4		9.5	2.0	
Delay (s)	140.0	14.4		69.4	41.5	6.0	96.0	54.8		75.6	66.8	
Level of Service	F	B		E	D	A	F	D		E	E	
Approach Delay (s)		21.1			43.5			85.7			70.4	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	137.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

8: Waring Rd & Princess View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	600	10	20	1530	390	10	20	10	330	10	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6	5.6		4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1770	3530		1770	3539	1583		1776		1770	1593	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.82		0.73	1.00	
Satd. Flow (perm)	1770	3530		1770	3539	1583		1472		1353	1593	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	151	698	12	23	1779	453	12	23	12	384	12	349
RTOR Reduction (vph)	0	1	0	0	0	170	0	9	0	0	81	0
Lane Group Flow (vph)	151	709	0	23	1779	283	0	38	0	384	280	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	10.0	66.5		2.3	58.7	58.7		29.1		29.0	29.0	
Effective Green, g (s)	10.0	66.5		2.3	58.7	58.7		29.1		29.0	29.0	
Actuated g/C Ratio	0.09	0.59		0.02	0.52	0.52		0.26		0.26	0.26	
Clearance Time (s)	4.4	5.5		4.4	5.6	5.6		4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4	3.4		2.0		2.0	2.0	
Lane Grp Cap (vph)	157	2083		36	1843	825		380		348	410	
v/s Ratio Prot	c0.09	0.20		0.01	c0.50						0.18	
v/s Ratio Perm						0.18		0.03		c0.28		
v/c Ratio	0.96	0.34		0.64	0.97	0.34		0.10		1.10	0.68	
Uniform Delay, d1	51.2	11.9		54.8	26.0	15.8		31.8		41.9	37.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	59.8	0.1		24.2	13.7	0.3		0.0		79.0	3.7	
Delay (s)	111.0	12.0		79.0	39.7	16.0		31.9		120.9	41.4	
Level of Service	F	B		E	D	B		C		F	D	
Approach Delay (s)		29.3			35.3			31.9			82.4	
Approach LOS		C			D			C			F	

Intersection Summary			
HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	112.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

9: Zion Ave & Waring Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	30	270	70	50	20	240	530	30	60	1300	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	5.6
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1708	1583		1782		1770	3510		1770	3539	1583
Flt Permitted	0.95	0.97	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1708	1583		1782		1770	3510		1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	33	293	76	54	22	261	576	33	65	1413	620
RTOR Reduction (vph)	0	0	256	0	4	0	0	2	0	0	0	192
Lane Group Flow (vph)	120	120	37	0	148	0	261	607	0	65	1413	428
Turn Type	Split		Perm	Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	14.4	14.4	14.4		15.3		15.9	58.0		7.1	48.5	48.5
Effective Green, g (s)	14.4	14.4	14.4		15.3		15.9	58.0		7.1	48.5	48.5
Actuated g/C Ratio	0.13	0.13	0.13		0.13		0.14	0.51		0.06	0.43	0.43
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	5.6
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	3.3
Lane Grp Cap (vph)	213	216	200		239		247	1787		110	1507	674
v/s Ratio Prot	c0.07	0.07			c0.08		c0.15	0.17		0.04	c0.40	
v/s Ratio Perm			0.02									0.27
v/c Ratio	0.56	0.56	0.19		0.62		1.06	0.34		0.59	0.94	0.63
Uniform Delay, d1	46.8	46.7	44.5		46.5		49.0	16.6		52.0	31.3	25.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	1.8	0.2		3.3		73.0	0.5		5.6	12.4	4.5
Delay (s)	48.8	48.5	44.7		49.9		122.0	17.1		57.5	43.7	30.2
Level of Service	D	D	D		D		F	B		E	D	C
Approach Delay (s)		46.5			49.9			48.6			40.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	113.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	40	460	450	20	190	700	1350	400	150	790	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.9	4.4	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1863	1583	3433	5085	1583	1770	5067	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	2787	3433	1863	1583	3433	5085	1583	1770	5067	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	43	489	479	21	202	745	1436	426	160	840	21
RTOR Reduction (vph)	0	0	0	0	0	154	0	0	184	0	3	0
Lane Group Flow (vph)	11	43	489	479	21	48	745	1436	242	160	858	0
Turn Type	Prot		pm+ov	Prot		Perm	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	0.8	7.2	24.8	14.7	21.5	21.5	17.6	36.4	51.1	12.6	31.4	
Effective Green, g (s)	0.8	7.2	24.8	14.7	21.5	21.5	17.6	36.4	51.1	12.6	31.4	
Actuated g/C Ratio	0.01	0.08	0.28	0.16	0.24	0.24	0.20	0.40	0.57	0.14	0.35	
Clearance Time (s)	4.5	4.9	4.4	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	
Vehicle Extension (s)	3.0	2.0	2.0	3.0	3.0	3.0	2.0	5.1	3.0	2.0	5.1	
Lane Grp Cap (vph)	16	149	768	561	445	378	671	2057	985	248	1768	
v/s Ratio Prot	0.01	0.02	c0.12	c0.14	0.01		c0.22	c0.28	0.04	c0.09	0.17	
v/s Ratio Perm			0.05			0.03			0.11			
v/c Ratio	0.69	0.29	0.64	0.85	0.05	0.13	1.11	0.70	0.25	0.65	0.49	
Uniform Delay, d1	44.5	39.0	28.6	36.6	26.4	26.9	36.2	22.2	9.8	36.6	23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.1	0.4	1.3	12.0	0.0	0.2	69.0	2.0	0.1	4.3	1.0	
Delay (s)	124.6	39.4	29.9	48.6	26.4	27.0	105.2	24.2	9.9	40.9	23.9	
Level of Service	F	D	C	D	C	C	F	C	A	D	C	
Approach Delay (s)		32.6			41.8			45.0			26.6	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	0	320	420	430	310	470	1820	0	0	1410	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.2	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Lane Util. Factor	0.97		0.88	0.97	0.95	0.95	0.97	0.91			0.86	1.00
Frt	1.00		0.85	1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		2787	3433	1752	1504	3433	5085			6408	1583
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		2787	3433	1752	1504	3433	5085			6408	1583
Peak-hour factor, PHF	0.95	0.92	0.95	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.95	0.95
Adj. Flow (vph)	337	0	337	457	467	337	495	1916	0	0	1484	495
RTOR Reduction (vph)	0	0	290	0	2	5	0	0	0	0	0	180
Lane Group Flow (vph)	337	0	47	457	499	298	495	1916	0	0	1484	315
Turn Type	Prot		Over	Split		Perm	Prot					Perm
Protected Phases	7		5	8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)	11.5		16.2	29.9	29.9	29.9	16.2	60.0			39.6	39.6
Effective Green, g (s)	11.5		16.2	29.9	29.9	29.9	16.2	60.0			39.6	39.6
Actuated g/C Ratio	0.10		0.14	0.26	0.26	0.26	0.14	0.52			0.34	0.34
Clearance Time (s)	4.5		4.2	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Vehicle Extension (s)	3.0		1.0	3.0	3.0	3.0	1.0	2.0			2.0	2.0
Lane Grp Cap (vph)	343		393	893	456	391	484	2653			2207	545
v/s Ratio Prot	c0.10		0.02	0.13	c0.28		c0.14	c0.38			0.23	
v/s Ratio Perm						0.20						0.20
v/c Ratio	0.98		0.12	0.51	1.09	0.76	1.02	0.72			0.67	0.58
Uniform Delay, d1	51.6		43.2	36.3	42.5	39.3	49.4	21.1			32.2	30.9
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	43.6		0.1	0.5	70.0	8.5	46.8	1.7			1.7	4.4
Delay (s)	95.3		43.2	36.8	112.5	47.8	96.2	22.8			33.8	35.3
Level of Service	F		D	D	F	D	F	C			C	D
Approach Delay (s)		69.2			69.5			37.9			34.2	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	17.8
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	70	260	360	330	90	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	283	391	359	98	120
RTOR Reduction (vph)	0	0	0	251	0	76
Lane Group Flow (vph)	76	283	391	108	98	44
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	2.9	22.3	14.9	14.9	18.2	18.2
Effective Green, g (s)	2.9	22.3	14.9	14.9	18.2	18.2
Actuated g/C Ratio	0.06	0.45	0.30	0.30	0.37	0.37
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	104	839	561	476	651	582
v/s Ratio Prot	c0.04	0.15	c0.21		c0.06	
v/s Ratio Perm				0.07		0.03
v/c Ratio	0.73	0.34	0.70	0.23	0.15	0.08
Uniform Delay, d1	22.9	8.8	15.3	13.0	10.5	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.0	0.2	3.8	0.2	0.5	0.3
Delay (s)	45.9	9.1	19.1	13.2	11.0	10.4
Level of Service	D	A	B	B	B	B
Approach Delay (s)		16.9	16.3		10.7	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	2820	140	70	1160	60	220	80	130	60	60	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9	4.9	4.9	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5048		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5048		1331	1863	1583	1293	1863	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	376	3032	151	75	1247	65	237	86	140	65	65	172
RTOR Reduction (vph)	0	0	24	0	4	0	0	0	64	0	0	129
Lane Group Flow (vph)	376	3032	127	75	1308	0	237	86	76	65	65	43
Turn Type	Prot		Perm	Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	32.6	83.3	83.3	6.6	57.1		35.1	35.1	35.1	35.1	35.1	35.1
Effective Green, g (s)	32.6	83.3	83.3	6.6	57.1		35.1	35.1	35.1	35.1	35.1	35.1
Actuated g/C Ratio	0.23	0.59	0.59	0.05	0.41		0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	4.4	5.7	5.7	4.4	5.9		4.9	4.9	4.9	4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	412	3026	942	83	2059		334	467	397	324	467	397
v/s Ratio Prot	c0.21	c0.60		0.04	0.26			0.05			0.03	
v/s Ratio Perm			0.08				c0.18		0.05	0.05		0.03
v/c Ratio	0.91	1.00	0.13	0.90	0.64		0.71	0.18	0.19	0.20	0.14	0.11
Uniform Delay, d1	52.3	28.4	12.5	66.4	33.1		47.8	41.2	41.3	41.4	40.7	40.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.8	16.8	0.3	66.1	0.6		12.1	0.9	1.1	0.1	0.0	0.0
Delay (s)	76.1	45.2	12.8	132.5	33.8		59.9	42.1	42.4	41.5	40.8	40.4
Level of Service	E	D	B	F	C		E	D	D	D	D	D
Approach Delay (s)		47.1			39.1			51.3			40.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Zion Ave & Mission Gorge Rd

Post-Mitigation PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	180	90	430	130	90	320	2080	480	130	880	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9	5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	3467	1766		1787	5136	1599	1787	5043	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	3467	1766		1787	5136	1599	1787	5043	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	194	194	97	462	140	97	344	2237	516	140	946	129
RTOR Reduction (vph)	0	0	86	0	16	0	0	0	40	0	12	0
Lane Group Flow (vph)	194	194	11	462	221	0	344	2237	476	140	1063	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot		Perm	Prot			Prot		pm+ov	Prot		
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	17.4	17.4	17.4	32.3	32.3		34.6	68.0	100.3	12.6	45.5	
Effective Green, g (s)	17.4	17.4	17.4	32.3	32.3		34.6	68.0	100.3	12.6	45.5	
Actuated g/C Ratio	0.12	0.12	0.12	0.22	0.22		0.23	0.45	0.67	0.08	0.30	
Clearance Time (s)	4.9	4.9	4.9	5.0	5.0		4.4	5.4	5.0	4.4	5.9	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.7	2.0	2.0	3.7	
Lane Grp Cap (vph)	207	218	185	747	380		412	2328	1069	150	1530	
v/s Ratio Prot	c0.11	c0.10		c0.13	0.12		0.19	c0.44	0.10	c0.08	0.21	
v/s Ratio Perm			0.01						0.20			
v/c Ratio	0.94	0.89	0.06	0.62	0.58		0.83	0.96	0.45	0.93	0.69	
Uniform Delay, d1	65.8	65.4	59.0	53.3	52.8		55.0	39.7	11.7	68.3	46.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	44.2	31.9	0.1	3.8	6.3		17.8	11.5	1.3	53.0	1.5	
Delay (s)	110.0	97.2	59.1	57.1	59.1		72.8	51.2	13.1	121.3	47.6	
Level of Service	F	F	E	E	E		E	D	B	F	D	
Approach Delay (s)		94.7			57.8			47.3			56.1	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Mission Gorge Rd & Princess View Dr

Post-Mitigation PM
1/10/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1660	220	110	390	10	120	10	160	10	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.6		4.4	6.8	6.8	4.4	5.5		4.4	4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4996		1770	3539	1583	3433	1600		1770	1793	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4996		1770	3539	1583	3433	1600		1770	1793	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1804	239	120	424	11	130	11	174	11	33	11
RTOR Reduction (vph)	0	14	0	0	0	5	0	139	0	0	10	0
Lane Group Flow (vph)	22	2029	0	120	424	6	130	46	0	11	34	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	2.1	44.9		8.3	49.9	49.9	14.0	18.9		0.7	6.2	
Effective Green, g (s)	2.1	44.9		8.3	49.9	49.9	14.0	18.9		0.7	6.2	
Actuated g/C Ratio	0.02	0.48		0.09	0.54	0.54	0.15	0.20		0.01	0.07	
Clearance Time (s)	4.4	5.6		4.4	6.8	6.8	4.4	5.5		4.4	4.9	
Vehicle Extension (s)	2.0	5.3		2.0	5.3	5.3	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	40	2420		158	1905	852	518	326		13	120	
v/s Ratio Prot	0.01	c0.41		c0.07	0.12		c0.04	0.03		0.01	c0.02	
v/s Ratio Perm						0.00						
v/c Ratio	0.55	0.84		0.76	0.22	0.01	0.25	0.14		0.85	0.28	
Uniform Delay, d1	44.8	20.8		41.2	11.2	9.9	34.7	30.3		45.9	41.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.0	3.1		16.8	0.1	0.0	0.1	0.1		162.2	0.5	
Delay (s)	53.8	23.8		58.0	11.4	9.9	34.8	30.3		208.1	41.6	
Level of Service	D	C		E	B	A	C	C		F	D	
Approach Delay (s)		24.1			21.4			32.2			74.9	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	19.3
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	1230	30	20	560	130	10	20	20	200	10	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.6	5.6		4.9		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3539	1583		1745		1770	1596	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.93		0.72	1.00	
Satd. Flow (perm)	1770	3526		1770	3539	1583		1632		1349	1596	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	214	1255	31	20	571	133	10	20	20	204	10	204
RTOR Reduction (vph)	0	2	0	0	0	87	0	15	0	0	155	0
Lane Group Flow (vph)	214	1284	0	20	571	46	0	35	0	204	59	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	9.1	28.9		0.6	20.3	20.3		14.3		14.2	14.2	
Effective Green, g (s)	9.1	28.9		0.6	20.3	20.3		14.3		14.2	14.2	
Actuated g/C Ratio	0.16	0.49		0.01	0.35	0.35		0.24		0.24	0.24	
Clearance Time (s)	4.4	5.5		4.4	5.6	5.6		4.9		5.0	5.0	
Vehicle Extension (s)	2.0	3.5		2.0	3.4	3.4		2.0		2.0	2.0	
Lane Grp Cap (vph)	275	1739		18	1226	548		398		327	387	
v/s Ratio Prot	c0.12	c0.36		0.01	0.16						0.04	
v/s Ratio Perm						0.03		0.02		c0.15		
v/c Ratio	0.78	0.74		1.11	0.47	0.08		0.09		0.62	0.15	
Uniform Delay, d1	23.8	11.8		29.0	14.9	12.9		17.1		19.8	17.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	11.9	1.7		250.0	0.3	0.1		0.0		2.7	0.1	
Delay (s)	35.7	13.6		279.0	15.2	13.0		17.1		22.5	17.5	
Level of Service	D	B		F	B	B		B		C	B	
Approach Delay (s)		16.7			22.1			17.1			19.9	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	9.4
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	490	70	360	60	60	70	230	880	50	80	480	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	5.6
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1706	1583		1743		1770	3510		1770	3539	1583
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1706	1583		1743		1770	3510		1770	3539	1583
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)	505	72	371	62	62	72	237	907	52	82	495	134
RTOR Reduction (vph)	0	0	289	0	18	0	0	3	0	0	0	100
Lane Group Flow (vph)	288	289	82	0	178	0	237	956	0	82	495	34
Turn Type	Split		Perm	Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	23.1	23.1	23.1		18.7		16.5	36.8		7.2	26.8	26.8
Effective Green, g (s)	23.1	23.1	23.1		18.7		16.5	36.8		7.2	26.8	26.8
Actuated g/C Ratio	0.22	0.22	0.22		0.18		0.16	0.35		0.07	0.26	0.26
Clearance Time (s)	4.9	4.9	4.9		4.9		4.4	4.9		4.4	5.6	5.6
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		2.0	3.3	3.3
Lane Grp Cap (vph)	370	376	349		311		278	1231		121	904	404
v/s Ratio Prot	c0.17	0.17			c0.10		c0.13	c0.27		0.05	0.14	
v/s Ratio Perm			0.05									0.02
v/c Ratio	0.78	0.77	0.23		0.57		0.85	0.78		0.68	0.55	0.08
Uniform Delay, d1	38.5	38.4	33.6		39.4		43.0	30.4		47.7	33.8	29.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.1	8.3	0.1		1.6		20.8	4.8		11.2	2.4	0.4
Delay (s)	47.6	46.6	33.8		41.0		63.8	35.2		58.9	36.2	30.1
Level of Service	D	D	C		D		E	D		E	D	C
Approach Delay (s)		41.9			41.0			40.9			37.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	14.2
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	70	400	430	30	170	290	1220	620	90	1120	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9	4.4	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	4.9
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	3433	1863	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	2787	3433	1863	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	71	408	439	31	173	296	1245	633	92	1143	10
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	234	0	0	6
Lane Group Flow (vph)	20	71	408	439	31	37	296	1245	399	92	1143	4
Turn Type	Prot		pm+ov	Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	5.4	8.6	17.3	14.1	17.3	17.3	8.7	32.8	46.9	5.4	29.5	29.5
Effective Green, g (s)	5.4	8.6	17.3	14.1	17.3	17.3	8.7	32.8	46.9	5.4	29.5	29.5
Actuated g/C Ratio	0.07	0.11	0.22	0.18	0.22	0.22	0.11	0.41	0.59	0.07	0.37	0.37
Clearance Time (s)	4.9	4.9	4.4	4.9	4.9	4.9	4.4	4.9	4.9	4.4	4.9	4.9
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	5.1	3.0	2.0	5.1	5.1
Lane Grp Cap (vph)	119	200	603	605	403	342	373	2085	928	119	1875	584
v/s Ratio Prot	0.01	0.04	c0.07	c0.13	0.02		c0.09	c0.24	0.08	0.05	0.22	
v/s Ratio Perm			0.07			0.02			0.18			0.00
v/c Ratio	0.17	0.35	0.68	0.73	0.08	0.11	0.79	0.60	0.43	0.77	0.61	0.01
Uniform Delay, d1	35.2	33.1	28.8	31.1	25.0	25.2	34.8	18.4	9.2	36.7	20.6	16.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	2.4	4.3	0.1	0.1	10.3	1.3	0.3	24.2	1.5	0.0
Delay (s)	35.4	33.5	31.2	35.4	25.1	25.3	45.1	19.7	9.5	60.9	22.0	16.0
Level of Service	D	C	C	D	C	C	D	B	A	E	C	B
Approach Delay (s)		31.7			32.2			20.2			24.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.6
Intersection Capacity Utilization	60.7%	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												
Volume (vph)	380	0	680	670	140	230	310	1520	0	0	1930	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		4.2	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Lane Util. Factor	0.97		0.88	0.97	0.95	0.95	0.97	0.91			0.86	1.00
Frt	1.00		0.85	1.00	0.96	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		2787	3433	1694	1504	3433	5085			6408	1583
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		2787	3433	1694	1504	3433	5085			6408	1583
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	388	0	694	728	152	250	316	1551	0	0	1969	122
RTOR Reduction (vph)	0	0	363	0	13	20	0	0	0	0	0	48
Lane Group Flow (vph)	388	0	331	728	199	170	316	1551	0	0	1969	74
Turn Type	Prot		Over	Split		Perm	Prot					Perm
Protected Phases	7		5	8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)	15.2		13.4	19.2	19.2	19.2	13.4	56.9			39.3	39.3
Effective Green, g (s)	15.2		13.4	19.2	19.2	19.2	13.4	56.9			39.3	39.3
Actuated g/C Ratio	0.14		0.13	0.18	0.18	0.18	0.13	0.54			0.37	0.37
Clearance Time (s)	4.6		4.2	4.5	4.5	4.5	4.2	4.6			4.6	4.6
Vehicle Extension (s)	2.0		1.0	3.0	3.0	3.0	1.0	2.0			2.0	2.0
Lane Grp Cap (vph)	497		356	628	310	275	438	2756			2398	592
v/s Ratio Prot	c0.11		c0.12	c0.21	0.12		0.09	0.30			c0.31	
v/s Ratio Perm						0.11						0.05
v/c Ratio	0.78		0.93	1.16	0.64	0.62	0.72	0.56			0.82	0.12
Uniform Delay, d1	43.3		45.3	42.9	39.7	39.5	44.0	15.9			29.7	21.6
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	7.2		30.1	88.5	4.5	4.1	4.9	0.8			3.3	0.4
Delay (s)	50.5		75.4	131.4	44.2	43.6	48.9	16.7			33.0	22.0
Level of Service	D		E	F	D	D	D	B			C	C
Approach Delay (s)		66.5			100.3			22.1			32.3	
Approach LOS		E			F			C			C	

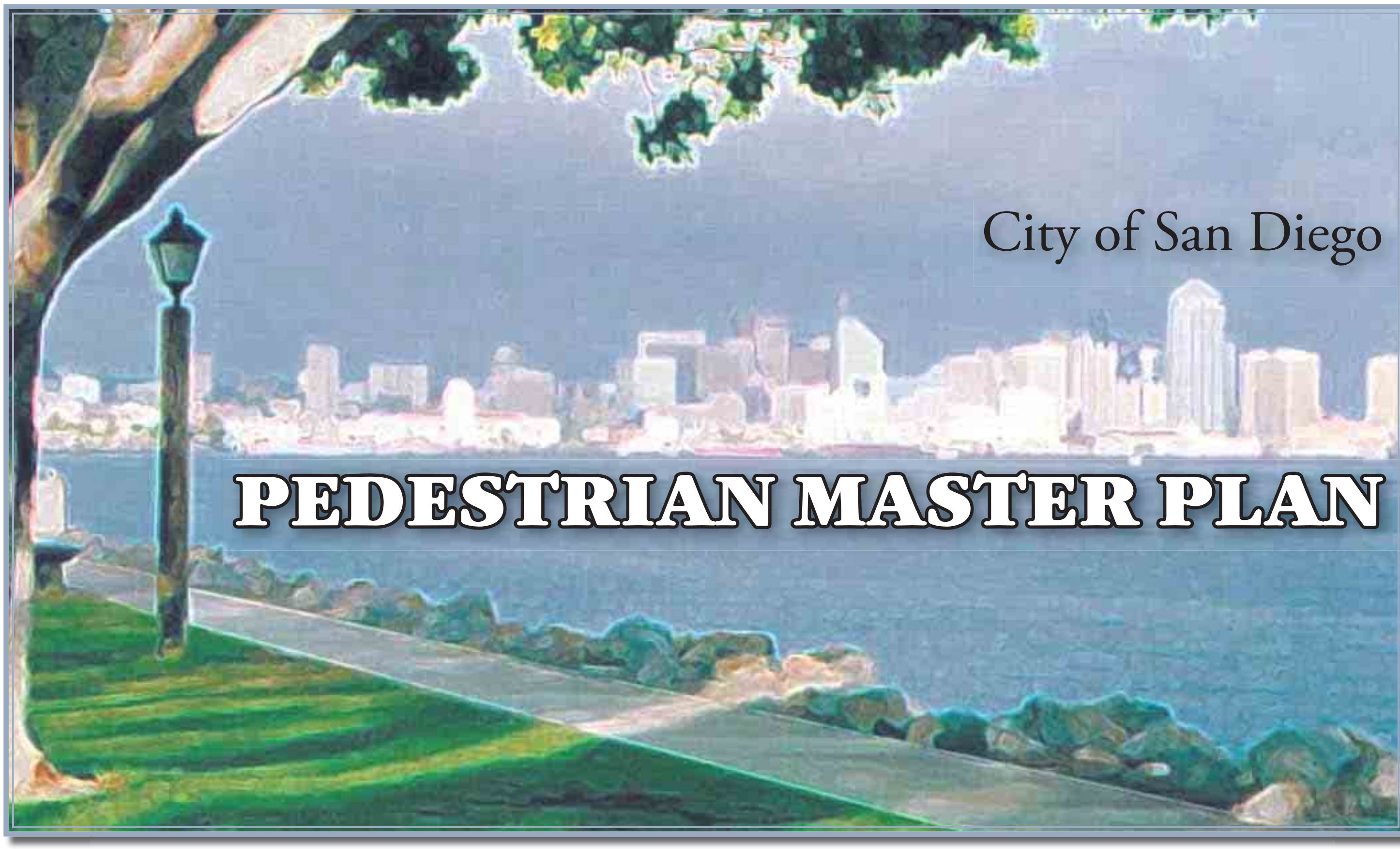
Intersection Summary			
HCM Average Control Delay	47.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	17.9
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	100	380	270	200	600	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	413	293	217	652	174
RTOR Reduction (vph)	0	0	0	167	0	92
Lane Group Flow (vph)	109	413	293	50	652	82
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	5.0	23.7	14.2	14.2	29.4	29.4
Effective Green, g (s)	5.0	23.7	14.2	14.2	29.4	29.4
Actuated g/C Ratio	0.08	0.38	0.23	0.23	0.47	0.47
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	143	711	426	362	838	749
v/s Ratio Prot	0.06	c0.22	c0.16		c0.37	
v/s Ratio Perm				0.03		0.05
v/c Ratio	0.76	0.58	0.69	0.14	0.78	0.11
Uniform Delay, d1	28.0	15.3	21.9	19.1	13.6	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.0	1.2	4.6	0.2	7.0	0.3
Delay (s)	49.0	16.5	26.5	19.2	20.7	9.4
Level of Service	D	B	C	B	C	A
Approach Delay (s)		23.3	23.4		18.3	
Approach LOS		C	C		B	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

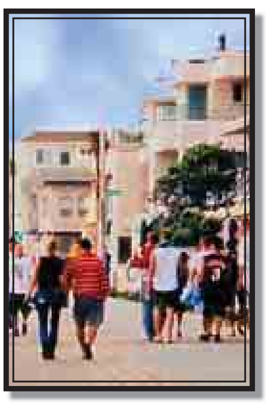
APPENDIX I

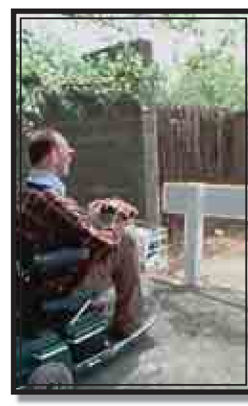
EXCERPTS FROM THE CITY OF SAN DIEGO PEDESTRIAN MASTER PLAN



City of San Diego

PEDESTRIAN MASTER PLAN



CITY-WIDE IMPLEMENTATION FRAMEWORK REPORT

December 2006

THE CITY OF SAN DIEGO

1.2 PLAN VISION STATEMENT

The Project Working Group and the consultant team prepared an overall vision statement for the PMP which is:

> *"To create a safe, accessible, connected and walkable pedestrian environment that enhances neighborhood quality and promotes walking as a practical and attractive means of transportation in a cost-effective manner."*

1.3 PLAN GOALS AND OUTCOMES

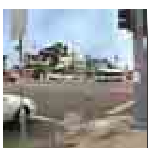
Goals supporting the vision statement were developed by the PWG and the consultant team. These goals were adjusted based on public input as well. The four goals that directly support the vision statement are:

1.3.1 Safety

Create a safe pedestrian network free of barriers and tripping hazards, that has sufficient street crossings, buffer pedestrians from vehicles and has facilities wide enough to accommodate peak pedestrian use.

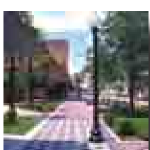
1.3.2 Accessibility

Make facilities accessible to pedestrians of all abilities and meet all local, state and federal requirements.



1.3.3 Connectivity

Develop a complete pedestrian network that provides direct and convenient connections for neighborhoods, employment centers, transit stations, public places and community destinations.



1.3.4 Walkability

Create pedestrian facilities that offer amenities to encourage usage and to enhance the pedestrian experience.

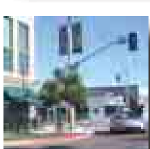
Three expected outcomes were developed to describe the results of implementing the four supporting goals described above:

1.3.5 Neighborhood Quality

When walkable communities are provided, they enhance neighborhood quality by providing opportunities for social interaction, enhanced economic development and healthy lifestyles.

1.3.6 Alternative Transportation

When walkable communities are provided, they support walking as a primary means of transportation, support transit and bike mobility options and can also improve the beginning and end of vehicular trips when the driver becomes a pedestrian.



1.3.7 Cost Effectiveness

When funded equitably and appropriately, pedestrian improvements can combine public and private investments for the good of the public and can lower expenses related to vehicular and transit investments.

Chapter

3

Issues and Potential Solutions

Chapter 3

Issues and Possible Solutions

This chapter discusses the issues currently affecting the pedestrian environment on a citywide basis. It also discusses some of the existing issues and potential solutions associated with the project objectives of improving safety, accessibility, connectivity, walkability, neighborhood quality and cost effectiveness.

3.1 SAFETY RELATED GOALS, ISSUES AND SOLUTIONS

Create a safe pedestrian network free of barriers and tripping hazards, that has sufficient street crossings, buffer pedestrians from vehicles and has facilities wide enough to accommodate peak pedestrian use.

Certain concerns over safety can affect behavior and decrease walking. Being a pedestrian comes with some safety risks, including a chance of being hit by a vehicle, being a victim of a crime and incurring injuries from a fall. This section describes existing conditions for each of these aspects of pedestrian safety.

3.1.1 Pedestrian Collisions and Injuries in San Diego

The following pedestrian collision and injury data were derived from the Statewide Integrated Traffic Records System (SWITRS). The analysis of the SWITRS data was based primarily on "prevalence" data, that is, how much or how often did a particular event or situation occur. Note all tables, unless otherwise noted, are from this source. For the most part, data on the volume of pedestrians does not exist so we are unable to measure relative risk. For example, an area with a high number of pedestrians would most likely have a higher number of pedestrian collisions compared to an area with many fewer pedestrians. But, this does not necessarily mean that the first area is more of a risky location to pedestrians because the relative risk of a pedestrian in either location is unknown. Where possible, other pedestrian safety literature and national data has been used to help describe what is commonly known about pedestrian collisions and injuries.

From 1999 to 2004, an average of 598 pedestrians were hit by a vehicle each year in San Diego.

On average, from 1999 to 2004, two people were hit by a vehicle each day in San Diego. This added up to an average of 598 pedestrians each year (see Table 3). There is a steady trend of fatalities per year which roughly stays at 4 percent over five years. The lowest trend was in 2001 when the fatality total dipped to 3 %.

Table 3: Pedestrians hit by a vehicle, City of San Diego (1999-2004) Source: SWITRS

	1999	2000	2001	2002	2003	2004	Totals
Number of pedestrian collisions each year	651	597	611	612	554	562	**3,587**
# of Non-injury pedestrians	41	30	33	35	33	28	**200**
Average # of ped collisions each day	2	2	2	2	2	2	**2**
# of ped injuries each year	674	614	578	627	516	587	**599**
# of ped fatalities each year	31	23	16	26	21	21	**138**
# of collisions with drunk/drug impaired pedestrians	0	0	0	0	0	0	**0**
# of collisions involving drunk/drug impaired drivers	5	6	6	7	7	2	**33**
# of collisions where driver suspended or unlicensed	1	0	1	2	1	1	**6**
# of collisions involving speeding	7	6	9	12	17	13	**64**
# of fatal injuries involving speeding	0	1	0	2	2	0	**5**
# of pedestrians at fault	200	114	126	131	109	133	**813**
# of drivers at fault	267	253	294	331	297	270	**1,712**
# of fault unknown	183	229	191	150	148	159	**1,060**
# of hit & run	122	106	142	133	113	105	**721**
# of collisions within 1/4 mile of school	318	289	281	290	248	256	**1,682**
# of collisions within 1/4 mile of parks	229	185	179	203	194	178	**1,168**

Table 4: Pedestrian collisions with vehicles for City of San Diego compared to the County of San Diego (1999-2004) Source: SWITRS

	1999	2000	2001	2002	2003	2004	Total	Yearly Average
City of San Diego	652	597	611	612	554	562	3,588	598
County of San Diego	480	430	419	441	447	509	2,726	454
Total Region	1,132	1,027	1,030	1,053	1,001	1,071	6,314	1,052
Percent of Collisions occurring in the City of San Diego	58%	58%	59%	58%	55%	52%	57%	57%

Table 5: Pedestrian collisions with vehicles for City of San Diego compared to the County, Adjusted for Population (1999-2004) Source: SWITRS

Year 2000	Population	the Year 2000	per 1,000 People
City of San Diego	1,223,400	597	0.49
County of San Diego	1,590,433	430	0.27
Total Region	2,813,833	1,027	0.36

More than half (57%) of the region's pedestrian collisions occur in the City of San Diego (see Table 4). Between 1999 and 2004, there were 3,588 and 6,314 for the City and County, respectively. A disproportionate amount also is shown when the data has been normalized per 1,000 people for the year 2000. Table 5 indicates the rate of pedestrian collisions is much higher than that of the County. The higher rate for the City is most likely explained by San Diego's higher density of pedestrians and traffic compared with the County.

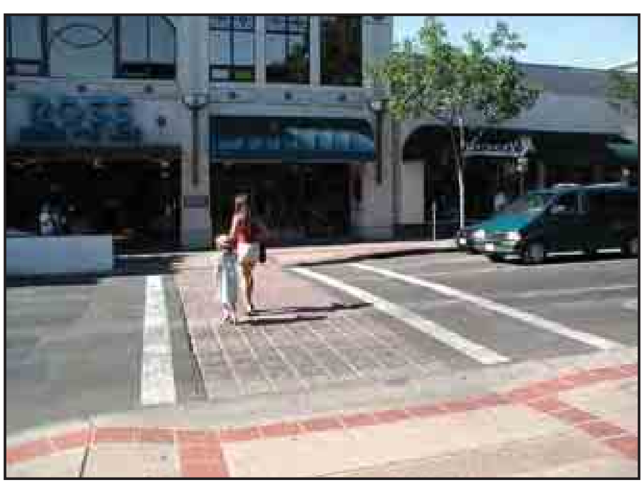
Pedestrians are at a physical disadvantage when hit by a vehicle. Since 1999, over 133 San Diegans have died due to pedestrian collisions while 3,500 survived, but suffered severe to minor injuries. Compared to the county, the City has a higher rate of pedestrian injury (.48 vs .39 per 1,000) but a slightly lower rate of pedestrian fatalities (.018 vs. .023 per 1,000).

More than half (57%) of the region's pedestrian collisions occur in the City of San Diego. Per 1,000 population, .49 pedestrians are involved in collisions in the City of San Diego compared to .27 for the rest of the County.

The City of San Diego accounted for only about 34 percent of all pedestrian fatalities in the county. This likely relates to higher speeds and corresponding lower survival rates on County roads versus those of the City where more urban areas have slightly lower speed rates. Pedestrian deaths in the City account for over 25 percent of all traffic-related fatalities, yet only about 6 percent of all trips are made on foot (2000 SWITRS Annual Report). This figure is more than two times the national average (11 percent), and one and a half times that of the state's average (17 percent) (NHTSA Traffic Safety Facts, 2003).

Pedestrian deaths in the City account for over 25 percent of all traffic-related fatalities, yet only about 6 percent of all trips are made on foot .

To highlight more positive trends, pedestrian collisions are heading downward, in San Diego and elsewhere. Nationally, pedestrian deaths have decreased by 37 percent since 1975. In San Diego, between 1999 and 2004, pedestrian collisions declined by 14 percent, greatly outpacing the 5 percent decline seen at the county level. Even more encouraging was the decrease in the number of deaths due to pedestrian collisions. During this same six-year timeframe, there were 32 percent fewer pedestrian fatalities in San Diego, compared to a 23 percent decline for the county. In addition to improvements in road safety and law enforcement, there were a number of factors that could have contributed to this downward trend, including fewer people walking and improvements in medical response times and services, leading to fewer deaths as a result of a collision.



3.1.2 Profile of Pedestrians at Risk for Collisions and Injuries

The young and the old are the most at-risk and vulnerable to pedestrian collisions and injuries. Children, ages 15 years and younger, are the most likely to be struck by a vehicle and pedestrian injuries are the one of the leading causes of injury death among school age children (see Table 6). In the year 2000 in San Diego, children under 15 years represented 20 percent of the total population, yet they accounted for 30 percent of all pedestrian collisions (see Table 7). Several factors put young children at greater risk for pedestrian collisions. Their smaller size means it is harder for drivers to see them and for them to see drivers, particularly when there are parked cars. Developmentally and physiologically, they are more impulsive and not yet able to accurately determine distances and vehicle speeds, so they may misjudge whether it is safe to cross a street.

Older adults are also more vulnerable as pedestrians. Seniors are not hit by cars as often, but they are three times more likely than younger people to die as a result of a pedestrian collision. In 2000 in San Diego, seniors ages 65 and older represented 9 percent of the total population, but they accounted for one third of all pedestrian deaths. This is largely due to the greater frailty of seniors and their decreased ability to fully recover from trauma and illness. Table 8 shows the rate in which the senior fatalities are greater than those of other age groups.

Table 6: Pedestrian collisions for City of San Diego Based on Age (1998-2004) Source: SWITRS

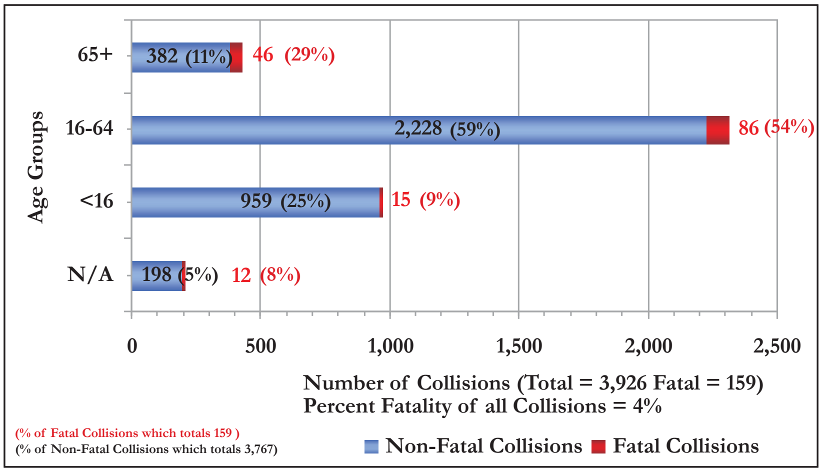


Table 7: Pedestrian collisions for City of San Diego Based on Age (2000) Source: SWITRS

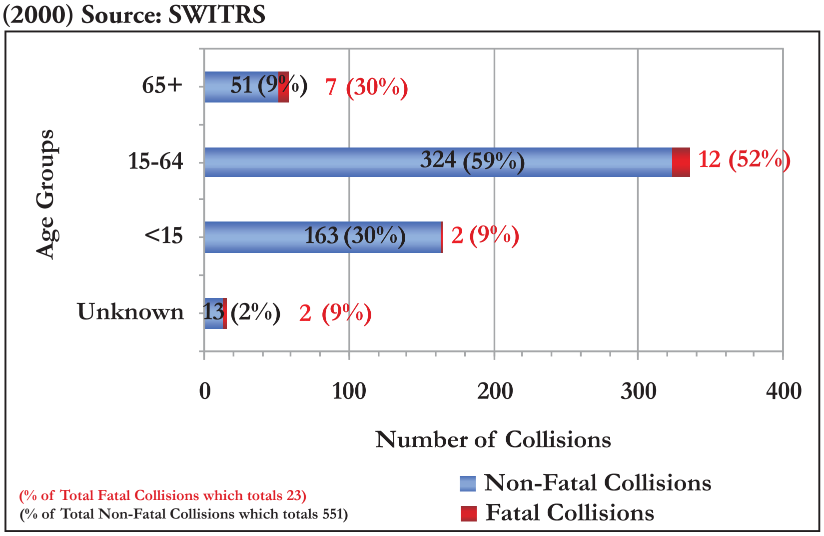
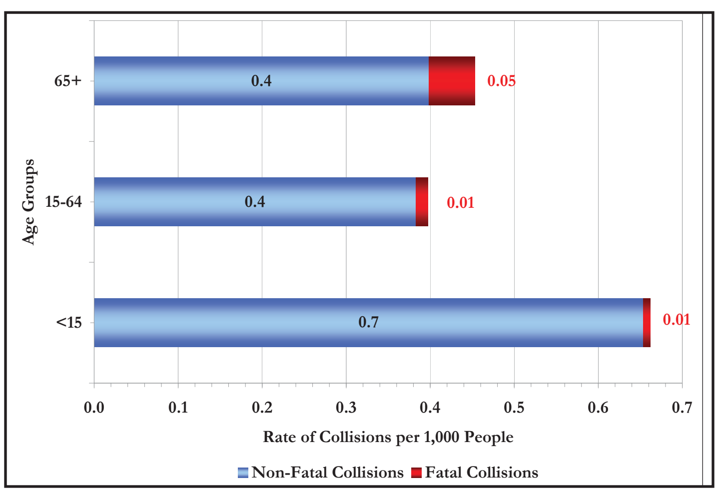


Table 8: Pedestrian collisions for City of San Diego Based on Age (2000) per 1,000 population. Source: SWITRS



People of color and those from low-income communities have some of the highest rates of pedestrian injuries and death.

People of color and those from low-income communities have some of the highest rates of pedestrian injuries and death. At the national level, Latinos and African Americans have pedestrian fatality rates approximately two times higher than the rate for Whites. In 2000 in San Diego County, African Americans had the highest pedestrian injury rate (22 per 100,000) followed by Latinos (12 per 100,000) and Whites (8 per 100,000). This pattern is also seen among children: in California, Latino children comprise 39 percent of the state's child population but 48 percent of all pedestrian incidents.

African-American children account for eight percent of the state's child population but are victims in 14 percent of all pedestrian crashes. Researchers believe differences in rates in these communities are due, in part, to differences in walking patterns and frequency of walking. For example, the Nationwide Personal Transportation Survey, conducted in 1995 by the Department of Transportation, found that African Americans walk 82 percent more than whites. Environmental and socioeconomic factors are also likely to contribute to these rate differences.

Between 1999 and 2004 about 2% of all pedestrian collisions involved a disabled pedestrian but almost 8 % of all fatal pedestrian collisions involved a person with a physical or mental disability.

The disabled are at increased risk of being hit and injured as pedestrians. Between 1999 and 2004 in San Diego, about 2 percent (82) of all pedestrian collisions involved a disabled pedestrian but almost 8 percent of all fatal pedestrian collisions involved a person with a physical or mental disability. The incidence of collisions are not disproportional to those with disabilities, since an estimated 15 percent to 20 percent of the San Diego region's population has some form of physical, developmental or mental challenge, according to the San Diego-based Center for an Accessible Society.

3.1.3 Pedestrian Collision Circumstances and Contributing Factors

At first glance, the answer to the question - "Why and under what circumstances do pedestrian collisions occur?" – may appear to be relatively simple. Typically, the focus is on the behavior and actions of the individuals involved in the crash: Did the pedestrian jaywalk? Was the driver speeding? Did the driver yield to the pedestrian? However, in most cases, there are a number of factors working in combination that cause and provide the circumstances for a crash and injuries. Circumstances and contributing factors can range from personal aspects of the driver and pedestrian to the broader socio-cultural environment. Understanding these factors is key to lowering the rate of collisions and improving pedestrian safety.

Personal Factors

Personal factors include the driver's and pedestrian's mental and physiological state at the time of the incident in addition to their specific maneuvers or actions that preceded the collision.

Alcohol Impairment

San Diego does not appear to have as significant of a problem of alcohol impaired pedestrians as some cities do.

The role of alcohol in pedestrian deaths, like motor vehicle occupant deaths, is major. Nationally, alcohol is involved in nearly 50 percent of all fatal pedestrian collisions. The driver is not always the impaired individual. In 2003 in the U.S., 36 percent of fatally injured pedestrians were legally drunk.

Pedestrian and Driver Actions

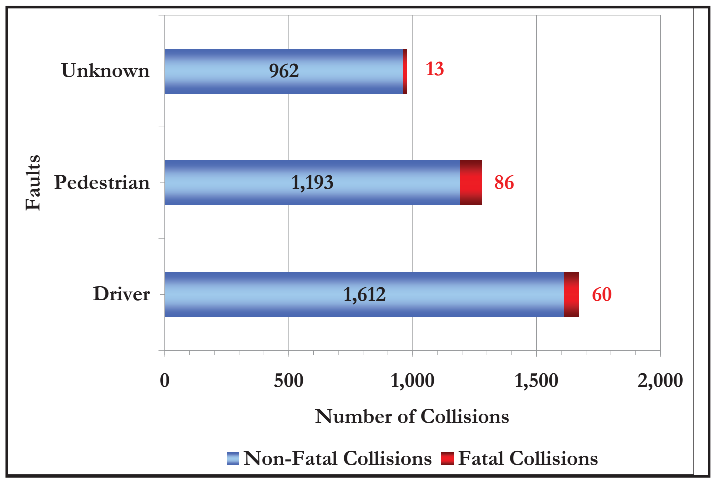
Clearly, the actions taken by pedestrians and drivers may help create the conditions for a crash or directly cause the crash. Between 1998 and 2004, the two most common actions of pedestrians just prior to being hit included crossing mid-block (16% of all pedestrian collisions) and crossing along with the signal at a signalized intersection (20%). Among fatal collisions, crossing mid-block was also the most common pedestrian action (26%). Crossing mid-block is clearly a risky maneuver for pedestrians (and is discussed in more detail below). However, the data suggest that pedestrians may be at significant risk even when they follow traffic laws.

With pedestrians determined to be at fault only 33% (24% fault unknown) of the time, the data suggest that pedestrians may be at significant risk even when they follow traffic laws.

In San Diego, drivers were at fault for pedestrian collisions 43 percent of the time, while pedestrians were at fault about 33 percent of the time (24% fault unknown). This differs from studies of other cities where drivers were culpable in 39 percent of collisions compared to 50 percent for pedestrians (see Table 9). Pedestrians were typically assigned fault in mid-block and intersection "dash" crashes, particularly among young children where mid-block "dart out" is one of the most common forms of being hit by a vehicle. Public health and safety experts contend that the tendency to blame children that are hit darting out near their home or on school routes places too much responsibility on the child. Until the age of 10, children often lack the experience and neurological development to perceive and avoid traffic dangers. Yet, parents want their neighborhoods to be safe places for their children to play outside and walk to school. To effectively improve pedestrian safety for children, experts recommend shifting our emphasis from victim blaming to efforts and ways in which we can improve and adapt street and neighborhood design to take child development and behavior into consideration.

In San Diego, drivers were at fault for pedestrian collisions 43 percent of the time, while pedestrians were at fault about 33 percent of the time (24% fault unknown).

Table 9: Pedestrian collisions for City of San Diego Based on Fault (1998-2004): Source: SWITRS



Unfortunately, 20 percent of pedestrian collisions in San Diego are "hit-and-run" incidents, compared to 12 percent for the state and 19 percent for the nation. This extrapolates to over 100 pedestrian collisions each year in which the driver flees the scene of the crash. Studies show that drivers in "hit and run" collisions are more likely to have had a previous arrest for driving while intoxicated and were more likely to be driving with an invalid or suspended license. Additionally, drivers with suspended or no license or other type of driving violations, were more likely to hit a pedestrian. These findings suggest a need for law enforcement and educational strategies that target offenders and risk-taking drivers.

Unfortunately, 20 percent of pedestrian collisions in San Diego are "hit-and-run" incidents, compared to 12 percent for the state and 19 percent for the nation.

Table 10: Survival Rate Based on Differing Speed Categories
Source: US Department of Transportation

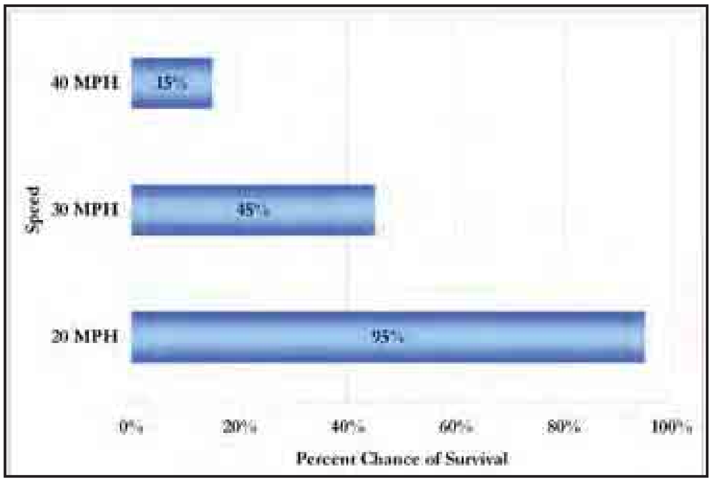


Table 11: Braking Distance with Reaction Time
Source: Transportation Tools to Improve Children's Health

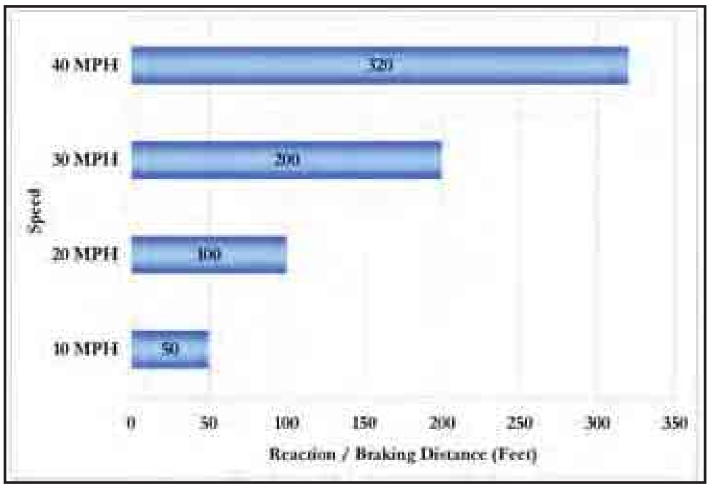
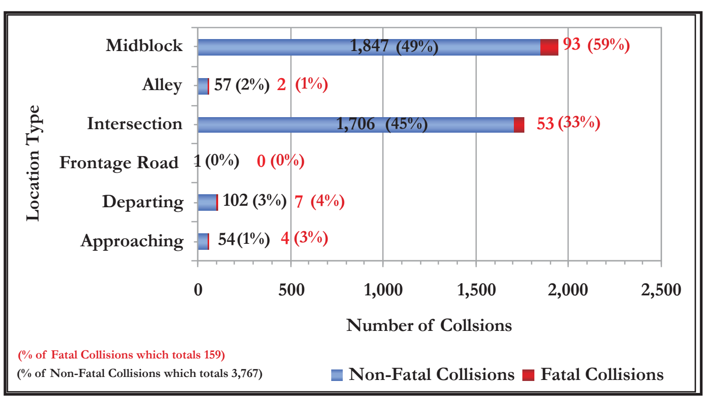


Table 12: Comparison of Collisions on Locations
Source: SWITRS



Driver Speed

Driver speed is one of the most critical factors influencing whether a pedestrian will be injured and die from a collision or whether they will escape injury-free. Studies show that pedestrians hit by a vehicle traveling 40 mph have only a 15 percent chance of survival (see Table 10). At 30 mph, their odds increase to 55 percent. In stark contrast, a pedestrian has a 95 percent chance of survival if hit by a vehicle moving at 20 mph (UK Department of Transportation: "Killing Speed and Saving Lives").

Drivers underestimate the distance it takes to react and come to a stop to avoid hitting a pedestrian. At 20 mph, drivers require 40 feet to stop. At 30 mph, the distance required to stop jumps to 75 feet. At 40 mph, drivers need at least 120 feet to come to a complete stop (see Table 11).

Location of Pedestrian Collisions

Figure 5 shows the general location of all pedestrian related vehicular collisions in the City of San Diego. According to the SWITRS data, Pedestrian collisions occur mid-block about as often as they do in intersections, but most fatal collisions take place mid-block. In San Diego, almost half (1,847) of all pedestrian collisions occurred mid-block and slightly less (1,706) occurred in intersections. In comparison, nearly 60 percent of all fatal collisions occurred mid-block and 33 percent took place in intersections (see Table 12). Mid-block collisions are more common and result in more deaths, in part because speeds are usually higher and drivers often do not expect to have to stop. Relative to younger people, seniors are more likely to be hit and killed in an intersection. This is partly because older adults are more likely than younger people to cross at intersections, and in general their slower walking speed and diminished vision, hearing, and reaction time put them at greater risk.

Figure 5: Location of Pedestrian Collisions (1998-2004)

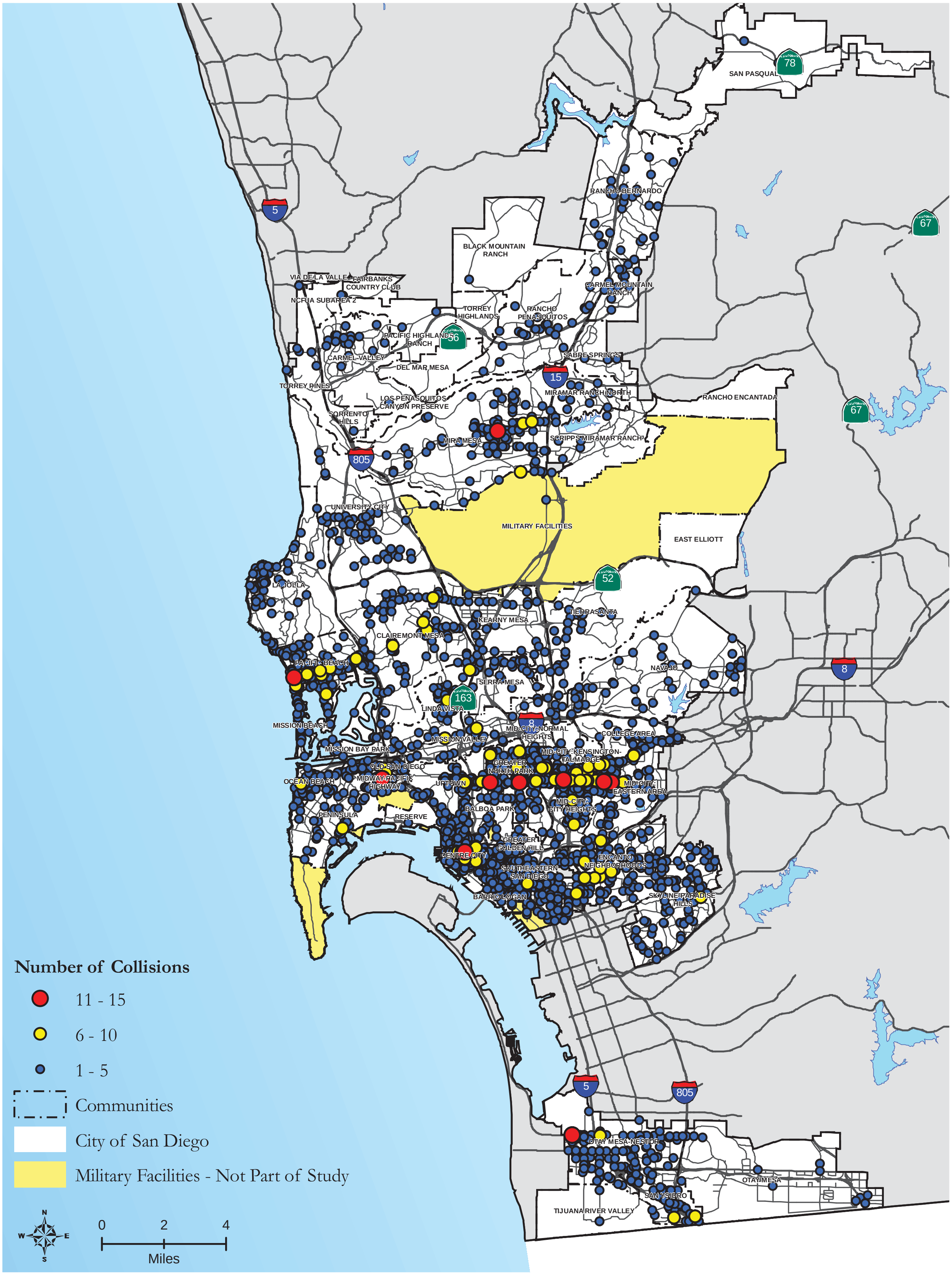


Table 13: Comparison of Collisions Relative to Street Classification
Source: SWITRS

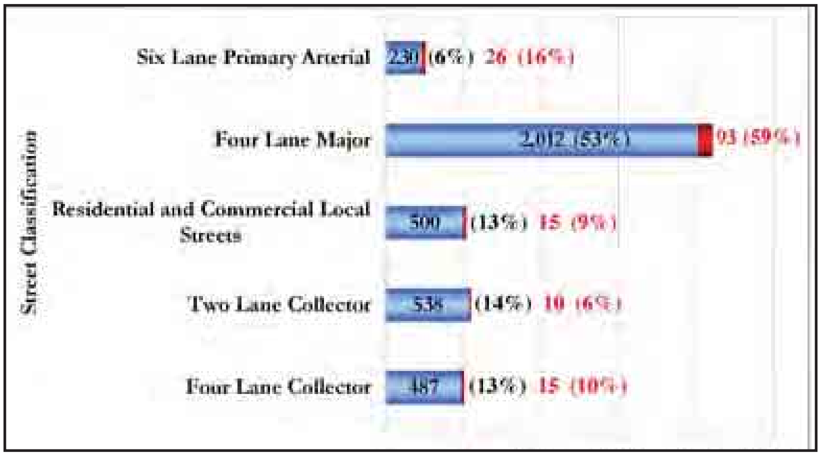


Table 14: Comparison of Collisions Relative to Roadway ADT
Source: SWITRS

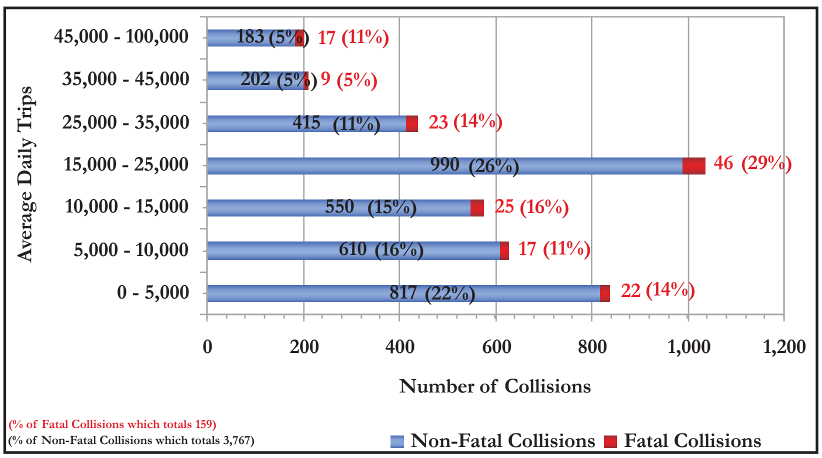
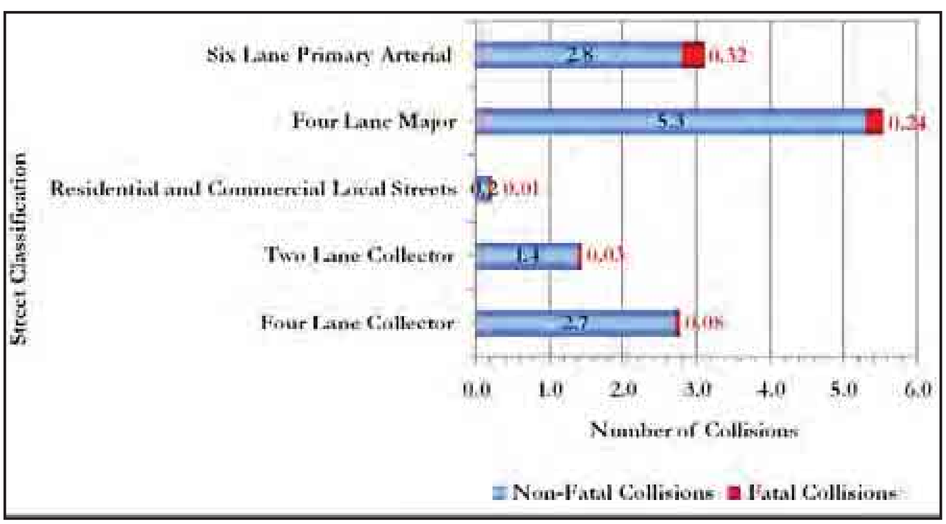


Table 15: Comparison of Collisions Relative to Street Classification, Normalized per Mile - Source: SWITRS



Streets that are fast and busy pose the greatest risk for pedestrians of all ages. The majority of San Diego's pedestrian collisions (52%) and fatal collisions (60%) take place on the Cities' Four Lane Major streets. By comparison, less than 39 percent of collisions and 26 percent of fatal collisions occur on local streets, local collector streets and collector streets (see Table 13). Supporting this pattern, the greatest number of collisions (26%) and fatal collisions (29%) occur on streets with an Average Daily Traffic (ADT) count of 15,000 – 25,000 vehicles, the volume of most major arterials (see Table 14). In many areas of the City, arterials divide communities, meaning residents have to cross them to get to shops, schools and other community locations.

A high portion of pedestrian collisions (22%) and fatalities (14%) occur on roads with the lowest traffic volumes (0-5,000 ADT). Typically, these are residential streets where speeds would be low and pedestrian access high. It is unclear why there are so many collisions and fatalities occurring on such slower lower volume streets. While traffic volumes are low, these streets nevertheless can have the occasional high speed driver, making collisions and fatalities more explainable. These lower volume streets tend to be residential neighborhoods where there are more children playing on or near a street. When looking at the rate of collisions per mile, the numbers tell a more logical story. Local streets become a less likely street for a collision to occur on since the majority of San Diego street miles fall into this category. A pedestrian is more likely to be involved in a collision or even killed on prime or major streets as their rates for fatal incidents are the highest (see Table 15).

The same can be said for streets with high average daily trips. Table 16 shows fatalities to occur more often on streets with over 15,000 ADT's. While major streets (four lane urban and major) have the highest incidence of collisions per mile (total collisions divided by total miles of this type of street in San Diego) of all of the street categories. Children are being hit on residential streets at 24%, on collectors at 21% and on primary arterials at 32% of total collisions. When normalizing the data for collisions per mile, the outcome is clearer. Children are more likely to be injured or killed along a major street or prime arterial (see Table 17). Without further data or analysis, one can only speculate on the reasons for different collision rates on these different categories of roads. However, national data generally points to serious injuries and fatalities are more likely on multi-lane wide streets with higher volumes of traffic and higher speeds. These streets are even more dangerous for school age children with less experience in crossing these busy streets and slower motor and cognitive skills that are needed to make appropriate judgements for crossing.

In recent years, there has been a significant effort at the national, state and local levels to improve children's safety along routes to and from school, particularly elementary schools. This was born out of the coinciding movements to reduce childhood pedestrian injuries and get kids walking to school to increase physical activity and prevent obesity. School age children are most likely to get hit near home or on the school route. In San Diego, 48 percent (1,903) of all pedestrian collisions between 1998 and 2004 occurred within a quarter mile of a school. This suggests our neighborhood schools are not isolated from higher risk streets. Table 18 lists elementary schools with the highest number of collisions between vehicles and children, within a quarter mile of the school. Most of these schools are in older urban neighborhoods with higher walk to school rates.

Table 16: Comparison of Collision Locations Relative to ADTs, Normalized per Mile -Source: SWITRS

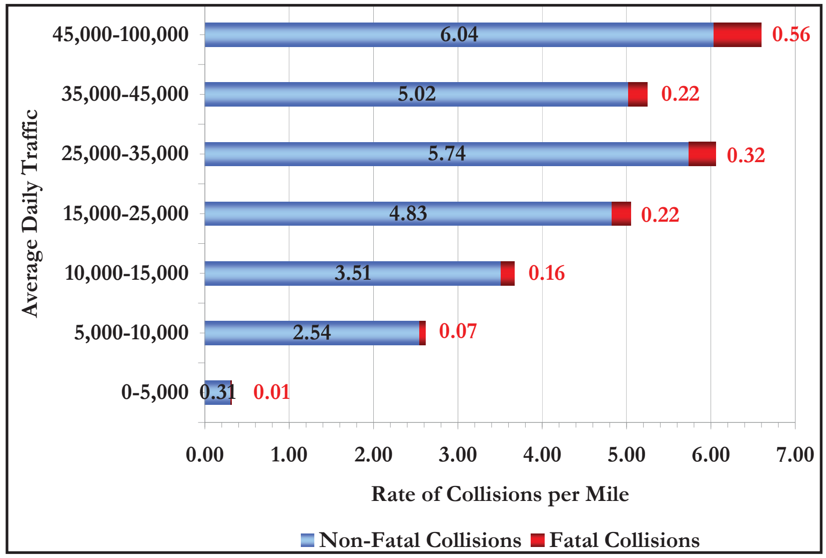


Table 17: Comparison of Collision Locations (for 16 Years and Younger) Relative to Street Classification, Normalized per Mile- Source: SWITRS

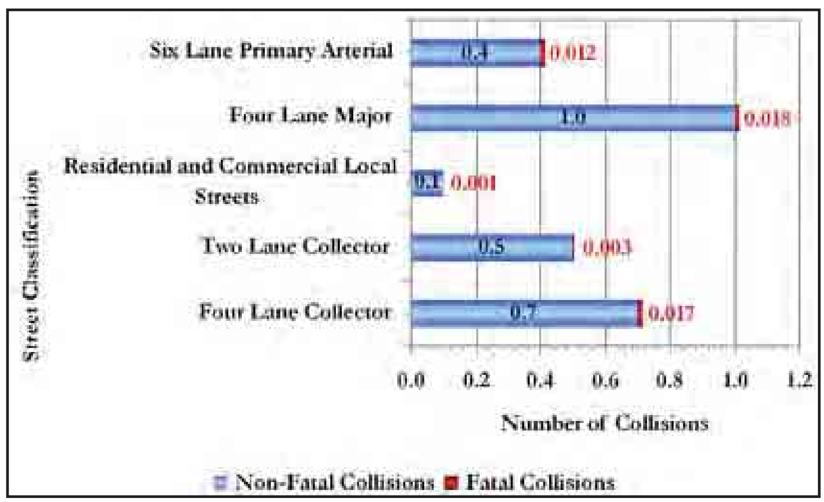
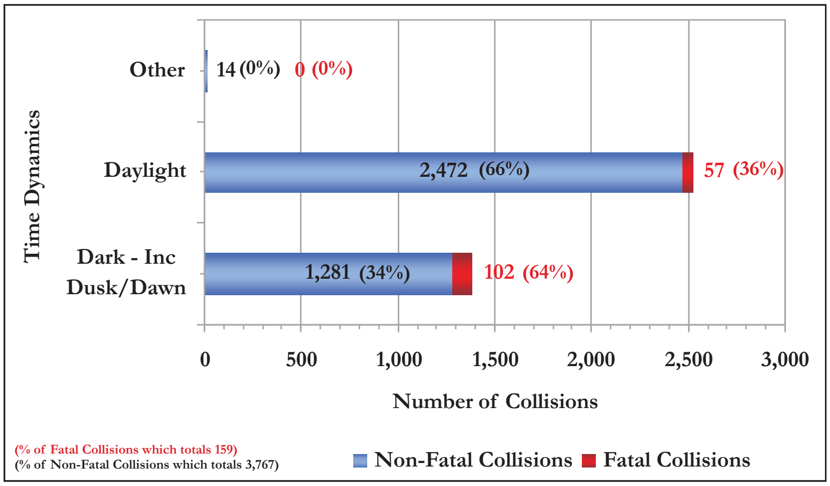


Table 18: Top 5 San Diego Elementary Schools with the Highest Collision Rates for Children- Source: SWITRS

Elementary School	Number of Collisions within a quarter mile for children under 12 years old (1998 - 2004)
Euclid Elementary	30
Our Lady of the Sacred Heart	20
Central Elementary	20
Rosa Parks Elementary	16
Adams Elementary	13

Table 19: Collisions Based on Time of Day: Source SWITRS



Time Dynamics of Collisions

In San Diego, the majority (62%) of all pedestrian collisions occur during daylight hours but the majority (66%) of all fatal collisions occur during the night, which includes dusk and dawn (see Table 19). At the county level, there are also more fatal pedestrian collisions in the late afternoon and evening hours, with the peak number occurring between 9:00 pm and 10:00 pm (San Diego County Health and Human Services, Trauma System Report: FY 00/01). Night time collisions may be more fatal due to several factors including greater speeds, poor lighting conditions and higher levels of alcohol impaired drivers. The time dynamics for child pedestrian collisions show a different pattern. Statewide, the most common time for child pedestrian injuries to occur is from 3:00 pm to 6:00 pm (on both weekdays and weekends), suggesting children at play. However, 21 percent of school-age children (ages 5-14 years) are injured during the weekday morning commute hours (6:00 to 9:00 am), compared to less than 1 percent at this time on weekends (California Department of Health Services, EPIC Branch. Pedestrian Injuries to Young Children. EPICgram Report No. 5. May 2002).

Vehicle Design

Over the past two decades, Americans have increasingly purchased light trucks and Sport Utility Vehicles (SUVs) and this has been strongly linked to an increase in pedestrian injury severity and changes in the types of injuries pedestrians incur. One study involving six cities found that pedestrians struck by light trucks/SUVs were three times more at-risk for severe injury and 3.4 times more at-risk for dying, compared to those hit by passenger vehicles (after controlling for pedestrian age and impact speed). The biomechanics of pedestrian injury in these types of crashes is different. The front-end design and higher bumpers of light trucks/SUVs mean that pedestrians are often hit in the upper extremities, thereby more likely to suffer head, neck and thorax injuries. With passenger vehicles, pedestrians are usually hit in their lower extremities. In addition, the greater mass of these larger vehicles contribute to more severe injuries. Experts point to the need to establish federal safety standards for the front-end design of light trucks/SUVs.

Physical Environment

Street and neighborhood design and the condition of roads are aspects of the physical environment that can cause or create the conditions for a pedestrian crash to occur. Studies show that automobile speeds and street design are the most significant physical environment risk factors for pedestrians. Design practices over the past fifty years have favored arterials that are wide and straight. These types of roads are now understood to contribute to speeding and diminish the safety of pedestrians. To address these risk factors, traffic safety experts recommend traffic calming and changes in road design.

...foot notes...

CVC 21949-21971 (Crosswalk regulations)

21954. (a) Every pedestrian upon a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right-of-way to all vehicles upon the roadway so near as to constitute an immediate hazard.

21955. Between adjacent intersections controlled by traffic control signal devices or by police officers, pedestrians shall not cross the roadway at any place except in a crosswalk.

3.1.4 Violence and Personal Safety

Personal safety is an important aspect of the pedestrian environment and greatly affects the level of pedestrian activity. People are less likely to walk – for transportation or recreation - when they fear being a victim of crime. In particular, seniors and low-income residents cite their fear of crime and violence as the most significant factor deterring them from walking. This, despite the fact that economic status and physical impairments make these groups the most dependent on walking and transit for transportation.

Recent data indicate that San Diegans, including pedestrians, may be safer from crime and violence. Between 2000 and 2004, crime rates in the City of San Diego fluctuated, but they showed a general downward trend. In 2004, there were 40.35 crimes per 1,000 residents, down by four percent from 2003, but up 1.1 percent from the 2002 rate of 39.91 per 1,000 residents. Perhaps most relevant to pedestrians, the rate of violent crimes dropped almost 10 percent from 5.78 per 1,000 residents in 2003 to 5.23 per 1,000 residents in 2004. This translated to almost 600 fewer acts of violent crime in the City of San Diego. Hopefully several years of these statistics will verify if this is an improved trend or a one-year anomaly.

Perception is sometimes more powerful than reality and such is the case when it comes to a parent's fears over letting their child walk to school. A generation ago, nearly two-thirds of children walked or rode their bikes to school. Today, less than 15 percent of children do so. Public health experts have warned that the related epidemics of childhood obesity, physical inactivity and Type II diabetes are some of the negative consequences of a society afraid to let children walk and play outside. Along with long distances and traffic concerns, parents cite fear of crime as a major barrier to letting their child walk to school. Parents are particularly afraid of "stranger danger" and child abductions. Yet children are at much greater risk of being killed or injured in a motor vehicle crash than they are of being abducted. In 2002, over 2,000 children were abducted in California, but only 54 of those were by strangers. Family members abducted all others. In that same year, more than 4,000 children were hospitalized due to injuries incurred as a passenger in a motor vehicle crash and 413 died. Parents' perception of risk is a significant barrier to getting more children to walk and play in our neighborhoods.

3.1.5 Pedestrian Trip and Falls

Trip and fall information in the City of San Diego, were collected for the fiscal year 2005 and included data for the entire 2003 and 2004 years. Only January to June was collected for 2005. In 2004, there were 88 incidents of trip and falls reported. For the six months of recorded data in 2005, there were 41 trip and falls. Many reasons for the incidents range from the more common tripping on a pothole or uneven sidewalk surface to bolts protruding from the sidewalk. Injuries described in the database include stubbed toes, twisted ankles, broken feet, injured collarbones and shoulders.

...foot notes...

CVC 21949-21971
(Crosswalk regulations)
21950. (a) The driver of a vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection, except as otherwise provided in this chapter. (b) This section does not relieve a pedestrian from the duty of using due care for his or her safety. No pedestrian may suddenly leave a curb or other place of safety and walk or run into the path of a vehicle that is so close as to constitute an immediate hazard.

3.1.6 Pedestrian Safety Education Awareness

This Plan, along with the City's Traffic Calming Program, describes the engineering improvements and pedestrian facilities needed to create a safe physical environment for pedestrians. However, creating the right environment is not, by itself, sufficient to fully address the problem of pedestrian safety in San Diego. Rather, this requires a comprehensive approach involving the three E's of traffic safety: Education, Engineering, and Enforcement. Education may include programs that target pedestrians and improve their pedestrian skills and knowledge. They may also include programs that target drivers and educate them on safe driving and yielding to pedestrians. Enforcement of laws may include special "sting" operations that increase enforcement and awareness of existing pedestrian safety laws or the adoption of new ordinances that give drivers greater responsibility for pedestrian safety (e.g., increasing fines for speeding or hitting a pedestrian in school zones).

Based on study findings and on what is known about effective practices, potential areas for pedestrian safety education in San Diego include:

- School Age Children and Parents (schools, after school programs, parenting classes)
- Seniors (senior centers)
- Low-income, recently immigrated and communities of color (community centers and religious centers)
- Drivers (DMV publications and testing requirements)

3.1.7 Solutions that Address Safety Issues

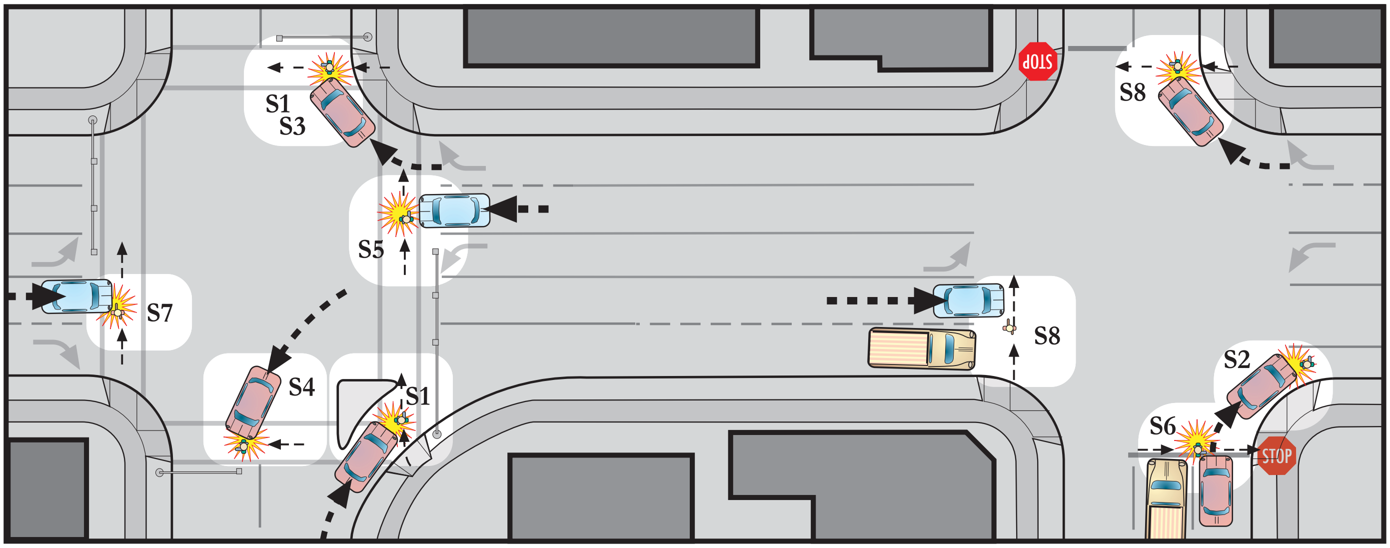
Tables 20 and 21 have been developed to describe the typical safety issues associated with pedestrians crossing at intersections and walking or crossing along roadway segments. These tables also make recommendations for possible solutions that can fully or partially address the safety issues.

...side step

Pedestrian safety can be improved when both drivers and pedestrians understand each other's right of way, when both pay greater attention to their actions and when the most appropriate improvements are matched with the existing setting. The combination of Education, Engineering and Encouragement actions are much more effective when all three are used instead of relying only on one approach.

Table 20: Safety Issues (at Intersections)

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
S1 - Right turning collisions. Collisions can occur between right turning vehicles and pedestrians even though both may have a green light or pedestrian walk phase. Dual right turn lanes may obstruct views and wide-radius corners with channeled right turn lanes can make collisions severe.	2S, 3S, 4S, 7S, 8S, 11S, 17S, 18S, 19S
S2 – Turns from minor road stop-controlled intersection. Turning vehicles may violate the pedestrian right-of-way.	2S, 3S, 4S, 7S, 17S, 19S
S3 – Right turns at red lights. Drivers of right turning vehicles at red lights may violate the pedestrian right-of-way during the pedestrian signal or when the pedestrian illegally walks against the red light because they may be watching for vehicles approaching from the left.	2S, 3S, 4S, 9S, 17S, 19S
S4 - Left turning collisions. Left turning vehicles at permissive left turns (green light yield) may violate pedestrian right-of-way, or at protected left turn (green arrow) if pedestrians walk illegally against the light.	1S, 3S, 4S, 8S, 17S, 19S
S5 – Wide streets. Age, ability and street crossing distance may make it difficult for some pedestrians to cross wide streets in one cycle. Pedestrian may enter the crossing signal phase illegally without time to cross.	1S, 2S, 3S, 4S, 8S, 11S, 17S, 18S, 19S
S6 - Multiple lane crosswalk collisions. Pedestrian collisions with vehicles can occur in crosswalks at stop signs with multiple lanes in each direction. Larger vehicles can shield views of pedestrians and drivers from each other. Drivers may also encroach on the crosswalk in an attempt to see oncoming traffic.	2S, 3S, 4S, 5S, 17S, 18S, 19S
S7 - Controlled intersection collisions. Pedestrian collisions with vehicles may occur at intersections with signals or stop signs. Collisions may occur due to high speeds, signal running, or either a driver or pedestrian violating the other's right-of-way.	1S, 2S, 3S, 4S, 6S, 9S, 17S, 18S, 19S
S8 - Uncontrolled intersection collisions. Collisions may occur at intersections without traffic controls (no stop signs or traffic signals). Multiple lanes in each direction can dramatically intensify this problem, as well as poor visibility and lack of median refuges. Drivers may not understand that pedestrians have right-of-way at intersections, regardless of crosswalk markings.	1S, 2S, 3S, 4S, 5S, 7S, 17S, 18S, 19S, *also see* **5W** *on page 4-23*

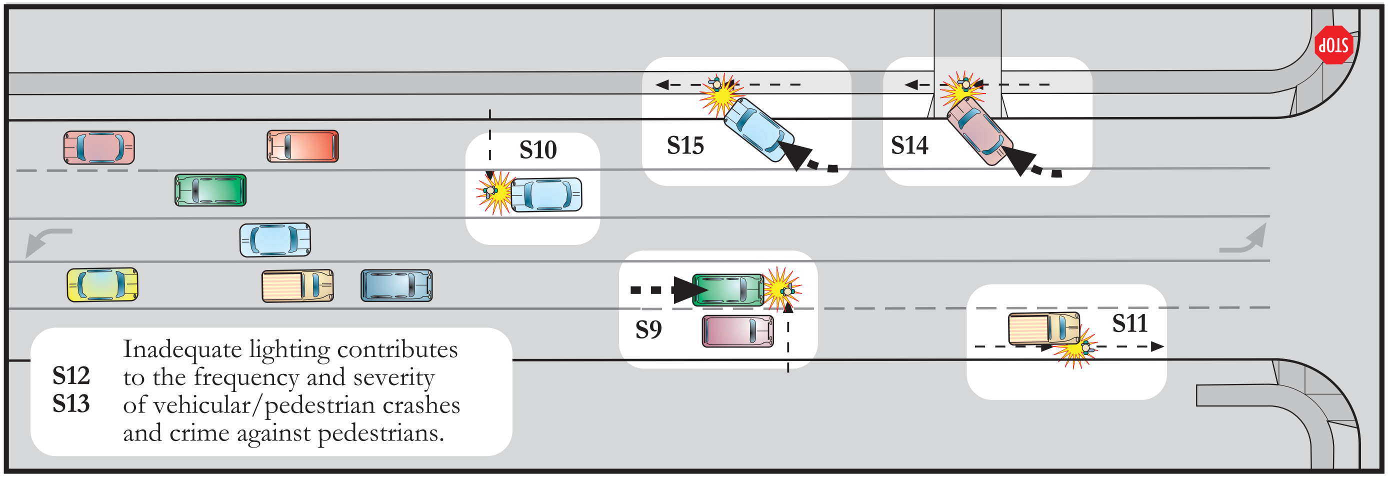
Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1S) Median refuges (a safe place to stand in the street) *(See page 4-15)*
2S) Pedestrian pop-outs (curb/sidewalk extensions into street) *(See page 4-15)*
3S) High-visibility crosswalk striping *(See page 4-16)*
4S) Elevated and/or specially paved crosswalks *(See page 4-16)*
5S) Advance stop bars 5-10 feet from crosswalks *(See page 4-16)*
6S) Radar speed monitoring and display *(See page 4-16)*
7S) Reduced curb radii *(See page 4-17)*
8S) Early pedestrian start at crossing signal *(See page 4-17)*
9S) No right turn on red at intersection *(See page 4-17)*
10S) Mid-block crosswalks with pedestrian flashers, but no traffic control *(See page 4-17)*
11S) Automatic pedestrian detection and signal control *(See page 4-18)*
12S) Mid-block crosswalks with signs, median or curb extensions and flashing lights in roadway *(See page 4-18)*
13S) Mid-block crosswalks with pedestrian-actuated traffic control devices *(See page 4-19)*
14S) One-lane mid-block crossing with high contrast markings, signs, and center lane marker *(See page 4-19)*
15S) Parkway planting buffer between cars and pedestrians *(See page 4-20)*
16S) On-street parking buffer between cars and pedestrians *(See page 4-20)*
17S) Adequate pedestrian lighting levels *(See page 4-21)*
18S) Traffic calming measures *(See page 4-21)*
19S) Enforcement and education solutions *(See page 4-21)*
20S) Missing sidewalk added or provide adequate walkway width clear of obstructions *(See page 4-21)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

Table 21: Safety Issues (along Streets)

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
S9 – Lack of legal or safe crossings. Uncontrolled, restricted or excessively spaced crossings without stop signs or signal control can encourage mid-block crossings (whether legal or illegal).	1S, 5S, 10S, 11S, 12S, 13S, 14S, 17S, 18S, 19S
S10 – Mid-block "jay walking." Some adjacent uses and high levels of pedestrian use may encourage illegal crossings, putting the pedestrian at risk, especially if crossing from between parked vehicles.	1S, 2S, 3S, 4S, 5S, 10S, 11S, 12S, 13S, 14S, 17S, 18S, 19S
S11 - Street collisions where no sidewalk exists. Where sidewalks are missing or damaged, pedestrians may be required to walk in the street, exposing them to collisions. Walking in the street is especially unsafe if vehicular speeds are above 25 mph, the travel lane is next to the curb or edge of the roadway, and the roadway is relatively narrow.	19S, 20S
S12 - Unsafe conditions in the dark. Where lighting and/or building forms do not allow for defensible space, the walker may be subjected to robbery or personal harm.	17S, 19S
S13 - Disincentive to walk in the dark. Inadequate light levels can influence a pedestrian's decision to not walk at night and can also result in collisions due to low visibility.	17S, 19S
S14 - Turning into or out of driveways and alleys. Vehicles turning into or out of curb-cuts, driveways or alleys can collide with pedestrians on sidewalks. The driver is violating pedestrian right-of-way, but this collision is difficult to control through physical changes.	15S, 17S, 19S
S15 - Out-of-control collisions on sidewalks. Pedestrians may be exposed to high speed vehicles where no buffers exist (such as trees, bike lane or parked cars). The problem is worse where there is no buffer between travel lanes and sidewalks.	6S, 15S, 16S, 18S, 19S

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

1S) Median refuges (a safe place to stand in the street) *(See page 4-15)*
2S) Pedestrian pop-outs (curb/sidewalk extensions into street) *(See page 4-15)*
3S) High-visibility crosswalk striping *(See page 4-16)*
4S) Elevated and/or specially paved crosswalks *(See page 4-16)*
5S) Advance stop bars >10 feet from crosswalks *(See page 4-16)*
6S) Radar speed monitoring and display *(See page 4-16)*
7S) Reduced curb radii *(See page 4-16)*
8S) Early pedestrian start at crossing signal *(See page 4-16)*
9S) No right turn on red at intersection *(See page 4-16)*
10S) Mid-block crosswalks with pedestrian flashers, but no traffic control *(See page 4-16)*
11S) Automatic pedestrian detection and signal control *(See page 4-18)*
12S) Mid-block crosswalks with signs, median or curb extensions and flashing lights in roadway *(See page 4-18)*
13S) Mid-block crosswalks with pedestrian-actuated traffic control devices *(See page 4-19)*
14S) One-lane mid-block crossing with high contrast markings, signs, and center lane marker *(See page 4-19)*
15S) Parkway planting buffer between cars and pedestrians *(See page 4-20)*
16S) On-street parking buffer between cars and pedestrians *(See page 4-20)*
17S) Adequate pedestrian lighting levels *(See page 4-21)*
18S) Various traffic calming measures *(See page 4-21)*
19S) Enforcement and education solutions *(See page 4-21)*
20S) Missing sidewalk added or provide adequate walkway width clear of obstructions *(See page 4-21)*

3.2 ACCESSIBILITY RELATED GOALS, ISSUES & SOLUTIONS

Make facilities accessible to pedestrians of all abilities and meet all local, state and federal requirements.

Following the specific requirements of federal and state legislation for accessibility is a focal point of this section. However, all improvements to the walking environment that these regulations require, have many benefits for making the walking environment better for all users, with or without physical challenges for access.

3.2.1 Regulatory Context - Americans with Disabilities Act of 1990

The Americans with Disabilities Act (ADA) of 1990 set standards and a compliance schedule for providing public accommodations for persons with disabilities. Typically, right-of-way accommodations included:

- Continuous, maintained sidewalks with uplifts not exceeding one-half inch
- Slopes not exceeding 1:12 (or 8.33 percent) for pathways with handrails and not exceeding 1:20 (or 5 percent) without handrails
- Curb ramps at street corners
- Accessible signals at signalized intersections
- Tactile strips at hazardous locations along rail line edges such as trolley platforms

3.2.2 State of California Title 24 Summary

In addition to the ADA, California has additional accessibility regulations through California Code of Regulation, Title 24. The federal ADA Accessibility Guidelines and California Title 24 differ in several technical respects, but the most important distinction between the two is that the ADA is civil rights legislation and Title 24 is a building code. Another important difference is that ADA applies to existing facilities, while Title 24 only applies when alterations, additions or new construction takes place. Therefore, if remedial work is performed to eliminate a physical barrier, the more stringent of ADA Accessibility Guidelines or Title 24 applies.

The ADA and Title 24 are also enforced differently. The ADA can be enforced only in a court of law when no other resolution is possible, and Title 24 is enforced by state and local building departments, either when a building permit is obtained or when a citizen complaint is filed in regard to an existing facility. Title 24 is the regulation that most directly affects the built environment in San Diego and provides the state leverage for implementing the federal ADA through the building review, approval and inspection process.

Universal access goals provide a better environment for all users, including those severely disabled to those with only minor physical challenges.

3.2.3 City of San Diego ADA Transition Plan

The City's 1997 ADA Transition Plan supplied a compliance "baseline" for providing navigable walkways and corner curb ramps. The 1997 Plan indicated:

- Since the 1970's, the City has administered an aggressive curb ramp retrofit program.
- A survey from the early 1990's found that approximately 39 percent, or 20,931 corner curb ramps were in place.
- There were 20 public stairways, none of which provided adjacent ramps. The Plan called for providing signs indicating an alternative route via public sidewalks.
- Of the approximately 4,000 transit stops within the City, half were estimated to be accessible.
- Since the adoption of the Transition Plan in 1997, the City has continued to install curb ramps, repair uplifted or broken sidewalks and to make transit stops accessible. Accessible (audible) pedestrian crossing signals have been installed at many intersections throughout the City.

The property owner and the City both have responsibility in making certain that the public right-of-way for pedestrians is fully accessible under the reasoning that accessibility is not limited to the installation of curb ramps. Universal access as well as Title 24 and ADA require accessible paths of travel that are free from obstructions, meet specific slope and cross slope requirements and are maintained to be safe and accessible. This requirement transfers to the street pavement used for crossing streets, whether in a marked or unmarked crosswalk.

3.2.4 Solutions that Address Accessibility Issues

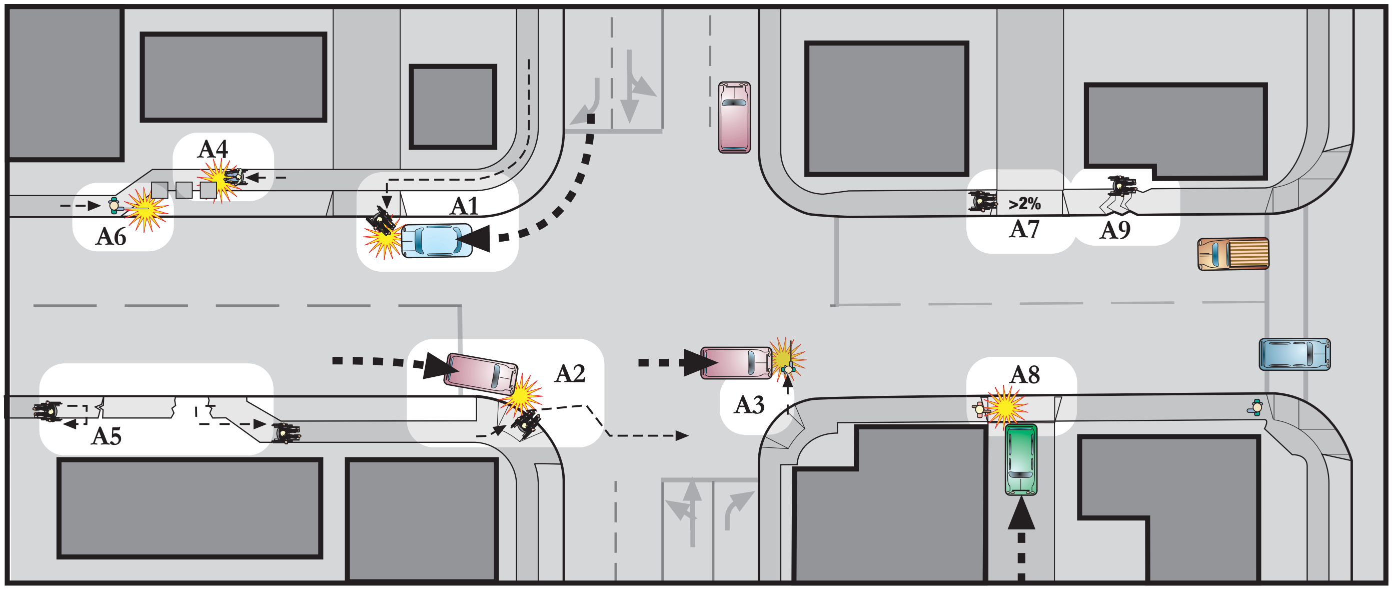
Table 22 has been developed to describe the typical accessibility issues associated with public rights-of-way that require walking or non-vehicular access. Several solutions are suggested, but it remains the responsibility of the property owner or agency to make sure that all reasonable efforts have been made to make as much of the environment universally accessible as possible and that the intent and the letter of ADA and Title 24 regulations have been met.

Findings within this PMP should be considered in future updates of the Transition Plan. The PMP suggests that accessibility is only second to safety in terms of priority for projects and solutions to public issues faced by pedestrians. The Transition Plan helps to set the priorities for improvements of the public right of way, considering limited financial ability to address all shortcomings. The highest priority should be given to improving areas that have accessibility issues as well as safety issues and other connectivity and walkability issues.

If any part of a route is inaccessible, the entire route is inaccessible. Not only is this a difficulty for the physically challenged but all users are forced to walk in the street. Photo Credit: Mike Singleton

Table 22: Accessibility Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
A1 – Missing curb ramps. Pedestrians requiring the use of ramps for maneuverability may not be able to cross the street, or may be forced to travel in the street, increasing the risk of vehicular/pedestrian collision.	1A
A2 – Curb ramps do not meet standards. Ramps that lack tactile indicators, or ramps that are constructed with steep running slopes, large gutter transitions or excessive cross slopes, decrease accessibility. Some intersections require two ramps per corner for safety and access.	1A, 3A, 6A
A3 – Missing pedestrian signals. Missing or non-accessible (height or location) pedestrian signals or signal actuators diminish maneuverability.	2A
A4- Sidewalk obstacles. Site furnishings, above-grade utilities, parked vehicles on sidewalks, vehicles overhanging walk, & construction fencing create vertical clearance & protruding barriers.	4A, 7A, *also see* 19S *on page 4-21*
A5 – Sidewalk gaps. Missing sidewalk segments can make an entire route inaccessible for some pedestrians.	4A, *also see* 20S *on page 4-21*
A6 – Inconsistent sidewalk design. Meandering walkways or abrupt changes in the travel path can be difficult for the visually impaired to navigate.	4A
A7 – Cross slopes. Excessive cross slopes, often at driveways, can decrease accessibility.	5A, 6A
A8 – Blind corners. Visual obstructions (especially at alleys) are made worse when combined with the lower height of wheelchairs or the visually challenged that may not know they are crossing an alley.	1A, 5A
A9 – Substandard walking surfaces. Slick or uneven walking surfaces, or trip hazards, can make maneuverability difficult.	3A, 6A,7A

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1A) Add/upgrade curb ramps equipped with tactile indicators/truncated domes *(See page 4-13)*
2A) Accessible crosswalk signals *(See page 4-13)*
3A) Walkways and ramps free of damage or slip hazards *(See page 4-16)*
4A) Pedestrian paths free of gaps, abrupt directional changes and with obstructions confined to utility/furnishing zone *(See page 4-14)*
5A) Sidewalks with limited driveways and minimal cross-slope *(See page 4-14)*
6A) Re-grade slope of walkway to meet ADA/Title 24 standards *(See page 4-14)*
7A) Repair, slice or patch lifts on walking surfaces and re-set utilities boxes to flush to eliminate trip hazards *(See page 4-14)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.3 CONNECTIVITY GOALS, ISSUES AND SOLUTIONS

Develop a complete pedestrian network that provides direct and convenient connections for neighborhoods, employment centers, transit stations, public places and community destinations.

Connectivity refers to the existence of a defined direct pedestrian path (generally along streets) between where a walker starts and where she or he wants to go. Community connectiveness is the basis for a pedestrian-friendly environment. The human scale of walking is typically not much more than 1/4 mile distance which is equivalent to a five- to ten-minute walk at an easy pace. Within this ten-minute radius, residents should be able to walk to the center from anywhere in a neighborhood to take care of daily needs or to use public transit. The pedestrian system is an integral component of the overall transit system and serves as a connector between where we live and where we work and how we connect to the city.

3.3.1 Typical Connectivity Issues

In San Diego, sidewalk obstacles that make walking difficult include gaps in the sidewalks, multi-block areas without pedestrian facilities, steep slope/canyon barriers, "difficult to cross" road barriers and land use barriers that prevent the easy pedestrian flows through a site.

Sidewalk Gaps

Throughout the City, there are gaps where sidewalks have not been completed because of development phasing. A typical situation occurs where development takes place on a parcel that is only a portion of an undeveloped block and the sidewalk is constructed to serve only the developed parcel. Until the remainder of the block is developed, there is no connection to other sidewalks in the area. Lack of sidewalk facilities exist at the local site level as well. Often movement around a development, community or commercial center is difficult because there is no separation between the vehicular driving and parking environment and the pedestrian.

Roadway edges that were thought would never be used by pedestrians, are often used even without proper walkway facilities.

Multi-block Areas without Pedestrian Facilities

During the 1960's and 1970's, some large development projects in some areas of the City were constructed without sidewalks and pedestrian facilities in the belief that all areas would be served almost exclusively by private automobile. However, this has not always been the case and pedestrians have had a difficult time in such neighborhoods, such as in parts of La Jolla (Birdrock and Soledad neighborhoods) and in parts of Linda Vista and Clairemont Mesa.

Steep Slope/Canyon Barriers

San Diego's canyons and hillsides are its defining natural features, but these landforms can make pedestrian movement difficult. In some of the City's older neighborhoods, these gaps were addressed by pedestrian bridges (such as Vermont and Upas Street bridges in Uptown) and stairways along hillsides (Uptown, La Jolla, Mission Valley).

Road Barriers

Designing for the movement of vehicles has often relegated the pedestrian to a secondary status. This includes practices of wide curb radii that allowed cars to make turns without significantly reducing speed, and freeway-like ramping, turn lanes and merge lanes that required a pedestrian to cross high speed traffic. Also, high speed, high volume and wide streets represent barriers because of the length of time needed to wait between cycles to cross, the overall crossing distance and the fear of safety issues. These roadway related barriers do affect connectivity.

Because of the volume of traffic and the lack of regularly spaced crossings, some of our urban roads become barriers for pedestrians.

Sidewalk Capacity & Obstruction Barriers

The location and size of sidewalks can also be a connectivity problem if the route is avoided because of other walkability issues. A sidewalk, even one that meets the City's minimum required width, can be a deterrent to pedestrian travel. Though against City Policy, poles for streetlights, traffic signal poles, utility boxes, newspaper racks, backflow preventors, vending machines, etc., are often located in the path of travel making it difficult to maneuver even if there is only a small number of pedestrians using the walk.

Street Patterns that Limit or Extend Pedestrian Connections

The typical suburban street layout, with its hierarchal designation of streets, long blocks without cross-streets and streets ending in cul-de-sacs, makes it difficult for pedestrians to walk from home to school, to shopping, or to recreation, because the street pattern does not allow easy access to destinations, even if they are relatively close by. In turn, this forces potential walkers to rely on the automobile. In some of the region's newer developments, a "connected" street system has been put in place. While not as formalized and geometrically arranged as the street systems in older communities, these systems do allow many options for people to walk to their destinations and they allow people to walk around the block. In neighborhoods where the street connectivity is not possible due to topography or traffic, pedestrian-only walkways have been put in place and some cul-de-sacs have pedestrian connections to adjacent areas.

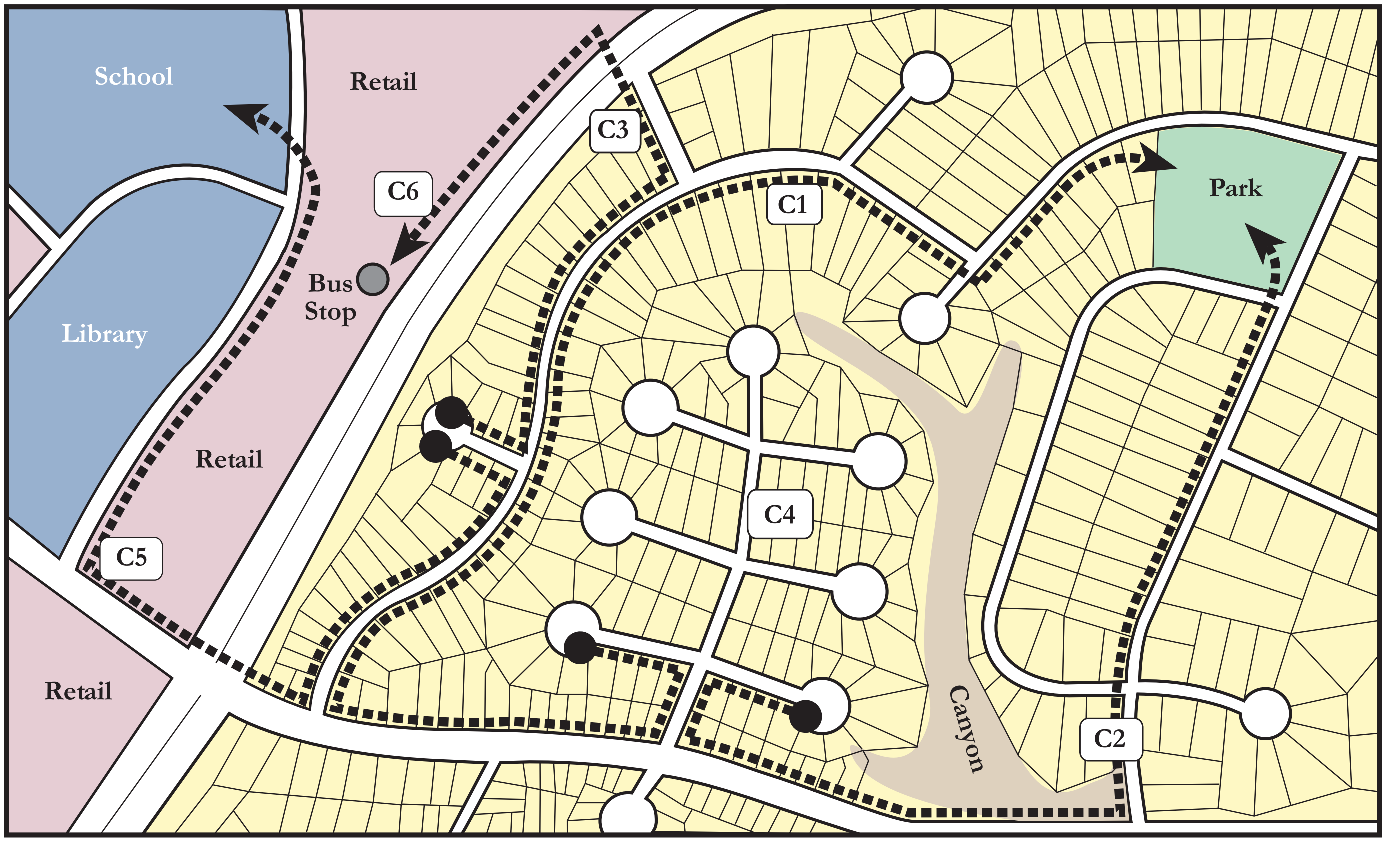
3.3.2 Solutions that Address Connectivity Issues

Table 23 has been developed to describe the typical connectivity issues associated with public rights-of-way and development patterns. Many of these solutions need to be brought up at the site planning and project approval stage. When a project is being portrayed as supporting smart growth strategies, it is incumbent upon the developer or property owner to prove that the new project will be connected with local land uses through direct walking facilities. This often requires connections that lead beyond the immediate limits of the project parcel. If the new or retrofitted environment is not fully connected at a pedestrian scale, then it will not support the objectives of smart growth.

Poorly placed utility boxes can counter the efforts that provide wide and obstruction free sidewalks.

Table 23: Connectivity Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
C1 - Street patterns are not connected. Pedestrians are required to take a long route to reach neighborhood attractors, schools and transit. Curvilinear and dead-end streets (cul-de-sacs) tend to discourage walking.	1C, 2C, 3C, 5C, 8C
C2 - Walking barriers. Natural barriers (canyons or slopes) or man-made barriers (freeways or rail lines) tend to discourage walking.	6C
C3 - High speed roadway barriers. High volume, multi-lane and high speed roads create a perceptual and/or safety barrier that discourages crossing and may require pedestrians to walk blocks out of direction to safely cross.	4C, 5C, 6C, 7C, *also see* 1S, 2S, 3S, 4S, 10S, 12S, 13S *on page 4-19*
C4 - Complete lack of walkways. Entire neighborhoods may lack pedestrian facilities. Except in some rural locations or other special circumstances, all streets should have sidewalks.	2C
C5 - Isolated land uses. If the distance between where people live and where they work, shop, learn or play is more than a mile, most people will never walk. Curvilinear streets and non-connected street patterns contribute to this effect.	3C, 5C, 8C
C6 - Isolated transit facilities. Transit systems are often not close enough to origins (generators) or destinations (attractors) to make walking between them feasible. Transit systems generate pedestrian activity, which, in turn, supports transit if the stops are within a reasonable walking distance.	1C, 2C, 3C, 4C, 5C, 6C, 7C, 8C

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1C) Missing sidewalk segments added in areas where sidewalks mostly exist (See page 4-24)
2C) Missing sidewalks added in areas where no sidewalks exist at all (See page 4-24)
3C) Connecting pathways added between streets (See page 4-24)
4C) Street widths reduced or features added to narrow crossing distance (See page 4-25)
5C) Destinations added or made more connected within walking distance of origins (See page 4-25)
6C) Pedestrian bridges that avoid excessively long approach ramps (See page 4-26)
7C) Pedestrian crossing opportunities added for all sides (legs) of intersections (See page 4-26)
8C) When reviewing projects, verification that pedestrian routes and distances between land uses are reasonable and direct (See page 4-26)

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.4 WALKABILITY GOALS, ISSUES AND SOLUTIONS

Create pedestrian facilities that offer amenities to encourage usage and to enhance the pedestrian experience.

Walkability is defined as a mixture of physical and perceptual elements that make up the built environment that are conducive to walking. They general fall within one of four zones (road edge zone, furnishing zone, throughway and the building frontage zone). The physical elements include the walkway itself (throughway zone), amenities along the walkway (usually in the furnishing zone), items that provide protection from harsh environmental conditions of sun, wind or rain provided adjacent to or above the walkway (also in the furnishing zone) and the uses along the walkway edge (usually the vehicular edge on one side and some form of building frontage zone on the other side). The perceptual elements are factors that contribute to the feeling of safety, protection from collisions, avoidance of crime, buffering from activity and noise and the comfort and interest that the visual environment provides. The ultimate measure of walkability is whether pedestrians seek out the walking environment, ignore the environment as they pass through it, or actually avoid it completely because of it being perceived as not being walkable.

3.4.1 Basic Requirements for Walkability

In addition to providing a safe, accessible and connected pedestrian environment, a walkable environment includes some additional elements and requirements including:

- The introduction of elements such as shade trees, pedestrian-level lighting, street furniture and appealing plazas not only enhance the pedestrian walking experience, but create streetscapes of superior design that improve the City's image and make the driving experience more pleasant.
- Protection from the elements. This is mostly handled through the use of street trees that add shade and reduce ground reflection of heat and light during warm weather. They provide protection from wind and rain during cold weather. They add visual interest to the streetscape. Trees also serve an important role in increasing safety from passing traffic and the improved perception of safety by buffering adjacent busy uses.
- The arrangement of physical elements must be handled in a way that promotes defensible space.
- Visual access into adjacent land uses such as windows of stores or residences, or an unfenced yard, park, or garden add interest and provide a sense that other people are providing "eyes on the street."
- Public art, water fountains, benches, trash receptacles, drinking fountains and quality lighting communicate welcome and invite lingering. These amenities can improve the success of business establishments.

3.4.2 Solutions that Address Walkability Issues

Table 24 has been developed to describe the typical environmental elements that prevent an area from being considered as walkable and proposes changes to this environment that will make it more walkable. In order for a facility to be truly walkable, however, it must also be mostly void of the issues shown on the Safety, Accessibility and Connectivity matrices.

...foot notes...

"The principal ornament to any city lies in the siting, layout, composition, and arrangement of its roads, squares, and individual works. Each must be properly planned and distributed according to use, importance, and convenience. For without order, there can be nothing commodious, graceful or noble."

Leon Battista Alberti, de Refedifica Foria.

3.5 NEIGHBORHOOD QUALITY GOALS

When walkable communities are provided, they enhance neighborhood quality by providing opportunities for social interaction, enhanced economic development and healthy lifestyles.

Though not a primary issue and solution topic, neighborhood quality is often the result of a variety of environmental and social elements that have been brought together to create a quality living and working environment. If a pedestrian and public environment has been provided that is safe, accessible, connected and walkable, a quality neighborhood is almost assured. When these four goals have been met, they produce positive side affects, such as neighborhood quality. There is a link between the physical environment and the degree of social interaction in a community. Streets and neighborhoods that promote pedestrian activity provide opportunities for the development of social networks. The physical environment of neighborhoods is also known to correlate with the incidence and fear of crime and violence. Certain building designs, the presence of trees and green space, good street lighting and community gathering places are all commonly known to provide residents with a greater sense of security and to serve as an actual deterrent to crime and violence. People like places that are more than just walkable, they like places where they can interact with others in their community.

...side step

When all of the elements of safety, accessibility, connectivity and walkability come together, a quality neighborhood or community will be created.

3.5.1 Required Elements to Assure Neighborhood Quality

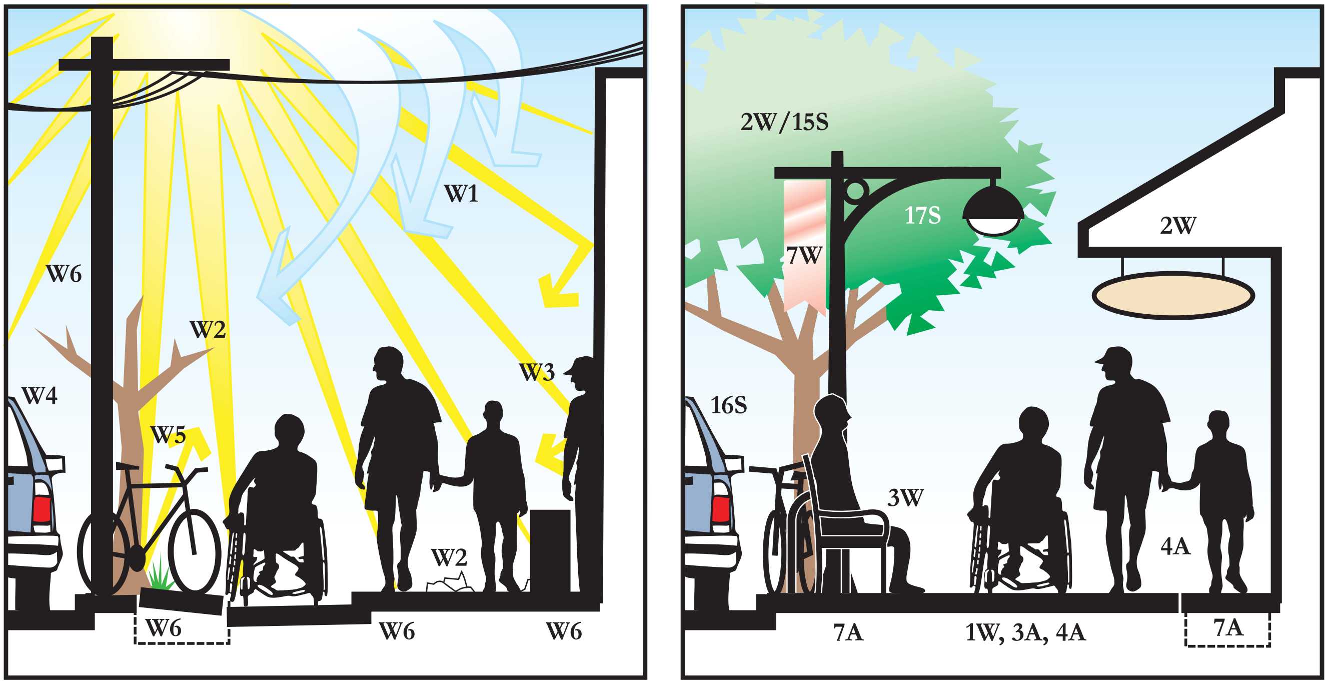
The most memorable public places in our cities and towns have generally been those places where people congregate on foot; the streets, parks and squares. These have been democratic places that make our towns and cities livable and vital. Community structure is the basis for a pedestrian-friendly environment. An inviting pedestrian environment helps create a sense of place within a neighborhood and not only makes the streets more walkable, they actually encourage walking, which is the overall goal of this plan.

Places that feel inviting to pedestrians usually share some common characteristics or amenities:

- A sense of enclosure, provided by buildings or other structures, awnings, or trees close to the walkway. Particularly in suburban areas, the proliferation of low-density neighborhoods with wide streets has not allowed a sense of enclosure to develop. There are notable exceptions in denser areas and traditional main streets such as La Jolla, Newport Avenue in Ocean Beach and Adams Avenue in Normal Heights.
- In traditional neighborhoods, buildings were not set back from the street and "window shopping" drew pedestrians along the street. In suburban areas, buildings were set far back from the street, separated from the sidewalk by parking lots, or feature blank walls rather than windows. In some cases, this suburban building form has also been allowed in traditional neighborhoods and in Downtown San Diego, disrupting the pedestrian environment.
- Clearly defined spaces are provided by the City via controls on the intrusion of private commercial uses in the pedestrian way such as zoning ordinances and code compliance. However, in neighborhoods lacking a planting buffer or a defined place for fixtures, the pedestrian path was frequently interrupted by a proliferation of utility poles, newspaper racks, mailboxes and other obstacles.

Table 24: Walkability Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



An unwalkable environment...made walkable

Issues	Potential Solutions *(See legend*)*
W1 - Harsh environmental conditions. Direct sun, noise, vehicle fumes and wind can all contribute to an unpleasant walking environment.	**1W, 2W,** *also see* **15S, 16S** *on page 4-20*
W2 - Poor maintenance. Trash, weeds, derelict structures and graffiti can discourage people from walking.	**1W,** *also see* **19S** *on page 4-21*
W3 - Perceived unsafe walkways due to fear of crime. The actual or perceived threat of theft, assault or panhandling can discourage walking.	**1W, 7W,** *also see* **17S** *on page 4-21*
W4 - Lack of buffer from high speed or high volume traffic. Proximity to high speed, high volume traffic creates an unpleasant walking environment.	**1W, 2W, 3W,** *also see* **2S, 15S, 16S, 18S** *on page 4-21*
W5 - Absence of site amenities. Streets lack amenities such as places to sit, shade, drinking fountains, trash receptacles, bicycle racks and pedestrian signage.	**3W, 7W,** *also see* **15S** *on page 4-20*
W6 - Walkway obstructions. This issue goes beyond minimum ADA standards and includes obstructions that force a sidewalk user to go around an obstruction, crowded sidewalks, or the presence of multiple surfaces, slopes and trip hazards.	**1W,** *also see* **3A, 4A, 7A** *on page 4-14*
W7- Limited or difficult street crossisngs. This issue relates to accessibility, safety, connectivity as well as walkability. It is included here to emphasis the need for visual clues and physical design features needed to create visible signs of a safe pedestrian crossing in a vehicle dominanted area.	**4W, 5W, 6W** *also see* **2S, 3S, 4S,** *on page 4-15 and 4-16*

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1W) Provide greater than minimum walkway widths and maintain minimum level of repair and maintenance (see page 4-22)
2W) Provide trees, awnings or building overhangs to shade walkways (see page 4-22)
3W) Provide street furnishings for comfort and enjoyment and place amenities (along with utilities) in the right location (see page 4-22)
4W) Provide countdown display crosswalk signals (see page 4-23)
5W) Provide traffic control for crossings such as traffic signals or "all way stops" (see page 4-23)
6W) Provide "pedestrian scrambles" simultaneous crossing allowed in any direction, including diagonally (see page 4-23)
7W) Provide public art such as decorative paving, tree grates, banners, art pieces, signage, etc. (see page 4-23)

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.6 ALTERNATIVE TRANSPORTATION GOAL

When walkable communities are provided, they support walking as a primary means of transportation, support other transit and bike transportation options and can also improve the beginning and end of vehicular trips when the driver becomes a pedestrian.

Another desired outcome of this PMP is to encourage the use of alternative means of transportation through facilitating pedestrian activity. If the four primary goals of this plan are met, then the chance of having walking as a primary transportation choice (or the use of transit in conjunction with walking as the transportation choice) is greatly increased.

Transit success is reliant upon a walkable and pedestrian friendly environment. Walking to work (or to shop or school) as a primary transportation mode, rivals the mode split of public transportation systems with a fraction of the cost of investment. Walking can also support or extend the travel distance of bicycling and even vehicular transportation since all vehicular trips start and end with a pedestrian mode.

It is beyond this plan to describe alternative transportation issues and solutions, except in recognizing the important role that walking plays in many alternative transportation strategies. To support these strategies, a pedestrian-friendly environment is needed that is safe, accessible, connected and walkable. When neighborhood quality goals are achieved as well, the environment will tend to support walking as a viable and preferred choice.

3.7 COST EFFECTIVENESS GOAL

When funded equitably and appropriately, pedestrian improvements can combine public and private investments for the good of the public and can lower expenses related to vehicular and transit investments.

The final desired outcome of this PMP is to assure cost-effective investment of private and public money for infrastructure needed to support a walkable community. Since funding for pedestrian facilities is limited and often competes with many other community funding priorities, it is highly critical that these funds be used as effectively as possible. Successful examples of improved pedestrian facilities that increase safety, access, connectivity and walkability are needed to assure the continued availability of funding for this alternative transportation mode. Funds spent that do not result in increased walking or that do not address the deficiencies in the pedestrian environment, can often be used as examples as to why funding should be limited for this transportation choice. Other sections of the plan (Chapter 5, 6, 7 and 8) describe the goals of cost-effective investments and prioritization processes for funding.

3.8 RELATIONSHIP OF GOALS & EXISTING POLICIES

Table 25 summarizes existing policies that have been adopted or are in the process of being adopted that affect the pedestrian environment. This plan does not directly create new policies, though it provides guidelines for how to implement policies. In most cases, the existing policies cover all of the topic areas necessary to encourage the inclusion of a walkable environment. Policies that were determined to need further review and refinement are:

- **Policies controlling pedestrian crosswalk striping** (Council Policy 200-07)

  Are the current policies and practices regarding the use of stop bars with double line standard crosswalk markings, the most appropriate for pedestrian safety, or should crosswalk markings with higher visibility to the driver be used (such as continental, zebra or ladder styles)? Should the city consider the use of these different marking styles under certain circumstances and not others? A hierarchy of pedestrian crosswalks is advisable to help indicate to the driver areas of higher pedestrian activity or special conditions such as nearby schools. Using the pedestrian route types in this plan as a basis, policies for crosswalk markings should be made specific to these different route types and treatment areas. Concern over stripng application and maintenance costs should be reviewed as well. The use of staggered continental style markings are used by many municipalities since they are highly visible and do not have the wear and maintenance restriping problems of other crosswalk markings.

- **Policies allowing the use of mid-block crosswalks (with flashing lights) across multiple traffic lanes without active traffic controls** (Council Policy 200-07)

  Should the city use mid-block crossings without active controlled signals? If so, in what situations are these crossings considered safe (such as one-lane each direction with a median refuge) and under what circumstances are other treatments that utilize traffic control warranted? (such as high pedestrian areas with multi-lane multi- threat situations resulting from the shadow affect of one vehicle blocking visibility for other vehicles).

- **Policies that allow for the use of third and fourth leg pedestrian restrictions in situations where left turn conflicts are minimal**

  Should the city refine policies that allow the elimination of pedestrian crossings? Clearly, certain situations such as dual left turns, make pedestrian crossings unsafe. However, in some situations, increased throughput of vehicular turning motions may come at the expense of pedestrian safety, connectivity, accessibility and walkability.

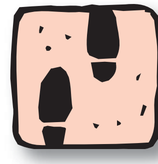
- **Current warrants for stop signs and traffic signals** (Council Policy 200-06, 07 & 08)

  Many times, the most effective method for increasing walkability, connectivity, accessibility and safety is to install a positive traffic control device such as stop signs or traffic signals. Should the city refine its policies on relying on collision and use warrants to justify these treatments or should a more proactive method of improving walkability and safety be integrated with the warrant process?

- **Increased lighting levels along pedestrian routes** (Council Policy 200-18)

  Are there locations with higher pedestrian use that warrant increased lighting levels? Lighting plays a factor in pedestrian safety through avoidance of collisions and crime, which indirectly affect walkability.

Steps that can be taken ...



• The policies listed on this page should be reviewed for adjustments and potential policy amendments or additions.

• Safety and collision data should be reviewed in greater detail to help discover repeating patterns, trends or geographic areas that may warrant appropriate countermeasures.

Table 25: Existing or Draft Proposed City of San Diego Policies Relevant to Pedestrian Issues and Goals

Policy #	Description	Safety	Accessibility	Connectivity	Walkability
DRAFT GP (OCTOBER 2006)-URBAN DESIGN ELEMENT					
GP-UD-A.2	Open space linkages			X	
GP-UD-A.3	Development adjacent to natural features			X	
GP-UD-A.5	Architecture				X
GP-UD-A.8	Landscape				X
GP-UD-A.9	Transit integration	X	X	X	X
GP-UD-A.10	Streets			X	X
GP-UD-A.12	Surface parking			X	
GP-UD-A.13	Lighting	X			
GP-UD-A.14	Signs				X
GP-UD-B.1	Residential design				X
GP-UD-B.4	Residential street frontages		X		X
GP-UD-B.5	Neighborhood streets			X	X
GP-UD-B.6	Alleys			X	
GP-UD-C.1	Mixed-use villages			X	X
GP-UD-C.2	Mixed-use villages			X	X
GP-UD-C.4	Pedestrian-oriented design				X
GP-UD-C.5	Village center public space				X
GP-UD-C.6	Village street layout and design	X	X	X	X
GP-UD-C.7	Streetscape	X	X	X	X
GP-UD-C.8	Superblocks			X	X
GP-UD-D.1	Pedestrian-oriented design	X	X	X	X
GP-UD-F.3	Public spaces				X
GP-UD-F.5	Village center public space				X
DRAFT GP (OCTOBER 2006) - ECONOMIC PROSPERITY ELEMENT					
GP-EP-A.21	Pedestrian design elements on industrial land			X	X
GP-EP-B.9	Retain commercial within walking distance of residential		X		
GP-EP-B.14	Redesignation of commercial land			X	X
DRAFT GP (OCTOBER 2006) - RECREATION ELEMENT					
GP-RE-C.1	Barrier free recreation facilities		X		
GP-RE-C.2	Barrier free outdoor experiences		X		
GP-RE-C.6	Linkages between recreation facilities			X	
GP-RE-C.7	Public access to open spaces and recreation facilities		X		
DRAFT GP (OCTOBER 2006) - CONSERVATION ELEMENT					
GP-CE-C.9	Access to Shoreline			X	
GP-CE-C.12	Beach and Shoreline Accessibility		X		
DRAFT GP (OCTOBER 2006) - MOBILITY ELEMENT					
GP-ME-A.1	Pedestrian safety and comfort	X	X		
GP-ME-A.2	Safe pedestrian routes	X	X		
GP-ME-A.3	Public education campaign	X	X		
GP-ME-A.4	Pedestrian accessibility	X	X		
GP-ME-A.5	Sidewalk design	X	X		
GP-ME-A.6	Interconnected pedestrian network	X	X	X	X
GP-ME-A.7	Pedestrian-oriented design	X	X	X	X
GP-ME-A.8	Mixed uses			X	X
GP-ME-A.9	Mobility, environmental, social and health benefits		X		X
GP-ME-B.3	Walking environment for transit users			X	X
GP-ME-B.9	Transit-supportive city land use planning			X	
GP-ME-C.3	Street layout and pedestrian connections			X	X
GP-ME-C.4	Improve operations and maintenance on city streets	X			
GP-ME-C.6	Minimize pedestrian conflicts at driveway curb cuts	X	X		
GP-ME-C.9	Multi-modal level of service			X	
DRAFT GP (OCTOBER 2006) -LAND USE AND COMMUNITY PLANNING ELEMENT					
GP-LU-H.5	Accessible social services		X		
GP-LU-H.6	Pedestrian linkages			X	
CITY COUNCIL POLICIES					
CP-200-06	Criteria for installation of traffic signals	X			
CP-200-07	Comprehensive pedestrian crossing policy	X		X	
CP-200-08	Criteria for installation of stop signs	X			
CP-200-12	Sidewalk maintenance	X	X		
CP-200-16	Accessible (audible) pedestrian traffic signals	X	X		
CP-200-18	Mid-block street light policy for developed areas	X	X		
CP-600-32	Centre City Streets Standards, Ped. Orientation & Access				X
CP-800-01	Installation of pedestrian separation structures	X	X		

Chapter

4

Route Types & Treatments

Chapter 4

Route Types & Treatments

4.1 OVERVIEW

Roadways are typically grouped by functional type and capacity. This chapter defines the different types of pedestrian facilities that exist in the City of San Diego based on similar functions, adjacent uses and characteristics of the walking environment. Different route types require different treatments in order to best support the walking environment of a particular area. Not all walking facilities need the same level of treatment. This chapter helps to establish a common definition of walking facilities and recommends treatments that may be applied to match the facility with the circumstance.

4.2 TYPES DEFINED

All walkway facilities in San Diego can be classified into one of seven types.

All walking facilities found within the City of San Diego fit into one of the following categories of walking facilities. Table 26 describes each route type. See Figures 6a-g for route types and examples.

4.2.1 District Sidewalks

A district route includes sidewalks in the more intensive mixed use and concentrated areas of the city.

District Sidewalks, labeled as Route Type 1, are sidewalks along roads that support heavy pedestrian levels in mixed-use concentrated urban areas. Usually, the district is an urbanized area with special functions, such as theater districts, office parks, shopping centers, or college campuses. The location of the district may be adjacent to neighborhoods, but these routes can be distinguished easily by adjacent uses, densities and urban form. It has an identifiable focus that provides orientation and character, and reinforces a sense of community among users by encouraging walking.

Table 26: Route Types

ROUTE TYPE:	1. District Sidewalks	2. Corridor Sidewalks	3. Connector Sidewalks	4. Neighborhood Sidewalks	5. Ancillary Pedestrian Facilities	6. Path	7. Trail (Included for Reference Only, not a Focus of this Plan)
Purpose	Sidewalks Along Roads that Support Heavy Pedestrian Levels in Mixed-use Concentrated Urban Areas	Sidewalks Along Roads that Support Moderate Density Business & Shopping Districts with Moderate Pedestrian Levels	Sidewalks Along Roads that Support Institutional, Industrial or Business Complexes with Limited Lateral Access & Low Pedestrian Levels	Sidewalks Along Roads that Support Low to Moderate Density Housing with Low to Moderate Pedestrian Levels	Facilities Away or Crossing Over Streets such as Plazas, Paseos, Promenades, Courtyards or Pedestrian Bridges & Stairways	Walkways and Paved Paths that are not Adjacent to Roads that Support Recreational and Transportation Purposes	Unpaved Walk Not Adjacent to Roads Used for Recreational Purposes
Typical Adjacent "Street Design Manual" Classifications	All types of adjacent streets are possible	Commercial, Urban Collector, Urban Major & Arterial	Commercial, Industrial, Urban Major, Rural Collector & Arterial	Rural, Low Volume Residential, Residential Local & Sub-collector	Not associated with a street	Not associated with a street	Not associated with a street
Cross Reference to Related "Strategic Framework Plan" Definitions	Existing: Regional Centers, Urban Villages & Neighborhood Villages	Existing: Sub-regional Districts and Transit Corridors	Existing: Sub-regional Districts, Transit Corridors, & Suburban Residential along Major Arterials	All other Residential Areas not Classified under the Strategic Framework Plan	Most common in Regional Centers, Urban or Neighborhood Villages but can be in any area	Can occur in any area, but most often found in Recreation, Tourist or Open Space Areas	Can occur in any area, but most often found in Recreation or Open Space Areas
Typical Adjacent Land Uses	Mixed-use Housing, Commercial, Office & Entertainment with Urban Densities	Multiple Land Uses but may be Separated. Often Strip Commercial or Office Complex.	Open Space, Industrial Uses, Institutional Uses or other Pedestrian Restricted Uses	Single-family and Moderate Density Multi-Family with Limited Supporting Neighborhood Commercial	Adjacent Land Uses Vary	Adjacent Uses Vary, Often Recreational or Open Space or Housing	Open Space, Parks and Natural Areas

4.2.2 Corridor Sidewalks

A corridor sidewalk is associated with major arterials and linear corridors that provide for mixed uses with at least a moderate level of density.

Corridor sidewalks are labeled as Route Type 2 and defined as sidewalks along roads that support moderate density business and shopping districts with moderate pedestrian levels. They can range from wide walks along boulevards to small sidewalks along a heavily auto oriented roadway. They may connect moderate to high density residential areas, but only if they are located along major arterials.

4.2.3 Connector Sidewalks

A connector sidewalk is often along a lower density corridor with few connections to adjacent land uses.

Connector sidewalks, labeled as Route Type 3, tend to have low pedestrian levels and are along roads with moderate to high average vehicular traffic. Connector sidewalks tend to be long and, in some cases, do not have accessible land uses directly adjacent to the sidewalk. This can include sidewalks along major arterials that run parallel to open space and canyon lands. Often, they are along land uses that require buffering from the street noise, resulting in noise walls that further isolate the pedestrian from the adjacent land uses.

These sidewalks have limited pedestrian use levels typically because of their remoteness and lack of nearby destinations. Often they can lead to nowhere, with the sidewalk stopping a distance away from other uses, typically where topography restricts the width of the road or where a development ends its improvements. Even though they have limited use, they are often along high speed streets. Without the existence of these walkways, the pedestrian may be forced to walk in a high speed and high volume street.

4.2.4 Neighborhood Sidewalks

A neighborhood sidewalk is limited to areas of lower density and single use residential areas.

Neighborhood sidewalks, labeled as Route Type 4, are sidewalks along roads that support low to moderate density housing with low to moderate pedestrian levels. Neighborhood streets and their associated walkways are generally lower volume streets, with low to moderate widths, single lanes in each direction and posted (prima facia) speed limits of 25 miles per hour. They are not as difficult to cross as a pedestrian and pedestrian collisions occur less frequently because the driver has ample time to see, react and brake. Speeding on these streets does occur and can result in pedestrian collisions. However, most physical design changes are not as likely to reduce these pedestrian collisions since they result from careless behavior.

4.2.5 Ancillary Pedestrian Facilities

A variety of special use facilities that do not fit the above definitions can be classified as ancillary. These are often away from street edges.

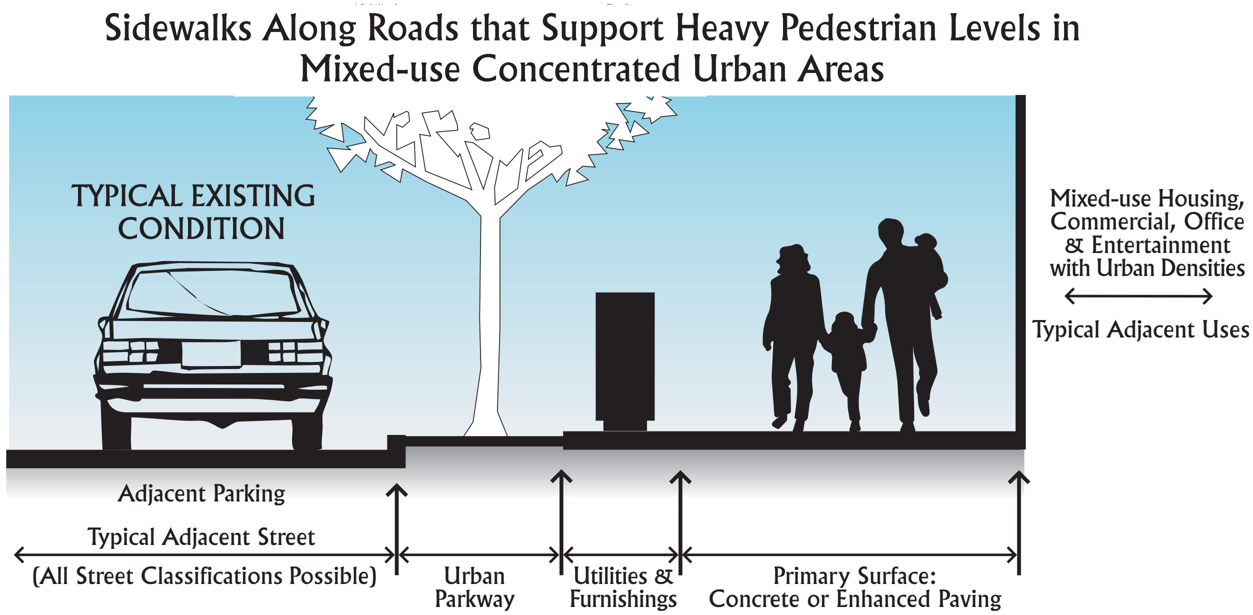
Route Type 5, Ancillary Pedestrian Facilities, are facilities away from or crossing over streets such as plazas, paseos, promenades, courtyards or pedestrian bridges and stairways. Many of these ancillary facilities attract local residents and workers and therefore generate moderate to high pedestrian use.

4.2.6 Paths

A path is a linear hard surface that is not connected to the edge of a street.

Route Type 6, Paths, are paved facilities with exclusive right-of-ways that act as corridors and have little or no vehicular cross flows. Many of these paths are exclusive to pedestrians and bicycles and are not associated with streets. Paths defined by the Pedestrian Master Plan are often associated with recreational uses. Many of these paths can be found in parks, near open space preserves and away from streets in residential areas. They are defined in this plan as being paved, away from a street edge and not shared with vehicles (except for emergency or maintenance vehicles). They are often shared with runners, skaters, cyclists and other recreational users.

Figure 6a: Route Type 1: District Sidewalks



Sidewalk with enhanced paving and outdoor cafes (University Avenue near 30th Street)

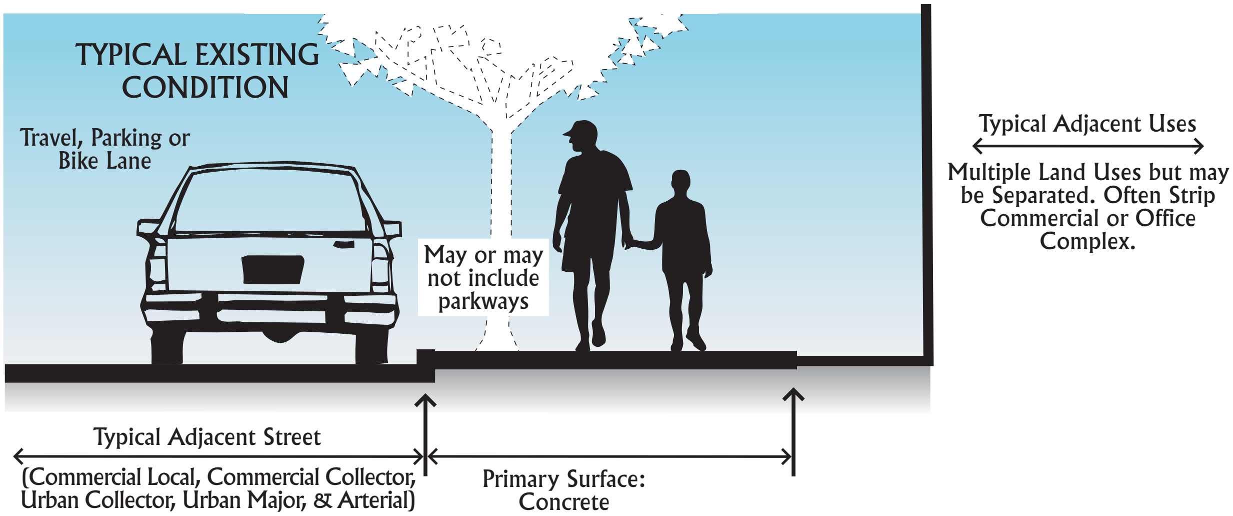
Sidewalk with wide clear paths and enhanced paving (Fifth Avenue at Washington Street)

Sidewalk with furnishing and frontage zones (Broadway at Columbia Street)

Sidewalk with street trees (Goldfinch Street north of Washington Street)

Figure 6b: Route Type 2: Corridor Sidewalks

Sidewalks Along Roads that Support Moderate Density Business and Shopping Districts with Moderate Pedestrian Levels



Sidewalk at curb
(Convoy Street at Engineer Road)

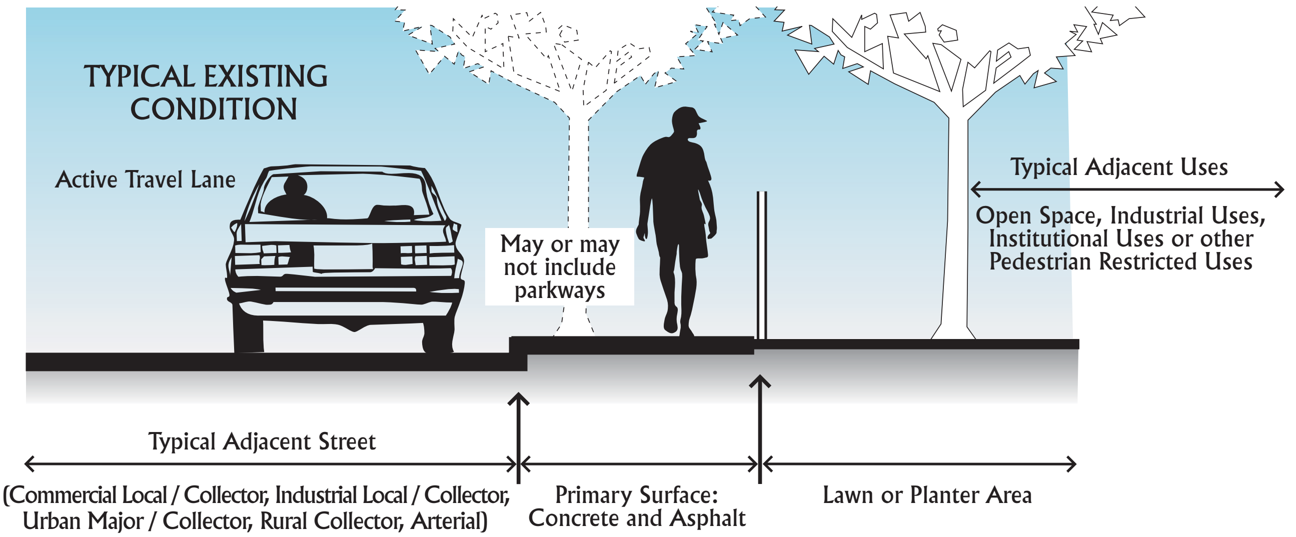
Wide sidewalk and angled parking
(Park Boulevard north of Polk Avenue)

Smaller scale sidewalk with street trees
(El Cajon Boulevard near Interstate 15)

Typical commercial district with supporting sidewalks
(San Ysidro)

Figure 6c: Route Type 3: Connector Sidewalks

Sidewalks Along Roads that Support Institutional, Industrial or Business Complexes with Limited Lateral Access and Low Pedestrian Levels



Asphalt sidewalk along curb
(Genesee Avenue north of Regents Road)

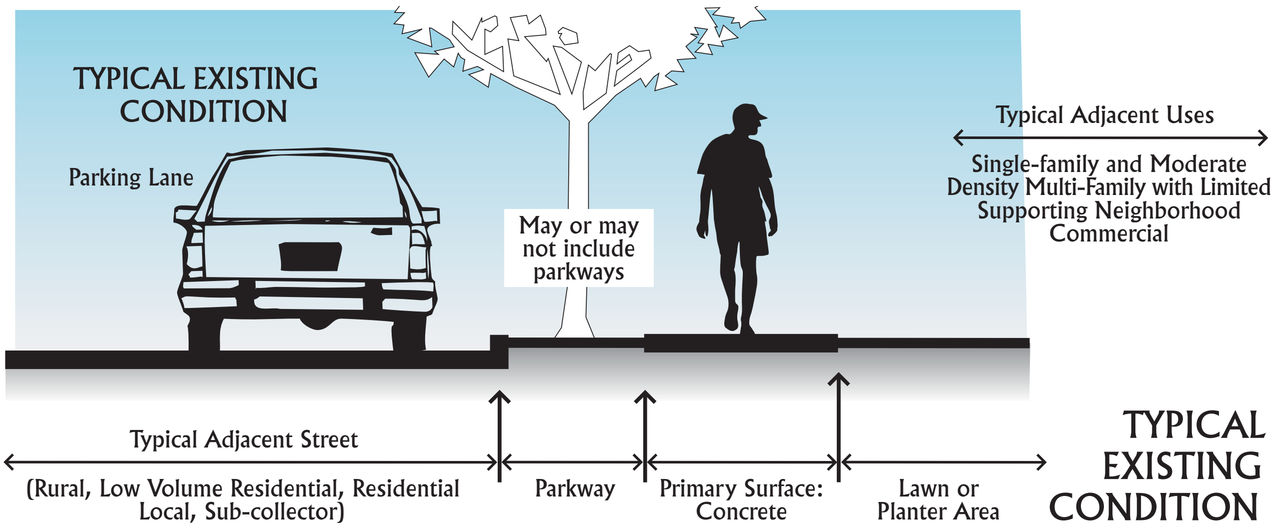
Though in a residential area, there are no connections to adjacent land uses (Camino de la Plaza in San Ysidro)

Buffered sidewalk
(Scripps Poway Parkway near Spring Canyon Road)

Wide but unbuffered sidewalk
(Mira Mesa Boulevard near Parkdale Avenue)

Figure 6d: Route Type 4: Neighborhood Sidewalk

Sidewalks Along Roads that Support Low to Moderate Density Housing with Low to Moderate Pedestrian Levels



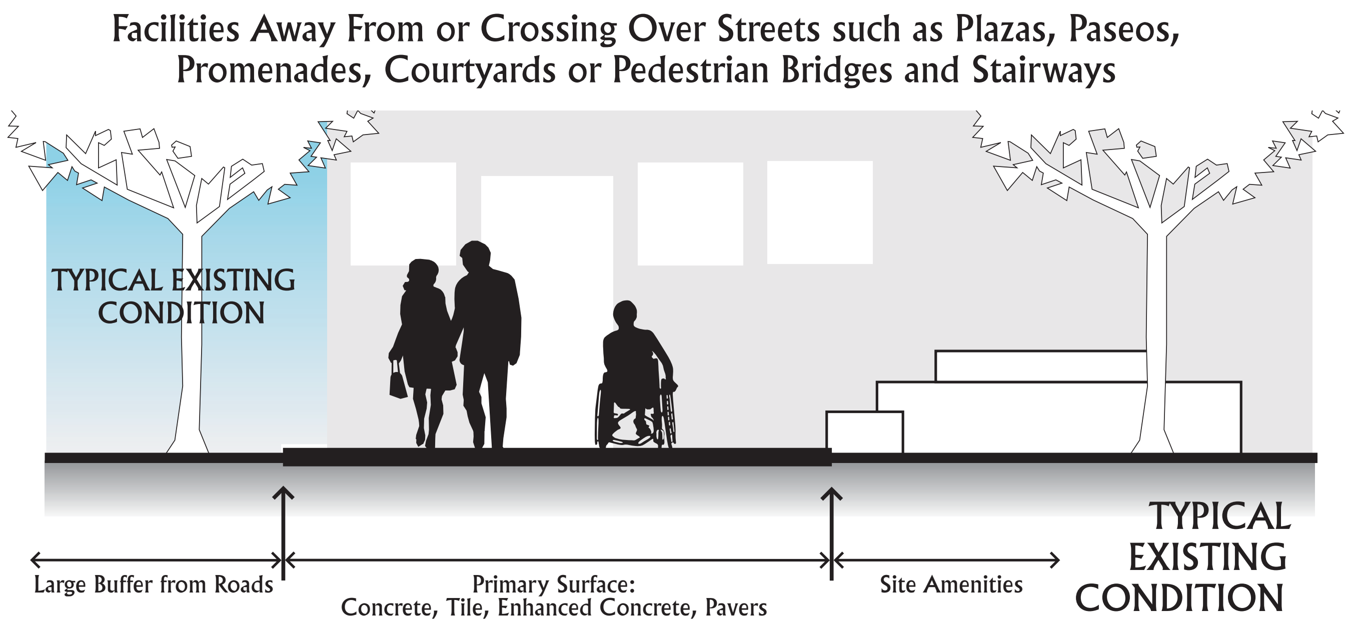
Sidewalk and parkway
(Myrtle Street west of Richmond Avenue)

Typical sidewalk in newer residential area with three car garage driveways (Seadrift & Sea Reef Way, Otay Mesa)

Sidewalk with wide driveways
(41st Street south of University Avenue)

Sidewalk with numerous driveways
(Russet Leaf Lane and Street)

Figure 6e: Route Type 5: Ancillary Pedestrian Facilities



Vermont Street bridge (over Washington Street)

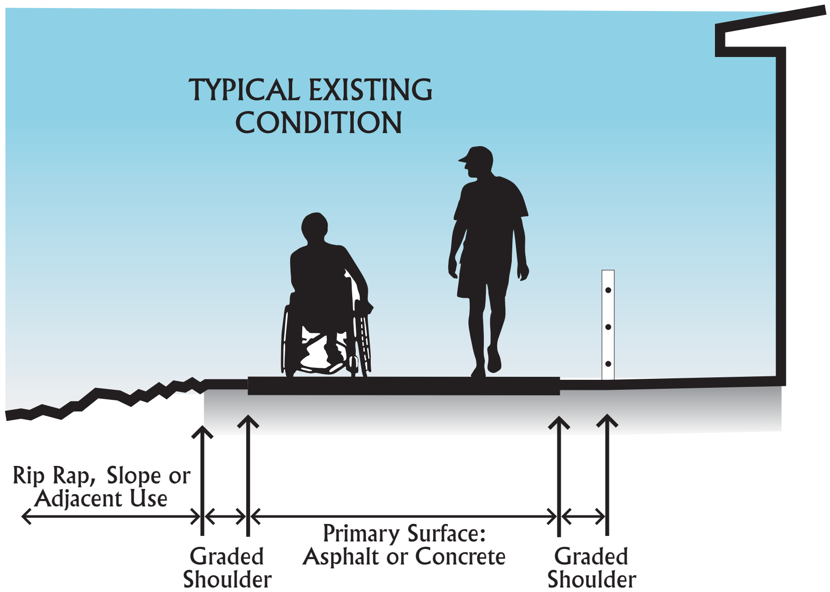
Martin Luther King Plaza and Promenade

Civic Center Plaza

Small Transit / Public Plaza in San Ysidro

Figure 6f: Route Type 6: Multi-use Pathways

Walkways and Paved Paths not Adjacent to Roads that Support Recreational and Transportation Uses

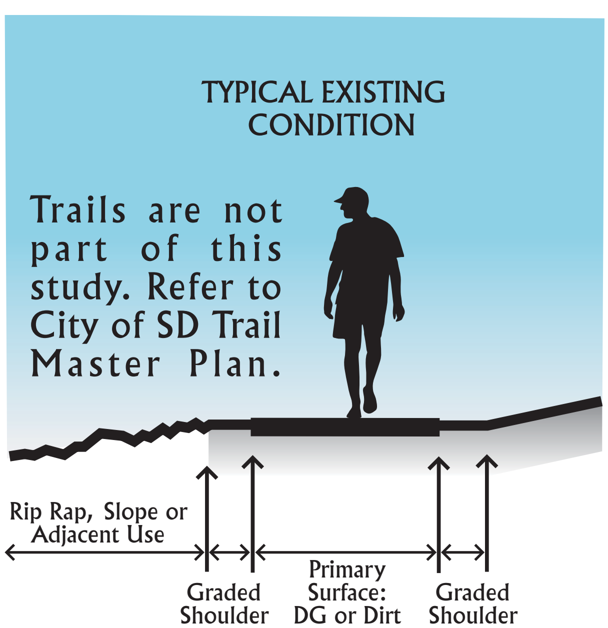


Multi-use path
(Mission Beach Boardwalk)

Walkway and bike path
(Embarcadero at G Street)

Figure 6g: Route Type 7: Walking or Hiking Trail

Unpaved Walk Not Adjacent to Roads, Used for Recreational Purposes



Dirt road/trail
(Balboa Park west of SR163)

Narrow trail
(Biltmore Trail in San Clemente Canyon)

4.2.7 Trails

A trail is unpaved and is not a focus of this plan.

Unpaved walkways or roads used for recreational use or open space maintenance are classified as Trails, Route Type 7. Trails are separated from roads and support activities such as hiking, biking and walking primarily through parks and open space. They differ from paths in that they are not paved with concrete or asphalt. Only authorized vehicles are permitted to access these trails, which in many cases are not ADA-compliant. Trails are not included in this study, but are defined to present all levels of pedestrian walkways. The San Diego Trails Master Plan and other Park Master Plans should be consulted for guidance on unpaved trails.

4.3 TREATMENT LEVELS

Though there should be flexibility in the specific conditions of any pedestrian facility, in general, different route types deserve different treatments.

This plan proposes four levels of pedestrian facilities, depending on the route type and special conditions found along a walkway.

Table 27 describes four treatment levels ranging from extensive treatments (Premium), to standard (Basic) and less expensive treatments for pedestrian facilities. Each of the treatment levels indicates the types of special circumstances that, if present, may warrant increasing the treatment up to the next level.

Table 27 also summarizes pedestrian facilities, techniques and enhancements that could be used in a particular area. This table (and the described treatment levels) have been created to help guide the appropriate use of treatments and to stretch limited public funding for pedestrian improvements.

A major premise of the "Basic Level" is that it is the minimum level that should be provided in all circumstances. In the case of certain neighborhoods and along certain connector streets, this "Basic Level" is adequate to provide the minimum level of safety, connectivity, access, and walkability.

In other areas, however, the "Basic Level" may not be enough to assure safety, connectivity, accessibility and walkability. In specific areas, the presence of major roadways and other detractors from pedestrian activity suggests a much higher level and expense associated with pedestrian treatments. In these situations, an "Enhanced Level" is recommended.

In yet other areas, the urban densities and design requirements and the presence of certain safety issues require a "Premium Level" to meet safety, connectivity, accessibility, and walkability goals.

4.4 TREATMENT LEVELS AND DEVELOPMENT PROJECTS

A developer is often required to construct and dedicate streets in newly developed areas or to pay into an assessment district or fund for the development's fair share of vehicular and pedestrian circulation requirements. The standards required for dedicating public streets by these new development projects are clearly defined in various ordinances and codes. Though the Street Design Manual has better defined standards for new development, often the full range of pedestrian facilities are not included in infill developments. Some developments apply for traffic reduction credits and off-street parking reductions based on efforts towards creating a better pedestrian environment or to obtain parking requirement reductions based on the existence of transit within the area of the development, whether a walkable connection exists or not.

...foot notes...

"Pay attention to the sidewalks--the most important part of the public realm."

Elizabeth Dunlop

Steps that can be taken ...

• The matrix (Table 27) and the discussion of potential solutions in this chapter, should be reviewed by various Departments of the City of San Diego and, if acceptable, be integrated into a variety of policies and departmental operating procedures and directives.

• Current city policies regarding requirements for pedestrian facilities, should be adjusted to use the route types described in this document. The route types each have different minimum width requirements and street crossing requirements as well as walkability amenities.

• An operating guide and brochure should be produced that can be distributed to the general public and to both developers and design / engineering professionals that describe the types of routes, typical issues and treatments that can be applied to those situations. The brochure should emphasize that final decisions on these treatments will require departmental review and approval.

• Project development policies should be reviewed to assure that projects in high pedestrian use areas where credit for smart growth or transit overlay zone parking reductions are taken, are providing off-site improvements if pedestrian connectivity or accessibility is not adequate in the immediate area.

• Policies should be developed that either require or encourage the right level of pedestrian improvements with the existing or potential level of pedestrian activity. The route types and associated treatments should be compared to the pedestrian priority areas discussed and mapped in the following chapter. Each infill, new development or redevelopment effort should be required to review pedestrian priorities, classification of existing route types in the area and recommended improvements for both on-site or off-site requirements.

In the developed areas of the city, new development or infill development are generally not required to bring streets up to the latest adopted standard. This is especially true for ministerial projects or smaller projects where finding a nexus between the project and the impacts on the community are difficult to define. A nexus is defined as a relationship between the project with a shortfall of infrastructure where the project would be expected to pay for its fair share of the shortfall. Developer impact fees can be collected for pedestrian improvements that might help bring an area into alignment with the latest adopted standards as long as a nexus can be found. In these cases, the development would pay for a fair share of costs for a particular public improvement. However, many community plans or public facility plans do not include recommendations on needed pedestrian improvements. Without the existence of adopted standards and plans, it is difficult to require projects to pay directly or indirectly for their fair share of these needed improvements.

This section of the plan suggests a strategy for helping to fund pedestrian improvements. Though a broad variety of funding sources may be applicable to pedestrian facilities, developer financed funding could be used more extensively. By providing a better defined level of treatment for areas, consistent requirements can be assigned to new or infill development. This is especially important for those types of developments that claim they are encouraging smart growth, mixed land uses, transit supportive land uses and pedestrian friendly facilities. If the development is requesting some variance, bonus, deviation or amendment from current plans or standards that affect the public realm, then it is reasonable to expect that a higher level of pedestrian facilities can be provided in order to justify these variances and to make findings of public benefit. An agreement between the developer and the community may exceed the project's normal fair share if the developer volunteers to provide more than the minimum in order to get an advisory approval by the local community planning group by showing additional public benefit.

In the case of infill development, it is much more difficult to have the development pay for and dedicate these improved facilities. Direct adjacent on-site improvements are commonly required, but generally do not extend beyond the parcel edge. If a PMP can be developed and adopted for a particular community, then new or infill development can be required to pay for their fair share of these improvements. The community planning discretionary process allows for a developer or applicant to voluntarily agree to certain conditions in order to obtain an advisory approval by the local community group. Please refer to Table 28 for how the various treatment levels can be applied to different development types.

4.5 SAMPLE PEDESTRIAN IMPROVEMENTS & TREATMENTS

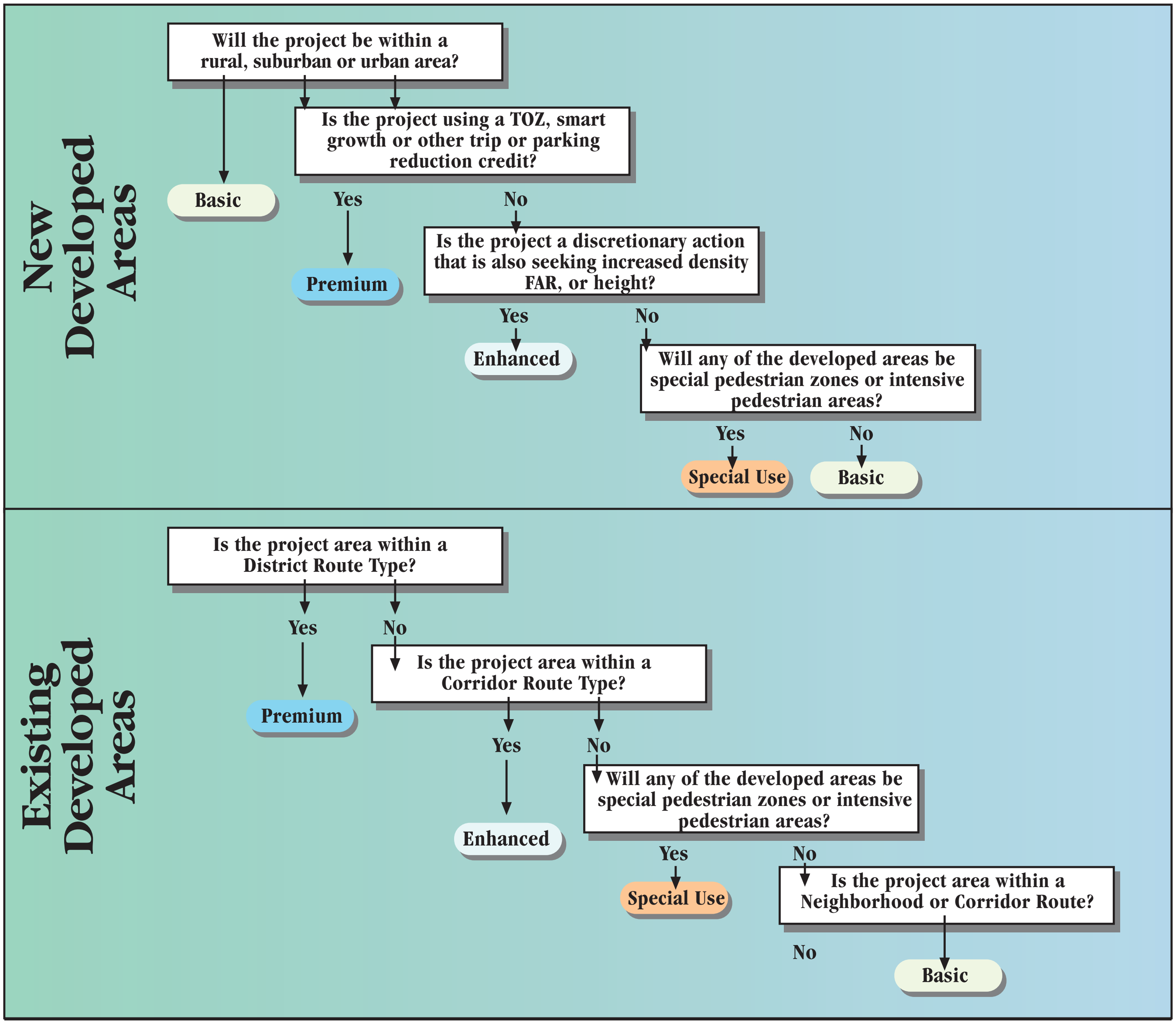
The following pages provide examples of the improvements indicated in Table 27 (refer to the numbering on this table). It will remain the responsibility of the planning, engineering and development services departments to determine which of these treatments are appropriate for specific areas or issues. They are included here so that a common language can be used and a comprehensive list of common tools can be identified that may help in a certain situation. This process can be used as the start of a dialog for needed solutions and treatments for specific situations. This dialog would normally be followed by review and recommendations from experts in the fields of traffic engineering, transportation planning, urban design, architecture or landscape architecture.

Table 27: Treatment Levels and Potential Improvements

TREATMENT LEVEL:	Treatment Level 1 "Premium" Walkway Improvements	Treatment Level 2 "Enhanced" Walkway Improvements	Treatment Level 3 "Basic" Walkway Improvements	Treatment Level 4 "Special Use" Walkway Improvements
Route Types Receiving These Treatment Levels (Unless Special Circumstances Exist*)	District Route Type / Special Pedestrian Zone	Corridor Route Type	Connector and Neighborhood Route Type	Path & Ancillary Route Types
*Special Circumstances that Warrant a Higher Treatment Level than Normal. Requirements in Each Column would Increase to the Column on its Left	Already Uses Highest Treatment Level	If within 1/4 mile of Transit/ School/ Ped. High Use/ Major Arterial	If within 1/4 mile of Transit/ School/ Maj. Commercial Facilities/ Maj. Arterials	Case-by-Case Basis
Provide Accessible Facilities Such As:				
1A) Curb ramps	!	!	!	?
2A) Audible/visual crosswalk signals	!	!	?	?
3A) Walkways & ramps free of damage or trip hazards	!	!	!	✔
4A) Pedestrian paths free of obstructions and barriers	!	!	!	✔
5A) Sidewalks with limited driveways and minimal cross-slope	!	✔	✔	✔
6A) Re-grade slope of walkway to meet ADA / Title 24 standards	?	?	?	?
7A) Repair, slice or patch lifts on walk surfaces or reset utility boxes to be flush	?	?	?	?
Provide Safety Features Such As:				
1S) Median refuges (a safe place to stand in the street)	!	✔	-	-
2S) Pedestrian popouts (curb / sidewalk extensions into street)	✔	✔	-	-
3S) High visibility crosswalk striping	!	✔	-	?
4S) Raised crosswalks or special paving materials to denote crosswalks	✔	✔	-	?
5S) Advance stop bars >10 feet from crosswalk	✔	✔	!	?
6S) Radar Speed Monitor & Display	?	?	?	?
7S) Reduced curb radii	✔	✔	✔	-
8S) Early pedestrian start at crossing signal (Lead Pedestrian Interval)	✔	?	-	?
9S) No Turn on Red at Intersection	?	?	?	?
10S) Mid-block crosswalks with ped. flashers but no traffic control	-	-	✔	-
11S) Automatic pedestrian detection & signal control	✔	-	-	?
12S) Mid-block crossing with signs, median or curb ext. & flashing lights in road	?	?	-	?
13S) Mid-block crosswalks with ped. actuated traffic control device	✔	?	-	-
14S) 1-Lane Mid-block with high contrast crossings, signs & center lane marker	?	?	✔	?
15S) Parkway planting for buffer between sidewalk and cars	!	!	!	?
16S) On-street parking for buffer between sidewalk and cars	!	✔	✔	-
17S) Adequate levels of pedestrian lighting	!	!	✔	✔
18S) Various traffic calming measures	✔	✔	✔	-
19S) Enforcement, education or encouragement solutions	?	?	?	?
20S) Missing sidewalks added or provide adeq. walk width clear of obstructions	?	?	?	?
Improve Walkability by Providing:				
1W) Above minimum walkway widths (> 5')	!	✔	?	?
2W) Trees that provide shade on walkways	!	!	✔	✔
3W) Street furnishings for comfort and enjoyment	!	✔	?	✔
4W) Countdown display crosswalk signals	✔	?	?	-
5W) Traffic control for crossings such as traffic signals or "All way stops"	!	✔	✔	✔
6W) Pedestrian scrambles (cross all directions of street)	?	-	-	?
Ensure Connectivity by Adding:				
1C) Missing sidewalk segments in areas where sidewalks mostly exist	!	!	✔	✔
2c) Missing sidewalks in areas where no sidewalks exist at all	!	✔	?	✔
3C) Connection pathways between streets	!	✔	✔	✔
4C) Narrow street widths or adding features to narrow for pedestrians	!	✔	✔	✔
5C) Destinations within walking distance of origins	!	✔	✔	✔
6C) Pedestrian bridges that avoid excessive ramp lengths	?	-	-	?
7C) Pedestrian crossing opportunities for all sides (legs) of an intersection	!	✔	✔	-
8C) Verify that pedestrian distances between land uses are reasonable & direct	?	?	?	?

LEGEND ("!"= required, "4" = suggested, "?"= suggested if conditions or standards met & "-" = not applicable)

Table 28: Development Type and Application of Route Treatment Levels

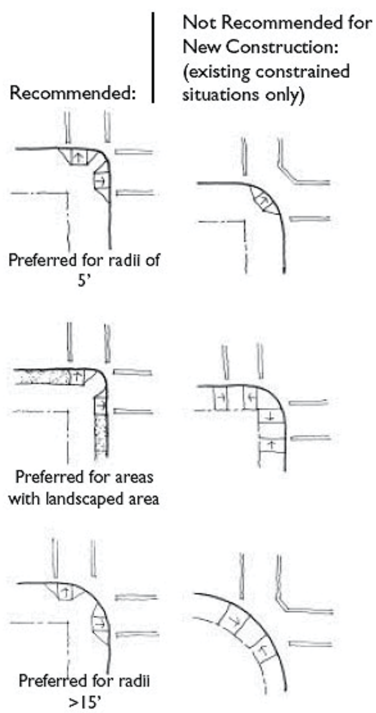


To determine the applicability of treatment levels to a particular area or project, first determine if it is within an existing developed community or a new community. Second, determine which route types are in the immediate area. Then, depending on the route type, determine the appropriate treatment level that would apply to the project or area.

1A) Typical Two Directional Curb Ramp (note: tactile strips and truncated domes needed but not shown) Photo credit: ITE Pedestrian Bike Council

1A) Curb ramp meeting latest tactile strip and truncated dome requirements. Photo credit: Mike Singleton

1A) Apex ramps (single ramp on corner), should be avoided on high volume streets with travel lanes at the curb. Photo credit: Dan Burden



1A) Match the right ramp to the right circumstance. Source: Planning & Designing for Pedestrians, SANDAG, June 2002

2A) Pole mounted ped. signal actuator placed in accessible area next to the curb ramp. Photo credit: Michael Ronkin

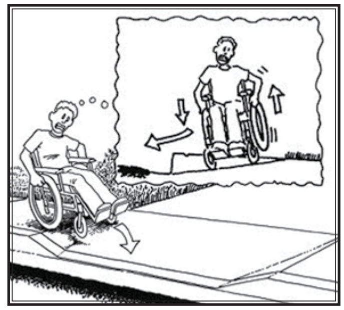
2A) Pedestrian actuator (Polara). Photo credit: ITE Pedestrian Bike Council

2A) Accessible and audible crossing pedestrian heads are required on most major intersections in San Diego. Audible signals do need to meet warrants. Photo credit: Dan Burden

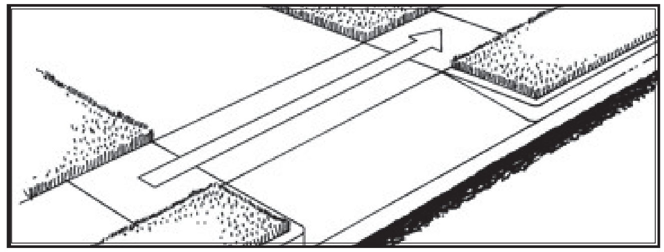
ACCESSIBILITY TREATMENTS

3A) Some of San Diego's sidewalks are in disrepair and represent both trip hazards as well as accessibility issues. Normally, property owners are responsible for repairs and replacement. Some shared cost programs do exist, however. Photo credit: Mike Singleton

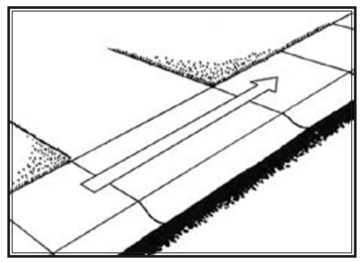
4A) Even though this project provided a wide walkway to start with, some equipment has been placed outside of the furnishings zone and in the throughway zone. Photo credit: Andy Hamilton



5A) The cross slope and transition area for many driveways are excessive for those in wheel chairs or those with other walking disabilities. Illustration credit: Gail Payne

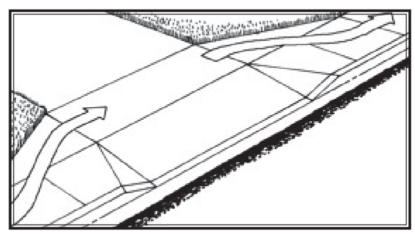


5A) A walkway separated from the curb with a parkway strip is the preferred solution. Illustration credit: Gail Payne



5A) A mountable curb can resolve existing situations. Illustration credit: Gail Payne

5A) A modified right of way can also solve the issue. Illustration credit: Gail Payne

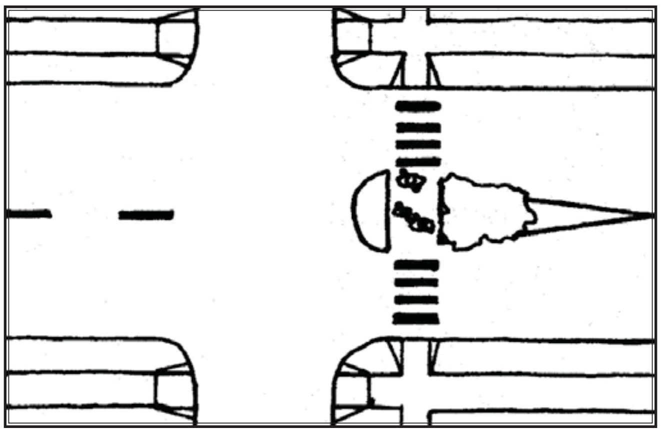


6A) Re-grade slope of walkway to meet ADA / Title 24 standards where technically possible. Some exceptions exist such as when conformance would damage the natural or cultural environment.

7A) Repair, slice or patch lifts on walk surfaces and/or reset ground level utility boxes to be flush. Photo credit: Mike Singleton

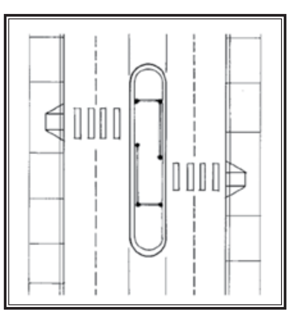
ACCESSIBILITY TREATMENTS

1S) A good example of a median refuge that provides access without ramps and protects a walker unable to make it across. Photo credit: Andy Hamilton

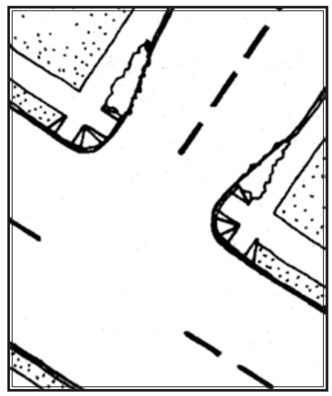


1S) Median refuges should be considered at intersections with or without traffic control. Multi-lane roadways should utilize solutions that include traffic control. Illustration credit: Planning & Designing for Pedestrians, SANDAG, June 2002

1S) Median refuges are essential where mid-block crossings are contemplated. They can include a straight cut-through or a staggered or coral style crossing. Photo credit: Dan Burden

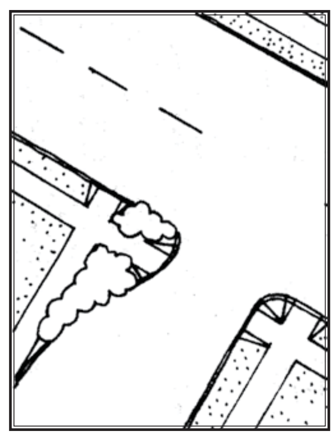


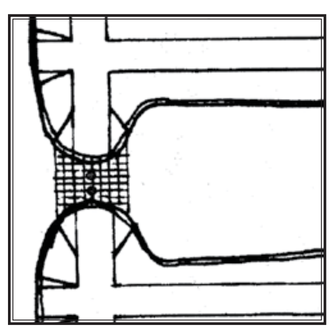
2S) Pedestrian pop-outs (curb extensions) can provide increased safety, improved visibility of pedestrians, protection for parked cars, and a shorter crossing distance for the pedestrian. They also provide for street furnishings, landscaping and social areas. Photo credit: Dan Burden



2S) Pedestrian pop-outs (sometimes referred to as curb extensions when not on all edges) decrease crossing distance and can help slow down traffic. Illustration credit: Dan Burden

2S) Pedestrian pop-outs can also serve to narrow a two lane one-way street into one lane or restrict entrance onto a two-way or one-way street. Illustration credit: Dan Burden





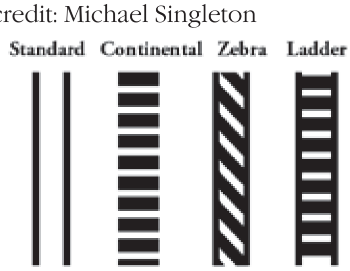
2S) Pedestrian pop-outs in conjunction with bollards can serve to block a street from vehicular traffic. Illustration credit: Dan Burden

SAFETY TREATMENTS

3S) Ladder style markings can be modified and spaced to lower the wear from vehicle tires. Photo credit: Dan Burden

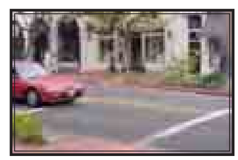
3S) Increased visibility can be obtained through a change of paving materials and striping. Photo credit: Michael Ronkin

3S) Certain urban areas (that are pedestrian dominant) should utilize high visibility markings in the entire intersection. Photo credit: Michael Singleton

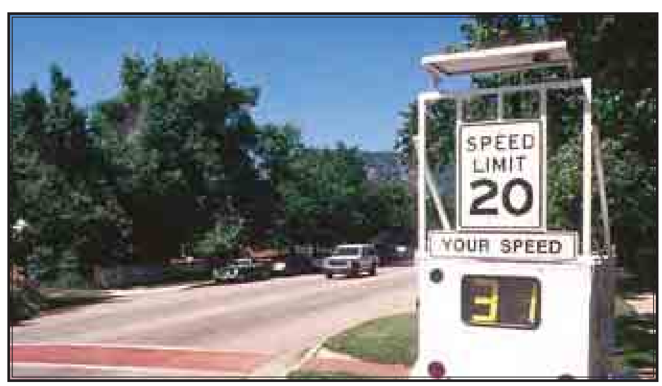


3S) A variety of crosswalk stripings are used in the United States. All are typically used in California except for the solid and the dashed. The standard would suffice for many intersections. Intersections with higher levels of pedestrian use, should utilize a spacing modified continental style (see 3S at the top of the page). Illustration credit: Dan Burden

4S) Raised crosswalks (speed tables) provide clear signs of a pedestrian crossing but need to be limited to lower speed, lower volume streets. Photo credit: Andy Hamilton



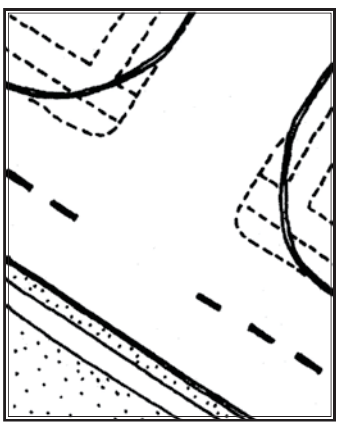
5S) Adequate lighting, pop-outs, the latest MUTCD approved signs and high visibility markings are essential for non-controlled multi-lane mid-block crossings. Note the stop bar should be located at least 30 feet from the actual crosswalk (see image on right). Photo credit: Michael Ronkin



6S) Many cite increased regulation and enforcement as the solution to controlling speeding and reckless driving. Physical improvements provide a long term solution. However, some devices such as radar speed display systems, can help to educate the public and will slow the driver down while in use. Photo credit: Dan Burden

SAFETY TREATMENTS

7S) Wide radius corners can promote high speed turning movements that can conflict with pedestrians. A high speed right turn can also take the driver's focus away from the crossing and its users and place the focus only on vehicles approaching from the left instead of pedestrians in the crosswalk. Photo credit: Michael Ronkin



7S) Reducing the radius of corners also serves to decrease the crossing distance for a pedestrian and places them in a higher visibility zone. Illustration credit: Dan Burden

8S) Right turn on red restrictions with an advance lead for the pedestrian crossing phase can reduce right hand turning conflicts. Photo credit: Michael Ronkin

9S) Right turn on red restrictions can lessen the conflicts between users and, if signs are properly handled, can increase awareness of these types of pedestrian / vehicle conflicts. Photo credit: Michael Ronkin

10S) A number of flashing pedestrian crossing warning signs are used in San Diego. Other solutions may be more appropriate where multi-lanes of travel on high volume streets exist. This crossing has visible signage and crosswalks along with a median refuge. Improved street lighting and advance stop bars could increase safety, but a pedestrian actuated traffic signal would provide for the safest condition. Photo credit: Mike Singleton

SAFETY TREATMENTS

11S) A traffic signal or special pedestrian crossing can be controlled by sensors that note when a pedestrian approaches and / or leaves an intersection or a mid-block area. Photo credit: Michael Ronkin

11S) This signal uses both a pedestrian crossing symbol as well as a red light when actuated. Photo credit: Michael Ronkin

12S) This crossing utilizes lighting in the pavement and in the signs to indicate a pedestrian is in the walkway. Sensors pick up when a pedestrian approaches and if the crosswalk is clear of pedestrians. Photo credit: Mike Singleton

13S) This mid-block crossing utilizes standard traffic signals, a stop bar, ladder style crosswalks, median refuge and a pedestrian controlled actuator. Photo credit: Mike Singleton

13S) The response time for stopping traffic for this mid-block crossing was quick, assuring that pedestrians will tend to wait for the lights. The design of the adjacent walkways concentrated pedestrians into this walkway crossing. Photo credit: Mike Singleton

13S) This mid-block pedestrian activated crosswalk in Linda Vista includes standard traffic signals, ladder style markings, signage and a median refuge. Photo credit: Mike Singleton

14S) If traffic control is not provided at an intersection, signage and stripping along with a center pedestrian zone marker may help to make these crossings as safe as possible. This type of sign may require changes to existing San Diego policies, though it is allowed under MUTCD. Photo credit: ITE Pedestrian and Bicycle Council

14S) This type of crossing should only be used on streets with one lane each direction or two one way lanes. The center marker is collapsible. It works to slow traffic and concentrate attention on the crosswalk. Photo credit: ITE Pedestrian and Bike Council

14S) This crossing is on a one lane in each direction street with curb extensions, striping, signage and trees that all help to slow a driver down. There is no multi-lane, multi-direction threat to this use of an uncontrolled mid-block crossing. Photo credit: Portland Office of Transportation

SAFETY TREATMENTS

15S) Sidewalks placed against the curb, against a high speed and high volume street are not comfortable to walk on because of a fear (perceived or real) of being hit by a passing vehicle. Photo credit: Michael Ronkin

15S) Trees placed in a parkway strip with the sidewalk away from the edge of the curb are much safer for pedestrians since the trees provide a level of collision protection and the distance increases the ability to get out of the way. Tree lined streets also tend to slow speeds slightly. Photo credit: Mike Singleton

15S) Even if a parkway strip does not exist, such as in this urban area, trees planted within close proximity of each other afford some level of comfort and protection for the pedestrian. Photo credit: Mike Singleton

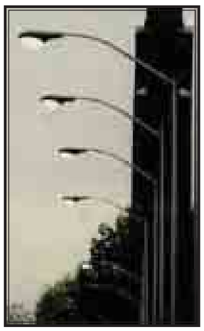
15S) Having an outside striped shoulder or bike lane along with a parkway strip and street trees can dramatically reduce collision potential and increase comfort levels for pedestrians. Photo credit: Michael Ronkin

16S) Adjacent parallel or angled parking provides an increased level of protection and comfort along major streets. Photo credit: Mike Singleton

16S) As a last resort, barriers may be required to protect pedestrians along high speed streets, especially on high speed horizontal curves. Photo credit: Mike Singleton

SAFETY TREATMENTS

17S) Adequate levels of pedestrian lighting are critical for public safety related to vehicular collisions or for the avoidance of crime related incidents. Photo credit: Mike Singleton

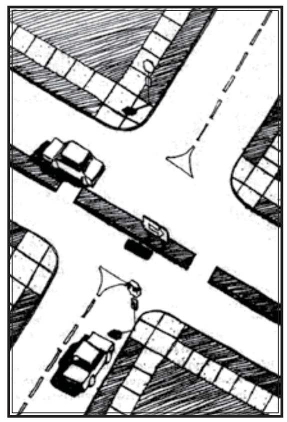


17S) Lighting levels are determined by spacing, height, lumens of the light fixture and orientation. Lighting should be concentrated in areas with collision potential. However, a minimal amount of lighting is needed along the entire walkway in order to make the general public feel safe when walking at night. Photo credit: Mike Singleton

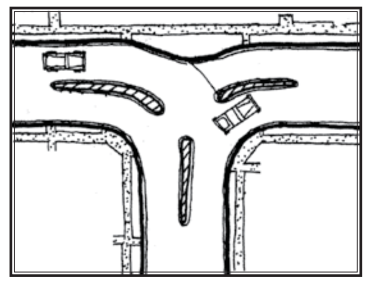
18S) Roundabout. Photo credit: Michael Ronkin

18S) Mini-traffic circle. Photo credit: Michael Ronkin

18S) Modern roundabout with properly planned pedestrian crossings, markings, signage and lighting Photo credit: Dan Burden



18S) Traffic divertors and median control points. Illustration credit: Dan Burden



18S) Speed tables (raised intersection). Illustration credit: Dan Burden

18S) Raised crosswalks. Illustration credit: Dan Burden

19S) Engineering, education or enforcement solutions can include, engineered physical solutions, increased regulatory enforcement through citations and warnings and the development of a public campaign to improve pedestrian and driver actions and awareness or other programs that encourage proper driving and awareness of pedestrian and cycling

20S) Fill in missing sidewalks or provide adequate walk width clear of obstructions

SAFETY TREATMENTS

1W) Match the sidewalk width to the intended use. Only suburban residential areas should be allowed at or below a 5' width. Photo credit: Dan Burden

1W) Commercial area widths should approach at least 10' in width since they must accommodate a variety of uses, street furniture and utilities. Photo credit: Andy Hamilton

1W) Residential area widths should be at least 5' in width but no more than 10'. A walkway can feel smaller or larger depending on adjacent walls or fences and the presence of a landscape buffer. Photo credit: Andy Hamilton

2W) Trees provide filtered shade as well as protection from adjacent cars. Other site amenities compel people to stop for a while. Photo credit: Dan Burden

3W) If an active street is desired, then accommodations for street furnishings and street uses must be made. Photo credit: Mike Singleton

3W) Public art or public amenities with varied and interesting materials can be used for their aesthetic value, as well as for their functional value. Photo credit: Mike Singleton

WALKABILITY IMPROVEMENTS

4W) Countdown pedestrian heads / timers can provide information to the pedestrian about when they should enter the crossing and how much time they have to exit the crosswalk. This treatment can be effectively used with a two-phase capable median refuge for those who do not make it across in one cycle. This treatment is effective in curtailing the number of pedestrians that enter the intersection after the light has changed to a flashing hand. A pedestrian viewing the opposing side countdown is also given information on when the other leg of the intersection will be green, thereby reducing the number of pedestrians walking against the light. Photo credit: Michael Ronkin

5W) Traffic signal controlled intersections are still one of the best methods for providing a safe crossing and should be considered at intersections with frequent pedestrian crossings. Photo credit: Mike Singleton

5W) Stop signs (2 or 4 way) can help in safe pedestrian crossings but are not essential on low volume, low speed residential neighborhood streets. Photo credit: Mike Singleton

6W) Pedestrian scrambles allow for pedestrian crossings across all portions of the segment and they tend to lower conflicts between pedestrians and vehciles at the beginning of the signal cycle.

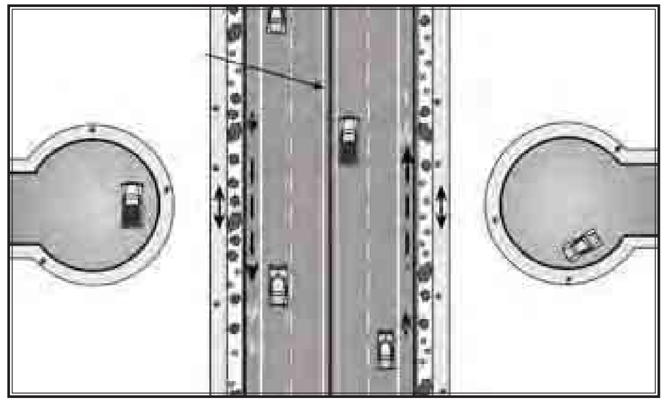
7W) High quality design in conjunction with the integration of public art and other physical elements, combine to create a walkable environment. Greater diversity in the visual environment will result in increased pedestrian use as well as longer social engagements along the walkway and increased window shopping that will economically help viable shopping districts.

WALKABILITY IMPROVEMENTS

1C) Sidewalk gaps affect the ability to connect areas by walking. They are especially unfair to those with physical challenges. All urban areas need to have sidewalks. Photo credit: Michael Ronkin

2C) Where signs of continual pedestrian use are present along higher volume and higher speed streets, the addition of sidewalks should be a top priority. Photo credit: Michael Ronkin

2C) In areas currently without sidewalks, where the street volume and speed is very low and the character is rural, sidewalks may not be needed. Photo credit: Michael Ronkin



3C) Missing connections for pedestrians between streets designed not to allow through vehicular traffic are unfriendly to walkers but sometimes can be retrofitted or at least avoided with new development. Illustration credit: Michael Ronkin

3C) A variety of barriers exist in the curvilinear and hierarchical street patterns of many suburbs. These should be avoided since fixing them later is very difficult. Photo credit: Michael Ronkin

3C) Even heavily traveled urban streets can act as barriers to pedestrians if appropriate crossings have not been provided. Photo credit: Mike Singleton

CONNECTIVITY IMPROVEMENTS

4C) Wide intersections are more difficult for pedestrians to feel comfortable crossing because of the distance to travel and wait time between crossings. Those that enter the crossing after the pedestrian light begins flashing can find themselves caught in traffic. Photo credit: Mike Singleton

4C) Wide streets negatively affect walkability and pedestrian safety. Narrow streets on the other hand, calm traffic and are more conducive for walking along and crossing.
Photo credit: Mike Singleton

4C) Retrofitting wide streets and intersections to improve walkability, can be very expensive. It is generally far less expensive to build these streets with pedestrians and cyclists in mind than to retrofit later. Photo credit: Dan Burden

5C) Mixed use compact development supports both transit and walking by providing destinations within short distances of trip origins. Photo credit: Dan Burden

5C) The proper pedestrian environment can support a variety of retail businesses and mixed land uses while offering a pleasant urban design. Photo credit: Dan Burden

5C) Streets should be designed for more than driving vehicles on. When all elements come together, a socially interactive environment will evolve. Photo credit: Dan Burden

6C) Grade separated pedestrian crossings should generally be avoided because of the expense and low level of use. Some circumstances warrant their use such as over freeways, railroads and other intensive surface uses where at-grade crossing may not be safe. Bridges that limit the amount of vertical climbing or do not go dramatically out of direction, will be used. Photo credit: Dan Burden

6C) To meet accessibility requirements, long ramps are required to climb over a roadway. These are often not used by pedestrians, creating a potentially greater risk of collision at street level. Photo credit: Michael Ronkin

7C) Some circumstances, such as dual left turn lanes, may require pedestrian restrictions on crossing in order to avoid safety issues. In other locations, the restrictions may have been primarily used to increase turning movements through the intersection. A case-by-case analysis is required to determine the right balance. Photo credit: Mike Singleton

7C) There are valid reasons for closing one or more segments of an intersection including intersection geometry, such as shown above. Photo credit: Mike Singleton

8C) Verify that pedestrian distances between land uses are reasonable and direct. Projects claiming reduced parking requirements and density bonuses for supporting smart growth, transit oriented development or mixed use projects, should provide for access and walkability in and around their sites. The applicant should submit plans showing actual distances along walking routes to transit, neighborhood services, parks, schools and other destinations found within the normal 1/4 mile walking distance radius.

Chapter

6

Pedestrian Project Prioritization Process

Chapter 6

Pedestrian Project Prioritization Process

A substantial amount of funding is needed to bring all of the city's public pedestrian facilities up to a standard that makes them safe, walkable, accessible, connected and assets to our neighborhoods. The amount far exceeds what is likely to be obtained. To be cost effective, a system of ranking and selecting priority projects for funding has been developed.

6.1 PROJECT DEFINITION AND ORIGIN

A repair or an improvement to a pedestrian facility does not necessarily make it a project. A project should be defined as new construction or a major retrofit that is likely to require the development of design and engineering plans and will result in a permit or other ministerial or discretionary review and will likely be built by a contractor or substantial city work forces. A project as discussed in this chapter, is a grouping of improvements that generally would cost more than $25,000 to implement. Wherever possible, groupings of improvements should be considered in order to obtain magnitude of cost savings.

6.2 PRIORITY OBJECTIVES

Multiple Benefit Criteria

1. Projects in areas of high pedestrian use that provide improvements for safety, access, connectivity and walkability issues, that also increase walking as an alternative transportation mode, should receive the highest scoring overall.

Safety Criteria

2. Walkways and crosswalks that are along wide, high speed, high traffic volume streets should take priority over residential and local collector streets with lower speeds and volume. Streets where collision data, speed, street geometry all indicate potential safety concerns, should receive the highest score for safety improvements.

3. Projects that improve safety and connectivity to schools and other public facilities such as community centers, libraries and recreation centers, especially those attracting a high concentration of seniors, should be considered to be the second highest priority for safety improvements.

Accessibility Criteria

4. Projects that modify a completely non-accessible route with fully accessible pedestrian routes in areas identified by this Master Plan as having high pedestrian activity (or by the most recent version of the ADA transition plan) will be given the highest accessible priority.

5. Other pedestrian improvements that enhance accessibility along lower use pedestrian routes that already have some level of access, will be given the next highest level of accessibility priority.

Connectivity Criteria

6. Projects that increase connectivity around "smart growth" mixed use projects that will generate significant levels of pedestrian activity but are in need of off-site connections, should receive the highest connectivity scoring.

7. Projects that remove barriers, close gaps or increase connectivity with other high pedestrian uses, should receive the second highest connectivity scoring.

Walkability Criteria

8. Projects that improve overall site amenities, protection from adjacent environmental conditions and improve clarity, comfort and interest for walking, should receive the highest scoring for walkability.

9. Projects that support greater interaction amongst the public, should be given the second highest priority for walkability.

A project as discussed in this chapter, is a grouping of improvements that generally would cost more than $25,000 to implement. Wherever possible, groupings of improvements should be considered in order to obtain magnitude of cost savings.

A project prioritization process is needed to assure cost effective use of limited public and private funding for pedestrian facilities. Safety, followed by accessibility, then connectivity and walkability are the general priorities set forth in this plan. However, the project that addresses the greatest number of the priorities listed above, should be given the top priority.

Steps that can be taken ...

• A refinement of the checklists and priority forms are needed. Ultimately, the forms should take into account most all of the questions and priorities identified by the various funding sources.

• The City should continue to coordinate with SANDAG staff in regards to the criteria used and the forms supplied for the annual ranking process. Certain modifications would help to integrate the City's efforts with SANDAG's and benefit other municipalities that are competing for these funds as well.

• A formal process for project identification, initial review, application completion, application verification and overall ranking of all pedestrian projects within the City of San Diego is needed. Several optional forms and processes are indicated in this Chapter.

6.3 OPTIONAL PRIORITY CHECKLISTS

Tables 34 - 36 have been included to show different methods of prioritizing pedestrian projects. Table 34 is one methodology that puts an emphasis on the PPM GIS maps that indicate areas of high or potentially high pedestrian use. A project that has multiple characteristics of improvements across the safety, accessibility, connectivity and walkability categories, and is also in a high use zone, will rise to the surface of this ranking system. This system will require some ongoing effort by planning staff to review the project location and have the GIS system pinpoint the project extent, buffer the extent by 1/4 mile, summarize the raw score of all pixels in the buffer, then divide by the total number of pixels in the total area to arrive at an average score per pixel.

Table 35 represents the current FY 2007 selection criteria from SANDAG, with this PMP's suggested revisions shown in red. If the reasons for these revisions are logical and compelling, the hope is that the City of San Diego can provide input on future versions of the SANDAG ranking form. Even without these changes to the SANDAG form, the system can be used to identify specific important items to the City, while still keeping as paramount, the ranking criteria that SANDAG is likely to use in selecting the projects. Ultimately, since many of the funding sources are managed by SANDAG and the Bike and Pedestrian Working Group under the administration of SANDAG rank all San Diego County bike and pedestrian projects, some consistency with the SANDAG prioritization model is needed.Table 36 is the latest version of the selection and priority criteria developed by the City of San Diego. It includes some criteria that neither Table 34 or Table 35 have included.

6.4 PROJECT IDENTIFICATION

Long range planners, transportation planners, facility financing planners and community planners in the City Planning and Community Investment Department as well as others in Development Services and engineers in the Engineering and Capital Projects Department as well as in Streets Division, will serve as the front line for project initiation. Requests for these projects may come from the Mayor's office, Council Offices, from the Community Planning Group or at staff level. Projects may be identified under future community plan updates, redevelopment projects or during the review of major development projects that will not be able to fully implement the area's pedestrian requirements. The institution of a regular inventory process is needed between Streets Division and Disability Services. This will help to identify needs above and beyond the CPMP or other community wide planning efforts. This process will also help to determine major maintenance issues and accessibility shortfalls.

6.5 PRIORITY SELECTION PROCESS

An initial review of the project is necessary to make sure that too much effort is not taken on a project that might only result in a low priority. Transportation planning staff will take the lead on determining the proper funding source and category that the project would best fit within. Initial review would verify if the project is included in an existing CPMP, adopted Community Plan or Facility Financing Plan. If the project did not originate with the Council Office or Community Group, a review of support by these groups is also advisable. Finally, a quick review of the PPM GIS maps is warranted to verify that it is within a high or moderate priority area. The initial likelihood of priority should be communicated to the project proponent and a copy of the adopted forms sent to them for their completion of the checklist and the development of backup materials. Once reviewed and verified by transportation planning staff, the project should be ranked with other pedestrian projects on at least a quarterly basis. This will assure that the most important projects with the greatest chance of approval for funding, will be put forward.

Table 34: Draft PMP Checklist

Pedestrian Project Prioritization Process Checklist	Project Scoring*
The project proponent will complete sections 2-5 below. GIS staff will provide the rankings for Item#1.	
1. Pedestrian Use Levels (existing or potential)	
According to the Pedestrian Priority Model, the area has the following rating for pedestrian activity**:	(Circle One Only)
Very High (50-75 Points using the Average GIS Mapping Score within 1/4 mile)	3
High (25-49 Points using the Average GIS Mapping Score within 1/4 mile)	2
Moderate (10-24 Points using the Average GIS Mapping Score within 1/4 mile)	1.5
Very High (1-9 Points using the Average GIS Mapping Score within 1/4 mile)	1
2. Safety	
What are the current pedestrian safety issues that this project will address?	(Circle One Only)
High pedestrian collision rates at intersections	10
High pedestrian collision rates along roadway segments	8
Low to Moderate pedestrian collision rates at intersections or roadway segments	5
No collisions can be verified but close calls exist & comfort levels would be improved resulting in increased use	2
3. Accessibility	
What issues of accessibility will benefit from this project?	(Circle One Only)
Adds missing segments of walkways will be added that will make a route fully accessible	8
Adds missing curb ramps and/or accessible pedestrian signals will be added	5
Removes obstacles from the throughway on walkways to create a wider path of travel that is obstruction free	3
Brings existing facilities that were once considered accessible, up to new standards	2
Adds or improves overall lighting levels of the pedestrian route	1
4. Connectivity	
How will this project improve connectivity and what will it help connect to?	(Circle One Only)
Adds missing pedestrian facilities or connections that will support mixed-use smart growth	5
Provides shorter, improved, safe & walkable routes to transit	4
Provides shorter, improved, safe & walkable connections to schools or public facilities	3
Provides safe, walkable & accessible connections between businesses & public facilities	2
Provides safe, walkable & accessible connections between residential areas & other uses	1
5. Walkability	
How will this project improve walkability?	(Circle One Only)
Reduces harsh environmental conditions through the addition of amenities that also support traffic calming & safety	3
Assists in reducing crime with improved street lighting, more defensible space & more eyes on the street	2
Creates more plazas, promenades & / or open space that will allow the gatherings for social interaction	1
Improves comfort & convenience for pedestrians by adding places to sit, trash receptacles & drinking fountains	1
Improves the overall streetscape design to be more inviting for people to walk, look, engage with others & shop	1
Total Score (add items # 2-5)	
Enter Weighting Score (Item #1)	
Total Weighted Score	

* suggested rating score from the consultant team that will be adjusted by staff and the PWG

** ratings are determined by using a clipping of a 1/4 mile radius centered on the middle of the improvements, then taking the total points found in this radius divided by the total number of cells to obtain an average GIS Mapping Score.

Table 35: SANDAG Pedestrian Project Selection Matrix (adaptations shown in red)

Category	Criteria	Points	Score
PROJECT STATUS FACTORS			
1. Community Support: Consistency with Community Plan	Must have at least 1 of the following to qualify. Please attach supporting documentation. 1. Resolution or minutes from City Council, planning group, or Planning Commission. Or 2. Project is part of a Non-Motorized Plan that has been approved within the last 5 years.	Pass/Fail	
2. Minimum Design Standards	Must meet the minimum geometric standards set forth in the SANDAG Planning and Designing for Pedestrians manual, the City of San Diego Pedestrian Master Plan and the Americans with Disabilities Act.*	Pass/Fail	
3. Project Readiness ** **20 Points Maximum**	Projects are eligible for points following completion of each phase.		
	Feasibility Study / Community Master Plan	4	
	Preliminary Design ***	4	
	Environmental Clearance	4	
	Right-of-way Acquisition	4	
	Final Engineering / Design Construction Documents***	4	
PROXIMITY AND CONNECTIVITY FACTORS			
4. GIS Analysis - (done by the City) 20 Points Maximum	Ranked according to the average score of all points in the GIS Pedestrian Priority Model determined by buffering a 1/4 mile radius around the improvement (point or linear feature).****	0 to 20	
5. Trail Connection	Provides missing connections as part of a "Trail or Path Route Types"	1	
6. Neighborhood Connection	Provides missing connections as part of a "Neighborhood or Connector Route Types"	3	
7. Corridor Connection	Provides missing connections as part of a "Corridor Route Type"	7	
8. District or Special Route Connection	Provides missing connections for a "District Route Type", a "Ancillary Route Type" or within or around a smart growth area	10	
9. Connection to Transit	Project provides a direct connection to a local transit stop	14	
	Project provides a direct connection to a regional transit station	20	
SAFETY FACTORS			
10 Safety Improvements 20 Points Maximum	Improves general safety of routes within existing network	4	
	Improves safety of street crossings to major public facilities	8	
	Improves safety of street crossings to schools or transit	12	
	Completes connections and crossings in existing network at locations with documented safety or accident history:		
	A. One to two correctable crashes involving non-motorized users within the last three years.	4	
	B. Three to four correctable crashes involving non-motorized users within the last three years.	6	
	C. Five to six correctable crashes involving non-motorized users within the last three years.	8	

* Design exceptions may be presented for review by the Bicycle-Pedestrian Working Group with the understanding that proposals must include a design that meets min. st

** Previous project milestones must be met before qualifying for subsequent funding.

*** Preliminary Engineering and Final Designs will be subject to design review by SANDAG.

**** This average score will be compared to the median score of the community planning area the project is found within, which will represent 10 on the scale of 20 points. For every 5% above the median, an additional 1 point will be added up to a total of 20 points. For every 5% the project is below the median, 1 point will be taken away.

Table 35 (continued): SANDAG Pedestrian Project Selection Matrix (adaptations shown in red)

Category	Criteria	Points	Score
PROJECT TYPE FACTORS			
11 Innovation & Design - 10 Points Maximum	Pedestrian priority measures such as: A. Animated eye indicators, countdown pedestrian signal, crosswalk signage and flashers, advance stop bars and other walk amenities including lighting, street trees and seating	2	
	B. Early pedestrian release interval, reduced corner radius, 2-phase crossing signals, high visibility crosswalk markings or contrasting materials	4	
	C. Improved access with curb ramps, adjusted driveways, audible & accessible signal actuators, or repaired inaccessible walkways	6	
	D. Raised crosswalk, speed table, raised intersection, median refuge, & cul-de-sac to roadway pedestrian connectors	8	
	E. Pedestrian bulb-out, active pedestrian detection / signal control, mid-block crosswalks with in-pavement flashers	10	
		Subtotal	
FUNDING FACTORS			
12 Matching Funds 25 Points Maximum	Matching funds can be from any of the following sources: 1. Identified & approved capital funding from identified source. Please provide proof in the form of a resolution or letter of approval. 2. Approved match grant. 3. In-kind services. Please provide adequate support documentation.	(Matching Funds x 2) / (Bike Portion of Project Cost) x 26	
13. Cost Benefit 15 Points Maximum	Subtotal Score / Grant Application Amount	0 to 15	
		Total Score	

Table 36: City of San Diego Suggested Prioritization Criteria Point System

Suggested Criteria	Consideration		Points (100 Max)
Health & Safety	*Safety, accessibility, connectivity & walkability*		
	Provides pedestrian safety, universal accessibility, connectivity, and walkability improvements.	High	20
	Provides universal accessibility, connectivity and walkability improvements for pedestrians.	Medium	15
	Provides walkability improvements for pedestrians.	Low	10
Capacity & Service	*Proximity to a pedestrian destination point*		
	Within ¼ mi of school or 1/8 mi of transit stop	High	20
	Within ½ mi of school, ¼ mi of transit stop, ¼ mi of neighborhood or community retail, 1/8 mi of park, 1/8 mi of library, or 1/8 mi of post office	Medium	15
	Farther than ½ mi of school, ¼ mi of transit stop, ¼ mi of neighborhood or community retail, 1/8 mi of park, 1/8 mi of library, or 1/8 mi of post office	Low	10
Maintenance	*Maintenance Assessment District Funded*		
	Has MAD or MAD is not required.	High	5
	Requires existing MAD to be expanded.	Medium	3
	Requires establishment of a new MAD	Low	1
Public Interest & Community	*Supported by Council or CPG*		
	Provides critical link. Included in a community plan or a council approved document.	High	15
	Provides for part of pedestrian circulation needed. Supported by Community Planning Group.	Medium	10
	Alternative facilities exist. Not included in a community plan or a council approved document.	Low	5
Readiness & Deliverability	*Funding for planning, design or implementation*		
	Full funding and R.O.W. available. Final plans ready to start or already completed.	High	10
	Partial funding available. Final plans ready to start or already completed.	Medium	7
	Feasibility study only.	Low	3
Multi-Benefit	*Serves multiple pedestrian destinations*		
	Provides pedestrian facilities that serve three or more destinations including schools, transit stops, parks, neighborhood or community retail, libraries or post office.	High	15
	Provides pedestrian facilities that serve two destinations including schools, transit stops, parks, neighborhood or community retail, libraries or post office.	Medium	10
	Provides pedestrian facilities that serve only one destination including schools, transit stops, parks, neighborhood or community retail, libraries or post office.	Low	5
Misc.	*Smart growth, population & employment density*		
	Within area with population density > 100 people per acre or employment density > 300 employees per acre.	High	15
	Within area with population density between 50 and 100 people per acre or employment density between 100 and 300 employees per acre.	Medium	10
	Within area with population density < 50 people per acre or employment density < 100 employees per acre.	Low	5

Chapter

9

Phase Two Guidance

Chapter 9

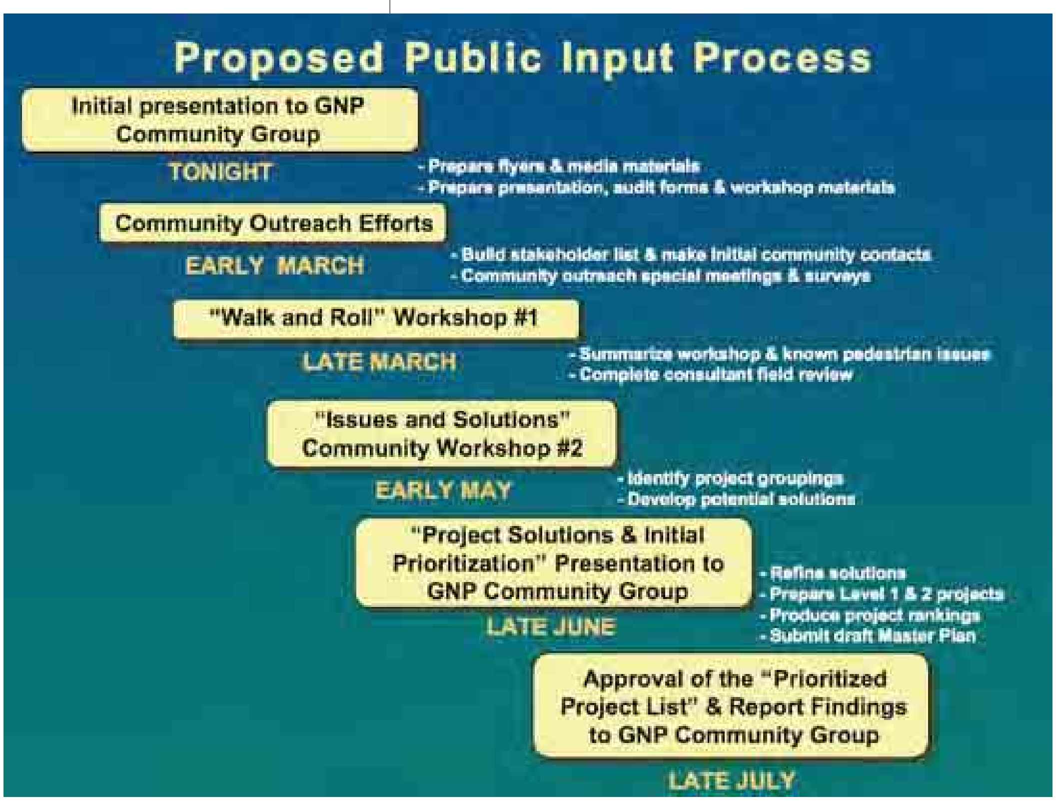
Phase Two Community Pedestrian Master Plan (CPMP) Guidance

This chapter is intended to provide direction for the creation of supplemental pedestrian master plans for each of the 46 officially recognized community planning group areas of San Diego. By providing this direction, a level of consistency can be obtained between these plans. Consistency is important since these plans will be compared against each other and will compete for project priorities. A community may be unfairly overlooked for its fair share of funding if the minimum levels of analysis and recommendations have not been provided. The overall goal is to describe a process and identify specific products needed for each plan. A sample project has been chosen and is discussed as a prototype. The Greater North Park area was selected as one of the first communities to be analyzed for the creation of a Community Specific Pedestrian Master Plan. It will be used here as an example on how these plans should be completed. It will also serve as the summary of initial meetings and workshops conducted for the study.

9.1 OVERALL PUBLIC INPUT PROCESS

One of the most important aspects of the preparation of a Community Pedestrian Master Plan (CPMP) is the involvement of the local community, They alone know of the many issues and constraints that they face in their own communities. They are aware of the local socio-economic and cultural differences of their community. Figure 13 shows a typical process chart aimed at obtaining public input on the development of the plan. Dates were specific to the North Park Plan, but have been displayed to help communicate the length of time necessary between major presentations and workshops. The major tasks associated with each of these public input milestones has also been included on Figure 13.

Figure 13: Sample Public Input Process for Greater North Park



Community outreach efforts must be an integral part of this program. A clear understanding of the ethnic, racial and socio-economic cross section of the community will be needed. A custom outreach program aimed at getting a broad community involvement will need to be submitted as one of the first deliverables on the contract.

9.2 COLLECT AND PROCESS MAPPING

Step 1 in the process must begin with the collection and processing of the Pedestrian Priority Model (PPM) GIS files clipped to the limits of the community plan (see Figure 14). These maps, along with the SWITRS collision data (see Figure 15), must be reviewed and packaged for presentation at the first community group meeting. This model is also used to determine the relative priority of projects based on their location within the community.

Figure 14: PPM Model for North Park-
Sample Attractor, Generator, Detractor and Composite Models. In general, the more warm the color, the greater the existing or potential pedestrian activity.

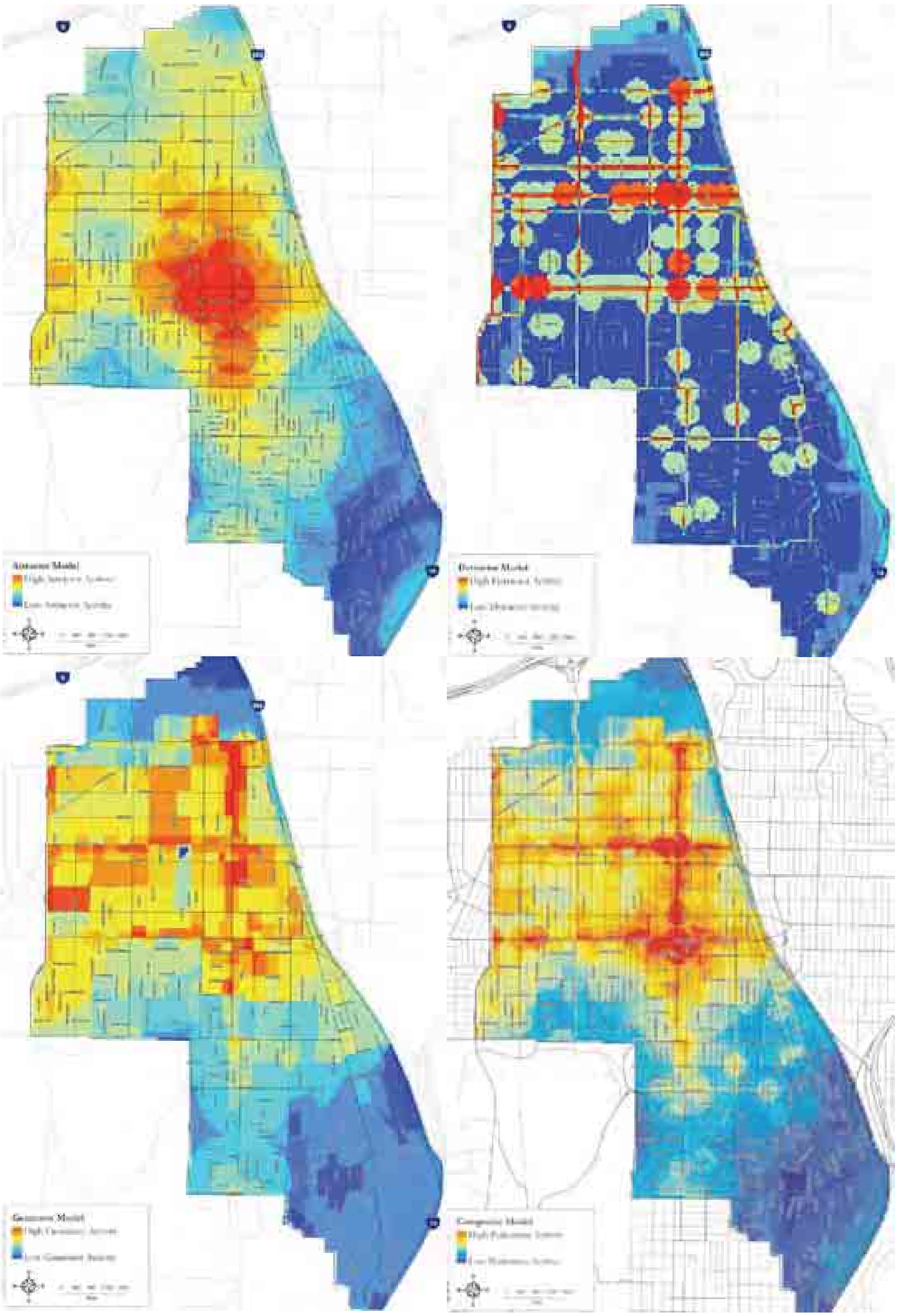
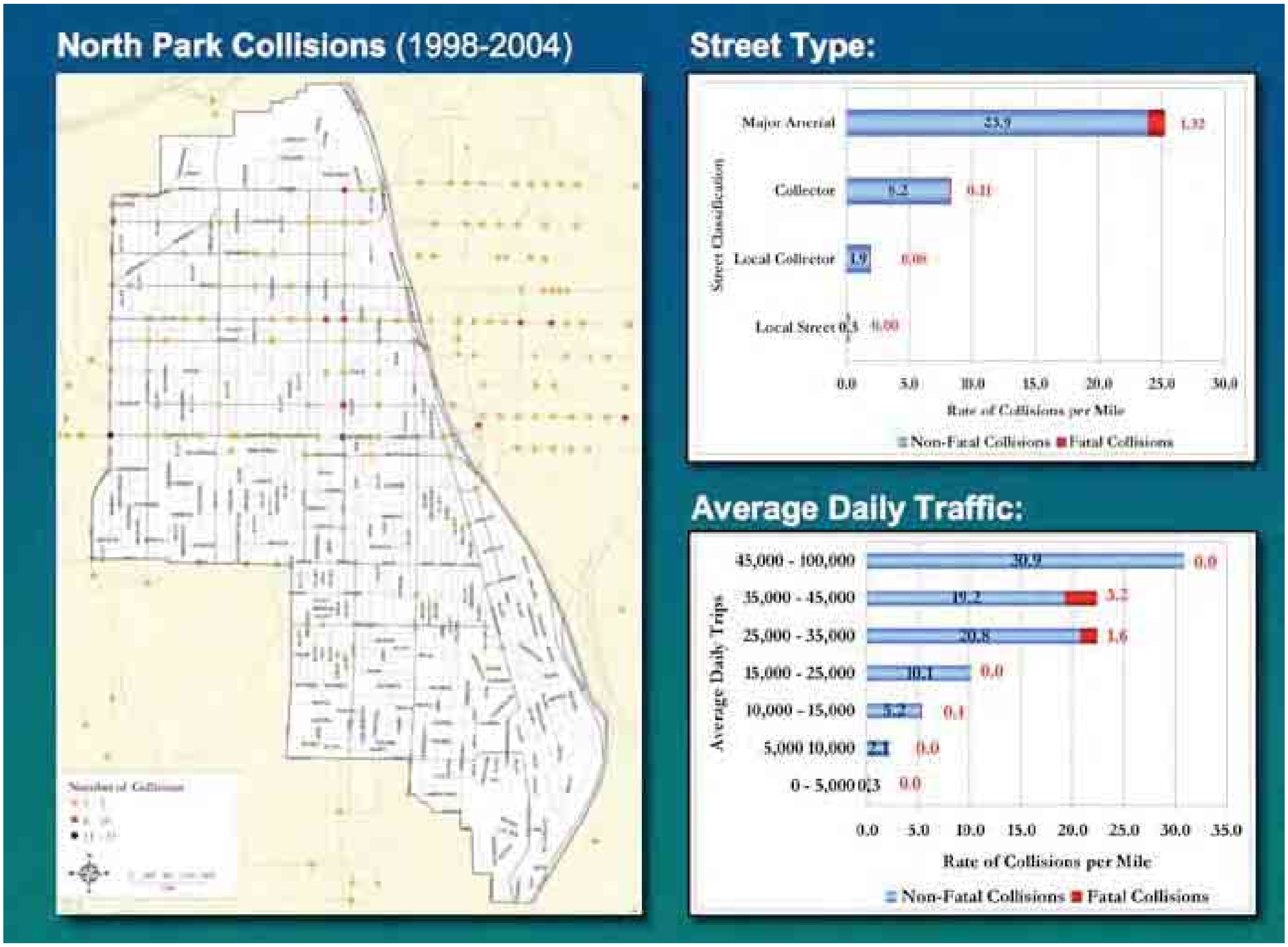


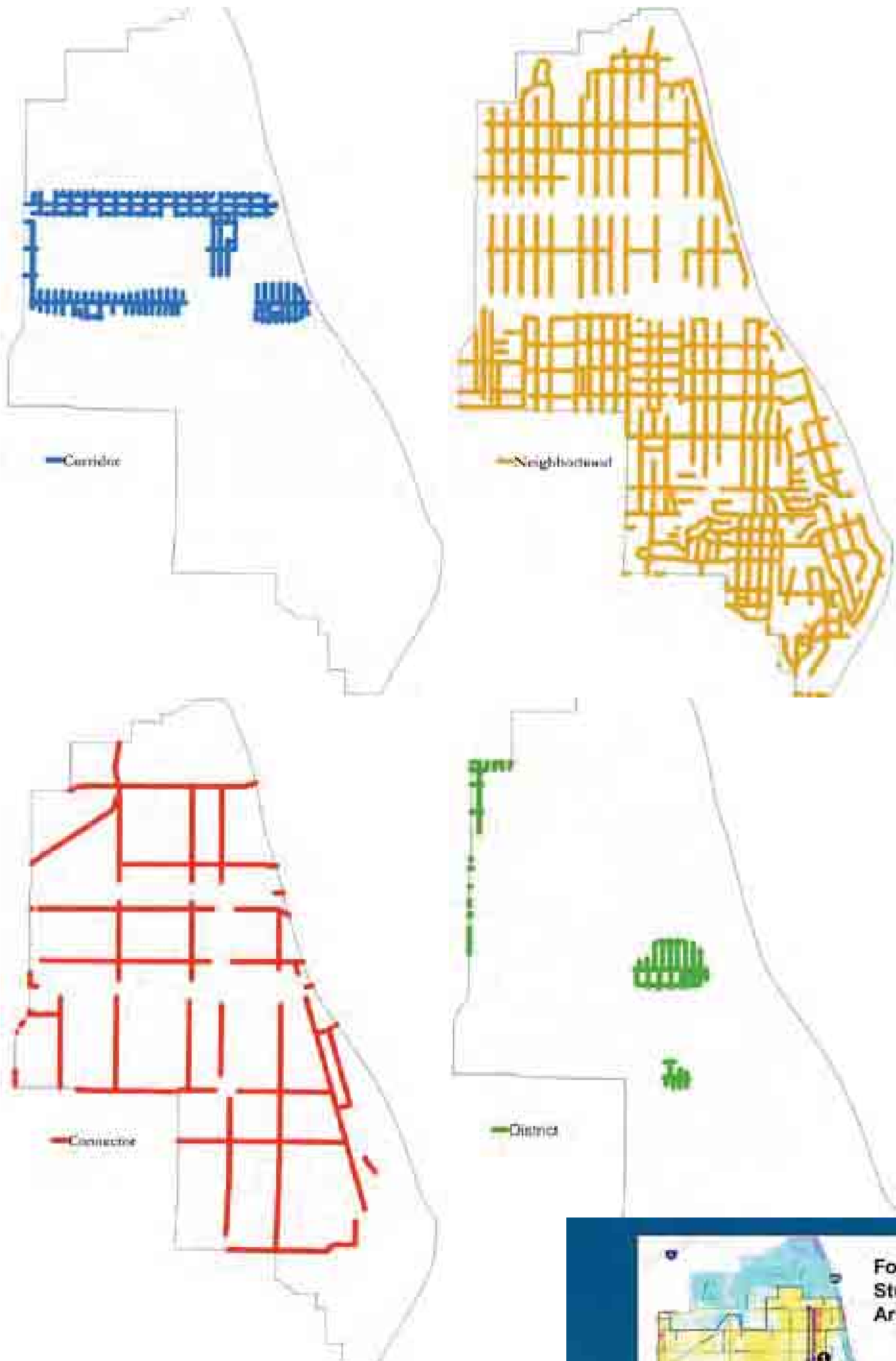
Figure 15: SWITRS Collision Data and Maps



9.3 COLLECT AND REVIEW COLLISION DATA AND MAPS

A high priority in the development of a community specific master plan, is the identification of safety issues and the application of relevant countermeasures to resolve these issues. Step 2 in the process includes the collection and processing of the tabular and mapping data associated with the SWITRS pedestrian / vehicular database. The data should be fully analyzed and processed to find specific trends, statistics and geographic areas of concern. These trends should be compared with data and mapping found in this City-wide PMP to see if the community has specific anomalies or special conditions that should be analyzed. Figure 15 shows collision information and a sample of statistical collision data that can be generated from SWITRS.

Figure 16: Route Type Classification Using GIS Layers

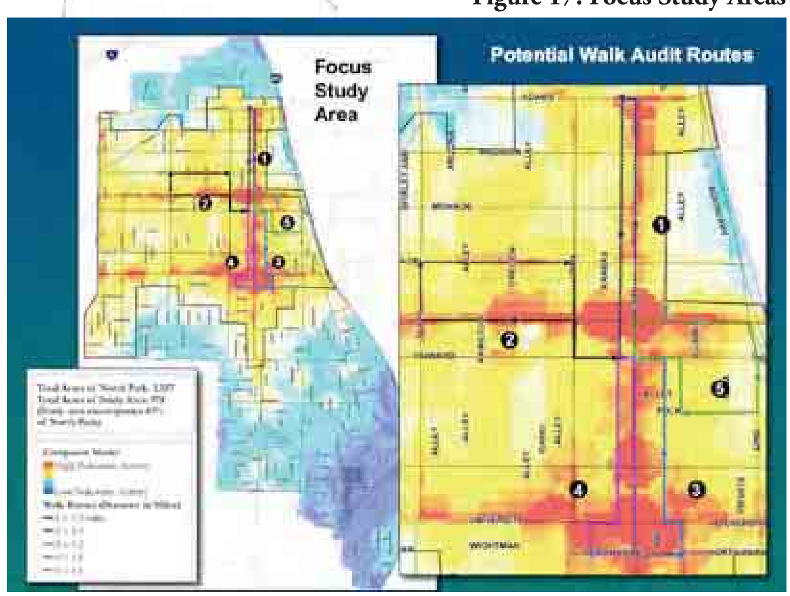


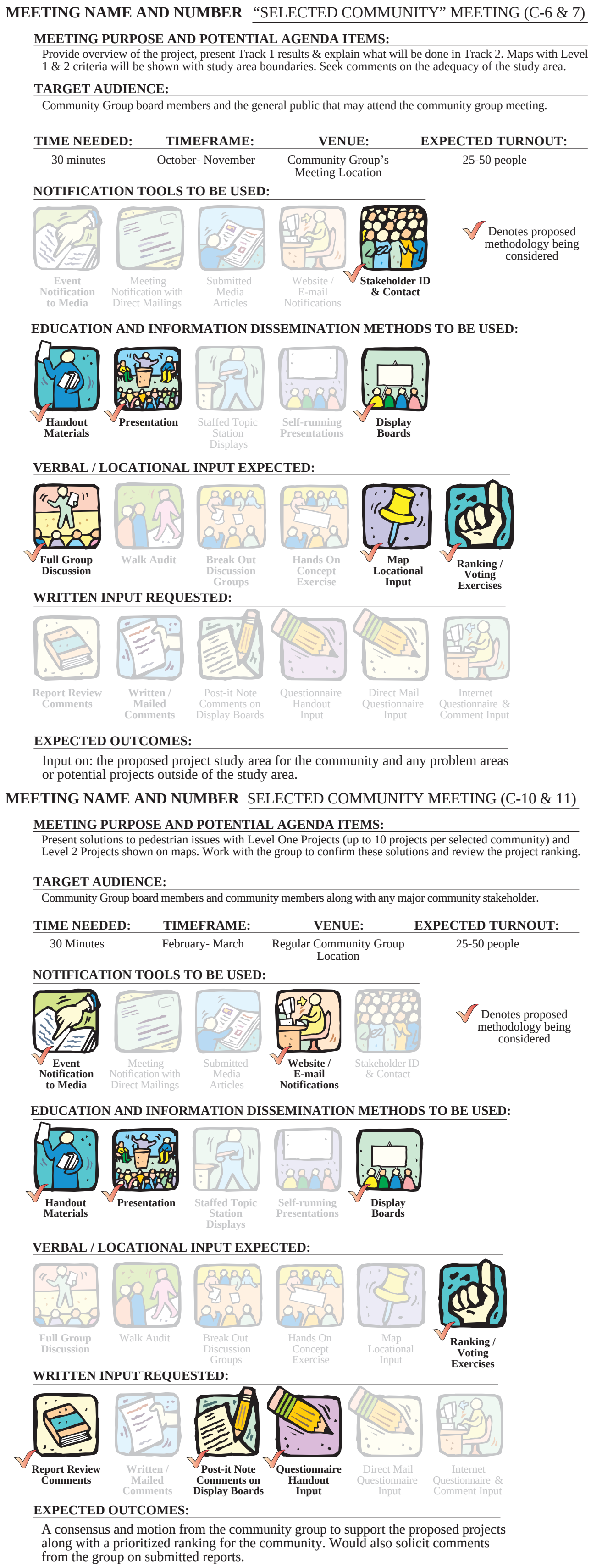
9.4 DETERMINE LIMITS OF FOCUS STUDY AREA

Step 3 needs to be the identification of the central focus or study area. This can be accomplished by looking at the concentrated areas of pedestrian activity and the classification of routes types throughout the community. Many of the route types are determined by land use, density and adjacent street types. Basic coverages in the GIS model can be extracted to help classify the route types (see Figure 16).

Generally, neighborhood streets neighborhood route types as well as low density housing, recreation and open space areas are not to be the focus of the master plans. Low density industrial areas and other land uses not expected to generate any significant amounts of pedestrian activity are also generally excluded from focus study areas. Field work in the study area should provide for the further classification and mapping of existing pedestrian routes throughout the community. Once the focus study area has been identified, an attempt should be made to find a number of potential routes that can be used as part of the initial community workshop (see Figure 17).

Figure 17: Focus Study Areas





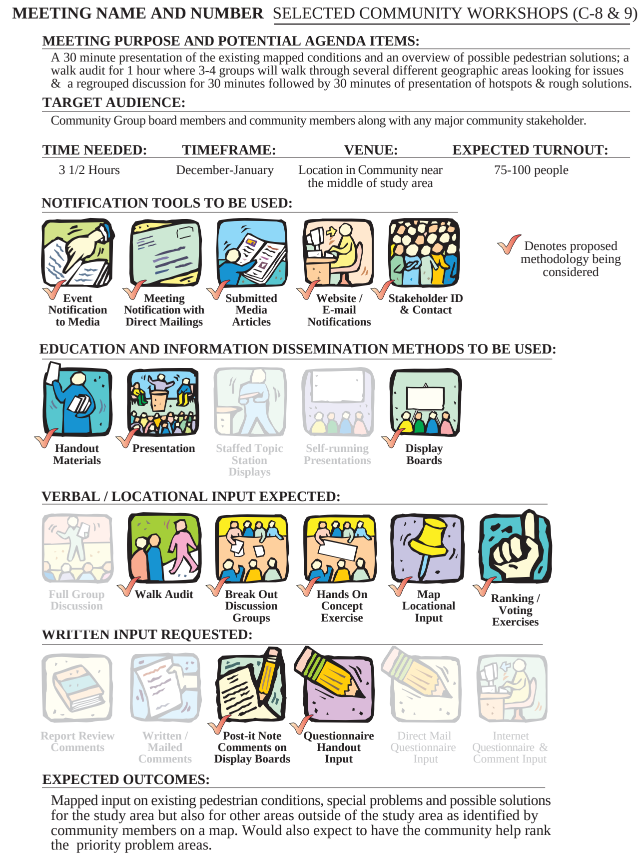


Figure 18: Purpose, Techniques and Expected Outcomes of the Three Required Community Workshops / Meetings

9.5 COMMUNITY INPUT PROGRAM

Step 4 in the process is to contact the local community planning group and get on the docket of this organization. A short 10-15 minute presentation should be given. The primary intent of the presentation would be to review the limits of the proposed focus study area with the group and obtain their approval of the focus of the study area. A second goal of the meeting is to establish contacts and recommend the creation of a subcommittee or other group to help steer the efforts of the plan. Suggestions on the location and time of the first workshop should also be solicited. The three exhibits shown on Figure 18 can be used to organize the minimum of three community workshops and presentations required to prepare a CPMP.

9.6 PREPARE AND CONDUCT THE FIRST COMMUNITY WORKSHOP

Step 5 includes the preparation and conducting of the public workshop. The primary goal of the workshop would be to obtain input from the broader community on the types of pedestrian issues that they see in their community. An outreach program is necessary to reach this broader community. Direct mailers and flyers (see Figure 19) should be distributed at least two weeks in advance of the workshop. Distribution of these flyers should include all business groups, nonprofit organizations, community centers, libraries, recreation centers, and schools. The agenda for the workshop (see Figure 20) should include some presentation of information about the City-wide Pedestrian Master Plan and how this CPMP fits into the larger picture. Exercises that help to identify specific areas of concern and that help to identify agreement on the priority of these areas, should be part of the workshop instructions (see Figure 21).

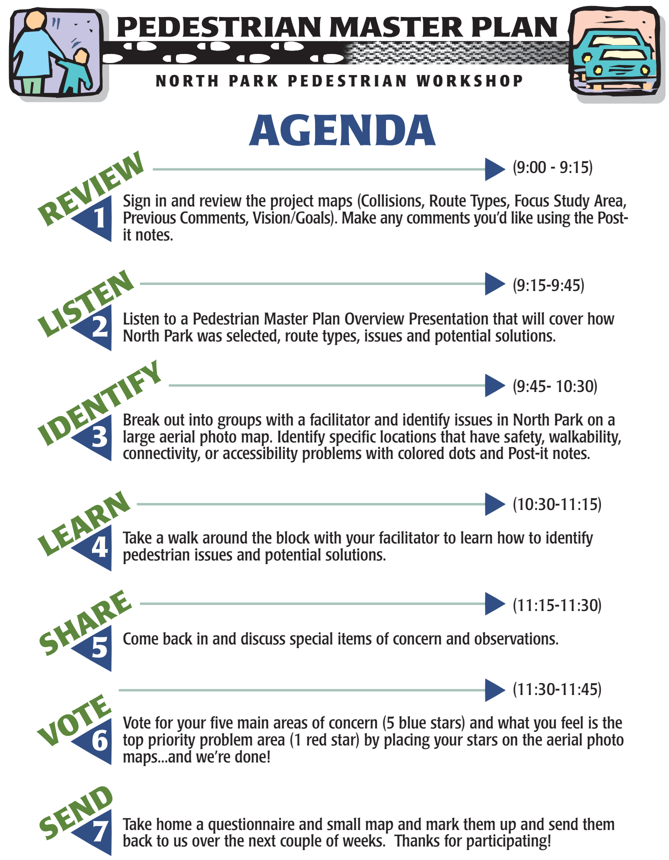
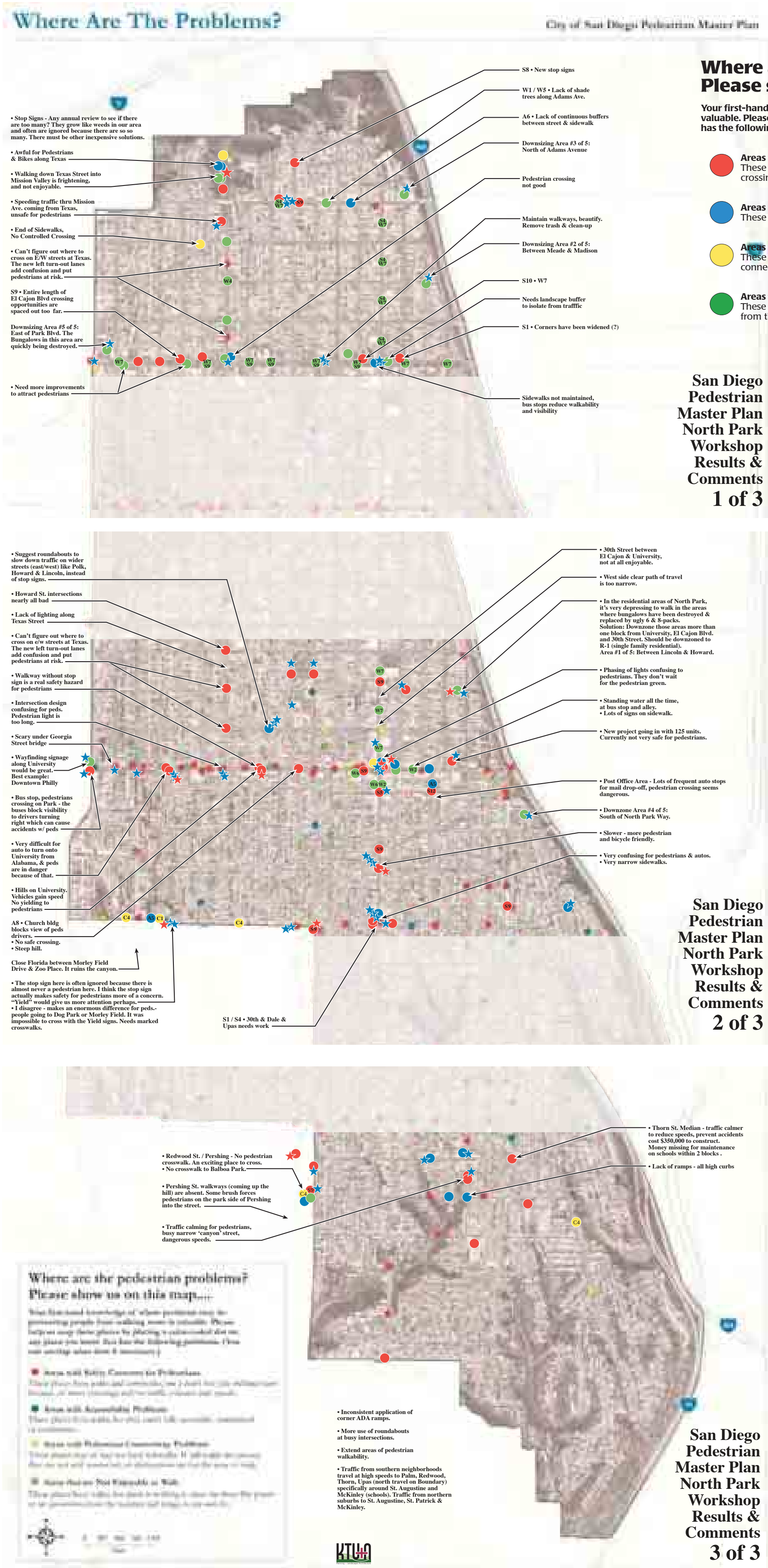


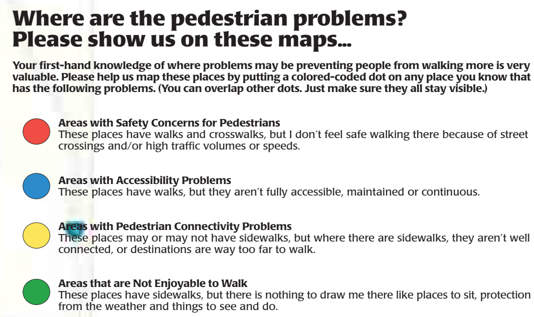
Figure 20: Suggested Workshop Agenda

Figure 19: Sample Flyer Announcing the Workshop

Figure 21: Instructions Indicating some of the Activities that can be Conducted at the Workshop

Figure 22: Workshop Mapping Results





9.7 DOCUMENT THE RESULTS OF THE WORKSHOP

Step 6 includes the documentation of the results found at the workshop. The primary results are detailed maps on locations of where particular types of pedestrian issues are known to occur (see Figure 22). Not only are the locations documented, but the maps also include all notes that were provided as part of the mapping exercises. Patterns typically become obvious, usually along the major corridors where pedestrian traffic is the highest. These maps form the basis of future potential projects and they provide a focus for the field work necessary to identify and clarify the issues brought up in the workshop.

9.8 FIELD WORK

Step 7 is a very important step in the process of developing the CPMP. The full consultant team would be expected to walk the focus study area and identify issues, confirm the community input, analyze the facets of the issue, and perhaps shed light on possible solutions that may improve these conditions. The primary goal of the field work is to narrow down the various issues into special project areas that can be further developed into projects or grouping of projects.

9.9 DETERMINE TREATMENTS

Step 8 will focus on the types of solutions to the issues and priorities identified by the community and the professional team through its fieldwork. Careful attention should be given to the classification of route types and the various treatment levels that can be applied to these areas. A listing of possible projects should be developed and this list should show groupings of projects. Some projects will remain on their own, but the team should look at grouping projects that have similar treatments in close proximity to each other. Draft recommendations for improvements for each of the identified projects should be provided.

9.10 PRESENT PROJECTS

A "Solutions" workshop should be conducted as the 9th step in this process. The purpose of the workshop is to solicit reaction to the listing of projects, the grouping of certain projects and the intended treatments for resolving issues or enhancing the walkability of areas. Another goal of the workshop is to have the participants rank the priorities of projects. This will form the basis of the high and moderate priority rankings.

9.11 SUBMIT REPORT

Step 10 is the final step in the process. Refined recommendations and implementation strategies should be included in the report along with detailed solutions and probable cost estimates. These draft recommendations will need to be taken to the community group and presented. A formal action item vote should be the focus of this meeting, since the CPMP needs to obtain local support and approval.

PROPOSED TABLE OF CONTENTS FOR COMMUNITY PEDESTRIAN MASTER PLANS

The following outline should be used in the development of Community Pedestrian Master Plans.

1 OVERVIEW OF THE COMMUNITY

- 1.1 SUMMARY OF CURRENT COMMUNITY PLAN
- 1.2 DEMOGRAPHICS OF THE COMMUNITY
- 1.3 GENERAL WALKING ENVIRONMENT

2 SPECIFIC COMMUNITY INPUT

- 2.1. COMMUNITY INPUT
  - 2.1.1. Questionnaire Summary
  - 2.1.2. Community Group Input
  - 2.1.3. "Issue" Workshop Summary
  - 2.1.4. "Solution" Workshop Summary
  - 2.1.5. "Presentation Feedback" Workshop Summary
- 2.2. MAPPING REVIEW FROM PMP
  - 2.2.1. Pedestrian Improvement Priority Model Summary
  - 2.2.2. Community-wide Route Type Summary
  - 2.2.3. Limits of Inventory Focus Study Area
  - 2.2.4. Safety Data Review in Focus Study Area
  - 2.2.5. Traffic Conditions Found in the Area
  - 2.2.6. Adjustments in Mapping or Study Area
- 2.3. FIELD INVENTORY SUMMARY OF ISSUES
  - 2.3.1. "Safety" Related Issues Found
  - 2.3.2. "Accessibility" Related Issues Found
  - 2.3.3. "Connectivity" Related Issues Found
  - 2.3.4. "Walkability" Issues Found
  - 2.3.5. Summary of Pedestrian Activity Areas
  - 2.3.6. Summary of Pedestrian Facility Deficiencies

3 SPECIFIC RECOMMENDATIONS

- 3.1. RECOMMENDED PROJECTS
  - 3.1.1. District High Priority Improvements
  - 3.1.2. Corridor High Priority Improvements
  - 3.1.3. Neighborhood High Priority Improvements
  - 3.1.4. Other Various Individual High Priority Improvements
  - 3.1.5. Other Various Individual Moderate Priority Improvements
- 3.2 RECOMMENDED IMPLEMENTATION AND PHASING
  - 3.2.1. Non-Sequential Stand-Alone Projects
  - 3.2.2. Sequential Phase One "Short-term" Projects
  - 3.2.3. Sequential Phase Two "Mid-term" Projects
  - 3.2.4. Sequential Phase Three "Long-term" Projects
  - 3.2.5. Projects to be Implemented by New Development
  - 3.2.6. Projects to be Implemented by Residential Property Only
  - 3.2.7. Projects to be Implemented by Public Projects

APPENDIX J

EXCERPTS FROM THE CITY OF SAN DIEGO BICYCLE MASTER PLAN, THE NAVAJO FACILITIES FINANCING PLAN, AND SANDAG'S SAN DIEGO RGIONAL BICYCLE PLAN

City of San Diego Bicycle Master Plan

San Diego, California

FINAL – Deceber 2013

PREPARED BY:
Alta Planning + Design
PREPARED FOR:
The City of San Diego

alta
PLANNING + DESIGN

6 Bicycle Facility Recommendations

The recommended improvements for the San Diego Bicycle Master Plan consist of bikeway network facilities, intersection and other spot improvements, and bicycle support facilities. Recommended bicycle support facilities and programs include bike parking, routine maintenance, signage, and bicycle signal detection maintenance. The recommended network consists primarily of on-street facilities, including 1090 miles of paved multi-use paths, proposed Bike Lanes, Bike Routes, Bicycle Boulevards, and Cycle Tracks. These totals include existing facilities and proposed facilities.

San Diego's numerous open spaces, parks, temperate, weather, and relatively compact downtown help to make bicycling in San Diego an effective transportation and recreation option at any time of the year. The recommendations included in this chapter will help to enhance San Diego's status as a great place to bicycle.

6.1 Bikeway Network

A comprehensive bikeway network improves bicyclists' level of safety, convenience, and access to key destinations. Planning a bikeway network enables the City to prioritize and seek funding to construct bicycle facilities where they will provide the greatest benefit to bicyclists and the community-at-large. It is important to note that bicyclists are legally entitled to ride on all city streets, whether the streets are a part of the designated bikeway network or not.

6.1.1 Bicycle Network Identification Process

Developing the recommended bicycle network involved four key steps. First, the city's existing facilities were combined with facilities identified in the following parallel planning documents:

- San Diego Bicycle Master Plan (2002)
- San Diego Downtown Community Plan (2006)
- San Diego Regional Bicycle Plan (2010)

Together, the existing and planned networks served as a foundation for the development of the recommended bicycle network. Next, this network comprised of existing and planned facilities was augmented with the network identified via the demand analysis presented in Chapter 5 (**Figure 5-8**). The bicycle demand analysis systematically identified roadway segments with high bicycle demand that do not currently have bicycle facility and were not proposed for bicycle facilities in any of the currently adopted plans. Third, this network was manually refined to ensure continuity and basic sensibility. Finally, the network was further refined with input from the community and City staff. **Appendix F** details the methodology used to developed the bicycle network.

6.1.2 Proposed Bicycle Network with Classifications

Figure 6-1 and **Figure 6-2** display the proposed bicycle network with classifications. The proposed facility classifications are based on the proposed 2002 Bicycle Master Plan, Downtown Community Plan, San Diego Regional Bicycle Plan network classifications, public input, and input from City staff including detailed input from City Planning & Community Investment staff. Proposed classifications are expected to be used as a guide and may change at implementation. The City of San Diego will strive to construct Class I facilities when possible. **Table 6-1** summarizes the proposed bicycle network miles including existing, proposed bikeways, and change in facility type.

Table 6-1: Recommended San Diego Bicycle Network

Facility Type	Miles of Existing	Miles of Proposed Unbuilt	Total Miles of Facility
Class I – Bike Path	72.3	94.1	166.4
Class II – Bike Lane	309.4	140.6	450.0
Class III – Bike Route	112.9	171.2	284.1
Class II or III (TBD)	--	143.4	143.4
Freeway Shoulder	16.1	-	-16.1*
Bicycle Boulevard	0	39.4	39.4
Cycle Track	0	6.6	6.6
Totals	**510.7**	**595.3**	**1,089.9**

Source: Alta Planning + Design, April 2011

** Facility will not be needed after construction of recommended network and is excluded from total facility miles..*

As shown in **Table 6-1**, there are approximately 511 miles of existing facilities with the majority being Bike Lanes. The recommended bicycle network includes recommendations for an additional 595 miles of bicycle facilities, for a future network totaling almost 1,090 miles.

6.2 High Priority Projects

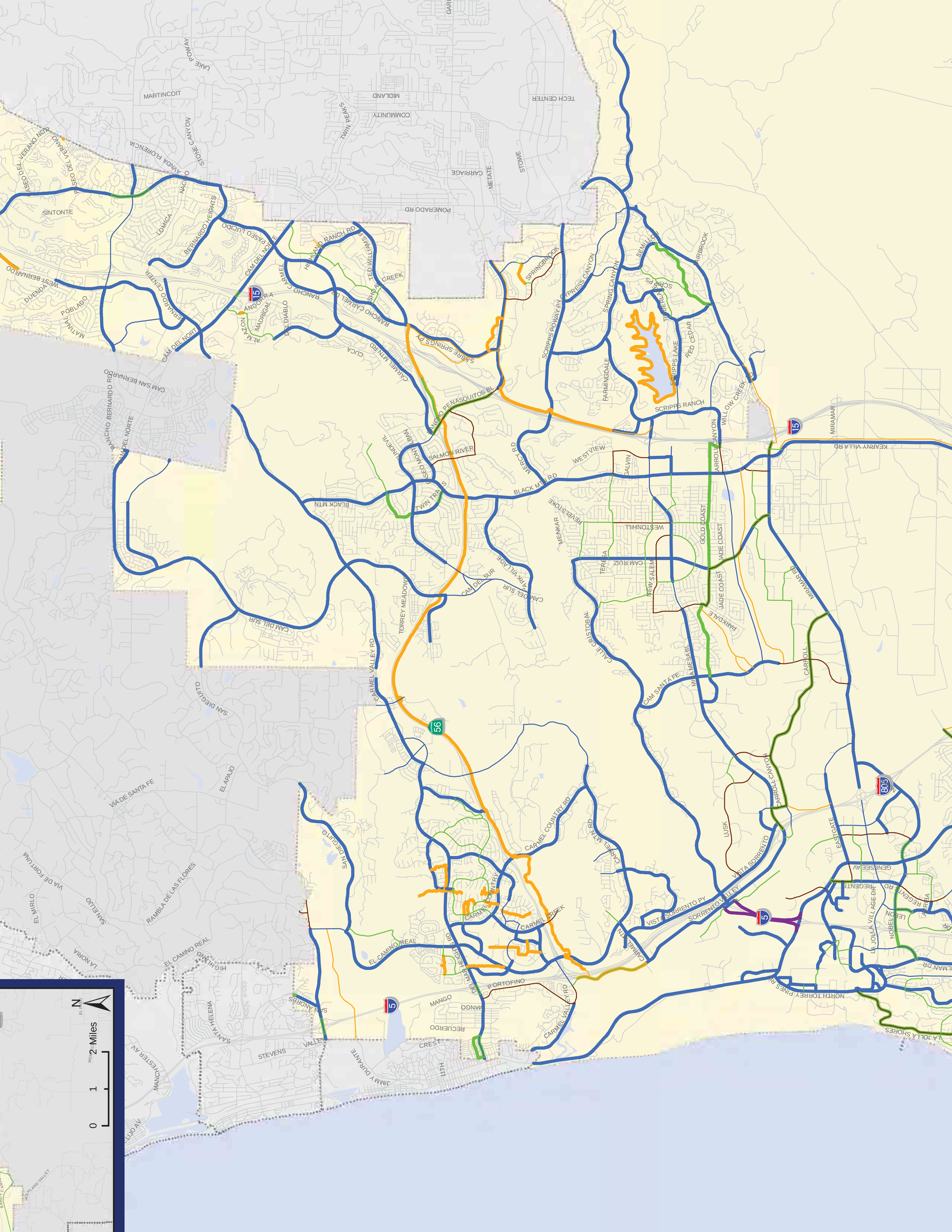
The high priority bicycle projects were identified through a planning prioritization process applied to the proposed bicycle network. It is important to note that all projects identified in the Bike Master Plan are important projects and once implemented will create a safe and comprehensive bikeway network. A planning prioritization process was applied to identify 40 high priority projects; This process is described in the following section and is expected to be refined over time. However, the list may change over time due to changing bicycle patterns, implementation opportunities and constraints, the development of other transportation system facilities, updated collision data, bike counts, population density, and funding availability. In addition to the high priority projects, implementing valuable network connections in communities with high transit ridership such as Mid-City and San Ysidro is a priority for the City of San Diego.

6.2.1 Prioritization Process

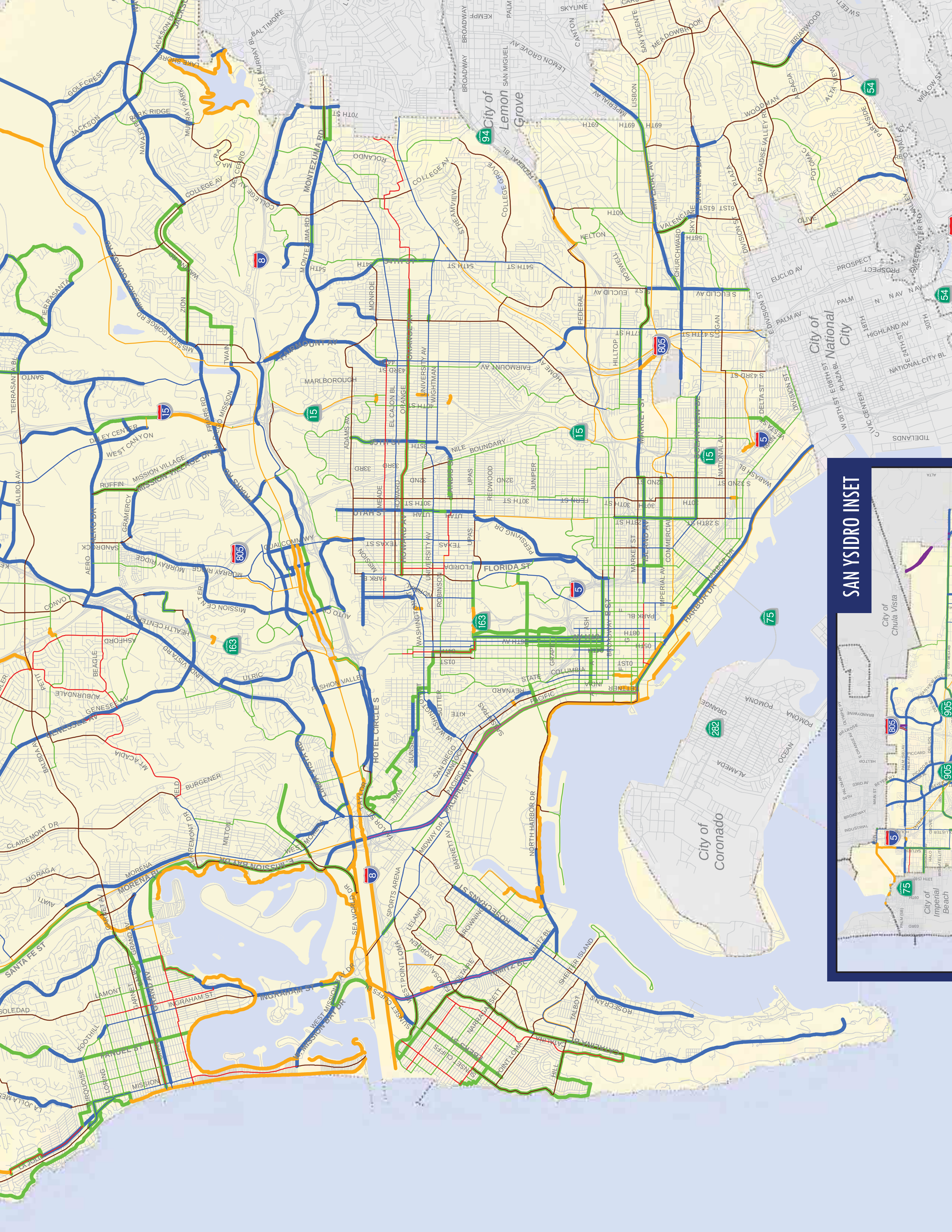
The bicycle network was prioritized based on key indicators of demand, deficiencies, and implementation factors in order to guide network implementation phasing. The project prioritization was completed in a two phase process, the first of which focused on more demand-driven factors and a second phase which addressed key implementation factors. The demand driven prioritization factors include bicycle demands, bicycle network gaps, public input gathered through the outreach process, overlap with the proposed regional bicycle network, and bicycle crashes. Data on these factors were entered into a Geographic Information System (GIS) along with their respective priority points.

Appendix F presents a detailed description of the methodology used for the first phase of the prioritization process.

Table 6-2 summarizes the prioritization inputs and point values assigned to each factor considered in the first phase of the prioritization process, which were finalized after extensive review and input from the Project Working Group.



LAKE POWAY
MARTINCOIT
MIDLAND
COMMUNITY
TWIN PEAKS
TECH CENTER
STOWE
METATE
CARRIAGE
POMERADO RD
PASEO DEL VERANO NORTE
SINTONTE
LOMICA
BERNARDO HEIGHTS
PASEO LUCIDO
CAM DEL NORTE
WEST BERNARDO
DUENDA
POBLADO
MATINAL
BERNARDO CENTER
RANCHO CARMEL
HIGHLAND RANCH RD
TED WILLIAMS
SHOAL CREEK
CARMEL MTN RD
CUCA
SABRE SPRINGS PY
SPRINGBROOK
CYPRESS CANYON
SPRING CANYON
SCRIPPS POWAY PY
SEMILLON
FAIRBROOK
RED CEDAR
SCRIPPS LAKE
FARMINGDALE
SCRIPPS RANCH
WILLOW CREEK
MIRAMAR
KEARNY VILLA RD
CAM SAN BERNARDO
RANCHO BERNARDO RD
CAM DEL NORTE
RANCHO PENASQUITOS BL
SALMON RIVER
BLACK MTN RD
BLACK MTN
WESTVIEW
MERCY RD
TWIN TRAILS
REVELSTOKE
MENKAR
GALVIN
WESTONHILL
GOLD COAST
JADE COAST
CAM RUIZ
TERESA
NEW SALEM
PARK VILLAGE
CAM DEL SUR
MIRAMAR RD
TORREY MEADOWS
CARMEL VALLEY RD
CALLE CRISTOBAL
PARKDALE
MIRA MESA BL
CAM SANTA FE
CARROLL
CARROLL CANYON
SAN DIEGUITO
VIA DE SANTA FE
EL APAJO
CARMEL COUNTRY RD
CARMEL MTN RD
LUSK
VISTA SORRENTO
EASTGATE
GENESEE AV
REGENTS
VIA DE FORTUNA
EL MIRLO
SAN ELIJO
RAMBLA DE LAS FLORES
LA NORIA
EL CAMINO REAL
HIGHLAND
CARMEL CREEK
VISTA SORRENTO PY
SORRENTO VALLEY
LA JOLLA VILLAGE DR
NOBEL
SAN ANDRES
SANTA HELENA
MANCHESTER AV
STEVENS
VALLEY
MANGO
RECUERDO
CREST
JIMMY DURANTE
11TH
PORTOFINO
DEL MAR HEIGHTS RD
CARMEL VALLEY RD
NORTH TORREY PINES RD
LA JOLLA SHORES
GILMAN DR
15
56
5
805
N
0
1
2 Miles



SAN YSIDRO INSET
City of Lemon Grove
City of National City
City of Coronado
City of Chula Vista
City of Imperial Beach
MONTEZUMA RD
COLLEGE AV
EL CAJON BL
UNIVERSITY AV
FAIRMOUNT AV
MARKET ST
IMPERIAL AV
EUCLID AV
FLORIDA ST
BOUNDARY
HARBOR DR
PACIFIC HWY
NORTH HARBOR DR
ROSECRANS
NIMITZ BL
SPORTS ARENA
WEST MISSION BAY DR
INGRAHAM ST
GARNET AV
GRAND AV
MORENA BL
CLAIREMONT DR
GENESEE AV
BALBOA AV
CONVOY
MISSION GORGE RD
FRIARS RD
HOTEL CIRCLE S
FASHION VALLEY
LINDA VISTA RD
ULRIC
MURRAY RIDGE
AERO DR
TIERRASANTA BL
GOLFCREST
JACKSON
NAVAJO RD
LAKE MURRAY BL
BALTIMORE
SKYLINE
MEADOWBROOK
PARADISE VALLEY RD
PLAZA BL
NATIONAL CITY BL
HIGHLAND AV
CIVIC CENTER
TIDELANDS
CORONADO
ORANGE
POMONA
OCEAN
ALAMEDA
SUNSET CLIFFS BL
CATALINA BL
TALBOT
SHELTER ISLAND
SANTA FE ST
LA JOLLA BL
SOLEDAD
TURQUOISE
LORING
MISSION BL

Table 6-2: Generalized Bicycle Network Prioritization Factors and Points

Prioritization Factor	Point Range
Combined Demand (Inter- and Intra-Community)	0 to 24
Bicycle Facility Gaps	0 to 6
Bicycle Crashes	0 to 6
Public Comment	0 or 3
Overlap with Proposed Regional Network	0 to 3

The top 25 percent of demand-driven priority roadway segments were then combined with the City's current bicycle Capital Improvement Project list, and a list of projects provided by the San Diego County Bicycle Coalition, many of which were already identified through the first phase of the prioritization process. The second phase of the prioritization process was applied to the list of potential projects derived from these three sources.

As noted above, the second phase of the prioritization process focused on implementation-oriented factors, such as project readiness, public right-of-way impacts, project cost, parking impacts, and other considerations. **Table 6-3** summarizes these implementation-oriented prioritization factors and describes the scoring process that was utilized for each factor. Finally, the project scores from the two prioritization phases described above were tabulated to generate an overall project score for each project. All projects were ranked based upon their respective overall project scores.

Table 6-3: Bicycle Facility-Specific Prioritization Factors and Points

Implementation Prioritization Factor	Point Range
Critical Network Connectivity: projects that either have no viable Bicycle Route alternative within 1 mile or provide a connection shorter than 0.5 mile between 2 existing bicycle facilities received 5 points. If neither of these attributes applies, the project received 0 points.	0 or 5
Unfunded Amount of Project Cost was ranked as follows: Less than $50,000 = 5 points $50,000 to $100,000 = 4 points $100,000 to $500,000 = 3 points $500,000 to $1,000,000 = 2 points $1,000,000 to $2,000,000 = 1 point Greater than $2,000,000 = 0 point	0 to 5
Parking Impacts were assessed using the following equation: 5 – [(# of spaces displaced/5) X 0.1] Note: Negative scores were not assessed to projects with a high amount of parking impacts - the lowest score that a project received is 0 points.	0 to 5
Right-of-Way (ROW) Impacts: No lane or curb impacts = 3 points Minor lane or curb impacts = 2 points Moderate amount of lane or curb impacts = 1 point Significant lane or curb impacts = 0 points	0 to 3
Project Funding: Fully Funded = 2 Partially Funded = 1 Not At All Funded = 0	0 to 2

6.2.2 High Priority Bicycle Projects

Figure 6-3, Figure 6-4, and Figure 6-5 display the high priority projects based upon the prioritization process described above and refined through the public review process. These high priority projects were presented to the public via the project Website and during the public open house held on May 20, 2010.

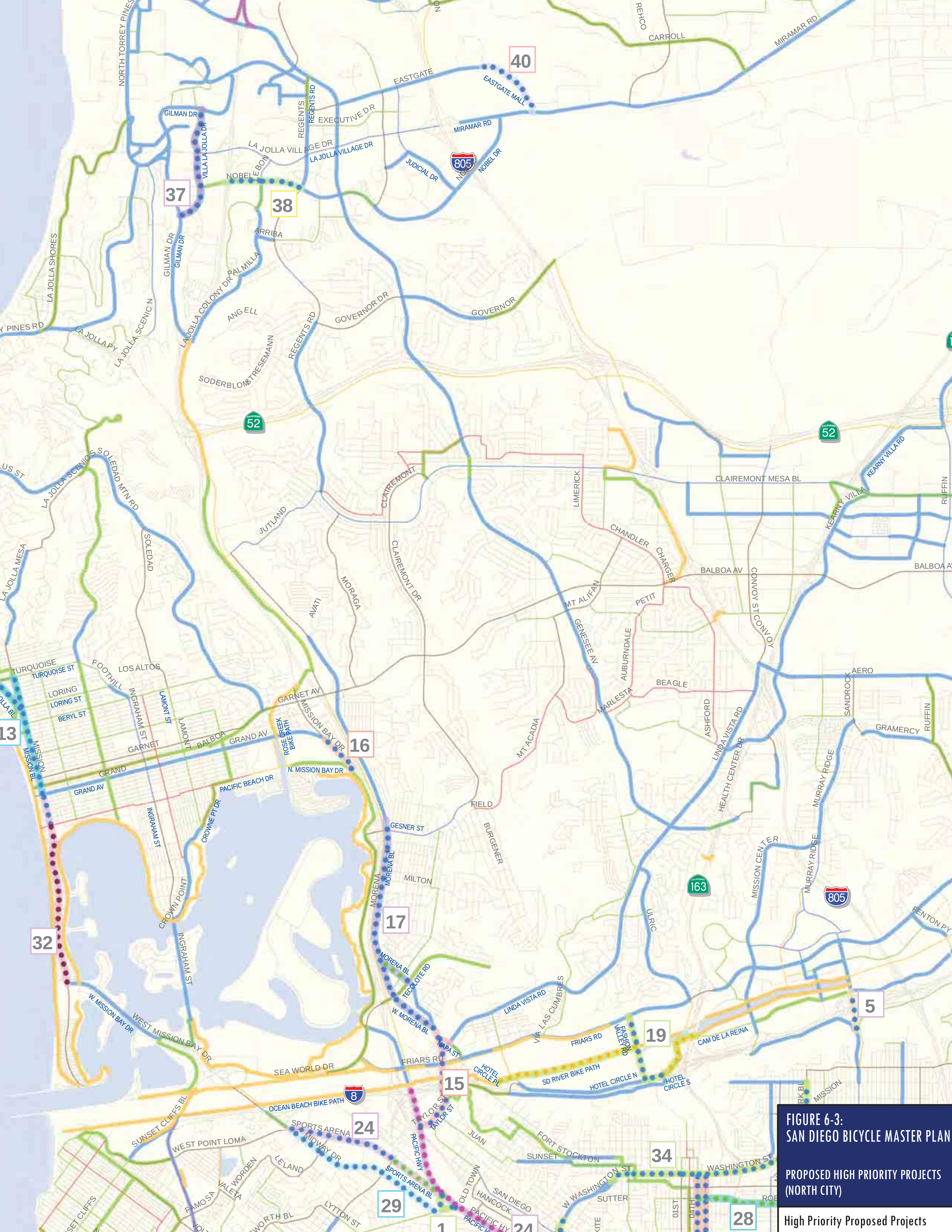
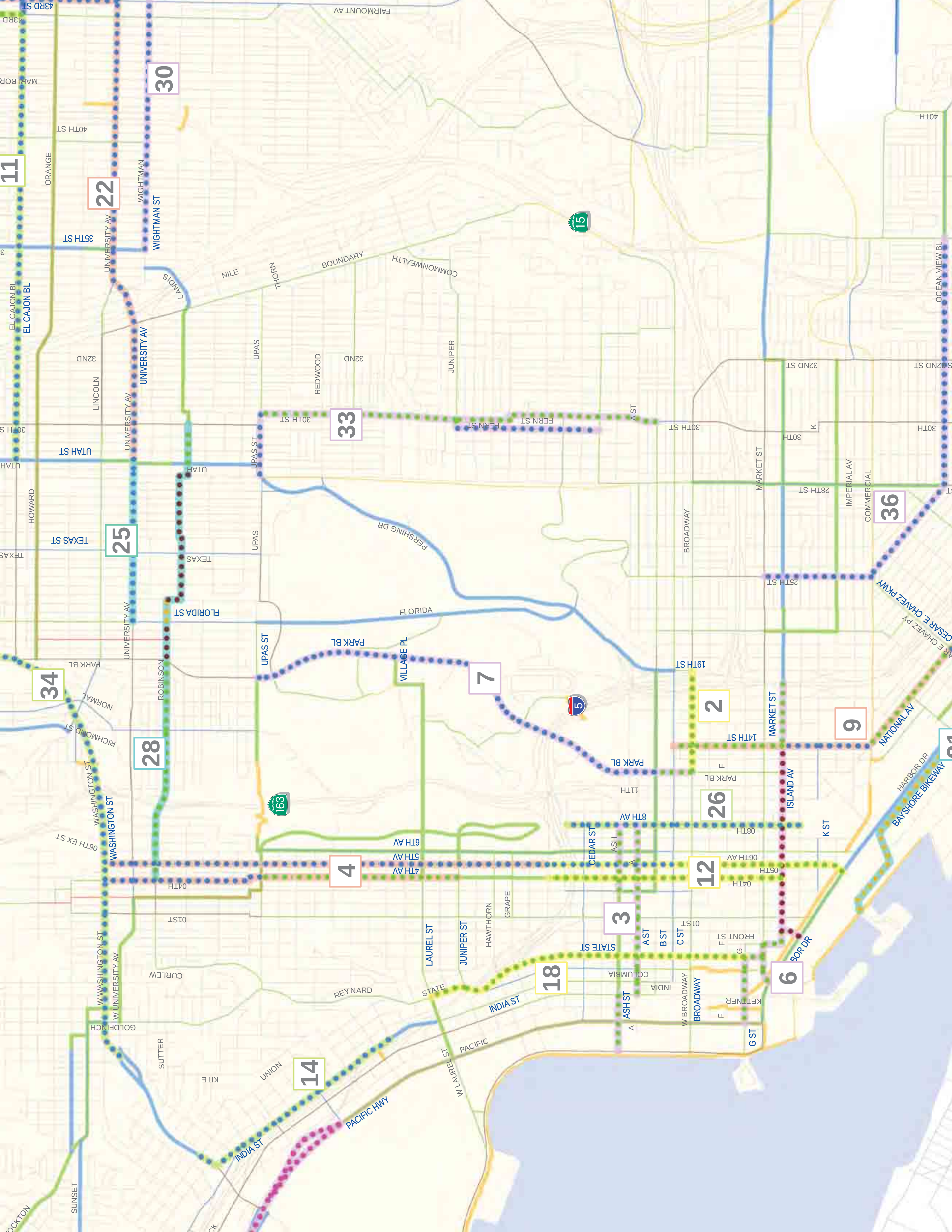


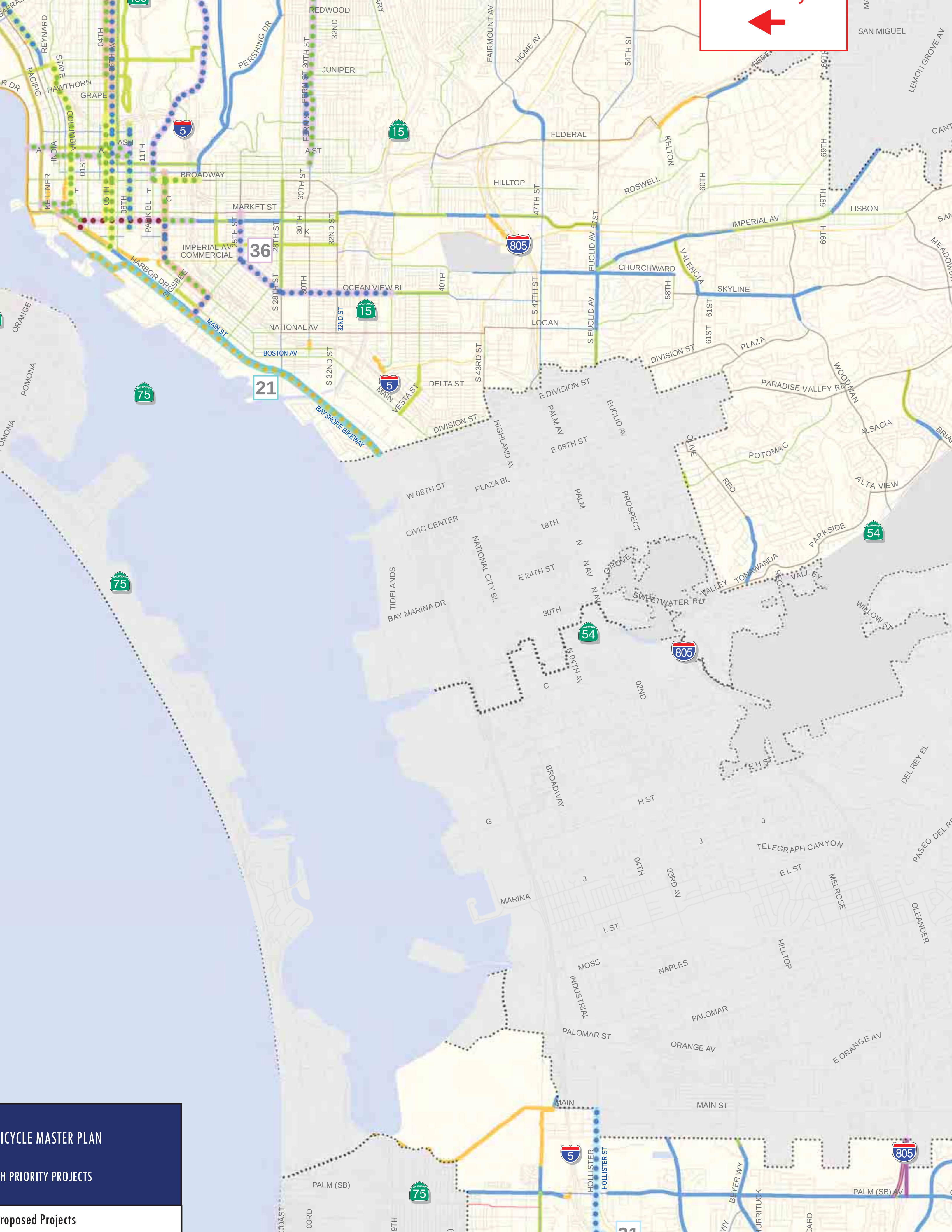
FIGURE 6-3:
SAN DIEGO BICYCLE MASTER PLAN

PROPOSED HIGH PRIORITY PROJECTS (NORTH CITY)

High Priority Proposed Projects



43RD ST
FAIRMOUNT AV
30
WIGHTMAN ST
22
11
15
35TH ST
UNIVERSITY AV
EL CAJON BL
BOUNDARY
COMMONWEALTH
NILE
THORN
LANDIS
UPAS
REDWOOD
32ND
JUNIPER
LINCOLN
ORANGE
MARLBOROUGH
40TH ST
33
30TH ST
FERN ST
A ST
32ND ST
OCEAN VIEW BL
UTAH ST
UPAS ST
MARKET ST
28TH ST
IMPERIAL AV
COMMERCIAL
36
HOWARD
TEXAS ST
25
PERSHING DR
BROADWAY
25TH ST
CESAR E CHAVEZ PKWY
FLORIDA ST
FLORIDA
PARK BL
UPAS ST
VILLAGE PL
7
19TH ST
34
NORMAL
RICHMOND ST
ROBINSON
28
5
2
14TH ST
9
NATIONAL AV
PARK BL
ISLAND AV
163
WASHINGTON ST
8TH AV
26
K ST
HARBOR DR
BAYSHORE BIKEWAY
CEDAR ST
6TH AV
5TH AV
4TH AV
4
12
LAUREL ST
JUNIPER ST
HAWTHORN
GRAPE
3
A ST
B ST
C ST
FRONT ST
STATE ST
18
COLUMBIA
INDIA
W BROADWAY
BROADWAY
KETTNER
6
G ST
ASH ST
CURLEW
REYNARD
STATE
INDIA ST
W WASHINGTON ST
W UNIVERSITY AV
GOLDFINCH
SUTTER
KITE
UNION
14
PACIFIC
W LAUREL ST
PACIFIC HWY
INDIA ST
SUNSET



ICYCLE MASTER PLAN
H PRIORITY PROJECTS
roposed Projects
REDWOOD
32ND
JUNIPER
30TH ST
FERN ST
A ST
FAIRMOUNT AV
HOME AV
54TH ST
SAN MIGUEL
LEMON GROVE AV
FEDERAL
KELTON
ROSWELL
60TH
69TH
LISBON
HILLTOP
47TH ST
51ST
IMPERIAL AV
EUCLID AV
CHURCHWARD
VALENCIA
SKYLINE
58TH
61ST
S 47TH ST
LOGAN
S EUCLID AV
DIVISION ST
PLAZA
PARADISE VALLEY RD
WOODMAN
ALSACIA
POTOMAC
ALTA VIEW
PARKSIDE
TONAWANDA
VALLEY
REYNARD
STATE
PACIFIC
HAWTHORN
GRAPE
COLUMBIA
INDIA
ASH
11TH
01ST
KETTNER
05TH
08TH
PARK BL
BROADWAY
MARKET ST
IMPERIAL AV
COMMERCIAL
25TH ST
28TH ST
30TH
32ND ST
K
HARBOR DR
SIGSBEE
S 28TH ST
OCEAN VIEW BL
40TH
NATIONAL AV
32ND ST
BOSTON AV
S 32ND ST
S 43RD ST
DELTA ST
MAIN ST
MAIN
VESTA ST
BAYSHORE BIKEWAY
DIVISION ST
E DIVISION ST
PALM AV
EUCLID AV
HIGHLAND AV
E 08TH ST
OLIVE
REO
W 08TH ST
PLAZA BL
PALM
PROSPECT
CIVIC CENTER
18TH
NATIONAL CITY BL
E 24TH ST
GROVE
TIDELANDS
BAY MARINA DR
30TH
SWEETWATER RD
WILLOW ST
N 04TH AV
C
02ND
ORANGE
POMONA
E H ST
DEL REY BL
BROADWAY
H ST
G
J
TELEGRAPH CANYON
PASEO DEL RE
E L ST
04TH
03RD AV
MELROSE
MARINA
OLEANDER
L ST
MOSS
NAPLES
HILLTOP
INDUSTRIAL
PALOMAR
PALOMAR ST
ORANGE AV
E ORANGE AV
MAIN
MAIN ST
HOLLISTER
HOLLISTER ST
BEYER WY
PALM (SB)
PALM (SB) AV
03RD
COAST
5
15
805
54
75
36
21

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Table 6-4 defines the high priority projects' extents, proposed facility type(s), and project mileage. Each of these high priority projects are also displayed on an individual project sheet that includes a description of the project area and issues; a listing of recommended improvements; a planning-level cost estimate; and an overview map of the project area with existing and proposed bicycle facilities. **Chapter 8** presents the high priority bicycle project sheets.

In regards to the prioritization process, it should be noted that the purpose of the ranking process is to create a recommended prioritized list of projects for implementation. The project list and ranking are flexible concepts based on needs analysis and ease of implementation that serve as guidelines. The list may change over time due to changing bicycle patterns, implementation opportunities and constraints, and the development of other transportation system facilities.

Table 6-4: High Priority Bicycle Projects

Location	From	To	Proposed Facility	Segment Miles	Project Miles
Pacific Hwy and Barnett Ave	Enterprise Rd	Barnet Ave	Class II; spot treatments	.0.26	0.26
Broadway	Park Blvd	19th Street	Class III	0.41	0.41
Ash Street	N. Harbor Dr	Kettner Blvd	Class III	0.23	0.23
4th Ave	Washington Street	Elm Street	Class II; Class III	1.41	3.1
5th Ave	Washington Street	Elm Street	Class II	1.69	
Texas Street/Qualcomm Way	Camino del Rio North	Camino del Rio South	Class II; spot treatments	0.69	0.69
G Street	Harbor Drive	State Street	Class III	0.27	1.71
State Street	G Street	Market Street	Class III	0.08	
Market Street	Harbor Drive	Union Street	Class III	0.16	
Union Street	Market Street	Island Avenue	Class III	0.07	
Front Street	Island Avenue	Harbor Drive	Bicycle Boulevard	0.08	
Island Avenue	Front Street	I-5	Bicycle Boulevard	1.05	
Park Blvd	Upas Street	Broadway	Class II; Class III	1.88	1.88
54th Street	Montezuma Rd	El Cajon Blvd	Class II; Class III	0.96	1.05
Collowood Boulevard	Monroe Avenue	54th Street	Class II	0.09	
14th Street	C Street	Commercial Street	Class II/Class III	0.79	1.53
National Ave	Commercial Street	Cesar E. Chavez Pkwy	Class III	0.52	
Cesar E. Chavez Pkwy	National Ave	Harbor Drive	Class II	0.22	
El Cajon Blvd	43rd Street	Montezuma Rd	Class II	2.88	2.88
El Cajon Blvd	Utah Street	43rd Street	Class II	1.73	1.86
43rd Street	Meade Avenue	El Cajon Boulevard	Class III	0.13	
4th Ave	Elm Street	Island Ave	Class III	0.93	2.11
5th Ave	Elm Street	Harbor Dr	Class II/Class III	1.18	
Mission Blvd	Turquoise Street	Grand Ave	Class II	1.01	1.01
India Street	Washington Street	Olive Street	Class II	0.87	0.98
Washington Street	India Street	0.1miles east of India Street	Class II	0.11	
Morena Blvd	W. Morena Blvd	Taylor Street	Class II	1.06	1.47
Napa Street (spur)	Morena Blvd	Linda Vista Rode	Class II	0.09	
Taylor Street	Morena Blvd	Pacific Hwy	Class II	0.32	

Location	From	To	Proposed Facility	Segment Miles	Project Miles
E. Mission Bay Dr	Interstate 5	Grand Ave	Class II	1.24	1.24
Morena Blvd	Gesner Street	W. Morena Blvd (S)	Class II	2.44	2.44
State Street	Columbia Street	Market Street	Class III	1.31	1.31
Fashion Valley Road	Friars Road	Hotel Circle N.	Class II	0.55	2.54
Hotel Circle N.	Fashion Valley Road	Hotel Circle S.	Class II	0.3	
San Diego River Bike Path	Hotel Circle Place	Fashion Valley Road	Class I	1.21	
Camino de la Reina	Hotel Circle South	S. San Diego River Bike Path	Class I	0.48	
Mira Mesa Blvd	Parkdale Rd	Interstate 15	Class II (gap closures)	1.13	1.13
Bayshore Bikeway	Embarcadero Path	National City City limits	Class I	3.24	3.24
University Avenue	Utah Street	Fairmount Ave	Class II	1.8	1.8
Fairmount Ave and Montezuma Rd	Camino del Rio South	Talmadge Canyon Row	Class II; spot treatments	2.2	2.2
Pacific Hwy	Ocean Beach Bike Path	Sassafras Street	Cycle Track	2.36	2.36
University Avenue	Florida Street	Utah Street	Class II	0.65	0.65
8th Ave	Date Street	J Street	Class II	0.94	0.94
University Avenue	Fairmount Ave	La Mesa City limit	Class II	2.13	2.13
Robinson Ave	4th Street	Alabama Street	Class III; Class I	1.23	1.97
Landis Street	Alabama Street	30th Street	Bike Blvd	0.74	
Midway Dr	W. Point Loma Bl	Barnett Ave	Class II	1.42	1.42
Wightman Street	Swift Avenue	Fairmount Ave	Class II	1.07	1.07
Hollister Street	Main Street	Coronado Av	Class II	1.36	1.63
Outer Road	Hollister Street	Coronado Av	Class II	0.27	
Mission Blvd	Grand Ave	W. Mission Bay Dr	Class II/Bike Blvd	1.59	1.59
30th Street	Upas Street	B Street	Class III	1.54	4.47
Fern Street	Juniper Street	B Street	Class II	0.68	
Upas Street	28th Street	30th Street	Class III	2.25	
Washington Street	University Avenue	Normal Street	Class II	2.01	2.59
Normal Street	Washington Street	El Cajon Blvd	Class II	0.19	
Park Boulevard	El Cajon Blvd	Madison Av	Class III	0.39	
Camino del Rio North	Mission City Pkwy	Interstate 15	Class II	1.29	1.29
25th Street	Market Street	Commercial Street	Class II	0.44	1.89
Ocean View Blvd	Commercial Street	36th Street	Class II	1.45	
Villa La Jolla Dr	Gilman Dr (N)	Gilman Dr (S)	Class II	0.97	0.97
Nobel Dr	Interstate 5	Regents Rd	Class II	0.67	0.67
W. San Ysidro Blvd	Dairy Mart Rd	Southern terminus of San Ysidro Blvd	Class II	2.2	2.2
Eastgate Mall	Olson Dr	Miramar Road	Class II	0.61	0.61
				Total Miles	**65.52**

Source: Alta Planning + Design, April 2011

6.3 Bike Parking and End-of-Trip Facilities

Bike parking and end-of-trip facilities are essential components of a bicycle system. Facilities such as bike parking racks, and showers and lockers for employees, further improve safety and convenience for bicyclists. Facility recommendations presented in this chapter are divided into the following categories: standard bike parking, high-capacity bike parking, end-of-trip amenities, and multimodal connections.

Additional parking facilities are proposed in new and existing commercial, retail, and employment areas. Bicycle parking recommendations include the City's standard inverted-U bike racks, lockers, high-capacity bike parking such as Corrals, and a proposed Bike Station at the Santa Fe Depot. Some of these recommendations would be implemented by the City of San Diego as the lead agency, and other recommendations, such as bike locker retrofits and upgrades, may be undertaken by SANDAG and require coordination with the City of San Diego.

Bicyclists need secure, well-located bicycle parking to support nearly all utilitarian and many recreational bicycle trips. Lack of parking can be a major obstacle to using a bicycle. A robust bicycle parking program is one of the most important strategies that jurisdictions can apply to enhance the bicycling environment. The program can improve the bicycling environment and increase the visibility of bicycling in a relatively short time.

6.3.1 Standard Bicycle Parking

Over the last several years, the City has installed bike racks by request on sidewalks and parkways throughout the city; however, there are still many locations where parking is either insufficient or lacking. In addition to responding to citizens' requests for bicycle racks in the public right-of-way, the City will expand the program to include a schedule for installing bicycle parking based on proximity to land uses that attract bicycle trips including transit hubs and activity centers. **Figure 3-5**, **Figure 3-6** and **Figure 3-7** in **Chapter 3** display key transit and activity centers where bike parking and end-of-trip amenities are expected to be present. The City is completing an inventory of bike parking, and will regularly update this inventory, continue securing funding to install bike parking, and develop a schedule to install bike parking in all locations identified in **Figure 3-5**, **Figure 3-6**, and **Figure 3-7** that lack bike parking facilities.

The City will also include bicycle storage standards in the *City of San Diego Standard Drawings* or *City of San Diego Landscape Technical Manual* for implementation at major employment centers, schools, transit centers, park-and-ride lots, bus routes, shopping centers, stadiums, and public and semi-public recreational areas.

Public bicycle parking programs can also be coordinated with property owners of commercial buildings to supply parking for employees and visitors. The City has an existing ordinance that requires bicycle parking in new commercial developments. These bicycle parking requirements are specified in the Municipal Code Sections 142.0525, 142.0530, and 142.0560. The City continues to ensure compliance with these regulations through the development review process.

6.3.2 High Volume Bicycle Parking

Where bicycle parking demand is high, more formal structures and larger facilities should be provided. Several options for high-volume bicycle parking are outlined below.

6.3.2.1 On-Street Bike Parking Corral

A relatively inexpensive solution to providing high-volume bicycle parking is to convert one or two on-street motor vehicle parking spaces into on-street bicycle parking. Bike racks are installed in the street and protected from motor vehicles with removable curbs and bollards. These facilities move bicycles off the sidewalks, and leave space for sidewalk café tables or pedestrians. Bicycle parking does not block sightlines like motor vehicles do, so it may be possible to locate bicycle parking in no-parking zones near intersections and crosswalks.

Bike parking Corral in Portland, Oregon

6.3.2.2 Bike Oasis

Bike Oases are installed on curb extensions and consist of attractive covered bike parking and an information panel. Portland's Bike Oases, for example, provide parking space for ten bikes. Bike and walking maps are installed on the information panel.

6.3.2.3 Bike Station

Bike Stations serve as one-stop bicycle service centers for bicycle commuters. They include 24-hour secure bicycle parking and may provide additional amenities such as a store to purchase items (helmets, raingear, tubes, patch kits, bike lights, and locks), bicycle repair facilities, showers and changing facilities, bicycle rentals, and information about biking. Some Bike Stations provide free bike parking, while others charge a fee or require membership.

Bike oasis parking area in Portland, Oregon

Bike Stations have been installed in several cities in California, including Long Beach, San Francisco, Los Angeles, and Berkeley, as well as out of state cities of Chicago, and Seattle.

A Bike Station at the Santa Fe Depot is proposed to serve the large number of commuters who work in the downtown area. The Santa Fe Depot is a historic site that serves as a regional and local transit hub, with San Diego Trolley service, a Coaster Station, and an Amtrak Station. In addition to its multimodal significance, this site is ideal for a Bike Station because it is situated in the downtown business district and offers attractive outdoor and indoor public areas. There are currently bike racks and two SANDAG bike lockers located at the station, which provide four locker spaces for bicyclists. Establishment of a Bike Station would provide additional bike parking as well as other amenities that would help to support bicyclists as they commute and make connections to other modes of transportation.

The following amenities should be considered for the Bike Station:

- Attended bicycle parking
- Bicycle rental establishment
- Accessory shop
- Bicycle repair shop
- Changing rooms
- Shower and locker facilities

Bike station in Long Beach, California

6.3.3 End-of-Trip Facilities

End-of-trip facilities such as restrooms, changing rooms, showers, and storage for bicycling clothes (helmet and other gear) are especially important for cyclists who commute to work.

The City will continue to implement its requirements for showers and lockers specified in the Municipal Code Sections 142.0530, and these shall be imposed upon all new development projects. Specific locations of proposed bicycle amenities are not mapped in this Bicycle Master Plan. Future amenity locations will be identified as the municipal code is enforced on individual development projects.

In order to ensure bicycle parking and amenity requirements are met per the Municipal Code, the City will evaluate the development review process and forms, and if necessary, make changes to the process to strengthen compliance with bicycle facility requirements. Improving the process may also include specific trainings for Development Services' personnel to better integrate bicycle facility requirements into the development review process.

6.4 Maintenance

Public workshop participants identified improved maintenance of San Diego's bikeways as a very high priority. Both on-street and off-street bikeways require regular maintenance. Typical tasks include repairing damaged and potholed roadway surfaces, clearing plant overgrowth and debris, and sweeping Bike Lanes and Bike Paths. Although these tasks are generally associated with routine roadway maintenance, on-street bikeways require specialized maintenance and, in general, greater attention to detail. Bicycles are more susceptible than motor vehicles to roadway irregularities such as potholes and loose gravel. For example, after repaving, a roadway lip between a gutter pan and asphalt does not affect a motor vehicle, but can easily catch a bicycle tire and possibly result in a cyclist losing control of the bicycle.

6.4.1 Bicycle-Oriented Maintenance Policy

The City's Street Division routinely sweeps streets based on schedules that can be viewed and downloaded from the City's website (http://www.sandiego.gov/stormwater/services/sweepschedules.shtml). Maintenance schedules should also be developed for Class I Bike Paths. Resurfacing specifications should be developed and maintained as the City performs street improvements or when companies require the trenching of certain streets for a period of time. Compaction standards should be developed to ensure that the settlement of pavement does not occur, especially within zones that have been trenched for some purpose.

Maintenance requirements for all roadways in the city are outlined in the City of San Diego's Standard Drawings. Maintenance access on Bike Paths can be achieved using standard City pick-up trucks on the pathway itself. Sections with narrow widths or other clearance restrictions are clearly marked. Class I Bike Path maintenance includes cleaning, resurfacing and restriping the asphalt path, repairs to crossings, cleaning drainage systems, trash removal, and landscaping. Underbrush and weed abatement should be performed once in the late spring and again in mid-summer. In addition, these same maintenance treatments should be performed on Class II and Class III facilities. These facilities are prioritized to include an accelerated maintenance plan that is already a part of the City's ongoing street maintenance. A maintenance schedule and checklist is provided in **Table 6-5**.

Trenching has become a major issue regarding roadway and bikeway maintenance in the City of San Diego. Trenching most often occurs in the bicyclists' path of a street and/or in the Bike Lane on those streets that have these facilities. The typical construction location in the roadway makes trenching a major maintenance issue for bicyclists. Field inspection should be increased to ensure that the condition of post-construction roadway surfaces is the same or better than the surface condition before construction commenced.

Utility and fiber-optic company trenching should be coordinated so that the number of trenching activities is minimized. Construction treatments for bicyclists will be implemented during times of construction activities that affect bicycle travel on streets. Detour and warning signage need to be implemented, and efforts to maintain riding space for bicyclists will be made through construction zones.

When streets are resurfaced, the City's Street Division will coordinate with the Traffic Engineering Division to determine the best striping plan for streets when they are restriped after resurfacing projects. If a segment of roadway slated to be resurfaced is identified as a proposed bikeway in the Bicycle Plan, efforts will be made to provide space for bicycle travel either as a Bike Lane or a Bike Route with a widened curb lane.

Table 6-5: Recommended Bikeway Maintenance Checklist and Schedule

Item	Frequency
Sign Replacement/Repair	1 - 3 years
Pavement Marking Replacement	1 - 3 years
Tree, Shrub & Grass Trimming/Fertilization	5 months - 1 year
Pavement Sealing/Potholes	5 - 15 years
Clean Drainage System	1 year
Pavement Sweeping	Weekly-Monthly/As needed
Shoulder and Grass Mowing	Weekly/As needed
Trash Disposal	Weekly/As needed
Lighting Replacement/Repair	1 year
Graffiti Removal	Weekly-Monthly/As needed
Maintain Furniture	1 year
Fountain/Restroom Cleaning/Repair	Weekly-Monthly/As needed
Pruning	1 - 4 years
Bridge/Tunnel Inspection	1 year
Remove Fallen Trees	As needed
Weed Control	Monthly/As needed
Maintain Emergency Telephones, CCTV	1 year

Item	Frequency
Maintain Irrigation Lines	1 year
Irrigate/Water Plants	Weekly-Monthly/As needed

Roadways that are regularly traveled by bicyclists will be swept more frequently and otherwise maintained regardless of whether a specific bikeway designation exists on those roadways.

The City of San Diego is considering the following specific measures when evaluating its street maintenance and repair policies to ensure that they reflect the needs of bicyclists:

Street sweeping. As motor vehicles travel along the roadway, debris is pushed to the outside lanes and shoulder. Debris also collects at the center of intersections. Street sweeping on these roadways will include removing debris on the shoulder and at intersections.

Minor repairs and improvements. Potholes and cracks along the shoulder of roadways primarily affect bicyclists and need be repaired within a timely manner. All repairs will be flush to the existing pavement surface.

Street resurfacing. When streets with bikeways are resurfaced, utility covers, grates and other in-street items can be brought up to the new level of pavement. Similarly, the new asphalt can be tapered to meet the gutter edge and provide a smooth transition between the roadway and the gutter pan.

Actively coordinate with maintenance workers. The City should ensure that maintenance workers are aware of new bicycle related maintenance policies. Maintenance workers should be involved in the development of bicycle related maintenance policies in order to ensure that City staff and maintenance workers understand each other's needs and limitations. After establishing policies, the City should follow up with the maintenance staff to verify compliance and to modify policies or provide additional support, if necessary, to ensure future compliance.

6.4.2 Bicycle Facility Maintenance Program Funding

Bicycling is an integral part of San Diego's transportation network, and maintenance of the bikeway network is part of the ongoing maintenance program for all city transportation facilities. As such, bikeway network maintenance should receive an appropriate allocation of the City's transportation maintenance funds.

6.5 Bicycle Signal Detection

In-pavement loop detectors are used at signalized intersections to trigger a traffic light when a roadway user approaches the intersection. California law (AB 1581) requires that all new traffic actuated traffic signals respond to the presence of bicycles and motorcyclists. The City of San Diego has received TDA/TransNet funding to install bicycle detection systems and pavement markings at 20 signalized intersections in San Diego to improve bicycling safety. The following recommendations are intended to build on the city's bicycle detection at signalized intersections.

6.5.1 Bicycle Loop Detector Installation

The City is committed to continue to seek funding and install bicycle loop detectors at signalized intersections, particularly during roadway construction.

6.5.2 Bicycle Loop Detector Calibration

While bicycle detector loops facilitate faster and more convenient bicycle trips, if they aren't calibrated properly, or stop functioning, they can frustrate cyclists waiting for signals to change, unaware that the loop is not working. The City is responsible for ensuring that all bicycle loops are operable.

6.6 Signage and Striping

All bikeway signage on public roadways in San Diego will conform to the signage identified in the *2010 California Manual on Uniform Traffic Control Devices (California MUTCD)*. These documents give specific information on the type and location of signage for bicycle facilities in California. For example, design guidelines are provided in the MUTCD for transitioning from a bicycle lane to a right turn only lane using optional dotted lines on the roadway to delineate the Bike Lane conflict zone and a "BEGIN RIGHT TURN LANE YIELD TO BIKES" sign (R4-4).

Standard destination signs can be customized to reflect San Diego's character.

Innovative signage can be developed for a number of reasons – as a standardized warning system, to assist with unique wayfinding, or to help lend a sense of place to a community. Some innovative signage is developed to increase awareness that bicyclists may use the full travel lane and to alert motorists to the proper response. Any signs to be installed on public roadways in California must be approved by Caltrans. New experimental designs can be utilized after approval. This continuing process of developing better wayfinding or safety-warning signs is important for designing safer and more enjoyable bicycling facilities, as well as improving the overall transportation system.

6.6.1 "Share The Road" Signage

For all Class III Bike Route implementation, the City will install "SHARE THE ROAD" signs (MUTCD W16-1) along with the standard "BIKE ROUTE" signage (MUTCD D11-1).

6.6.2 Designated Bikeway Signs

The installation of bikeway signs on all designated bicycle facilities is important to heighten motorist awareness of cyclists and help cyclists find their way. The City will ensure that all bikeways are signed per the *2010 California MUTCD*.

Bike Route signage with wayfinding/directional information.

6.6.3 Bicycle Boulevard Signage

All recommended Bicycle Boulevards will be equipped with bicycle boulevard identification, wayfinding, and warning signage. The City will develop distinctive signage that identifies Bicycle Boulevards as such and encourages their use by bicyclists. Destination signage will also be used along Bicycle Boulevards to provide bicyclists with direction, distance or estimated travel times to key destinations including transit stations, commercial districts, recreational areas, schools and universities. The City will also install warning signs along Bicycle Boulevards to alert motorists and cyclists of road condition changes including turns in Bicycle Boulevards, ends of Bicycle Boulevards, upcoming traffic calming features, and traffic control devices.

The City is considering modifying its existing wayfinding system so that it is more consistent and distinct. A city-wide wayfinding system could include all bikeway types including Bicycle Boulevards, and be similar in character to the bicycle boulevard signage. A signage plan, such as Oakland, California's, will be developed to ensure that the signage is complete, coherent and does not result in sign clutter.

6.7 Multi-Modal Connections

Measures to providing a convenient connection for bicyclists to continue their trips on public transit vehicles include three key elements, providing bicycle access to transit stops, providing bicycle parking facilities at transit stops and accommodating bicycles on trains, trolleys, and buses. The City of San Diego takes part in the first two of these three elements by ensuring that the proposed bikeway network connects to existing transit stops and providing bicycle parking at major train, trolley, and bus transit stops.

6.7.1 Bicycle Access to Major Transit Centers

Recommendations for improving bicycle access to transit stops include:

- All actuated traffic signals near San Diego's existing and future trolley stations and major bus transfer centers should be able to be activated by cyclists. Actuation can be provided in left-turn lanes as well as through lanes. If the actuation is provided by a push button, it will be oriented toward the street, and allow cyclists to push the button without dismounting.
- Streets in which transit stations are located should include bicycle facilities that are designed to ensure access to the transit station is safe, direct, and does not conflict with motor vehicles.
- Destination signs indicating direction and distance to transit stops should be located on sidewalks, bikeways, and major arterials.
- Local area maps showing bicycle and pedestrian facilities and local destinations should be posted at transit stations.
- Warning signs notifying drivers of bicycle and pedestrian crossing should be installed at transit stop driveway crossings, bikeway crossings, pathway crossings, and other places with potential user conflicts. Similarly, appropriate regulatory signage should be installed for cyclists and pedestrians.
- Safe, direct, and well-marked routes should be provided for cyclists and pedestrians through the station area to the platform, sidewalks, bikeways, ticketing area, and bike parking.

6.7.2 Bicycle Parking at Transit Stops

Providing ample secure bicycle parking at transit stops is essential to increasing bicycle mode share to transit. Bicycle parking, including racks and SANDAG lockers, is currently provided at San Diego transit stations.

In general, bicycle parking will be provided as close to bus stops as possible, without restricting pedestrian flow or ADA access. Signs will be placed directing cyclists to parking locations, and if "no bicycle parking" signs are used, they will be accompanied with signs directing cyclists to bicycle parking locations.

When evaluating bicycle parking demand, The City will take into account the quality and placement of parking supplies. If underused bike parking is moved to a more secure, visible and convenient location, use of the parking may increase. The following improvements have been shown to increase bicycle parking usage:

- Moving bike racks and lockers to locations that are more visible to potential users

- Moving bike racks to locations that are more convenient to other services, such as customer service windows
- Improving signage to let transit passengers know the process for renting bicycle lockers
- Advertising bicycle parking services in local bicycle publications

Figure 3-7 in Chapter 3 displays transit hubs in San Diego. The City will prioritize installing short- and long-term bike parking facilities at all transit hubs where currently lacking, as a part of an expanded City bicycle parking program proposed in the Bicycle Parking section of this chapter.

6.8 Bicycle Sharing

Bike Share programs can provide safe and convenient access to bicycles for short trips, such as running errands during lunch, and transit-work trips. The international community has experimented with Bike Share programs for nearly 40 years. Bike Share programs, such as systems in Paris and Lyon, France, help increase cycling mode share, serve as a missing link in the public transit system, reduce a city's travel-related carbon footprint and provide additional 'green' jobs related to system management and maintenance. In the US, many cities are looking into Bike Share programs, though they have not yet been widely implemented. Downtown San Diego and San Diego's beach communities are excellent candidates for a bicycle sharing pilot program due to relatively flat topography and high volume of visitors to these areas.

CycleStation Bike Share Program.
Source: Alta Planning + Design

Until recently, Bike Share programs worldwide experienced low to moderate success; in the last 5 years, innovations in technology have given rise to a new (third) generation of technology-driven Bike Share programs. These new Bike Share programs can dramatically increase the visibility of cycling and lower barriers to use by requiring only that the user have a desire to bike and a credit card or phone.

Existing and proposed Bike Share programs employ a wide variety of technologies, and "lessons learned" are being continually applied to new systems. For a Bike Share program to be successful it is important that the correct technology and package of services involved be mated to the unique challenges that each program faces. For this reason it is strongly recommended that before considering implementation of a Bike Share program, to have an independent assessment of community needs, economics, technologies, logistical issues, service area, and other challenges faced in an implemented system.

The City of San Diego issued a Request for Sponsorship through its Corporate Partnership Program in September 2012 and subsequently selected DecoBike to implement the City's bike share program. DecoBike is responsible for all aspects of the bike sharing program including financing, building out, marketing, operating and maintaining a complete bike sharing system in the City of San Diego. To compliment the bike sharing program a circular destination route to popular landmarks is under development. Public outreach has taken place to identify the station locations. Significant program coverage is expected. Phase I of the bike sharing program is expected in early 2014 with approximately 180 station locations and 1,800 custom bikes in San Diego's Downtown area.

CITY OF SAN DIEGO
FACILITIES FINANCING PROGRAM

TITLE: **MISSION TRAILS BIKE PATH STUDY**

DEPARTMENT: ENGINEERING AND CAPITAL PROJECTS

CIP NO.: 58-160.0

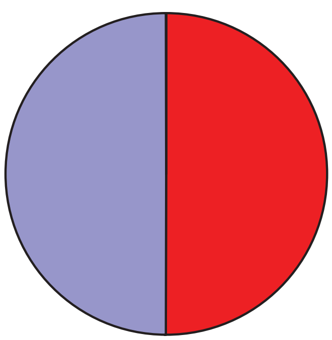
PROJECT: T13
COUNCIL DISTRICT: 7
COMMUNITY PLAN: NAVAJO

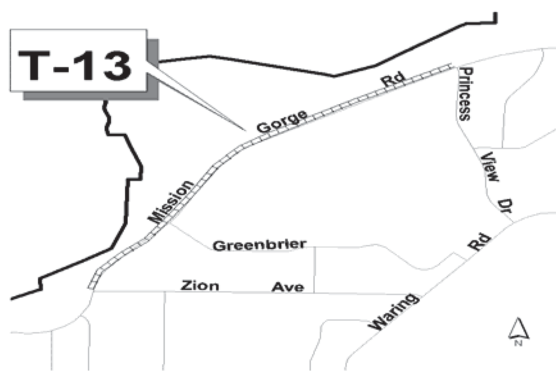
DESCRIPTION: THIS PROJECT PROVIDES FOR A FEASIBILITY STUDY OF A CLASS I BIKE PATH BETWEEN ZION AVE AND PRINCESS VIEW DRIVE ALONG THE SAN DIEGO RIVER. THE FEASIBILITY STUDY WILL DEVISE SEVERAL ALTERNATIVE ALIGNMENTS FOR THE BIKE PATH, ANALYZE THE COST, DETERMINE ENVIRONMENTAL IMPACTS, SOLICIT COMMUNITY INPUT, AND CONSIDER OTHER FACTORS ASSOCIATED WITH EACH ALTERNATIVE.

JUSTIFICATION: THE BIKE PATH IS NEEDED FOR THE CONTINUITY OF THE BIKEWAY SYSTEM ALONG THE SAN DIEGO RIVER. THIS PROJECT IS CONSISTENT WITH THE NAVAJO COMMUNITY PLAN AND IS IN CONFORMANCE WITH THE CITY'S PROGRESS GUIDE AND GENERAL PLAN.

SCHEDULE: PHASE I OF THE FEASIBILITY STUDY BEGAN IN FISCAL YEAR 2002. PHASE II OF THE STUDY BEGAN IN FISCAL YEAR 2005. THE STUDY IS SCHEDULED TO BE COMPLETED IN FISCAL YEAR 2008.

PROJECT FUNDING





FUNDING:	SOURCE	EXPEN/ENCUM	CONT APPR	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
$50,000	LTF 03	$50,000							
$50,000	PABIKE	$50,000							
$100,000	**TOTAL**	$100,000	$0	$0	$0	$0	$0	$0	$0

CITY OF SAN DIEGO
FACILITIES FINANCING PROGRAM

TITLE: **BIKE ROUTE CONSTRUCTION COMMUNITY WIDE**

DEPARTMENT: ENGINEERING AND CAPITAL PROJECTS

PROJECT: T14
COUNCIL DISTRICT: 7
COMMUNITY PLAN: NAVAJO

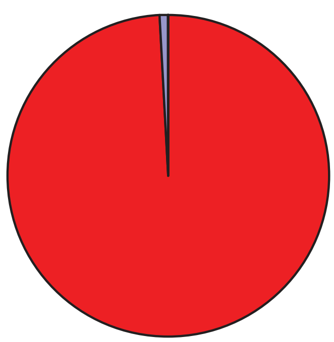
CIP NO.: 52-781.0

DESCRIPTION: THIS PROJECT WILL BUILD BICYCLE LANES THROUGHOUT THE COMMUNITY. SOME OF THE LOCATIONS INCLUDE: SAN DIEGO RIVER PATH FROM QUALCOMM WAY TO FATHER JUNIPERO SERRA TRAILS (CLASS I); COWLES MTN BLVD FROM ACUFF DR TO LA MESA CITY LIMITS (CLASS II); DEL CERRO BLVD FROM WESTERN TERMINUS TO EASTERN TERMINUS (CLASS II); MURRAY PARK DR/MADRA AVE FROM JACKSON DR TO DEL CERRO BLVD (CLASS II); MISSION GORGE RD FROM FRIARS RD TO I-8 (CLASS II); PARKRIDGE BLVD FROM JACKSON DR TO MURRAY PARK DR (CLASS II); PRINCESS VIEW DR FROM MISSION GORGE RD TO WARING RD (CLASS II); WARING RD FROM ZION AVE TO NAVAJO RD (CLASS II).

JUSTIFICATION: THIS PROJECT WILL IMPROVE SAFETY IN THE COMMUNITY AND INCREASE THE USE OF ALTERNATE TRANSPORTATION. THE $75,000 IN TRANS FUNDING WILL PERFORM A STUDY REGARDING THE BICYCLE FACILITY ALONG THE SAN DIEGO RIVER TO MISSION TRAILS PARK.

SCHEDULE: THESE IMPROVEMENTS WILL BE SCHEDULED WHEN FUNDING IS IDENTIFIED. ADDITIONAL SITES MAY BE ADDED AS NEEDED.

PROJECT FUNDING



FUNDING:	SOURCE	EXPEN/ENCUM	CONT APPR	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
$9,425,000	UNIDEN								
$75,000	TRANS			$75,000					
$9,500,000	**TOTAL**	$0	$0	$75,000	$0	$0	$0	$0	$0

CITY OF SAN DIEGO
FACILITIES FINANCING PROGRAM

TITLE: **MISSION GORGE ROAD BIKEWAY**

DEPARTMENT: ENGINEERING AND CAPITAL PROJECTS

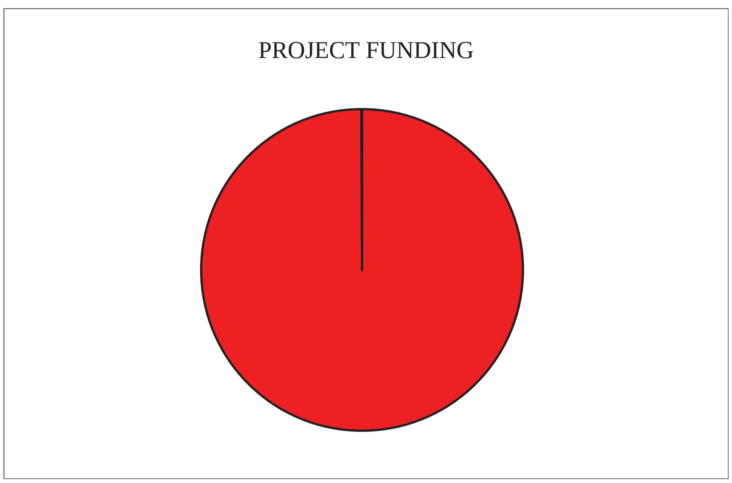
PROJECT: T15
COUNCIL DISTRICT: 7
COMMUNITY PLAN: NAVAJO

CIP NO.: 58-069.0

DESCRIPTION: THIS PROJECT PROVIDED FOR THE INSTALLATION OF A BIKE LANE ON MISSION GORGE ROAD, FROM PRINCESS VIEW DRIVE TO 300 FEET EAST OF PRINCESS VIEW DRIVE.

JUSTIFICATION: THIS PROJECT WILL SERVE AS A TRAFFIC CONGESTION AND AIR POLLUTION MITIGATION MEASURE BY ENCOURAGING BICYCLE TRANSPORTATION. IT WILL ALSO ASSURE SPACE FOR A PERMANENT BIKE LANE AT THIS LOCATION.

SCHEDULE: THIS PROJECT WAS COMPLETED IN FISCAL YEAR 1995.



FUNDING:	SOURCE	EXPEN/ENCUM	CONT APPR	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
$85,000	LTF	$85,000							
$85,000	**TOTAL**	$85,000	$0	$0	$0	$0	$0	$0	$0

SAN DIEGO
REGIONAL BICYCLE PLAN

Riding to 2050

SANDAG

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3 Recommended Regional Bicycle Network

A primary objective of the Plan is to improve the connectivity and quality of the regional bicycle network and bicycle support facilities. Defining and improving a comprehensive regional bicycle network is essential to meeting the 2030 RTP goals of options that help alleviate future traffic demands and congestion. The Plan is regional in focus and provides a framework to promote consistency between and among local jurisdictions and encourage the development of quality facilities region wide. The current regional system requires additional on- and off-street bicycle facilities, safety improvements, improved connections to transit facilities and corridor realignments to enable bicyclists to reach key destinations and encourage more people to bicycle more frequently.

As described in the 2030 RTP,

> *"The goal of the [Regional Bicycle Plan] is to encourage the development of a unified bicycle system throughout the San Diego region that serves the needs of people using their bicycle for transportation and recreational bicyclists with connections to local and regional activity centers and transit facilities and other regional non-motorized systems."*

This chapter describes the infrastructure-related components of the regional bicycle system and is organized into the following sections:

- Existing Bikeways
- Regional Bikeways in the 2030 RTP
- Network Planning Process
- Regional Corridor Classifications
- Regional Bicycle Network
- Regional Bicycle Parking

The regional bicycle network presented in this chapter is a vital component of the overall regional bicycle system vision, which also includes distinctive bicycle programs and support facilities.

3.1 Existing Bikeways

SANDAG publishes a bike map showing existing bicycle facilities in the region, as well as other recommended routes. **Table 3.1** summarizes mileage of bikeways by facility type for the entire region, including those facilities designated as regional corridors. **Figure 3-1** displays all existing local and regional bikeways across the region.

Table 3.1
Existing Bicycle Facilities in the Region

Facility Type	Miles	% of Total
Class I – Path	159.3	11.9%
Class II – Lane	890.2	66.4%
Class III – Route	243.9	18.2%
Freeway Shoulders	47.4	3.5%
TOTALS	**1,340.8**	**100%**

Source: SANDAG Bikes shapefile, 2010; Alta Planning + Design, April, 2010

There are approximately 1,340 miles of existing bikeway facilities in the region. Class II facilities are the predominate type of bikeway at roughly 66 percent of the total, followed by Class III facilities at 18 percent of the regional total. Class I facilities comprise about 12 percent of the regional total. Although bicycles are allowed on a few select freeway shoulders, this Plan does not propose to include those facilities in the regional bicycle network as they are not intended to accommodate users of all types.

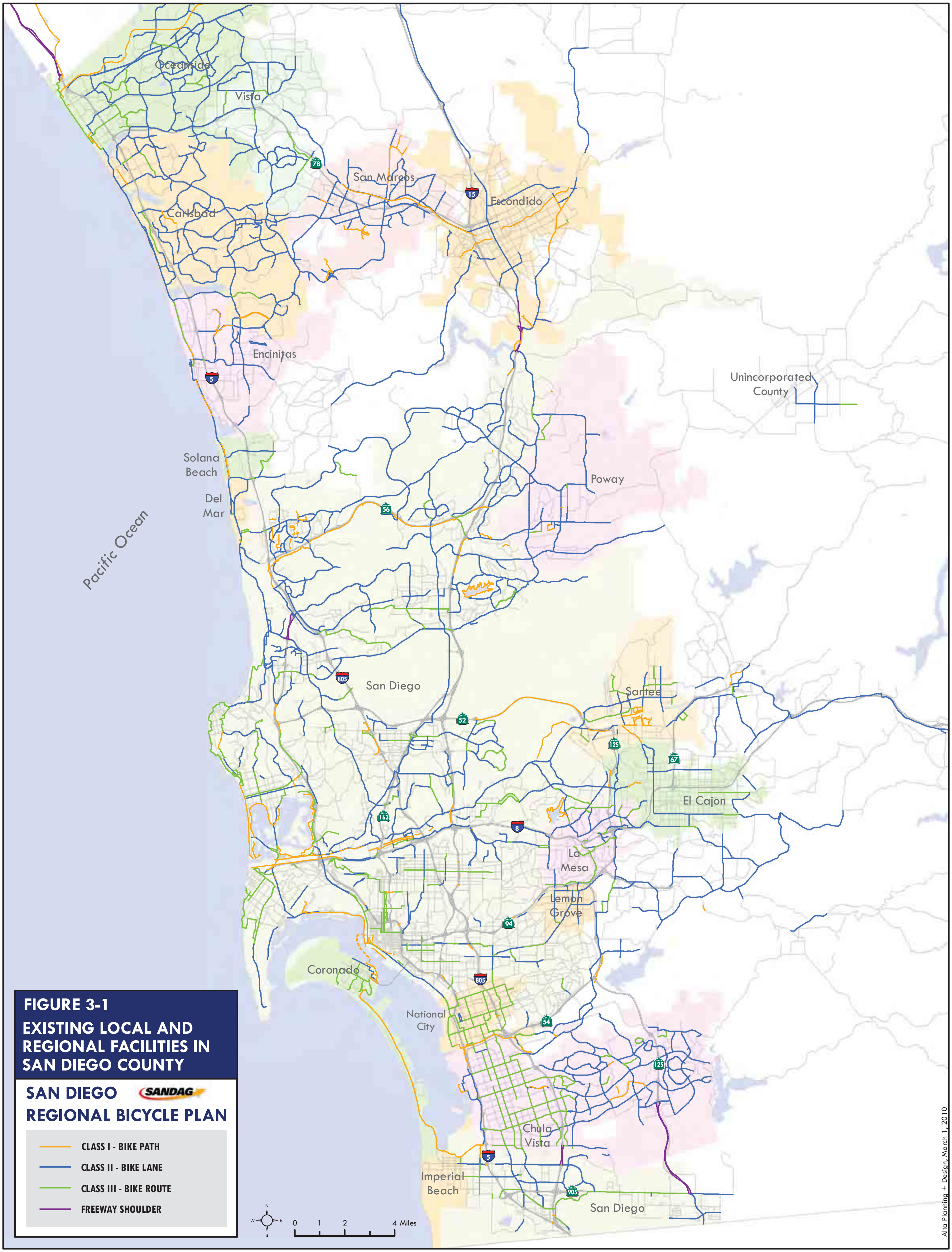

FIGURE 3-1
EXISTING LOCAL AND REGIONAL FACILITIES IN SAN DIEGO COUNTY

SAN DIEGO REGIONAL BICYCLE PLAN

Table 3.2 presents a summary of existing bikeways by facility type and jurisdiction. Six local jurisdictions – Del Mar, Imperial Beach, La Mesa, Lemon Grove, Poway, and Vista – have one mile or less of Class I facilities; while Imperial Beach and National City are the only jurisdictions with one mile or less of Class II facilities.

Table 3.2
Existing Bicycle Facilities by Jurisdiction

Jurisdiction	Mileage by Facility Type				Total Mileage by Jurisdiction	Percent of Regional Total Mileage	Percent of Regional Population
	Class I	Class II	Class III	Freeway Shoulder			
Carlsbad	4.2	85.6	4.9	0	94.7	7.06%	3.3%
Chula Vista	6.0	67.1	42.6	5.3	121	9.02%	7.4%
Coronado	9.6	1.5	5.0	0	16.1	1.20%	0.7%
Del Mar	0.1	6.0	0.2	0	6.3	0.47%	0.1%
El Cajon	1.3	14.8	3.5	0	19.6	1.46%	3.1%
Encinitas	4.4	21.1	3.0	0	28.5	2.13%	2.0%
Escondido	10.2	33.0	0.1	1.8	45.1	3.36%	4.6%
Imperial Beach	0.6	0.2	0.3	0	1.1	0.08%	0.9%
La Mesa	0.0	13.0	10.5	0	23.5	1.75%	1.8%
Lemon Grove	0.0	7.8	1.0	0	8.8	0.66%	0.8%
National City	2.5	1.0	20.4	0	23.9	1.78%	2.0%
Oceanside	8.8	81.0	16.4	0	106.2	7.92%	5.7%
Poway	0.7	27.0	3.2	0	30.9	2.31%	1.6%
San Diego	71.6	308.4	112.9	16.1	509	37.96%	42.5%
San Marcos	11.8	45.3	0.0	0	57.1	4.26%	2.6%
Santee	7.7	13.7	8.1	0	29.5	2.20%	1.8%
Solana Beach	1.6	3.6	1.4	0	6.6	0.50%	0.4%
Vista	0.0	23.5	4.6	0	28.1	2.10%	3.1%
Unincorporated	18.2	136.6	5.8	24.2	184.8	13.78%	15.5%
TOTALS	**159.3**	**890.2**	**243.9**	**47.4**	**1,340.8**	**100%**	**100%**

Source: SANDAG Bikes shapefile, 2010; Alta Planning + Design, April 2010

As shown in Table 3.2, the City of San Diego has the greatest percentage of facilities that are also part of the regional bicycle network, at roughly 38 percent of the regionwide total, while Imperial Beach, Del Mar, and Solana Beach have the smallest percentage of the regional total, respectively. The overall trends in bikeway facility provision follow trends in population and land area. There are eight jurisdictions whose share of regional bicycle facilities is less than their share of the regional population. These jurisdictions include El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, San Diego, Vista, and the unincorporated county.

3.2 Regional Bikeways in the 2030 RTP

The regional bicycle network as proposed in the 2030 RTP consists of a total of 445 miles of existing and planned facility. The 2030 RTP does not define the classification for each of the segments in the regional corridor system. **Figure 3-2** displays an overview of the adopted regional corridors from the 2030 RTP, which served as the starting point for the development of the regional bicycle network.

3.3 Network Planning Process

Development of the Plan required close examination of the network and alignments in the 2030 RTP. The network planning process included public input, consultation with the SANDAG Bicycle-Pedestrian Working Group (BPWG) comprised of staff members from each of the 19 local jurisdictions, and GIS mapping and modeling to refine the proposed network alignments and facility classifications.

Criteria adopted by the SANDAG Transportation Committee were employed in refining an updated regional bicycle network, including serving the highest relative bicycle demands across the region, providing for the most direct connections, and incorporating existing facilities where feasible (A complete presentation of the existing conditions analysis documenting this background assessment is presented in **Appendix A**.). **Figure 3-3** presents a regionwide overview of the updated regional bicycle network adopted by the Transportation Committee. Proposed changes to the 2030 RTP regional network include the addition of seven new corridors and the adjustment of alignments for eight corridors. **Figure 3-4** displays the changes between the 2030 RTP regional network and the updated network for the Plan.

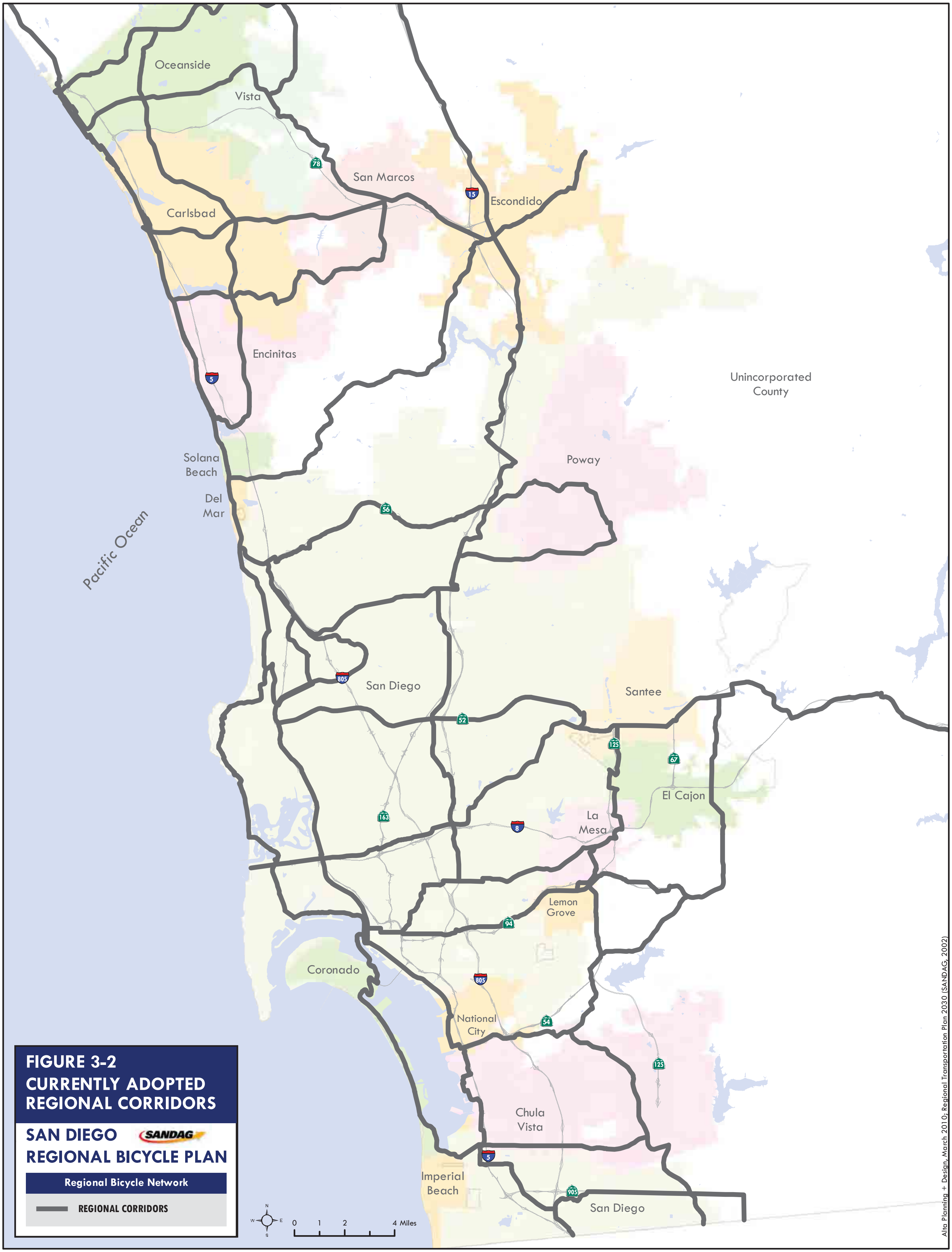

FIGURE 3-2
CURRENTLY ADOPTED REGIONAL CORRIDORS

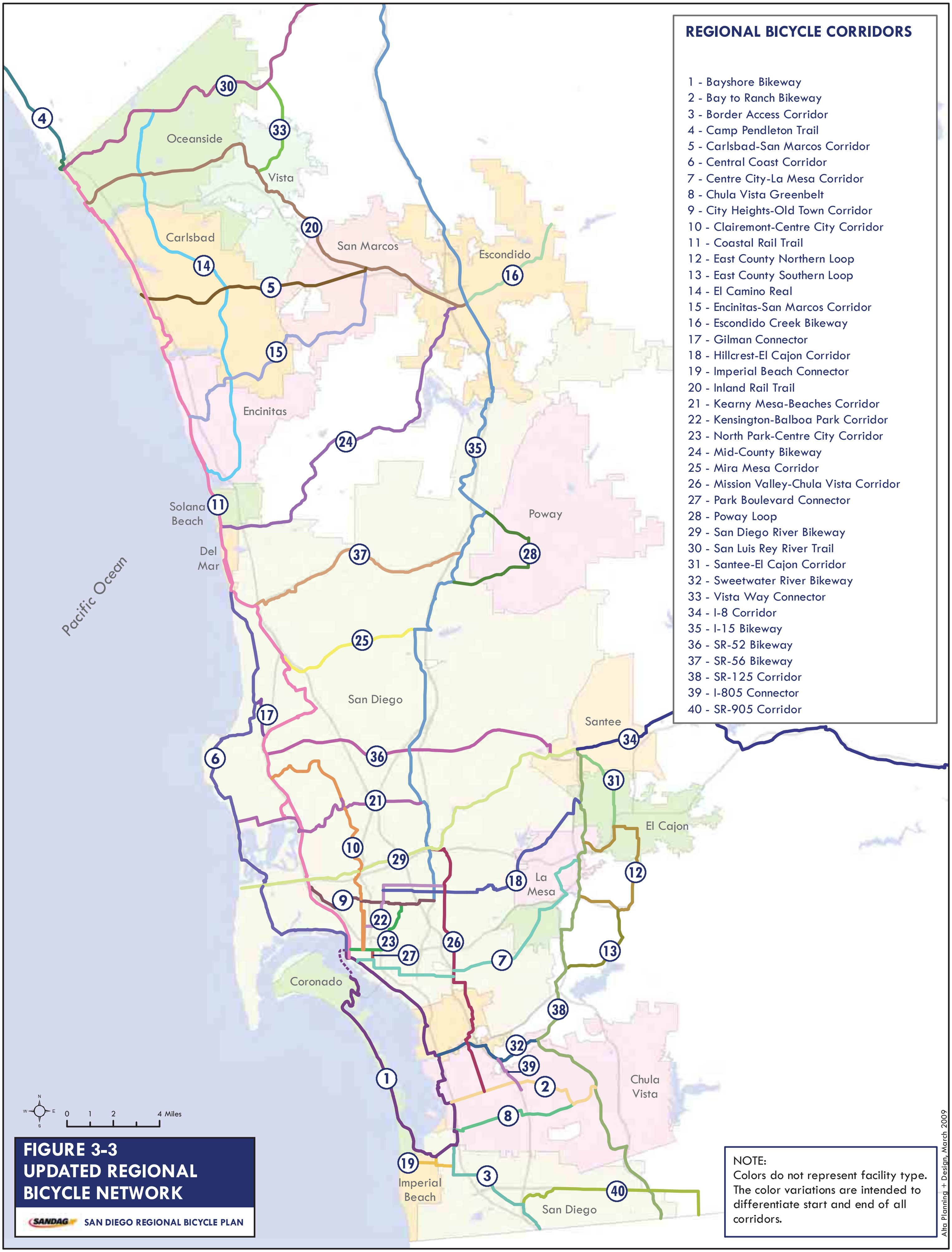

FIGURE 3-3
UPDATED REGIONAL BICYCLE NETWORK

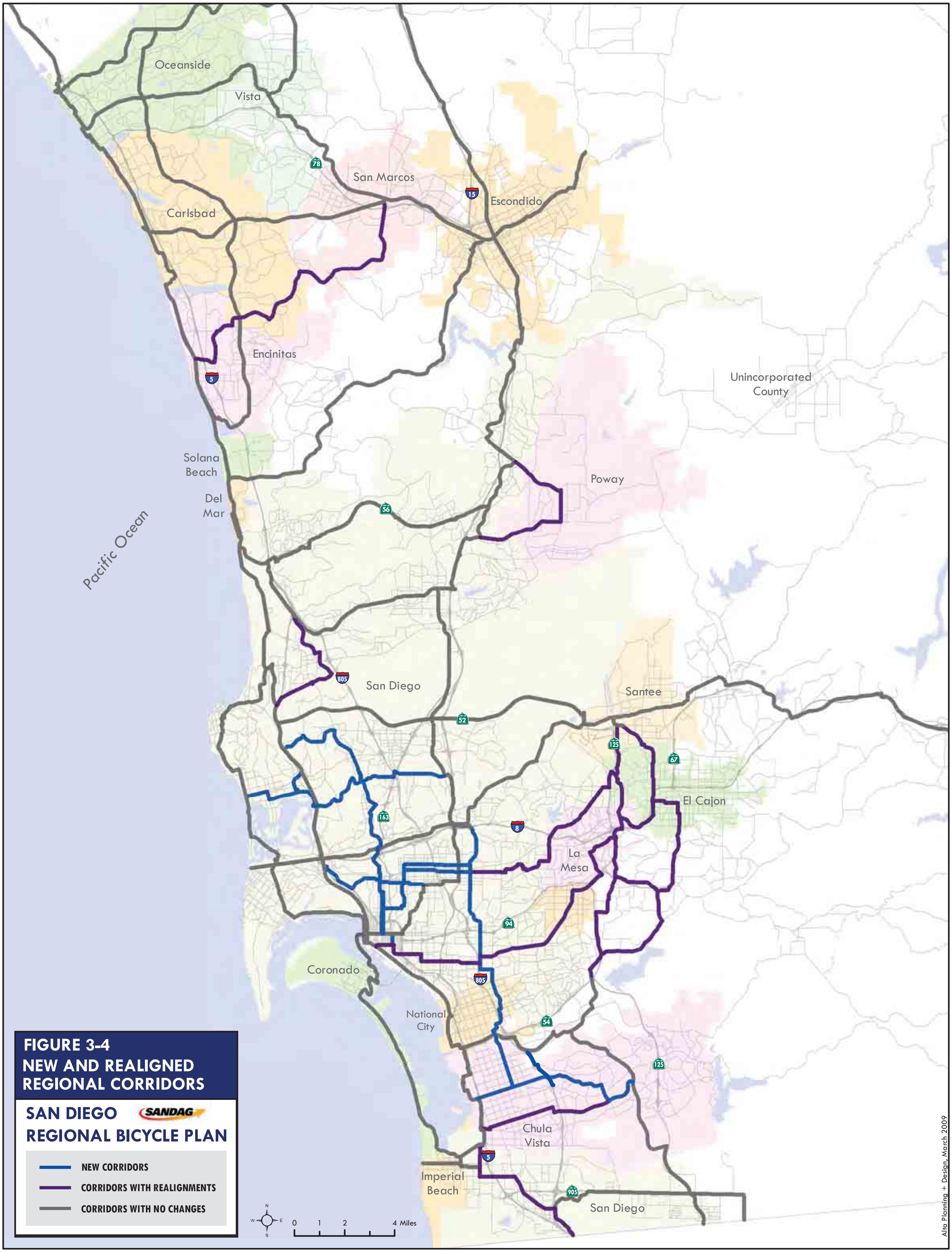
FIGURE 3-4
NEW AND REALIGNED REGIONAL CORRIDORS
SAN DIEGO REGIONAL BICYCLE PLAN
SANDAG
NEW CORRIDORS
CORRIDORS WITH REALIGNMENTS
CORRIDORS WITH NO CHANGES
0 1 2 4 Miles
Oceanside
Vista
San Marcos
Escondido
Carlsbad
Encinitas
Unincorporated County
Solana Beach
Del Mar
Poway
Pacific Ocean
San Diego
Santee
El Cajon
La Mesa
Coronado
National City
Chula Vista
Imperial Beach
San Diego
Alta Planning + Design, March 2009

3.4 Regional Corridor Classifications

The same method that informed the network alignment process described in Section 3.3 was utilized to establish a bicycle facilities classification system that was applied to the regional corridor alignments to establish a clear vision for future development of the regional bikeway system. The system included five classification types. Three are from the Caltrans Highway Design Manual (referenced in Chapter 7) bikeway classifications enhanced with additional bicycle facility treatments, such as intersection treatments to improve high bicycle/motorist conflict areas. The Plan also proposes the consideration of two classifications not currently defined by the Highway Design Manual – bicycle boulevards and cycle tracks – to provide additional opportunities for regional bikeway connections. Because cycle tracks include non-standard design elements, the cycle track classification is recommended for limited segments to serve as a pilot project. **Table 3-3** displays the classification system employed in planning for the regional bicycle system. Greater detail on the design of standard and non-standard facilities and treatments is provided in **Chapter 7**. All regional corridors should be identifiable via identification and way-finding signage that names each corridor and allows users to easily understand the destinations served by each respective corridor.

Table 3.3
Regional Corridor Classification System

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Class I – Bike Path

Bike paths are bikeways that are physically separated from vehicular traffic. Also termed shared-use paths, bike paths accommodate bicycle, pedestrian, and other non-motorized travel. Paths can be constructed in roadway right-of-way or independent right-of-way. Bike paths provide critical connections in the region where roadways are absent or are not conducive to bicycle travel.

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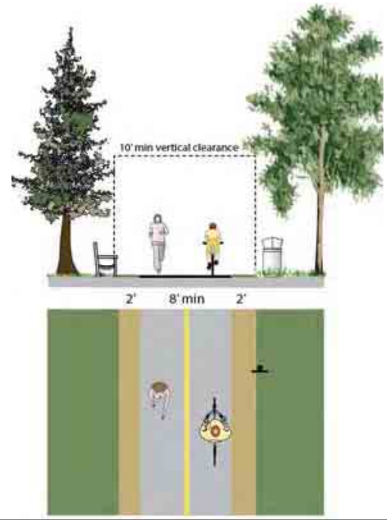

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<td>

Class II - Bike Lanes

Bike lanes are defined by pavement markings and signage used to allocate a portion of a roadway for exclusive or preferential bicycle travel. Within the regional corridor system, bike lanes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues. Such treatments include innovative signage, intersection treatments, and bicycle loop detectors.

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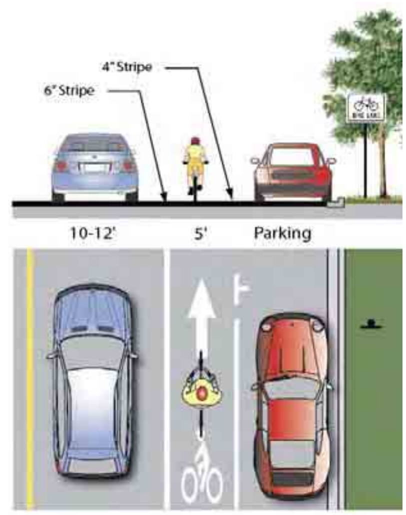

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Class III - Bike Routes

Bike routes are located on shared roadways that accommodate vehicles and bicycles in the same travel lane. Established by signs, bike routes provide continuity to other bike facilities or designate preferred routes through corridors with high demand. Within the regional corridor system, bike routes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues.

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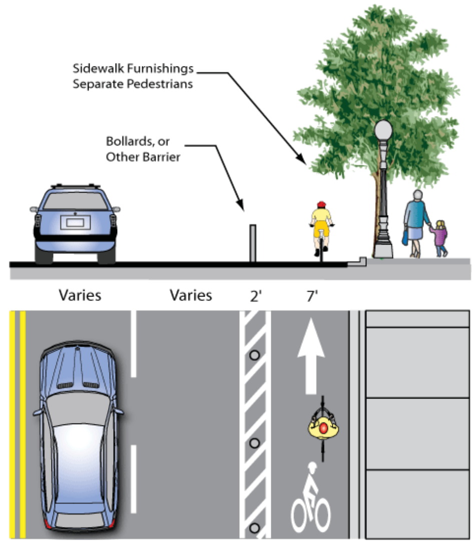
</table>

Table 3.3, Continued
Regional Corridor Classification System

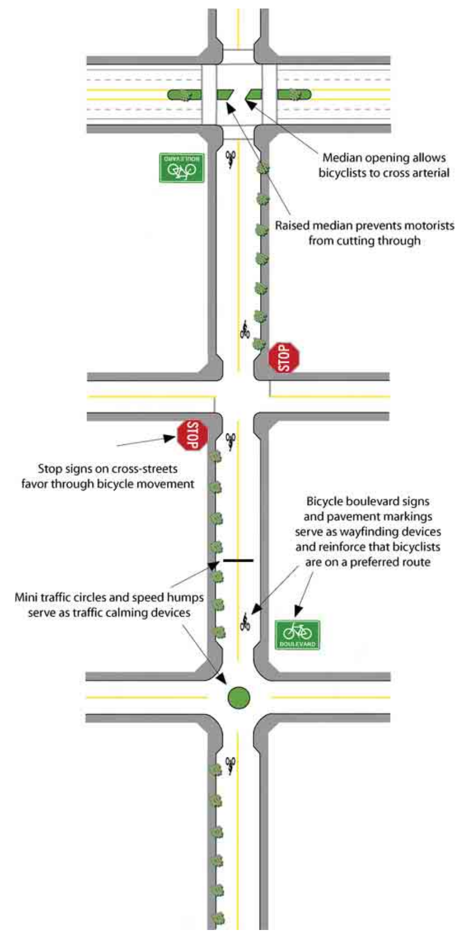
Cycle Tracks

A cycle track is a hybrid type bicycle facility that combines the experience of a separated path with the on-street infrastructure of a conventional bike lane. Cycle tracks are bikeways located in roadway right-of-way but separated from vehicle lanes by physical barriers or buffers. Cycle tracks provide for one-way bicycle travel in each direction adjacent to vehicular travel lanes and are exclusively for bicycle use. **Cycle tracks are not recognized by Caltrans Highway Design Manual as a bikeway facility.** Development of cycle track on segments of the regional corridor system is proposed through experimental, pilot projects.



Bicycle Boulevards

Bicycle boulevards are local roads or residential streets that have been enhanced with traffic calming and other treatments to facilitate safe and convenient bicycle travel. Bicycle boulevards accommodate bicyclists and motorists in the same travel lanes, typically without specific vehicle or bicycle lane delineation. These roadway designations prioritize bicycle travel above vehicular travel. The treatments applied to create a bike boulevard heighten motorists' awareness of bicyclists and slow vehicle traffic, making the boulevard more conducive to safe bicycle and pedestrian activity. Bicycle boulevard treatments include signage, pavement markings, intersection treatments, traffic calming measures and can include traffic diversions. **Bicycle boulevards are not defined as bikeways by Caltrans Highway Design Manual; however, the basic design features of bicycle boulevards comply with Caltrans standards.**



3.5 The Regional Bicycle Network

This section presents alignments and classifications for the updated regional bicycle network. The regional bicycle network reflects a comprehensive view of the region's bikeway system needs and represents the vision for a regional network in the year 2050. As part of the planning effort, two bicycle network alternatives were developed, the preferred regional bicycle network and a revenue constrained network. The revenue constrained network is based on a scenario in which only currently known federal, state, and local transportation revenues, supplemented with resources anticipated to become available through 2030, are available for network construction. Whereas, the preferred regional bicycle network accurately reflects the region's bikeway needs unconstrained by shorter-term fiscal conditions. Further details on the different revenue scenarios can be found in Chapter 6.

Section 3.3 of this chapter summarizes the process employed to develop the regional bicycle network. **Figure 3-5** shows the alignments along with the bicycle facility classifications proposed for each corridor. **Figure 3-6** displays existing facilities within the regional corridors along with portions of the regional corridor system that have not been built.

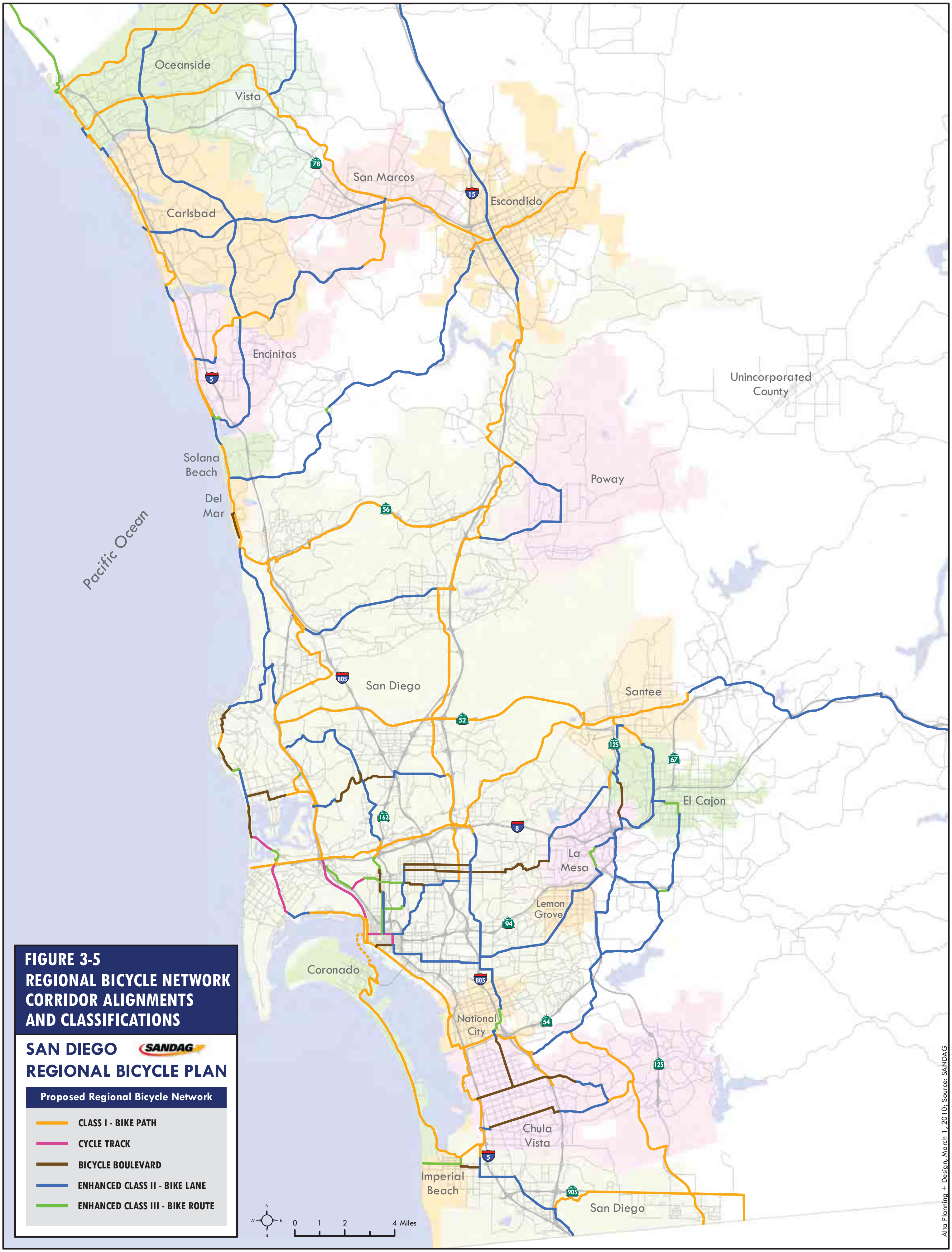
Table 3.4 presents a summary of the regional bicycle network mileage by classification type for each of its 40 corridors. As shown, the network would provide for approximately 515.5 miles of facility, including roughly 227.8 miles of Class I facility, 212.5 miles of enhanced Class II, 33.7 miles of enhanced Class III, 8.3 miles of cycle track, and 34.2 miles of bicycle boulevard.

Table 3.4
Facility Type and Mileage for the Regional Bicycle Network

Facility Type	Mileage	Percent of Total
Class I – Bike Path	227.8	44.2 %
Enhanced Class II – Bike Lane	212.5	41.3 %
Enhanced Class III – Bike Route	32.7	6.3 %
Cycle Track	8.3	1.6 %
Bicycle Boulevard	34.2	6.6 %
TOTALS	**515.5**	**100 %**

Source: Alta Planning + Design, April 2009

The bicycle network map and summary tables for the constrained revenue funding scenario is provided in **Appendix B**.


Oceanside
Vista
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Pacific Ocean
Unincorporated County
Poway
San Diego
Santee
El Cajon
La Mesa
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
San Diego
FIGURE 3-5
REGIONAL BICYCLE NETWORK CORRIDOR ALIGNMENTS AND CLASSIFICATIONS
SAN DIEGO REGIONAL BICYCLE PLAN
SANDAG
Proposed Regional Bicycle Network
CLASS I - BIKE PATH
CYCLE TRACK
BICYCLE BOULEVARD
ENHANCED CLASS II - BIKE LANE
ENHANCED CLASS III - BIKE ROUTE
0 1 2 4 Miles
Alta Planning + Design, March 1, 2010; Source: SANDAG

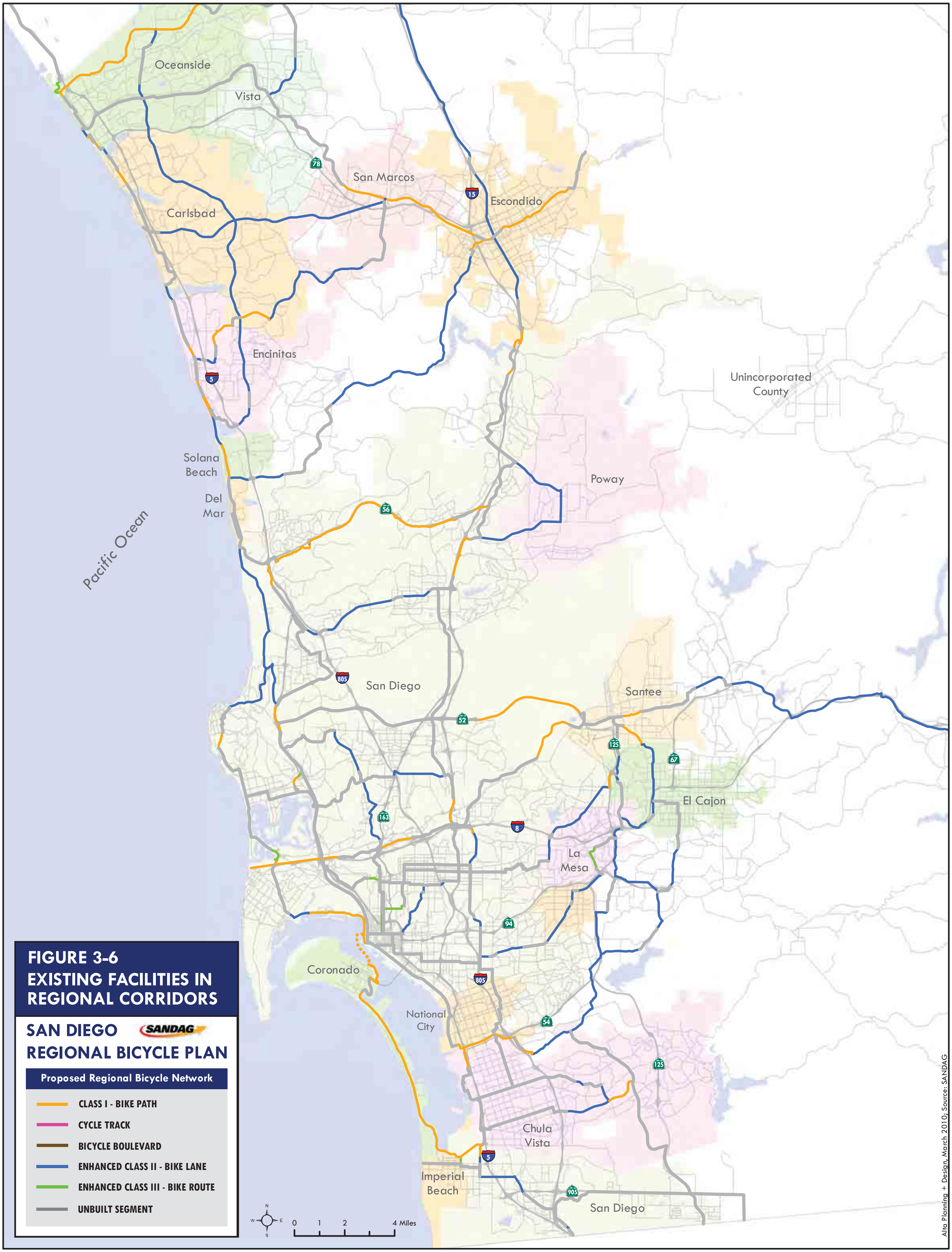


FIGURE 3-6
EXISTING FACILITIES IN REGIONAL CORRIDORS

3.6 Priority Projects

As part of the implementation of the Plan a project prioritization process using criteria adopted by the SANDAG Transportation Committee will be developed and applied to the regional network to phase implementation.

3.6.1 Project Prioritization Process

The prioritization framework will assess estimated bicycling demands and bicycle facility deficiencies across the region. The bicycle travel demand assessment will employ a gravity model approach where the level of demand on any given segment of the proposed network is assumed to be positively correlated with land use intensities of locations being connected, and inversely correlated with the distances between these locations. The Smart Growth Opportunity Areas (SGOAs), as shown on the SANDAG Board adopted Smart Growth Concept Map (**Appendix C**) will be used to define a set of origins and destinations across the region, with linkages via the proposed regional bicycle network assessed for relative demands. Based upon the gravity model concept, therefore, the higher the land use intensity of a SGOA served by the regional bicycle network, the greater the estimated demand along that particular segment. Likewise, the shorter the distances between any two SGOAs along the regional bicycle network, the higher the estimated demand on that particular segment.

The RCP identifies seven categories of smart growth place types, including the Metropolitan Center, Urban Centers, Town Centers, Community Centers, Rural Villages, Mixed-Use Transit Corridors and Special Use Centers. Each smart growth place type is associated with housing and employment density targets, as well as transit service thresholds. The Smart Growth Concept map was developed in collaboration with the 19 jurisdictions in the San Diego region and includes nearly 200 existing and planned/potential SGOAs. Using SGOAs in the regional bicycle network prioritization process allows the region to emphasize important synergies between its land use, transit, and bicycle planning efforts.

Table 3.5 displays the RCP seven smart growth place types and the respective residential, employment, and transit targets.

Table 3.5
Land Use and Transit Targets for RCP Smart Growth Place Types

Smart Growth Place Type	Minimum Residential Target	Minimum Employment Target	Minimum Transit Service Characteristics
Metropolitan Center	75 du/ac	80 emp/ac	Regional Services
Urban Center	40 du/ac	50 emp/ac	Light Rail/Rapid Bus
Town Center	20 du/ac	30 emp/ac	Light Rail/Rapid Bus
Community Center	20 du/ac	N/A	High Frequency Local Bus within Transit Priority Areas based on the Urban Service Boundary in the 2007-2011 Coordinated Plan
Rural Village	10.9 du/ac	N/A	N/A
Special Use Center	Optional	45 emp/ac	Light Rail/Rapid Bus
Mixed-Use Transit Corridor	25 du/ac	N/A	High Frequency Local Bus

Source: Smart Growth Concept Site Descriptions June 6, 2008 (SANDAG)

Notes:
du/ac = dwelling units per acre
emp/ac = employees per acre

In addition to the demand-based criteria, the prioritization process will also incorporate bicycle network deficiencies and levels of prior facility funding. Specifically, the deficiency assessment will consider bicycle facility gaps, incidence of bicycle crashes, and public comment related to problem areas. Factors such as the presence of a facility gap, high crash locations, more public comment, and prior funding will be given higher priority.

3.7 Regional Bicycle Parking

Secure and convenient bicycle parking is essential to facilitating bicycle transportation, including multimodal trip-chaining where the bicycle is used for a portion of the total trip. The SANDAG iCommute bike locker program continues to advance bicycle-transit integration in the region by managing 872 spaces in bike lockers at 60 transit centers (Trolley, COASTER, SPRINTER, and BRT Stations), and Park and Ride lots throughout San Diego County. iCommute mechanical and electronic lockers can be accessed for a $25 dollar key deposit fee and are available to users on a first-come, first-served basis. **Table 3.6** displays the quantity of iCommute bike lockers and locker spaces by location.

Table 3.6
SANDAG iCommute Bike Lockers in the San Diego Region

Site Name	Total Lockers	Total Spaces
12th and Imperial Trolley Station	2	4
24th Street Trolley Station	2	4
70th Street Trolley Station	6	12
8th Street Trolley Station	4	8
Alvarado Medical Center Trolley	6	12
Amaya Trolley Station	7	14
Bayfront Trolley Station (E Street)	9	18
Beyer Blvd Trolley Station	2	4
Buena Creek (SPRINTER)	9	18
Cal State San Marcos (SPRINTER)	10	20
Carlsbad Village	2	4
Carmel Mtn. Park & Ride #4	4	8
Coast Highway (SPRINTER)	4	8
College Blvd (SPRINTER)	10	20
Crouch St (SPRINTER)	8	16
El Cajon Transit Terminal	8	16
El Camino Real (SPRINTER)	5	10
Encanto Trolley Station	2	4
Encinitas Coaster Station	16	28
Escondido Ave (SPRINTER)	11	22
Escondido Transit Ctr	19	38
Euclid Ave Trolley Station	1	2
Fashion Valley Transit Center	16	16
Fenton Pkwy	2	4
Gillespie Field Trolley (Weld)	6	12
Grantville Trolley Station	6	12
Grossmont Trolley Station	4	8
H St. Trolley Station	11	22
Harborside Trolley Station	1	2
Hazard Center Trolley Station	6	12
Iris Ave Trolley Station	14	28
La Mesa Trolley Station	3	6
Lemon Grove Trolley (Broadway)	4	8
Massachusetts Trolley Station	3	6
Melrose Station (SPRINTER)	7	14
Mission SD Trolley Station	6	12

(Continued on next page)

Table 3.6 (continued)
SANDAG iCommute Bike Lockers in the San Diego Region

Site Name	Total Lockers	Total Spaces
Mission Valley Ctr Trolley	4	8
Morena/Linda Vista Trolley	6	12
Nordahl Road Station (SPRINTER)	8	16
Oceanside Transit Center	10	20
Old Town Transit Center	24	48
Pacific Fleet Trolley Station	2	4
Palm Ave Trolley Station	7	14
Palomar College Station (SPRINTER)	16	32
Palomar Trolley Station	6	12
Poinsettia Coaster Station	6	12
Qualcomm Stadium Trolley	6	12
Rancho Bernardo BRT	8	16
Rancho Carmel Park & Ride #31	2	4
Rancho Del Oro (SPRINTER)	8	16
Sabre Springs BRT	8	16
Sabre Springs Park & Ride #16	2	4
San Marcos Civic Center (SPRINTER)	18	36
Santa Fe Depot	2	4
Santee Trolley Station	20	40
Solana Beach Coaster Station	6	12
Sorrento Valley Coaster	22	44
Spring Street Trolley Station	3	6
Vista Transit Center (SPRINTER)	14	28
Washington Trolley Station	2	4
TOTAL	**446**	**872**

Source: SANDAG, 2008

iCommute also reaches out to the community regarding bicycle locker availability via the San Diego Region Bike Map, the iCommute website, and biking advocacy organizations. This form of encouragement is one facet of iCommute's overall efforts to reduce drive-alone vehicular trips through the promotion of alternative commutes.

Providing long-term bike parking at transit centers increases bike-transit trip potential; however, short- and long-term parking facilities are needed elsewhere throughout the region to encourage local bicycle trips by both transit riders and persons traveling solely by bicycle. Many office buildings, commercial districts, and tourist attractions lack sufficient bicycle parking in terms of design and quantity. This discourages people from cycling because many bicyclists desire reasonable protection against theft, vandalism, and inclement weather. According to the bicycle user questionnaire distributed for the Regional Bicycle Plan planning process, 43 percent of respondents indicated that they would bicycle more frequently if more bike parking was available. An even greater percentage of public workshop participants expressed strong interest in bike parking. Bicycle parking is most effective when it is located close to trip destinations, visible, and easy to use. If quality bicycle parking facilities are not provided, determined bicyclists lock their bicycles to street signs, parking meters, lampposts, or trees, all of which are undesirable because they are often less secure, may interfere with pedestrian movements, and can create liability issues or damage to street furniture or trees.

In addition to maintaining the iCommute bike locker program, SANDAG has a role in providing policy guidance to local jurisdictions to ensure adequate bicycle parking is available throughout the region. Locally adopted and enforced bike parking ordinances are most critical to ensuring bike parking is provided by private developers, yet few jurisdictions in San Diego County currently have an ordinance that mandates specific bike parking requirements. Bike parking ordinances at a minimum should include parameters for the quantity and type of bike parking facilities that are required by type of development. They should also include provisions for the design options and placement of facilities to ensure they are secure, convenient, visible and maneuverable. Chicago, Illinois; Santa Cruz, California; and Madison, Wisconsin have been successful in implementing ordinances that make bike parking compulsory. **Appendix D** provides a model bike parking ordinance and is intended to assist cities in developing a local bike parking ordinance. **Chapter 7** provides a brief overview of effective bike parking design options.