PASADENA DEPARTMENT OF TRANSPORTATION

MOVING PEOPLE TO PLACES, CONNECTIVITY

Transportation Impact Analysis

Outside of CEQA Evaluation

Project Address: 1133 Rosemont Avenue

Project Summary: Expansion of the existing Brookside Golf Course to add 40-bays to the existing 20-bay driving range to total 60-bays, and an addition of a 36-hole miniature golf course

Applicant:
Rose Bowl Operating Company
1001 Rose Bowl Drive
Pasadena, CA 91103

Attention:
Luis Rocha, Zoning Administrator
City Planning Department

May 28, 2021

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I. Study Objective

The Department of Transportation conducted this analysis to assess the changes to intersection Levels of Service (LOS) and "Access and Connector-Neighborhood" Street Type segments adjacent to the project. The findings may result in imposing project approval conditions to better manage project trips and protect neighborhoods from the proposed development's vehicular trips, if applicable.

II. Project Description

The City of Pasadena Department of Transportation received an application to improve the existing Brookside Golf Course with an expansion of the existing 20-bay driving range to 60-bays, and an addition of a 36-hole miniature golf course. As described in the project description, the existing Brookside Golf Complex is currently served by approximately 100 employees, and operation of the project would not require additional employees.

III. Existing Transportation Network

Street System Classifications

Rosemont Avenue is a north-south 2-lane Neighborhood Connector with a speed limit of 35 mph adjacent to the project. It is observed as a Green Edge Drive north of Seco Street and a Residential – Suburban south of Seco Street in the City's Street Design Guide. Time limited parking is allowed along the east side of this roadway adjacent to the project. This roadway includes an existing recreational loop surrounding the golf course and Rose Bowl Stadium.

Lincoln Avenue is a 2-lane City Connector from Orange Grove Boulevard to the northern City limits, and an Access Road south of Orange Grove Boulevard. It is observed as a Residential – Suburban north of the Mountain Street intersection and a Commercial – Suburban south of the Mountain Street intersection.

Washington Boulevard is a 2-lane Neighborhood Connector west of Lincoln Avenue with parking allowed on the south side of the street. Between Forest Avenue and Lincoln Avenue are primarily residential uses.

Seco Street is an east-west City Connector from Linda Vista Avenue to Lincoln Avenue with a speed limit of 35 mph. A center median island is found along this roadway between Arroyo Boulevard to Rosemont Avenue. Public transit stops closest to the project are found along Seco Street. This roadway includes an existing recreational loop surrounding the golf course and Rose Bowl Stadium.

Orange Grove Boulevard is a 4-lane City Connector from Columbia Street to the south to Sierra Madre Villa Avenue to the east. It is predominantly observed as Residential – Suburban within the City limits. Between Rosemont Avenue to Oakland Avenue, Orange

Grove Boulevard is observed as a Commercial – Suburban in the City's Street Design Guide.

Street segment analyses are limited to "access" and "neighborhood connector" street types within a residential context.

The analysis considered potential traffic changes along the following street segments and intersections:

Segment

- Washington Boulevard between Forest Avenue and Lincoln Avenue
- Rosemont Ave between Prospect Terrace and Fremont Drive

Intersections

- Lincoln Avenue at Washington Boulevard
- Lincoln Avenue at Mountain Street-Seco Street
- Orange Grove Boulevard at Rosemont Avenue

Existing Transit Service

Public transit service within the project study area is currently provided by Pasadena Transit (PT) Route 51. The locations of public transit stops near the project are located along Seco Street between Arroyo Boulevard and Rosemont Avenue south of the Rose Bowl.

Figure 1 highlights the location of the project in relation to the Rose Bowl.

Figure 2 depicts the project in the City of Pasadena's Adopted Streets Plan map.

Figure 1. Project Location and Site Boundary

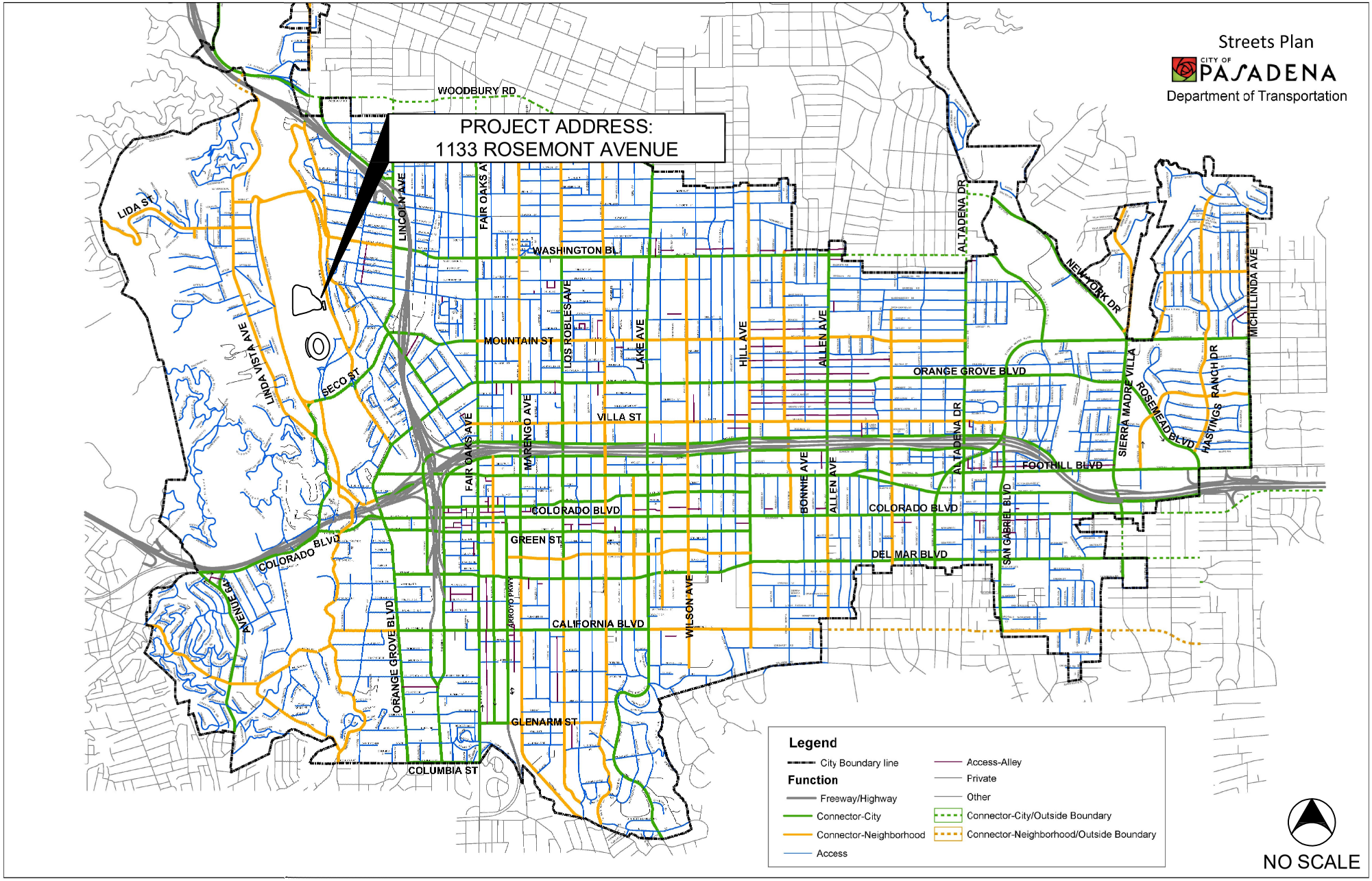


FIGURE 2
CITY OF PASADENA ADOPTED STREET TYPES

PASADENA
DEPARTMENT OF TRANSPORTATION

BROOKSIDE GOLF COURSE - 1133 ROSEMONT AVENUE

IV. Transportation Analysis Methodology

With the City of Pasadena General Plan, the City's guiding principles cumulatively represent the community's vision for the future:

- Growth will be targeted to serve community needs and enhance quality of life.
- New construction that could affect the integrity of historic resources will be compatible with, and differentiated from, the existing historic resource.
- Economic vitality will be promoted to provide jobs, services, revenues, and opportunities.
- Pasadena will be a socially, economically, and environmentally sustainable community.
- Pasadena will be a city where people can circulate without cars.
- Pasadena will be promoted as a cultural, scientific, corporate, entertainment, and educational center for the region.
- Community participation will be a permanent part of achieving a greater city.
- Pasadena is committed to public education and a diverse educational system responsive to the broad needs of the community.

Understanding the goals and objectives of the General Plan, the Pasadena Department of Transportation sets forth goals and policies to improve overall transportation in Pasadena and create "a community where people can circulate without cars." Inherent in this vision statement is to accommodate different modes of transportation including vehicle, pedestrian, bicycle, and transit. The analysis is based on City Transportation Impact Analysis Guidelines. This report will assess accessibility of these different modes of travel and the project's transportation impacts using the City's adopted transportation performance measures.

Analysis Criteria - Transportation Performance Measures

The Department's defined criteria and categories when determining the level of transportation impact of projects fall under three categories based on project size and community-wide significance.

- Exempt projects have 10 residential units or less, are 10,000 sf or less, or generate less than 300 daily trips if less than 10,000 sf.
- Category 1 Projects considered below community-wide significance are between 11-49 residential units, or 10,001 to 49,999 sf.
- Category 2 Projects classified as having community-wide significance have 50 or more residential units, or are 50,000 sf or more.

Pasadena Department of Transportation's mobility performance measures assess the quality of walking, biking, transit, and vehicular travel in the City. A combination of vehicular and multimodal performance measures are employed to evaluate system performance in reviewing new development impacts.

The following table summarizes the City's Metrics Cap Outside of CEQA for projects below "communitywide significance:"

Table 1. City of Pasadena Metrics Cap

METRIC	DESCRIPTION	CAP*
1. Street Segment Analysis	The street segment analysis assesses traffic intrusion on local streets in residential neighborhoods	Increases of 10-15% above existing on streets with more than 1,500 ADT would trigger conditions of approval to reduce project vehicular trips
2. Auto Level of Service	Level of Service (LOS) as defined by the Transportation Research Board's *Highway Capacity Manual (HCM) 2010*.	A decrease beyond LOS D Citywide or LOS E within Transit Oriented Districts (TODs) would trigger conditions of approval to reduce project vehicular trips
3. PEQI	Pedestrian Environmental Quality Index	Below average conditions
4. BEQI	Bicycle Environmental Quality Index	Below average conditions

*The adopted caps are not intended to be the absolute limits, but rather limits/ranges when exceeded may require additional project approval conditions.

Caps for Determining Project Street Segment Changes

Caps for evaluating changes in vehicular volumes on street segments were developed to measure the potential changes of net new trips from projects that intensify an existing land use, change site access, or alter existing traffic patterns. The caps are designed to capture a project's anticipated level of changes measured in terms of net new trips over existing conditions.

Specific caps have been established to determine whether there would be any potential project changes along neighborhood street segments by project traffic. A conservative approach is taken when calculating the traffic growth by basing the calculation on the increase relative to existing traffic volumes as follows:

$$\text{Percentage of Increase} = {}^{\text{net new project trips}}/_{\text{existing daily traffic}}$$

The daily traffic growth caps for determining the level of street segment transportation changes are summarized as follows:

Table 2. Street Segment Caps

Existing ADT	Project-Related Vehicular Increase in ADT
0 to 1,500 average daily trips	150 trips or more
1,501 to 3,499 average daily trips	10 percent or more of final project ADT
3,500 or more	8 percent or more of final project ADT

If project-related net trips exceed the caps in the table above, conditions of approval would require the project applicant to implement measures to discourage neighborhood intrusion by project related traffic. If the project traffic increases fall below the street segment caps, additional analyses are not required.

Caps for Determining Intersection Changes

Proposed development projects that meet or exceed the caps will be evaluated using the Highway Capacity Manual (HCM) Level of Service (LOS) analysis criteria at study intersections. This methodology determines an intersection's level of service by calculating delay. LOS descriptions are summarized in Table 3.

Table 3. LOS Capacity Criteria

HIGHWAY CAPACITY LEVEL OF SERVICE CRITERIA		
LOS	DESCRIPTION	DELAY (s)
A	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0

E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor (vehicle) progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0
Source: 2010 *Highway Capacity Manual.*		

Intersection LOS analysis using HCM criteria will be conducted for peak hour conditions. LOS caps are summarized in the following table:

Table 4: Intersection Level of Service Caps.

Study Intersections	Existing + Project LOS Cap
Citywide	D
Transit Oriented District (TOD)	E

Where the evaluated intersections exceed the LOS caps, conditions of approval will be recommended consistent with the City's guiding principles to encourage walking, biking, and transit to and from the project site to reduce project-related vehicular trips.

Pedestrian and Bicycle Environmental Quality Index Discussion

The Pedestrian Environmental Quality Index (PEQI) and Bicycle Environmental Quality Index (BEQI) is a quantitative, observational instrument used to describe and summarize the street and intersection environmental factors known to affect people's travel behaviors. The PEQI and BEQI were developed by the San Francisco Department of Public Health as a tool to assess pedestrian and bicycle safety and needs as well as to gain attention and demand for non-vehicle travel planning. The PEQI and BEQI consists of factors associated with pedestrian and bicycle environmental quality and safety, classified into five categories; Intersection Safety, Traffic, Street Design, Land Use and Perceived Safety.

Data is primarily collected through an observational survey. Indicator scores for each indicator category are based on a survey of national experts, including City, transportation planners and consultants regarding the importance of each indicator to pedestrian and bicycle environmental quality. The scores reflect the degree to which environmental factors supportive of walking, biking, and safety have been incorporated into street segment and intersection design. The PEQI and BEQI analysis result in a score for street segments and intersections on a scale ranging between 0-100 as outlined below.

Score	Description
81-100	Highest quality, many important pedestrian/bicycle conditions present
61-80	High quality, some important pedestrian/bicycle conditions present
41-60	Average quality, pedestrian/bicycle conditions present but room for improvement
21-40	Low quality, minimal pedestrian/bicycle conditions
20 and below	Poor quality, pedestrian/bicycle conditions absent

V. Transportation Analysis

Project Trip Generation

The industry standard procedure to determine the number of daily and peak hour trips a project would generate is based on published trip generation estimates from the ITE Trip Generation manual and is summarized in the following table:

Trip Generation Rates (proposed)

Proposed Use	Land Use Code	Amount	Units	Measure	Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Miniature Golf Course*	431	36	HOLES	1	3.60	0.06	0.05	0.11	0.18	0.15	0.33
Golf Driving Range	432	60	TEES	1	13.65	0.24	0.16	0.40	0.56	0.69	1.25

Trip Generation Rates (previous)

Previous Use	Land Use Code	Amount	Units	Measure	Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Golf Driving Range	432	20	TEES	1	13.65	0.24	0.16	0.40	0.56	0.69	1.25

Volumes

Proposed Use		Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Miniature Golf Course*		130	2	2	4	7	5	12
Golf Driving Range		819	15	9	24	34	41	75
Total Project Trips		949	17	11	28	40	47	87
Internal Trip Capture (Driving Range)	50%	410	7	5	12	17	21	38
Net Project Vehicle Trips		539	10	6	16	23	26	49

Volumes

Previous Use		Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Golf Driving Range		273	5	3	8	11	14	25
Total Project Trips		273	5	3	8	11	14	25
Internal Trip Capture	50%	137	2	2	4	6	7	13
Net Project Vehicle Trips		136	3	1	4	5	7	12

* Used ratio of total PM peak hour between LU 431 and LU 432 to determine LU 431 daily and AM peak hour trip generation rate.

Net total (proposed minus existing trips)	***403***	***7***	***5***	***12***	***18***	***19***	***37***

In summary, it is estimated that the project would generate 403 net daily trip, 12 AM and 37 PM peak hour project trips.

Street Segment Analysis

Figure 3 describes the project trip distribution and project traffic intersection volumes on the street network. A growth factor of 1.15 was used to adjust the available counts on file. The calculated segment analysis results are summarized in Table 5.

Table 5. Street Segment Volume Summary

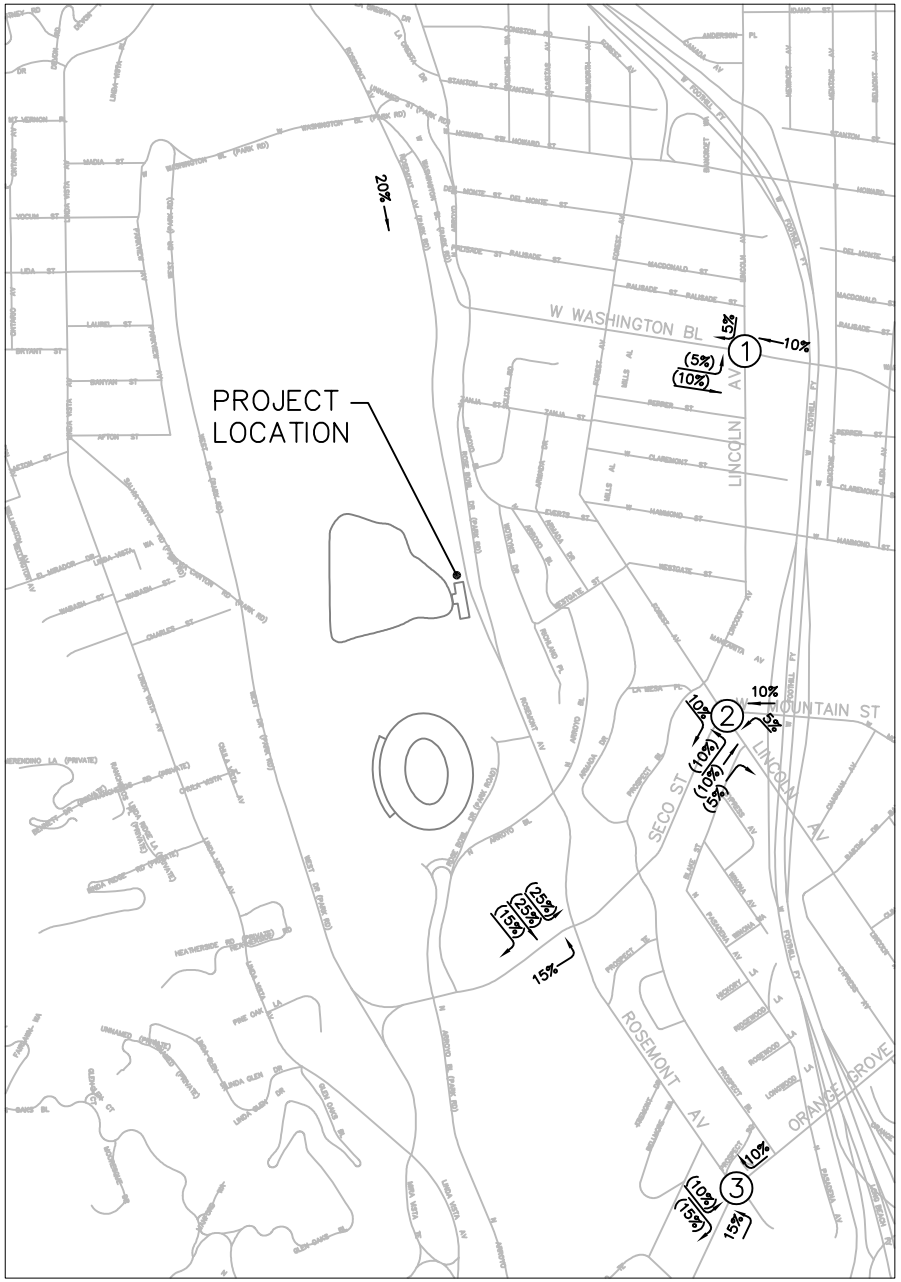
Street Segment	Baseline ADT	Baseline ADT x 1.15	Project ADT	Vehicular Increase in ADT	Exceeds Cap?
Washington Blvd b/t Forest Ave and Lincoln Ave	2,440	2,806	60	2.2%	No
Rosemont Ave b/t Prospect Terrace and Fremont Dr	4,555	5,238	101	1.9%	No

Intersection Level of Service (LOS) Analysis

Figure 4 indicates that the project is outside of the City's Transit Oriented District. Therefore, the Existing + Project LOS cap for intersections is "LOS D". A growth factor of 1.15 was used to adjust the available counts on file. The calculated LOS results are summarized in Table 6.

Table 6. Signalized Intersection LOS Summary

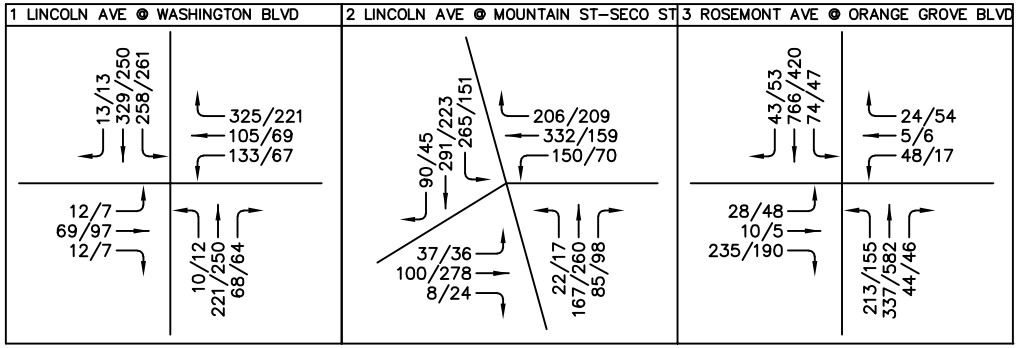
Intersection	Peak Hour	Existing		Existing w/Project		Exceeds LOS Cap?
		Delay	LOS	Delay	LOS	Yes/No
Lincoln Ave at Washington Blvd	AM	17.1	B	17.1	B	No
	PM	16.1	B	17.0	B	No
Lincoln Ave at Mountain St-Seco St	AM	10.7	B	10.7	B	No
	PM	9.4	A	9.5	A	No
Orange Grove Blvd at Rosemont Ave	AM	12.2	B	12.2	B	No
	PM	8.1	A	8.2	A	No



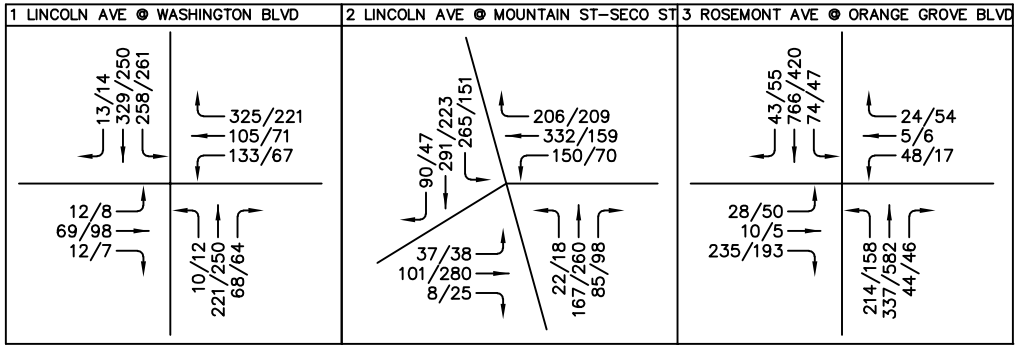
LEGEND

XX% PROJECT INBOUND TRIPS
(XX%) PROJECT OUTBOUND TRIPS

EXISTING TRAFFIC VOLUMES*



EXISTING + PROJECT TRAFFIC VOLUMES*



* A growth factor of 1.15 was used to adjust available counts.

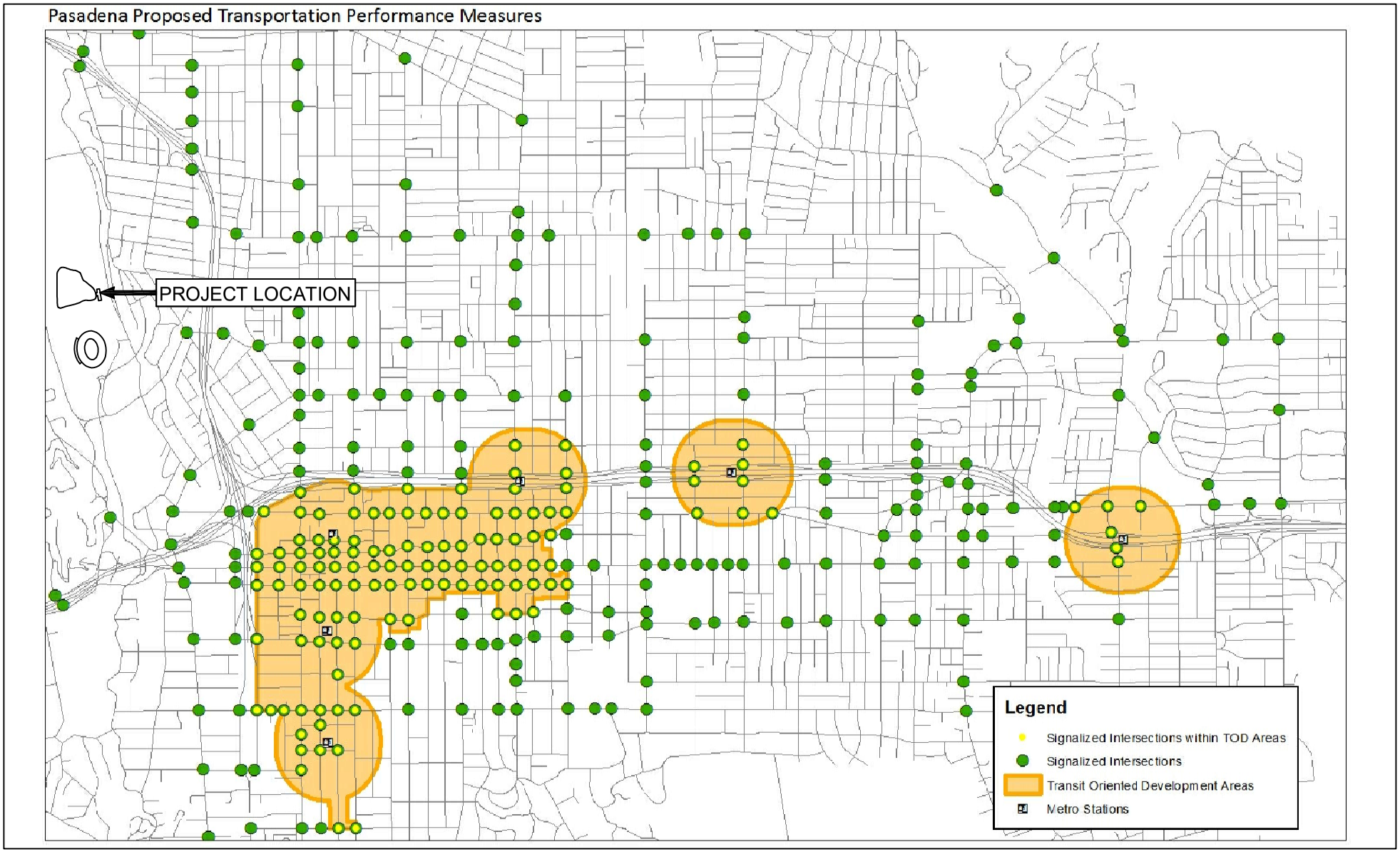
LEGEND

XX/YY EXISTING AM/PM PEAK HOUR VOLUMES

NO SCALE

PASADENA
DEPARTMENT OF TRANSPORTATION

FIGURE 3
PROJECT TRIP DISTRIBUTION AND TRAFFIC VOLUMES
BROOKSIDE GOLF COURSE – 1133 ROSEMONT AVENUE



NO SCALE

PASADENA
DEPARTMENT OF TRANSPORTATION

FIGURE 4
CITY OF PASADENA ADOPTED TRANSIT ORIENTED DEVELOPMENT AREA
BROOKSIDE GOLF COURSE - 1133 ROSEMONT AVENUE

PEQI/BEQI Analysis

An observational survey was conducted along Rosemont Avenue between Washington Boulevard and Rose Bowl Drive to document existing pedestrian and bicycle quality conditions. Vehicle traffic features (i.e., number of lanes, vehicle speed, etc.) as well as street quality features (i.e., sidewalk widths and impediments, driveway cuts, land use characteristics, etc.) were collected on both sides of the street.

Environmental quality of non-vehicular modes must be improved when the assessment of project study segments reveal less than average conditions. According to the PEQI and BEQI indicator and indicator category scores, the following observational scores are:

Table 7. PEQI/BEQI Summary

Segment	**PEQI Score**	**BEQI Score**
Rosemont Avenue between Washington Blvd and Rose Bowl Drive		
- West side	46 - Average	37 - Low
- East side	49 - Average	37 - Low

PEQI and BEQI calculations are found in the appendix of this report.

VI. Conclusion

The City of Pasadena Department of Transportation conducted an analysis to review the proposed improvements to the existing Brookside Golf Course. The application proposes to expand the existing 20-bay driving range to 60-bays, and add a 36-hole miniature golf course.

No segments or intersections exceed the adopted caps.

The calculated PEQI scores determined that existing pedestrian conditions are average along Rosemont Avenue between Washington Boulevard and Rose Bowl Drive.

The calculated BEQI scores determined that existing bicycling conditions are low along Rosemont Avenue between Washington Boulevard and Rose Bowl Drive.

VII. Appendices

Memorandum of Understanding
Traffic Volumes
HCM Analysis
PEQI Calculation Sheet
BEQI Calculation Sheet

Appendix:
Memorandum of Understanding

Appendix:
Traffic Volumes

Brookside Golf Course Improvement Project

Peak IntersectionVolumes Summary

1133 Rosemont Avenue

Intersection	Direction	AM Peak Baseline Year 2012	PM Peak Baseline Year 2012	AM Peak Baseline Year+Ambient Growth* Growth Factor = 1.15	PM Peak Baseline Year+Ambient Growth* Growth Factor = 1.15	Project % IN	Project % OUT	Project Volume AM	Project Volume PM	AM Peak Baseline Year+Ambient Growth+Project	PM Peak Baseline Year+Ambient Growth+Project
		Volumes	Volumes	Volumes	Volumes					Volumes	Volumes
Lincoln Ave at Washington Blvd	NBL	9	10	10	12			0	0	10	12
	NBT	192	217	221	250			0	0	221	250
	NBR	59	56	68	64			0	0	68	64
	SBL	224	227	258	261			0	0	258	261
	SBT	286	217	329	250			0	0	329	250
	SBR	11	11	13	13	5%		0	1	13	14
	EBL	10	6	12	7		5%	0	1	12	8
	EBT	60	84	69	97		10%	0	2	69	98
	EBR	10	6	12	7			0	0	12	7
	WBL	116	58	133	67			0	0	133	67
	WBT	91	60	105	69	10%		1	2	105	71
	WBR	283	192	325	221			0	0	325	221
Lincoln Ave at Mountain St-Seco St	NBL	19	15	22	17	5%		0	1	22	18
	NBT	145	226	167	260			0	0	167	260
	NBR	74	85	85	98			0	0	85	98
	SBL	230	131	265	151			0	0	265	151
	SBT	253	194	291	223			0	0	291	223
	SBR	78	39	90	45	10%		1	2	90	47
	EBL	32	31	37	36		10%	0	2	37	38
	EBT	87	242	100	278		10%	0	2	101	280
	EBR	7	21	8	24		5%	0	1	8	25
	WBL	130	61	150	70			0	0	150	70
	WBT	289	138	332	159			0	0	332	159
	WBR	179	182	206	209			0	0	206	209
Orange Grove Blvd at Rosemont Ave	NBL	185	135	213	155	15%		1	3	214	158
	NBT	293	506	337	582			0	0	337	582
	NBR	38	40	44	46			0	0	44	46
	SBL	64	41	74	47			0	0	74	47
	SBT	666	365	766	420			0	0	766	420
	SBR	37	46	43	53	10%		1	2	43	55
	EBL	24	42	28	48		10%	0	2	28	50
	EBT	9	4	10	5			0	0	10	5
	EBR	204	165	235	190		15%	1	3	235	193
	WBL	42	15	48	17			0	0	48	17
	WBT	4	5	5	6			0	0	5	6
	WBR	21	47	24	54			0	0	24	54

* Exhibit D-1 of the 2010 Congestion Management Program for Los Angeles County estimates the general traffic volume growth factor in Pasadena to be 1.098 in year 2025. To be conservative, the analysis used 1.15 as the growth factor from available 2012 counts.

City of Pasadena

Transportation Data Management System

Volume Count Report

LOCATION INFO	
Location ID	1928
Type	SPOT
Fnct'l Class	-
Located On	Washington Blvd
Direction	2-WAY
County	Los Angeles
Community	Pasadena
MPO ID	
HPMS ID	
Agency	City of Pasadena

COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 1/27/2011
End Date	Fri 1/28/2011
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	
Notes	
Station	
Study	
Speed Limit	
Description	
Sensor Type	
Source	
Latitude,Longitude	

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	2	1	3	3	9
1:00-2:00	2	0	1	1	4
2:00-3:00	2	1	0	3	6
3:00-4:00	0	2	4	0	6
4:00-5:00	5	1	4	3	13
5:00-6:00	2	6	8	8	24
6:00-7:00	9	15	13	28	65
7:00-8:00	21	46	31	42	140
8:00-9:00	73	57	73	64	267
9:00-10:00	34	20	39	34	127
10:00-11:00	33	33	32	37	135
11:00-12:00	34	40	27	43	144
12:00-13:00	26	16	41	36	119
13:00-14:00	27	41	33	39	140
14:00-15:00	45	36	34	51	166
15:00-16:00	61	73	29	28	191
16:00-17:00	41	39	49	32	161
17:00-18:00	51	78	64	61	254
18:00-19:00	46	41	31	31	149
19:00-20:00	30	24	35	23	112
20:00-21:00	20	18	21	16	75
21:00-22:00	18	17	14	17	66
22:00-23:00	12	14	10	6	42
23:00-24:00	6	6	10	3	25
Total					2,440
AADT					2,440
AM Peak					08:00-09:00 267
PM Peak					17:00-18:00 254

City of Pasadena

MS2

Transportation Data Management System

Volume Count Report

LOCATION INFO	
Location ID	2089
Type	SPOT
Fnct'l Class	-
Located On	Rosemont Avenue
Loc On Alias	
BETWEEN	Prospect Terrace AND Fremont Drive
Direction	2-WAY
County	Los Angeles
Community	Pasadena
MPO ID	
HPMS ID	
Agency	City of Pasadena

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/14/2016
End Date	Wed 6/15/2016
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	2-WAY
Notes	pasadena
Station	2089
Study	
Speed Limit	
Description	
Sensor Type	
Source	
Latitude,Longitude	

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	0	0	1	1	2
1:00-2:00	5	1	2	3	11
2:00-3:00	1	0	0	2	3
3:00-4:00	0	0	2	4	6
4:00-5:00	0	2	2	4	8
5:00-6:00	11	17	28	33	89
6:00-7:00	32	27	31	31	121
7:00-8:00	53	56	56	80	245
8:00-9:00	83	86	85	115	369
9:00-10:00	74	69	77	83	303
10:00-11:00	71	86	51	63	271
11:00-12:00	67	78	73	58	276
12:00-13:00	64	72	67	74	277
13:00-14:00	59	52	57	70	238
14:00-15:00	70	65	66	71	272
15:00-16:00	69	74	84	63	290
16:00-17:00	77	75	76	89	317
17:00-18:00	98	90	99	111	398
18:00-19:00	93	96	75	90	354
19:00-20:00	93	78	70	64	305
20:00-21:00	81	51	40	49	221
21:00-22:00	40	20	24	17	101
22:00-23:00	11	13	6	11	41
23:00-24:00	15	9	6	7	37
Total					4,555
AADT					4,555
AM Peak					08:00-09:00 369
PM Peak					17:30-18:30 399

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_001 **Day:** TUESDAY

City: City of Pasadena **Date:** 2/28/2012

AM

NS/EW Streets:	Lincoln Ave			Lincoln Ave			Washington Blvd			Washington Blvd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	1	
7:00 AM	1	19	3	34	34	1	3	6	2	15	6	43	167
7:15 AM	1	31	8	31	49	2	2	13	4	11	12	55	219
7:30 AM	0	43	12	53	57	1	2	13	2	28	26	81	318
7:45 AM	4	44	13	75	61	4	4	19	4	32	21	63	344
8:00 AM	2	52	21	50	89	1	1	13	2	30	28	76	365
8:15 AM	3	53	13	46	79	5	3	15	2	26	16	63	324
8:30 AM	3	33	12	47	76	9	4	16	2	14	30	56	302
8:45 AM	4	46	8	47	77	6	4	17	4	13	18	40	284
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	18	321	90	383	522	29	23	112	22	169	157	477	2323
APPROACH %'s :	4.20%	74.83%	20.98%	41.01%	55.89%	3.10%	14.65%	71.34%	14.01%	21.05%	19.55%	59.40%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	9	192	59	224	286	11	10	60	10	116	91	283	1351
PEAK HR FACTOR :		0.867			0.930			0.741			0.907		0.925

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_001 **Day:** TUESDAY

City: City of Pasadena **Date:** 2/28/2012

PM

NS/EW Streets:	Lincoln Ave			Lincoln Ave			Washington Blvd			Washington Blvd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	0	1	0	0	1	1	
4:00 PM	2	61	13	53	57	2	2	15	3	21	8	55	292
4:15 PM	0	59	8	43	55	2	3	17	2	16	16	46	267
4:30 PM	2	49	16	58	66	4	4	22	5	10	10	42	288
4:45 PM	3	39	10	71	44	1	1	19	2	12	12	36	250
5:00 PM	5	54	14	51	54	3	2	22	0	19	29	48	301
5:15 PM	0	50	11	60	51	4	1	24	2	12	12	52	279
5:30 PM	2	60	11	62	57	3	0	20	1	13	13	53	295
5:45 PM	3	53	20	54	55	1	3	18	3	14	6	39	269
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	17	425	103	452	439	20	16	157	18	117	106	371	2241
APPROACH %'s :	3.12%	77.98%	18.90%	49.62%	48.19%	2.20%	8.38%	82.20%	9.42%	19.70%	17.85%	62.46%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	10	217	56	227	217	11	6	84	6	58	60	192	1144
PEAK HR FACTOR :		0.931			0.932			0.889			0.807		0.950

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_007 **Day:** TUESDAY

City: City of Pasadena **Date:** 2/28/2012

AM

NS/EW Streets:	Lincoln Ave			Lincoln Ave			Mountain St/Seco St			Mountain St/Seco St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	1	2	0	1	2	0	
7:00 AM	2	18	17	48	28	11	3	28	0	12	29	17	213
7:15 AM	1	26	15	44	44	12	4	17	1	14	29	22	229
7:30 AM	3	31	20	65	48	20	8	15	2	13	48	36	309
7:45 AM	9	37	23	56	56	25	10	42	2	49	118	69	496
8:00 AM	6	40	18	57	72	14	6	15	1	35	64	45	373
8:15 AM	1	37	13	52	77	19	8	15	2	33	59	29	345
8:30 AM	6	36	14	56	61	18	9	15	1	18	47	20	301
8:45 AM	4	41	13	35	47	15	4	15	3	23	55	18	273
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	32	266	133	413	433	134	52	162	12	197	449	256	2539
APPROACH %'s :	7.42%	61.72%	30.86%	42.14%	44.18%	13.67%	23.01%	71.68%	5.31%	21.84%	49.78%	28.38%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	19	145	74	230	253	78	32	87	7	130	289	179	1523
PEAK HR FACTOR :		0.862			0.948			0.583			0.633		0.768

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_007 **Day:** TUESDAY

City: City of Pasadena **Date:** 2/28/2012

PM

NS/EW Streets:	Lincoln Ave			Lincoln Ave			Mountain St/Seco St			Mountain St/Seco St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	1	2	0	1	2	0	
4:00 PM	9	46	18	33	67	9	7	36	3	19	33	46	326
4:15 PM	9	59	26	45	43	7	6	25	6	11	37	46	320
4:30 PM	8	55	24	36	53	10	10	42	5	13	42	37	335
4:45 PM	4	56	21	37	44	12	9	50	6	9	36	35	319
5:00 PM	5	61	20	34	61	8	6	71	7	18	39	47	377
5:15 PM	4	45	15	37	35	10	6	60	2	18	34	53	319
5:30 PM	2	64	29	23	54	9	10	61	6	16	29	47	350
5:45 PM	1	73	22	23	47	6	10	55	6	12	24	28	307
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	42	459	175	268	404	71	64	400	41	116	274	339	2653
APPROACH %'s :	6.21%	67.90%	25.89%	36.07%	54.37%	9.56%	12.67%	79.21%	8.12%	15.91%	37.59%	46.50%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	15	226	85	131	194	39	31	242	21	61	138	182	1365
PEAK HR FACTOR :		0.858			0.883			0.875			0.907		0.905

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_019 **Day:** TUESDAY

City: City of Pasadena **Date:** 2/28/2012

AM

NS/EW Streets:	Orange Grove Blvd			Orange Grove Blvd			Rosemont Ave			Rosemont Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	0	1	0	0	1	0	
7:00 AM	16	31	3	0	91	6	2	0	13	11	0	0	173
7:15 AM	19	69	2	0	117	10	4	1	29	6	1	2	260
7:30 AM	17	81	2	1	150	7	6	0	41	7	0	1	313
7:45 AM	34	97	1	4	198	11	8	3	80	5	2	5	448
8:00 AM	21	94	5	8	176	8	7	2	40	12	1	4	378
8:15 AM	25	55	13	28	168	12	4	2	47	7	0	6	367
8:30 AM	29	47	19	24	124	6	5	2	37	18	1	6	318
8:45 AM	24	63	4	7	146	12	5	3	45	8	1	6	324
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	185	537	49	72	1170	72	41	13	332	74	6	30	2581
APPROACH %'s :	23.99%	69.65%	6.36%	5.48%	89.04%	5.48%	10.62%	3.37%	86.01%	67.27%	5.45%	27.27%	
PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	109	293	38	64	666	37	24	9	204	42	4	21	1511
PEAK HR FACTOR :		0.833			0.900			0.651			0.670		0.843

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5078_019 **Day:** TUESDAY

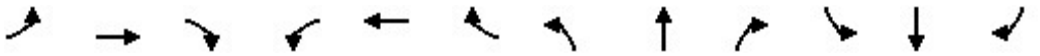
City: City of Pasadena **Date:** 2/28/2012

PM

NS/EW Streets:	Orange Grove Blvd			Orange Grove Blvd			Rosemont Ave			Rosemont Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	0	1	0	0	1	0	
4:00 PM	34	119	6	4	94	13	8	0	27	5	0	2	312
4:15 PM	28	118	6	3	99	13	9	0	15	3	2	2	298
4:30 PM	29	119	5	0	89	12	6	1	22	4	0	2	289
4:45 PM	39	123	11	6	95	16	12	0	24	4	1	6	337
5:00 PM	33	126	13	10	94	18	11	2	34	3	2	13	359
5:15 PM	33	128	8	10	103	11	16	1	37	1	0	8	356
5:30 PM	33	122	9	8	89	12	8	0	47	3	1	13	345
5:45 PM	36	130	10	13	79	5	7	1	47	8	2	13	351
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	265	985	68	54	742	100	77	5	253	31	8	59	2647
APPROACH %'s :	20.11%	74.73%	5.16%	6.03%	82.81%	11.16%	22.99%	1.49%	75.52%	31.63%	8.16%	60.20%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	135	506	40	41	365	46	42	4	165	15	5	47	1411
PEAK HR FACTOR :		0.967			0.911			0.959			0.728		0.983

CONTROL : Signalized

Appendix:
HCM Analysis



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	69	12	133	105	325	10	221	68	258	329	13
Future Volume (vph)	12	69	12	133	105	325	10	221	68	258	329	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt		0.98			1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1856			1848	1615	1805	3483		1805	1900	1615
Flt Permitted		0.96			0.78	1.00	0.45	1.00		0.56	1.00	1.00
Satd. Flow (perm)		1790			1486	1615	850	3483		1069	1900	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.81	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	13	78	13	164	130	401	11	238	73	277	354	14
RTOR Reduction (vph)	0	7	0	0	0	220	0	42	0	0	0	8
Lane Group Flow (vph)	0	97	0	0	294	181	11	269	0	277	354	6
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4		4	2			2		2
Actuated Green, G (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Effective Green, g (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Actuated g/C Ratio		0.45			0.45	0.45	0.42	0.42		0.42	0.42	0.42
Clearance Time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Grp Cap (vph)		808			671	729	355	1457		447	794	675
v/s Ratio Prot								0.08			0.19	
v/s Ratio Perm		0.05			c0.20	0.11	0.01			c0.26		0.00
v/c Ratio		0.12			0.44	0.25	0.03	0.18		0.62	0.45	0.01
Uniform Delay, d1		9.5			11.2	10.2	10.3	11.0		13.7	12.5	10.2
Progression Factor		1.00			0.98	2.60	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3			2.1	0.8	0.2	0.3		6.3	1.8	0.0
Delay (s)		9.8			13.0	27.2	10.4	11.3		20.0	14.3	10.2
Level of Service		A			B	C	B	B		C	B	B
Approach Delay (s)		9.8			21.2			11.2			16.7	
Approach LOS		A			C			B			B	

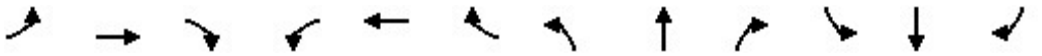
Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	100	8	150	332	206	22	167	85	265	291	90
Future Volume (vph)	37	100	8	150	332	206	22	167	85	265	291	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.94			0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1805	3566		1805	3403			3415			3457	
Flt Permitted	0.34	1.00		0.67	1.00			0.89			0.71	
Satd. Flow (perm)	649	3566		1281	3403			3051			2501	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.86	0.86	0.86	0.88	0.88	0.88
Adj. Flow (vph)	42	114	9	165	365	226	26	194	99	301	331	102
RTOR Reduction (vph)	0	6	0	0	155	0	0	47	0	0	18	0
Lane Group Flow (vph)	42	117	0	165	436	0	0	272	0	0	716	0
Confl. Peds. (#/hr)			7						1			5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	15.6	15.6		15.6	15.6			26.1			26.1	
Effective Green, g (s)	15.6	15.6		15.6	15.6			26.1			26.1	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.53			0.53	
Clearance Time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Vehicle Extension (s)	4.8	4.8		4.8	4.8			5.8			5.8	
Lane Grp Cap (vph)	204	1123		403	1072			1608			1318	
v/s Ratio Prot		0.03			0.13							
v/s Ratio Perm	0.06			c0.13				0.09			c0.29	
v/c Ratio	0.21	0.10		0.41	0.41			0.17			0.54	
Uniform Delay, d1	12.4	12.0		13.3	13.3			6.1			7.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.0	0.1		1.3	0.5			0.1			1.0	
Delay (s)	13.4	12.1		14.6	13.8			6.2			8.7	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		12.4			14.0			6.2			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	7.8
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

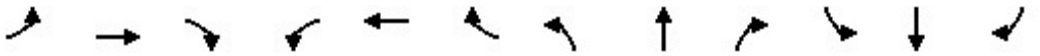
Movement	NBL	NBR	NBR2	SEL	SET	SER	NWL	NWT	NWR	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	213	337	44	28	10	235	48	5	24	74	766	43
Future Volume (vph)	213	337	44	28	10	235	48	5	24	74	766	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4			4.4	3.6		4.4	3.6	4.4	4.4	4.4
Lane Util. Factor	1.00	0.88			1.00	1.00		1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.96	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	2787			1796	1583		1782	1583	1770	3433	1583
Flt Permitted	0.33	1.00			0.77	1.00		0.72	1.00	0.50	0.95	1.00
Satd. Flow (perm)	616	2787			1443	1583		1338	1583	941	3433	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.73	0.73	0.73	0.91	0.91	0.91
Adj. Flow (vph)	220	347	45	29	10	245	66	7	33	81	842	47
RTOR Reduction (vph)	0	6	0	0	0	98	0	0	28	0	0	8
Lane Group Flow (vph)	220	386	0	0	39	147	0	73	5	81	842	39
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Over		Perm	NA	Perm	Perm	NA	Perm	Perm	Prot	Perm
Protected Phases		2			4			4			2	
Permitted Phases	6			4		4	4		4	6		2
Actuated Green, G (s)	60.5	60.5			11.6	11.6		11.6	11.6	60.5	60.5	60.5
Effective Green, g (s)	60.4	60.4			10.8	11.6		10.8	11.6	60.4	60.4	60.4
Actuated g/C Ratio	0.75	0.75			0.14	0.14		0.14	0.14	0.75	0.75	0.75
Clearance Time (s)	4.3	4.3			3.6	3.6		3.6	3.6	4.3	4.3	4.3
Vehicle Extension (s)	2.5	4.8			3.0	3.0		3.0	3.0	2.5	4.8	4.8
Lane Grp Cap (vph)	465	2104			194	229		180	229	710	2591	1195
v/s Ratio Prot		0.14									0.25	
v/s Ratio Perm	c0.36				0.03	c0.09		0.05	0.00	0.09		0.02
v/c Ratio	0.47	0.18			0.20	0.64		0.41	0.02	0.11	0.32	0.03
Uniform Delay, d1	3.7	2.8			30.8	32.2		31.7	29.3	2.6	3.2	2.5
Progression Factor	3.11	3.04			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.2			0.5	6.0		1.5	0.0	0.3	0.3	0.1
Delay (s)	14.9	8.7			31.3	38.2		33.2	29.4	3.0	3.5	2.5
Level of Service	B	A			C	D		C	C	A	A	A
Approach Delay (s)	10.9				37.3			32.0			3.4	
Approach LOS	B				D			C			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.8
Intersection Capacity Utilization	54.2%	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												
Traffic Volume (vph)	7	97	7	67	69	221	12	250	64	261	250	13
Future Volume (vph)	7	97	7	67	69	221	12	250	64	261	250	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected		1.00			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1878			1854	1615	1805	3499		1805	1900	1615
Flt Permitted		0.99			0.83	1.00	0.53	1.00		0.55	1.00	1.00
Satd. Flow (perm)		1857			1570	1615	1015	3499		1040	1900	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.81	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	109	8	83	85	273	13	269	69	281	269	14
RTOR Reduction (vph)	0	4	0	0	0	145	0	38	0	0	0	8
Lane Group Flow (vph)	0	121	0	0	168	128	13	300	0	281	269	6
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4		4	2			2		2
Actuated Green, G (s)		28.1			28.1	28.1	24.1	24.1		24.1	24.1	24.1
Effective Green, g (s)		28.1			28.1	28.1	24.1	24.1		24.1	24.1	24.1
Actuated g/C Ratio		0.47			0.47	0.47	0.40	0.40		0.40	0.40	0.40
Clearance Time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Grp Cap (vph)		869			735	756	407	1405		417	763	648
v/s Ratio Prot								0.09			0.14	
v/s Ratio Perm		0.07			c0.11	0.08	0.01			c0.27		0.00
v/c Ratio		0.14			0.23	0.17	0.03	0.21		0.67	0.35	0.01
Uniform Delay, d1		9.1			9.5	9.2	10.9	11.7		14.7	12.5	10.8
Progression Factor		1.00			0.90	2.57	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3			0.7	0.5	0.1	0.3		8.4	1.3	0.0
Delay (s)		9.4			9.2	24.1	11.0	12.1		23.2	13.8	10.8
Level of Service		A			A	C	B	B		C	B	B
Approach Delay (s)		9.4			18.4			12.1			18.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

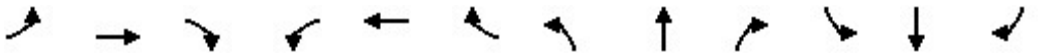


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	278	24	70	159	209	17	260	98	151	223	45
Future Volume (vph)	36	278	24	70	159	209	17	260	98	151	223	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.91			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1805	3563		1805	3302			3449			3483	
Flt Permitted	0.50	1.00		0.55	1.00			0.93			0.71	
Satd. Flow (perm)	947	3563		1037	3302			3217			2502	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.86	0.86	0.86	0.88	0.88	0.88
Adj. Flow (vph)	41	316	27	77	175	230	20	302	114	172	253	51
RTOR Reduction (vph)	0	13	0	0	159	0	0	50	0	0	13	0
Lane Group Flow (vph)	41	330	0	77	246	0	0	386	0	0	463	0
Confl. Peds. (#/hr)			7						1			5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	14.4	14.4		14.4	14.4			24.5			24.5	
Effective Green, g (s)	14.4	14.4		14.4	14.4			24.5			24.5	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.52			0.52	
Clearance Time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Vehicle Extension (s)	4.8	4.8		4.8	4.8			5.8			5.8	
Lane Grp Cap (vph)	292	1098		319	1018			1687			1312	
v/s Ratio Prot		c0.09			0.07							
v/s Ratio Perm	0.04			0.07				0.12			c0.19	
v/c Ratio	0.14	0.30		0.24	0.24			0.23			0.35	
Uniform Delay, d1	11.7	12.3		12.1	12.1			6.0			6.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.3		0.8	0.2			0.2			0.4	
Delay (s)	12.1	12.6		12.8	12.3			6.2			6.9	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		12.6			12.4			6.2			6.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	7.8
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	NBR2	SEL	SET	SER	NWL	NWT	NWR	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	155	582	46	48	5	190	17	6	54	47	420	53
Future Volume (vph)	155	582	46	48	5	190	17	6	54	47	420	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4			4.4	3.6		4.4	3.6	4.4	4.4	4.4
Lane Util. Factor	1.00	0.88			1.00	1.00		1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.96	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	2787			1782	1583		1796	1583	1770	3433	1583
Flt Permitted	0.49	1.00			0.72	1.00		0.77	1.00	0.39	0.95	1.00
Satd. Flow (perm)	914	2787			1347	1583		1434	1583	719	3433	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.73	0.73	0.73	0.91	0.91	0.91
Adj. Flow (vph)	160	600	47	50	5	198	23	8	74	52	462	58
RTOR Reduction (vph)	0	3	0	0	0	175	0	0	66	0	0	12
Lane Group Flow (vph)	160	644	0	0	55	23	0	31	8	52	462	46
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Over		Perm	NA	Perm	Perm	NA	Perm	Perm	Prot	Perm
Protected Phases		2			4			4			2	
Permitted Phases	6			4		4	4		4	6		2
Actuated Green, G (s)	63.0	63.0			9.1	9.1		9.1	9.1	63.0	63.0	63.0
Effective Green, g (s)	62.9	62.9			8.3	9.1		8.3	9.1	62.9	62.9	62.9
Actuated g/C Ratio	0.79	0.79			0.10	0.11		0.10	0.11	0.79	0.79	0.79
Clearance Time (s)	4.3	4.3			3.6	3.6		3.6	3.6	4.3	4.3	4.3
Vehicle Extension (s)	2.5	4.8			3.0	3.0		3.0	3.0	2.5	4.8	4.8
Lane Grp Cap (vph)	718	2191			139	180		148	180	565	2699	1244
v/s Ratio Prot		c0.23									0.13	
v/s Ratio Perm	0.18				c0.04	0.01		0.02	0.01	0.07		0.03
v/c Ratio	0.22	0.29			0.40	0.13		0.21	0.05	0.09	0.17	0.04
Uniform Delay, d1	2.2	2.4			33.5	31.9		32.8	31.6	2.0	2.1	1.9
Progression Factor	0.40	0.41			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3			1.9	0.3		0.7	0.1	0.3	0.1	0.1
Delay (s)	1.6	1.3			35.4	32.2		33.6	31.7	2.3	2.2	1.9
Level of Service	A	A			D	C		C	C	A	A	A
Approach Delay (s)	1.4				32.9			32.2			2.2	
Approach LOS	A				C			C			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.8
Intersection Capacity Utilization	47.6%	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												
Traffic Volume (vph)	12	69	12	133	105	325	10	221	68	258	329	13
Future Volume (vph)	12	69	12	133	105	325	10	221	68	258	329	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt		0.98			1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1856			1848	1615	1805	3483		1805	1900	1615
Flt Permitted		0.96			0.78	1.00	0.45	1.00		0.56	1.00	1.00
Satd. Flow (perm)		1790			1486	1615	850	3483		1069	1900	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.81	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	13	78	13	164	130	401	11	238	73	277	354	14
RTOR Reduction (vph)	0	7	0	0	0	220	0	42	0	0	0	8
Lane Group Flow (vph)	0	97	0	0	294	181	11	269	0	277	354	6
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4		4	2			2		2
Actuated Green, G (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Effective Green, g (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Actuated g/C Ratio		0.45			0.45	0.45	0.42	0.42		0.42	0.42	0.42
Clearance Time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Grp Cap (vph)		808			671	729	355	1457		447	794	675
v/s Ratio Prot								0.08			0.19	
v/s Ratio Perm		0.05			c0.20	0.11	0.01			c0.26		0.00
v/c Ratio		0.12			0.44	0.25	0.03	0.18		0.62	0.45	0.01
Uniform Delay, d1		9.5			11.2	10.2	10.3	11.0		13.7	12.5	10.2
Progression Factor		1.00			0.98	2.60	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3			2.1	0.8	0.2	0.3		6.3	1.8	0.0
Delay (s)		9.8			13.0	27.2	10.4	11.3		20.0	14.3	10.2
Level of Service		A			B	C	B	B		C	B	B
Approach Delay (s)		9.8			21.2			11.2			16.7	
Approach LOS		A			C			B			B	

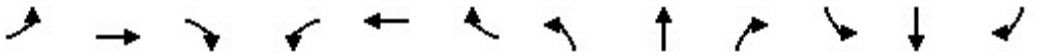
Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	101	8	150	332	206	22	167	85	265	291	90
Future Volume (vph)	37	101	8	150	332	206	22	167	85	265	291	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.94			0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1805	3566		1805	3403			3415			3457	
Flt Permitted	0.34	1.00		0.67	1.00			0.89			0.71	
Satd. Flow (perm)	649	3566		1279	3403			3051			2501	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.86	0.86	0.86	0.88	0.88	0.88
Adj. Flow (vph)	42	115	9	165	365	226	26	194	99	301	331	102
RTOR Reduction (vph)	0	6	0	0	155	0	0	47	0	0	18	0
Lane Group Flow (vph)	42	118	0	165	436	0	0	272	0	0	716	0
Confl. Peds. (#/hr)			7						1			5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	15.6	15.6		15.6	15.6			26.1			26.1	
Effective Green, g (s)	15.6	15.6		15.6	15.6			26.1			26.1	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.53			0.53	
Clearance Time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Vehicle Extension (s)	4.8	4.8		4.8	4.8			5.8			5.8	
Lane Grp Cap (vph)	204	1123		403	1072			1608			1318	
v/s Ratio Prot		0.03			0.13							
v/s Ratio Perm	0.06			c0.13				0.09			c0.29	
v/c Ratio	0.21	0.10		0.41	0.41			0.17			0.54	
Uniform Delay, d1	12.4	12.0		13.3	13.3			6.1			7.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.0	0.1		1.3	0.5			0.1			1.0	
Delay (s)	13.4	12.1		14.6	13.8			6.2			8.7	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		12.4			14.0			6.2			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	7.8
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	NBR2	SEL	SET	SER	NWL	NWT	NWR	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	214	337	44	28	10	235	48	5	24	74	766	43
Future Volume (vph)	214	337	44	28	10	235	48	5	24	74	766	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4			4.4	3.6		4.4	3.6	4.4	4.4	4.4
Lane Util. Factor	1.00	0.88			1.00	1.00		1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.96	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	2787			1796	1583		1782	1583	1770	3433	1583
Flt Permitted	0.33	1.00			0.77	1.00		0.72	1.00	0.50	0.95	1.00
Satd. Flow (perm)	616	2787			1443	1583		1338	1583	941	3433	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.73	0.73	0.73	0.91	0.91	0.91
Adj. Flow (vph)	221	347	45	29	10	245	66	7	33	81	842	47
RTOR Reduction (vph)	0	6	0	0	0	98	0	0	28	0	0	8
Lane Group Flow (vph)	221	386	0	0	39	147	0	73	5	81	842	39
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Over		Perm	NA	Perm	Perm	NA	Perm	Perm	Prot	Perm
Protected Phases		2			4			4			2	
Permitted Phases	6			4		4	4		4	6		2
Actuated Green, G (s)	60.5	60.5			11.6	11.6		11.6	11.6	60.5	60.5	60.5
Effective Green, g (s)	60.4	60.4			10.8	11.6		10.8	11.6	60.4	60.4	60.4
Actuated g/C Ratio	0.75	0.75			0.14	0.14		0.14	0.14	0.75	0.75	0.75
Clearance Time (s)	4.3	4.3			3.6	3.6		3.6	3.6	4.3	4.3	4.3
Vehicle Extension (s)	2.5	4.8			3.0	3.0		3.0	3.0	2.5	4.8	4.8
Lane Grp Cap (vph)	465	2104			194	229		180	229	710	2591	1195
v/s Ratio Prot		0.14									0.25	
v/s Ratio Perm	c0.36				0.03	c0.09		0.05	0.00	0.09		0.02
v/c Ratio	0.48	0.18			0.20	0.64		0.41	0.02	0.11	0.32	0.03
Uniform Delay, d1	3.7	2.8			30.8	32.2		31.7	29.3	2.6	3.2	2.5
Progression Factor	3.13	3.09			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.2			0.5	6.0		1.5	0.0	0.3	0.3	0.1
Delay (s)	15.1	8.8			31.3	38.2		33.2	29.4	3.0	3.5	2.5
Level of Service	B	A			C	D		C	C	A	A	A
Approach Delay (s)	11.1				37.3			32.0			3.4	
Approach LOS	B				D			C			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.8
Intersection Capacity Utilization	54.3%	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												
Traffic Volume (vph)	8	98	7	67	71	221	12	250	64	261	250	14
Future Volume (vph)	8	98	7	67	71	221	12	250	64	261	250	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected		1.00			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1877			1855	1615	1805	3499		1805	1900	1615
Flt Permitted		0.98			0.83	1.00	0.54	1.00		0.55	1.00	1.00
Satd. Flow (perm)		1853			1571	1615	1028	3499		1042	1900	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.81	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	110	8	83	88	273	13	269	69	281	269	15
RTOR Reduction (vph)	0	4	0	0	0	150	0	38	0	0	0	9
Lane Group Flow (vph)	0	123	0	0	171	123	13	300	0	281	269	6
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4		4	2			2		2
Actuated Green, G (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Effective Green, g (s)		27.1			27.1	27.1	25.1	25.1		25.1	25.1	25.1
Actuated g/C Ratio		0.45			0.45	0.45	0.42	0.42		0.42	0.42	0.42
Clearance Time (s)		3.9			3.9	3.9	3.9	3.9		3.9	3.9	3.9
Lane Grp Cap (vph)		836			709	729	430	1463		435	794	675
v/s Ratio Prot								0.09			0.14	
v/s Ratio Perm		0.07			c0.11	0.08	0.01			c0.27		0.00
v/c Ratio		0.15			0.24	0.17	0.03	0.21		0.65	0.34	0.01
Uniform Delay, d1		9.7			10.1	9.8	10.3	11.1		13.9	11.8	10.2
Progression Factor		1.00			1.04	3.15	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.4			0.8	0.5	0.1	0.3		7.2	1.2	0.0
Delay (s)		10.0			11.3	31.2	10.4	11.4		21.1	13.0	10.2
Level of Service		B			B	C	B	B		C	B	B
Approach Delay (s)		10.0			23.6			11.4			17.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	47.5%	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												
Traffic Volume (vph)	36	280	25	70	159	209	18	260	98	151	223	47
Future Volume (vph)	36	280	25	70	159	209	18	260	98	151	223	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.91			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1805	3561		1805	3302			3449			3482	
Flt Permitted	0.50	1.00		0.54	1.00			0.93			0.71	
Satd. Flow (perm)	947	3561		1034	3302			3211			2499	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.86	0.86	0.86	0.88	0.88	0.88
Adj. Flow (vph)	41	318	28	77	175	230	21	302	114	172	253	53
RTOR Reduction (vph)	0	13	0	0	158	0	0	50	0	0	13	0
Lane Group Flow (vph)	41	333	0	77	247	0	0	387	0	0	465	0
Confl. Peds. (#/hr)			7						1			5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	14.8	14.8		14.8	14.8			24.5			24.5	
Effective Green, g (s)	14.8	14.8		14.8	14.8			24.5			24.5	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.52			0.52	
Clearance Time (s)	3.9	3.9		3.9	3.9			3.9			3.9	
Vehicle Extension (s)	4.8	4.8		4.8	4.8			5.8			5.8	
Lane Grp Cap (vph)	297	1118		324	1037			1670			1299	
v/s Ratio Prot		c0.09			0.07							
v/s Ratio Perm	0.04			0.07				0.12			c0.19	
v/c Ratio	0.14	0.30		0.24	0.24			0.23			0.36	
Uniform Delay, d1	11.6	12.2		12.0	12.0			6.2			6.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.3		0.7	0.2			0.2			0.5	
Delay (s)	12.0	12.5		12.7	12.2			6.4			7.1	
Level of Service	B	B		B	B			A			A	
Approach Delay (s)		12.5			12.3			6.4			7.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	7.8
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	NBR2	SEL	SET	SER	NWL	NWT	NWR	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	158	582	46	50	5	193	17	6	54	47	420	55
Future Volume (vph)	158	582	46	50	5	193	17	6	54	47	420	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4			4.4	3.6		4.4	3.6	4.4	4.4	4.4
Lane Util. Factor	1.00	0.88			1.00	1.00		1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.96	1.00		0.96	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	2787			1781	1583		1796	1583	1770	3433	1583
Flt Permitted	0.49	1.00			0.72	1.00		0.77	1.00	0.39	0.95	1.00
Satd. Flow (perm)	914	2787			1345	1583		1432	1583	719	3433	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.73	0.73	0.73	0.91	0.91	0.91
Adj. Flow (vph)	163	600	47	52	5	201	23	8	74	52	462	60
RTOR Reduction (vph)	0	3	0	0	0	178	0	0	66	0	0	13
Lane Group Flow (vph)	163	644	0	0	57	23	0	31	8	52	462	47
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Over		Perm	NA	Perm	Perm	NA	Perm	Perm	Prot	Perm
Protected Phases		2			4			4			2	
Permitted Phases	6			4		4	4		4	6		2
Actuated Green, G (s)	63.0	63.0			9.1	9.1		9.1	9.1	63.0	63.0	63.0
Effective Green, g (s)	62.9	62.9			8.3	9.1		8.3	9.1	62.9	62.9	62.9
Actuated g/C Ratio	0.79	0.79			0.10	0.11		0.10	0.11	0.79	0.79	0.79
Clearance Time (s)	4.3	4.3			3.6	3.6		3.6	3.6	4.3	4.3	4.3
Vehicle Extension (s)	2.5	4.8			3.0	3.0		3.0	3.0	2.5	4.8	4.8
Lane Grp Cap (vph)	718	2191			139	180		148	180	565	2699	1244
v/s Ratio Prot		c0.23									0.13	
v/s Ratio Perm	0.18				c0.04	0.01		0.02	0.01	0.07		0.03
v/c Ratio	0.23	0.29			0.41	0.13		0.21	0.05	0.09	0.17	0.04
Uniform Delay, d1	2.2	2.4			33.6	31.9		32.8	31.6	2.0	2.1	1.9
Progression Factor	0.40	0.41			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3			2.0	0.3		0.7	0.1	0.3	0.1	0.1
Delay (s)	1.6	1.3			35.5	32.2		33.6	31.7	2.3	2.2	1.9
Level of Service	A	A			D	C		C	C	A	A	A
Approach Delay (s)	1.4				32.9			32.2			2.2	
Approach LOS	A				C			C			A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.8
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Appendix:
PEQI Calculation Sheet

City of Pasadena
Department of Transportation
Pedestrian Environmental Quality Index
Calculation Summary
-- Segment --

Segment: Rosemont Avenue
Limits: Between Washington Blvd and Rose Bowl Dr

Indicator Category	Score Weight	Indicator Response	Southbound (West side) Surveyed Response Category Score	Indicator Response	Northbound (East side) Surveyed Response Category Score
Traffic					
Number of Lanes	0.64	2	9	2	9
Posted Speed Limit	0.64	Over 25 mph	0	Over 25 mph	0
Traffic Volume[1]	0.64	1,000-6,000 V/D	11	1,000-6,000 V/D	11
Street Traffic Calming Features (TCFs)	0.64	None	0	None	0
			20		**20**
Street design					
Width of Sidewalk	1.35	No Sidewalk	0	No Sidewalk	0
Width of Throughway	1.35	No Sidewalk	0	No Sidewalk	0
Large SW Obstructions	1.35	None	22	None	22
Sidewalk Impediments	1.35	None	24	None	24
Trees	1.35	Continuous	9	Continuous	9
Driveway Cuts	1.35	1 to 5	7	None	15
Presence of Buffer	1.35	None	0	Parallel parking	11
Planters/Gardens	1.35	Yes	4	Yes	4
Public Seating	1.35	No	0	No	0
			66		**85**
Land Use					
Public Art/ Historic Sites	0.15	Yes	4	No	0
Retail Use/Public Places	0.15	1 or 2	7	None	0
			11		**0**
Perceived Safety					
Lighting	0.34	None	0	None	0
Illegal Graffiti	0.34	No	2	No	2
Litter	0.34	No	11	No	11
Empty Spaces	0.34	No	4	No	4
			17		**17**
Domain Summary	Score Weight		Category Score		Category Score
Traffic	0.64	Traffic	20	Traffic	20
Street Design	1.35	Street Design	66	Street Design	85
Land Use	0.15	Land Use	11	Land Use	0
Safety	0.34	Safety	17	Safety	17
	2.48		114		122
			PEQI Score **46** Southbound (West side)		PEQI Score **49** Northbound (East side)

Appendix:
BEQI Calculation Sheet

City of Pasadena
Department of Transportation
Bicycle Environmental Quality Index
Calculation Summary

Segment: Rosemont Avenue
Limits: Between Washington Blvd and Rose Bowl Dr

Indicator Category	Score Weight	Southbound (West side) Indicator Response	Southbound (West side) Surveyed Response Category Score	Northbound (East side) Indicator Response	Northbound (East side) Surveyed Response Category Score
Street design					
Presence of a Marked Area for Bicycle Traffic	2.05	None	4	None	4
Width of Bike Lane	2.05	None	0	None	0
Bicycle Lane Markings	2.05	None	4	None	4
Connectivity of Bicycle Lanes	2.05	No	13	No	13
Pavement Type/Condition	2.05	Smooth Surface	40	Smooth Surface	40
Street Slope	2.05	< 5%	27	< 5%	27
Driveway Cuts	2.05	Few (Less than Five)	16	None	27
Presence of Trees	2.05	Continuously Lined	29	Continuously Lined	29
			133		**144**
Vehicle Traffic					
Posted Speed Limit	1.39	35	0	35	0
Traffic Volume - Avg # of Vehicles Per Day	1.39	1,000 - 5,000	19	1,000 - 5,000	19
Percentage of Heavy Vehicles	1.39	Less than 5%	36	Less than 5%	36
Parallel Parking Adjacent to Bicycle Lane/Route	1.39	None	27	Time-restricted Parallel Parking (TPP) < 7 ft	19
Traffic Calming Features Streets	1.39	0 TCF	11	0 TCF	11
Number of Lanes	1.39	2	31	2	31
			124		**116**
Safety/Other					
Presence of Bicycle Lane Signs	0.42	No	15	No	15
Bicycle/Pedestrian Scale Lighting	0.42	No	15	No	15
			30		**30**
Land Use					
Bicycle Parking	0.66	No	12	No	12
Retail Use	0.66	1 - 2	16	0	14
Line of Site	0.66	Clear Line of Sight	36	Clear Line of Sight	36
			64		**62**

Domain Summary	Score Weight	Min Score	Category Score	Min Score	Category Score
Street design	2.05	62	133	62	144
Vehicle Traffic	1.39	59	124	59	116
Safety/Other	0.42	30	30	30	30
Land Use	0.66	33	64	33	62
	4.52	184	351	184	352

BEQI Score [1] **37** Southbound (West side)

BEQI Score [1] **37** Northbound (East side)

MEMORANDUM

PASADENA DEPARTMENT OF TRANSPORTATION

MOVING PEOPLE TO PLACES, CONNECTIVITY

DATE: **June 3, 2021**

TO: **Luis Rocha, Zoning Administrator**
Planning and Development Department

FROM: **Nader Asmar, T.E.**
Principal Engineer

RE: **CEQA**

CASE: **Brookside Golf Course Improvements Project**
1133 Rosemont Avenue

The City of Pasadena, Department of Transportation (DOT) reviewed the application for the improvements to the existing Brookside Golf Course described as an expansion of the existing 20-bay driving range to 60 bays, and the addition of a 36-hole miniature golf course. As indicated in the project description, the existing Brookside Golf Complex is currently served by approximately 100 employees, and operation of the project would not require additional employees.

Since there is no increase in service population, there will be no significant impact to any of the City's five CEQA transportation thresholds.

This memo was prepared based on the project scope provided to DOT. An update of the findings might be required if a significant change is made to the project scope, or if additional analysis is requested by the decision makers.

If you have any questions, please feel free to contact me, or Mr. Conrad Viana of my staff at extension 7424.

c: Laura Rubio-Cornejo, Director of Transportation
David Reyes, Planning Director, Planning Department
Jennifer Paige, Deputy Planning Director, Planning Department
Beilin Yu, Senior Planner, Planning Department

MEMORANDUM

PASADENA DEPARTMENT OF TRANSPORTATION

MOVING PEOPLE TO PLACES, CONNECTIVITY

DATE: **June 3, 2021**

TO: **Luis Rocha, Zoning Administrator**
Planning and Development Department

FROM: **Nader Asmar, T.E.**
Principal Engineer

RE: **Transportation Analysis – Conditions of Approval**

CASE: **1133 Rosemont Avenue**

The City of Pasadena, Department of Transportation (DOT) conducted a transportation analysis for the improvements to the existing Brookside Golf Course described as an expansion of the existing 20-bay driving range to 60 bays, and the addition of a 36-hole miniature golf course.

Pursuant to the City's transportation study guidelines, DOT recommends the following conditions for the project:

1. Prior to the start of construction or the issuance of any permits, the applicant shall submit a Construction Staging & Traffic Management Plan to the Department of Public Works for review and approval. This plan shall show the impact of the various construction stages on the public right-of-way including street occupations, closures, detours, staging areas, and routes of construction vehicles entering and exiting the construction site.

   Construction-related traffic (delivery trucks or haul trucks) shall be restricted to the hours between 9:00 AM to 3:00 PM to limit peak hour traffic conflict along the local street network.

2. The project shall satisfy the project's parking requirements to the satisfaction of the Planning Department.

The study and conditions have been prepared based on the project scope provided to DOT. An update of the traffic study and its findings might be required if a significant change is made to the project scope, or if additional analysis is requested by the decision makers.

If you have any questions, please feel free to contact me, or Mr. Conrad Viana of my staff at extension 7424.

Enclosed: Transportation Analysis – Outside of CEQA, dated May 28, 2021

c: Laura Rubio-Cornejo, Director of Transportation
David Reyes, Planning Director, Planning Department
Jennifer Paige, Deputy Planning Director, Planning Department
Beilin Yu, Senior Planner, Planning Department