



Citywide Roadway & Transportation Master Plan

Addendum



Prepared for:
City of Tracy
November 2013



Background

The City of Tracy adopted the Transportation and Roadway Master Plan (TMP) in November 2012. In September 2013, the City also adopted the Cordes Ranch Specific Plan Environmental Impact Report (CRDEIR). The TMP identified roadway improvements through Horizon Year (2035) and right-of-way requirements through Cordes Ranch Specific Plan buildout.

The CREIR identified interchange improvements at the I-205/Mountain House Parkway and the I-580/Patterson Pass Road - Mountain House Parkway for 2035 and Cordes Ranch Buildout per Caltrans request. The purpose of this Addendum to the TMP is to include these additional improvements and include them in the City's Transportation Master Plan.

The information in this addendum utilizes the TMP format and graphic layout for consistency. The traffic volumes, traffic operations (LOS), concept layouts, and cost estimates are indicated in this October 2013 TMP Addendum.

The I-205/Mountain House Parkway interchange was not included in the November 2012 TMP because its current layout analyzed 2035 traffic conditions in the PSR. The inclusion in the TMP now, and the additional improvements identified in the Cordes Ranch EIR, is warranted because of the additional traffic growth expected beyond 2035, which includes buildout of the Cordes Ranch Specific Plan.

Existing Conditions

The two interchange ramp terminals are identified in the figures and tables as follows:

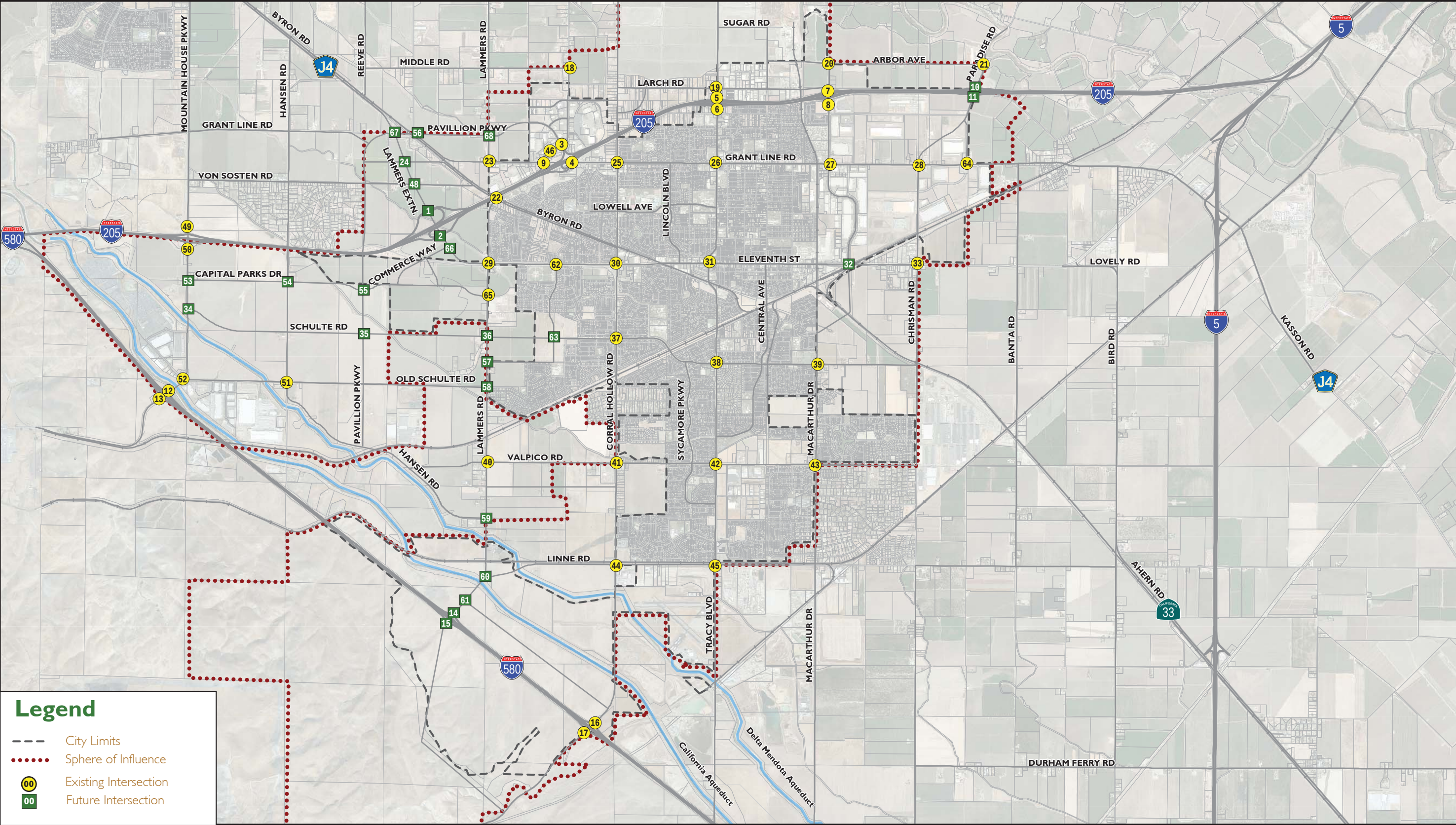
I-205/Mountain House Parkway:

- # 49: I-205/Mountain House Parkway Westbound Ramps
- # 50: I-205/Mountain House Parkway Eastbound Ramps

I-580/Patterson Pass Road - Mountain House Parkway

- # 12: I-580/Patterson Pass Road- Mountain House Parkway Northbound Ramps
- # 13: I-580/Patterson Pass Road- Mountain House Parkway Southbound Ramps

Figure 1 indicates the existing intersection locations. **Figure 2** indicates the existing AM and PM peak hour Level of Service (LOS) results for the intersections at both interchanges. The intersections all operate at acceptable LOS C or better. The existing I-580 Patterson Pass Road-Mountain House Parkway interchange analysis results were obtained from the CREIR.



Legend

- City Limits
- Sphere of Influence
- Existing Intersection
- Future Intersection

North

0

0.5

1

2

Miles (Approximate)

Figure I: Study Intersection Locations
City of Tracy Transportation Master Plan



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2035 Conditions

The turning movement volumes, lane configuration and the LOS results for 2035 conditions are indicated in **Figures 3a, 3b, and 4** respectively. Improvements at the I-205 Mountain House Parkway interchange include the following:

- The westbound off ramp is to be restriped to provide two left-turn lanes and one shared through/right turn lane.
- The northbound right turn lane onto eastbound I-205 will be converted to a free right turn lane with an acceptance lane on the ramp. Additionally, signal timings will be optimized.
- The westbound off-ramp will be restriped to include one through-left and two right-turn lanes.
- The phasing of signal at the westbound interchange will be changed to allow southbound through and westbound rights to run concurrently on the same phase.

Improvements at the I-580/ Patterson Pass Road-Mountain House Parkway interchange have been identified in the TMP already.



Kimley-Horn
and Associates, Inc.

Figure 3a: Horizon Year AM (PM) Peak Hour Traffic Volumes





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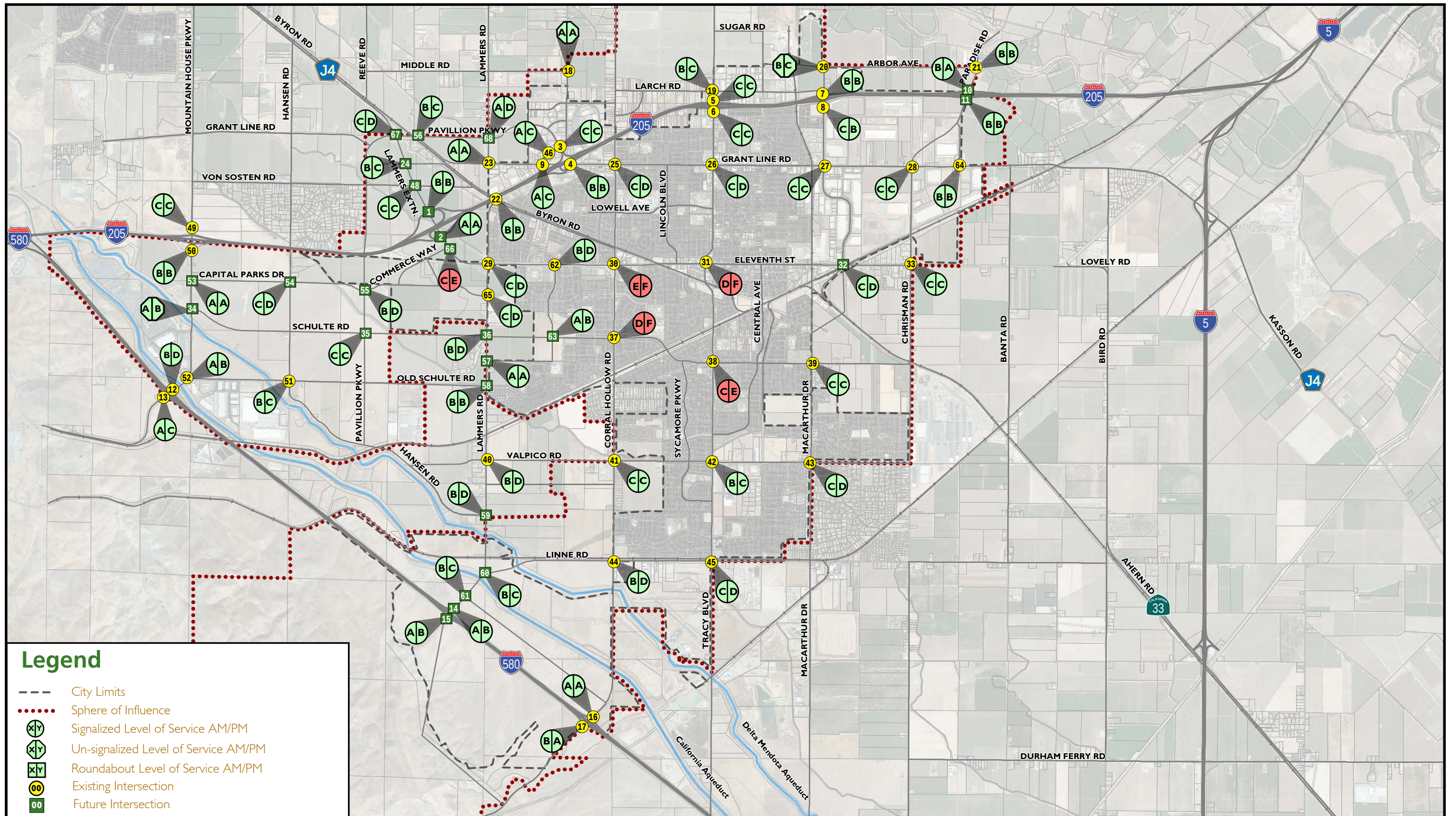


Figure 4: Horizon Year AM (PM) Level of Service
 City of Tracy Transportation Master Plan



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Cordes Ranch Specific Plan Buildout Conditions

Figure 5 indicates the Buildout volumes at the two interchanges for the AM and PM peak hours. Three alternatives were developed for buildout conditions for the I-205/Mountain House Parkway interchange. The improvements for buildout conditions include widened bridges at both interchanges, the construction of multi-lane loop onramps, and ramp metering. Auxiliary lanes will also be constructed to provide adequate deceleration and acceleration distance for vehicles existing and entering the freeways.

Figure 5: Buildout Volumes and Lane Configurations

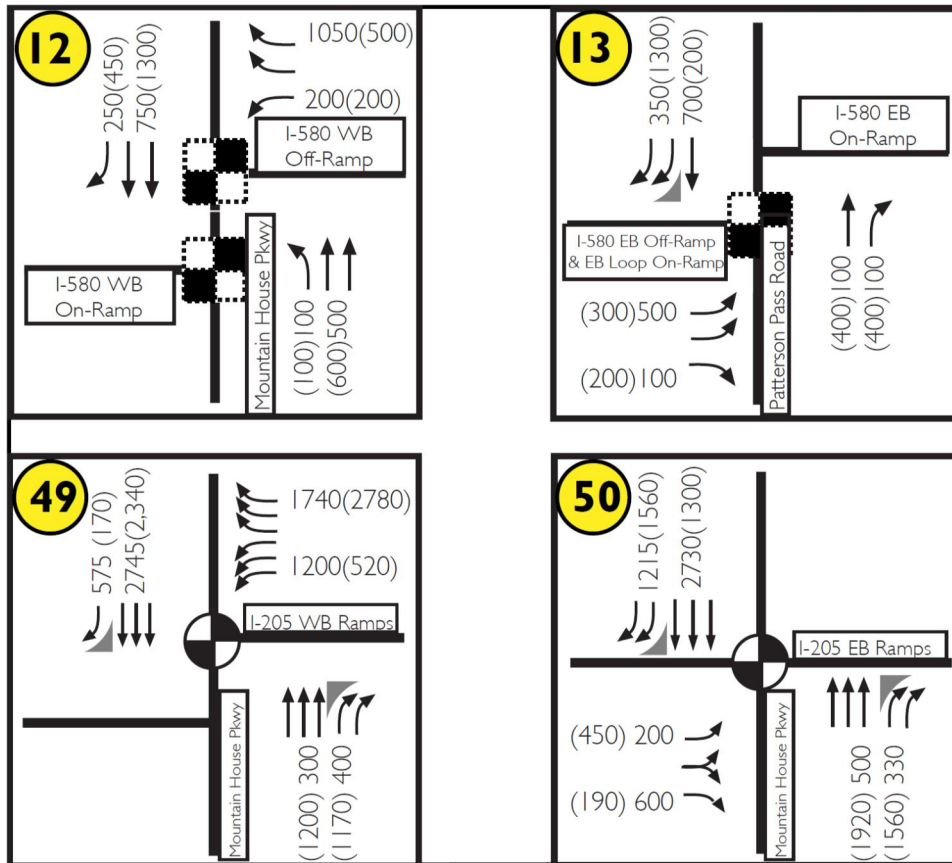


Table 1 indicates the development scenario LOS for the interchanges, including the alternatives for the I-205/ Mountain House Parkway interchange. The layouts of the various alternatives and the worksheets for the LOS analysis are shown in the Appendix.

Table 1: Existing and Horizon Year Intersection Delays and Levels of Service

Year	Number	Intersection	Control Type	Delay		LOS	
				AM	PM	AM	PM
Existing	49	I-205 WB Ramps/Mtn House Rd	Signal	8.2	7.6	A	A
	50	I-205 EB Ramps/Mtn House Rd	Signal	5.1	7.6	A	A
2035 + Phase I	49	I-205 WB Ramps/Mtn House Rd	Signal	27.1	27.0	C	C
	50	I-205 EB Ramps/Mtn House Rd	Signal	12.0	11.7	B	B
2035 + Buildout with controlled ramp intersections and existing bridge	49	I-205 WB Ramps/Mtn House Rd	Signal	44.0	97.6	D	F
	50	I-205 EB Ramps/Mtn House Rd	Signal	36.0	34.8	D	C
2035 + Buildout with controlled ramp intersections and widened bridge	49	I-205 WB Ramps/Mtn House Rd	Signal	24.0	68.2	C	E
	50	I-205 EB Ramps/Mtn House Rd	Signal	21.2	14.9	C	B
2035 + Buildout with free loop on-ramps and existing bridge	49	I-205 WB Ramps/Mtn House Rd	Signal	37.6	31.5	D	C
	50	I-205 EB Ramps/Mtn House Rd	Signal	20.3	11.6	C	B
2035 + Buildout	12	I-205 WB Off Ramps/Mtn House Rd/Patterson Pass Rd	Signal	16.0	16.5	B	B
	12	I-205 WB On Ramps/Mtn House Rd/Patterson Pass Rd	Signal	4.1	6.2	A	A
	13	I-205 EB Ramps/Mtn House Rd/Patterson Pass Rd	Signal	19.4	10.2	B	B

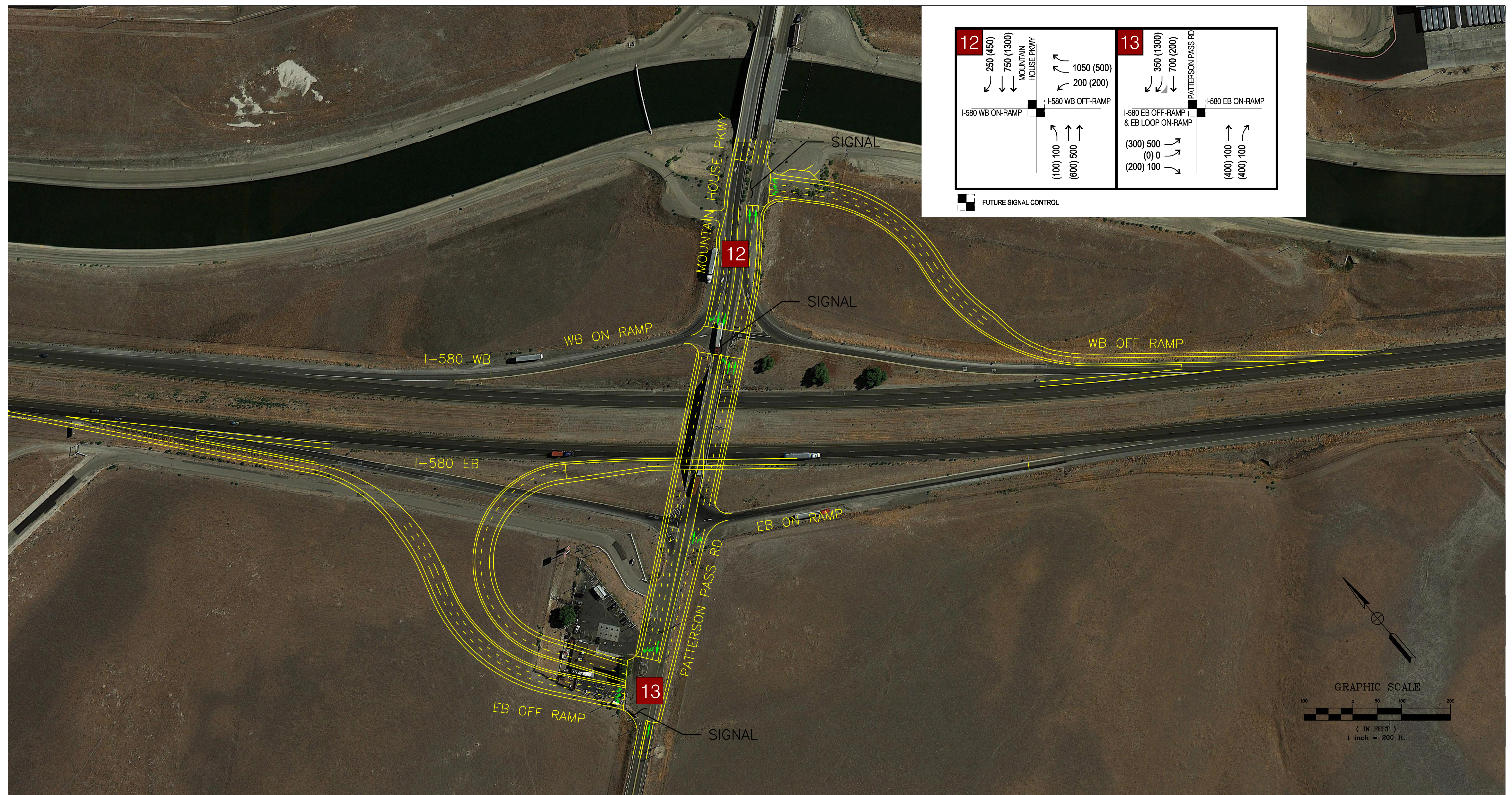
The following improvements are required at the I-205/Mountain House Parkway interchange to accommodate growth in traffic:

- Widening of the Mountain House Parkway Overpass
- Construction of a westbound loop on ramp and construction of a new intersection
- Relocation and widening of the westbound off ramp
- Restriping of the eastbound off ramp
- Widening of the eastbound on ramp
- Restriping the northbound approach at the eastbound ramps to include two free right turn lanes
- Signalizing the intersections

The I-580/Patterson Pass Road - Mountain House Parkway interchange will also be improved for buildout conditions and include the following:

- Widening of the Patterson Pass Road/Mountain House Parkway Overpass
- Construction of an eastbound loop on ramp
- Relocation of the eastbound and westbound off ramps and reconstruction of the respective intersections
- Signalizing the intersections

Concept layouts of the two interchanges are indicated in **Figure 6** and **Figure 7**.



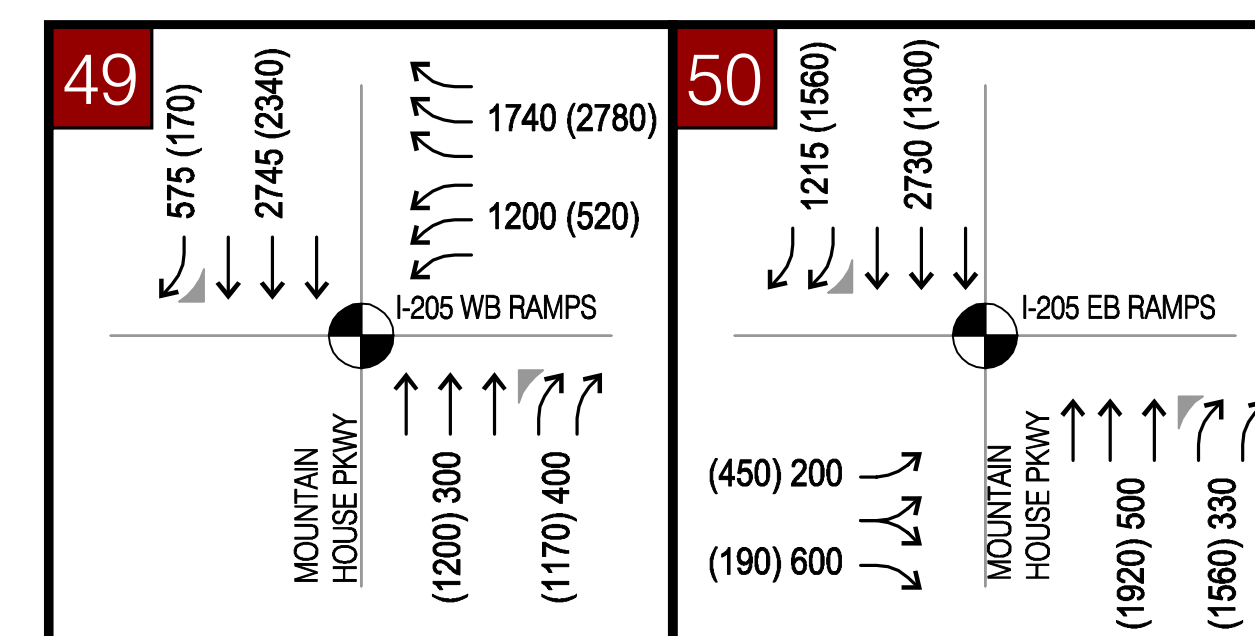
I-580/PATTERSON PASS INTERCHANGE IMPROVEMENTS

FIGURE 6

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EXISTING SIGNAL CONTROL

I-205/MOUNTAINHOUSE PKWY INTERCHANGE IMPROVEMENTS
BRIDGE WIDENING AND OFF RAMP IMPROVEMENTS

FIGURE 7

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Cost Estimates

The aforementioned interchange improvement costs were added to the TMP implementation plan. Chapter 5 of the TMP initially provided cost estimates for the following facilities:

- Overpasses/Underpasses/Bridges/Culverts
- Intersections
- Roadway Segments
- Intelligent Transportation System
- Railroad Crossings

With the addition of the two interchanges, the total cost for TMP Infrastructure improvements is approximately \$830 million, as shown in **Table 2** below.

Table 2: Total Preliminary Cost Estimates for Horizon Year TMP Infrastructure

Description	Preliminary Cost Estimate
Overpasses/Underpasses/Bridges/Culverts	\$ 205,022,000
Intersections	\$ 206,233,860
Roadway Segments (Program Costs) ¹	\$ 400,550,899
Intelligent Transportation System	\$ 18,563,300
Total Cost of Improvements²	\$ 830,370,059
Grant Administration	\$ 12,000,000
RTIF Off-set	(\$ 75,000,000)
Measure K	(\$40,000,000)
Grant Funding Off-set	(\$ 160,000,000)
Transportation Master Plan Program	\$ 562,370,059
¹ Program costs refer to the portion of roadway segment improvements that will be funded by the city.	
² Total includes funding from Capital Improvement Program (CIP) or other funding sources.	

Table 3 shows the updated cost estimates for overpasses, underpasses, bridges, and culverts, which includes the improvements to these two interchanges. **Table 4** shows the updated costs for intersections. Intersections #12 and #13, have been removed from this table as their costs were included in the updated overpass cost estimate. **Tables 5 and 6** show the cost estimates for roadway segments and ITS infrastructure, respectively.

Table 3: Preliminary Cost Estimates for Overpass/Underpass/Bridge/Culvert

Type/Location	Replace or Widen	Length (Ft)	Existing Width (Ft)	Water Channel/ Freeway Length (Ft)	Future (BUILDOUT)						BO/Horizon Year	Future Area (ft ²)	Structure and Earthwork Cost	ROW Area (Ft ²)	ROW/Easement Cost	Total Cost	CIP Funding	
					Travel Width	# Lanes	S/W (Ft.)	Bike Facility	Bike Width (Ft.)	K Rail & Sep (Ft.)	Total Width (Ft)						Project #	Amount (c)
Overpass/Underpass																		
I-580/Corral Hollow Road	Replace Bridge	350	34	155	52	4	5	lanes	10	4	80	28,000	\$ 12,600,000	8,970	\$ 31,000	\$ 12,631,000		
I-580/Lammers Road	New Overcrossing	350	0	0	86	6	5	path	10	6	107	37,450	\$ 16,853,000	37,450	\$ 129,000	\$ 16,982,000		
I-205 Pavilion Parkway overcrossing	New Overcrossing	350	0	155	52	4	5	path	10	6	80	28,000	\$ 12,600,000	15,600	\$ 54,000	\$ 12,654,000		
I-580/Mountain House/Patterson Pass overcrossing	Bridge Widening															\$ 17,525,000		
I-205/Paradise Road	Replace Bridge	290	34	155	52	4	5	path	10	6	80	23,200	\$ 10,440,000	6,210	\$ 21,000	\$ 10,461,000		
I-205/Mountain House overcrossing	Bridge Widening															\$ 13,465,000		
Railroad Crossings																		
Lammers Road Railroad Crossing #2	New Bridge	100	0	100	86	6	5	path	10	6	107	10,700	\$ 3,242,000	10,700	\$ 37,000	\$ 3,279,000		
11th Street/MacArthur Drive #9	New Bridge															\$ 29,000,000		\$ 20,000,000
Chrisman Road Railroad Crossing at #22	New Bridge	100	0	100	86	6	5	path	10	6	107	10,700	\$ 3,242,000	10,700	\$ 37,000	\$ 3,279,000		
Hansen Road Railroad Crossing #23	New Bridge	100	0	100	86	6	5	path	10	6	107	10,700	\$ 3,242,000	10,700	\$ 37,000	\$ 3,279,000		
Lammers Road at Valpico Road #1	Widen from 2-4 lanes															\$ 300,000		
Corral Hollow Road north of Linne Road # 5	Widen from 2-4 lanes															\$ 300,000		
Tracy Boulevard north of Linne Road #8	Widen from 2-4 lanes															\$ 300,000		
MacArthur Drive south of 6th Street #15	Close, keep bike, ped															\$ 150,000		
Chrisman Road at Schulte Road #16	Widen from 2-4 lanes															\$ 300,000		
MacArthur Drive Extension #21	New 4 lane crossing															\$ 500,000		
Lammers Road at Byron Road #26 relocate: Grant Line	Relocate 2 Lane Crossing															\$ 300,000		
Bridges																		
Delta Mendota Canal/Mountain House Parkway	Widen	335	36	115	64	4	0	path	10	4	78	14,070	\$ 4,263,000	14,070	\$ 16,000	\$ 4,279,000		
California Aqueduct/Mountain House Parkway	Widen	350	72	115	86	6	0	path	10	4	100	9,800	\$ 4,410,000	6,580	\$ 23,000	\$ 4,433,000		
Delta Mendota Canal/Old Schulte Road	Widen	325	49	110	71	4	0	path	10	4	85	11,700	\$ 3,545,000	11,700	\$ 13,000	\$ 3,558,000		
Delta Mendota Aqueduct/Lammers Road	Replace	130	26	105	86	6	0	path	10	4	100	13,000	\$ 5,850,000	9,620	\$ 11,000	\$ 5,861,000		
California Aqueduct/Lammers Road	Replace	170	24	130	86	6	0	path	10	4	100	17,000	\$ 7,650,000	12,920	\$ 15,000	\$ 7,665,000		
Delta Mendota Canal/Corral Hollow Road	Replace	130	29	105	52	4	0	path	10	4	66	8,580	\$ 3,861,000	4,810	\$ 6,000	\$ 3,867,000	73PP-054	\$ 446,000
California Aqueduct/Corral Hollow Road	Replace	220	35	150	52	4	0	path	10	4	66	14,520	\$ 6,534,000	6,820	\$ 8,000	\$ 6,542,000		
Culvert																		
Upper Main Canal/Lammers Road	Widen	65	93	30	86	4	0	path	10	4	100	455	\$ 138,000	455	\$ 1,000	\$ 139,000		
Upper Main Canal/Corral Hollow Road	none	60	0	0	0	4	0	path	0	0	0	-	\$ -	0	\$ -	\$ -		
Subtotal													\$ 98,470,000		\$ 439,000	\$ 161,049,000		\$ 20,446,000
Contingencies (15%)																\$ 24,157,000		
Engineering Design and Planning (10%)																\$ 16,105,000		
Construction Management (10%)																\$ 16,105,000		
Program Administration (5%)																\$ 8,052,000		
Grand Total																\$ 225,468,000		
Grand Total (With CIP Funding)																\$ 205,022,000		
Notes:																		
I-580/Mountain House/Patterson Pass and I-205/Mountain House Overpass/Interchange costs were estimated using a separate spreadsheet. Soft costs were estimated at a total of \$4,050,000 per overpass/interchange. Part of that sum was included in the "Engineering Design and Planning (10%)" cost included on this spreadsheet.																		
RR Bridge crossing : include 100% of bridge cost for earthwork estimate.																		
RR Crossing #24, Pavillion Parkway east of Lammers cost included in intersection improvements.																		
RR Crossing #9, MacArthur Drive at 11th RR crossing included in Overpass.																		
Freeway overpasses and Lammer canal widening include 50% cost for earthwork/approaches.																		
Length includes tapers/transition to main roadway.																		
ROW cost of \$150,000/acre assumed for overpass/underpass. Construction easement cost of \$50,000/acre assumed for bridges and culverts.																		
New structure cost of \$300/s.f. includes includes both the superstructure and substructure and assumes low structure height, no environmental constraints or aesthetic issues, dry conditions, no bridge skews, spread footings, and no stage construction. Widening structure cost of \$350/s.f.																		

Table 4: Preliminary Cost Estimates for Intersections

Number	Intersection	Preliminary Cost Estimate	CIP #	CIP Funding	Amount Funded by TIF
1	I-205 WB Ramps/Lammers Extension	See Int #2			
2	I-205 EB Ramps/Lammers Extension	\$ 55,423,000			\$ 55,423,000
3	I-205 WB Ramps/Naglee Road	\$ 45,000			\$ 45,000
4	I-205 EB Ramps/Grant Line Road	\$ 19,000,000			\$ 19,000,000
5	I-205 WB Ramps/Tracy Boulevard	\$ 339,000	72PP-064	\$ 303,171	\$ 35,891
6	I-205 EB Ramps/Tracy Boulevard	\$ 316,000			\$ 316,483
7	I-205 WB Ramps/MacArthur Drive	\$ 14,441,000		\$ 14,441,311	\$ -
8	I-205 EB Ramps/MacArthur Drive	See Int #7			
9	Naglee Road (I-205 WB Ramps) /Grant Line Road	\$ 412,000			\$ 412,066
10	I-205 WB Ramps/Chrisman	\$ 24,000,000			\$ 24,000,000
11	I-205 EB Ramps/Chrisman	See Int #10			
12	I-580 WB Ramps/Mountain House Parkway	N/A*			\$ -
13	I-580 EB Ramps/Patterson Pass Road	N/A*			\$ -
14	I-580 WB Ramps/Lammers Road	\$ 2,804,000			\$ 2,803,646
15	I-580 EB Ramps/Lammers Road	\$ 2,577,000			\$ 2,577,317
16	I-580 WB Ramps/Corral Hollow Road	\$ 316,000	72PP-030	\$ 479,862	\$ (163,379)
17	I-580 EB Ramps/Corral Hollow Road	\$ 475,000			\$ 474,724
18	Naglee Road/Middle Road	N/A*			\$ -
19	Larch Road/Tracy Boulevard	\$ 719,000			\$ 718,888
20	MacArthur Drive/Arbor Avenue	N/A*			\$ -
21	Paradise Road / Arbor Avenue	\$ 1,058,000			\$ 1,057,931
22	Lammers Road/Byron Road	\$ 745,000			\$ 744,965
23	Lammers Road/Grant Line Road	\$ 849,000			\$ 849,448
24	Byron Extension/Lammers Extension	\$ 5,451,000			\$ 5,451,000
25	Corral Hollow Road/Grant Line Road	\$ 43,000	72PP-017	\$ 319,200	\$ (276,450)
26	Tracy Boulevard/Grant Line Road	\$ 301,000	72018		\$ 300,659
27	MacArthur Drive/Grant Line Road	N/A*			\$ -
28	Chrisman Avenue/Grant Line Road	\$ 1,179,000	72PP-040	\$ 385,400	\$ 793,222
29	Lammers Road/Eleventh Street	\$ 236,000	72024/7205	\$ 200,000	\$ 35,829
30	Corral Hollow Road/Eleventh Street	\$ 45,000		\$ 122,750	\$ (77,750)
31	Tracy Boulevard/Eleventh Street	N/A*			\$ -
32	MacArthur Drive/Eleventh Street (North)	See Table 2			\$ -
33	Chrisman Avenue/Eleventh Street (South)	\$ 551,000			\$ 551,207
34	Mountain House Parkway/ Schulte Road	\$ 313,000			\$ 312,965
35	Pavillion Extension/Schulte Road	\$ 1,319,000			\$ 1,318,896
36	Lammers Road/Schulte Road	\$ 2,425,000	72068	\$ 361,800	\$ 2,063,027
37	Corral Hollow Road/Schulte Road	\$ 386,000	72016	\$ 167,053	\$ 219,106
38	Tracy Boulevard/Schulte Road	\$ 158,000			\$ 158,241
39	MacArthur Drive/Schulte Road	\$ 752,000			\$ 751,646
40	Lammers Road/Valpico Road	\$ 1,625,000			\$ 1,624,597
41	Corral Hollow Road/Valpico Road	\$ 1,104,000	72PP-053	\$ 1,230,721	\$ (126,428)
42	Tracy Boulevard/Valpico Road	N/A*	72038		\$ -
43	MacArthur Drive/Valpico Road	\$ 158,000	72037		\$ 158,241
44	Corral Hollow Road/Linne Road	\$ 8,945,000		\$ 422,132	\$ 8,522,868
45	Tracy Boulevard/Linne Road	\$ 3,544,000		\$ 178,291	\$ 3,365,709
46	Naglee Road/Park and Ride	N/A*			\$ -
48	Lammers Extension/Van Sosteen	\$ 2,219,000			\$ 2,219,231

Notes: Ints 1 & 2 costs obtained for Alternative 6 from I-205/Lammers Road PSR (January 2006)
The cost of the Intersection #12 and #13 roundabouts are included in the overpass cost.
*N/A indicates no intersection improvements identified in the Tracy Transportation Master Plan

Table 4 (Cont.): Preliminary Cost Estimates for Intersections

Number	Intersection	Preliminary Cost Estimate	CIP #	CIP Funding	Amount Funded by TIF
51	Hansen Road/Old Schulte Road	\$ 807,000			\$ 806,976
52	Mountain House Parkway/Schulte Road	N/A*			\$ -
53	Mountain House Parkway/Capital Parks Drive	\$ 708,000			\$ 707,717
54	Hansen Road/Capital Parks Drive	\$ 1,277,000			\$ 1,277,422
55	Pavillion Extension/Capital Parks Drive	\$ 2,120,000			\$ 2,119,973
56	Pavillion Extension/Grant Line Extension	\$ 19,865,000			\$ 19,865,000
57	Lammers Road/Crossroads Drive	\$ 1,179,000			\$ 1,178,622
58	Lammers Road/Schulte Road	\$ 1,396,000			\$ 1,395,680
59	Lammers Road/Ellis Drive	\$ 1,625,000			\$ 1,624,597
60	Lammers Road/Linne Road	\$ 1,922,000			\$ 1,921,914
61	Lammers Road/South Aqueduct Road	\$ 1,922,000			\$ 1,921,914
62	Crossroads Drive/Eleventh Street	N/A*			\$ -
63	Crossroads Drive/Schulte Road	\$ 1,625,000			\$ 1,624,597
64	Paradise Road/Grant Line Road	\$ 1,030,000			\$ 1,029,963
65	Lammers Road/Capital Parks Drive	\$ 1,594,000			\$ 1,593,739
66	Lammers Road/Commerce Way	\$ 2,962,000			\$ 2,962,066
67	Pavillion Parkway/Lammers Extension	\$ 18,172,000			\$ 18,172,000
68	Pavillion Parkway/Lammers Road	\$ 1,402,000			\$ 1,401,610
a	Hansen Road/Schulte Road	\$ 435,000			\$ 435,329
b	Pavillion Parkway/Grant Line Road	\$ 510,000			\$ 509,659
c	Pavillion Parkway/Von Sosten Road	\$ 658,000			\$ 658,317
d	Pavillion Parkway/Old Schulte Road	\$ 584,000			\$ 583,988
e	Pavillion Parkway/Hansen Road	\$ 584,000			\$ 583,988
f	Commerce Way (West)/Capital Parks Drive	\$ 733,000			\$ 732,646
g	Commerce Way (East)/Capital Parks Drive	\$ 658,000			\$ 658,317
h	Hansen Road/Valpico Road	\$ 658,000			\$ 658,317
i	Lammers Road/Connector Road(South Valpico)	\$ 881,000			\$ 881,305
j	Linne Road/Delta Mendota Link Road	\$ 881,000			\$ 881,305
k	Corral Hollow Road/Delta Mendota Link Road	\$ 733,000			\$ 732,646
l	MacArthur Drive/MacArthur Drive (North)	\$ 658,000			\$ 658,317
m	Chrisman Road/Valpico Road	\$ 149,000		\$ 241,071	\$ (92,412)
n	Chrisman Road/Schulte Road	\$ 807,000			\$ 806,976
o	Chrisman Road/Paradise Road	\$ 520,000			\$ 520,305
p	Corral Hollow Road/Larch Road	\$ 677,000			\$ 677,317
q	Corral Hollow Road/Auto Plaza Drive	\$ 881,000			\$ 881,305
r	Naglee Road/Auto Plaza Drive	\$ 510,000		\$ 309,008	\$ 200,651
	Total	\$ 225,396,000		\$ 19,161,770	\$ 206,233,860
Notes: Ints 1 & 2 costs obtained for Alternative 6 from I-205/Lammers Road PSR (January 2006) The cost of the Intersection #12 and #13 roundabouts are included in the overpass cost. *N/A indicates no intersection improvements identified in the Tracy Transportation Master Plan					

Table 5: Preliminary Cost Estimates for Roadway Segments

Segment	From	To	Roadway Type	Program Cost
Construction of New Roadways				
Capital Parks Dr	Mountain House Pkwy	New Street	new 4L undiv Arterial	\$ 2,650,000
Capital Parks Dr	New Street	Hansen Rd	new 4L undiv Arterial	\$ 2,590,000
Capital Parks Dr	Hansen Rd	Pavilion Ext	new 4L undiv Arterial	\$ 3,940,000
Capital Parks Dr	Pavilion Ext	New Street	new 4L undiv Arterial	\$ 1,860,000
Capital Parks Dr	New Street	New Street	new 4L undiv Arterial	\$ 2,310,000
Capital Parks Dr	New Street	New Street	new 4L undiv Arterial	\$ 1,870,000
Capital Parks Dr	New Street	Lammers Rd	new 6L Arterial	\$ 1,700,000
New Schulte Rd	Mountain House Pkwy	New Street	new 4L div Arterial	\$ 8,350,000
New Schulte Rd	New Street	Hansen Rd	new 4L div Arterial	\$ 3,750,000
New Schulte Rd	Hansen Rd	Pavilion Ext	new 4L div Arterial	\$ 8,660,000
New Schulte Rd	Pavilion Ext	New Street	new 4L div Arterial	\$ 5,130,000
New Schulte Rd	New Street	New Street	new 4L div Arterial	\$ 2,390,000
New Schulte Rd	Lammers Rd	Crossroads Dr	new 4L div Arterial	\$ 6,720,000
New Schulte Rd	Crossroads Dr	Edge of Development	new 4L div Arterial	\$ 2,310,000
New E-W Street (south of Valpico)	Wilkinson Wy	Corral Hollow Rd	new 2L Collector	\$ 1,370,000
Linne Rd	Lammers Rd	Light Industrial Rd	new 4L Parkway	\$ 1,480,000
Linne Rd	Light Industrial Rd	Corral Hollow Rd	new 4L Parkway	\$ 14,510,000
Light Industrial Rd	Linne Rd	Corral Hollow Rd	new 4L undiv Arterial	\$ 7,240,000
Aqueduct Rd	Lammers Rd	Corral Hollow Rd	new 4L undiv Arterial	\$ -
Ellis Dr	Lammers Rd	Wilkinson Wy	new 2L Collector	\$ -
Ellis Dr	Wilkinson Wy	Corral Hollow Rd	new 2L Collector	\$ -
Wilkinson Wy	Valpico Rd	New Street	new 2L Collector	\$ -
Wilkinson Wy	New Street	Ellis Dr	new 2L Collector	\$ -
Wilkinson Wy	Ellis Dr	Corral Hollow Rd	new 2L Collector	\$ -
Pavilion Pkwy	Grant Line Rd	Byron Rd/11th St	new 4L Arterial	\$ 600,000
Pavilion Pkwy	Byron Rd/11th St	Grant Line Rd/RR		\$ -
Pavilion Pkwy	Grant Line Rd/RR	Lammers Rd	new 6L Arterial	\$ 7,130,000
Pavilion Pkwy	Lammers Rd	Power Rd	new 4L Arterial	\$ 4,960,000
Byron Rd	Pavilion Ext	Byron Rd/11th St	new 2L Arterial	\$ 1,100,000
Byron Rd	Byron Rd/11th St	Byron Rd	new 2L Arterial	\$ 3,040,000
New Street	Property Line	Larch Rd	new 4L undiv Arterial	\$ 1,050,000
Power Rd	Pavilion Pkwy	Grant Line Rd	new 6L Arterial	\$ 4,430,000
Chrisman Rd	Grant Line Rd	Paradise Rd	new 4L Parkway	\$ 7,420,000
Auto Plaza Ext	Power Rd	Naglee Rd	new 4L undiv Arterial	\$ 2,290,000
Auto Plaza Ext	Naglee Rd	Corral Hollow Rd	new 4L undiv Arterial	\$ 2,920,000
Lammers Ext	Byron Rd	Pavilion Pkwy		\$ -
Lammers Ext	Pavilion Pkwy	Byron Rd	new 6L Parkway	\$ 3,270,000
Lammers Ext	Byron Rd	Von Sosten Rd	new 6L Parkway	\$ 2,380,000
Lammers Ext	Von Sosten Rd	I-205 On/Off Ramps	new 6L Parkway	\$ 3,250,000
Lammers Ext	I-205 On/Off Ramps	I-205 On/Off Ramps		\$ -
Lammers Ext	I-205 On/Off Ramps	Commerce Wy	new 6L Parkway	\$ 600,000
Lammers Ext	Commerce Wy	11th St	new 8L Parkway	\$ 3,380,000
Pavilion Ext	Grant Line Rd	Byron Rd	new 4L Arterial	\$ 1,750,000
Pavilion Ext	Byron Rd	Von Sosten Rd	new 4L Arterial	\$ 1,890,000
Pavilion Ext	Rancho Ramon Dr	I-205	new 4L Arterial	\$ 2,200,000
Pavilion Ext	I-205	Capital Parks Dr	new 4L Arterial	\$ 2,800,000
Pavilion Ext	Capital Parks Dr	Schulte Rd	new 4L Arterial	\$ 2,970,000
Pavilion Ext	Schulte Rd	Old Schulte Rd	new 4L Arterial	\$ 4,040,000
Pavilion Ext	Property Line	Hansen Rd	new 4L Arterial	\$ 2,150,000
Rancho Ramon Ext	Pavilion Ext	Property Line	new 2L Collector	\$ -
Rancho Ramon Ext	Property Line	Von Sosten Rd	new 2L Collector	\$ -
Rancho Ramon Ext	Von Sosten Rd	Grant Line Rd	new 2L Collector	\$ -
Commerce Wy	Byron Rd/11th St	New Street	new 6L Parkway	\$ 3,040,000
Commerce Wy	New Street	Capital Parks Dr	new 4L undiv Arterial	\$ 570,000
Commerce Wy	Capital Parks Dr	Schulte Rd	new 4L undiv Arterial	\$ -
New Street	Commerce Wy	Capital Parks Dr	new 4L undiv Arterial	\$ 1,760,000
Crossroads Dr	Lammers Rd	Curve	new 2L Arterial	\$ 5,450,000
Crossroads Dr	Curve	Schulte Rd	new 2L Arterial	\$ 1,580,000
Crossroads Dr	Schulte Rd	Property Line	new 4L Arterial	\$ 1,950,000
MacArthur Dr	11th St	Curve	new 4L undiv Arterial	\$ 2,470,000
MacArthur Dr	Curve	MacArthur Dr	new 4L undiv Arterial	\$ 2,320,000
Lammers Rd	I-580 EB Ramp	Old Schulte Road	new 4L Parkway	\$ 22,390,000
Larch Rd	Corral Hollow Rd	Tracy Blvd	new 4L undiv Arterial	\$ 5,590,000
Larch Rd	Tracy Blvd	east terminus	new 4L undiv Arterial	\$ 4,540,000
New E-W Street (s/o Capital Parks)	New Street	New Street	new 4L undiv Arterial	\$ -
New Street (bet MHP & Hansen)	Capital Parks Dr	Old Schulte Rd	new 2L Collector	\$ -
New Street (w/o Lammers)	Capital Parks Dr	Old Schulte Rd	new 4L undiv Arterial	\$ -
Mountain House Parkway	I-205	Capital Parks Dr	new 4L Parkway	\$ 2,640,000
Mountain House Parkway	Capital Parks Dr	Schulte Rd	new 2L Parkway	\$ 2,550,000
Mountain House Parkway	Schulte Rd	Old Schulte Rd	widen to 4L Parkway	\$ 3,860,000

Note: Structural costs (e.g. retaining walls) are not included. Traffic control systems and traffic signals are included in intersection or ITS costs.
 Costs include streetlight costs (\$16,000 per 250 ft) and utility coordination costs (\$20,000 for segments less than 2,500' or \$40,000 for segments > 2,500').
 Full curb-to-curb construction cost is included for: Mountain House Parkway, Old Schulte Road, New Schulte Road, Lammers Road, Linne Road, Chrisman Road, and Corral Hollow Road

Table 5 (Continued):

Segment	From	To	Roadway Type	Program Cost
Widening of Existing Roadways				
Hansen Rd	I-205 Overpass	Old Schulte Road	widen 2L to 4L undiv Arterial	\$ 9,710,000
Lammers Rd	s/o Middle	Grant Line Rd	widen 2L to 4L undiv Arterial	\$ 3,160,000
Lammers Rd	11th St	school	widen 2L to 6L Parkway	\$ -
Lammers Rd	school	school	widen 2L to 6L Parkway	\$ -
Lammers Rd	school	Old Schulte Rd	new 6L Parkway	\$ 8,550,000
Corral Hollow Rd	I-205	Grant Line Rd	widen 2L to 6L Arterial	\$ 2,450,000
Corral Hollow Rd	Grant Line Rd	11th St	widen 4L to 6L Arterial	\$ 11,280,000
Corral Hollow Rd	11th St	Schulte Rd	widen 4L to 6L Arterial	\$ 7,630,000
Corral Hollow Rd	Schulte Rd	RR	widen 2L to 6L Parkway	\$ 4,490,000
Corral Hollow Rd	RR	Valpico Rd	widen 2L to 4L Arterial	\$ 7,960,000
Corral Hollow Rd	Valpico Rd	Linne	widen 2L to 4L Arterial	\$ 8,650,000
Corral Hollow Rd	Linne Rd	I-580 VWB Ramp	widen 2L to 4L Arterial	\$ 13,460,000
Corral Hollow Rd	I-580 EB Ramp	Southern City Limit	widen 2L to 4L Arterial	\$ 3,570,000
Holly Dr	11th St	First St	restripe only	\$ 640,000
Chrisman	Grant Line Rd	11th St	widen 2L to 6L Parkway	\$ 9,430,000
Chrisman	11th St	Schulte Rd	widen 2L to 4L Parkway	\$ 10,160,000
Chrisman	Schulte Rd	Valpico	widen 2L to 4L Parkway	\$ 10,280,000
Grant Line	Byron Rd	Lammers Rd	widen 2L to 4L Arterial	\$ 2,720,000
Grant Line	Lammers Rd	Naglee Rd	widen 4L to 6L Arterial	\$ 3,330,000
Grant Line	Parker Dr	Holly St	widen 2L to 4L undiv Arterial	\$ -
Grant Line	w/o Chrisman Rd	Chrisman Rd	widen 2L to 4L undiv Arterial	\$ 2,810,000
Grant Line	Chrisman Rd	Paradise Rd	widen 2L to 4L undiv Arterial	\$ 2,080,000
Grant Line	Paradise Rd	Banta Rd	widen 2L to 6L Arterial	\$ 4,200,000
Lowell Dr	w/o Orchard	Corral Hollow Rd	widen 2L to 4L undiv Arterial	\$ 2,470,000
Schulte Rd	MacArthur Dr	Chrisman Rd	widen 2L to 4L undiv Arterial	\$ 6,910,000
Valpico Rd	east of Wilkinson Wy	Corral Hollow Rd	widen 2L to 4L Arterial	\$ 3,650,000
Valpico Rd	Corral Hollow Rd	w/o Sycamore Parkway	widen 2L to 4L Arterial	\$ 4,500,000
Valpico Rd	Tracy Blvd	Glenbriar Dr	widen 2L to 4L Arterial	\$ 4,430,000
MacArthur Dr	New Street	Schulte Rd	widen 2L to 4L Arterial	\$ 2,070,000
Linne Rd	Corral Hollow Rd	Tracy Blvd	widen 2L to 6L Parkway	\$ 12,910,000
Linne Rd	Tracy Blvd	w/o MacArthur Dr	widen 2L to 4L Parkway	\$ 7,130,000
Old Schulte Rd	Creek	Lammers Rd	new 2L Parkway	\$ 21,940,000
Segments Outside SOI Limits				
Schulte Rd	New Street	Lammers Rd	new 4L undiv Arterial	\$ 3,990,000
Valpico Rd	New Street	Lammers Rd	new 2L Arterial	\$ 6,600,000
Valpico Rd	Lammers	east of Wilkinson Wy	widen 2L to 4L Arterial	\$ 7,150,000
New East-West Street (south of Valpico)	Lammers Rd	Wilkinson Wy	new 2L Collector	\$ 390,000
Hansen Rd	Pavillion Ext	Valpico Rd	new 2L Arterial	\$ 4,410,000
Hansen Rd	Valpico Rd	Lammers Rd	new 2L Arterial	\$ 7,730,000
New North-South Rd	Schulte	Old Schulte	new 2L Collector	\$ 20,000
New North-South Rd	north of Schulte	Old Schulte	new 4L undiv Arterial	\$ 570,000
Commerce Wy	north of Valpico Rd	Valpico Rd	new 2L Collector	\$ 400,000
Subtotal New and Widening (Including Segments Outside SOI)				\$ 428,990,000
Temporary Sidewalks/Bike Paths				\$ 8,682,360
Other Funding Contribution (Gateway development)				\$ (2,373,197)
CIP Funding				\$ (34,748,264)
Total To Be Funded by TIF				\$ 400,550,899
Note: Structural costs (e.g. retaining walls) are not included. Traffic control systems and traffic signals are included in intersection or ITS costs. Costs include streetlight costs (\$16,000 per 250 ft) and utility coordination costs (\$20,000 for segments less than 2,500' or \$40,000 for segments > 2,500'). Full curb-to-curb construction cost is included for: Mountain House Parkway, Old Schulte Road, New Schulte Road, Lammers Road, Linne Road, Chrisman Road, and Corral Hollow Road				

Table 6: Preliminary Cost Estimates for Intelligent Transportation System Infrastructure

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST
FIBER OPTIC COMMUNICATION SYSTEM INSTALLATION (TRAFFIC MANAGEMENT IMPROVEMENTS ONLY)					
1	Furnish and Install 3" Conduit (Including Pull Boxes)	LF	212,500	\$35	\$7,437,500
2	Furnish and Install 144 Strand Singlemode Fiber Optic Cable	LF	413,000	\$4	\$1,652,000
3	Signalized Intersection Upgrades (Includes Splice Vault/Enclosure/Communication Equipment/Controller & Cabinet Modifications)	EA	109	\$20,000	\$2,180,000
4	Furnish and Install CCTV Camera System (includes CCTV Camera, Cables, Mounting and Video Encoder)	EA	53	\$15,000	\$795,000
5	Furnish and Install DMS System (Including Display/Sign Structure/Pole/Foundation/Splice Vault/Cabinet/Communication Equipment). This TMP includes the use of DMS signs on trailers on an "as needed" basis. Future updates may reassess the use of standard DMS signs.	EA	0	\$130,000	\$0
6	Furnish and Install Field Communication Hub (Including Splice Vault/Enclosure/Communication Equipment/Cabinet)	EA	4	\$30,000	\$120,000
SUBTOTAL					\$12,184,500
FIBER OPTIC COMMUNICATION SYSTEM INSTALLATION (PUBLIC WORKS DEPARTMENT)					
7	PUBLIC WORKS DEPARTMENT Furnish and Install Two (2) Workstations (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$50,000	\$50,000
SUBTOTAL					\$50,000
FIBER OPTIC COMMUNICATION SYSTEM INSTALLATION (WATER DEPARTMENT)					
8	WATER TREATMENT PLANT Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$45,000	\$45,000
SUBTOTAL					\$45,000
FIBER OPTIC COMMUNICATION SYSTEM INSTALLATION (PARKS/LIBRARY)					
8	TRACY SPORTS COMPLEX Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$50,000	\$50,000
9	EL PESCADERO PARK Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$50,000	\$50,000
10	TRACY BALL PARK Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$50,000	\$50,000
11	POWERS PARK Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Splice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	1	\$50,000	\$50,000

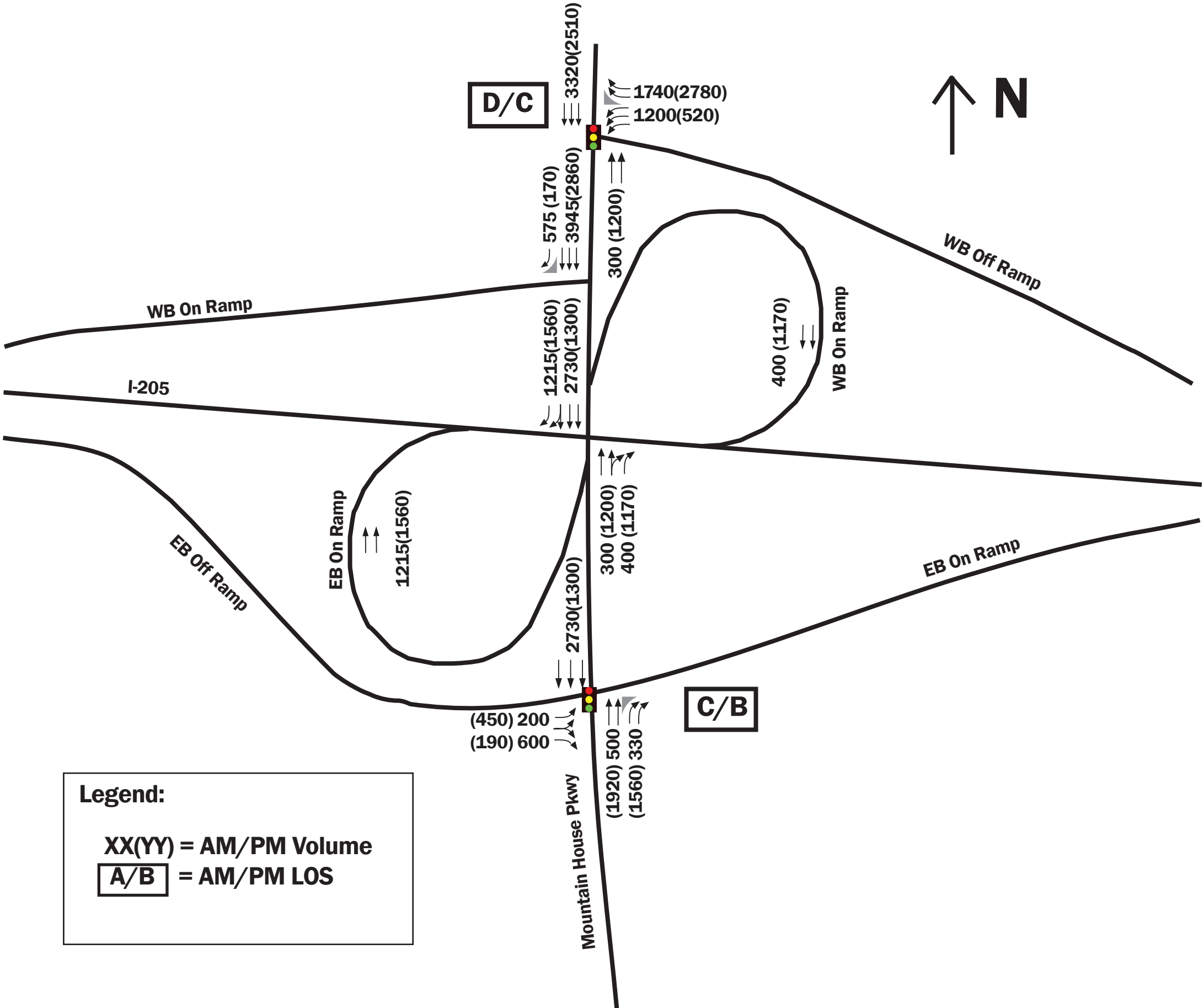
Table 6 (Continued):

	LINCOLN PARK Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$50,000	\$50,000
12					
13	TRACY PUBLIC LIBRARY Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$50,000	\$50,000
SUBTOTAL		\$300,000			
FIBER OPTIC COMMUNICATION SYSTEM INSTALLATION (FIRE DEPARTMENT/STATIONS)					
14	TRACY FIRE DEPARTMENT BUILDING Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$40,000	\$40,000
15	TRACY FIRE STATION NO. 1 Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$40,000	\$40,000
16	TRACY FIRE STATION NO. 6 Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$40,000	\$40,000
17	TRACY FIRE STATION NO. 7 Furnish and Install One (1) Workstation (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Communication Equipment/Equipment Rack/Ethernet Switch/Fiber Distribution Unit/Miscellaneous)	LS	I	\$40,000	\$40,000
SUBTOTAL		\$160,000			
CITY HALL - TRAFFIC MANAGEMENT CENTER					
18	TRAFFIC MANAGEMENT CENTER (TMC) Furnish and Install TMC (Including Fiber Optic Cable/Conduit/Spice Vault-Enclosure and Video Wall/Communication Equipment & Software/Furniture)	LS	I	\$400,000	\$400,000
SUBTOTAL		\$400,000			
OTHER COSTS ASSOCIATED WITH INTELLIGENT TRANSPORTATION SYSTEM					
19	Testing	LS	I	\$50,000	\$50,000
20	Training	LS	I	\$20,000	\$20,000
21	System Integration	LS	I	\$50,000	\$50,000
SUBTOTAL		\$120,000			
TOTAL - (ALL SUBTOTALS)		\$13,259,500			
40% CONTINGENCIES		\$5,303,800			
TOTAL - (ALL SUBTOTALS WITH CONTINGENCIES)		\$18,563,300			

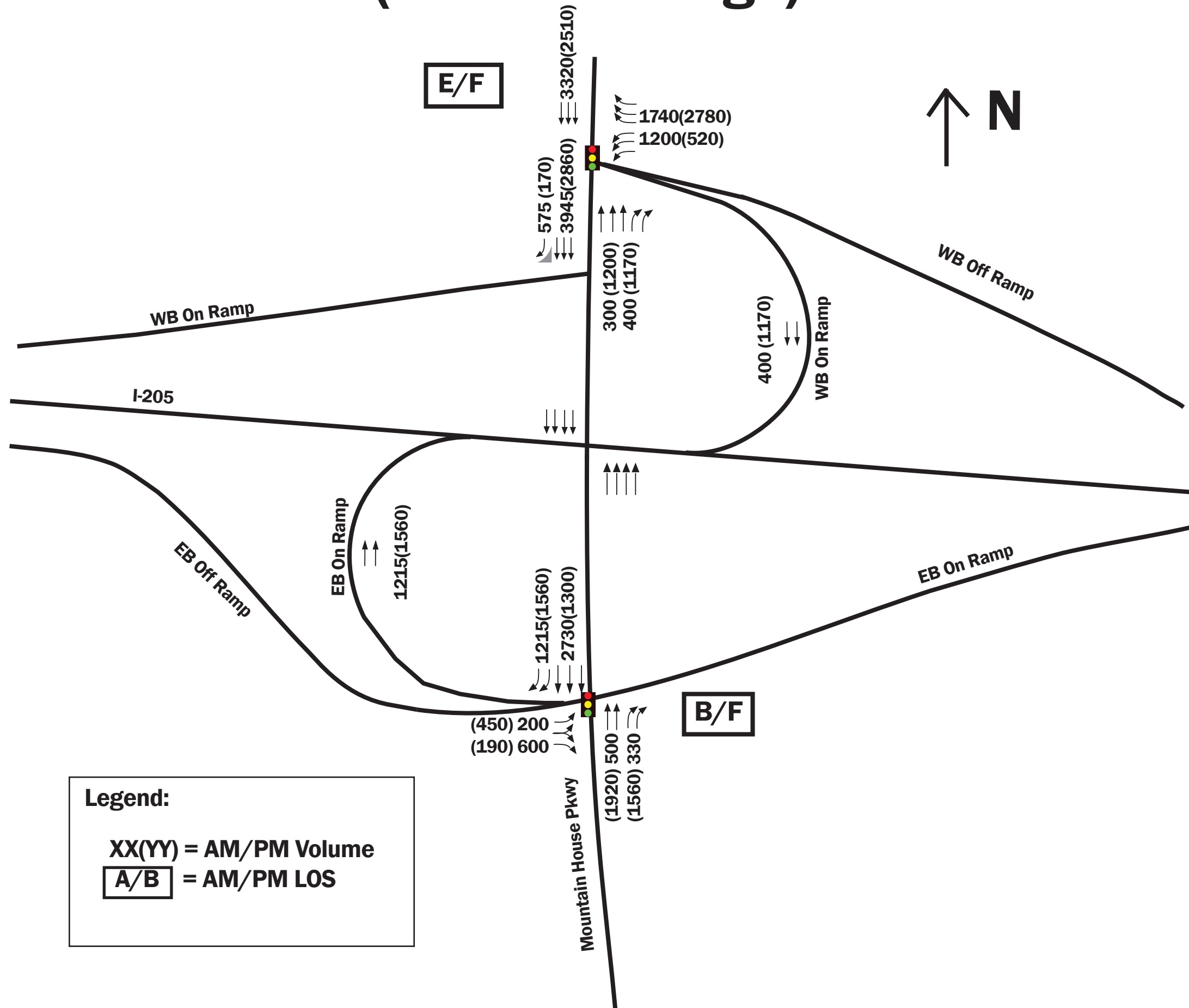
APPENDIX A

I-205/MOUNTAIN HOUSE BUILDOUT DRAWINGS

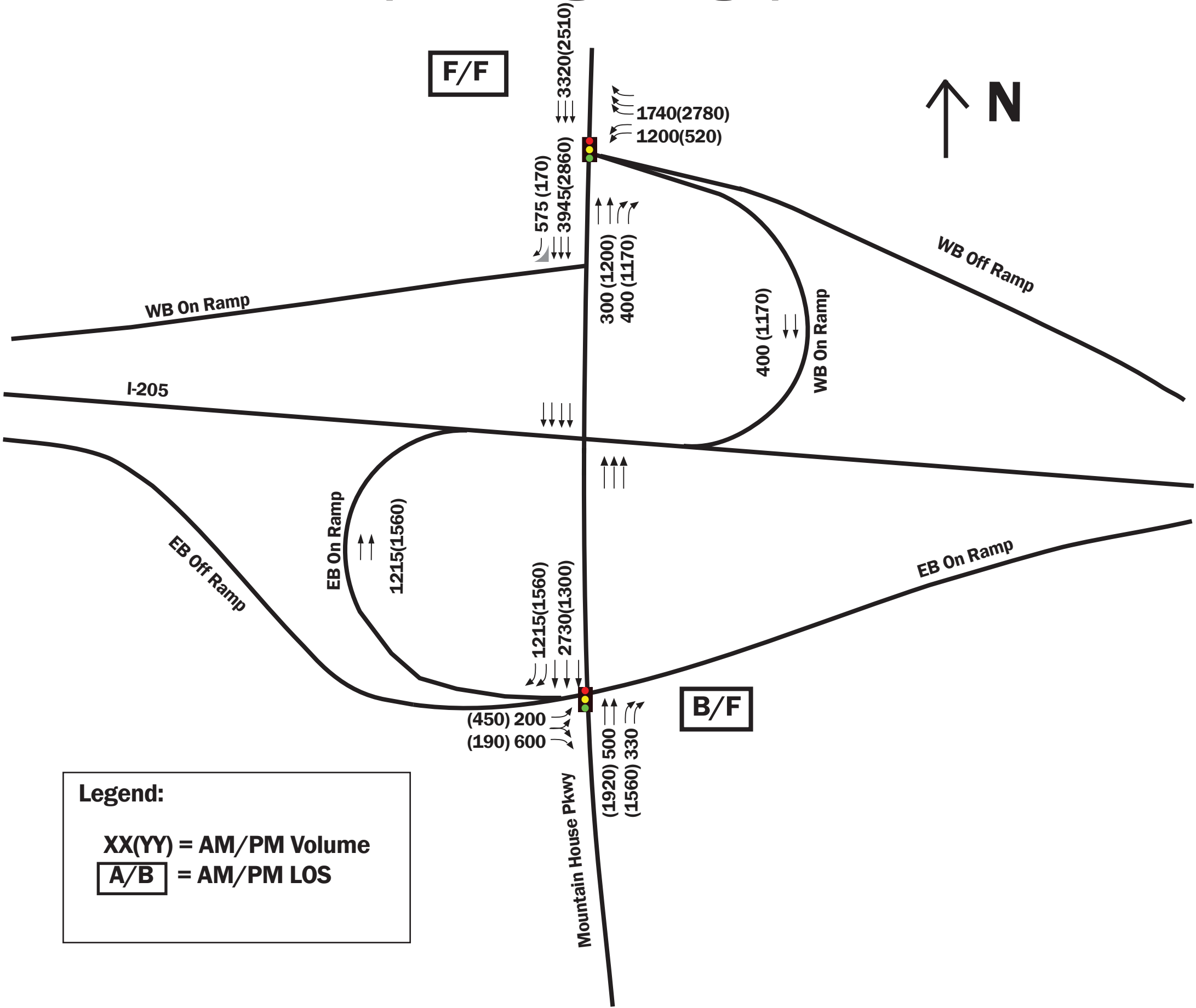
2035 + Buildout - Free Flow Ramps (Existing Bridge)



2035 + Buildout - Controlled Ramps (Widened Bridge)



2035 + Buildout - Controlled Ramps (Existing Bridge)



APPENDIX B
SYNCHRO WORKSHEETS

HCM Signalized Intersection Capacity Analysis

1: I-205 WB Ramps & Mountain House Parkway

2035 Plus Phase I
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗↘		↕↕	↗		↕↕↕	↗
Volume (vph)	0	0	0	610	0	1740	0	300	70	0	1670	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	2.9		4.0	5.7		4.0	2.3
Lane Util. Factor					1.00	0.88		0.95	1.00		0.91	1.00
Frpb, ped/bikes					1.00	1.00		1.00	0.95		1.00	0.99
Flpb, ped/bikes					1.00	1.00		1.00	1.00		1.00	1.00
Frt					1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected					0.95	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)					1641	2584		3282	1401		4715	1450
Flt Permitted					0.95	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)					1641	2584		3282	1401		4715	1450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	610	0	1740	0	300	70	0	1670	350
RTOR Reduction (vph)	0	0	0	0	0	189	0	0	50	0	0	0
Lane Group Flow (vph)	0	0	0	0	610	1551	0	300	20	0	1670	350
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type				Split		custom			Perm			Free
Protected Phases				8	8	1		2			6	
Permitted Phases						8			2			Free
Actuated Green, G (s)					34.1	50.1		25.1	25.1		45.1	90.0
Effective Green, g (s)					35.2	52.3		26.8	25.1		46.8	90.0
Actuated g/C Ratio					0.39	0.58		0.30	0.28		0.52	1.00
Clearance Time (s)					5.1	4.0		5.7	5.7		5.7	
Vehicle Extension (s)					2.3	3.0		4.0	4.0		4.0	
Lane Grp Cap (vph)					642	1585		977	391		2452	1450
v/s Ratio Prot					0.37	c0.19		0.09			c0.35	
v/s Ratio Perm						0.41			0.01			0.24
v/c Ratio					0.95	0.98		0.31	0.05		0.68	0.24
Uniform Delay, d1					26.5	18.3		24.4	23.7		16.1	0.0
Progression Factor					1.00	1.00		0.60	0.60		1.00	1.00
Incremental Delay, d2					23.8	17.5		0.8	0.2		1.6	0.4
Delay (s)					50.3	35.8		15.5	14.4		17.6	0.4
Level of Service					D	D		B	B		B	A
Approach Delay (s)		0.0			39.6			15.3			14.6	
Approach LOS		A			D			B			B	
Intersection Summary												
HCM Average Control Delay			27.1			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			6.9			
Intersection Capacity Utilization			81.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: I-205 EB Ramps & Mountain House Parkway

2035 Plus Phase I

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Volume (vph)	150	0	170	0	0	0	0	220	150	0	770	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1559	1559	1468					3282	1393		3282	
Flt Permitted	0.95	0.95	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1559	1559	1468					3282	1393		3282	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	150	0	170	0	0	0	0	220	150	0	770	0
RTOR Reduction (vph)	0	0	147	0	0	0	0	0	33	0	0	0
Lane Group Flow (vph)	75	75	23	0	0	0	0	220	117	0	770	0
Confl. Peds. (#/hr)									10			10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Split		Perm						Perm			
Protected Phases	4	4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)	9.2	9.2	9.2					70.0	70.0		70.0	
Effective Green, g (s)	9.2	9.2	9.2					70.0	70.0		70.0	
Actuated g/C Ratio	0.10	0.10	0.10					0.78	0.78		0.78	
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	
Lane Grp Cap (vph)	159	159	150					2553	1083		2553	
v/s Ratio Prot	c0.05	0.05						0.07			c0.23	
v/s Ratio Perm			0.02						0.08			
v/c Ratio	0.47	0.47	0.15					0.09	0.11		0.30	
Uniform Delay, d1	38.1	38.1	36.8					2.4	2.4		2.9	
Progression Factor	1.00	1.00	1.00					0.72	2.21		1.80	
Incremental Delay, d2	0.8	0.8	0.2					0.1	0.2		0.1	
Delay (s)	38.9	38.9	37.0					1.8	5.6		5.4	
Level of Service	D	D	D					A	A		A	
Approach Delay (s)		37.9			0.0			3.3			5.4	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM Average Control Delay			12.0				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)				10.8	
Intersection Capacity Utilization			91.9%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: I-205 WB On-Ramp & Mountain House Parkway

2035 Plus Phase I
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						 		 			   	
Volume (vph)	0	0	0	260	0	1830	0	800	240	0	2240	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	2.9		4.0	5.7		4.0	2.3
Lane Util. Factor					1.00	0.88		0.95	1.00		0.91	1.00
Frpb, ped/bikes					1.00	1.00		1.00	0.95		1.00	0.99
Flpb, ped/bikes					1.00	1.00		1.00	1.00		1.00	1.00
Frt					1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected					0.95	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)					1719	2707		3438	1467		4940	1519
Flt Permitted					0.95	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)					1719	2707		3438	1467		4940	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	260	0	1830	0	800	240	0	2240	160
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	187	0	0	0
Lane Group Flow (vph)	0	0	0	0	260	1825	0	800	53	0	2240	160
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Turn Type				Split		custom			Perm			Free
Protected Phases				8		8			2			6
Permitted Phases						8			2			Free
Actuated Green, G (s)					14.5	55.5		19.7	19.7		64.7	90.0
Effective Green, g (s)					15.6	57.7		21.4	19.7		66.4	90.0
Actuated g/C Ratio					0.17	0.64		0.24	0.22		0.74	1.00
Clearance Time (s)					5.1	4.0		5.7	5.7		5.7	
Vehicle Extension (s)					2.3	3.0		4.0	4.0		4.0	
Lane Grp Cap (vph)					298	1823		817	321		3645	1519
v/s Ratio Prot					0.15	c0.47		c0.23			0.45	
v/s Ratio Perm						0.21			0.04			0.11
v/c Ratio					0.87	1.00		0.98	0.16		0.61	0.11
Uniform Delay, d1					36.2	16.1		34.1	28.5		5.7	0.0
Progression Factor					1.00	1.00		0.73	1.45		1.00	1.00
Incremental Delay, d2					23.0	21.3		26.3	1.1		0.8	0.1
Delay (s)					59.2	37.4		51.2	42.4		6.4	0.1
Level of Service					E	D		D	D		A	A
Approach Delay (s)		0.0			40.1			49.1			6.0	
Approach LOS		A			D			D			A	
Intersection Summary												
HCM Average Control Delay			27.0				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)		6.9			
Intersection Capacity Utilization			92.8%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: I-205 EB Off-Ramp & Mountain House Parkway

2035 Plus Phase I
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	0	100	0	0	0	0	700	560	0	680	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1633	1633	1538					3438	1459		3438	
Flt Permitted	0.95	0.95	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1633	1633	1538					3438	1459		3438	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	340	0	100	0	0	0	0	700	560	0	680	0
RTOR Reduction (vph)	0	0	85	0	0	0	0	0	150	0	0	0
Lane Group Flow (vph)	170	170	15	0	0	0	0	700	410	0	680	0
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												1
Turn Type	Split		Perm						Perm			
Protected Phases	4	4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)	13.3	13.3	13.3					65.9	65.9		65.9	
Effective Green, g (s)	13.3	13.3	13.3					65.9	65.9		65.9	
Actuated g/C Ratio	0.15	0.15	0.15					0.73	0.73		0.73	
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	
Lane Grp Cap (vph)	241	241	227					2517	1068		2517	
v/s Ratio Prot	c0.10	0.10						0.20			0.20	
v/s Ratio Perm			0.01						c0.28			
v/c Ratio	0.71	0.71	0.07					0.28	0.38		0.27	
Uniform Delay, d1	36.5	36.5	33.0					4.1	4.5		4.0	
Progression Factor	1.00	1.00	1.00					0.50	2.35		0.57	
Incremental Delay, d2	7.4	7.4	0.0					0.2	0.9		0.2	
Delay (s)	43.9	43.9	33.0					2.3	11.5		2.5	
Level of Service	D	D	C					A	B		A	
Approach Delay (s)		41.5			0.0			6.4			2.5	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM Average Control Delay			11.7					HCM Level of Service			B	
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0					Sum of lost time (s)			10.8	
Intersection Capacity Utilization			115.4%					ICU Level of Service			H	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountain House Parkway & I-205 WB Ramps

2035+BO AM Controlled Ramps

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1200	0	1740	0	300	400	0	2745	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		2.9		4.0	5.7		4.0	2.3
Lane Util. Factor				0.97		0.76		0.95	0.88		0.91	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.96		1.00	0.99
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3183		3347		3282	2472		4715	1450
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3183		3347		3282	2472		4715	1450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	1200	0	1740	0	300	400	0	2745	575
RTOR Reduction (vph)	0	0	0	0	0	171	0	0	302	0	0	0
Lane Group Flow (vph)	0	0	0	1200	0	1569	0	300	98	0	2745	575
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type				Prot		custom		NA	Perm		NA	Free
Protected Phases				8		1		2			6	
Permitted Phases						8			2			Free
Actuated Green, G (s)				44.9		75.9		29.3	29.3		64.3	120.0
Effective Green, g (s)				46.0		78.1		31.0	29.3		66.0	120.0
Actuated g/C Ratio				0.38		0.65		0.26	0.24		0.55	1.00
Clearance Time (s)				5.1		4.0		5.7	5.7		5.7	
Vehicle Extension (s)				2.3		3.0		4.0	4.0		4.0	
Lane Grp Cap (vph)				1220		2259		847	603		2593	1450
v/s Ratio Prot				c0.38		0.19		0.09			c0.58	
v/s Ratio Perm						0.28			0.04			0.40
v/c Ratio				0.98		0.69		0.35	0.16		1.06	0.40
Uniform Delay, d1				36.6		13.4		36.3	35.7		27.0	0.0
Progression Factor				1.00		1.00		1.37	1.65		1.00	1.00
Incremental Delay, d2				21.7		0.9		1.1	0.6		35.7	0.8
Delay (s)				58.3		14.3		51.0	59.5		62.7	0.8
Level of Service				E		B		D	E		E	A
Approach Delay (s)		0.0			32.3			55.8			51.9	
Approach LOS		A			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			44.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			10.9			
Intersection Capacity Utilization			93.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Mountain House Parkway & I-205 EB Ramps

2035+BO AM Controlled Ramps

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	0	600	0	0	0	0	500	330	0	2730	1215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	0.88
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	1.00
Frt	1.00	0.86	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1559	1347	1395					3282	2463		4715	2462
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1559	1347	1395					3282	2463		4715	2462
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	200	0	600	0	0	0	0	500	330	0	2730	1215
RTOR Reduction (vph)	0	19	19	0	0	0	0	0	110	0	0	351
Lane Group Flow (vph)	180	295	287	0	0	0	0	500	220	0	2730	864
Confl. Peds. (#/hr)									10			10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Split	NA	Perm					NA	Perm		NA	Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	29.2	29.2	29.2					80.0	80.0		80.0	80.0
Effective Green, g (s)	29.2	29.2	29.2					80.0	80.0		80.0	80.0
Actuated g/C Ratio	0.24	0.24	0.24					0.67	0.67		0.67	0.67
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	379	327	339					2188	1642		3143	1641
v/s Ratio Prot	0.12	c0.22						0.15			c0.58	
v/s Ratio Perm			0.21						0.09			0.35
v/c Ratio	0.47	0.90	0.85					0.23	0.13		0.87	0.53
Uniform Delay, d1	38.8	44.0	43.3					7.9	7.3		15.8	10.3
Progression Factor	1.00	1.00	1.00					0.51	0.61		1.03	8.32
Incremental Delay, d2	0.3	26.2	16.8					0.2	0.2		0.3	0.1
Delay (s)	39.2	70.2	60.1					4.3	4.7		16.6	85.6
Level of Service	D	E	E					A	A		B	F
Approach Delay (s)		59.3			0.0			4.4			37.9	
Approach LOS		E			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			36.0		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)					10.8		
Intersection Capacity Utilization			86.5%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountain House Parkway & I-205 WB Ramps

2035+BO PM Controlled Ramps

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	520	0	2780	0	1200	1170	0	2340	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		2.9		4.0	5.7		4.0	2.3
Lane Util. Factor				0.97		0.76		0.95	0.88		0.91	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.95		1.00	0.99
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3183		3347		3282	2456		4715	1450
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3183		3347		3282	2456		4715	1450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	520	0	2780	0	1200	1170	0	2340	170
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	489	0	0	0
Lane Group Flow (vph)	0	0	0	520	0	2772	0	1200	681	0	2340	170
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type				Prot		custom		NA	Perm		NA	Free
Protected Phases				8		1		2			6	
Permitted Phases						8			2			Free
Actuated Green, G (s)				24.9		90.9		44.3	44.3		114.3	150.0
Effective Green, g (s)				26.0		93.1		46.0	44.3		116.0	150.0
Actuated g/C Ratio				0.17		0.62		0.31	0.30		0.77	1.00
Clearance Time (s)				5.1		4.0		5.7	5.7		5.7	
Vehicle Extension (s)				2.3		3.0		4.0	4.0		4.0	
Lane Grp Cap (vph)				551		2142		1006	725		3646	1450
v/s Ratio Prot				0.16		c0.58		c0.37			0.50	
v/s Ratio Perm						0.25			0.28			0.12
v/c Ratio				0.94		1.29		1.19	0.94		0.64	0.12
Uniform Delay, d1				61.3		28.5		52.0	51.5		7.7	0.0
Progression Factor				1.00		1.00		0.92	1.48		1.00	1.00
Incremental Delay, d2				24.9		136.0		93.6	15.0		0.9	0.2
Delay (s)				86.1		164.5		141.5	91.3		8.5	0.2
Level of Service				F		F		F	F		A	A
Approach Delay (s)		0.0			152.1			116.7			8.0	
Approach LOS		A			F			F			A	
Intersection Summary												
HCM 2000 Control Delay			97.6			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.29									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			10.9			
Intersection Capacity Utilization			104.7%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Mountain House Parkway & I-205 EB Ramps

2035+BO PM Controlled Ramps

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	0.88
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1559	1485	1395					3282	2446		4715	2445
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1559	1485	1395					3282	2446		4715	2445
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	1560
RTOR Reduction (vph)	0	17	73	0	0	0	0	0	330	0	0	385
Lane Group Flow (vph)	234	218	98	0	0	0	0	1920	1230	0	1300	1175
Confl. Peds. (#/hr)									10			10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Split	NA	Perm					NA	Perm		NA	Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	26.2	26.2	26.2					113.0	113.0		113.0	113.0
Effective Green, g (s)	26.2	26.2	26.2					113.0	113.0		113.0	113.0
Actuated g/C Ratio	0.17	0.17	0.17					0.75	0.75		0.75	0.75
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	272	259	243					2472	1842		3551	1841
v/s Ratio Prot	c0.15	0.15						c0.59			0.28	
v/s Ratio Perm			0.07						0.50			0.48
v/c Ratio	0.86	0.84	0.40					0.78	0.67		0.37	0.64
Uniform Delay, d1	60.1	59.9	55.0					11.0	9.2		6.3	8.8
Progression Factor	1.00	1.00	1.00					0.70	2.71		1.47	9.14
Incremental Delay, d2	22.5	20.6	0.4					0.6	0.5		0.2	1.3
Delay (s)	82.6	80.6	55.4					8.3	25.4		9.4	81.7
Level of Service	F	F	E					A	C		A	F
Approach Delay (s)		74.6			0.0			16.0			48.8	
Approach LOS		E			A			B			D	
Intersection Summary												
HCM 2000 Control Delay			34.8									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			150.0									Sum of lost time (s) 10.8
Intersection Capacity Utilization			79.0%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountain House Parkway & I-205 WB Ramps

2035+BO AM Control + New Brdg

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1200	0	1740	0	300	400	0	2745	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		2.9		4.0	5.7		4.0	2.3
Lane Util. Factor				0.94		0.76		0.91	0.88		0.91	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.96		1.00	0.99
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				4627		3347		4715	2477		4715	1450
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				4627		3347		4715	2477		4715	1450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	1200	0	1740	0	300	400	0	2745	575
RTOR Reduction (vph)	0	0	0	0	0	227	0	0	289	0	0	0
Lane Group Flow (vph)	0	0	0	1200	0	1513	0	300	111	0	2745	575
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type				Prot		custom		NA	Perm		NA	Free
Protected Phases				8		1		2			6	
Permitted Phases						8			2			Free
Actuated Green, G (s)				30.7		64.7		30.5	30.5		68.5	110.0
Effective Green, g (s)				31.8		66.9		32.2	30.5		70.2	110.0
Actuated g/C Ratio				0.29		0.61		0.29	0.28		0.64	1.00
Clearance Time (s)				5.1		4.0		5.7	5.7		5.7	
Vehicle Extension (s)				2.3		3.0		4.0	4.0		4.0	
Lane Grp Cap (vph)				1337		2123		1380	686		3009	1450
v/s Ratio Prot				c0.26		0.23		0.06			c0.58	
v/s Ratio Perm						0.22			0.04			0.40
v/c Ratio				0.90		0.71		0.22	0.16		0.91	0.40
Uniform Delay, d1				37.5		14.9		29.4	30.1		17.2	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2				8.2		1.2		0.4	0.5		5.5	0.8
Delay (s)				45.7		16.1		29.7	30.6		22.7	0.8
Level of Service				D		B		C	C		C	A
Approach Delay (s)		0.0			28.2			30.2			18.9	
Approach LOS		A			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			24.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.9			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Mountain House Parkway & I-205 EB Ramps

2035+BO AM Control + New Brdg

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	0	600	0	0	0	0	500	330	0	2730	1215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	0.88
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	1.00
Frt	1.00	0.86	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1559	1347	1395					3282	2463		4715	2462
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1559	1347	1395					3282	2463		4715	2462
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	200	0	600	0	0	0	0	500	330	0	2730	1215
RTOR Reduction (vph)	0	19	19	0	0	0	0	0	110	0	0	351
Lane Group Flow (vph)	180	295	287	0	0	0	0	500	220	0	2730	864
Confl. Peds. (#/hr)									10			10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Split	NA	Perm					NA	Perm		NA	Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	29.2	29.2	29.2					80.0	80.0		80.0	80.0
Effective Green, g (s)	29.2	29.2	29.2					80.0	80.0		80.0	80.0
Actuated g/C Ratio	0.24	0.24	0.24					0.67	0.67		0.67	0.67
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	379	327	339					2188	1642		3143	1641
v/s Ratio Prot	0.12	c0.22						0.15			c0.58	
v/s Ratio Perm			0.21						0.09			0.35
v/c Ratio	0.47	0.90	0.85					0.23	0.13		0.87	0.53
Uniform Delay, d1	38.8	44.0	43.3					7.9	7.3		15.8	10.3
Progression Factor	1.00	1.00	1.00					0.51	0.61		1.00	1.00
Incremental Delay, d2	0.3	26.2	16.8					0.2	0.2		3.6	1.2
Delay (s)	39.2	70.2	60.1					4.3	4.7		19.4	11.5
Level of Service	D	E	E					A	A		B	B
Approach Delay (s)		59.3			0.0			4.4			17.0	
Approach LOS		E			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.2									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			120.0									Sum of lost time (s) 10.8
Intersection Capacity Utilization			86.5%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountain House Parkway & I-205 WB Ramps

2035+BO PM Control+Widen Brdg

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	520	0	2780	0	1200	1170	0	2340	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		2.9		4.0	5.7		4.0	2.3
Lane Util. Factor				0.94		0.76		0.91	0.88		0.91	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.96		1.00	0.99
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				4627		3347		4715	2472		4715	1450
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				4627		3347		4715	2472		4715	1450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	520	0	2780	0	1200	1170	0	2340	170
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	878	0	0	0
Lane Group Flow (vph)	0	0	0	520	0	2772	0	1200	292	0	2340	170
Confl. Peds. (#/hr)									10			
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type				Prot		custom		NA	Perm		NA	Free
Protected Phases				8		1 8		2			6	
Permitted Phases									2			Free
Actuated Green, G (s)				10.9		79.9		29.3	29.3		98.3	120.0
Effective Green, g (s)				12.0		81.0		31.0	29.3		100.0	120.0
Actuated g/C Ratio				0.10		0.68		0.26	0.24		0.83	1.00
Clearance Time (s)				5.1				5.7	5.7		5.7	
Vehicle Extension (s)				2.3				4.0	4.0		4.0	
Lane Grp Cap (vph)				462		2259		1218	603		3929	1450
v/s Ratio Prot				0.11		c0.83		c0.25			0.50	
v/s Ratio Perm									0.12			0.12
v/c Ratio				1.13		1.23		0.99	0.49		0.60	0.12
Uniform Delay, d1				54.0		19.5		44.3	38.9		3.3	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2				80.9		106.3		22.5	2.8		0.7	0.2
Delay (s)				134.9		125.8		66.8	41.7		4.0	0.2
Level of Service				F		F		E	D		A	A
Approach Delay (s)		0.0			127.2			54.4			3.7	
Approach LOS		A			F			D			A	
Intersection Summary												
HCM 2000 Control Delay			68.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			10.9			
Intersection Capacity Utilization			94.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Mountain House Parkway & I-205 EB Ramps

2035+BO PM Control+Widen Brdg

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	0.88
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1559	1485	1395					3282	2446		4715	2445
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1559	1485	1395					3282	2446		4715	2445
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	1560
RTOR Reduction (vph)	0	17	73	0	0	0	0	0	330	0	0	385
Lane Group Flow (vph)	234	218	98	0	0	0	0	1920	1230	0	1300	1175
Confl. Peds. (#/hr)									10			10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Split	NA	Perm					NA	Perm		NA	Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	26.2	26.2	26.2					113.0	113.0		113.0	113.0
Effective Green, g (s)	26.2	26.2	26.2					113.0	113.0		113.0	113.0
Actuated g/C Ratio	0.17	0.17	0.17					0.75	0.75		0.75	0.75
Clearance Time (s)	5.1	5.1	5.1					5.7	5.7		5.7	5.7
Vehicle Extension (s)	1.3	1.3	1.3					4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	272	259	243					2472	1842		3551	1841
v/s Ratio Prot	c0.15	0.15						c0.59			0.28	
v/s Ratio Perm			0.07						0.50			0.48
v/c Ratio	0.86	0.84	0.40					0.78	0.67		0.37	0.64
Uniform Delay, d1	60.1	59.9	55.0					11.0	9.2		6.3	8.8
Progression Factor	1.00	1.00	1.00					0.29	1.62		1.00	1.00
Incremental Delay, d2	22.5	20.6	0.4					0.6	0.5		0.3	1.7
Delay (s)	82.6	80.6	55.4					3.8	15.4		6.6	10.5
Level of Service	F	F	E					A	B		A	B
Approach Delay (s)		74.6			0.0			9.0			8.7	
Approach LOS		E			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.9		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				10.8			
Intersection Capacity Utilization			79.0%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountainhouse Pkwy & I-205 WB Ramps

2035+BO AM Free Loops

7/10/2013

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	  	 	 			  
Volume (vph)	1200	1740	300	0	0	3320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.94	0.88	0.95			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	4627	2584	3282			4715
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	4627	2584	3282			4715
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1200	1740	300	0	0	3320
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1200	1740	300	0	0	3320
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%
Turn Type	NA	Free	NA			NA
Protected Phases	8		2			6
Permitted Phases		Free				
Actuated Green, G (s)	30.0	120.0	82.0			82.0
Effective Green, g (s)	30.0	120.0	82.0			82.0
Actuated g/C Ratio	0.25	1.00	0.68			0.68
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1156	2584	2242			3221
v/s Ratio Prot	c0.26		0.09			c0.70
v/s Ratio Perm		0.67				
v/c Ratio	1.04	0.67	0.13			1.03
Uniform Delay, d1	45.0	0.0	6.6			19.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	36.9	1.4	0.0			24.4
Delay (s)	81.9	1.4	6.6			43.4
Level of Service	F	A	A			D
Approach Delay (s)	34.3		6.6			43.4
Approach LOS	C		A			D
Intersection Summary						
HCM 2000 Control Delay			37.6		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.03			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			93.6%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Mountainhouse Pkwy & I-205 EB Ramps

2035+BO AM Free Loops

7/10/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	0	600	0	0	0	0	500	330	0	2730	0
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					4.0	4.0		4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	
Frt	1.00	0.86	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1559	1347	1395					3282	2584		4715	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1559	1347	1395					3282	2584		4715	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	200	0	600	0	0	0	0	500	330	0	2730	0
RTOR Reduction (vph)	0	8	8	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	180	306	298	0	0	0	0	500	330	0	2730	0
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Prot	NA	Perm					NA	Free		NA	
Protected Phases	7	4						2			6	
Permitted Phases			4						Free			
Actuated Green, G (s)	27.0	27.0	27.0					65.0	100.0		65.0	
Effective Green, g (s)	27.0	27.0	27.0					65.0	100.0		65.0	
Actuated g/C Ratio	0.27	0.27	0.27					0.65	1.00		0.65	
Clearance Time (s)	4.0	4.0	4.0					4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)	420	363	376					2133	2584		3064	
v/s Ratio Prot	0.12	c0.23						0.15			c0.58	
v/s Ratio Perm			0.21						0.13			
v/c Ratio	0.43	0.84	0.79					0.23	0.13		0.89	
Uniform Delay, d1	30.1	34.5	33.9					7.2	0.0		14.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.7	16.1	10.9					0.1	0.1		3.7	
Delay (s)	30.8	50.6	44.8					7.3	0.1		18.2	
Level of Service	C	D	D					A	A		B	
Approach Delay (s)		43.9			0.0			4.4			18.2	
Approach LOS		D			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.3									
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			84.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Mountainhouse Pkwy & I-205 WB Ramps

2035+BO PM Free Flow Loops

7/10/2013

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	  	 	 			  
Volume (vph)	520	2780	1200	0	0	2510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.94	0.88	0.95			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	4627	2584	3282			4715
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	4627	2584	3282			4715
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	520	2780	1200	0	0	2510
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	520	2780	1200	0	0	2510
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%
Turn Type	NA	Free	NA			NA
Protected Phases	8		2			6
Permitted Phases		Free				
Actuated Green, G (s)	8.0	50.2	34.2			34.2
Effective Green, g (s)	8.0	50.2	34.2			34.2
Actuated g/C Ratio	0.16	1.00	0.68			0.68
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	737	2584	2235			3212
v/s Ratio Prot	0.11		0.37			0.53
v/s Ratio Perm		c1.08				
v/c Ratio	0.71	1.08	0.54			0.78
Uniform Delay, d1	20.0	25.1	4.0			5.5
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	3.1	42.1	0.2			1.3
Delay (s)	23.1	67.2	4.3			6.7
Level of Service	C	E	A			A
Approach Delay (s)	60.3		4.3			6.7
Approach LOS	E		A			A
Intersection Summary						
HCM 2000 Control Delay			31.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			1.28			
Actuated Cycle Length (s)			50.2		Sum of lost time (s)	8.0
Intersection Capacity Utilization			65.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Mountainhouse Pkwy & I-205 EB Ramps

2035+BO PM Free Flow Loops

7/10/2013

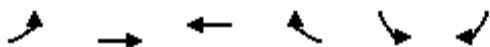
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88		0.91	
Frt	1.00	0.99	0.85					1.00	0.85		1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1559	1485	1395					3282	2584		4715	
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1559	1485	1395					3282	2584		4715	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	450	0	190	0	0	0	0	1920	1560	0	1300	0
RTOR Reduction (vph)	0	8	70	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	234	227	101	0	0	0	0	1920	1560	0	1300	0
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Turn Type	Prot	NA	Perm					NA	Free		NA	
Protected Phases	7	4						2			6	
Permitted Phases			4						Free			
Actuated Green, G (s)	22.3	22.3	22.3					61.0	91.3		61.0	
Effective Green, g (s)	22.3	22.3	22.3					61.0	91.3		61.0	
Actuated g/C Ratio	0.24	0.24	0.24					0.67	1.00		0.67	
Clearance Time (s)	4.0	4.0	4.0					4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)	380	362	340					2192	2584		3150	
v/s Ratio Prot	0.15	0.15						c0.59			0.28	
v/s Ratio Perm			0.07						c0.60			
v/c Ratio	0.62	0.63	0.30					0.88	0.60		0.41	
Uniform Delay, d1	30.7	30.8	28.1					12.1	0.0		6.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.00	
Incremental Delay, d2	3.0	3.4	0.5					4.3	1.1		0.1	
Delay (s)	33.6	34.1	28.6					16.4	1.1		7.0	
Level of Service	C	C	C					B	A		A	
Approach Delay (s)		32.5			0.0			9.5			7.0	
Approach LOS		C			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.6									
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			91.3									
Intersection Capacity Utilization			74.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Patterson Pass Road/Patterson Pass Rd & I-580 WB Ramps

2035 + Project Buildout

AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	100	500	950	250	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	0.97		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1388	2777	2777	1210		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1388	2777	2777	1210		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	526	1000	263	0	0
RTOR Reduction (vph)	0	0	0	84	0	0
Lane Group Flow (vph)	105	526	1000	179	0	0
Confl. Peds. (#/hr)				5		
Heavy Vehicles (%)	30%	30%	30%	30%	30%	30%
Turn Type	Prot	NA	NA	Perm		
Protected Phases	5	2	6			
Permitted Phases				6		
Actuated Green, G (s)	4.8	40.0	27.2	27.2		
Effective Green, g (s)	4.8	40.0	27.2	27.2		
Actuated g/C Ratio	0.12	1.00	0.68	0.68		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	166	2777	1888	822		
v/s Ratio Prot	c0.08	0.19	c0.36			
v/s Ratio Perm				0.15		
v/c Ratio	0.63	0.19	0.53	0.22		
Uniform Delay, d1	16.8	0.0	3.2	2.4		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	7.6	0.2	1.1	0.6		
Delay (s)	24.4	0.2	4.3	3.0		
Level of Service	C	A	A	A		
Approach Delay (s)		4.2	4.0		0.0	
Approach LOS		A	A		A	
Intersection Summary						
HCM 2000 Control Delay			4.1		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			40.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			38.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

4: I-580 WB Ramp & Patterson Pass Rd/Mountain House Parkway

2035 + Project Buildout

AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Volume (vph)	500	0	0	1000	200	1050
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	0.88
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3343			3343	1671	2632
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3343			3343	1671	2632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	0	0	1053	211	1105
RTOR Reduction (vph)	0	0	0	0	0	172
Lane Group Flow (vph)	526	0	0	1053	211	933
Turn Type	NA			NA	NA	custom
Protected Phases	2			6	8	8
Permitted Phases						8
Actuated Green, G (s)	17.0			17.0	20.0	20.0
Effective Green, g (s)	17.0			17.0	20.0	20.0
Actuated g/C Ratio	0.38			0.38	0.44	0.44
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1262			1262	742	1169
v/s Ratio Prot	0.16			c0.32	0.13	c0.35
v/s Ratio Perm						
v/c Ratio	0.42			0.83	0.28	0.80
Uniform Delay, d1	10.3			12.7	7.9	10.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			6.6	1.0	5.7
Delay (s)	11.4			19.3	8.9	16.5
Level of Service	B			B	A	B
Approach Delay (s)	11.4			19.3	15.3	
Approach LOS	B			B	B	
Intersection Summary						
HCM 2000 Control Delay			16.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.81			
Actuated Cycle Length (s)			45.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

7: I-580 EB Ramps & Patterson Pass Road

2035 + Project Buildout

AM Peak Hour

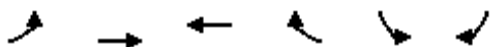
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	100	100	0	700	350	0	0	0	500	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	0.88				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.97		1.00	0.97				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		1429	1179		1429	2079				1289	1289	1214
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		1429	1179		1429	2079				1289	1289	1214
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)	0	105	105	0	737	368	0	0	0	526	0	105
RTOR Reduction (vph)	0	0	40	0	0	140	0	0	0	0	0	79
Lane Group Flow (vph)	0	105	65	0	737	228	0	0	0	263	263	26
Confl. Peds. (#/hr)			5			5						
Heavy Vehicles (%)	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Turn Type		NA	Perm		NA	Perm				Split	NA	Perm
Protected Phases		2			6					4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)		37.2	37.2		37.2	37.2				14.8	14.8	14.8
Effective Green, g (s)		37.2	37.2		37.2	37.2				14.8	14.8	14.8
Actuated g/C Ratio		0.62	0.62		0.62	0.62				0.25	0.25	0.25
Clearance Time (s)		4.0	4.0		4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)		885	730		885	1288				317	317	299
v/s Ratio Prot		0.07			0.52					0.20	0.20	
v/s Ratio Perm			0.06			0.11						0.02
v/c Ratio		0.12	0.09		0.83	0.18				0.83	0.83	0.09
Uniform Delay, d1		4.7	4.6		9.0	4.9				21.4	21.4	17.4
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		0.3	0.2		9.0	0.3				16.2	16.2	0.1
Delay (s)		4.9	4.8		18.0	5.2				37.7	37.7	17.5
Level of Service		A	A		B	A				D	D	B
Approach Delay (s)		4.9			13.7			0.0			34.3	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			19.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			57.4%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Patterson Pass Road/Patterson Pass Rd & I-580 WB Ramps

2035 + Project Buildout

PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	100	600	1500	450	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	0.97		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1388	2777	2777	1208		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1388	2777	2777	1208		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	632	1579	474	0	0
RTOR Reduction (vph)	0	0	0	90	0	0
Lane Group Flow (vph)	105	632	1579	384	0	0
Confl. Peds. (#/hr)				5		
Heavy Vehicles (%)	30%	30%	30%	30%	30%	30%
Turn Type	Prot	NA	NA	Perm		
Protected Phases	5	2	6			
Permitted Phases				6		
Actuated Green, G (s)	4.8	50.0	37.2	37.2		
Effective Green, g (s)	4.8	50.0	37.2	37.2		
Actuated g/C Ratio	0.10	1.00	0.74	0.74		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	133	2777	2066	898		
v/s Ratio Prot	c0.08	0.23	c0.57			
v/s Ratio Perm				0.32		
v/c Ratio	0.79	0.23	0.76	0.43		
Uniform Delay, d1	22.1	0.0	3.8	2.4		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	26.0	0.2	2.8	1.5		
Delay (s)	48.1	0.2	6.6	3.9		
Level of Service	D	A	A	A		
Approach Delay (s)		7.0	5.9		0.0	
Approach LOS		A	A		A	
Intersection Summary						
HCM 2000 Control Delay			6.2		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			50.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			53.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

4: I-580 WB Ramp & Patterson Pass Rd/Mountain House Parkway

2035 + Project Buildout

PM Peak Hour

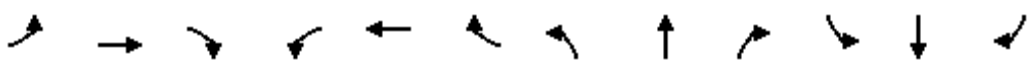
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↵	↵↵
Volume (vph)	600	0	0	1750	200	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	0.88
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3343			3343	1671	2632
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3343			3343	1671	2632
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	0	0	1842	211	526
RTOR Reduction (vph)	0	0	0	0	0	358
Lane Group Flow (vph)	632	0	0	1842	211	168
Turn Type	NA			NA	NA	custom
Protected Phases	2			6	8	8
Permitted Phases						8
Actuated Green, G (s)	36.0			36.0	16.0	16.0
Effective Green, g (s)	36.0			36.0	16.0	16.0
Actuated g/C Ratio	0.60			0.60	0.27	0.27
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2005			2005	445	701
v/s Ratio Prot	0.19			c0.55	c0.13	0.06
v/s Ratio Perm						
v/c Ratio	0.32			0.92	0.47	0.24
Uniform Delay, d1	5.9			10.7	18.5	17.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.4			8.3	3.6	0.8
Delay (s)	6.3			19.0	22.1	18.0
Level of Service	A			B	C	B
Approach Delay (s)	6.3			19.0	19.2	
Approach LOS	A			B	B	
Intersection Summary						
HCM 2000 Control Delay			16.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			66.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

7: I-580 EB Ramps & Patterson Pass Road

2035 + Project Buildout

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↑	↗↗				↘	↖	↗
Volume (vph)	0	400	400	0	200	1300	0	0	0	300	0	200
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	4.0				4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	0.88				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.97		1.00	0.97				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		1429	1179		1429	2079				1289	1289	1214
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		1429	1179		1429	2079				1289	1289	1214
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)	0	421	421	0	211	1368	0	0	0	316	0	211
RTOR Reduction (vph)	0	0	142	0	0	461	0	0	0	0	0	168
Lane Group Flow (vph)	0	421	279	0	211	907	0	0	0	158	158	43
Confl. Peds. (#/hr)			5			5						
Heavy Vehicles (%)	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Turn Type		NA	Perm		NA	Perm				Split	NA	Perm
Protected Phases		2			6					4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)		39.8	39.8		39.8	39.8				12.2	12.2	12.2
Effective Green, g (s)		39.8	39.8		39.8	39.8				12.2	12.2	12.2
Actuated g/C Ratio		0.66	0.66		0.66	0.66				0.20	0.20	0.20
Clearance Time (s)		4.0	4.0		4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)		947	782		947	1379				262	262	246
v/s Ratio Prot		0.29			0.15					c0.12	0.12	
v/s Ratio Perm			0.24			c0.44						0.04
v/c Ratio		0.44	0.36		0.22	0.66				0.60	0.60	0.17
Uniform Delay, d1		4.8	4.5		4.0	6.0				21.7	21.7	19.7
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		1.5	1.3		0.5	2.5				3.9	3.9	0.3
Delay (s)		6.3	5.7		4.5	8.5				25.6	25.6	20.1
Level of Service		A	A		A	A				C	C	C
Approach Delay (s)		6.0			8.0			0.0			23.4	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			10.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			49.3%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												