APPDENDIX G
TRAFFIC ANALYSIS

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APPENDIX G TRAFFIC ANALYSIS

Table G-1. No-Build vs Existing Analysis

Int #	N/S Street	E/W Street	Peak Period	V/C	Existing Conditions		No Build		Change in Delay	Impact
					Delay (sec)	LOS (based on delay)	Delay (sec)	LOS (based on delay)		
1	Crenshaw Blvd	Jefferson Blvd	AM	1.066	26	C	67	E	41	Yes
			PM	0.981	24	C	57	E	33	Yes
2	Crenshaw Blvd	Exposition Blvd	AM	1.167	40	D	87	F	47	Yes
			PM	0.965	15	B	23	C	8	No
3	Crenshaw Blvd	Rodeo Rd	AM	0.972	31	C	58	E	27	Yes
			PM	0.858	25	C	40	D	15	Yes
4	Crenshaw Blvd	Coliseum St	AM	0.891	20	B	27	C	7	**No**
			PM	0.703	8	A	10	A	2	**No**
5	Crenshaw Blvd	MLK, Jr. Blvd	AM	0.945	52	D	104	F	52	Yes
			PM	0.876	42	D	63	E	21	Yes
6	Crenshaw Blvd	Stocker St	AM	0.975	49	D	68	E	19	Yes
			PM	1.026	53	D	84	F	31	Yes
7	Crenshaw Blvd	Vernon Ave	AM	0.955	48	D	91	F	43	Yes
			PM	0.932	39	D	77	E	38	Yes
8	Crenshaw Blvd	48th St	AM	0.716	12	B	19	B	7	No
			PM	0.691	8	A	20	C	12	Yes
9	Crenshaw Blvd	54th St	AM	0.936	20	C	31	C	11	Yes
			PM	0.827	14	B	22	C	8	No
10	Crenshaw Blvd	Slauson Ave	AM	1.089	117	F	171	F	54	Yes
			PM	1.129	109	F	118	F	9	Yes
11	Crenshaw Blvd	Hyde Park Blvd	AM	0.755	23	C	28	C	5	**No**
			PM	0.745	24	C	32	C	8	**No**

Table G-1. No-Build vs Existing Analysis (continued)

Int #	N/S Street	E/W Street	Peak Period	V/C	Existing Conditions		No Build		Change in Delay	Impact
					Delay (sec)	LOS (based on delay)	Delay (sec)	LOS (based on delay)		
12	Crenshaw Blvd	67th Street	AM	0.639	17	B	19	B	2	**No**
			PM	0.651	19	B	25	C	6	**No**
13	Florence Ave	Redondo Blvd	AM	0.787	27	C	58	E	31	Yes
			PM	0.545	16	B	20	B	4	No
14	Prairie Ave	Florence Ave	AM	0.777	32	C	61	E	29	Yes
			PM	0.949	31	C	50	D	19	Yes
15	Centinela Blvd	Florence Ave	AM	1.119	31	C	90	F	59	Yes
			PM	1.188	44	D	77	E	33	Yes
16	Hillcrest Blvd	Florence Ave	AM	0.634	20	C	27	C	7	**No**
			PM	0.571	18	B	20	C	2	**No**
17	La Brea Ave	Florence Ave	AM	0.988	66	E	131	F	65	Yes
			PM	0.835	42	D	61	E	19	Yes
18	Fir Ave/Ivy Ave	Florence Ave	AM	0.439	6	A	7	A	1	**No**
			PM	0.639	10	A	12	B	2	**No**
19	Eucalyptus Ave	Florence Ave	AM	0.689	12	B	17	B	5	No
			PM	0.795	24	C	52	D	28	Yes
20	Inglewood Ave	Florence Ave	AM	0.623	4	A	5	A	1	**No**
			PM	0.565	6	A	7	A	1	**No**
21	La Cienega Blvd	Florence Ave	AM	1.017	66	E	119	F	53	Yes
			PM	1.169	77	E	115	F	38	Yes
22	Florence Ave	Manchester Ave	AM	1.081	53	D	88	F	35	Yes
			PM	0.824	29	C	40	D	11	Yes
23	Aviation Blvd	Hillcrest Blvd	AM	0.578	9	A	12	B	3	**No**
			PM	0.449	4	A	5	A	1	**No**

Table G-1. No-Build vs Existing Analysis (continued)

Int #	N/S Street	E/W Street	Peak Period	V/C	Existing Conditions		No Build		Change in Delay	Impact
					Delay (sec)	LOS (based on delay)	Delay (sec)	LOS (based on delay)		
24	Aviation Blvd	Arbor Vitae St	AM	0.952	33	C	104	F	71	Yes
			PM	0.791	15	B	25	C	10	Yes
25	Aviation Blvd	Century Blvd	AM	1.065	50	D	109	F	59	Yes
			PM	1.053	56	E	97	F	41	Yes
26	Aviation Blvd	Imperial Hwy	AM	0.705	47	D	58	E	9	Yes
			PM	0.953	60	E	99	F	39	Yes

Table G-2. LPA vs Existing Analysis

Int #	N/S Street	E/W Street	Peak Period	Existing Conditions		LPA		Change in Delay	Impact
				Delay (sec)	LOS (based on delay)	Delay (sec)	LOS (based on delay)		
1	Crenshaw Blvd	Jefferson Blvd	AM	26	C	26	C	0	No
			PM	24	C	24	C	0	No
2	Crenshaw Blvd	Exposition Blvd	AM	40	D	37	D	-3	No
			PM	15	B	15	B	0	No
3	Crenshaw Blvd	Rodeo Rd	AM	31	C	30	C	-1	No
			PM	25	C	24	C	-1	No
4	Crenshaw Blvd	Coliseum St	AM	20	B	20	B	0	No
			PM	8	A	8	A	0	No
5	Crenshaw Blvd	MLK, Jr. Blvd	AM	52	D	54	D	2	No
			PM	42	D	44	D	2	No
6	Crenshaw Blvd	Stocker St	AM	49	D	50	D	1	No
			PM	53	D	54	D	1	No
7	Crenshaw Blvd	Vernon Ave	AM	48	D	49	D	1	No
			PM	39	D	39	D	0	No
8	Crenshaw Blvd	48th St	AM	12	B	14	B	2	No
			PM	8	A	8	A	0	No
9	Crenshaw Blvd	54th St	AM	20	C	25	C	5	No
			PM	14	B	15	B	1	No
10	Crenshaw Blvd	Slauson Ave	AM	117	F	61	E	-56	No
			PM	109	F	99	F	-10	No
11	Crenshaw Blvd	Hyde Park Blvd	AM	23	C	17	C	-6	No
			PM	24	C	18	C	-6	No
12	Crenshaw Blvd	67th Street	AM	17	B	17	B	0	No
			PM	19	B	17	B	-2	No
13	Florence Ave	Redondo Blvd	AM	27	C	26	C	-1	No
			PM	16	B	18	B	2	No

Table G-2. LPA vs Existing Analysis (continued)

Int #	N/S Street	E/W Street	Peak Period	Existing Conditions		LPA		Change in Delay	Impact
				Delay (sec)	LOS (based on delay)	Delay (sec)	LOS (based on delay)		
14	Prairie Ave	Florence Ave	AM	32	C	27	C	-5	No
			PM	31	C	32	C	1	No
15	Centinela Blvd	Florence Ave	AM	31	C	13	B	-18	No
			PM	44	D	43	D	-1	No
16	Hillcrest Blvd	Florence Ave	AM	20	C	19	C	-1	No
			PM	18	B	18	B	0	No
17	La Brea Ave	Florence Ave	AM	66	E	68	E	2	No
			PM	42	D	43	D	1	No
18	Fir Ave/Ivy Ave	Florence Ave	AM	6	A	14	A	8	No
			PM	10	A	18	A	8	No
19	Eucalyptus Ave	Florence Ave	AM	12	B	19	B	7	No
			PM	24	C	19	C	-5	No
20	Inglewood Ave	Florence Ave	AM	4	A	4	A	0	No
			PM	6	A	6	A	0	No
21	La Cienega Blvd	Florence Ave	AM	66	E	68	E	2	No
			PM	77	E	78	E	1	No
22	Florence Ave	Manchester Ave	AM	53	D	55	D	2	No
			PM	29	C	30	C	1	No
23	Aviation Blvd	Hillcrest Blvd	AM	9	A	6.8	A	-2.2	No
			PM	4	A	4	A	0	No
24	Aviation Blvd	Arbor Vitae St	AM	33	C	33	C	0	No
			PM	15	B	16	B	1	No
25	Aviation Blvd	Century Blvd	AM	50	D	50	D	0	No
			PM	56	E	57	E	1	No
26	Aviation Blvd	Imperial Hwy	AM	47	D	46	D	-1	No
			PM	60	E	60	E	0	No

Table G-3. LPA vs No-Build Analysis

Int #	N/S Street	E/W Street	Peak Period	No-Build Alternative			LPA			Delay Change	Impact
				V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS		
1	Crenshaw Blvd	Jefferson Blvd	AM	1.066	67	E	1.074	67	E	0	No
			PM	0.981	57	E	0.975	57	E	0	No
2	Crenshaw Blvd	Exposition Blvd	AM	1.167	87	F	1.143	81	F	-6	No
			PM	0.965	23	C	0.963	23	C	0	No
3	Crenshaw Blvd	Rodeo Rd	AM	0.972	58	E	0.969	57	E	-1	No
			PM	0.858	40	D	0.856	39	D	-1	No
4	Crenshaw Blvd	Coliseum St	AM	0.891	27	C	0.887	27	C	0	No
			PM	0.703	10	A	0.701	10	A	0	No
5	Crenshaw Blvd	MLK, Jr. Blvd.	AM	0.945	104	F	0.949	107	F	3	No
			PM	0.876	63	E	0.891	66	E	3	No
6	Crenshaw Blvd	Stocker St	AM	0.975	68	E	0.973	69	E	1	No
			PM	1.026	84	F	1.031	85	F	1	No
7	Crenshaw Blvd	Vernon Ave	AM	0.955	91	F	0.957	93	F	2	No
			PM	0.932	77	E	0.929	77	E	0	No
8	Crenshaw Blvd	48th St	AM	0.716	19	B	0.83	22.5	C	3.5	No
			PM	0.691	20	C	0.79	19.9	B	-0.1	No
9	Crenshaw Blvd	54th St	AM	0.936	31	C	1.11	38.4	D	7.4	No
			PM	0.827	22	C	0.95	24.0	C	2	No
10	Crenshaw Blvd	Slauson Ave	AM	1.089	171	F	1.13	88.7	F	-82.3	No
			PM	1.129	118	F	1.27	107.6	F	-10.4	No
11	Crenshaw Blvd	Hyde Park Blvd	AM	0.755	28	C	0.751	21	C	-7	No
			PM	0.745	32	C	0.759	24	C	-8	No
12	Crenshaw Blvd	67th St	AM	0.639	19	B	0.637	19	B	0	No
			PM	0.651	25	C	0.640	22	C	-3	No

Table G-3. LPA vs No-Build Analysis (continued)

Int #	N/S Street	E/W Street	Peak Period	No-Build Alternative			LPA			Delay Change	Impact
				V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS		
13	Florence Ave	Redondo Blvd / High St	AM	0.787	58	E	0.791	55	E	-3	No
			PM	0.545	20	B	0.545	22	C	2	No
14	Prairie Ave	Florence Ave	AM	0.777	61	E	0.777	51	D	-10	No
			PM	0.949	50	D	0.952	51	D	1	No
15	Centinela Blvd	Florence Ave	AM	1.119	90	F	0.93	36.6	D	-53.4	No
			PM	1.188	77	E	1.09	74.8	E	-2.2	No
16	Hillcrest Blvd	Florence Ave	AM	0.634	27	C	0.638	26	C	-1	No
			PM	0.571	20	C	0.574	20	C	0	No
17	La Brea Ave	Florence Ave	AM	0.988	131	F	1.007	135	F	4	No
			PM	0.835	61	E	0.850	62	E	1	No
18	Fir Ave/Ivy Ave	Florence Ave	AM	0.439	7	A	0.49	16.9	B	9.9	No
			PM	0.639	12	B	0.65	21.5	C	9.5	No
19	Eucalyptus Ave	Florence Ave	AM	0.689	17	B	0.83	26.7	C	9.7	No
			PM	0.795	52	D	0.87	42.2	D	-9.8	No
20	Inglewood Ave	Florence Ave	AM	0.623	5	A	0.621	5	A	0	No
			PM	0.565	7	A	0.565	7	A	0	No
21	La Cienega Blvd	Florence Ave	AM	1.017	119	F	1.023	123	F	4	Yes
			PM	1.169	115	F	1.177	117	F	2	No
22	Florence Ave	Manchester Ave	AM	1.081	88	F	1.111	91	F	3	Yes
			PM	0.824	40	D	0.833	41	D	1	No
23	Aviation Blvd	Hillcrest Blvd	AM	0.578	12	B	0.575	9	A	-3	No
			PM	0.449	5	A	0.448	5	A	0	No

Table G-3. LPA vs No-Build Analysis (continued)

Int #	N/S Street	E/W Street	Peak Period	No-Build Alternative			LPA			Delay Change	Impact
				V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS		
24	Aviation Blvd	Arbor Vitae St	AM	0.952	104	F	0.949	103	F	-1	No
			PM	0.791	25	C	0.803	26	C	1	No
25	Aviation Blvd	Century Blvd	AM	1.065	109	F	1.063	109	F	0	No
			PM	1.053	97	F	1.064	98	F	1	No
26	Aviation Blvd	Imperial Hw	AM	0.705	58	E	0.704	57	E	-1	No
			PM	0.953	99	F	0.951	99	F	0	No

Table G-4. LPA At-Grade Intersection Level of Service Analysis – 150, 140, and 130 Second Signal Timing Lengths

Int #	N/S Street	E/W Street	Peak Period	No-Build Alternative		LPA											
						150 Second Cycle				140 Second Cycle				130 Second Cycle			
				Delay (sec)	LOS	Delay (sec)	LOS	Delay Change	Impact	Delay (sec)	LOS	Delay Change	Impact	Delay (sec)	LOS	Delay Change	Impact
18	Crenshaw Blvd	48th St	AM	19	B	22.5	C	3.5	No	19.6	B	0.6	No	19.0	B	0	No
			PM	20	C	19.9	B	-0.1	No	18.6	B	-1.4	No	27.5	C	7.5	No
19	Crenshaw Blvd	54th St	AM	31	C	38.4	D	7.4	No	40.0	D	9.0	**Yes**	51.0	D	20.0	**Yes**
			PM	22	C	24.0	C	2.0	No	36.3	D	14.3	**Yes**	36.3	D	14.3	**Yes**
20	Crenshaw Blvd	Slauson Ave	AM	171	F	88.7	F	-82.3	No	108.0	F	-63	No	117.8	F	-53.2	No
			PM	118	F	107.6	F	-10.4	No	115.7	F	-2.3	No	107.4	F	-10.6	No

Table G-5. LPA At-Grade Intersection Level of Service Analysis – 120 and 150/75 Second Signal Timing Lengths

Int #	N/S Street	E/W Street	Peak Period	No-Build Alternative		LPA							
						120 Second Cycle				150/75 Second Cycle			
				Delay (sec)	LOS	Delay (sec)	LOS	Delay Change	Impact	Delay (sec)	LOS	Delay Change	Impact
18	Crenshaw Blvd	48th St	AM	19	B	24.9	C	5.9	No	164.9	F	145.9	**Yes**
			PM	20	C	25.2	C	5.2	No	37.6	D	17.6	**Yes**
19	Crenshaw Blvd	54th St	AM	31	C	49.3	D	18.3	**Yes**	32.8	C	1.8	No
			PM	22	C	33.6	C	11.6	**Yes**	31.7	C	9.7	No
20	Crenshaw Blvd	Slauson Ave	AM	171	F	121.9	F	-49.1	No	87.2	F	-83.8	No
			PM	118	F	117.7	F	-0.3	No	138.5	F	20.5	**Yes**

Figure G-1. Existing (2008) Peak Hour Volumes

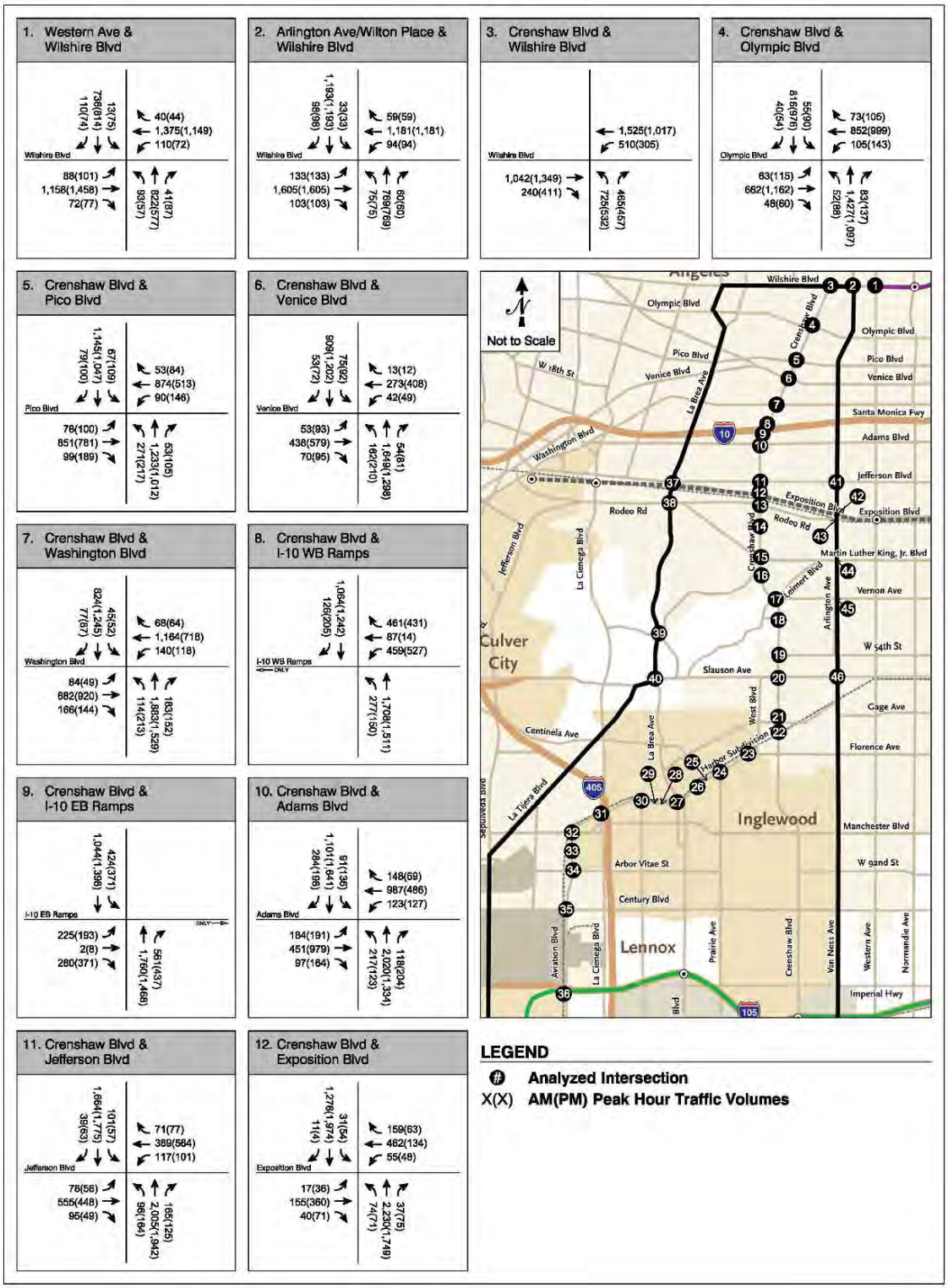


Figure G-1. Existing (2008) Peak Hour Volumes (continued)

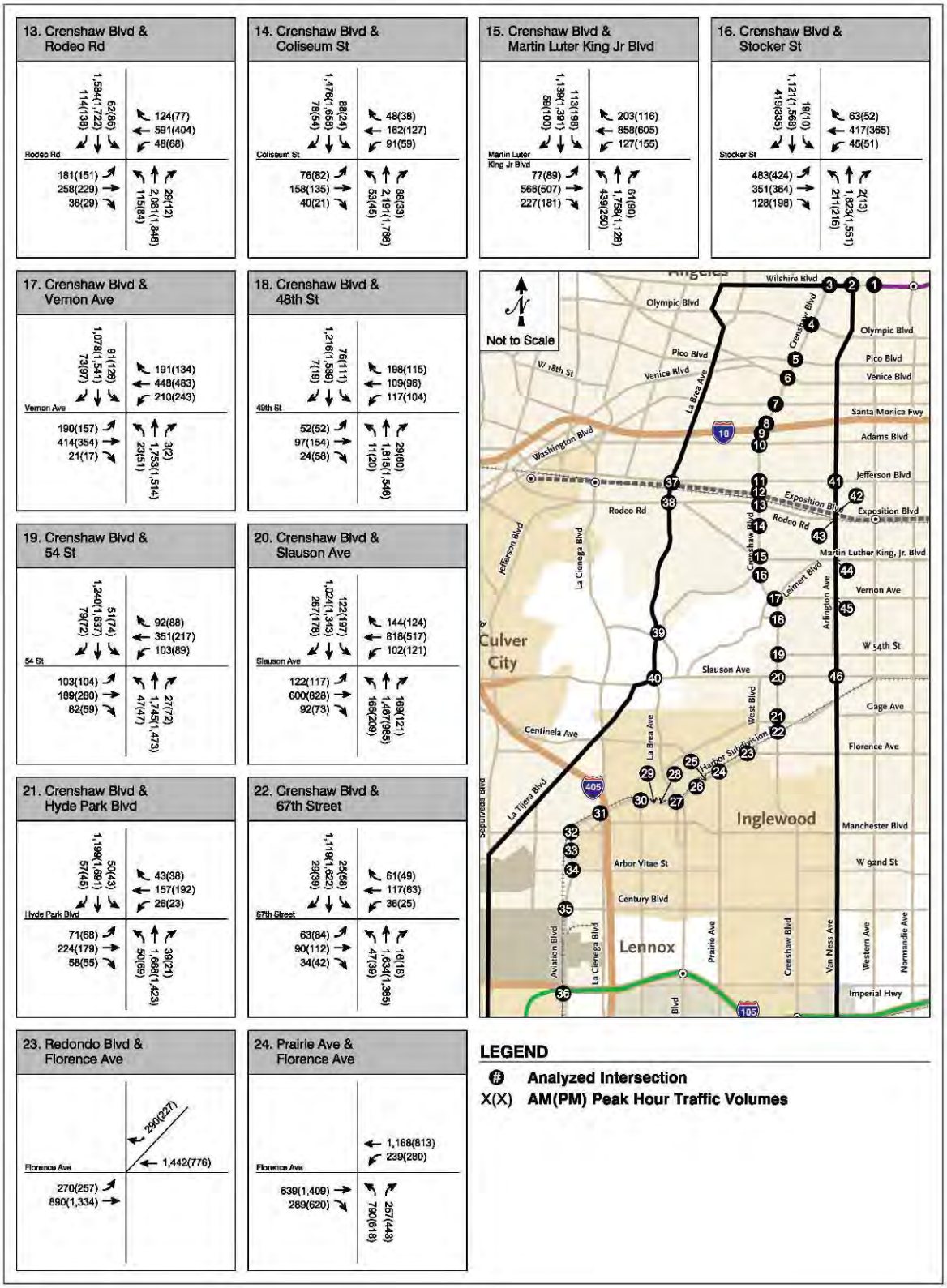


Figure G-1. Existing (2008) Peak Hour Volumes (continued)

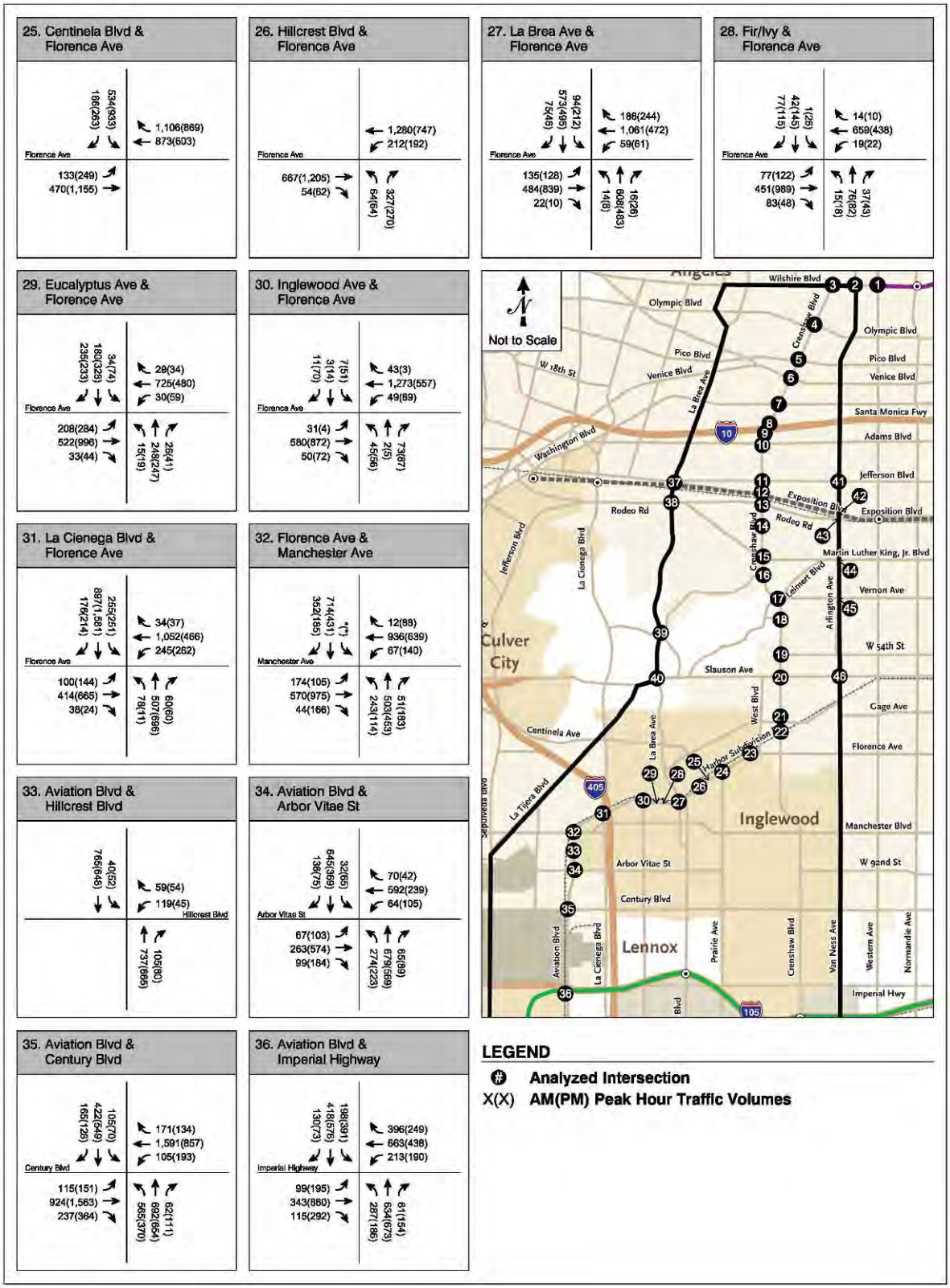


Figure G-1. Existing (2008) Peak Hour Volumes (continued)

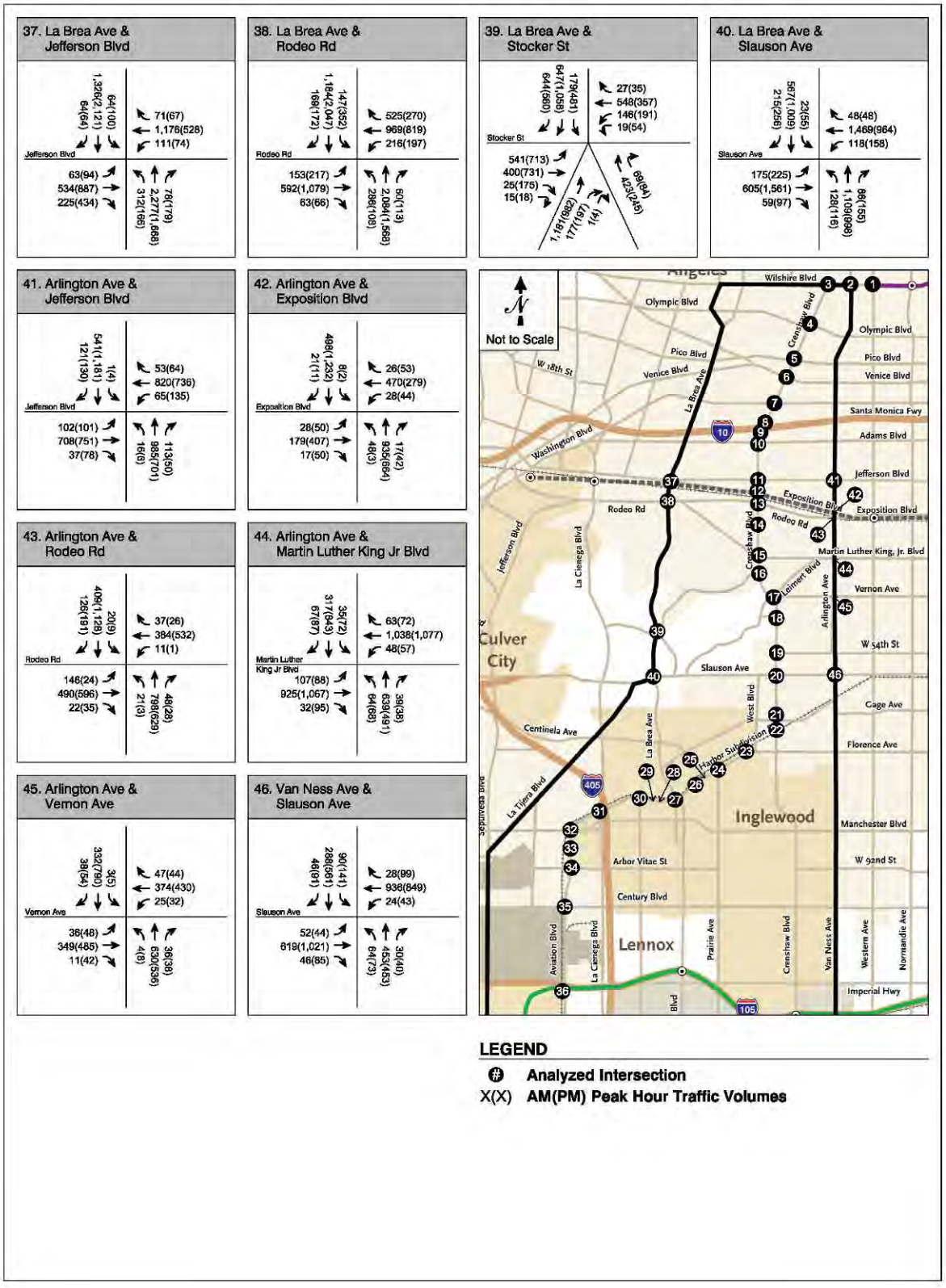


Figure G-2. No-Build (Year 2030) Peak Hour Traffic Volumes

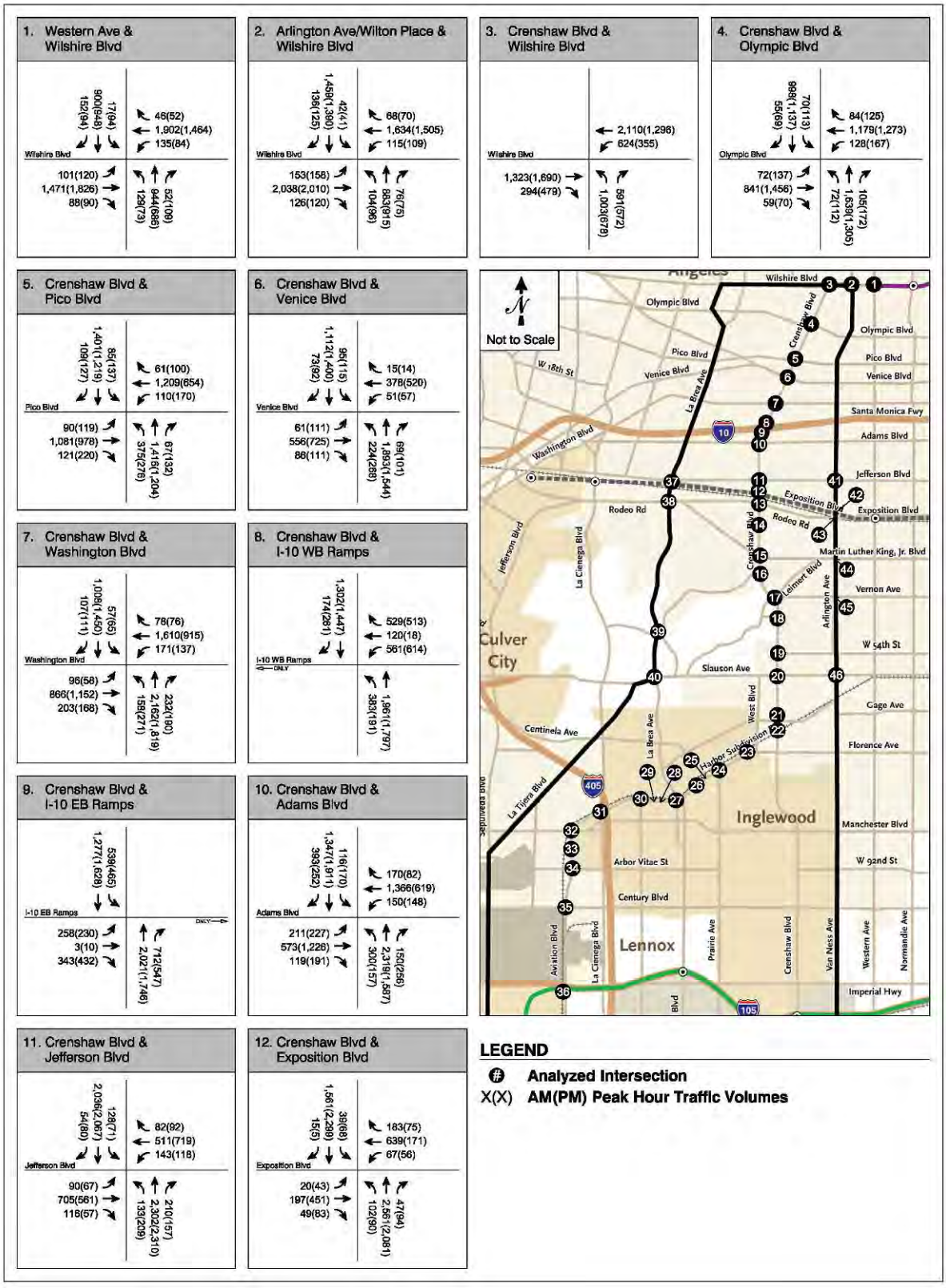


Figure G-2. No-Build (Year 2030) Peak Hour Traffic Volumes (continued)

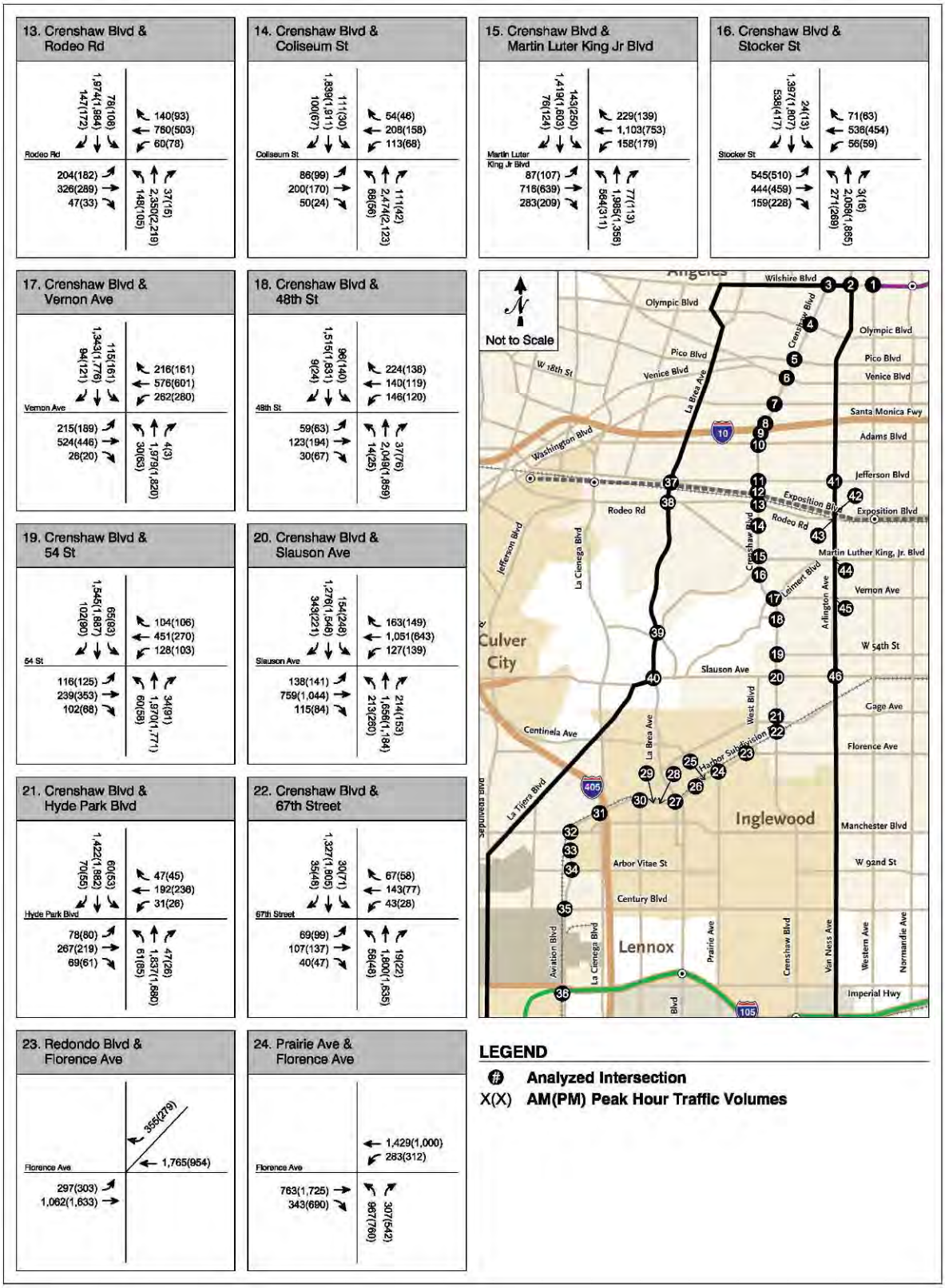


Figure G-2. No-Build (Year 2030) Peak Hour Traffic Volumes (continued)

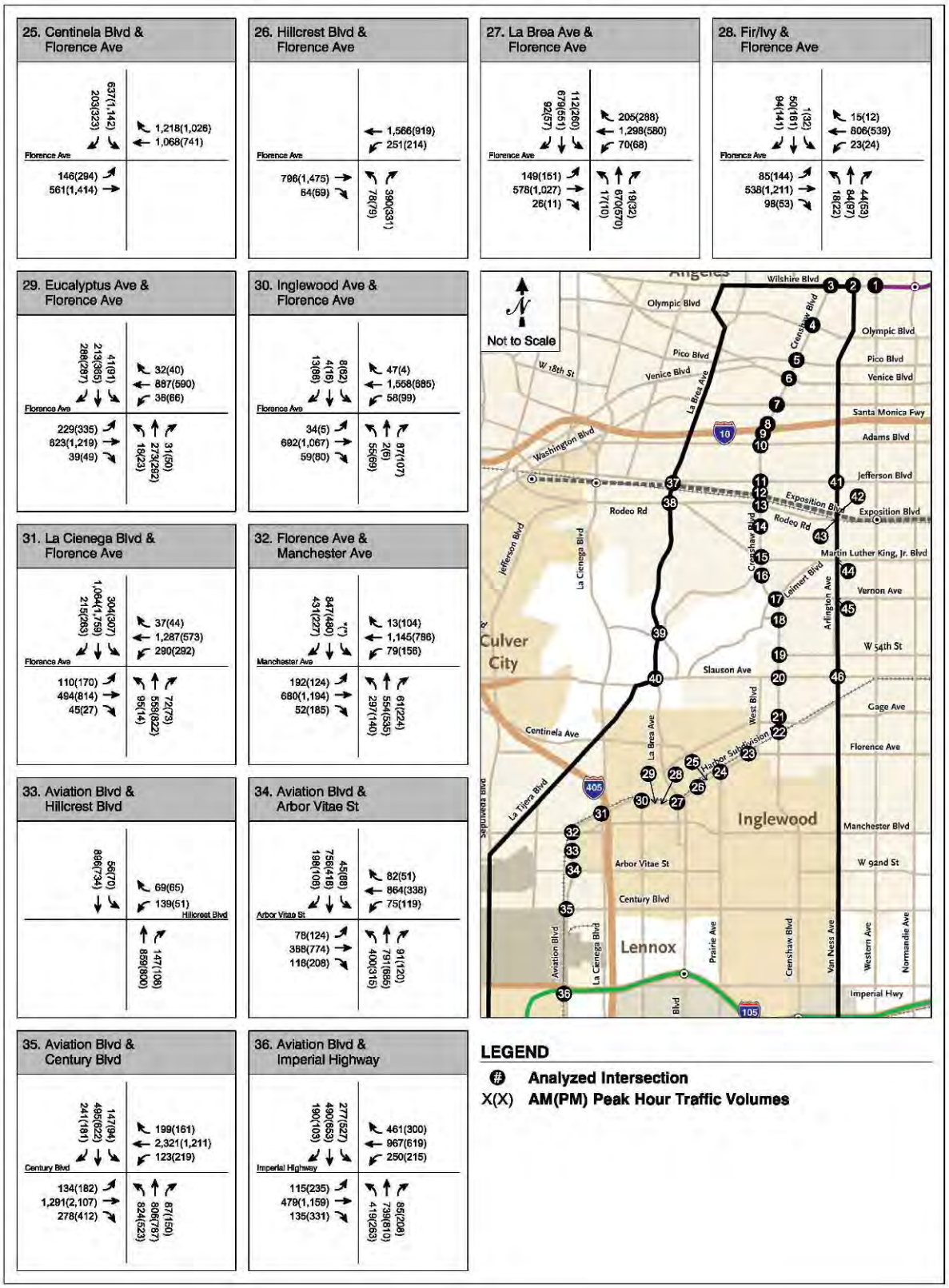


Figure G-2. No-Build (Year 2030) Peak Hour Traffic Volumes (continued)

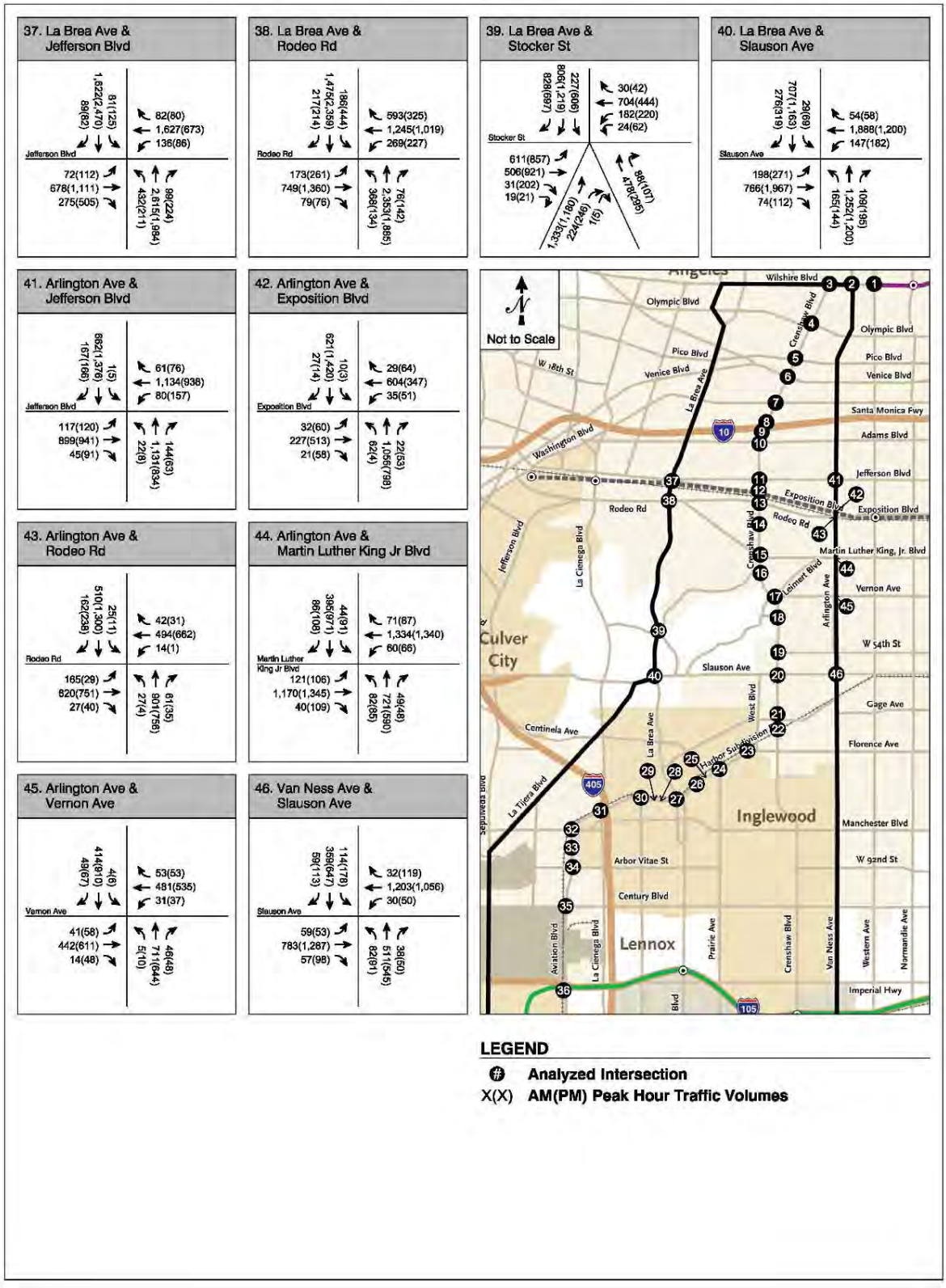


Figure G-3. LPA Peak Hour Traffic Volumes

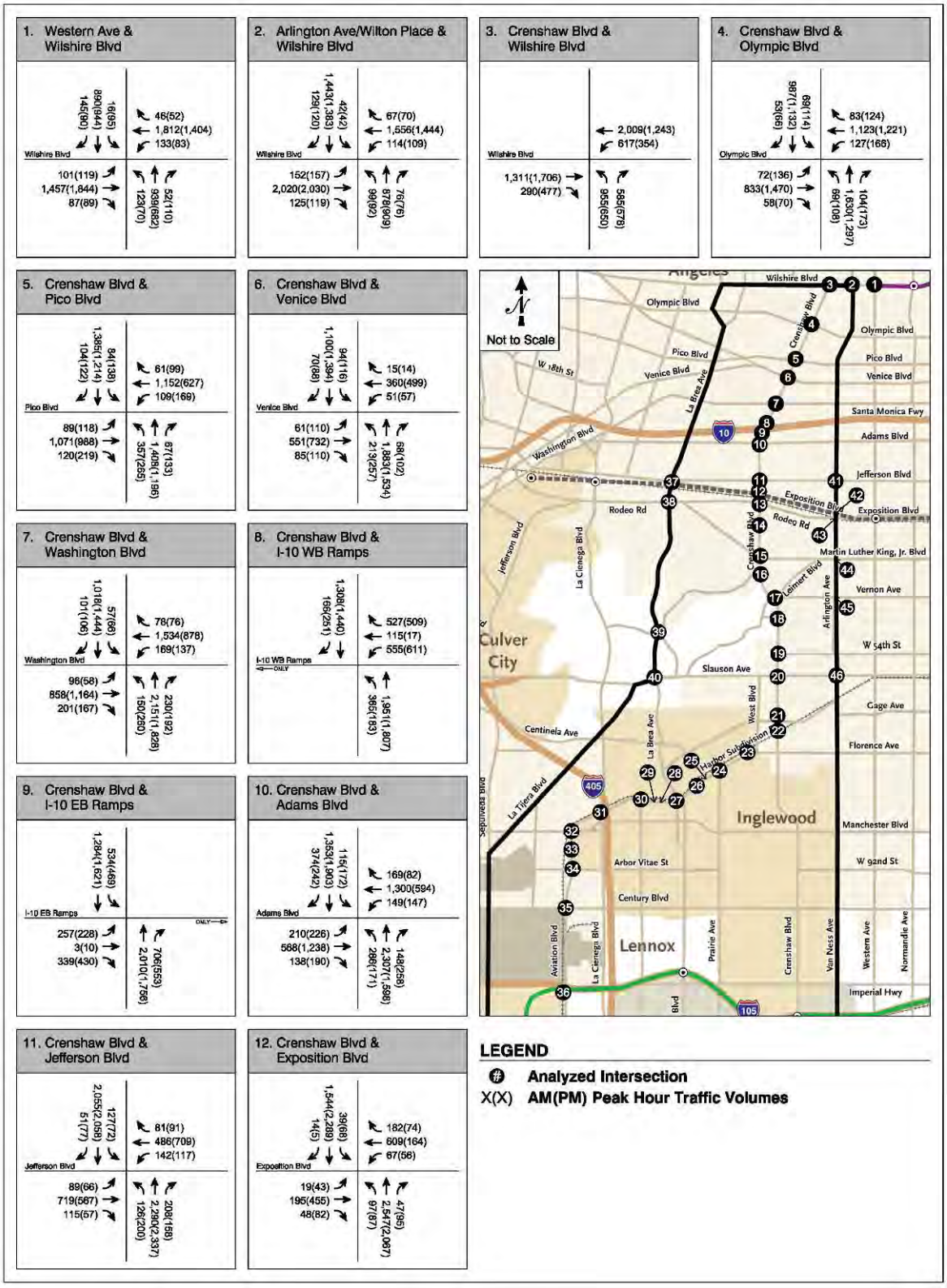


Figure G-3. LPA Peak Hour Traffic Volumes (continued)

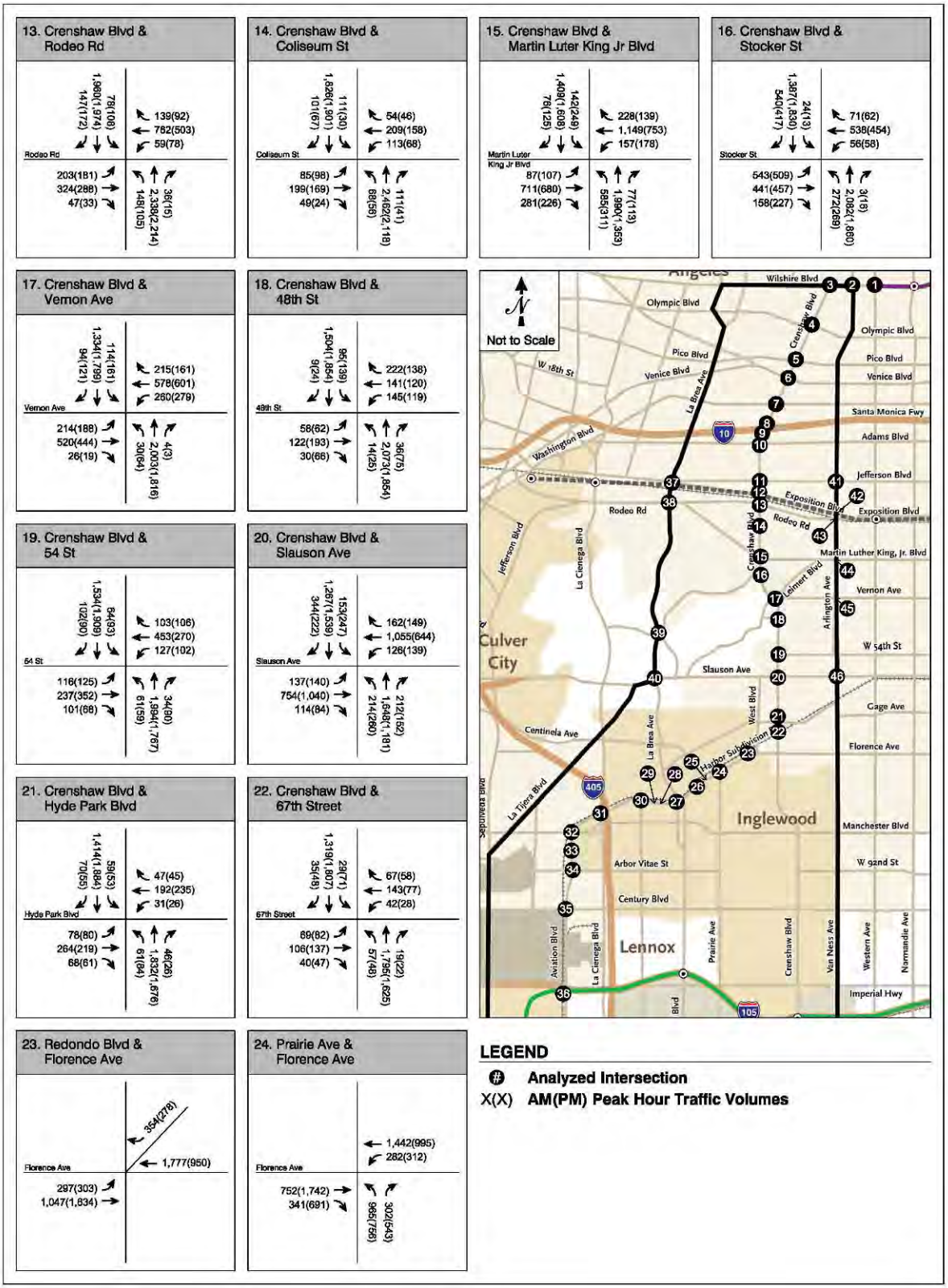


Figure G-3. LPA Peak Hour Traffic Volumes (continued)

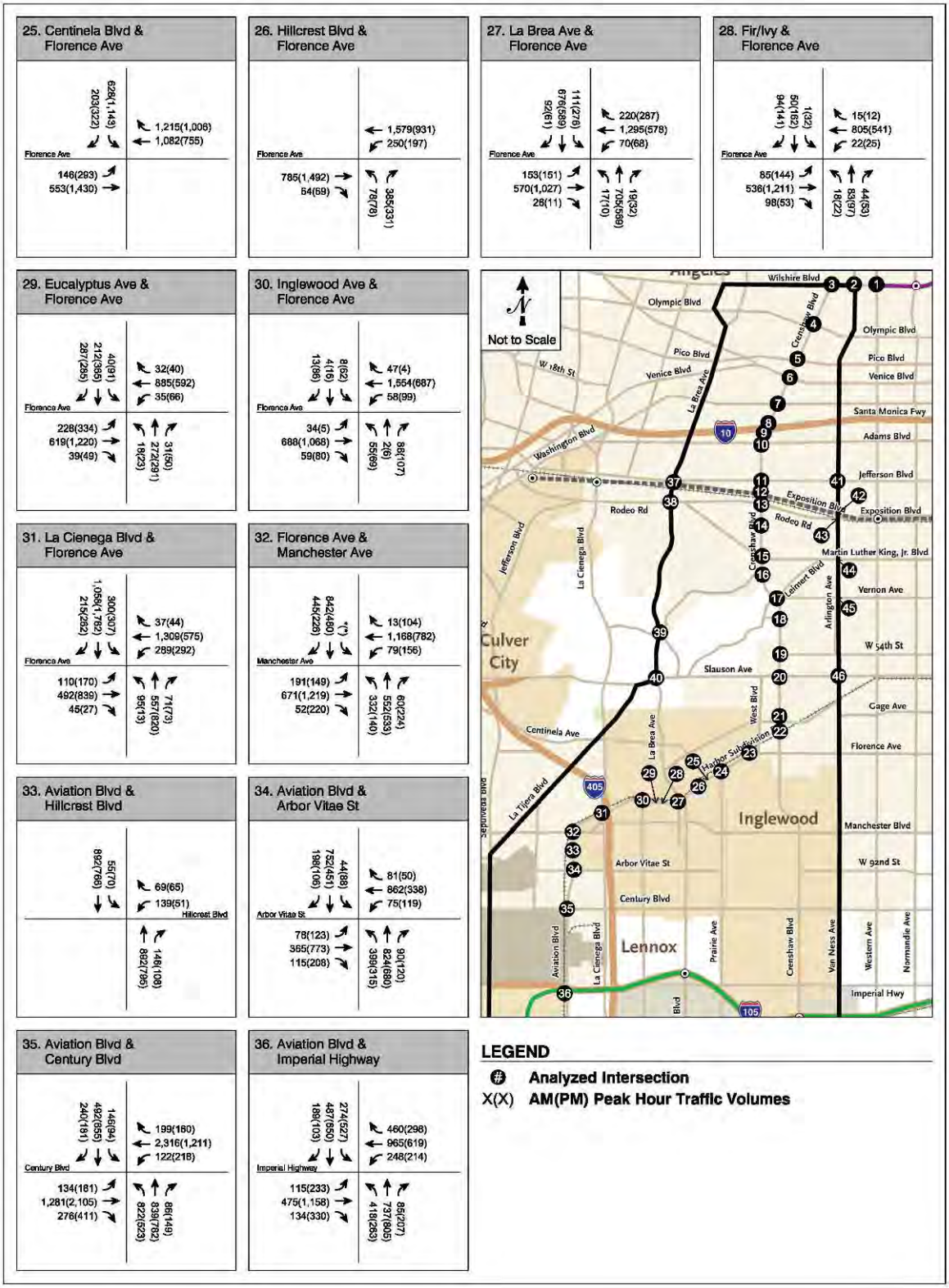
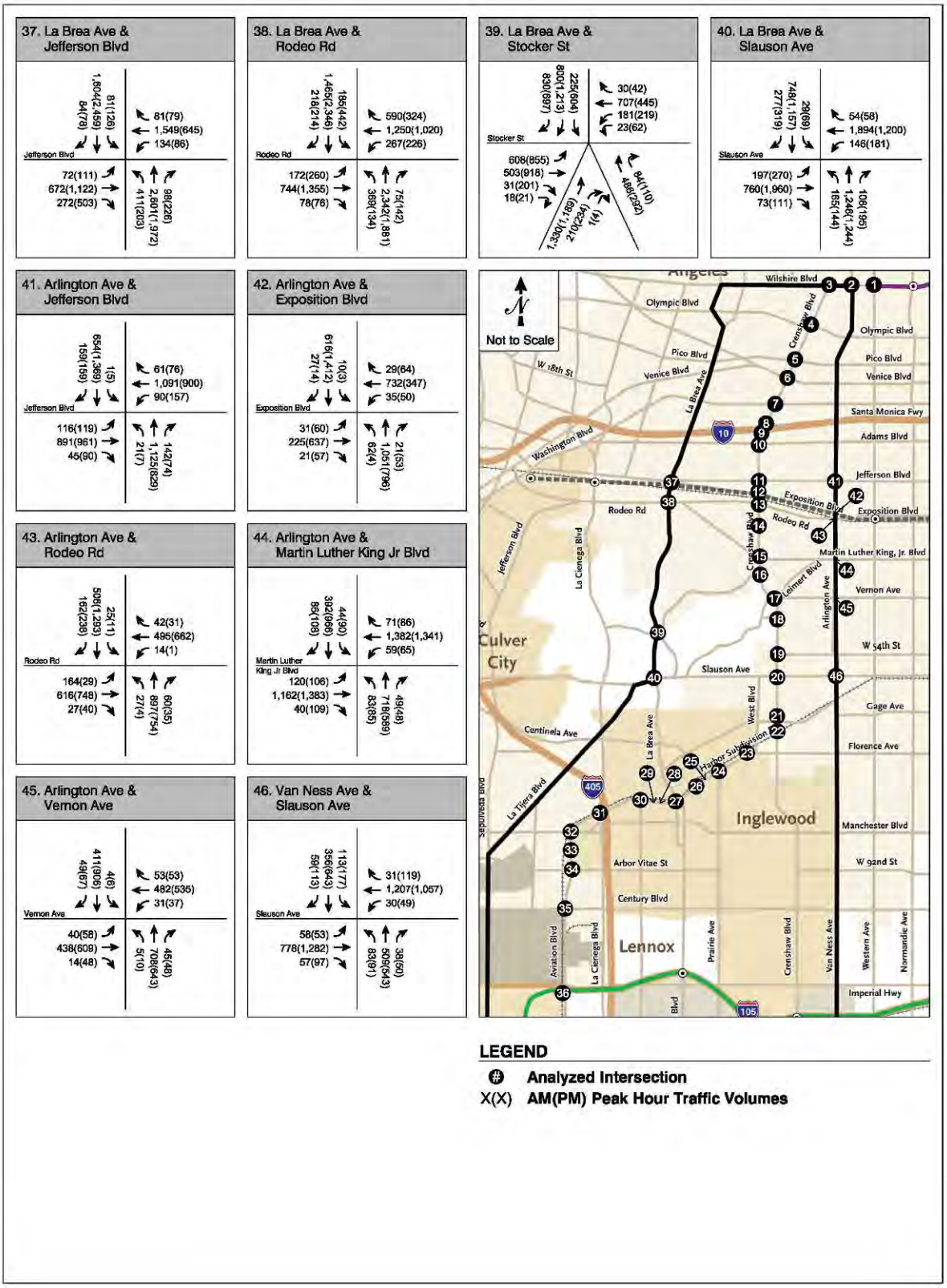


Figure G-3. LPA Peak Hour Traffic Volumes (continued)



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Intersection Delay & Lane Configuration Data for FEIS/FEIR (Subtask 6.3.3.1)

Crenshaw/LAX Transit Corridor Project
Advanced Conceptual Engineering
Contract E0117

Prepared for:
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Prepared by:
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October 2010

This document has been prepared by the Hatch Mott MacDonald Crenshaw/LAX Transit Corridor Team, which includes Hatch Mott MacDonald and the following subconsultants:

- Anil Verma Associates, Inc.
- Base Architecture
- DCA Civil Engineering Group
- Earth Mechanics, Inc.
- Epic Land Solutions
- E. W. Moon
- Hood Design
- IBI Group
- Jacobs Engineering Group, Inc.
- J. L. Patterson & Associates
- McKissack & McKissack
- PQM, Inc.
- The Solis Group
- Ultrasystems
- Wagner Engineering & Survey
- Wilson Ihrig & Associates

ISSUE AND REVISION RECORD

Rev	Date	Originator	Checker	Approver	Description
0	6/21/10	T. Fa'aola	J. Levy	S. Schibuola	Draft
1	10/04/10	T. Fa'aola	J. Levy	S. Schibuola	ACE Final

CONTENTS

FIGURES

TABLES

APPENDICES

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1 EXECUTIVE SUMMARY

The Los Angeles County Metropolitan Transportation Authority (Metro) is planning transit improvements in the Crenshaw/LAX Transit Corridor to accommodate demand for travel in north-south and east-west directions. These improvements will provide more direct service between downtown Los Angeles and Los Angeles International Airport (LAX), and important connections between the Crenshaw corridor and downtown Los Angeles, the Westside, and the South Bay.

As part of the advanced conceptual engineering design services, Metro has requested that Hatch Mott MacDonald (HMM) provide information that will be used to respond to certain comments received on the Draft Environmental Impact Report (DEIR), and provide the information needed by the environmental consultant to update their information based on the latest conceptual design.

This report is a summary of intersection delays and lane configuration data based on the new advanced conceptual designs for the Crenshaw/LAX Transit Corridor to be used in the final environmental documents. Traffic analysis was performed on several intersections along Crenshaw Boulevard, from Exposition Boulevard to Florence Avenue. The traffic analysis results did vary from the original DEIR average delay estimates. General reductions in delay were due to longer cycle times at intersections in below-grade running areas; variations along the on-street running portions may be related to the instability of the delay results. This is consistent with actual conditions at intersections that are overloaded, where minor changes in traffic flows or other conditions can cause significant changes in operation delays.

3 TRAFFIC DESIGN

This report documents the Crenshaw/LAX Transit Corridor intersection lane configurations, delay, and level of service. The corridor intersection lane configurations and Draft EIS/EIR level of service analysis were updated based on the new advanced conceptual designs for the Crenshaw LRT.

3.1 Proposed Lane Configurations

A schematic of the LRT corridor from Crenshaw Boulevard/Exposition Boulevard to Aviation Boulevard/111th Street is included in **Appendix A**. The schematic shows the proposed lane configurations at each intersection, control type, and the light rail alignment with proposed station locations.

3.2 Delay and Level of Service Changes

The delay and level of service for the Project was re-calculated from the DEIS/DEIR based on new information obtained from the advanced conceptual engineering designs and additional intersection counts. The analysis, shown in *Table 3-1 - LRT Alternative Intersection Analysis,* is a comparison of the DEIS/DEIR intersection results and the updated results based on the advanced conceptual designs.

As seen in *Table 3-1*, there are several differences between the DEIS/DEIR analysis and the advanced conceptual engineering design analysis results. The differences between the two results are due to the following changes:

- Pedestrian flashing “do not walk” crossing times were increased at all at-grade intersections based on planned roadway widths using a 4 feet/minute walking speed.
- Pedestrian walk times (initial walking person symbol) were adjusted to a minimum of 7 seconds with 15 seconds used for walk times in at-grade station entrances.
- Due to high traffic volumes, pedestrians, and long crossing times, the use of transit priority is not expected to be effective along Crenshaw Boulevard. To provide station to station travel for the LRT with minimum stops, progression timings were determined. The coordination plans provided bi-directional through bands along Crenshaw Boulevard for the LRT and arterial traffic. To provide the best progression for the LRT, longer than typical cycle lengths were explored. Longer cycle lengths provide larger progressive windows for the LRT and are required to provide protected left turn phasing whenever traffic turns left across the LRT tracks. The maximum LADOT allowable cycle length of 150 seconds provides the best LRT flows. This cycle length was applied to the entire section of Crenshaw Boulevard, including areas without on-street running, for consistent progression along the arterial. By using longer cycle lengths, levels of service for the on-street running portions were mostly unaffected, while operations were significantly improved at MLK Boulevard, Stocker Street, and Vernon Avenue.
- Signals were changed to fixed cycle length for at-grade intersections to provide dual direction progression.
- All red time was changed at several locations to provide a consistent one second of all red time.

- Lane widths were changed from 12 feet to 10 feet on Crenshaw Boulevard in at-grade crossing intersections to better reflect proposed lane widths.
- Northbound and southbound left turns were removed at 54th Street/Crenshaw Boulevard.
- The southbound left turn at Exposition Boulevard/Crenshaw Boulevard was removed.
- Double left-turn lanes (150 feet) were added to Slauson Avenue/Crenshaw Boulevard on the east and westbound approaches. Dedicated right-turn lanes were allowed between 4PM and 6 PM on the north and southbound approaches. It will remain a shared through right turn lane on the north and southbound approaches between 6:30AM and 4PM due to school drop offs.
- Westbound at Centinela Ave/Florence Avenue is now double right-turns and two through lanes.
- Protected left turns were added at the intersections of Florence Avenue with Cedar, Eucalyptus, and Ivy to provide railroad clearance operations at these locations, and address delays caused by railroad pre-emption.

The analysis found significant instability in the Synchro delay calculations at intersections that are projected to be at—or above—capacity. This is consistent with actual conditions at intersections that are overloaded, where minor changes in traffic flows or other conditions can cause significant changes in operation delays. Minor changes in timing of the Synchro model resulted in wide variations of delays. These intersections can reach gridlock during some periods of time and handle high volumes of traffic steadily at other times. The impacts on traffic and LRT operations at these intersections can only be approximated in these calculations, and variability in their operation should be expected. Microscopic modeling of these locations is reported in a separate report.

The Synchro delay and level of service calculations sheets can be found in **Appendix B**.

Table 3-1 – LRT Alternative Intersection Analysis.

Intersection	Control Type	Peak Hour	DEIS/DEIR Analysis		Advanced Design Analysis (updated from DEIS/DEIR)		
			Delay[a]	LOS[b]	Delay	LOS	Δ[c]
Exposition Boulevard & Crenshaw Boulevard	Signal	AM	129	F	107.6	F	-21.4
		PM	65	E	78.3	E	13.3
Rodeo Road & Crenshaw Boulevard	Signal	AM	113	F	100.0	F	-13
		PM	42	D	87.5	F	45.5
Rodeo Place & Crenshaw Boulevard	Unsig.	AM	-	-	13.7	B	-
		PM	-	-	11.1	B	-
Coliseum Street & Crenshaw Boulevard	Signal	AM	31	C	49.8	D	18.8
		PM	18	B	16.9	B	-1.1
Coliseum Place & Crenshaw Boulevard	Unsig.	AM	-	-	11.1	B	-
		PM	-	-	9.7	A	-

Table 3-1 – LRT Alternative Intersection Analysis.

Intersection	Control Type	Peak Hour	DEIS/DEIR Analysis		Advanced Design Analysis (updated from DEIS/DEIR)		
			Delay[a]	LOS[b]	Delay	LOS	Δ[c]
39th Street & Crenshaw Boulevard	Signal	AM	-	-	28.8	C	-
		PM	-	-	26.7	C	-
MLK Boulevard & Crenshaw Boulevard	Signal	AM	107	F	70.5	E	-36.5
		PM	66	E	59.5	E	-6.5
Stocker Street & Crenshaw Boulevard	Signal	AM	69	E	59.8	E	-9.2
		PM	85	F	70.9	E	-14.1
Vernon Avenue & Crenshaw Boulevard	Signal	AM	96	F	66.2	E	-29.8
		PM	77	E	66.9	E	-10.1
48th Street & Crenshaw Boulevard	Signal	AM	22	C	30.1	C	8.1
		PM	23	C	28.1	C	5.1
50th Street & Crenshaw Boulevard	Signal	AM	-	-	11.6	B	-
		PM	-	-	4.6	A	-
52nd Street & Crenshaw Boulevard	Signal	AM	-	-	30.8	C	-
		PM	-	-	15.3	B	-
54th Street & Crenshaw Boulevard	Signal	AM	63	E	50.2	D	-12.8
		PM	36	D	36.4	D	0.4
57th Street & Crenshaw Boulevard	Signal	AM	-	-	21.4	C	-
		PM	-	-	27.3	C	-
Slauson Avenue & Crenshaw Boulevard	Signal	AM	110	F	65.0	E	-45.0
		PM	115	F	64.1	E	-50.9
59th Street & Crenshaw Boulevard	Signal	AM	-	-	13.2	B	-
		PM	-	-	20.5	C	-
60th Street & Crenshaw Boulevard	Signal	AM	-	-	19.3	B	-
		PM	-	-	18.7	B	-
Florence Ave & Centinela Ave & La Colina Drive	Signal	AM	103	F	49.7	D	-53.3
		PM	127	F	144.1	F	17.1

Table 3-1 – LRT Alternative Intersection Analysis.

Intersection	Control Type	Peak Hour	DEIS/DEIR Analysis		Advanced Design Analysis (updated from DEIS/DEIR)		
			Delay[a]	LOS[b]	Delay	LOS	Δ[c]
*Florence Avenue & Centinela Avenue (*Option 3 Grade Separation)[d]	Signal	AM	88	F	29.7	C	-73.3
		PM	76	E	40.9	D	-86.1
Florence Avenue & Ivy Avenue	Signal	AM	7.0	A	16.9	B	9.9
		PM	12	B	27.7	C	15.7
Florence Avenue & Eucalyptus Avenue	Signal	AM	17	B	31.9	C	14.9
		PM	52	D	67.5	E	15.5
Florence Avenue & Cedar Street	Signal	AM	-	-	30.5	C	-
		PM	-	-	19.5	B	-

Notes:
a. Delay is represented as seconds
b. LOS = level of service
c. Δ = difference from DEIR and Advanced Design results
d. The Florence/Avenue/Centinela Avenue intersection could also be affected if the Option 3 Grade Separation is the final alignment selected. Therefore, the additional analysis with the Option 3 effects to Florence Avenue/ Centinela Avenue is shown in the table.

As seen in *Table 3-1*, the traffic analysis results did vary from the original DEIS/DEIR average delay estimates. General reductions in delay were due to longer cycle times at intersections in below-grade running areas; variations along the on-street running portions may be related to the instability of the delay results described above.

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Appendix A – Crenshaw/LAX Transit Corridor Schematics

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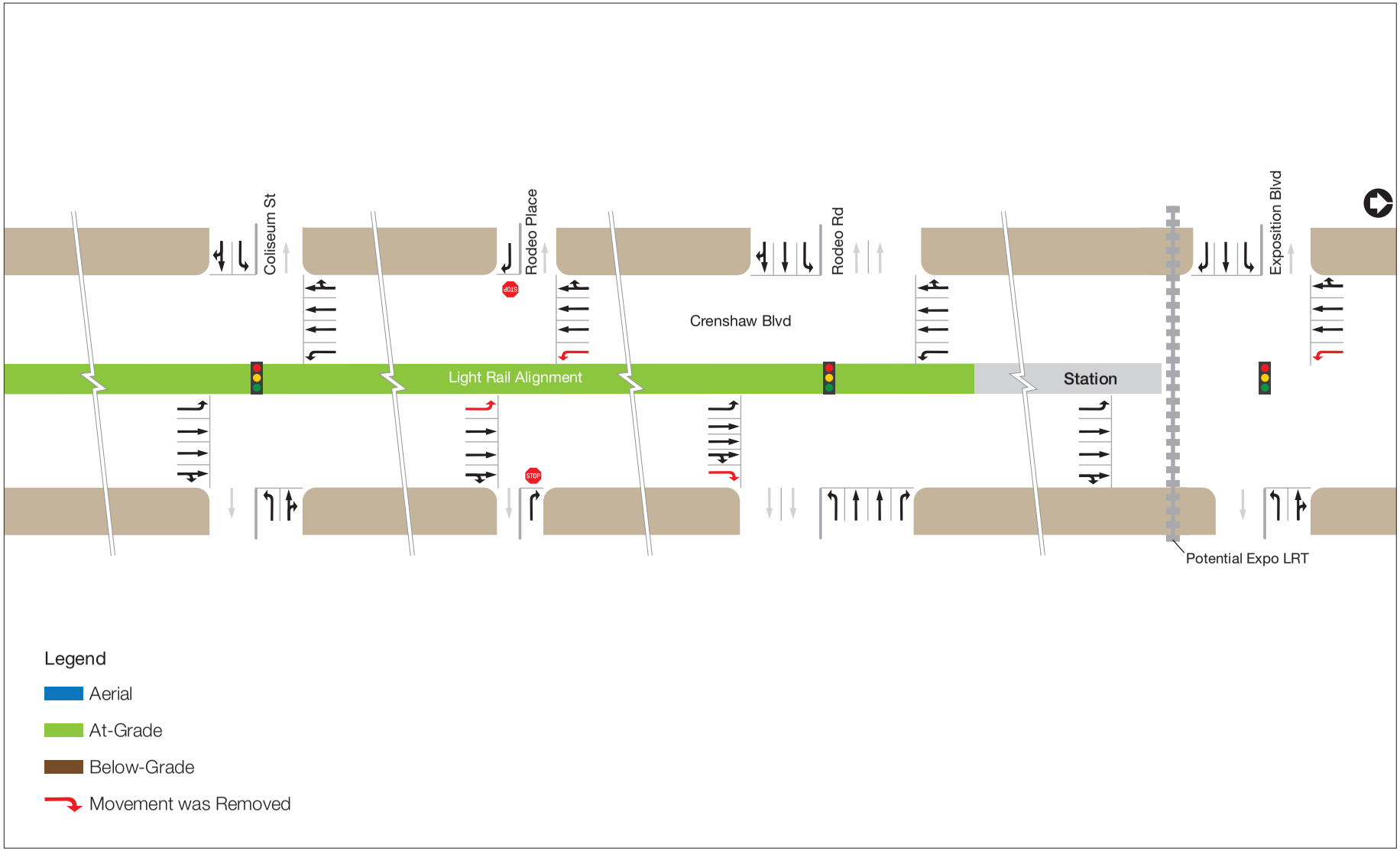

Plan

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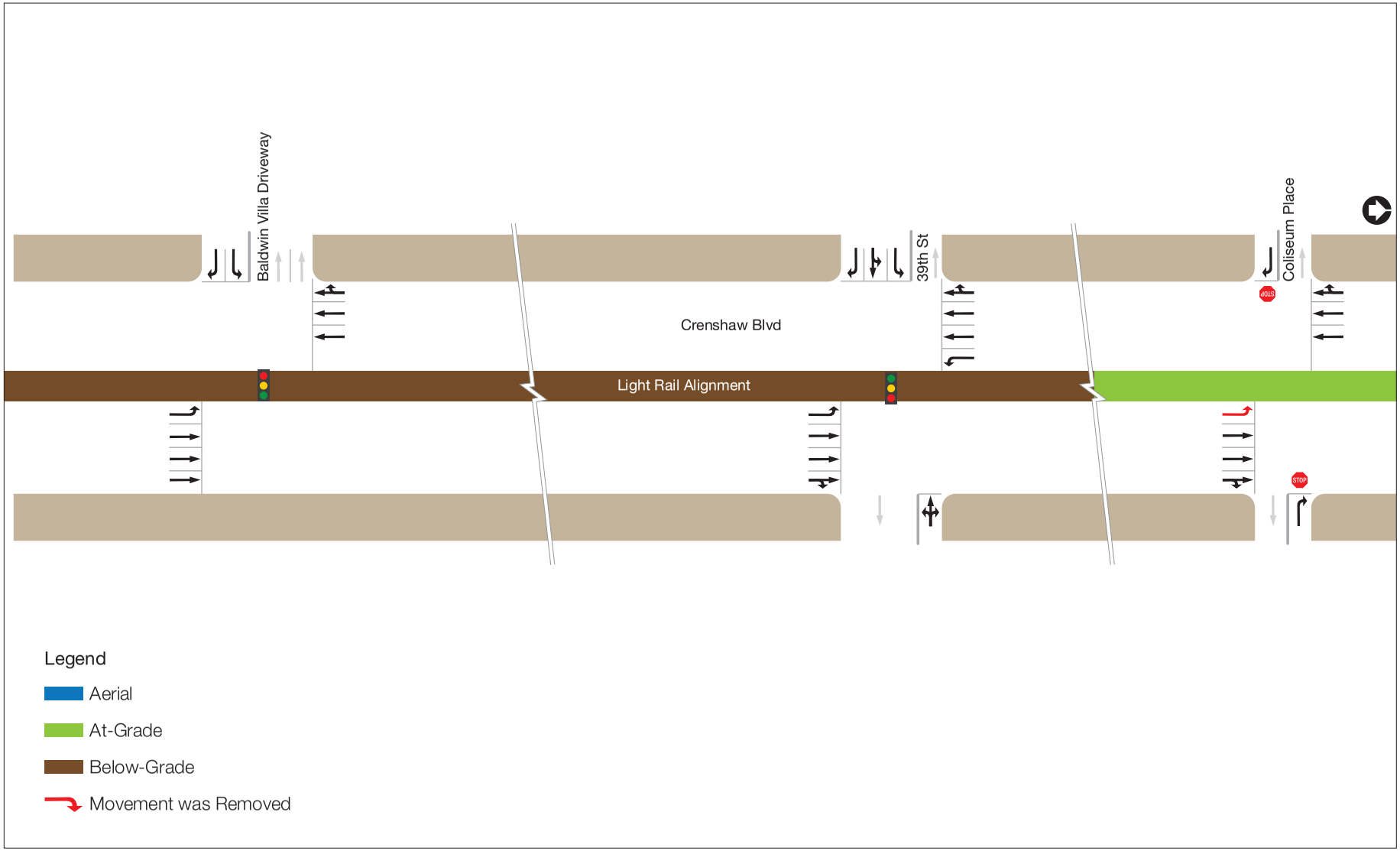

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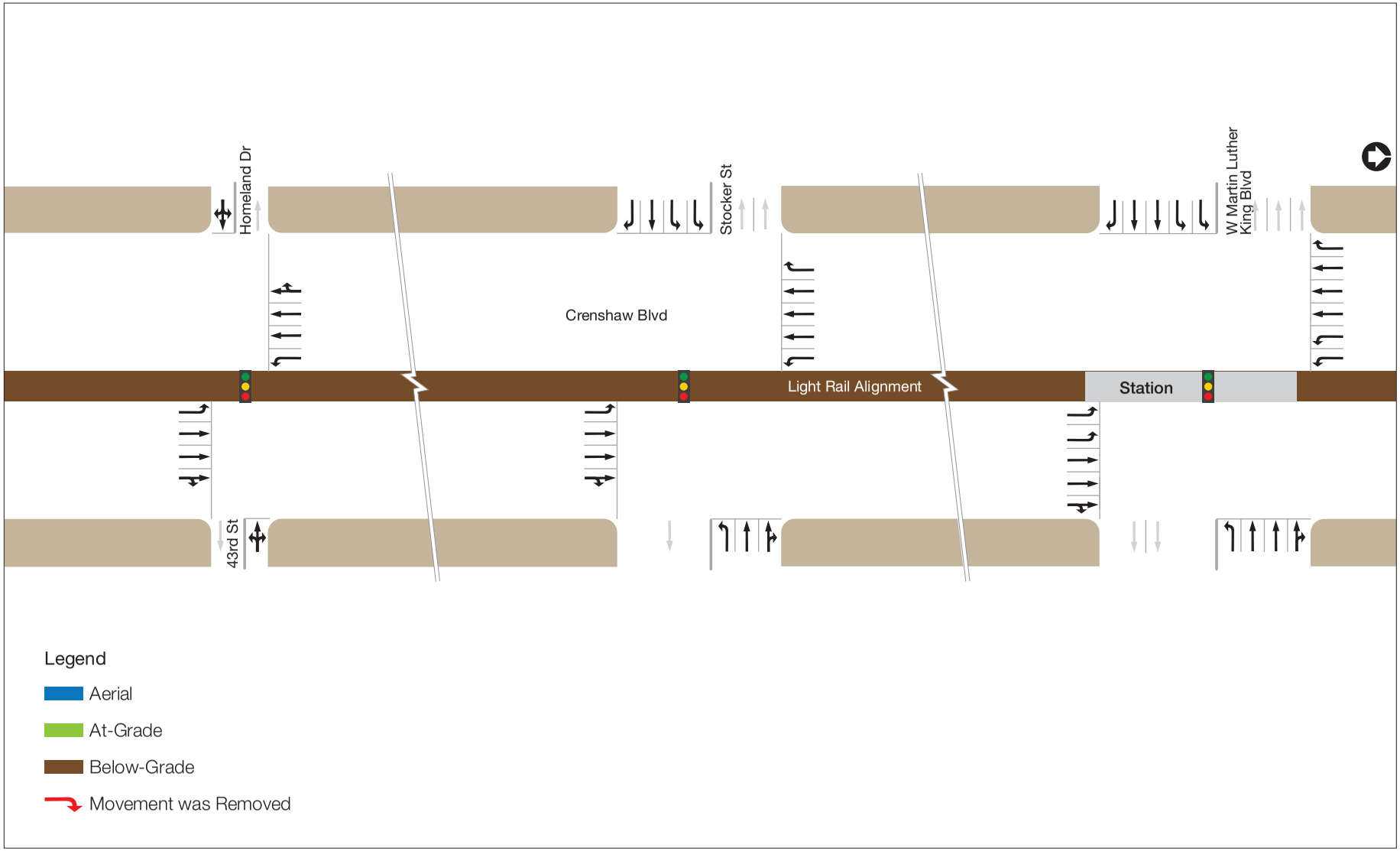

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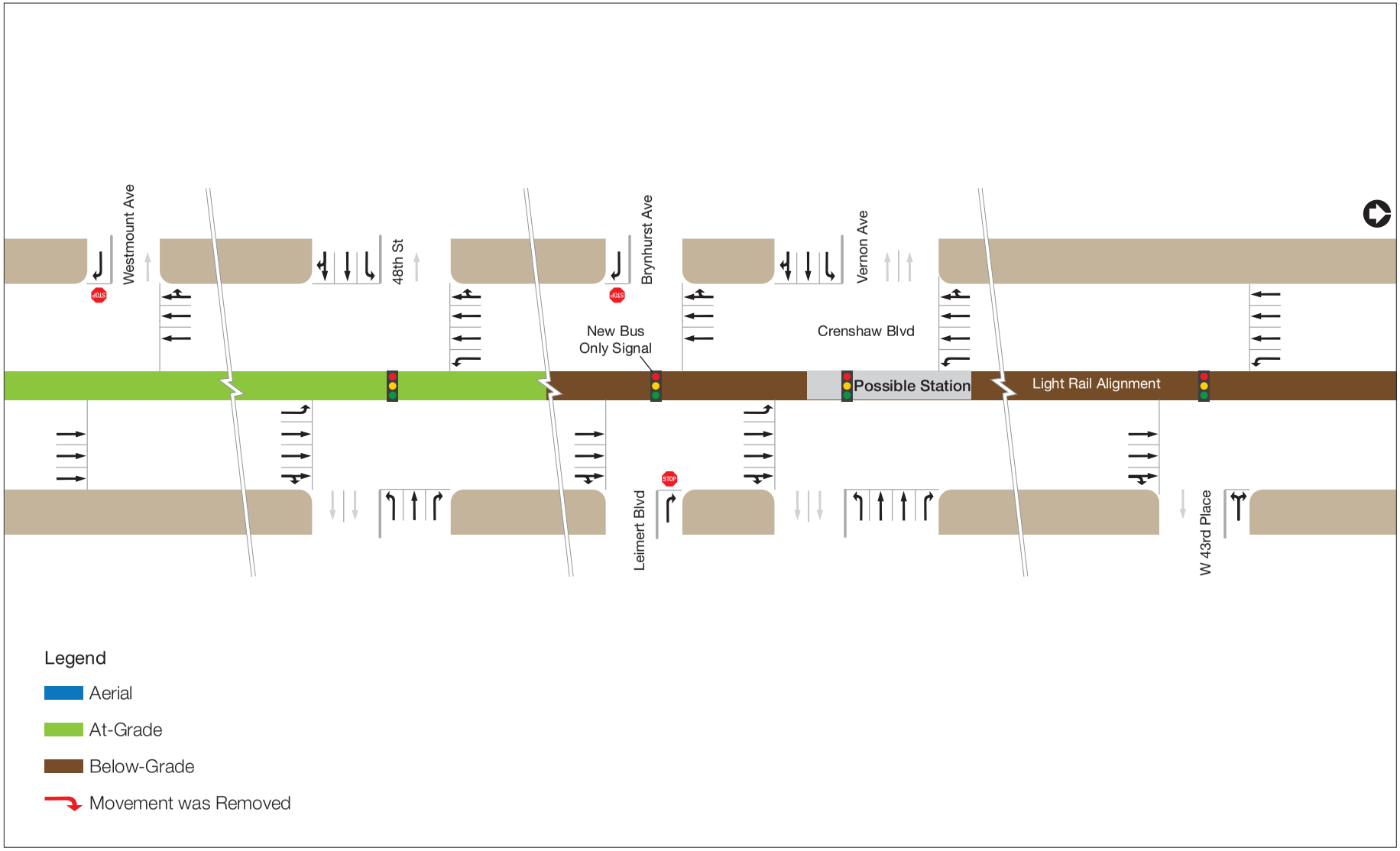

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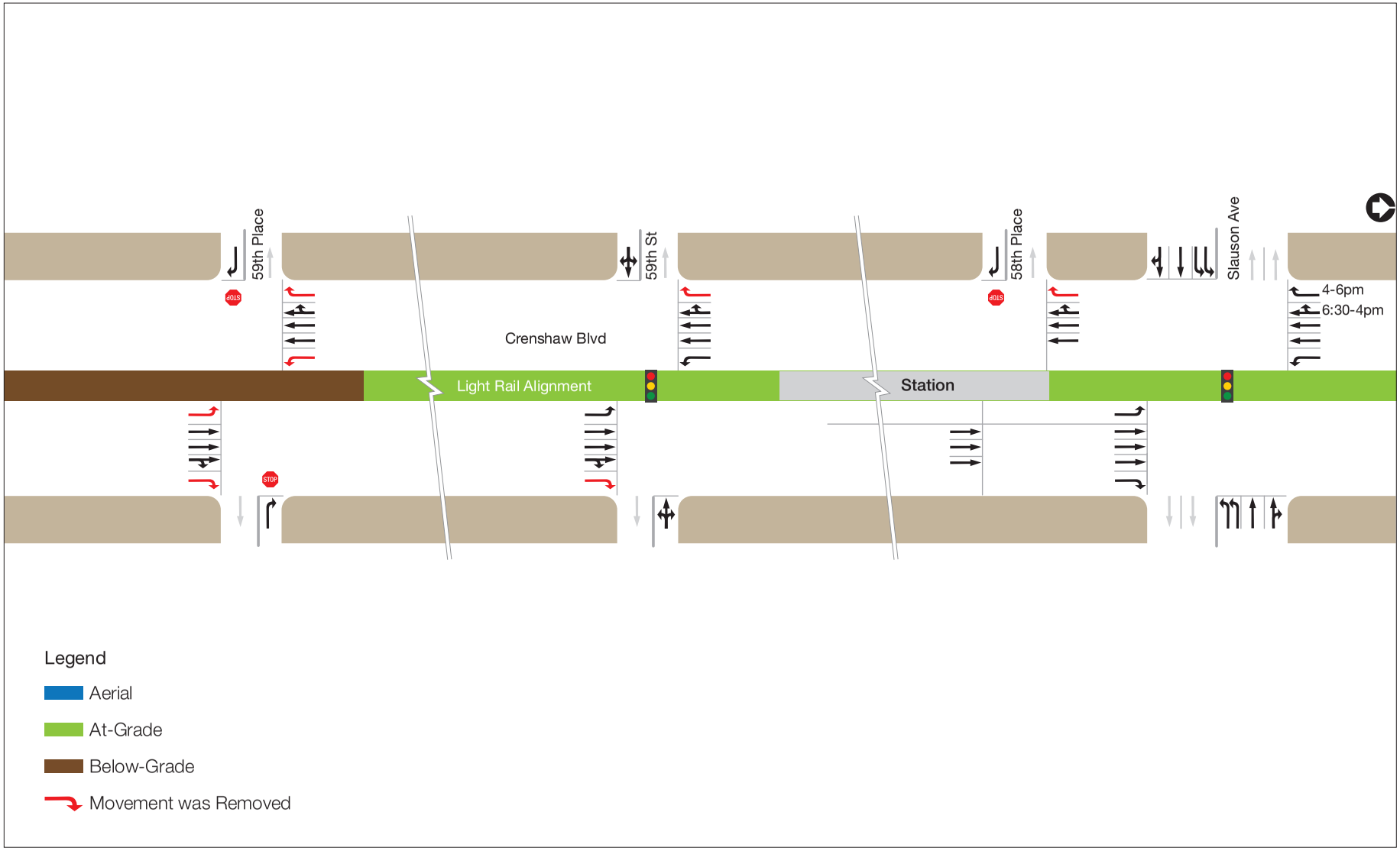

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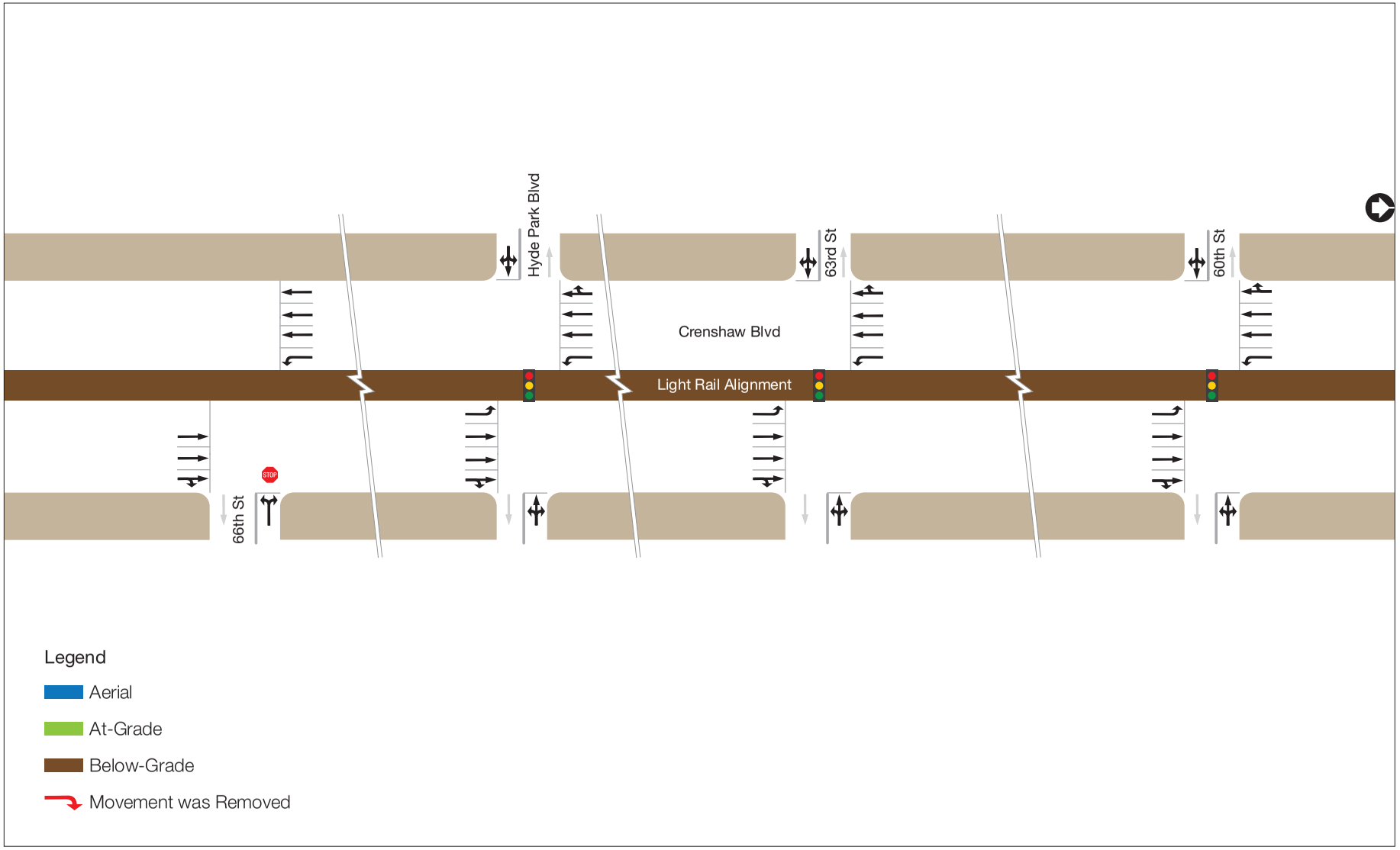

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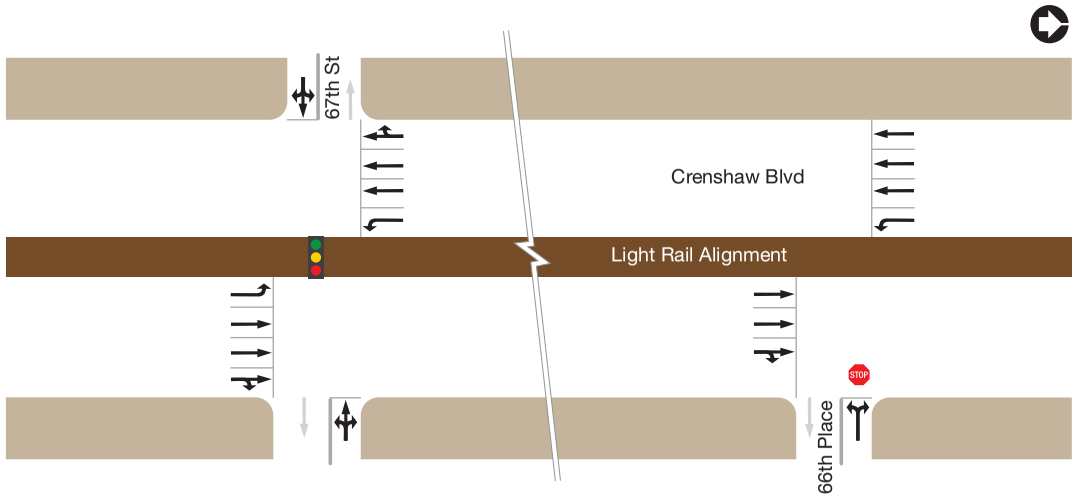

Legend

- Aerial
- At-Grade
- Below-Grade
- Movement was Removed

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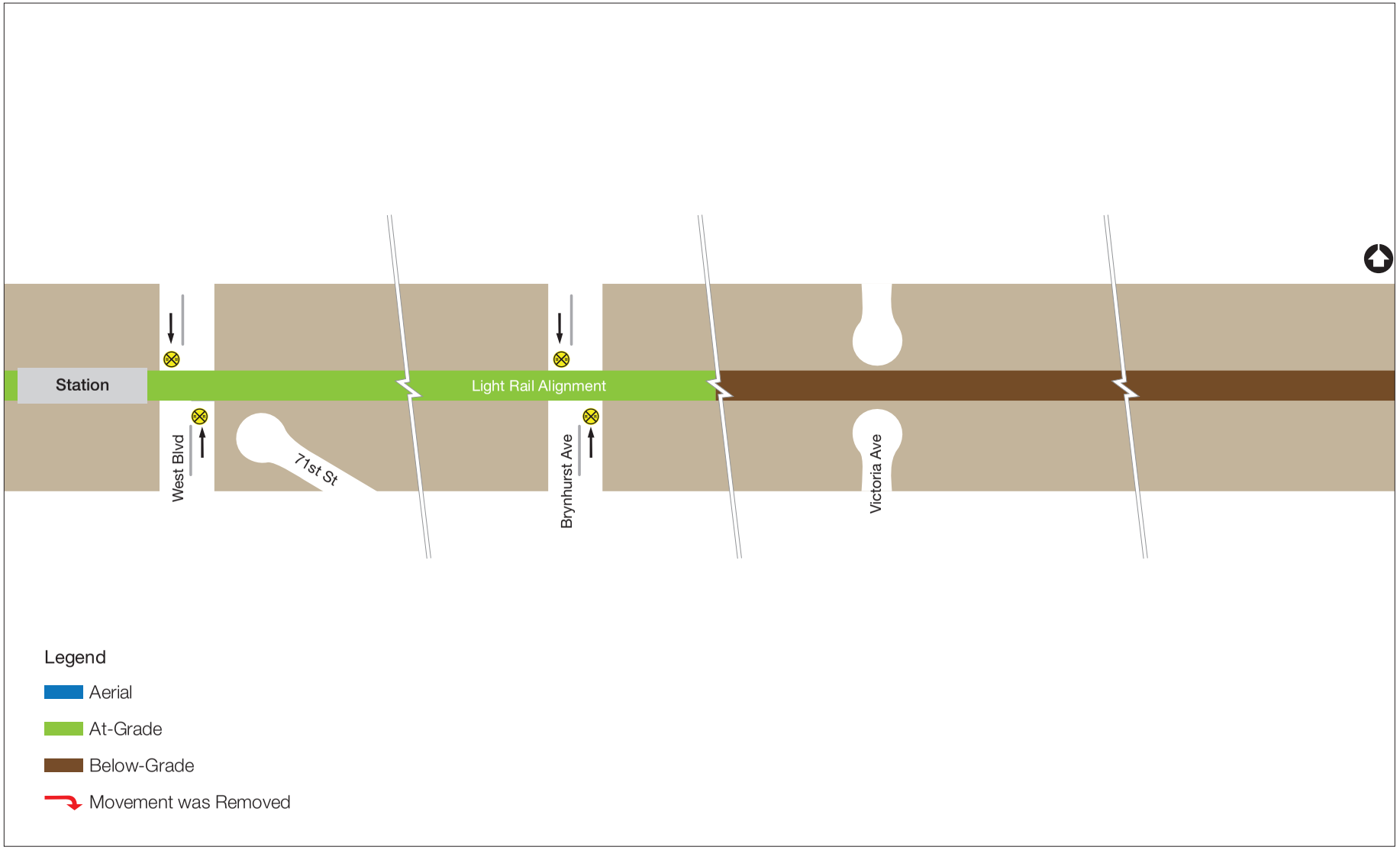

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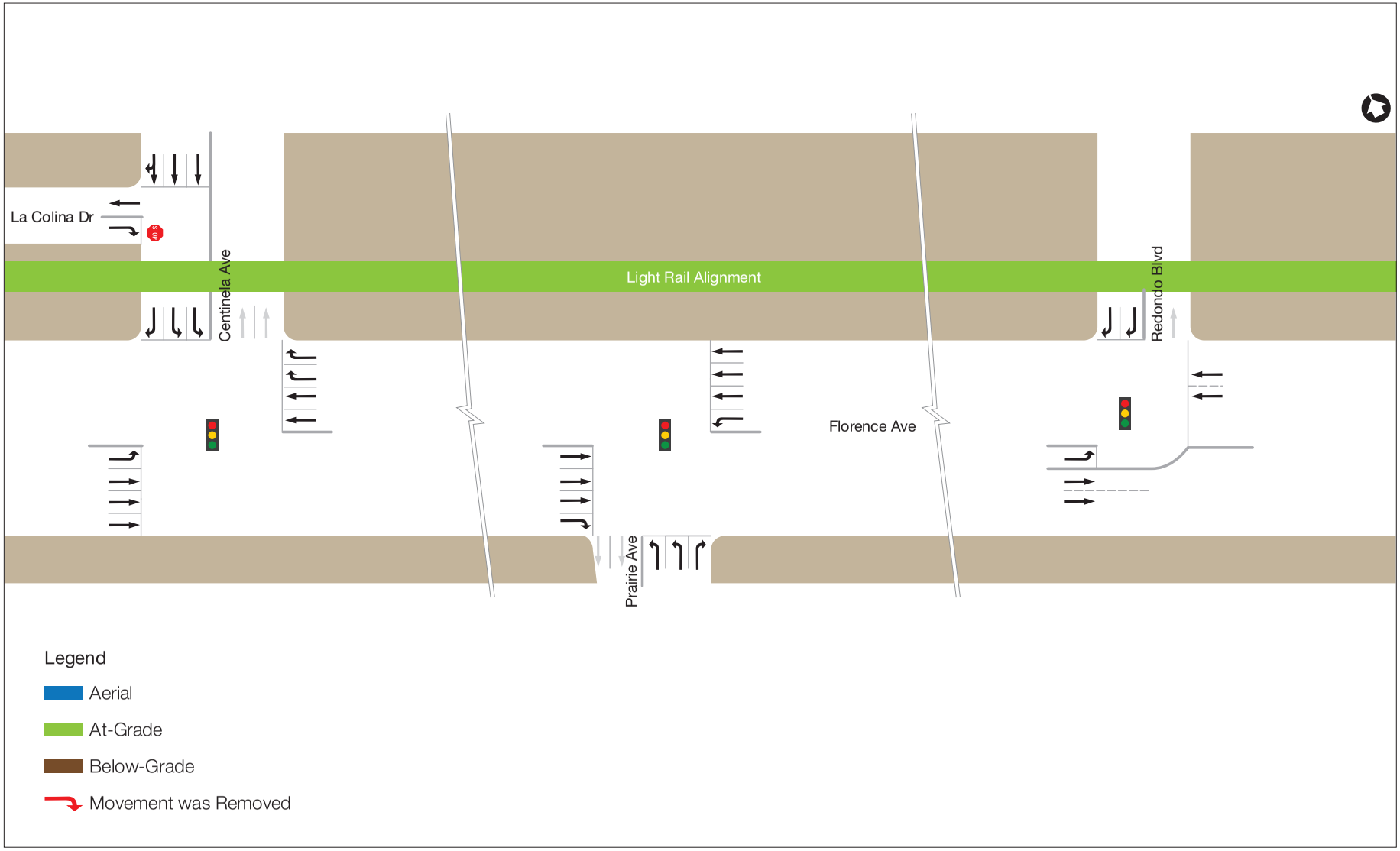

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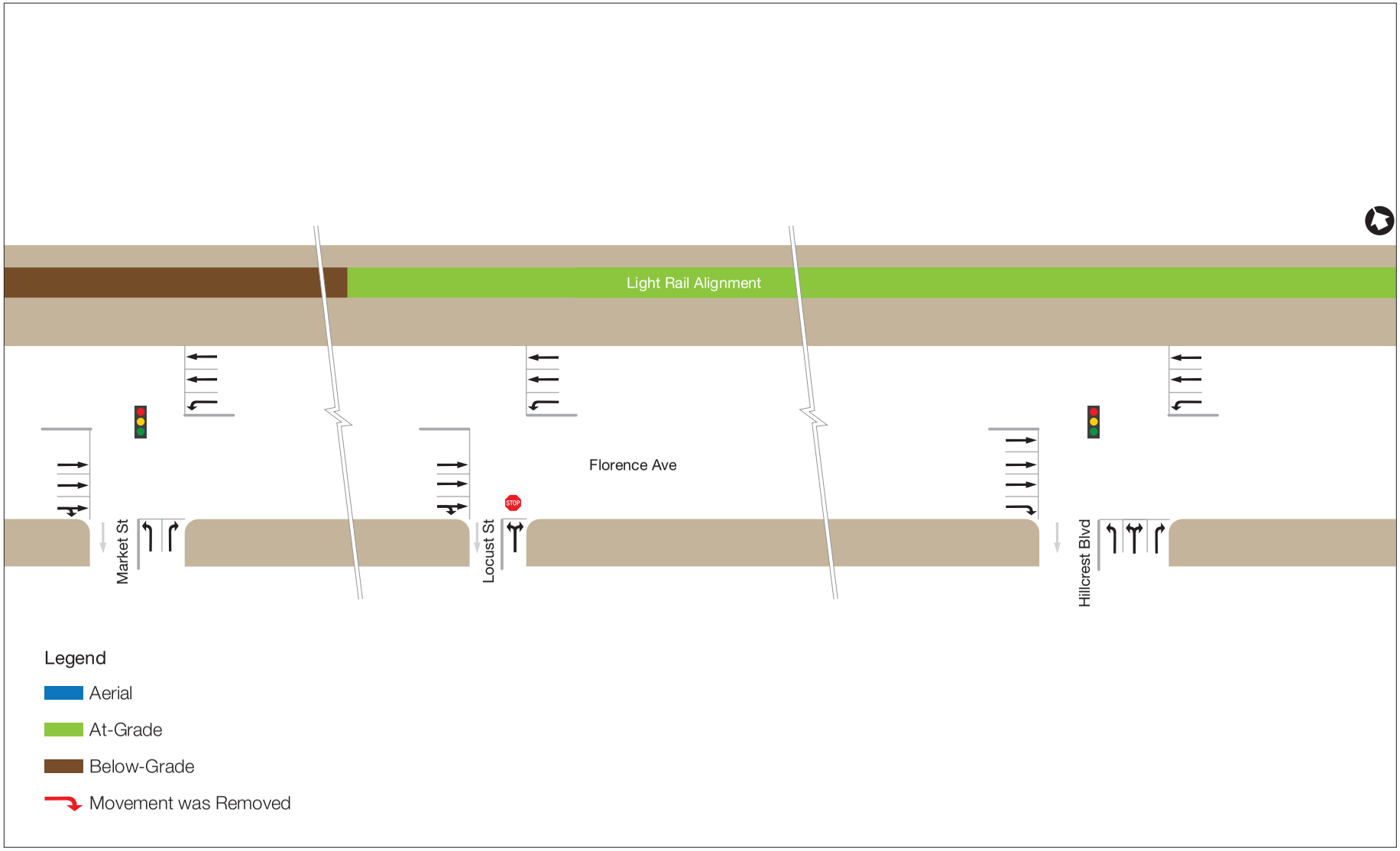

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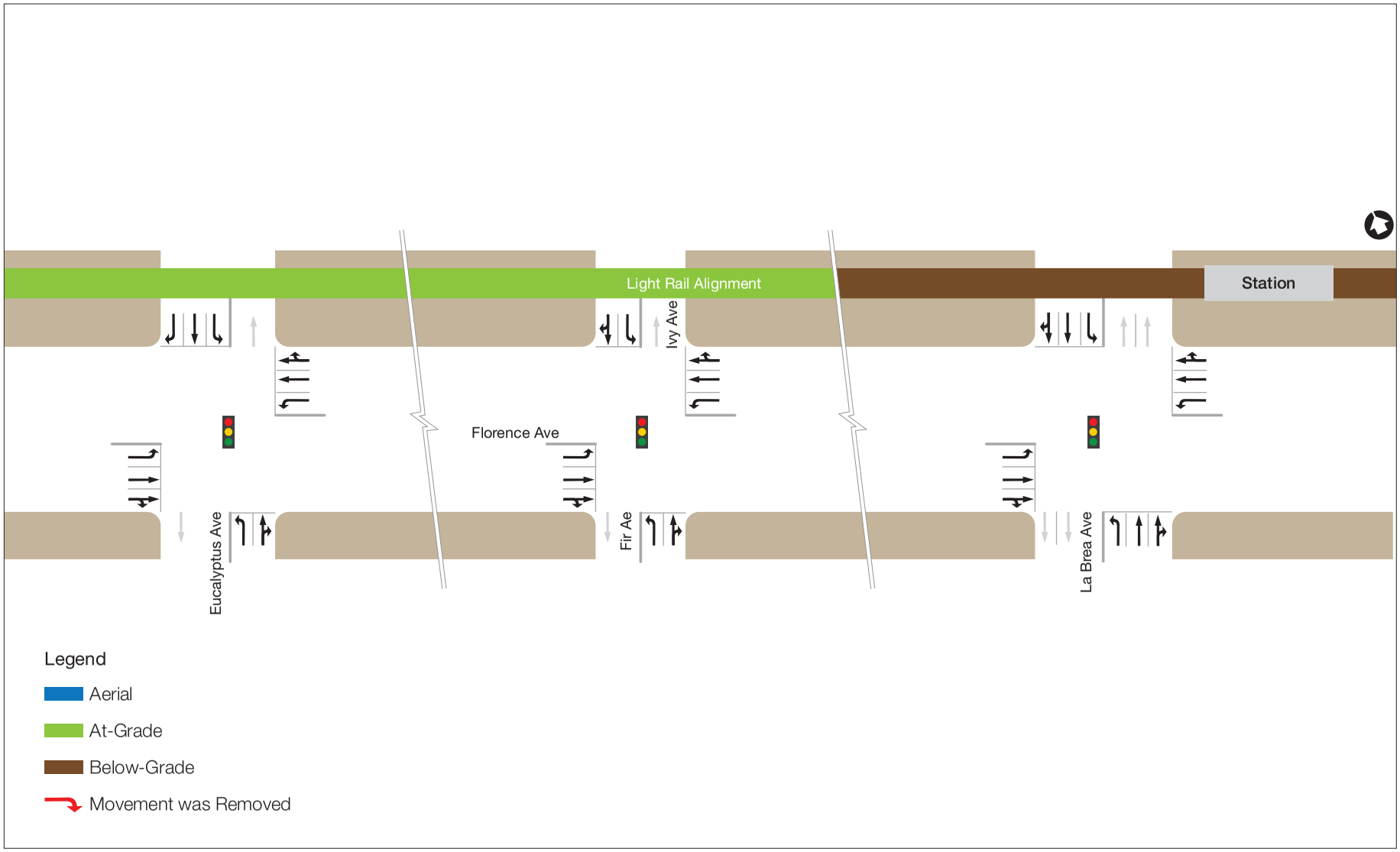

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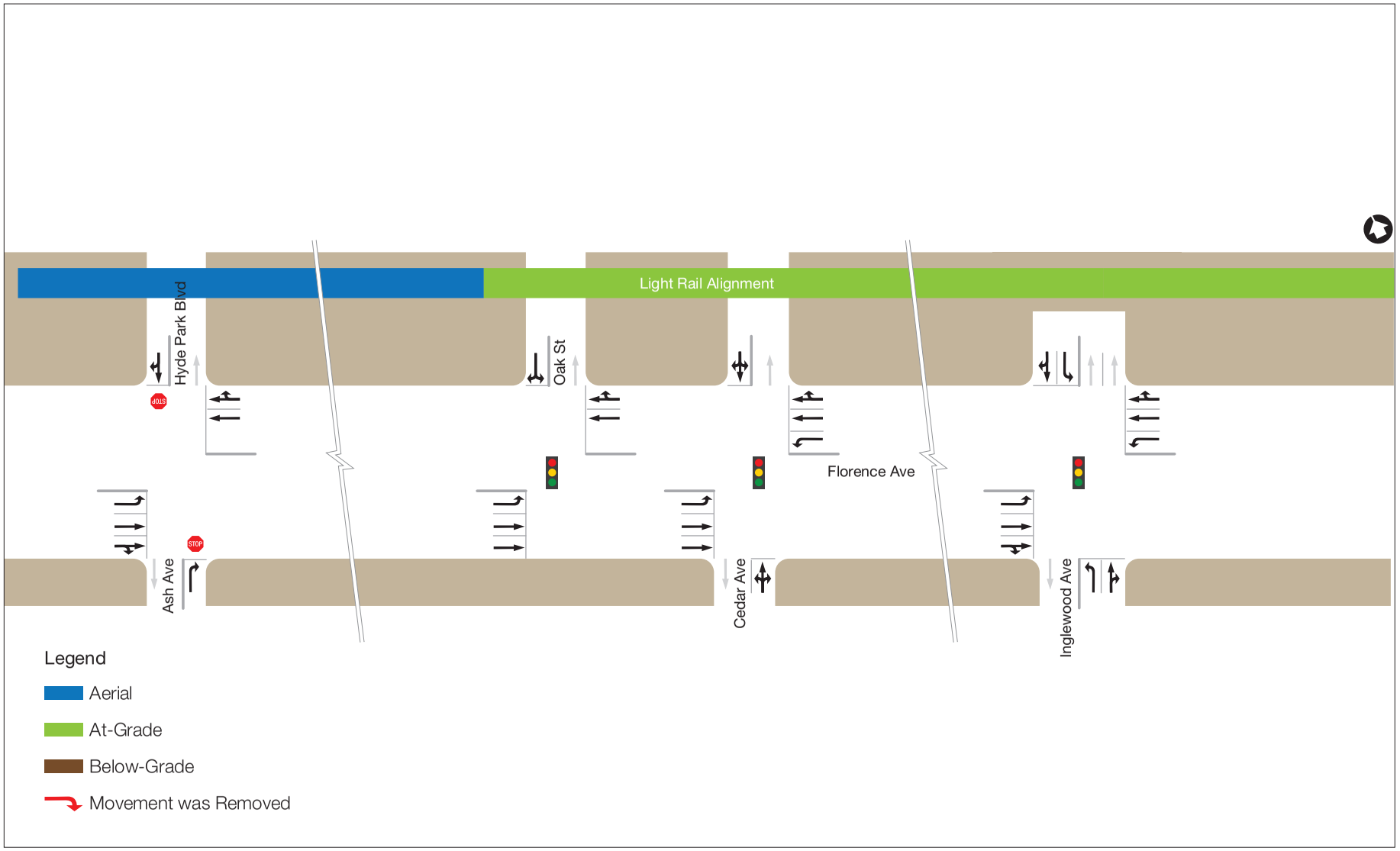

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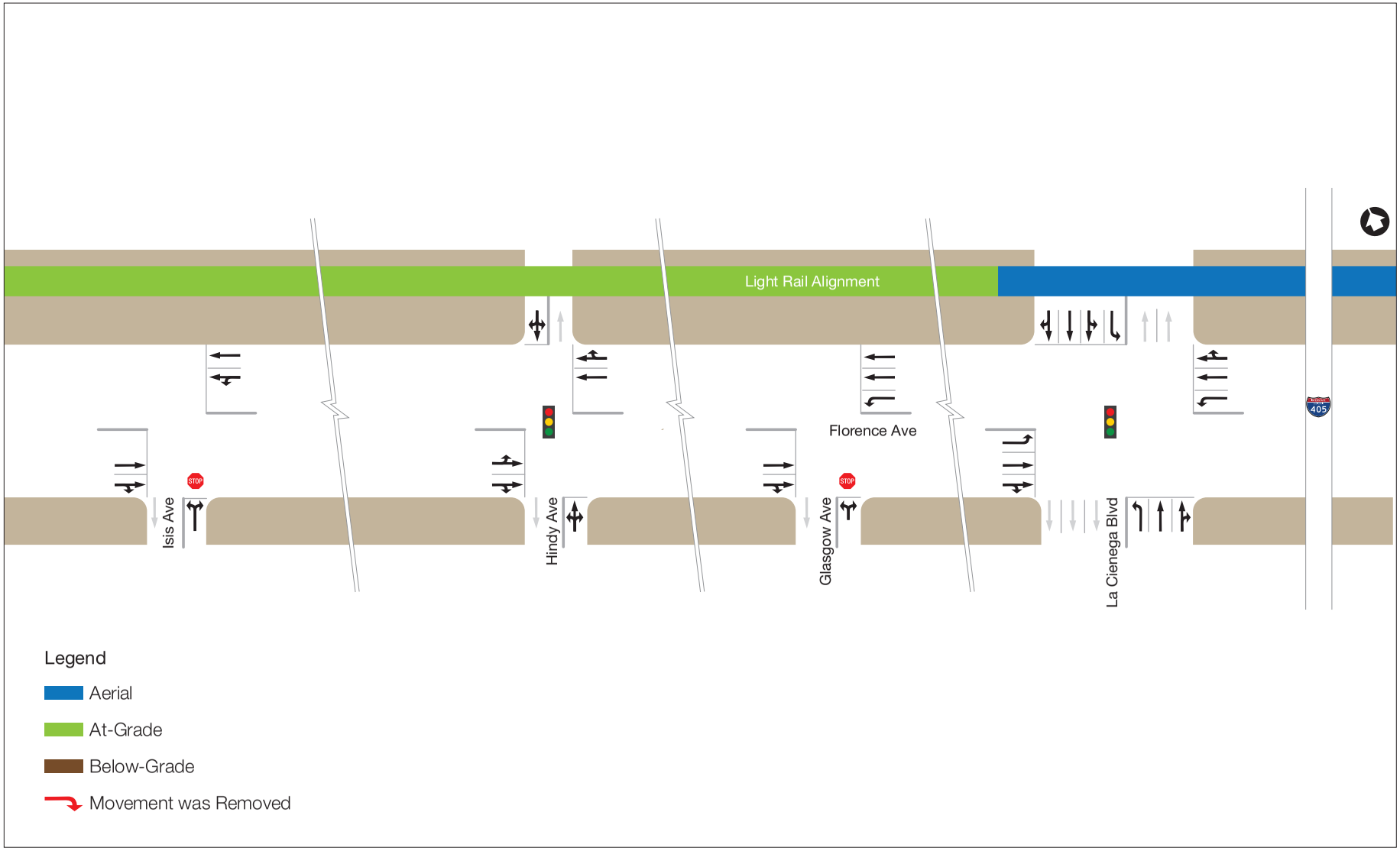

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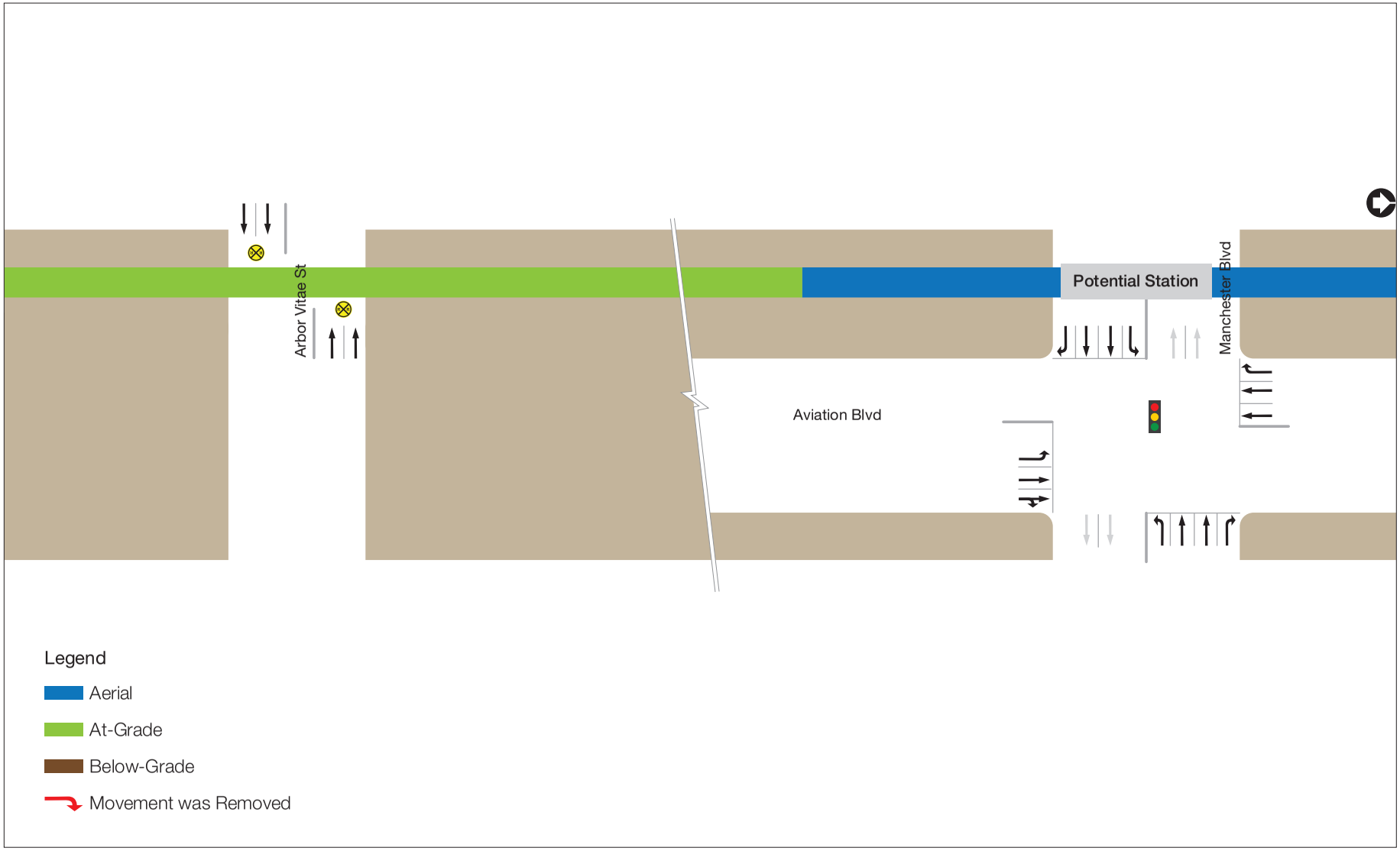

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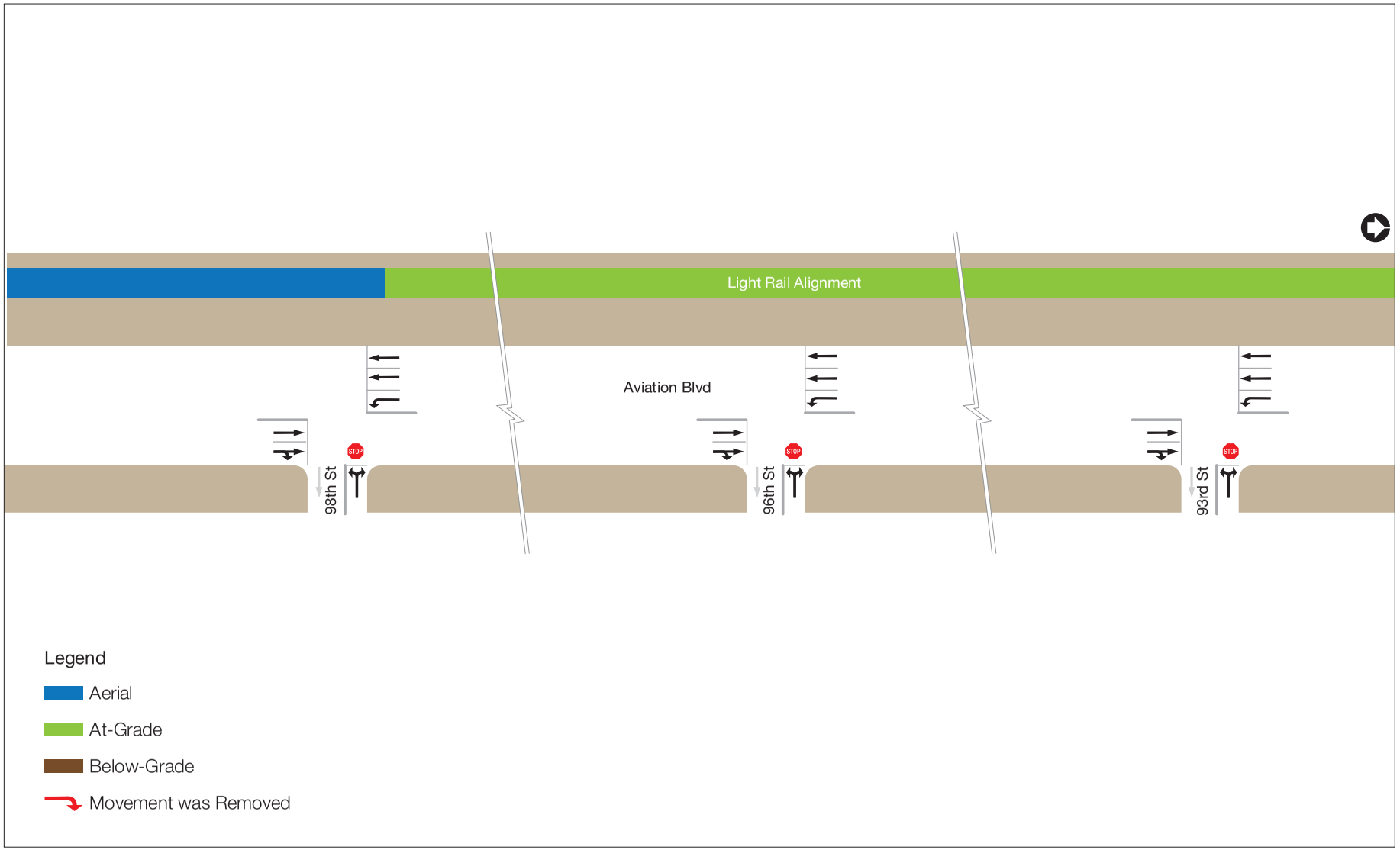

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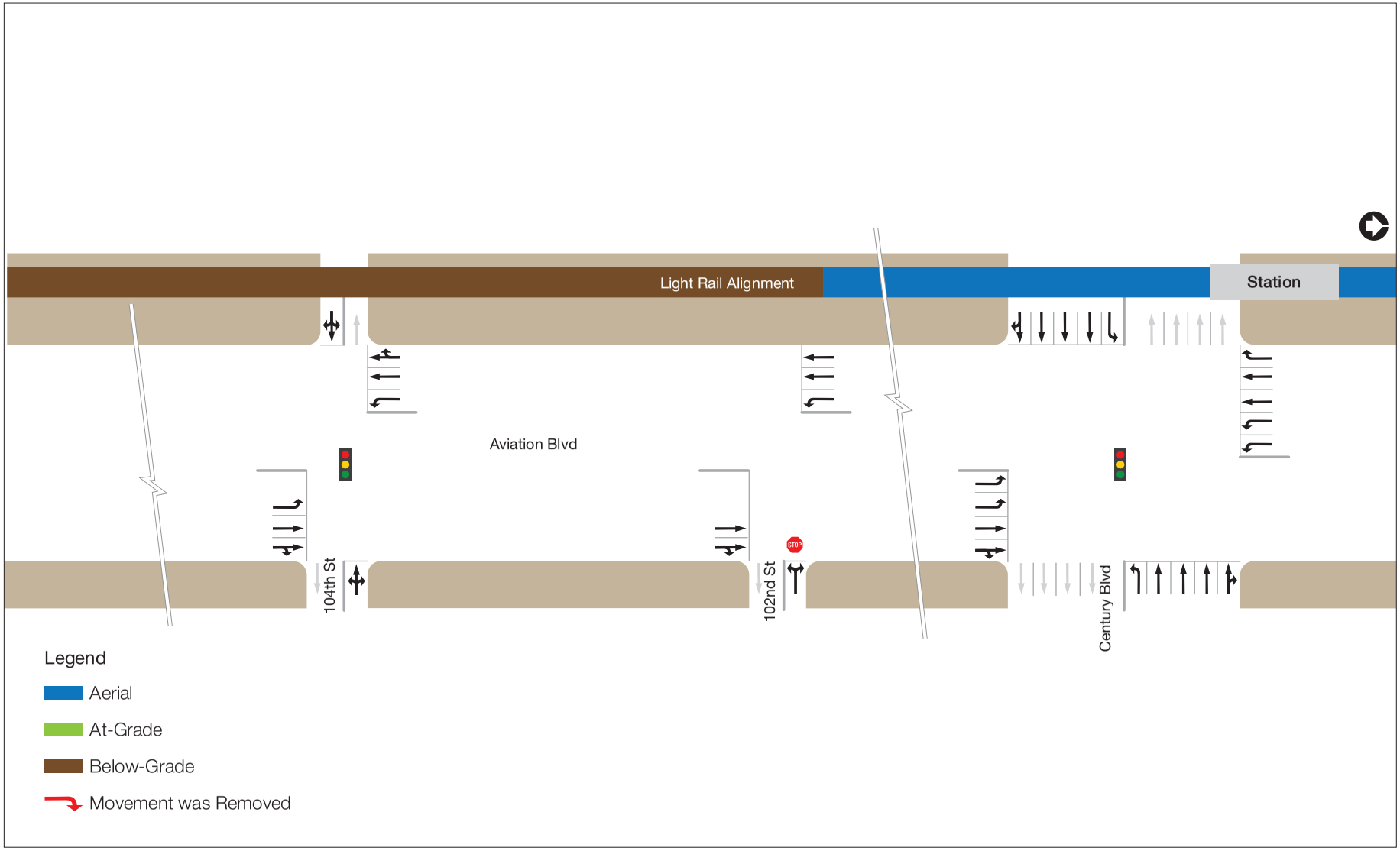

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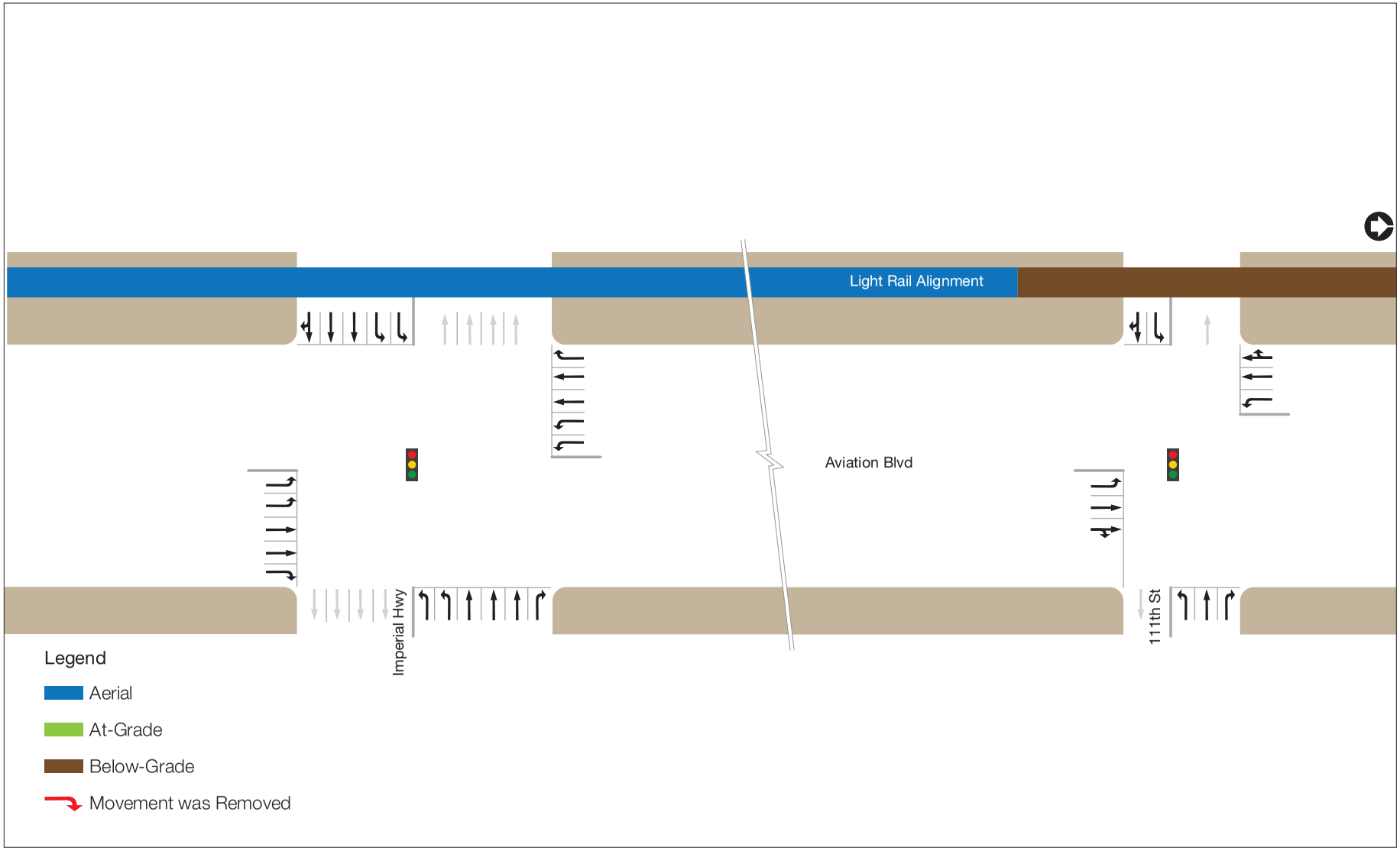

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Appendix B – Synchro Intersection Calculation Sheets

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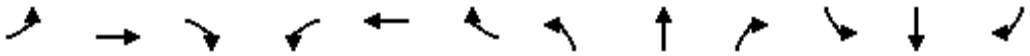


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	195	48	67	609	182	97	2547	47	0	1544	14
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0	4.0	3.5	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.91			0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00			1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1583	1667	1417	1583	1599		1478	4231			4239	
Flt Permitted	0.08	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	133	1667	1417	1583	1599		1478	4231			4239	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	212	52	73	662	198	105	2768	51	0	1678	15
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	1	0
Lane Group Flow (vph)	21	212	52	73	859	0	105	2819	0	0	1692	0
Confl. Peds. (#/hr)	15					15	5		8	8		5
Turn Type	Perm		Over	Prot			Prot					
Protected Phases		4	5	3	8		5	2			6	
Permitted Phases	4											
Actuated Green, G (s)	49.5	49.5	7.0	7.0	60.5		7.0	80.5			69.5	
Effective Green, g (s)	50.0	50.0	7.0	7.5	61.0		7.0	81.0			70.0	
Actuated g/C Ratio	0.33	0.33	0.05	0.05	0.41		0.05	0.54			0.47	
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5		4.0	4.5			4.5	
Lane Grp Cap (vph)	44	556	66	79	650		69	2285			1978	
v/s Ratio Prot		0.13	0.04	0.05	c0.54		0.07	c0.67			0.40	
v/s Ratio Perm	0.16											
v/c Ratio	0.48	0.38	0.79	0.92	1.32		1.52	1.23			0.86	
Uniform Delay, d1	39.6	38.2	70.8	71.0	44.5		71.5	34.5			35.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.67	0.32			1.00	
Incremental Delay, d2	32.8	2.0	61.6	81.7	155.6		241.4	105.5			5.0	
Delay (s)	72.4	40.2	132.3	152.7	200.1		289.5	116.7			40.5	
Level of Service	E	D	F	F	F		F	F			D	
Approach Delay (s)		59.4			196.4			122.9			40.5	
Approach LOS		E			F			F			D	

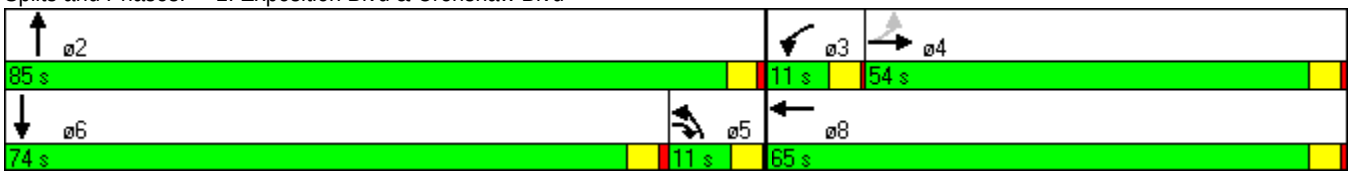
Intersection Summary			
HCM Average Control Delay	107.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.1%	ICU Level of Service	H
Analysis Period (min)	15		

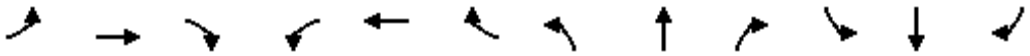
c Critical Lane Group

Phase Number	2	3	4	5	6	8
Movement	NBT	WBL	EBTL	NBL	SBT	WBT
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize		Yes	Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	85	11	54	11	74	65
Maximum Split (%)	56.7%	7.3%	36.0%	7.3%	49.3%	43.3%
Minimum Split (s)	36.5	8	50.5	8	36.5	50.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1	0.5	1	0.5	1	1
Minimum Initial (s)	10	4	10	4	10	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	7		15		7	15
Flash Dont Walk (s)	10		31		10	31
Dual Entry	No	No	No	No	No	No
Inhibit Max	No	Yes	No	Yes	No	No
Start Time (s)	85	20	31	9	85	20
End Time (s)	20	31	85	20	9	85
Yield/Force Off (s)	15.5	27	80.5	16	4.5	80.5
Yield/Force Off 170(s)	5.5	27	49.5	16	144.5	49.5
Local Start Time (s)	0	85	96	74	0	85
Local Yield (s)	80.5	92	145.5	81	69.5	145.5
Local Yield 170(s)	70.5	92	114.5	81	59.5	114.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	145
Offset: 85 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 1: Exposition Blvd & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	324	47	59	762	139	148	2338	36	78	1960	147
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	3.5	4.0		3.5	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	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	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3101		1583	3167	1417	1478	4236		1478	4198	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3101		1583	3167	1417	1478	4236		1478	4198	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	211	338	49	61	794	145	154	2435	38	81	2042	153
RTOR Reduction (vph)	0	8	0	0	0	62	0	1	0	0	5	0
Lane Group Flow (vph)	211	379	0	61	794	83	154	2472	0	81	2190	0
Confl. Peds. (#/hr)			1	1			2		3	3		2
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	14.0	41.2		11.0	38.2	38.2	13.0	72.8		8.0	67.8	
Effective Green, g (s)	14.5	41.7		11.5	38.7	38.7	13.0	73.3		8.0	68.3	
Actuated g/C Ratio	0.10	0.28		0.08	0.26	0.26	0.09	0.49		0.05	0.46	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Grp Cap (vph)	153	862		121	817	366	128	2070		79	1911	
v/s Ratio Prot	c0.13	0.12		0.04	c0.25		0.10	c0.58		0.05	c0.52	
v/s Ratio Perm						0.06						
v/c Ratio	1.38	0.44		0.50	0.97	0.23	1.20	1.19		1.03	1.15	
Uniform Delay, d1	67.8	44.5		66.5	55.1	43.9	68.5	38.4		71.0	40.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.71	0.47		1.39	0.49	
Incremental Delay, d2	206.0	1.6		14.2	25.3	1.4	98.4	87.9		93.2	70.6	
Delay (s)	273.8	46.2		80.7	80.5	45.3	146.9	106.0		192.0	90.6	
Level of Service	F	D		F	F	D	F	F		F	F	
Approach Delay (s)		126.5			75.4			108.4			94.2	
Approach LOS		F			E			F			F	

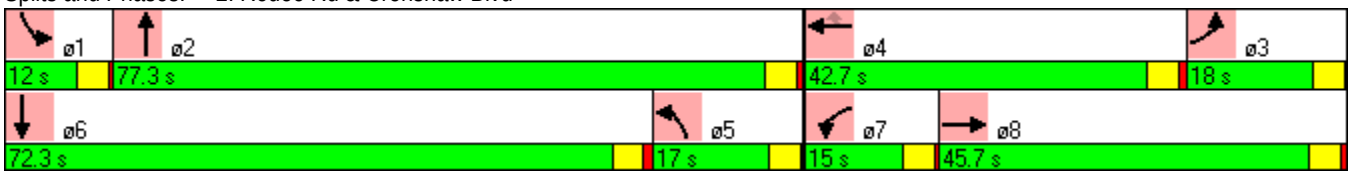
Intersection Summary			
HCM Average Control Delay	100.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		

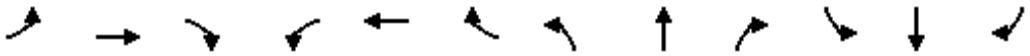
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	EBL	WBT	NBL	SBT	WBL	EBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Maximum Split (s)	12	77.3	18	42.7	17	72.3	15	45.7
Maximum Split (%)	8.0%	51.5%	12.0%	28.5%	11.3%	48.2%	10.0%	30.5%
Minimum Split (s)	12	36.5	8	42.7	8	36.5	8	42.7
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	0.5	1	0.5	1	0.5	1
Minimum Initial (s)	4	10	4	10	4	10	4	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		16		31		16		31
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	80	92	62	19.3	2.3	80	19.3	34.3
End Time (s)	92	19.3	80	62	19.3	2.3	34.3	80
Yield/Force Off (s)	88	14.8	76	57.5	15.3	147.8	30.3	75.5
Yield/Force Off 170(s)	88	148.8	76	26.5	15.3	131.8	30.3	44.5
Local Start Time (s)	138	0	120	77.3	60.3	138	77.3	92.3
Local Yield (s)	146	72.8	134	115.5	73.3	55.8	88.3	133.5
Local Yield 170(s)	146	56.8	134	84.5	73.3	39.8	88.3	102.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	150
Offset: 92 (61%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 2: Rodeo Rd & Crenshaw Blvd

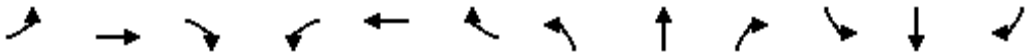




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	50	0	0	50	0	2500	50	0	2002	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	54	0	0	54	0	2717	54	0	2176	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								600			560	
pX, platoon unblocked	0.65	0.65	0.57	0.65	0.65	0.43	0.57			0.43		
vC, conflicting volume	3163	4975	753	3524	4975	933	2230			2772		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	752	0	0	752	0	517			509		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	91	100	100	88	100			100		
cM capacity (veh/h)	586	219	618	605	219	470	596			456		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	54	54	1087	1087	598	870	870	490
Volume Left	0	0	0	0	0	0	0	0
Volume Right	54	54	0	0	54	0	0	54
cSH	618	470	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.12	0.64	0.64	0.35	0.51	0.51	0.29
Queue Length 95th (ft)	7	10	0	0	0	0	0	0
Control Delay (s)	11.4	13.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B						
Approach Delay (s)	11.4	13.7	0.0			0.0		
Approach LOS	B	B						

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	65.4%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	199	49	113	209	54	68	2462	111	111	1826	101
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1579	1608		1568	1610		1478	4215		1478	4199	
Flt Permitted	0.32	1.00		0.35	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	533	1608		575	1610		1478	4215		1478	4199	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	89	207	51	118	218	56	71	2565	116	116	1902	105
RTOR Reduction (vph)	0	6	0	0	6	0	0	3	0	0	4	0
Lane Group Flow (vph)	89	252	0	118	268	0	71	2678	0	116	2003	0
Confl. Peds. (#/hr)	4		14	14		4	10		1	1		10
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4								
Actuated Green, G (s)	34.5	34.5		34.5	34.5		20.0	88.5		13.0	81.5	
Effective Green, g (s)	36.0	36.0		36.0	36.0		20.0	89.0		13.0	82.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.13	0.59		0.09	0.55	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.0	4.5		4.0	4.5	
Lane Grp Cap (vph)	128	386		138	386		197	2501		128	2295	
v/s Ratio Prot		0.16			0.17		0.05	c0.64		0.08	c0.48	
v/s Ratio Perm	0.17			c0.21								
v/c Ratio	0.70	0.65		0.86	0.69		0.36	1.07		0.91	0.87	
Uniform Delay, d1	52.0	51.4		54.5	52.0		59.2	30.5		67.9	29.5	
Progression Factor	1.00	1.00		1.00	1.00		0.81	1.33		0.50	0.17	
Incremental Delay, d2	26.8	8.3		45.4	9.9		3.0	37.2		9.9	0.5	
Delay (s)	78.8	59.7		99.9	61.9		51.2	77.9		43.5	5.6	
Level of Service	E	E		F	E		D	E		D	A	
Approach Delay (s)		64.6			73.3			77.2			7.7	
Approach LOS		E			E			E			A	

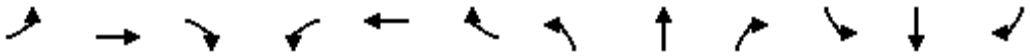
Intersection Summary			
HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	WBTL	NBL	SBT	EBTL
Lead/Lag	Lag	Lead		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	17	93	40	24	86	40
Maximum Split (%)	11.3%	62.0%	26.7%	16.0%	57.3%	26.7%
Minimum Split (s)	8	36.5	40	8	36.5	40
Yellow Time (s)	3.5	3.9	3.9	3.5	3.9	3.9
All-Red Time (s)	0.5	0.6	1.6	0.5	0.6	1.6
Minimum Initial (s)	4	10	10	4	10	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	27.5		10	27.5
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	No	No	Yes	No	No
Start Time (s)	8	65	25	65	89	25
End Time (s)	25	8	65	89	25	65
Yield/Force Off (s)	21	3.5	59.5	85	20.5	59.5
Yield/Force Off 170(s)	21	143.5	32	85	10.5	32
Local Start Time (s)	69	126	86	126	0	86
Local Yield (s)	82	64.5	120.5	146	81.5	120.5
Local Yield 170(s)	82	54.5	93	146	71.5	93

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	145
Offset: 89 (59%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

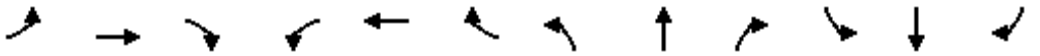
Splits and Phases: 4: Coliseum St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	25	0	0	25	0	2616	25	0	1963	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	0	0	27	0	2843	27	0	2134	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								661			670	
pX, platoon unblocked	0.76	0.76	0.61	0.76	0.76	0.57	0.61			0.57		
vC, conflicting volume	3122	5018	725	3595	5018	961	2161			2871		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	1726	0	0	1726	0	663			1632		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	96	100	100	96	100			100		
cM capacity (veh/h)	746	67	661	749	67	616	562			224		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	27	1137	1137	596	853	853	454
Volume Left	0	0	0	0	0	0	0	0
Volume Right	27	27	0	0	27	0	0	27
cSH	661	616	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.04	0.67	0.67	0.35	0.50	0.50	0.27
Queue Length 95th (ft)	3	3	0	0	0	0	0	0
Control Delay (s)	10.7	11.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B						
Approach Delay (s)	10.7	11.1	0.0			0.0		
Approach LOS	B	B						

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	67.1%	ICU Level of Service	C	
Analysis Period (min)	15			



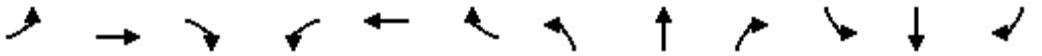
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	56	33	55	99	88	45	2328	32	26	1390	43
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.96		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	0.97	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1501	1541	1361		1550		1575	4529		1583	4516	
Flt Permitted	0.44	0.62	1.00		0.89		0.13	1.00		0.04	1.00	
Satd. Flow (perm)	699	978	1361		1389		208	4529		66	4516	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	61	36	60	108	96	49	2530	35	28	1511	47
RTOR Reduction (vph)	0	0	27	0	4	0	0	1	0	0	2	0
Lane Group Flow (vph)	120	128	9	0	260	0	49	2564	0	28	1556	0
Confl. Peds. (#/hr)	3		23	23		3	21		36	36		21
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	39.5	39.5	39.5		39.5		101.5	101.5		101.5	101.5	
Effective Green, g (s)	39.5	39.5	39.5		39.5		101.5	101.5		101.5	101.5	
Actuated g/C Ratio	0.26	0.26	0.26		0.26		0.68	0.68		0.68	0.68	
Clearance Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lane Grp Cap (vph)	184	258	358		366		141	3065		45	3056	
v/s Ratio Prot								c0.57			0.34	
v/s Ratio Perm	0.17	0.13	0.01		c0.19		0.24			0.43		
v/c Ratio	0.65	0.50	0.03		0.71		0.35	0.84		0.62	0.51	
Uniform Delay, d1	49.1	46.8	41.0		50.1		10.3	18.1		13.5	12.0	
Progression Factor	1.00	1.00	1.00		1.00		1.54	1.82		1.24	0.80	
Incremental Delay, d2	16.6	6.7	0.1		11.2		1.9	0.8		30.4	0.3	
Delay (s)	65.7	53.5	41.1		61.2		17.7	33.8		47.1	9.9	
Level of Service	E	D	D		E		B	C		D	A	
Approach Delay (s)		57.1			61.2			33.5			10.6	
Approach LOS		E			E			C			B	

Intersection Summary			
HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	106	44	106	44
Maximum Split (%)	70.7%	29.3%	70.7%	29.3%
Minimum Split (s)	36	41.5	36	41.5
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	1
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	9	30	13	30
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	144	100	144	100
End Time (s)	100	144	100	144
Yield/Force Off (s)	95.5	139.5	95.5	139.5
Yield/Force Off 170(s)	86.5	109.5	82.5	109.5
Local Start Time (s)	0	106	0	106
Local Yield (s)	101.5	145.5	101.5	145.5
Local Yield 170(s)	92.5	115.5	88.5	115.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	100
Offset: 144 (96%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 6: 39th Street & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	711	281	157	1149	228	585	1990	77	142	1409	76
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91		0.97	0.91		0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3072	3167	1417	1583	4409		3072	4520		3072	4550	1378
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3072	3167	1417	1583	4409		3072	4520		3072	4550	1378
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	773	305	171	1249	248	636	2163	84	154	1532	83
RTOR Reduction (vph)	0	0	126	0	20	0	0	3	0	0	0	39
Lane Group Flow (vph)	95	773	179	171	1477	0	636	2244	0	154	1532	44
Confl. Peds. (#/hr)	15		10	10		15	10		10	10		10
Turn Type	Prot		Over	Prot			Prot			Prot		Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	5.0	36.5	28.0	15.0	46.5		28.0	71.1		6.0	49.1	49.1
Effective Green, g (s)	6.0	38.0	29.0	16.0	48.0		29.0	73.0		7.0	51.0	51.0
Actuated g/C Ratio	0.04	0.25	0.19	0.11	0.32		0.19	0.49		0.05	0.34	0.34
Clearance Time (s)	5.0	5.5	5.0	5.0	5.5		5.0	5.9		5.0	5.9	5.9
Vehicle Extension (s)	2.0	4.3	2.0	3.0	4.2		2.0	3.0		2.0	5.0	5.0
Lane Grp Cap (vph)	123	802	274	169	1411		594	2200		143	1547	469
v/s Ratio Prot	0.03	0.24	0.13	c0.11	c0.34		0.21	c0.50		0.05	c0.34	
v/s Ratio Perm												0.03
v/c Ratio	0.77	0.96	0.65	1.01	1.05		1.07	1.02		1.08	0.99	0.09
Uniform Delay, d1	71.3	55.3	55.9	67.0	51.0		60.5	38.5		71.5	49.3	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.77	0.63		0.60	0.98	1.26
Incremental Delay, d2	23.4	23.3	4.2	72.4	37.3		47.0	18.8		93.5	19.6	0.4
Delay (s)	94.8	78.6	60.1	139.4	88.3		93.3	43.1		136.3	67.6	42.7
Level of Service	F	E	E	F	F		F	D		F	E	D
Approach Delay (s)		75.1			93.5			54.2			72.4	
Approach LOS		E			F			D			E	

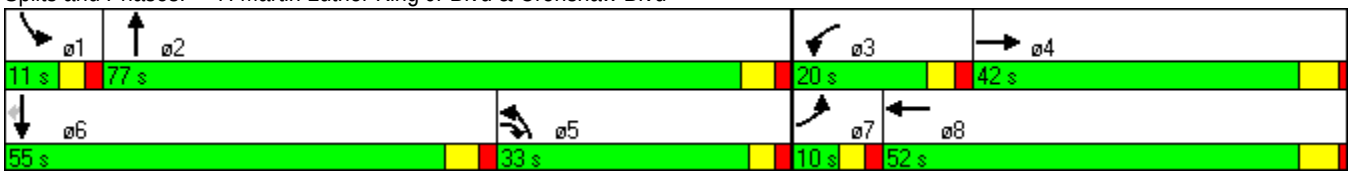
Intersection Summary			
HCM Average Control Delay	70.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

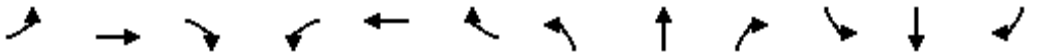
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize								
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	11	77	20	42	33	55	10	52
Maximum Split (%)	7.3%	51.3%	13.3%	28.0%	22.0%	36.7%	6.7%	34.7%
Minimum Split (s)	10	32.9	10	38.5	10	34.9	10	30.5
Yellow Time (s)	3	3.9	3	4.3	3	3.9	3	4.3
All-Red Time (s)	2	2	2	1.2	2	2	2	1.2
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	2	3	3	4.3	2	5	2	4.2
Minimum Gap (s)	2	3	3	3	2	3	2	3
Time Before Reduce (s)	0	0.1	0	0.1	0	0.1	0	0.1
Time To Reduce (s)	0	2	0	2	0	2	0	2
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		20		26		22		18
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No	No
Start Time (s)	70	81	8	28	125	70	8	18
End Time (s)	81	8	28	70	8	125	18	70
Yield/Force Off (s)	76	2.1	23	64.5	3	119.1	13	64.5
Yield/Force Off 170(s)	76	132.1	23	38.5	3	97.1	13	46.5
Local Start Time (s)	95	106	33	53	0	95	33	43
Local Yield (s)	101	27.1	48	89.5	28	144.1	38	89.5
Local Yield 170(s)	101	7.1	48	63.5	28	122.1	38	71.5

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	145
Offset: 125 (83%), Referenced to phase 2:NBT and 6:SBT, Start of Red	

Splits and Phases: 7: Martin Luther King Jr Blvd & Crenshaw Blvd





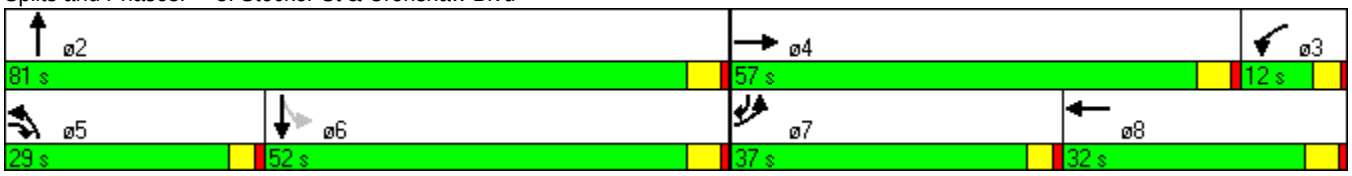
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	543	441	158	56	538	71	272	2082	3	24	1387	540
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95		1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3072	1667	1417	1583	3104		1583	4549		1583	4550	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.08	1.00	1.00
Satd. Flow (perm)	3072	1667	1417	1583	3104		1583	4549		139	4550	1417
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	554	450	161	57	549	72	278	2124	3	24	1415	551
RTOR Reduction (vph)	0	0	73	0	7	0	0	0	0	0	0	245
Lane Group Flow (vph)	554	450	89	57	614	0	278	2127	0	24	1415	306
Confl. Peds. (#/hr)	5		18	18		5	16		1	1		16
Turn Type	Prot		Over	Prot			Prot			Perm		Over
Protected Phases	7	4	5	3	8		5	2			6	7
Permitted Phases										6		
Actuated Green, G (s)	33.0	52.0	25.0	8.0	27.0		25.0	76.1		47.1	47.1	33.0
Effective Green, g (s)	33.0	53.0	25.0	8.0	28.0		25.0	77.0		48.0	48.0	33.0
Actuated g/C Ratio	0.22	0.35	0.17	0.05	0.19		0.17	0.51		0.32	0.32	0.22
Clearance Time (s)	4.0	5.0	4.0	4.0	5.0		4.0	4.9		4.9	4.9	4.0
Lane Grp Cap (vph)	676	589	236	84	579		264	2335		44	1456	312
v/s Ratio Prot	0.18	0.27	0.06	0.04	c0.20		c0.18	0.47			c0.31	c0.22
v/s Ratio Perm										0.17		
v/c Ratio	0.82	0.76	0.38	0.68	1.06		1.05	0.91		0.55	0.97	0.98
Uniform Delay, d1	55.7	43.0	55.6	69.7	61.0		62.5	33.4		42.0	50.3	58.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.12	1.27		0.43	0.41	1.45
Incremental Delay, d2	10.7	9.1	4.5	36.2	54.7		42.2	1.8		14.2	8.1	24.1
Delay (s)	66.4	52.1	60.1	105.9	115.7		112.2	44.0		32.1	28.5	108.3
Level of Service	E	D	E	F	F		F	D		C	C	F
Approach Delay (s)		60.0			114.9			51.9			50.6	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	59.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	3	4	5	6	7	8
Movement	NBT	WBL	EBT	NBL	SBTL	EBL	WBT
Lead/Lag		Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Maximum Split (s)	81	12	57	29	52	37	32
Maximum Split (%)	54.0%	8.0%	38.0%	19.3%	34.7%	24.7%	21.3%
Minimum Split (s)	30.9	9	32	9	34.9	9	32
Yellow Time (s)	3.9	3	3.9	3	3.9	3	3.9
All-Red Time (s)	1	1	1.1	1	1	1	1.1
Minimum Initial (s)	10	5	5	5	10	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)	7		7		7		7
Flash Dont Walk (s)	19		20		23		14.5
Dual Entry	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No
Start Time (s)	60	48	141	60	89	141	28
End Time (s)	141	60	48	89	141	28	60
Yield/Force Off (s)	136.1	56	43	85	136.1	24	55
Yield/Force Off 170(s)	117.1	56	23	85	113.1	24	40.5
Local Start Time (s)	69	57	0	69	98	0	37
Local Yield (s)	145.1	65	52	94	145.1	33	64
Local Yield 170(s)	126.1	65	32	94	122.1	33	49.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	125
Offset: 141 (94%), Referenced to phase 2:NBT and 6:SBTL, Start of Red	

Splits and Phases: 8: Stocker St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	214	520	26	260	578	215	114	1334	94	30	2003	4
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	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	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3141		1583	3167	1417	1583	4499		1582	4548	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.10	1.00	
Satd. Flow (perm)	1583	3141		1583	3167	1417	1583	4499		174	4548	
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)	225	547	27	274	608	226	120	1404	99	32	2108	4
RTOR Reduction (vph)	0	2	0	0	0	125	0	5	0	0	0	0
Lane Group Flow (vph)	225	572	0	274	608	101	120	1498	0	32	2112	0
Confl. Peds. (#/hr)	10		5	5		10	8		5	5		8
Turn Type	Prot			Prot		Over	Prot			Perm		
Protected Phases	3	8		7	4	1	1	6			2	
Permitted Phases		8			4					2		
Actuated Green, G (s)	22.0	26.1		26.0	30.0	11.0	11.0	84.0		69.0	69.0	
Effective Green, g (s)	22.0	27.0		26.0	31.0	11.0	11.0	85.0		70.0	70.0	
Actuated g/C Ratio	0.15	0.18		0.17	0.21	0.07	0.07	0.57		0.47	0.47	
Clearance Time (s)	4.0	4.9		4.0	5.0	4.0	4.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	565		274	655	104	116	2549		81	2122	
v/s Ratio Prot	0.14	c0.18		0.17	c0.19	0.07	c0.08	0.33			c0.46	
v/s Ratio Perm										0.18		
v/c Ratio	0.97	1.01		1.00	0.93	0.97	1.03	0.59		0.40	1.00	
Uniform Delay, d1	63.7	61.5		62.0	58.4	69.3	69.5	21.1		26.2	39.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.84	1.12		1.37	1.21	
Incremental Delay, d2	49.9	40.8		54.4	19.4	78.4	61.0	0.4		6.2	11.9	
Delay (s)	113.6	102.3		116.4	77.8	147.7	119.5	24.0		42.1	60.2	
Level of Service	F	F		F	E	F	F	C		D	E	
Approach Delay (s)		105.5			101.6			31.1			60.0	
Approach LOS		F			F			C			E	

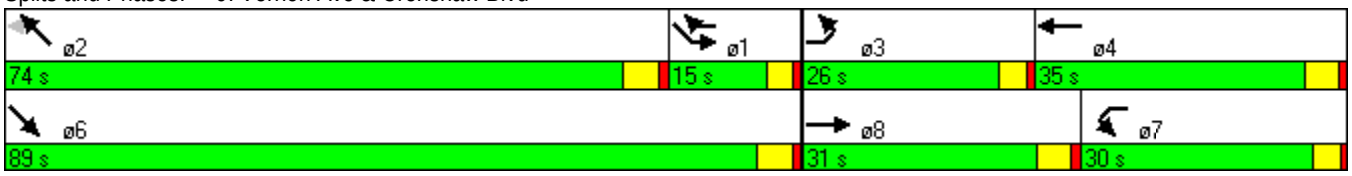
Intersection Summary			
HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

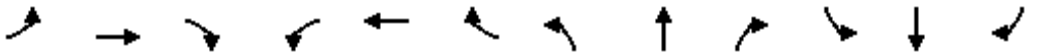
c Critical Lane Group

Phase Number	1	2	3	4	6	7	8
Movement	SEL	NWTL	EBL	WBT	SET	WBL	EBT
Lead/Lag	Lag	Lead	Lead	Lag		Lag	Lead
Lead-Lag Optimize							
Recall Mode	None	C-Max	None	None	C-Max	None	None
Maximum Split (s)	15	74	26	35	89	30	31
Maximum Split (%)	10.0%	49.3%	17.3%	23.3%	59.3%	20.0%	20.7%
Minimum Split (s)	9	32	9	34	34	9.4	30.9
Yellow Time (s)	3	3.9	3	3.9	3.9	3	3.9
All-Red Time (s)	1	1.1	1	1.1	1.1	1	1
Minimum Initial (s)	5	10	5	10	10	5	10
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7		7	7		7
Flash Dont Walk (s)		20		22	22		18
Dual Entry	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No
Start Time (s)	145	71	10	36	71	41	10
End Time (s)	10	145	36	71	10	71	41
Yield/Force Off (s)	6	140	32	66	5	67	36.1
Yield/Force Off 170(s)	6	120	32	44	133	67	18.1
Local Start Time (s)	0	76	15	41	76	46	15
Local Yield (s)	11	145	37	71	10	72	41.1
Local Yield 170(s)	11	125	37	49	138	72	23.1

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 145 (97%), Referenced to phase 2:NWTL and 6:SET, Start of Red	

Splits and Phases: 9: Vernon Ave & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	122	30	145	141	222	14	2073	36	95	1504	9
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1546	3062		1579	1667	1356	1478	4234		1478	4241	
Flt Permitted	0.56	1.00		0.63	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	914	3062		1041	1667	1356	1478	4234		1478	4241	
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)	61	128	32	153	148	234	15	2182	38	100	1583	9
RTOR Reduction (vph)	0	15	0	0	0	141	0	1	0	0	0	0
Lane Group Flow (vph)	61	145	0	153	148	93	15	2219	0	100	1592	0
Confl. Peds. (#/hr)	26		3	3		26	13		4	4		13
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4		4						
Actuated Green, G (s)	37.5	37.5		37.5	37.5	37.5	21.0	82.2		16.0	77.2	
Effective Green, g (s)	39.0	39.0		39.0	39.0	39.0	21.0	83.0		16.0	78.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26	0.14	0.55		0.11	0.52	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	4.0	4.8		4.0	4.8	
Lane Grp Cap (vph)	238	796		271	433	353	207	2343		158	2205	
v/s Ratio Prot		0.05			0.09		0.01	c0.52		0.07	c0.38	
v/s Ratio Perm	0.07			c0.15		0.07						
v/c Ratio	0.26	0.18		0.56	0.34	0.26	0.07	0.95		0.63	0.72	
Uniform Delay, d1	44.0	43.1		48.1	45.1	44.1	56.0	31.4		64.2	27.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.71	0.48		1.15	1.03	
Incremental Delay, d2	2.6	0.5		8.3	2.1	1.8	0.4	6.1		13.5	1.6	
Delay (s)	46.6	43.6		56.4	47.2	45.9	40.3	21.3		87.6	30.1	
Level of Service	D	D		E	D	D	D	C		F	C	
Approach Delay (s)		44.4			49.3			21.4			33.5	
Approach LOS		D			D			C			C	

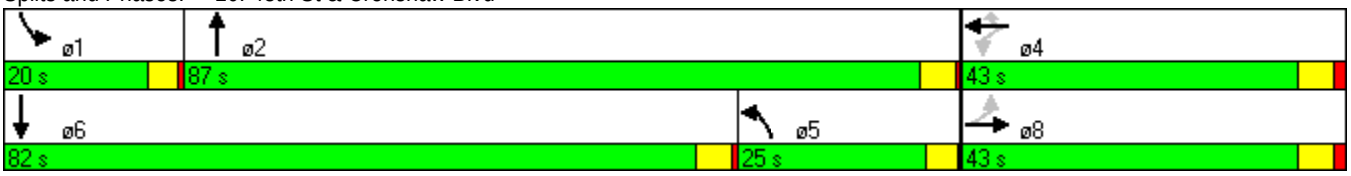
Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	WBTL	NBL	SBT	EBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	20	87	43	25	82	43
Maximum Split (%)	13.3%	58.0%	28.7%	16.7%	54.7%	28.7%
Minimum Split (s)	8	24.3	42.5	8	24.3	42.5
Yellow Time (s)	3.5	4	3.9	3.5	4	3.9
All-Red Time (s)	0.5	0.8	1.6	0.5	0.8	1.6
Minimum Initial (s)	4	10	5	4	10	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12.5	30		12.5	30
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	No	No	Yes	No	No
Start Time (s)	64	84	21	146	64	21
End Time (s)	84	21	64	21	146	64
Yield/Force Off (s)	80	16.2	58.5	17	141.2	58.5
Yield/Force Off 170(s)	80	3.7	28.5	17	128.7	28.5
Local Start Time (s)	130	0	87	62	130	87
Local Yield (s)	146	82.2	124.5	83	57.2	124.5
Local Yield 170(s)	146	69.7	94.5	83	44.7	94.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	120
Offset: 84 (56%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 10: 48th St & Crenshaw Blvd



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	42	67	1798	52	55	1193
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Lane Width	12	12	10	12	10	10
Total Lost time (s)	4.5		4.5		4.0	4.5
Lane Util. Factor	1.00		0.91		1.00	0.91
Frpb, ped/bikes	0.93		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.92		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1400		4218		1478	4247
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1400		4218		1478	4247
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	73	1954	57	60	1297
RTOR Reduction (vph)	38	0	2	0	0	0
Lane Group Flow (vph)	81	0	2009	0	60	1297
Confl. Peds. (#/hr)		75		13	13	
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	51.5		77.5		8.0	89.5
Effective Green, g (s)	51.5		77.5		8.0	89.5
Actuated g/C Ratio	0.34		0.52		0.05	0.60
Clearance Time (s)	4.5		4.5		4.0	4.5
Lane Grp Cap (vph)	481		2179		79	2534
v/s Ratio Prot	c0.06		c0.48		c0.04	0.31
v/s Ratio Perm						
v/c Ratio	0.17		0.92		0.76	0.51
Uniform Delay, d1	34.3		33.5		70.1	17.6
Progression Factor	1.00		0.23		0.58	0.14
Incremental Delay, d2	0.8		5.9		37.5	0.5
Delay (s)	35.1		13.7		78.5	3.0
Level of Service	D		B		E	A
Approach Delay (s)	35.1		13.7			6.4
Approach LOS	D		B			A

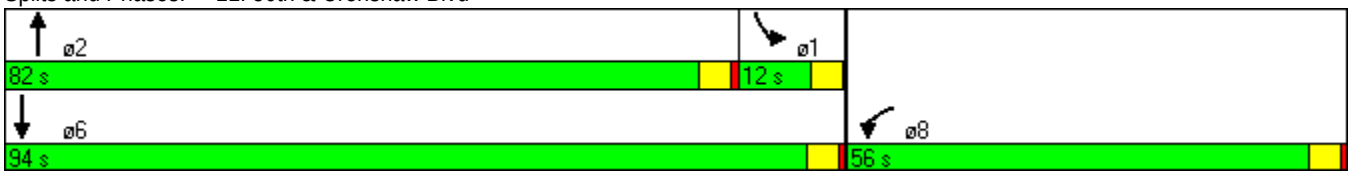
Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	6	8
Movement	SBL	NBT	SBT	WBL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	12	82	94	56
Maximum Split (%)	8.0%	54.7%	62.7%	37.3%
Minimum Split (s)	8	22.5	22.5	56
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	1
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		7.5	7.5	27.5
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	138	56	56	0
End Time (s)	0	138	0	56
Yield/Force Off (s)	146	133.5	145.5	51.5
Yield/Force Off 170(s)	146	126	138	24
Local Start Time (s)	82	0	0	94
Local Yield (s)	90	77.5	89.5	145.5
Local Yield 170(s)	90	70	82	118

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	130
Offset: 56 (37%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 11: 50th & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	21	20	32	47	20	63	61	28	1760	53	33	1181
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	12	10	10	12	10	10
Total Lost time (s)		4.5			4.5			4.0	4.5		4.0	4.5
Lane Util. Factor		1.00			1.00			1.00	0.91		1.00	0.91
Frpb, ped/bikes		0.99			0.98			1.00	0.99		1.00	1.00
Flpb, ped/bikes		0.99			1.00			1.00	1.00		1.00	1.00
Frt		0.94			0.93			1.00	1.00		1.00	1.00
Flt Protected		0.99			0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1526			1500			1478	4186		1478	4238
Flt Permitted		0.90			0.87			0.95	1.00		0.95	1.00
Satd. Flow (perm)		1390			1336			1478	4186		1478	4238
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	22	35	51	22	68	66	30	1913	58	36	1284
RTOR Reduction (vph)	0	18	0	0	22	0	0	0	2	0	0	1
Lane Group Flow (vph)	0	62	0	0	119	0	0	96	1969	0	36	1296
Confl. Peds. (#/hr)	20		4	4		20		6		63	63	
Turn Type	Perm			Perm			Prot	Prot			Prot	
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8								
Actuated Green, G (s)		34.5			34.5			18.0	98.5		4.0	84.5
Effective Green, g (s)		34.5			34.5			18.0	98.5		4.0	84.5
Actuated g/C Ratio		0.23			0.23			0.12	0.66		0.03	0.56
Clearance Time (s)		4.5			4.5			4.0	4.5		4.0	4.5
Lane Grp Cap (vph)		320			307			177	2749		39	2387
v/s Ratio Prot								0.06	c0.47		c0.02	0.31
v/s Ratio Perm		0.04			c0.09							
v/c Ratio		0.19			0.39			0.54	0.72		0.92	0.54
Uniform Delay, d1		46.5			48.8			62.1	16.7		72.8	20.6
Progression Factor		1.00			1.00			0.77	2.30		0.96	0.46
Incremental Delay, d2		1.3			3.6			1.1	0.1		113.5	0.8
Delay (s)		47.9			52.5			48.8	38.5		183.2	10.3
Level of Service		D			D			D	D		F	B
Approach Delay (s)		47.9			52.5				39.0			15.0
Approach LOS		D			D				D			B

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

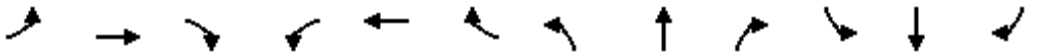
Movement	SBR
Lane Configurations	
Volume (vph)	12
Ideal Flow (vphpl)	1700
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	13
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	6
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	8	103	39	22	89	39
Maximum Split (%)	5.3%	68.7%	26.0%	14.7%	59.3%	26.0%
Minimum Split (s)	8	22	39	8	22	39
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		7.5	27.5		7.5	27.5
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	40	48	1	40	62	1
End Time (s)	48	1	40	62	1	40
Yield/Force Off (s)	44	146.5	35.5	58	146.5	35.5
Yield/Force Off 170(s)	44	139	8	58	139	8
Local Start Time (s)	128	136	89	128	0	89
Local Yield (s)	132	84.5	123.5	146	84.5	123.5
Local Yield 170(s)	132	77	96	146	77	96

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 62 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 12: 52nd & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	237	101	127	453	103	0	2055	98	0	1598	163
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.99		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	0.96		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1583	1583		1578	1615			4198			4170	
Flt Permitted	0.15	1.00		0.38	1.00			1.00			1.00	
Satd. Flow (perm)	244	1583		629	1615			4198			4170	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	123	252	107	135	482	110	0	2186	104	0	1700	173
RTOR Reduction (vph)	0	9	0	0	2	0	0	3	0	0	8	0
Lane Group Flow (vph)	123	350	0	135	590	0	0	2287	0	0	1865	0
Confl. Peds. (#/hr)	5		6	6		5			22			7
Turn Type	Perm			Perm								
Protected Phases		8			4			2			6	
Permitted Phases	8			4								
Actuated Green, G (s)	58.5	58.5		58.5	58.5			81.3			81.3	
Effective Green, g (s)	60.0	60.0		60.0	60.0			82.0			82.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.55			0.55	
Clearance Time (s)	5.5	5.5		5.5	5.5			4.7			4.7	
Lane Grp Cap (vph)	98	633		252	646			2295			2280	
v/s Ratio Prot		0.22			0.37			c0.54			0.45	
v/s Ratio Perm	c0.50			0.21								
v/c Ratio	1.26	0.55		0.54	0.91			1.00			0.82	
Uniform Delay, d1	45.0	34.7		34.4	42.5			33.9			27.9	
Progression Factor	1.00	1.00		1.00	1.00			0.85			1.51	
Incremental Delay, d2	174.3	3.5		7.9	19.5			15.5			3.2	
Delay (s)	219.3	38.1		42.3	62.0			44.3			45.4	
Level of Service	F	D		D	E			D			D	
Approach Delay (s)		84.4			58.3			44.3			45.4	
Approach LOS		F			E			D			D	

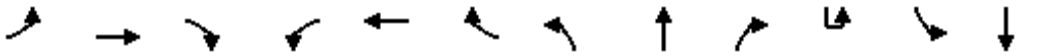
Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	6	8
Movement	NBT	WBTL	SBT	EBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	86	64	86	64
Maximum Split (%)	57.3%	42.7%	57.3%	42.7%
Minimum Split (s)	24.2	40	24.2	40
Yellow Time (s)	4	3.9	4	3.9
All-Red Time (s)	0.7	1.6	0.7	1.6
Minimum Initial (s)	10	5	10	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	12.5	27.5	12.5	27.5
Dual Entry	No	No	No	No
Inhibit Max	No	No	No	No
Start Time (s)	131	67	131	67
End Time (s)	67	131	67	131
Yield/Force Off (s)	62.3	125.5	62.3	125.5
Yield/Force Off 170(s)	49.8	98	49.8	98
Local Start Time (s)	0	86	0	86
Local Yield (s)	81.3	144.5	81.3	144.5
Local Yield 170(s)	68.8	117	68.8	117

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 131 (87%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 13: 54 St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	78	24	113	34	38	82	101	1610	13	64	28	1219
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	12	10	10
Total Lost time (s)		4.5			4.5		4.0	4.5			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.91			1.00	0.91
Frpb, ped/bikes		0.99			0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.93			0.93		1.00	1.00			1.00	0.99
Flt Protected		0.98			0.99		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1497			1510		1478	4231			1478	4203
Flt Permitted		0.75			0.87		0.95	1.00			0.95	1.00
Satd. Flow (perm)		1141			1327		1478	4231			1478	4203
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	26	123	37	41	89	110	1750	14	70	30	1325
RTOR Reduction (vph)	0	27	0	0	24	0	0	0	0	0	0	4
Lane Group Flow (vph)	0	207	0	0	143	0	110	1764	0	0	100	1394
Confl. Peds. (#/hr)	7		11	11		7	33		61		61	
Turn Type	Perm			Perm			Prot			Prot	Prot	
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8								
Actuated Green, G (s)		38.5			38.5		14.0	80.5			18.0	85.0
Effective Green, g (s)		38.5			38.5		14.0	80.5			18.0	85.0
Actuated g/C Ratio		0.26			0.26		0.09	0.54			0.12	0.57
Clearance Time (s)		4.5			4.5		4.0	4.5			4.0	4.0
Lane Grp Cap (vph)		293			341		138	2271			177	2382
v/s Ratio Prot							0.07	c0.42			0.07	c0.33
v/s Ratio Perm		c0.18			0.11							
v/c Ratio		0.71			0.42		0.80	0.78			0.56	0.59
Uniform Delay, d1		50.6			46.4		66.6	27.6			62.3	21.1
Progression Factor		1.00			1.00		0.63	0.45			1.29	0.63
Incremental Delay, d2		13.5			3.8		10.4	0.6			7.6	0.6
Delay (s)		64.1			50.2		52.3	13.1			88.2	14.0
Level of Service		E			D		D	B			F	B
Approach Delay (s)		64.1			50.2			15.4				18.9
Approach LOS		E			D			B				B

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

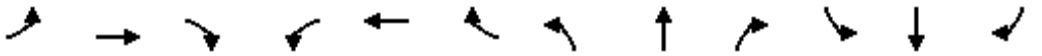
Movement	SBR
Lane Configurations	
Volume (vph)	67
Ideal Flow (vphpl)	1700
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	73
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	33
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	22	85	43	18	89	43
Maximum Split (%)	14.7%	56.7%	28.7%	12.0%	59.3%	28.7%
Minimum Split (s)	8	22	39	8	8	39
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	0.5	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7			7
Flash Dont Walk (s)		7.5	27.5			27.5
Dual Entry	No	Yes	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	117	139	74	56	117	74
End Time (s)	139	74	117	74	56	117
Yield/Force Off (s)	135	69.5	112.5	70	52	112.5
Yield/Force Off 170(s)	135	62	85	70	52	85
Local Start Time (s)	128	0	85	67	128	85
Local Yield (s)	146	80.5	123.5	81	63	123.5
Local Yield 170(s)	146	73	96	81	63	96

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 139 (93%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 14: 57th & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	754	114	126	1055	162	214	1648	212	153	1267	34
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.0	4.0	4.5	4.0
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.91	1.00	1.00	0.86	1.00	1.00	0.80
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4320		3072	3167	1287	1478	4247	1221	1478	4247	1134
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3072	4320		3072	3167	1287	1478	4247	1221	1478	4247	1134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	820	124	137	1147	176	233	1791	230	166	1377	37
RTOR Reduction (vph)	0	14	0	0	0	1	0	0	22	0	0	19
Lane Group Flow (vph)	149	930	0	137	1147	175	233	1791	208	166	1377	18
Confl. Peds. (#/hr)	113		238	238		113	136		85	85		136
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	7.0	48.5		9.0	50.5	66.5	23.0	59.5	68.5	16.0	52.5	59.5
Effective Green, g (s)	7.0	48.5		9.0	50.5	66.5	23.0	59.5	68.5	16.0	52.5	59.5
Actuated g/C Ratio	0.05	0.32		0.06	0.34	0.44	0.15	0.40	0.46	0.11	0.35	0.40
Clearance Time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.0	4.0	4.5	4.0
Lane Grp Cap (vph)	143	1397		184	1066	571	227	1685	558	158	1486	480
v/s Ratio Prot	c0.05	0.22		0.04	c0.36	0.03	0.16	c0.42	0.02	c0.11	0.32	0.00
v/s Ratio Perm						0.10			0.15			0.01
v/c Ratio	1.04	0.67		0.74	1.08	0.31	1.03	1.06	0.37	1.05	0.93	0.04
Uniform Delay, d1	71.5	43.8		69.4	49.8	26.9	63.5	45.2	26.7	67.0	46.9	27.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.58	0.41	0.26	1.09	0.88	0.86
Incremental Delay, d2	86.8	2.5		23.6	50.4	1.4	48.9	35.4	0.9	79.5	9.9	0.1
Delay (s)	158.3	46.3		93.0	100.2	28.3	85.5	54.0	7.8	152.4	51.3	24.0
Level of Service	F	D		F	F	C	F	D	A	F	D	C
Approach Delay (s)		61.6			90.8			52.5			61.3	
Approach LOS		E			F			D			E	

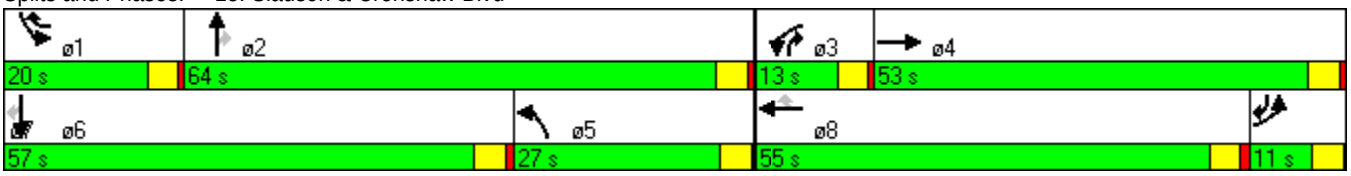
Intersection Summary			
HCM Average Control Delay	65.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

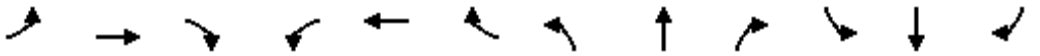
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Maximum Split (s)	20	64	13	53	27	57	11	55
Maximum Split (%)	13.3%	42.7%	8.7%	35.3%	18.0%	38.0%	7.3%	36.7%
Minimum Split (s)	8	30	8	50.5	8	32.5	8	50.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	0.5	1	0.5	1	0.5	1
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		15		7		15
Flash Dont Walk (s)		18.5		31		21		31
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	136	6	70	83	43	136	125	70
End Time (s)	6	70	83	136	70	43	136	125
Yield/Force Off (s)	2	65.5	79	131.5	66	38.5	132	120.5
Yield/Force Off 170(s)	2	47	79	100.5	66	17.5	132	89.5
Local Start Time (s)	130	0	64	77	37	130	119	64
Local Yield (s)	146	59.5	73	125.5	60	32.5	126	114.5
Local Yield 170(s)	146	41	73	94.5	60	11.5	126	83.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	150
Offset: 6 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 15: Slauson & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	0	4	6	7	73	29	2082	4	32	1387	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00			0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.89		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1497			1420		1478	4242		1478	4247	
Flt Permitted		0.93			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1421			1407		1478	4242		1478	4247	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	4	7	8	79	32	2263	4	35	1508	0
RTOR Reduction (vph)	0	3	0	0	59	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	0	35	0	32	2267	0	35	1508	0
Confl. Peds. (#/hr)	26					26	26		95	95		26
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		38.5			38.5		14.0	91.5		7.0	84.5	
Effective Green, g (s)		38.5			38.5		14.0	91.5		7.0	84.5	
Actuated g/C Ratio		0.26			0.26		0.09	0.61		0.05	0.56	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Grp Cap (vph)		365			361		138	2588		69	2392	
v/s Ratio Prot							0.02	c0.53		0.02	c0.36	
v/s Ratio Perm		0.00			c0.03							
v/c Ratio		0.01			0.10		0.23	0.88		0.51	0.63	
Uniform Delay, d1		41.6			42.5		63.0	24.5		69.8	22.2	
Progression Factor		1.00			1.00		1.30	0.46		0.74	0.28	
Incremental Delay, d2		0.1			0.5		2.7	3.2		11.0	0.5	
Delay (s)		41.7			43.0		84.7	14.4		62.3	6.7	
Level of Service		D			D		F	B		E	A	
Approach Delay (s)		41.7			43.0			15.4			7.9	
Approach LOS		D			D			B			A	

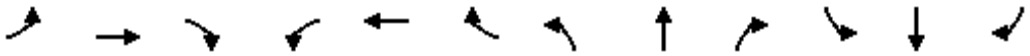
Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lag	Lead		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	11	96	43	18	89	43
Maximum Split (%)	7.3%	64.0%	28.7%	12.0%	59.3%	28.7%
Minimum Split (s)	8	22	42.5	8	22	42.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		8	31		8	31
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	62	116	73	116	134	73
End Time (s)	73	62	116	134	73	116
Yield/Force Off (s)	69	57.5	111.5	130	68.5	111.5
Yield/Force Off 170(s)	69	49.5	80.5	130	60.5	80.5
Local Start Time (s)	78	132	89	132	0	89
Local Yield (s)	85	73.5	127.5	146	84.5	127.5
Local Yield 170(s)	85	65.5	96.5	146	76.5	96.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	110
Offset: 134 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 16: 59th & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	51	39	46	142	122	50	1841	11	21	1286	41
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1566			1548		1583	4540		1583	4520	
Flt Permitted		0.60			0.93		0.13	1.00		0.05	1.00	
Satd. Flow (perm)		969			1447		217	4540		87	4520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	55	42	50	154	133	54	2001	12	23	1398	45
RTOR Reduction (vph)	0	7	0	0	5	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	180	0	0	332	0	54	2013	0	23	1441	0
Confl. Peds. (#/hr)	13		6	6		13	9		47	47		9
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		53.5			53.5		87.5	87.5		87.5	87.5	
Effective Green, g (s)		53.5			53.5		87.5	87.5		87.5	87.5	
Actuated g/C Ratio		0.36			0.36		0.58	0.58		0.58	0.58	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Grp Cap (vph)		346			516		127	2648		51	2637	
v/s Ratio Prot								c0.44			0.32	
v/s Ratio Perm		0.19			c0.23		0.25			0.27		
v/c Ratio		0.52			0.64		0.43	0.76		0.45	0.55	
Uniform Delay, d1		38.1			40.3		17.3	23.4		17.7	19.1	
Progression Factor		1.00			1.00		1.00	1.00		0.44	0.00	
Incremental Delay, d2		5.5			6.1		10.1	2.1		20.8	0.6	
Delay (s)		43.6			46.3		27.4	25.5		28.6	0.7	
Level of Service		D			D		C	C		C	A	
Approach Delay (s)		43.6			46.3			25.6			1.1	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	92	58	92	58
Maximum Split (%)	61.3%	38.7%	61.3%	38.7%
Minimum Split (s)	22.5	41.5	22.5	41.5
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	1
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	11	30	10	30
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	128	70	128	70
End Time (s)	70	128	70	128
Yield/Force Off (s)	65.5	123.5	65.5	123.5
Yield/Force Off 170(s)	54.5	93.5	55.5	93.5
Local Start Time (s)	0	92	0	92
Local Yield (s)	87.5	145.5	87.5	145.5
Local Yield 170(s)	76.5	115.5	77.5	115.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 128 (85%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 17: 60th & Crenshaw Blvd

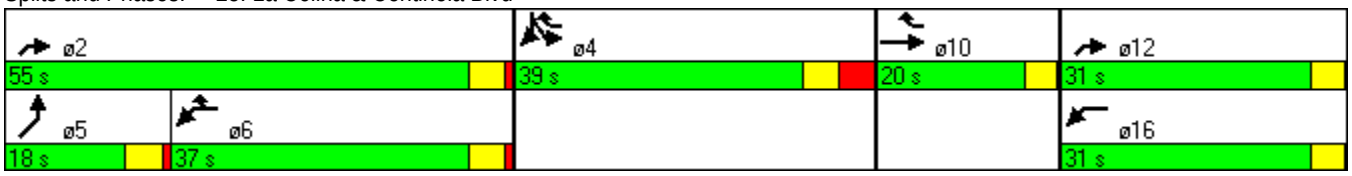
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (vph)	0	20	20	1082	0	1215	628	203	60	146	553
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.0		4.0		7.0	6.0	6.0		4.0	4.0
Lane Util. Factor		1.00		0.97		0.88	0.97	1.00		1.00	0.76
Frt		0.93		1.00		0.85	1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)		1554		3072		2493	3072	1417		1583	3230
Flt Permitted		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)		1554		3072		2493	3072	1417		1583	3230
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	22	22	1176	0	1321	683	221	65	159	601
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	44	0	1176	0	1321	683	286	0	159	601
Turn Type				Prot		custom		Prot			custom
Protected Phases		10		6 16		4 10 6	4	4		5	2 12
Permitted Phases											
Actuated Green, G (s)		16.0		59.0		92.0	31.0	31.0		13.0	81.0
Effective Green, g (s)		16.0		61.0		89.0	33.0	33.0		14.0	79.0
Actuated g/C Ratio		0.11		0.42		0.61	0.23	0.23		0.10	0.54
Clearance Time (s)		4.0					8.0	8.0		5.0	
Vehicle Extension (s)		3.0					3.0	3.0		2.0	
Lane Grp Cap (vph)		171		1292		1530	699	322		153	1760
v/s Ratio Prot		0.03		c0.38		c0.53	c0.22	0.20		c0.10	0.19
v/s Ratio Perm											
v/c Ratio		0.26		0.91		0.86	0.98	0.89		1.04	0.34
Uniform Delay, d1		59.1		39.4		23.0	55.6	54.2		65.5	18.5
Progression Factor		1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.8		9.7		5.3	28.1	24.2		83.5	0.1
Delay (s)		59.9		49.2		28.3	83.7	78.4		149.0	18.6
Level of Service		E		D		C	F	E		F	B
Approach Delay (s)		59.9			38.1		82.2			45.9	
Approach LOS		E			D		F			D	

Intersection Summary			
HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6	10	12	16
Movement	NER	SBL	NEL	WBL	EBT	NER	WBL
Lead/Lag			Lead	Lag			
Lead-Lag Optimize			Yes	Yes			
Recall Mode	C-Min	None	None	C-Max	None	None	None
Maximum Split (s)	55	39	18	37	20	31	31
Maximum Split (%)	37.9%	26.9%	12.4%	25.5%	13.8%	21.4%	21.4%
Minimum Split (s)	17	38	15	37	20	20	31
Yellow Time (s)	4	4	4	4	3.5	3.5	3.5
All-Red Time (s)	1	4	1	1	0.5	0.5	0.5
Minimum Initial (s)	12	5	4	30	4	4	4
Vehicle Extension (s)	3.5	3	2	3.5	3	3	3
Minimum Gap (s)	2	3	2	2	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7					7
Flash Dont Walk (s)		22					19
Dual Entry	No	Yes	No	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes	Yes
Start Time (s)	127	37	127	0	76	96	96
End Time (s)	37	76	0	37	96	127	127
Yield/Force Off (s)	32	68	140	32	92	123	123
Yield/Force Off 170(s)	32	46	140	32	92	123	104
Local Start Time (s)	127	37	127	0	76	96	96
Local Yield (s)	32	68	140	32	92	123	123
Local Yield 170(s)	32	46	140	32	92	123	104

Intersection Summary	
Cycle Length	145
Control Type	Actuated-Coordinated
Natural Cycle	145
Offset: 0 (0%), Referenced to phase 2:NER and 6:WBL, Start of Green	

Splits and Phases: 25: La Colina & Centinela Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (vph)	0	20	20	755	0	1006	1143	322	60	293	1430
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.0		4.0		7.0	6.0	6.0		4.0	4.0
Lane Util. Factor		1.00		0.97		0.88	0.97	1.00		1.00	0.76
Frt		0.93		1.00		0.85	1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)		1554		3072		2493	3072	1417		1583	3230
Flt Permitted		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)		1554		3072		2493	3072	1417		1583	3230
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	22	22	821	0	1093	1242	350	65	318	1554
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	44	0	821	0	1093	1242	415	0	318	1554
Turn Type				Prot		custom		Prot			custom
Protected Phases		10		6 16		4 10 6	4	4		5	2 12
Permitted Phases											
Actuated Green, G (s)		15.1		64.9		91.1	35.0	35.0		13.0	82.9
Effective Green, g (s)		15.1		62.9		93.1	37.0	37.0		14.0	80.9
Actuated g/C Ratio		0.10		0.42		0.62	0.25	0.25		0.09	0.54
Clearance Time (s)		4.0					8.0	8.0		5.0	
Vehicle Extension (s)		3.0					3.0	3.0		2.0	
Lane Grp Cap (vph)		156		1288		1547	758	350		148	1742
v/s Ratio Prot		0.03		0.27		c0.44	c0.40	0.29		c0.20	c0.48
v/s Ratio Perm											
v/c Ratio		0.28		0.64		0.71	1.64	1.19		2.15	0.89
Uniform Delay, d1		62.4		34.5		19.2	56.5	56.5		68.0	30.7
Progression Factor		1.00		1.09		0.62	1.00	1.00		0.92	0.81
Incremental Delay, d2		1.0		0.7		1.0	293.3	108.8		537.8	6.0
Delay (s)		63.4		38.2		13.1	349.8	165.3		600.7	31.0
Level of Service		E		D		B	F	F		F	C
Approach Delay (s)		63.4			23.8		303.6			127.7	
Approach LOS		E			C		F			F	

Intersection Summary			
HCM Average Control Delay	144.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6	10	12	16
Movement	NER	SBL	NEL	WBL	EBT	NER	WBL
Lead/Lag			Lag	Lead			
Lead-Lag Optimize			Yes	Yes			
Recall Mode	C-Min	None	None	C-Max	None	None	None
Maximum Split (s)	56	43	18	38	20	31	31
Maximum Split (%)	37.3%	28.7%	12.0%	25.3%	13.3%	20.7%	20.7%
Minimum Split (s)	17	38	15	37	20	20	31
Yellow Time (s)	4	4	4	4	3.5	3.5	3.5
All-Red Time (s)	1	4	1	1	0.5	0.5	0.5
Minimum Initial (s)	12	5	4	30	4	4	4
Vehicle Extension (s)	3.5	3	2	3.5	3	3	3
Minimum Gap (s)	2	3	2	2	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7					7
Flash Dont Walk (s)		22					19
Dual Entry	No	Yes	No	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes	Yes
Start Time (s)	0	56	38	0	99	119	119
End Time (s)	56	99	56	38	119	0	0
Yield/Force Off (s)	51	91	51	33	115	146	146
Yield/Force Off 170(s)	51	69	51	33	115	146	127
Local Start Time (s)	0	56	38	0	99	119	119
Local Yield (s)	51	91	51	33	115	146	146
Local Yield 170(s)	51	69	51	33	115	146	127

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	145

Offset: 0 (0%), Referenced to phase 2:NER and 6:WBL, Start of Green, Master Intersection

Splits and Phases: 25: La Colina & Centinela Blvd

HCM Signalized Intersection Capacity Analysis
28: Florence Ave & Fir/Ivy

8/30/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	536	98	22	805	15	18	83	44	1	50	94
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3093		1583	3158		1583	1580		1583	1503	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3093		1583	3158		1583	1580		1583	1503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	583	107	24	875	16	20	90	48	1	54	102
RTOR Reduction (vph)	0	12	0	0	2	0	0	32	0	0	88	0
Lane Group Flow (vph)	92	678	0	24	889	0	20	106	0	1	68	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	10.9	43.5		3.2	35.8		1.6	11.5		0.8	10.7	
Effective Green, g (s)	11.9	44.5		4.2	36.8		1.6	11.5		0.8	10.7	
Actuated g/C Ratio	0.16	0.59		0.06	0.48		0.02	0.15		0.01	0.14	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.5		3.0	3.5		3.0	2.0		3.0	4.0	
Lane Grp Cap (vph)	248	1811		87	1529		33	239		17	212	
v/s Ratio Prot	c0.06	0.22		0.02	c0.28		c0.01	c0.07		0.00	0.05	
v/s Ratio Perm												
v/c Ratio	0.37	0.37		0.28	0.58		0.61	0.44		0.06	0.32	
Uniform Delay, d1	28.7	8.4		34.4	14.1		36.9	29.3		37.2	29.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.6		1.7	1.6		27.6	0.5		1.5	1.2	
Delay (s)	29.6	9.0		36.2	15.7		64.5	29.8		38.7	30.6	
Level of Service	C	A		D	B		E	C		D	C	
Approach Delay (s)		11.4			16.2			34.2			30.6	
Approach LOS		B			B			C			C	

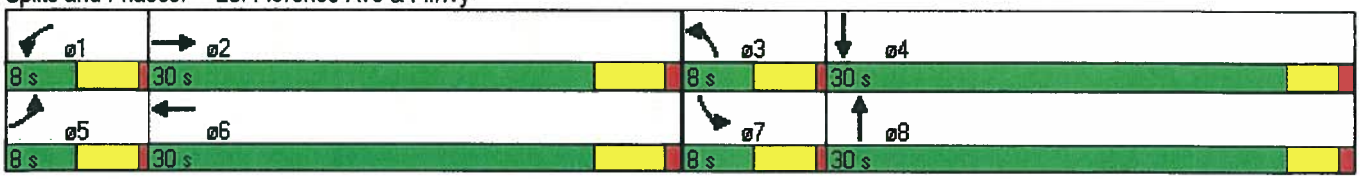
Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	8	30	8	30	8	30	8	30
Maximum Split (%)	10.5%	39.5%	10.5%	39.5%	10.5%	39.5%	10.5%	39.5%
Minimum Split (s)	8	30	8	27	8	30	8	27
Yellow Time (s)	3.5	4	3.5	3	3.5	4	3.5	3
All-Red Time (s)	0.5	1	0.5	1	0.5	1	0.5	1
Minimum Initial (s)	4	25	4	4	4	25	4	4
Vehicle Extension (s)	3	3.5	3	4	3	3.5	3	2
Minimum Gap (s)	3	2	3	4	3	2	3	2
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		15		16		15		16
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	53	61	15	23	53	61	15	23
End Time (s)	61	15	23	53	61	15	23	53
Yield/Force Off (s)	57	10	19	49	57	10	19	49
Yield/Force Off 170(s)	57	71	19	33	57	71	19	33
Local Start Time (s)	68	0	30	38	68	0	30	38
Local Yield (s)	72	25	34	64	72	25	34	64
Local Yield 170(s)	72	10	34	48	72	10	34	48

Intersection Summary	
Cycle Length	76
Control Type	Actuated-Coordinated
Natural Cycle	75

Offset: 61 (80%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Splits and Phases: 28: Florence Ave & Fir/Ivy



HCM Signalized Intersection Capacity Analysis
29: Florence Ave & Eucalyptus Ave

8/30/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	619	39	35	885	32	18	272	31	40	212	287
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	3139		1583	3150		1583	1641		1583	1667	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1583	3139		1583	3150		1583	1641		609	1667	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	248	673	42	38	962	35	20	296	34	43	230	312
RTOR Reduction (vph)	0	4	0	0	2	0	0	4	0	0	0	216
Lane Group Flow (vph)	248	711	0	38	995	0	20	326	0	43	230	96
Turn Type	Prot			Prot			Prot			Perm		Perm
Protected Phases	5	2 10		1	6 14		3	8			4	
Permitted Phases										4		4
Actuated Green, G (s)	17.6	55.4		3.6	41.4		1.6	27.0		21.4	21.4	21.4
Effective Green, g (s)	18.6	57.4		4.6	43.4		1.6	27.0		21.4	21.4	21.4
Actuated g/C Ratio	0.18	0.56		0.04	0.42		0.02	0.26		0.21	0.21	0.21
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	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	286	1749		71	1327		25	430		127	346	294
v/s Ratio Prot	c0.16	0.23		0.02	c0.32		0.01	c0.20			0.14	
v/s Ratio Perm										0.07		0.07
v/c Ratio	0.87	0.41		0.54	0.75		0.80	0.76		0.34	0.66	0.33
Uniform Delay, d1	41.0	13.1		48.2	25.2		50.5	35.0		34.8	37.5	34.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.0	0.2		7.6	2.4		95.2	6.6		0.6	3.7	0.2
Delay (s)	64.0	13.2		55.7	27.6		145.7	41.6		35.3	41.2	34.9
Level of Service	E	B		E	C		F	D		D	D	C
Approach Delay (s)		26.3			28.6			47.6			37.4	
Approach LOS		C			C			D			D	

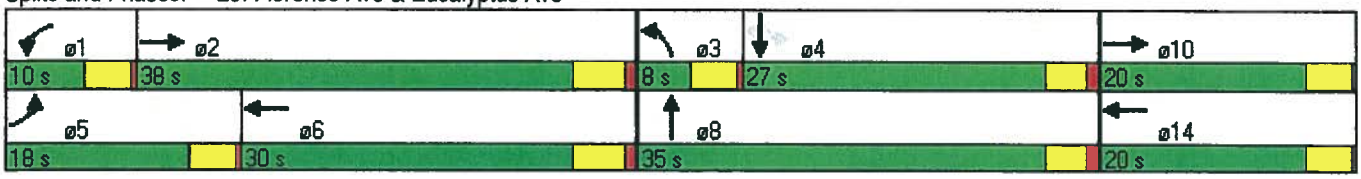
Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	3	4	5	6	8	10	14
Movement	WBL	EBT	NBL	SBTL	EBL	WBT	NBT	EBT	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes			
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None
Maximum Split (s)	10	38	8	27	18	30	35	20	20
Maximum Split (%)	9.7%	36.9%	7.8%	26.2%	17.5%	29.1%	34.0%	19.4%	19.4%
Minimum Split (s)	8	30	8	27	15	30	27	20	20
Yellow Time (s)	3.5	4	3.5	3	3.5	4	3	3.5	3.5
All-Red Time (s)	0.5	1	0.5	1	0.5	1	1	0.5	0.5
Minimum Initial (s)	4	25	4	4	4	25	4	4	4
Vehicle Extension (s)	3	3.5	3	2	3	3.5	2	3	3
Minimum Gap (s)	3	2	3	2	3	2	2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7	7	5	5
Flash Dont Walk (s)		15		16		15	16	11	11
Dual Entry	No	No	No	Yes	No	No	Yes	Yes	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	No	Yes	Yes
Start Time (s)	85	95	30	38	85	0	30	65	65
End Time (s)	95	30	38	65	0	30	65	85	85
Yield/Force Off (s)	91	25	34	61	99	25	61	81	81
Yield/Force Off 170(s)	91	10	34	45	99	10	45	70	70
Local Start Time (s)	85	95	30	38	85	0	30	65	65
Local Yield (s)	91	25	34	61	99	25	61	81	81
Local Yield 170(s)	91	10	34	45	99	10	45	70	70

Intersection Summary	
Cycle Length	103
Control Type	Actuated-Coordinated
Natural Cycle	100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Splits and Phases: 29: Florence Ave & Eucalyptus Ave



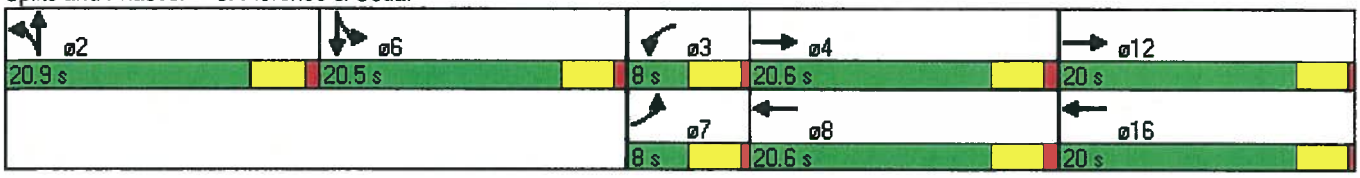
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	639	15	45	898	6	61	3	24	7	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	950	3527		1770	3515			1684			920	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	950	3527		1770	3515			1684			920	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	30	833	20	59	1171	8	80	4	31	9	1	7
RTOR Reduction (vph)	0	2	0	0	1	0	0	15	0	0	6	0
Lane Group Flow (vph)	30	851	0	59	1178	0	0	100	0	0	11	0
Heavy Vehicles (%)	90%	2%	2%	2%	2%	90%	2%	90%	2%	90%	90%	90%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4 12		3	8 16		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	2.4	37.4		3.2	38.2			16.4			16.0	
Effective Green, g (s)	2.4	37.4		3.2	38.2			16.4			16.0	
Actuated g/C Ratio	0.03	0.42		0.04	0.42			0.18			0.18	
Clearance Time (s)	4.0			4.0				4.5			4.5	
Vehicle Extension (s)	3.0			3.0				3.0			3.0	
Lane Grp Cap (vph)	25	1466		63	1492			307			164	
v/s Ratio Prot	0.03	0.24		c0.03	c0.34			c0.06			c0.01	
v/s Ratio Perm												
v/c Ratio	1.20	0.58		0.94	0.79			0.33			0.07	
Uniform Delay, d1	43.8	20.3		43.3	22.4			32.0			30.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	247.2	0.6		90.1	2.9			2.8			0.8	
Delay (s)	291.0	20.8		133.4	25.3			34.8			31.6	
Level of Service	F	C		F	C			C			C	
Approach Delay (s)		30.0			30.4			34.8			31.6	
Approach LOS		C			C			C			C	

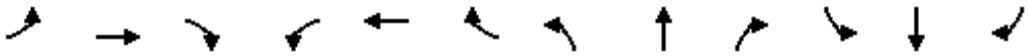
Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	3	4	6	7	8	12	16
Movement	NBTL	WBL	EBT	SBTL	EBL	WBT	EBT	WBT
Lead/Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize		Yes	Yes		Yes	Yes		
Recall Mode	C-Max	None	None	Max	None	None	None	None
Maximum Split (s)	20.9	8	20.6	20.5	8	20.6	20	20
Maximum Split (%)	23.2%	8.9%	22.9%	22.8%	8.9%	22.9%	22.2%	22.2%
Minimum Split (s)	20.5	8	20.5	20.5	8	20.5	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1	0.5	1	1	0.5	1	0.5	0.5
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)	5		5	5		5	5	5
Flash Dont Walk (s)	11		11	11		11	11	11
Dual Entry	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	41.4	49.4	20.9	41.4	49.4	70	70
End Time (s)	20.9	49.4	70	41.4	49.4	70	0	0
Yield/Force Off (s)	16.4	45.4	65.5	36.9	45.4	65.5	86	86
Yield/Force Off 170(s)	5.4	45.4	54.5	25.9	45.4	54.5	75	75
Local Start Time (s)	0	41.4	49.4	20.9	41.4	49.4	70	70
Local Yield (s)	16.4	45.4	65.5	36.9	45.4	65.5	86	86
Local Yield 170(s)	5.4	45.4	54.5	25.9	45.4	54.5	75	75

Intersection Summary	
Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 3: Florence & Cedar





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	455	82	56	164	74	87	2067	95	0	2289	5
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.5	4.5	4.0	3.5	4.5		4.0	4.5			4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.91			0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00			1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1563	1667	1417	1583	1574		1478	4211			4245	
Flt Permitted	0.55	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)	912	1667	1417	1583	1574		1478	4211			4245	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	495	89	61	178	80	95	2247	103	0	2488	5
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	47	495	89	61	255	0	95	2350	0	0	2493	0
Confl. Peds. (#/hr)	20					20	10		10	10		10
Turn Type	Perm		Over	Prot			Prot					
Protected Phases		8	5	7	4		5	2			6	
Permitted Phases	8											
Actuated Green, G (s)	46.0	46.0	8.0	4.0	54.0		8.0	86.0			74.0	
Effective Green, g (s)	46.5	46.5	8.0	4.5	54.5		8.0	86.5			74.5	
Actuated g/C Ratio	0.31	0.31	0.05	0.03	0.36		0.05	0.58			0.50	
Clearance Time (s)	5.0	5.0	4.0	4.0	5.0		4.0	5.0			5.0	
Lane Grp Cap (vph)	283	517	76	47	572		79	2428			2108	
v/s Ratio Prot		c0.30	0.06	c0.04	0.16		0.06	c0.56			c0.59	
v/s Ratio Perm	0.05											
v/c Ratio	0.17	0.96	1.17	1.30	0.45		1.20	0.97			1.18	
Uniform Delay, d1	37.6	50.8	71.0	72.8	36.3		71.0	30.4			37.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.69	0.56			1.00	
Incremental Delay, d2	1.3	30.3	156.6	230.9	2.5		102.0	1.8			87.4	
Delay (s)	38.9	81.1	227.6	303.7	38.8		151.2	18.7			125.1	
Level of Service	D	F	F	F	D		F	B			F	
Approach Delay (s)		98.6			89.4			23.9			125.1	
Approach LOS		F			F			C			F	

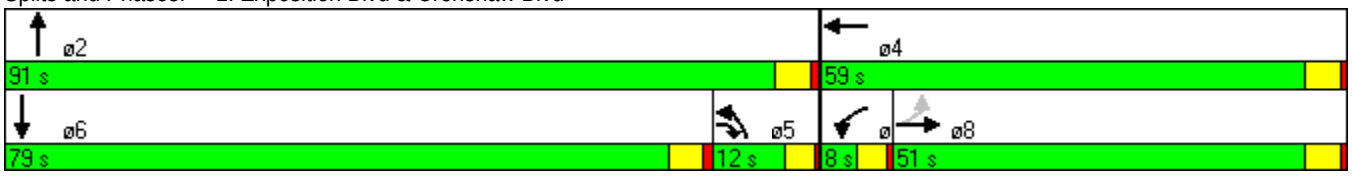
Intersection Summary			
HCM Average Control Delay	78.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		

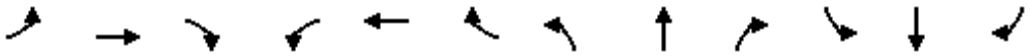
c Critical Lane Group

Phase Number	2	4	5	6	7	8
Movement	NBT	WBT	NBL	SBT	WBL	EBTL
Lead/Lag			Lag	Lead	Lead	Lag
Lead-Lag Optimize			Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	91	59	12	79	8	51
Maximum Split (%)	60.7%	39.3%	8.0%	52.7%	5.3%	34.0%
Minimum Split (s)	37	51	8.5	37	8	51
Yellow Time (s)	4	4	3.5	4	3.5	4
All-Red Time (s)	1	1	0.5	1	0.5	1
Minimum Initial (s)	10	10	4	10	4	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	7	15		7		15
Flash Dont Walk (s)	25	31		25		31
Dual Entry	No	No	No	No	No	No
Inhibit Max	No	No	Yes	No	Yes	No
Start Time (s)	134	75	63	134	75	83
End Time (s)	75	134	75	63	83	134
Yield/Force Off (s)	70	129	71	58	79	129
Yield/Force Off 170(s)	45	98	71	33	79	98
Local Start Time (s)	0	91	79	0	91	99
Local Yield (s)	86	145	87	74	95	145
Local Yield 170(s)	61	114	87	49	95	114

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	175
Offset: 134 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 1: Exposition Blvd & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	181	288	33	78	503	92	105	2214	15	108	1974	172
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	3.5	4.5		3.5	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	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	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3114		1583	3167	1417	1478	4242		1478	4190	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3114		1583	3167	1417	1478	4242		1478	4190	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	189	300	34	81	524	96	109	2306	16	112	2056	179
RTOR Reduction (vph)	0	6	0	0	0	62	0	1	0	0	7	0
Lane Group Flow (vph)	189	328	0	81	524	34	109	2321	0	112	2228	0
Confl. Peds. (#/hr)			1	1			2		3	3		2
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	14.0	38.0		14.0	38.0	38.0	9.0	71.0		9.0	71.0	
Effective Green, g (s)	14.5	38.5		14.5	38.5	38.5	9.0	71.5		9.0	71.5	
Actuated g/C Ratio	0.10	0.26		0.10	0.26	0.26	0.06	0.48		0.06	0.48	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	153	799		153	813	364	89	2022		89	1997	
v/s Ratio Prot	c0.12	0.11		0.05	c0.17		0.07	c0.55		0.08	c0.53	
v/s Ratio Perm						0.02						
v/c Ratio	1.24	0.41		0.53	0.64	0.09	1.22	1.15		1.26	1.12	
Uniform Delay, d1	67.8	46.3		64.5	49.7	42.5	70.5	39.2		70.5	39.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.89	0.78		1.42	0.32	
Incremental Delay, d2	149.6	1.6		12.5	3.9	0.5	148.4	70.7		124.6	52.9	
Delay (s)	217.3	47.9		77.0	53.6	43.0	210.9	101.3		224.8	65.4	
Level of Service	F	D		E	D	D	F	F		F	E	
Approach Delay (s)		109.1			54.8			106.2			73.0	
Approach LOS		F			D			F			E	

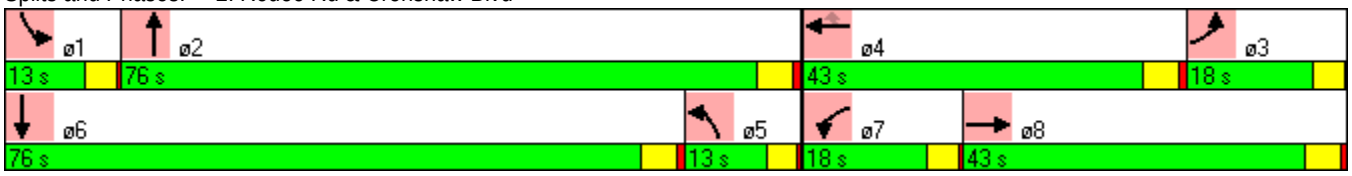
Intersection Summary			
HCM Average Control Delay	87.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

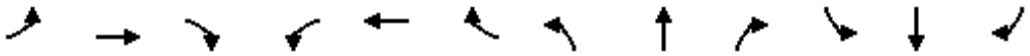
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	EBL	WBT	NBL	SBT	WBL	EBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Maximum Split (s)	13	76	18	43	13	76	18	43
Maximum Split (%)	8.7%	50.7%	12.0%	28.7%	8.7%	50.7%	12.0%	28.7%
Minimum Split (s)	8	36.5	8	43	8	36.5	8	43
Yellow Time (s)	3.5	4	3.5	4	3.5	4	3.5	4
All-Red Time (s)	0.5	1	0.5	1	0.5	1	0.5	1
Minimum Initial (s)	4	10	4	10	4	10	4	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		16		31		16		31
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	140	3	122	79	66	140	79	97
End Time (s)	3	79	140	122	79	66	97	140
Yield/Force Off (s)	149	74	136	117	75	61	93	135
Yield/Force Off 170(s)	149	58	136	86	75	45	93	104
Local Start Time (s)	137	0	119	76	63	137	76	94
Local Yield (s)	146	71	133	114	72	58	90	132
Local Yield 170(s)	146	55	133	83	72	42	90	101

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	180
Offset: 3 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 2: Rodeo Rd & Crenshaw Blvd

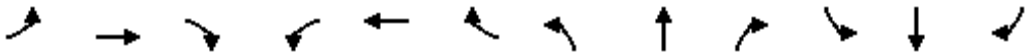




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	50	0	0	50	0	2254	50	0	2035	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	54	0	0	54	0	2450	54	0	2212	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								590			570	
pX, platoon unblocked	0.75	0.75	0.55	0.75	0.75	0.59	0.55			0.59		
vC, conflicting volume	3126	4760	781	3269	4776	844	2299			2504		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	1185	0	0	1206	0	491			1126		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	91	100	100	92	100			100		
cM capacity (veh/h)	705	141	595	700	137	641	587			364		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	54	54	980	980	544	885	885	529
Volume Left	0	0	0	0	0	0	0	0
Volume Right	54	54	0	0	54	0	0	87
cSH	595	641	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.08	0.58	0.58	0.32	0.52	0.52	0.31
Queue Length 95th (ft)	8	7	0	0	0	0	0	0
Control Delay (s)	11.7	11.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B						
Approach Delay (s)	11.7	11.1	0.0			0.0		
Approach LOS	B	B						

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	169	24	68	158	46	56	2118	41	30	1901	67
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	3.5	3.5		3.5	3.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1578	1629		1565	1604		1478	4233		1478	4216	
Flt Permitted	0.43	1.00		0.45	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	717	1629		745	1604		1478	4233		1478	4216	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	102	176	25	71	165	48	58	2206	43	31	1980	70
RTOR Reduction (vph)	0	4	0	0	7	0	0	1	0	0	2	0
Lane Group Flow (vph)	102	197	0	71	206	0	58	2248	0	31	2048	0
Confl. Peds. (#/hr)	4		14	14		4	10		1	1		10
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4								
Actuated Green, G (s)	36.0	36.0		36.0	36.0		11.0	94.0		6.0	89.0	
Effective Green, g (s)	37.5	37.5		37.5	37.5		11.0	94.5		6.0	89.5	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.07	0.63		0.04	0.60	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	179	407		186	401		108	2667		59	2516	
v/s Ratio Prot		0.12			0.13		c0.04	c0.53		0.02	0.49	
v/s Ratio Perm	c0.14			0.10								
v/c Ratio	0.57	0.48		0.38	0.51		0.54	0.84		0.53	0.81	
Uniform Delay, d1	49.2	48.0		46.6	48.4		67.0	21.9		70.6	23.7	
Progression Factor	1.00	1.00		1.00	1.00		0.98	0.61		0.80	0.15	
Incremental Delay, d2	12.5	4.1		5.9	4.7		15.3	3.0		7.4	0.7	
Delay (s)	61.7	52.1		52.5	53.1		80.7	16.4		64.1	4.2	
Level of Service	E	D		D	D		F	B		E	A	
Approach Delay (s)		55.3			52.9			18.0			5.1	
Approach LOS		E			D			B			A	

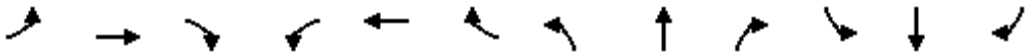
Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	WBTL	NBL	SBT	EBTL
Lead/Lag	Lag	Lead		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	10	99	41	15	94	41
Maximum Split (%)	6.7%	66.0%	27.3%	10.0%	62.7%	27.3%
Minimum Split (s)	8	36.5	40.1	8	36.5	40.1
Yellow Time (s)	3.5	4	4	3.5	4	4
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	10	10	4	10	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	27.5		10	27.5
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	No	No	Yes	No	No
Start Time (s)	101	2	111	96	2	111
End Time (s)	111	101	2	111	96	2
Yield/Force Off (s)	107	96	147	107	91	147
Yield/Force Off 170(s)	107	86	119.5	107	81	119.5
Local Start Time (s)	5	56	15	0	56	15
Local Yield (s)	11	0	51	11	145	51
Local Yield 170(s)	11	140	23.5	11	135	23.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	105
Offset: 96 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Red	

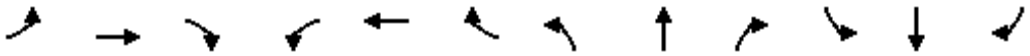
Splits and Phases: 4: Coliseum St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	50	0	0	50	0	2215	50	0	1943	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	54	0	0	54	0	2408	54	0	2112	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								650			670	
pX, platoon unblocked	0.76	0.76	0.64	0.76	0.76	0.75	0.64			0.75		
vC, conflicting volume	2996	4601	731	3193	4601	830	2166			2462		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317	2420	0	576	2420	0	843			1782		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	100	100	93	100			100		
cM capacity (veh/h)	436	24	692	282	24	813	503			258		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	54	54	963	963	536	845	845	477
Volume Left	0	0	0	0	0	0	0	0
Volume Right	54	54	0	0	54	0	0	54
cSH	692	813	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.07	0.57	0.57	0.32	0.50	0.50	0.28
Queue Length 95th (ft)	6	5	0	0	0	0	0	0
Control Delay (s)	10.6	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	A						
Approach Delay (s)	10.6	9.7	0.0			0.0		
Approach LOS	B	A						

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			



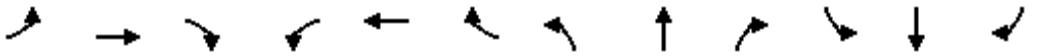
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	164	127	29	102	151	57	37	1646	76	72	2127	101
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.93		1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	0.99	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1503	1567	1317		1572		1583	4451		1583	4492	
Flt Permitted	0.46	0.85	1.00		0.69		0.04	1.00		0.08	1.00	
Satd. Flow (perm)	723	1345	1317		1109		70	4451		126	4492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	138	32	111	164	62	40	1789	83	78	2312	110
RTOR Reduction (vph)	0	0	4	0	6	0	0	3	0	0	3	0
Lane Group Flow (vph)	142	174	28	0	331	0	40	1869	0	78	2419	0
Confl. Peds. (#/hr)	2		49	49		2	30		70	70		30
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	45.0	45.0	45.0		45.0		95.0	95.0		95.0	95.0	
Effective Green, g (s)	45.0	45.0	45.0		45.0		95.0	95.0		95.0	95.0	
Actuated g/C Ratio	0.30	0.30	0.30		0.30		0.63	0.63		0.63	0.63	
Clearance Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	217	404	395		333		44	2819		80	2845	
v/s Ratio Prot								0.42			0.54	
v/s Ratio Perm	0.20	0.13	0.02		c0.30		0.57			c0.62		
v/c Ratio	0.65	0.43	0.07		1.00		0.91	0.66		0.97	0.85	
Uniform Delay, d1	45.7	42.2	37.5		52.4		23.8	17.4		26.4	21.8	
Progression Factor	1.00	1.00	1.00		1.00		0.52	0.24		1.05	1.06	
Incremental Delay, d2	14.4	3.3	0.3		48.1		86.5	0.8		81.5	2.6	
Delay (s)	60.1	45.5	37.9		100.5		98.9	5.0		109.3	25.9	
Level of Service	E	D	D		F		F	A		F	C	
Approach Delay (s)		50.8			100.5			6.9			28.5	
Approach LOS		D			F			A			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	130.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	100	50	100	50
Maximum Split (%)	66.7%	33.3%	66.7%	33.3%
Minimum Split (s)	36	42	36	42
Yellow Time (s)	4	4	4	4
All-Red Time (s)	1	1	1	1
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	9	30	13	30
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	130	80	130	80
End Time (s)	80	130	80	130
Yield/Force Off (s)	75	125	75	125
Yield/Force Off 170(s)	66	95	62	95
Local Start Time (s)	0	100	0	100
Local Yield (s)	95	145	95	145
Local Yield 170(s)	86	115	82	115

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	120
Offset: 130 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 6: 39th Street & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	680	226	178	753	139	311	1353	113	249	1608	125
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91		0.97	0.91		0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3072	3167	1417	1583	4418		3072	4484		3072	4550	1371
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3072	3167	1417	1583	4418		3072	4484		3072	4550	1371
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	739	246	193	818	151	338	1471	123	271	1748	136
RTOR Reduction (vph)	0	0	106	0	17	0	0	6	0	0	0	56
Lane Group Flow (vph)	116	739	140	193	952	0	338	1588	0	271	1748	80
Confl. Peds. (#/hr)	15		20	20		15	15		15	15		15
Turn Type	Prot		Over	Prot			Prot			Prot		Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.5	34.5	16.0	18.0	44.0		16.0	61.5		14.6	60.1	60.1
Effective Green, g (s)	9.5	36.0	17.0	19.0	45.5		17.0	63.4		15.6	62.0	62.0
Actuated g/C Ratio	0.06	0.24	0.11	0.13	0.30		0.11	0.42		0.10	0.41	0.41
Clearance Time (s)	5.0	5.5	5.0	5.0	5.5		5.0	5.9		5.0	5.9	5.9
Vehicle Extension (s)	2.0	4.3	2.0	3.0	4.2		2.0	3.0		2.0	5.0	5.0
Lane Grp Cap (vph)	195	760	161	201	1340		348	1895		319	1881	567
v/s Ratio Prot	0.04	c0.23	0.10	c0.12	0.22		c0.11	0.35		0.09	c0.38	
v/s Ratio Perm												0.06
v/c Ratio	0.59	0.97	0.87	0.96	0.71		0.97	0.84		0.85	0.93	0.14
Uniform Delay, d1	68.4	56.5	65.4	65.1	46.4		66.3	38.7		66.0	41.9	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.87	0.79		0.68	1.38	2.08
Incremental Delay, d2	3.2	26.0	34.6	51.9	2.0		28.3	2.6		9.9	5.4	0.3
Delay (s)	71.6	82.5	100.0	117.0	48.4		85.6	33.2		54.6	63.1	57.2
Level of Service	E	F	F	F	D		F	C		D	E	E
Approach Delay (s)		85.2			59.8			42.4			61.6	
Approach LOS		F			E			D			E	

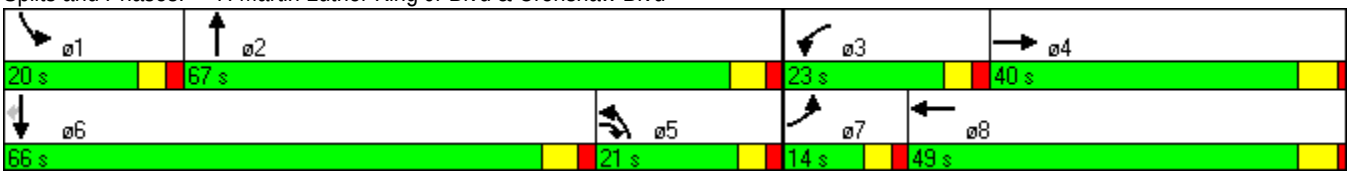
Intersection Summary			
HCM Average Control Delay	59.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

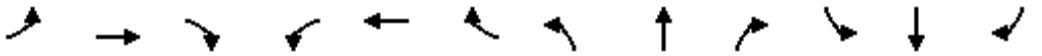
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize								
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	67	23	40	21	66	14	49
Maximum Split (%)	13.3%	44.7%	15.3%	26.7%	14.0%	44.0%	9.3%	32.7%
Minimum Split (s)	10	30.9	10	34.5	10	38.9	10	34.5
Yellow Time (s)	3	3.9	3	4.3	3	3.9	3	4.3
All-Red Time (s)	2	2	2	1.2	2	2	2	1.2
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	2	3	3	4.3	2	5	2	4.2
Minimum Gap (s)	2	3	3	3	2	3	2	3
Time Before Reduce (s)	0	0.1	0	0.1	0	0.1	0	0.1
Time To Reduce (s)	0	2	0	2	0	2	0	2
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		18		22		26		20
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No	No
Start Time (s)	86	106	23	46	2	86	23	37
End Time (s)	106	23	46	86	23	2	37	86
Yield/Force Off (s)	101	17.1	41	80.5	18	146.1	32	80.5
Yield/Force Off 170(s)	101	149.1	41	58.5	18	120.1	32	60.5
Local Start Time (s)	84	104	21	44	0	84	21	35
Local Yield (s)	99	15.1	39	78.5	16	144.1	30	78.5
Local Yield 170(s)	99	147.1	39	56.5	16	118.1	30	58.5

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	115
Offset: 2 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Red	

Splits and Phases: 7: Martin Luther King Jr Blvd & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	509	457	227	58	454	62	269	1860	16	13	1830	417
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95		1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3072	1667	1417	1583	3103		1583	4543		1583	4550	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.09	1.00	1.00
Satd. Flow (perm)	3072	1667	1417	1583	3103		1583	4543		143	4550	1417
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	519	466	232	59	463	63	274	1898	16	13	1867	426
RTOR Reduction (vph)	0	0	101	0	7	0	0	0	0	0	0	143
Lane Group Flow (vph)	519	466	131	59	519	0	274	1914	0	13	1867	283
Confl. Peds. (#/hr)	5		18	18		5	16		1	1		16
Turn Type	Prot		Over	Prot			Prot			Perm		Over
Protected Phases	7	4	5	3	8		5	2			6	7
Permitted Phases										6		
Actuated Green, G (s)	22.0	43.9	22.0	6.5	28.4		22.0	85.7		59.7	59.7	22.0
Effective Green, g (s)	22.0	44.9	22.0	6.5	29.4		22.0	86.6		60.6	60.6	22.0
Actuated g/C Ratio	0.15	0.30	0.15	0.04	0.20		0.15	0.58		0.40	0.40	0.15
Clearance Time (s)	4.0	5.0	4.0	4.0	5.0		4.0	4.9		4.9	4.9	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	451	499	208	69	608		232	2623		58	1838	208
v/s Ratio Prot	0.17	c0.28	0.09	0.04	c0.17		c0.17	0.42			c0.41	c0.20
v/s Ratio Perm										0.09		
v/c Ratio	1.15	0.93	0.63	0.86	0.85		1.18	0.73		0.22	1.02	1.36
Uniform Delay, d1	64.0	51.1	60.2	71.3	58.2		64.0	23.1		29.3	44.7	64.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.05	1.20		0.56	0.44	0.92
Incremental Delay, d2	90.6	24.7	6.1	60.6	11.2		100.3	0.8		3.9	18.1	174.9
Delay (s)	154.6	75.8	66.3	131.9	69.4		167.7	28.6		20.5	37.8	233.8
Level of Service	F	E	E	F	E		F	C		C	D	F
Approach Delay (s)		107.6			75.7			46.0			73.9	
Approach LOS		F			E			D			E	

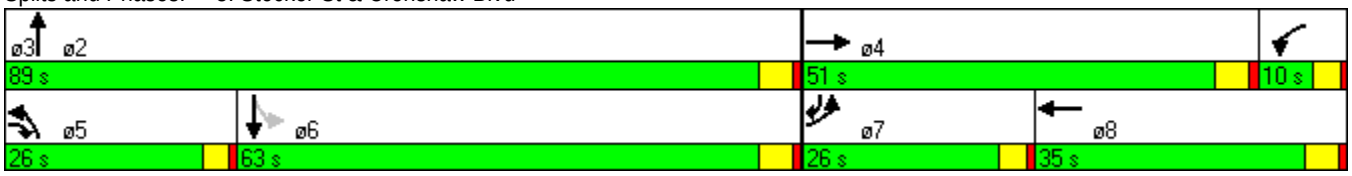
Intersection Summary			
HCM Average Control Delay	70.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	3	4	5	6	7	8
Movement	NBT	WBL	EBT	NBL	SBTL	EBL	WBT
Lead/Lag		Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	89	10	51	26	63	26	35
Maximum Split (%)	59.3%	6.7%	34.0%	17.3%	42.0%	17.3%	23.3%
Minimum Split (s)	26.4	9	31	9	31.9	9	35
Yellow Time (s)	3.9	3	3.9	3	3.9	3	3.9
All-Red Time (s)	1	1	1.1	1	1	1	1.1
Minimum Initial (s)	10	5	5	5	10	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)	7		7		7		7
Flash Dont Walk (s)	14.5		19		20		23
Dual Entry	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No
Start Time (s)	72	62	11	72	98	11	37
End Time (s)	11	72	62	98	11	37	72
Yield/Force Off (s)	6.1	68	57	94	6.1	33	67
Yield/Force Off 170(s)	141.6	68	38	94	136.1	33	44
Local Start Time (s)	61	51	0	61	87	0	26
Local Yield (s)	145.1	57	46	83	145.1	22	56
Local Yield 170(s)	130.6	57	27	83	125.1	22	33

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	155
Offset: 11 (7%), Referenced to phase 2:NBT and 6:SBTL, Start of Red	

Splits and Phases: 8: Stocker St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	188	444	19	279	601	161	181	1799	121	64	1816	3
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	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	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3142		1583	3167	1417	1583	4498		1583	4549	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.05	1.00	
Satd. Flow (perm)	1583	3142		1583	3167	1417	1583	4498		91	4549	
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)	198	467	20	294	633	169	191	1894	127	67	1912	3
RTOR Reduction (vph)	0	2	0	0	0	90	0	5	0	0	0	0
Lane Group Flow (vph)	198	485	0	294	633	79	191	2016	0	67	1915	0
Confl. Peds. (#/hr)	10		15	15		10	10		10	10		10
Turn Type	Prot			Prot		Over	Prot			Perm		
Protected Phases	3	8		7	4	1	1	6			2	
Permitted Phases		8			4					2		
Actuated Green, G (s)	18.0	25.3		21.7	28.9	13.0	13.0	89.1		72.1	72.1	
Effective Green, g (s)	18.0	26.2		21.7	29.9	13.0	13.0	90.1		73.1	73.1	
Actuated g/C Ratio	0.12	0.17		0.14	0.20	0.09	0.09	0.60		0.49	0.49	
Clearance Time (s)	4.0	4.9		4.0	5.0	4.0	4.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	549		229	631	123	137	2702		44	2217	
v/s Ratio Prot	c0.13	c0.15		c0.19	0.20	0.06	c0.12	0.45			0.42	
v/s Ratio Perm										c0.73		
v/c Ratio	1.04	0.88		1.28	1.00	0.64	1.39	0.75		1.52	0.86	
Uniform Delay, d1	66.0	60.4		64.2	60.1	66.2	68.5	21.7		38.5	34.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	1.10		1.05	1.10	
Incremental Delay, d2	76.8	15.6		156.7	36.6	10.4	190.6	0.6		285.1	2.5	
Delay (s)	142.8	76.0		220.9	96.7	76.6	249.9	24.3		325.5	40.1	
Level of Service	F	E		F	F	E	F	C		F	D	
Approach Delay (s)		95.3			126.9			43.8			49.7	
Approach LOS		F			F			D			D	

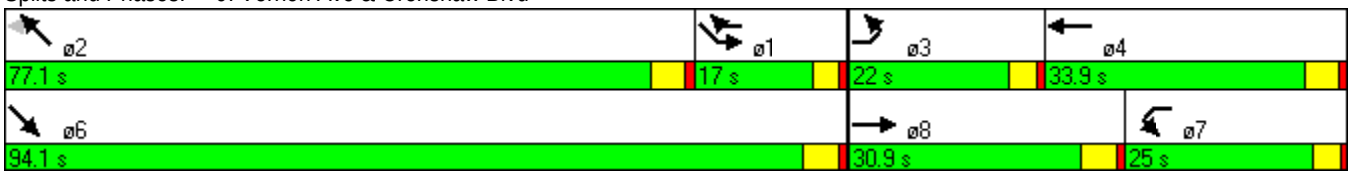
Intersection Summary			
HCM Average Control Delay	66.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

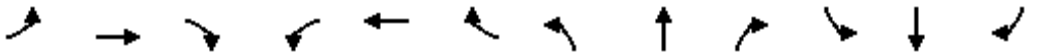
c Critical Lane Group

Phase Number	1	2	3	4	6	7	8
Movement	SEL	NWTL	EBL	WBT	SET	WBL	EBT
Lead/Lag	Lag	Lead	Lead	Lag		Lag	Lead
Lead-Lag Optimize							
Recall Mode	None	C-Max	None	None	C-Max	None	None
Maximum Split (s)	17	77.1	22	33.9	94.1	25	30.9
Maximum Split (%)	11.3%	51.4%	14.7%	22.6%	62.7%	16.7%	20.6%
Minimum Split (s)	9	31	9	31	27	9.4	30.9
Yellow Time (s)	3	3.9	3	3.9	3.9	3	3.9
All-Red Time (s)	1	1.1	1	1.1	1.1	1	1
Minimum Initial (s)	5	10	5	10	10	5	10
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7		7	7		7
Flash Dont Walk (s)		12		7.5	15		18
Dual Entry	No	No	No	No	No	No	No
Inhibit Max	No	No	No	No	No	No	No
Start Time (s)	9	81.9	26	48	81.9	56.9	26
End Time (s)	26	9	48	81.9	26	81.9	56.9
Yield/Force Off (s)	22	4	44	76.9	21	77.9	52
Yield/Force Off 170(s)	22	142	44	69.4	6	77.9	34
Local Start Time (s)	0	72.9	17	39	72.9	47.9	17
Local Yield (s)	13	145	35	67.9	12	68.9	43
Local Yield 170(s)	13	133	35	60.4	147	68.9	25

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	125
Offset: 9 (6%), Referenced to phase 2:NWTL and 6:SET, Start of Red	

Splits and Phases: 9: Vernon Ave & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	193	66	119	120	138	25	1854	75	139	1854	24
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1520	3032		1577	1667	1326	1478	4219		1478	4235	
Flt Permitted	0.60	1.00		0.50	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	961	3032		831	1667	1326	1478	4219		1478	4235	
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)	65	203	69	125	126	145	26	1952	79	146	1952	25
RTOR Reduction (vph)	0	22	0	0	0	107	0	3	0	0	1	0
Lane Group Flow (vph)	65	250	0	125	126	38	26	2028	0	146	1976	0
Confl. Peds. (#/hr)	26		3	3		26	13		4	4		13
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4		4						
Actuated Green, G (s)	37.5	37.5		37.5	37.5	37.5	7.0	79.2		19.0	91.2	
Effective Green, g (s)	39.0	39.0		39.0	39.0	39.0	7.0	80.0		19.0	92.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26	0.05	0.53		0.13	0.61	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	4.0	4.8		4.0	4.8	
Lane Grp Cap (vph)	250	788		216	433	345	69	2250		187	2597	
v/s Ratio Prot		0.08			0.08		0.02	c0.48		0.10	c0.47	
v/s Ratio Perm	0.07			c0.15		0.03						
v/c Ratio	0.26	0.32		0.58	0.29	0.11	0.38	0.90		0.78	0.76	
Uniform Delay, d1	44.0	44.8		48.3	44.4	42.3	69.4	31.5		63.5	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.74	0.40		1.19	1.18	
Incremental Delay, d2	2.5	1.1		10.8	1.7	0.6	12.7	5.5		16.4	1.2	
Delay (s)	46.6	45.8		59.2	46.1	42.9	64.2	18.0		91.9	26.1	
Level of Service	D	D		E	D	D	E	B		F	C	
Approach Delay (s)		46.0			49.1			18.6			30.6	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	WBTL	NBL	SBT	EBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	23	84	43	11	96	43
Maximum Split (%)	15.3%	56.0%	28.7%	7.3%	64.0%	28.7%
Minimum Split (s)	8	29.8	42.5	8	29.8	42.5
Yellow Time (s)	3.5	4	3.9	3.5	4	3.9
All-Red Time (s)	0.5	0.8	1.6	0.5	0.8	1.6
Minimum Initial (s)	4	10	5	4	10	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		18	15		18	12.5
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	No	No	Yes	No	No
Start Time (s)	70	93	27	16	70	27
End Time (s)	93	27	70	27	16	70
Yield/Force Off (s)	89	22.2	64.5	23	11.2	64.5
Yield/Force Off 170(s)	89	4.2	49.5	23	143.2	52
Local Start Time (s)	127	0	84	73	127	84
Local Yield (s)	146	79.2	121.5	80	68.2	121.5
Local Yield 170(s)	146	61.2	106.5	80	50.2	109

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	115
Offset: 93 (62%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 10: 48th St & Crenshaw Blvd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	16	30	1554	42	33	1721
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Lane Width	12	12	10	12	10	10
Total Lost time (s)	4.0		4.5		4.0	4.5
Lane Util. Factor	1.00		0.91		1.00	0.91
Frpb, ped/bikes	0.98		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1462		4221		1478	4247
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1462		4221		1478	4247
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	33	1689	46	36	1871
RTOR Reduction (vph)	26	0	2	0	0	0
Lane Group Flow (vph)	24	0	1733	0	36	1871
Confl. Peds. (#/hr)		14		11	11	
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	33.0		92.5		12.0	108.5
Effective Green, g (s)	33.0		92.5		12.0	108.5
Actuated g/C Ratio	0.22		0.62		0.08	0.72
Clearance Time (s)	4.0		4.5		4.0	4.5
Lane Grp Cap (vph)	322		2603		118	3072
v/s Ratio Prot	c0.02		c0.41		0.02	c0.44
v/s Ratio Perm						
v/c Ratio	0.08		0.67		0.31	0.61
Uniform Delay, d1	46.4		18.7		65.1	10.3
Progression Factor	1.00		0.09		1.00	0.33
Incremental Delay, d2	0.5		1.0		4.3	0.6
Delay (s)	46.9		2.8		69.2	4.0
Level of Service	D		A		E	A
Approach Delay (s)	46.9		2.8			5.2
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	6	8
Movement	SBL	NBT	SBT	WBL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	16	97	113	37
Maximum Split (%)	10.7%	64.7%	75.3%	24.7%
Minimum Split (s)	8	22	22	36
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		7.5	7.5	25
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	31	84	84	47
End Time (s)	47	31	47	84
Yield/Force Off (s)	43	26.5	42.5	80
Yield/Force Off 170(s)	43	19	35	55
Local Start Time (s)	97	0	0	113
Local Yield (s)	109	92.5	108.5	146
Local Yield 170(s)	109	85	101	121

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	80
Offset: 84 (56%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 11: 50th & Crenshaw Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	17	20	20	27	20	36	59	17	1519	25	41	1715
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	12	10	10	12	10	10
Total Lost time (s)		4.5			4.5			4.0	4.5		4.0	4.5
Lane Util. Factor		1.00			1.00			1.00	0.91		1.00	0.91
Frpb, ped/bikes		0.99			0.99			1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	1.00
Frt		0.95			0.94			1.00	1.00		1.00	1.00
Flt Protected		0.99			0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1549			1525			1478	4233		1478	4241
Flt Permitted		0.92			0.90			0.95	1.00		0.95	1.00
Satd. Flow (perm)		1441			1397			1478	4233		1478	4241
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	22	22	29	22	39	64	18	1651	27	45	1864
RTOR Reduction (vph)	0	13	0	0	18	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	49	0	0	72	0	0	82	1677	0	45	1875
Confl. Peds. (#/hr)	10		5	5		10		10		5	5	
Turn Type	Perm			Perm			Prot	Prot			Prot	
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8								
Actuated Green, G (s)		34.5			34.5			16.0	86.5		16.0	86.5
Effective Green, g (s)		34.5			34.5			16.0	86.5		16.0	86.5
Actuated g/C Ratio		0.23			0.23			0.11	0.58		0.11	0.58
Clearance Time (s)		4.5			4.5			4.0	4.5		4.0	4.5
Lane Grp Cap (vph)		331			321			158	2441		158	2446
v/s Ratio Prot								c0.06	0.40		0.03	c0.44
v/s Ratio Perm		0.03			c0.05							
v/c Ratio		0.15			0.22			0.52	0.69		0.28	0.77
Uniform Delay, d1		46.0			46.9			63.4	22.3		61.7	24.1
Progression Factor		1.00			1.00			1.31	0.32		1.04	0.52
Incremental Delay, d2		0.9			1.6			6.4	0.9		3.6	1.9
Delay (s)		47.0			48.5			89.3	8.1		68.1	14.6
Level of Service		D			D			F	A		E	B
Approach Delay (s)		47.0			48.5				11.9			15.8
Approach LOS		D			D				B			B

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

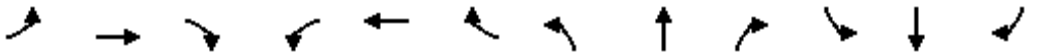
Movement	SBR
Lane Configurations	
Volume (vph)	10
Ideal Flow (vphpl)	1700
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	10
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	20	91	39	20	91	39
Maximum Split (%)	13.3%	60.7%	26.0%	13.3%	60.7%	26.0%
Minimum Split (s)	8	22	39	8	22	39
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		7.5	27.5		7.5	27.5
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	53	73	14	53	73	14
End Time (s)	73	14	53	73	14	53
Yield/Force Off (s)	69	9.5	48.5	69	9.5	48.5
Yield/Force Off 170(s)	69	2	21	69	2	21
Local Start Time (s)	130	0	91	130	0	91
Local Yield (s)	146	86.5	125.5	146	86.5	125.5
Local Yield 170(s)	146	79	98	146	79	98

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 73 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 12: 52nd & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	352	68	102	270	106	0	1826	186	0	2002	149
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1580	1621		1580	1588			4148			4189	
Flt Permitted	0.23	1.00		0.17	1.00			1.00			1.00	
Satd. Flow (perm)	386	1621		287	1588			4148			4189	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	133	374	72	109	287	113	0	1943	198	0	2130	159
RTOR Reduction (vph)	0	5	0	0	10	0	0	8	0	0	6	0
Lane Group Flow (vph)	133	441	0	109	390	0	0	2133	0	0	2283	0
Confl. Peds. (#/hr)	5		6	6		5			22			7
Turn Type	Perm			Perm								
Protected Phases		8			4			2			6	
Permitted Phases	8			4								
Actuated Green, G (s)	44.5	44.5		44.5	44.5			95.3			95.3	
Effective Green, g (s)	46.0	46.0		46.0	46.0			96.0			96.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.64			0.64	
Clearance Time (s)	5.5	5.5		5.5	5.5			4.7			4.7	
Lane Grp Cap (vph)	118	497		88	487			2655			2681	
v/s Ratio Prot		0.27			0.25			0.51			c0.55	
v/s Ratio Perm	0.34			c0.38								
v/c Ratio	1.13	0.89		1.24	0.80			0.80			0.85	
Uniform Delay, d1	52.0	49.5		52.0	47.8			20.0			21.4	
Progression Factor	1.00	1.00		1.00	1.00			1.45			0.51	
Incremental Delay, d2	121.1	20.4		173.2	13.0			2.1			2.8	
Delay (s)	173.1	69.9		225.2	60.8			31.1			13.7	
Level of Service	F	E		F	E			C			B	
Approach Delay (s)		93.6			96.0			31.1			13.7	
Approach LOS		F			F			C			B	

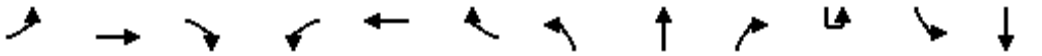
Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	6	8
Movement	NBT	WBTL	SBT	EBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	100	50	100	50
Maximum Split (%)	66.7%	33.3%	66.7%	33.3%
Minimum Split (s)	24.2	40	24.2	40
Yellow Time (s)	4	3.9	4	3.9
All-Red Time (s)	0.7	1.6	0.7	1.6
Minimum Initial (s)	10	5	10	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	12.5	27.5	12.5	27.5
Dual Entry	No	No	No	No
Inhibit Max	No	No	No	No
Start Time (s)	61	11	61	11
End Time (s)	11	61	11	61
Yield/Force Off (s)	6.3	55.5	6.3	55.5
Yield/Force Off 170(s)	143.8	28	143.8	28
Local Start Time (s)	0	100	0	100
Local Yield (s)	95.3	144.5	95.3	144.5
Local Yield 170(s)	82.8	117	82.8	117

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 61 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 13: 54 St & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	69	55	97	16	50	51	51	1361	76	93	69	1621
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	12	10	10
Total Lost time (s)		4.5			4.5		4.0	4.5			4.0	4.5
Lane Util. Factor		1.00			1.00		1.00	0.91			1.00	0.91
Frpb, ped/bikes		0.99			0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.94			0.94		1.00	0.99			1.00	0.99
Flt Protected		0.98			0.99		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1530			1542		1478	4206			1478	4207
Flt Permitted		0.83			0.95		0.95	1.00			0.95	1.00
Satd. Flow (perm)		1284			1470		1478	4206			1478	4207
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	60	105	17	54	55	55	1479	83	101	75	1762
RTOR Reduction (vph)	0	19	0	0	19	0	0	4	0	0	0	3
Lane Group Flow (vph)	0	221	0	0	107	0	55	1558	0	0	176	1832
Confl. Peds. (#/hr)	9		2	2		9	13		2		2	
Turn Type	Perm			Perm			Prot			Prot	Prot	
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8								
Actuated Green, G (s)		38.5			38.5		12.0	66.5			32.0	86.5
Effective Green, g (s)		38.5			38.5		12.0	66.5			32.0	86.5
Actuated g/C Ratio		0.26			0.26		0.08	0.44			0.21	0.58
Clearance Time (s)		4.5			4.5		4.0	4.5			4.0	4.5
Lane Grp Cap (vph)		330			377		118	1865			315	2426
v/s Ratio Prot							0.04	c0.37			0.12	c0.44
v/s Ratio Perm		c0.17			0.07							
v/c Ratio		0.67			0.28		0.47	0.84			0.56	0.76
Uniform Delay, d1		50.1			44.7		65.9	36.9			52.7	23.8
Progression Factor		1.00			1.00		0.55	0.27			0.76	1.31
Incremental Delay, d2		10.4			1.9		6.8	2.5			3.3	1.1
Delay (s)		60.5			46.6		43.0	12.4			43.5	32.2
Level of Service		E			D		D	B			D	C
Approach Delay (s)		60.5			46.6			13.5				33.2
Approach LOS		E			D			B				C

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

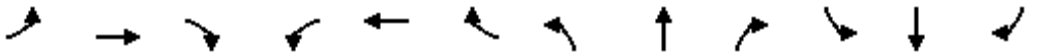
Movement	SBR
Lane Configurations	
Volume (vph)	67
Ideal Flow (vphpl)	1700
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	73
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	13
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	36	71	43	16	91	43
Maximum Split (%)	24.0%	47.3%	28.7%	10.7%	60.7%	28.7%
Minimum Split (s)	8	22	39	8	22	39
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		7.5	27.5		7.5	27.5
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	129	15	86	70	129	86
End Time (s)	15	86	129	86	70	129
Yield/Force Off (s)	11	81.5	124.5	82	65.5	124.5
Yield/Force Off 170(s)	11	74	97	82	58	97
Local Start Time (s)	114	0	71	55	114	71
Local Yield (s)	146	66.5	109.5	67	50.5	109.5
Local Yield 170(s)	146	59	82	67	43	82

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 15 (10%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 14: 57th & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	1040	84	139	644	149	260	1181	152	247	1539	222
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.0	4.0	4.5	4.0
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.93	1.00	1.00	0.85	1.00	1.00	0.79
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4419		3072	3167	1311	1478	4247	1211	1478	4247	1122
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3072	4419		3072	3167	1311	1478	4247	1211	1478	4247	1122
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	1130	91	151	700	162	283	1284	165	268	1673	241
RTOR Reduction (vph)	0	6	0	0	0	2	0	0	41	0	0	28
Lane Group Flow (vph)	152	1215	0	151	700	160	283	1284	124	268	1673	213
Confl. Peds. (#/hr)	113		238	238		113	136		85	85		136
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	5.0	46.0		5.0	46.0	74.0	24.0	54.0	59.0	28.0	58.0	63.0
Effective Green, g (s)	5.0	46.0		5.0	46.0	74.0	24.0	54.0	59.0	28.0	58.0	63.0
Actuated g/C Ratio	0.03	0.31		0.03	0.31	0.49	0.16	0.36	0.39	0.19	0.39	0.42
Clearance Time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.0	4.0	4.5	4.0
Lane Grp Cap (vph)	102	1355		102	971	647	236	1529	476	276	1642	501
v/s Ratio Prot	c0.05	c0.27		c0.05	0.22	0.05	c0.19	0.30	0.01	0.18	c0.39	0.01
v/s Ratio Perm						0.08			0.09			0.18
v/c Ratio	1.49	0.90		1.48	0.72	0.25	1.20	0.84	0.26	0.97	1.02	0.42
Uniform Delay, d1	72.5	49.7		72.5	46.3	21.9	63.0	44.0	30.8	60.6	46.0	30.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.57	0.42	0.09	1.18	0.56	0.57
Incremental Delay, d2	265.2	9.5		261.2	4.6	0.9	113.3	3.8	0.9	40.5	24.3	2.0
Delay (s)	337.7	59.3		333.7	50.9	22.8	149.3	22.3	3.7	111.9	50.2	19.4
Level of Service	F	E		F	D	C	F	C	A	F	D	B
Approach Delay (s)		90.1			88.6			41.3			54.4	
Approach LOS		F			F			D			D	

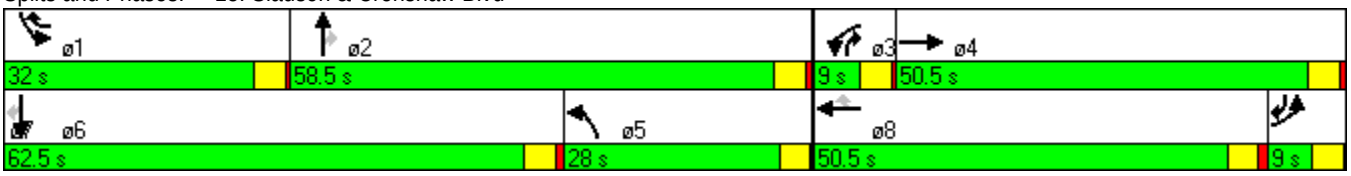
Intersection Summary			
HCM Average Control Delay	64.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

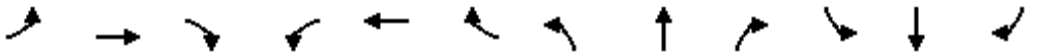
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Maximum Split (s)	32	58.5	9	50.5	28	62.5	9	50.5
Maximum Split (%)	21.3%	39.0%	6.0%	33.7%	18.7%	41.7%	6.0%	33.7%
Minimum Split (s)	8	30	8	50.5	8	32.5	8	50.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	0.5	1	0.5	1	0.5	1
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		15		7		15
Flash Dont Walk (s)		18.5		31		21		31
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	135	17	75.5	84.5	47.5	135	126	75.5
End Time (s)	17	75.5	84.5	135	75.5	47.5	135	126
Yield/Force Off (s)	13	71	80.5	130.5	71.5	43	131	121.5
Yield/Force Off 170(s)	13	52.5	80.5	99.5	71.5	22	131	90.5
Local Start Time (s)	118	0	58.5	67.5	30.5	118	109	58.5
Local Yield (s)	146	54	63.5	113.5	54.5	26	114	104.5
Local Yield 170(s)	146	35.5	63.5	82.5	54.5	5	114	73.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	160
Offset: 17 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 15: Slauson & Crenshaw Blvd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	29	1	2	81	63	1658	22	50	1858	15
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lane Width	12	12	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.99			0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.89			0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1445			1350		1478	4206		1478	4232	
Flt Permitted		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1404			1349		1478	4206		1478	4232	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	1	32	1	2	88	68	1802	24	54	2020	16
RTOR Reduction (vph)	0	24	0	0	65	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	26	0	68	1825	0	54	2036	0
Confl. Peds. (#/hr)	50		2	2		50	56		168	168		56
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		39.5			39.5		13.0	84.5		13.0	84.5	
Effective Green, g (s)		39.5			39.5		13.0	84.5		13.0	84.5	
Actuated g/C Ratio		0.26			0.26		0.09	0.56		0.09	0.56	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Grp Cap (vph)		370			355		128	2369		128	2384	
v/s Ratio Prot							0.05	c0.43		0.04	c0.48	
v/s Ratio Perm		0.01			c0.02							
v/c Ratio		0.04			0.07		0.53	0.77		0.42	0.85	
Uniform Delay, d1		41.2			41.5		65.6	25.3		64.9	27.6	
Progression Factor		1.00			1.00		1.32	0.52		0.87	0.69	
Incremental Delay, d2		0.2			0.4		12.4	2.1		3.0	1.3	
Delay (s)		41.4			41.9		98.8	15.2		59.4	20.2	
Level of Service		D			D		F	B		E	C	
Approach Delay (s)		41.4			41.9			18.2			21.2	
Approach LOS		D			D			B			C	

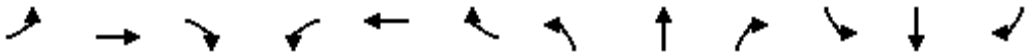
Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBT	EBTL	NBL	SBT	WBTL
Lead/Lag	Lag	Lead		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Maximum Split (s)	17	89	44	17	89	44
Maximum Split (%)	11.3%	59.3%	29.3%	11.3%	59.3%	29.3%
Minimum Split (s)	8	22	42.7	8	22	42.7
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	1	1	0.5	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		8	31		8	31
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	82	143	99	143	10	99
End Time (s)	99	82	143	10	99	143
Yield/Force Off (s)	95	77.5	138.5	6	94.5	138.5
Yield/Force Off 170(s)	95	69.5	107.5	6	86.5	107.5
Local Start Time (s)	72	133	89	133	0	89
Local Yield (s)	85	67.5	128.5	146	84.5	128.5
Local Yield 170(s)	85	59.5	97.5	146	76.5	97.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	100
Offset: 10 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Green	

Splits and Phases: 16: 59th & Crenshaw Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	126	51	60	118	120	34	1448	24	62	1692	79
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1578			1527		1583	4528		1583	4471	
Flt Permitted		0.77			0.86		0.06	1.00		0.10	1.00	
Satd. Flow (perm)		1231			1326		99	4528		169	4471	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	137	55	65	128	130	37	1574	26	67	1839	86
RTOR Reduction (vph)	0	6	0	0	15	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	257	0	0	308	0	37	1599	0	67	1922	0
Confl. Peds. (#/hr)	28		22	22		28	51		30	30		51
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		54.5			54.5		86.5	86.5		86.5	86.5	
Effective Green, g (s)		54.5			54.5		86.5	86.5		86.5	86.5	
Actuated g/C Ratio		0.36			0.36		0.58	0.58		0.58	0.58	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Grp Cap (vph)		447			482		57	2611		97	2578	
v/s Ratio Prot								0.35			c0.43	
v/s Ratio Perm		0.21			c0.23		0.37			0.40		
v/c Ratio		0.57			0.64		0.65	0.61		0.69	0.75	
Uniform Delay, d1		38.4			39.6		21.5	20.8		22.3	23.6	
Progression Factor		1.00			1.00		1.00	1.00		0.31	0.25	
Incremental Delay, d2		5.3			6.4		45.4	1.1		18.7	1.0	
Delay (s)		43.7			46.0		66.9	21.9		25.6	7.0	
Level of Service		D			D		E	C		C	A	
Approach Delay (s)		43.7			46.0			22.9			7.6	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	91	59	91	59
Maximum Split (%)	60.7%	39.3%	60.7%	39.3%
Minimum Split (s)	22.5	41.5	22	41.5
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	1
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7	7	7
Flash Dont Walk (s)	11	30	10	30
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	5	96	5	96
End Time (s)	96	5	96	5
Yield/Force Off (s)	91.5	0.5	91.5	0.5
Yield/Force Off 170(s)	80.5	120.5	81.5	120.5
Local Start Time (s)	0	91	0	91
Local Yield (s)	86.5	145.5	86.5	145.5
Local Yield 170(s)	75.5	115.5	76.5	115.5

Intersection Summary	
Cycle Length	150
Control Type	Pretimed
Natural Cycle	90
Offset: 5 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 17: 60th & Crenshaw Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (vph)	0	20	20	755	0	1006	1143	322	60	293	1430
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.0		4.0		7.0	6.0	6.0		4.0	4.0
Lane Util. Factor		1.00		0.97		0.88	0.97	1.00		1.00	0.88
Frt		0.93		1.00		0.85	1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)		1554		3072		2493	3072	1417		1583	2493
Flt Permitted		1.00		0.95		1.00	0.95	1.00		0.95	1.00
Satd. Flow (perm)		1554		3072		2493	3072	1417		1583	2493
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	22	22	821	0	1093	1242	350	65	318	1554
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	44	0	821	0	1093	1242	415	0	318	1554
Turn Type				Prot		custom		Prot			custom
Protected Phases		10		6 16		4 10 6	4	4		5	2 12
Permitted Phases											
Actuated Green, G (s)		15.1		64.9		91.1	35.0	35.0		13.0	82.9
Effective Green, g (s)		15.1		62.9		93.1	37.0	37.0		14.0	80.9
Actuated g/C Ratio		0.10		0.42		0.62	0.25	0.25		0.09	0.54
Clearance Time (s)		4.0					8.0	8.0		5.0	
Vehicle Extension (s)		3.0					3.0	3.0		2.0	
Lane Grp Cap (vph)		156		1288		1547	758	350		148	1345
v/s Ratio Prot		0.03		0.27		c0.44	c0.40	0.29		c0.20	c0.62
v/s Ratio Perm											
v/c Ratio		0.28		0.64		0.71	1.64	1.19		2.15	1.16
Uniform Delay, d1		62.4		34.5		19.2	56.5	56.5		68.0	34.5
Progression Factor		1.00		1.09		0.62	1.00	1.00		0.92	0.84
Incremental Delay, d2		1.0		0.7		1.0	293.3	108.8		537.8	78.4
Delay (s)		63.4		38.2		13.1	349.8	165.3		600.7	107.4
Level of Service		E		D		B	F	F		F	F
Approach Delay (s)		63.4			23.8		303.6			191.2	
Approach LOS		E			C		F			F	

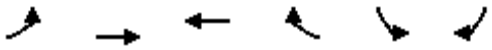
Intersection Summary			
HCM Average Control Delay	165.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6	10	12	16
Movement	NER	SBL	NEL	WBL	EBT	NER	WBL
Lead/Lag			Lag	Lead			
Lead-Lag Optimize			Yes	Yes			
Recall Mode	C-Min	None	None	C-Max	None	None	None
Maximum Split (s)	56	43	18	38	20	31	31
Maximum Split (%)	37.3%	28.7%	12.0%	25.3%	13.3%	20.7%	20.7%
Minimum Split (s)	17	38	15	37	20	20	31
Yellow Time (s)	4	4	4	4	3.5	3.5	3.5
All-Red Time (s)	1	4	1	1	0.5	0.5	0.5
Minimum Initial (s)	12	5	4	30	4	4	4
Vehicle Extension (s)	3.5	3	2	3.5	3	3	3
Minimum Gap (s)	2	3	2	2	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7					7
Flash Dont Walk (s)		22					19
Dual Entry	No	Yes	No	Yes	Yes	Yes	Yes
Inhibit Max	No	No	No	No	Yes	Yes	Yes
Start Time (s)	0	56	38	0	99	119	119
End Time (s)	56	99	56	38	119	0	0
Yield/Force Off (s)	51	91	51	33	115	146	146
Yield/Force Off 170(s)	51	69	51	33	115	146	127
Local Start Time (s)	0	56	38	0	99	119	119
Local Yield (s)	51	91	51	33	115	146	146
Local Yield 170(s)	51	69	51	33	115	146	127

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	145

Offset: 0 (0%), Referenced to phase 2:NER and 6:WBL, Start of Green, Master Intersection

Splits and Phases: 25: La Colina & Centinela Blvd



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	293	1430	755	1006	1143	322
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	7.0	6.0	6.0
Lane Util. Factor	1.00	0.91	0.95	0.88	0.97	1.00
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	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	4550	3167	2493	3072	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	4550	3167	2493	3072	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	1554	821	1093	1242	350
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	318	1554	821	1093	1242	350
Confl. Peds. (#/hr)					50	
Turn Type	Prot			pt+ov		Perm
Protected Phases	5	2	6	4 6	4	
Permitted Phases						4
Actuated Green, G (s)	21.0	59.0	33.0	81.0	43.0	43.0
Effective Green, g (s)	22.0	60.0	34.0	78.0	45.0	45.0
Actuated g/C Ratio	0.19	0.52	0.30	0.68	0.39	0.39
Clearance Time (s)	5.0	5.0	5.0		8.0	8.0
Vehicle Extension (s)	2.0	3.5	3.5		3.0	3.0
Lane Grp Cap (vph)	303	2374	936	1691	1202	554
v/s Ratio Prot	c0.20	0.34	c0.26	0.44	c0.40	
v/s Ratio Perm						0.25
v/c Ratio	1.05	0.65	0.88	0.65	1.03	0.63
Uniform Delay, d1	46.5	20.0	38.5	10.6	35.0	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	65.3	1.4	11.4	0.9	34.9	2.4
Delay (s)	111.8	21.4	49.9	11.5	69.9	30.7
Level of Service	F	C	D	B	E	C
Approach Delay (s)		36.7	27.9		61.3	
Approach LOS		D	C		E	

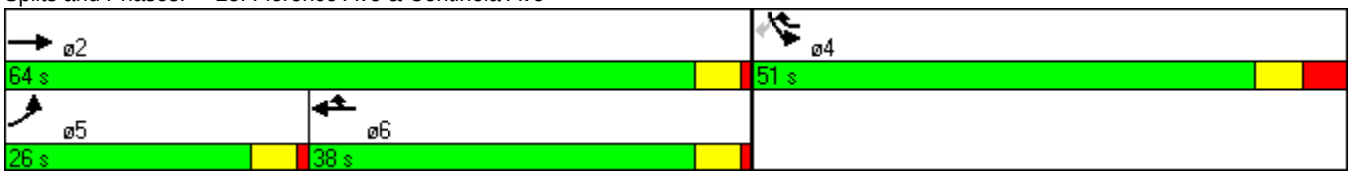
Intersection Summary			
HCM Average Control Delay	40.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	EBT	SBL	EBL	WBT
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Min	None	None	C-Max
Maximum Split (s)	64	51	26	38
Maximum Split (%)	55.7%	44.3%	22.6%	33.0%
Minimum Split (s)	17	38	9	37
Yellow Time (s)	4	4	4	4
All-Red Time (s)	1	4	1	1
Minimum Initial (s)	12	5	4	30
Vehicle Extension (s)	3.5	3	2	3.5
Minimum Gap (s)	2	3	2	2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7		
Flash Dont Walk (s)		22		
Dual Entry	No	Yes	No	Yes
Inhibit Max	No	No	No	No
Start Time (s)	89	38	89	0
End Time (s)	38	89	0	38
Yield/Force Off (s)	33	81	110	33
Yield/Force Off 170(s)	33	59	110	33
Local Start Time (s)	89	38	89	0
Local Yield (s)	33	81	110	33
Local Yield 170(s)	33	59	110	33

Intersection Summary	
Cycle Length	115
Control Type	Actuated-Coordinated
Natural Cycle	115
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	

Splits and Phases: 25: Florence Ave & Centinela Ave



HCM Signalized Intersection Capacity Analysis
28: Florence Ave & Fir/Ivy

8/30/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	1211	53	25	541	12	22	97	53	32	162	141
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3147		1583	3156		1583	1578		1583	1550	
Flt Permitted	0.95	1.00		0.95	1.00		0.37	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3147		1583	3156		608	1578		1583	1550	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	1316	58	27	588	13	24	105	58	35	176	153
RTOR Reduction (vph)	0	3	0	0	2	0	0	19	0	0	31	0
Lane Group Flow (vph)	157	1371	0	27	599	0	24	144	0	35	298	0
Turn Type	Prot			Prot			Perm			Prot		
Protected Phases	5	2 10		1	6 10			8		7	4	
Permitted Phases							8					
Actuated Green, G (s)	12.4	58.9		2.4	48.9		20.3	20.3		2.4	26.7	
Effective Green, g (s)	13.4	60.9		3.4	50.9		20.3	20.3		2.4	26.7	
Actuated g/C Ratio	0.13	0.58		0.03	0.48		0.19	0.19		0.02	0.25	
Clearance Time (s)	4.0			4.0			4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0			3.0			2.0	2.0		3.0	4.0	
Lane Grp Cap (vph)	202	1825		51	1530		118	305		36	394	
v/s Ratio Prot	c0.10	c0.44		0.02	0.19			0.09		0.02	c0.19	
v/s Ratio Perm							0.04					
v/c Ratio	0.78	0.75		0.53	0.39		0.20	0.47		0.97	0.76	
Uniform Delay, d1	44.4	16.4		50.0	17.2		35.6	37.6		51.3	36.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.0	1.8		9.6	0.2		0.3	0.4		138.2	8.5	
Delay (s)	61.3	18.2		59.6	17.4		35.9	38.0		189.5	44.7	
Level of Service	E	B		E	B		D	D		F	D	
Approach Delay (s)		22.6			19.2			37.7			58.6	
Approach LOS		C			B			D			E	

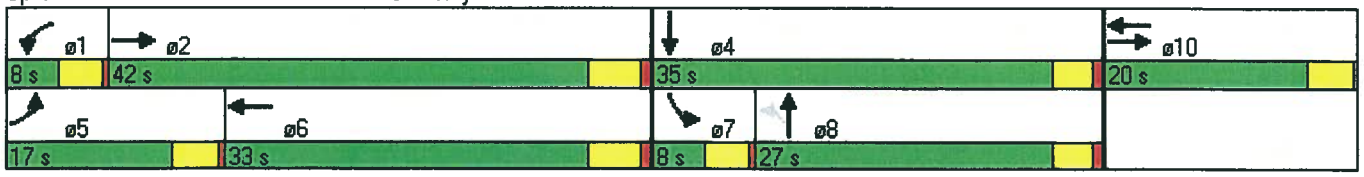
Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	4	5	6	7	8	10
Movement	WBL	EBT	SBT	EBL	WBT	SBL	NBTL	EBWB
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None	None	None
Maximum Split (s)	8	42	35	17	33	8	27	20
Maximum Split (%)	7.6%	40.0%	33.3%	16.2%	31.4%	7.6%	25.7%	19.0%
Minimum Split (s)	8	30	27	8	30	8	27	20
Yellow Time (s)	3.5	4	3	3.5	4	3.5	3	3.5
All-Red Time (s)	0.5	1	1	0.5	1	0.5	1	0.5
Minimum Initial (s)	4	25	4	4	25	4	4	4
Vehicle Extension (s)	3	3.5	4	3	3.5	3	2	3
Minimum Gap (s)	3	2	4	3	2	3	2	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7	5
Flash Dont Walk (s)		15	16		15		16	11
Dual Entry	No	No	Yes	No	No	No	Yes	Yes
Inhibit Max	Yes	No	No	Yes	No	Yes	No	Yes
Start Time (s)	14	22	64	14	31	64	72	99
End Time (s)	22	64	99	31	64	72	99	14
Yield/Force Off (s)	18	59	95	27	59	68	95	10
Yield/Force Off 170(s)	18	44	79	27	44	68	79	104
Local Start Time (s)	88	96	33	88	0	33	41	68
Local Yield (s)	92	28	64	101	28	37	64	84
Local Yield 170(s)	92	13	48	101	13	37	48	73

Intersection Summary	
Cycle Length	105
Control Type	Actuated-Coordinated
Natural Cycle	95

Offset: 31 (30%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Splits and Phases: 28: Florence Ave & Fir/Ivy



HCM Signalized Intersection Capacity Analysis
29: Florence Ave & Eucalyptus Ave

8/30/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	334	1220	49	66	592	40	23	291	50	91	365	285
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	3148		1583	3137		1583	1630		1583	1667	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1583	3148		1583	3137		880	1630		1583	1667	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	363	1326	53	72	643	43	25	316	54	99	397	310
RTOR Reduction (vph)	0	2	0	0	4	0	0	4	0	0	0	213
Lane Group Flow (vph)	363	1377	0	72	682	0	25	366	0	99	397	97
Turn Type	Prot			Prot			custom			Prot		Over
Protected Phases	7	4 12		3	8 12					1		7
Permitted Phases							2	2			6	
Actuated Green, G (s)	31.0	67.0		7.0	43.0		28.0	28.0		25.0	58.0	31.0
Effective Green, g (s)	31.0	67.0		7.0	43.0		29.0	29.0		26.0	59.0	31.0
Actuated g/C Ratio	0.21	0.46		0.05	0.30		0.20	0.20		0.18	0.41	0.21
Clearance Time (s)	4.0			4.0			5.0	5.0		5.0	5.0	4.0
Vehicle Extension (s)	3.0			3.0			3.5	3.5		3.5	3.5	3.0
Lane Grp Cap (vph)	338	1455		76	930		176	326		284	678	303
v/s Ratio Prot	c0.23	c0.44		0.05	0.22					0.06		0.07
v/s Ratio Perm							0.03	c0.22			c0.24	
v/c Ratio	1.07	0.95		0.95	0.73		0.14	1.12		0.35	0.59	0.32
Uniform Delay, d1	57.0	37.3		68.8	45.9		47.8	58.0		52.1	33.5	48.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	70.0	12.7		84.4	2.6		1.7	87.2		3.4	3.7	0.6
Delay (s)	127.0	50.0		153.2	48.5		49.4	145.2		55.4	37.2	48.7
Level of Service	F	D		F	D		D	F		E	D	D
Approach Delay (s)		66.1			58.4			139.1			43.8	
Approach LOS		E			E			F			D	

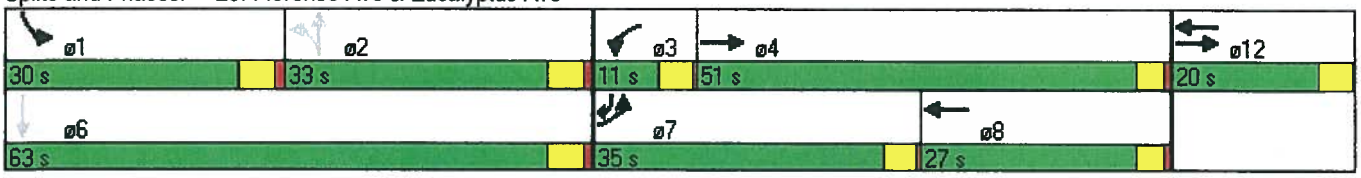
Intersection Summary				
HCM Average Control Delay	67.5	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	99.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

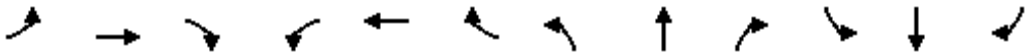
Phase Number	1	2	3	4	6	7	8	12
Movement	SBL	NBTL	WBL	EBT	SBT	EBL	WBT	EBWB
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	Max	C-Max	None	None	C-Max	None	None	None
Maximum Split (s)	30	33	11	51	63	35	27	20
Maximum Split (%)	20.7%	22.8%	7.6%	35.2%	43.4%	24.1%	18.6%	13.8%
Minimum Split (s)	30	30	8	27	30	8	27	20
Yellow Time (s)	4	4	3.5	3	4	3.5	3	3.5
All-Red Time (s)	1	1	0.5	1	1	0.5	1	0.5
Minimum Initial (s)	25	25	4	4	25	4	4	4
Vehicle Extension (s)	3.5	3.5	3	2	3.5	3	2	3
Minimum Gap (s)	2	2	3	2	2	3	2	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)	7	7		7	7		7	5
Flash Dont Walk (s)	15	15		16	15		16	11
Dual Entry	No	No	No	Yes	No	No	Yes	Yes
Inhibit Max	No	No	Yes	No	No	Yes	No	Yes
Start Time (s)	115	0	33	44	115	33	68	95
End Time (s)	0	33	44	95	33	68	95	115
Yield/Force Off (s)	140	28	40	91	28	64	91	111
Yield/Force Off 170(s)	125	13	40	75	13	64	75	100
Local Start Time (s)	115	0	33	44	115	33	68	95
Local Yield (s)	140	28	40	91	28	64	91	111
Local Yield 170(s)	125	13	40	75	13	64	75	100

Intersection Summary	
Cycle Length	145
Control Type	Actuated-Coordinated
Natural Cycle	145

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Splits and Phases: 29: Florence Ave & Eucalyptus Ave





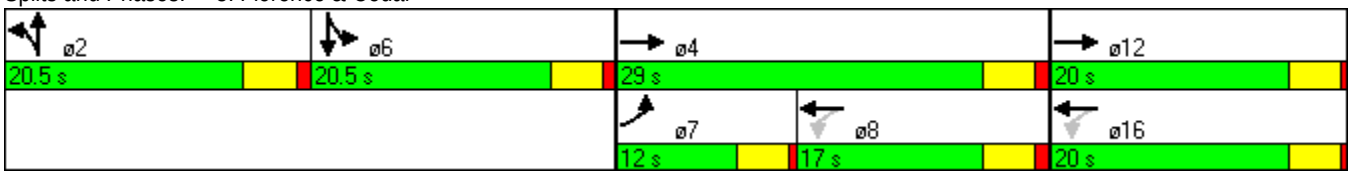
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1122	43	43	520	0	22	1	28	4	4	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.93			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	950	3520		1770	3539			1666			894	
Flt Permitted	0.95	1.00		0.09	1.00			0.98			0.99	
Satd. Flow (perm)	950	3520		174	3539			1666			894	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	1	1463	56	56	678	0	29	1	37	5	5	29
RTOR Reduction (vph)	0	3	0	0	0	0	0	32	0	0	24	0
Lane Group Flow (vph)	1	1516	0	56	678	0	0	35	0	0	15	0
Heavy Vehicles (%)	90%	2%	2%	2%	2%	90%	2%	90%	2%	90%	90%	90%
Turn Type	Prot			Perm			Split			Split		
Protected Phases	7	4 12			8 16		2	2		6	6	
Permitted Phases				8 16								
Actuated Green, G (s)	1.3	48.2		42.9	42.9			12.8			16.0	
Effective Green, g (s)	1.3	48.2		42.9	42.9			12.8			16.0	
Actuated g/C Ratio	0.01	0.54		0.48	0.48			0.14			0.18	
Clearance Time (s)	4.0							4.5			4.5	
Vehicle Extension (s)	3.0							3.0			3.0	
Lane Grp Cap (vph)	14	1885		83	1687			237			159	
v/s Ratio Prot	0.00	c0.43			0.19			c0.02			c0.02	
v/s Ratio Perm				0.32								
v/c Ratio	0.07	0.80		0.67	0.40			0.15			0.10	
Uniform Delay, d1	43.8	17.1		18.2	15.2			33.8			30.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.2	2.6		19.5	0.2			1.3			1.2	
Delay (s)	45.9	19.6		37.7	15.4			35.1			32.1	
Level of Service	D	B		D	B			D			C	
Approach Delay (s)		19.7			17.1			35.1			32.1	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	6	7	8	12	16
Movement	NBTL	EBT	SBTL	EBL	WBTL	EBT	WBTL
Lead/Lag				Lead	Lag		
Lead-Lag Optimize				Yes	Yes		
Recall Mode	C-Max	None	Max	None	None	None	None
Maximum Split (s)	20.5	29	20.5	12	17	20	20
Maximum Split (%)	22.8%	32.2%	22.8%	13.3%	18.9%	22.2%	22.2%
Minimum Split (s)	20.5	20.5	20.5	8	20.5	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1	1	1	0.5	1	0.5	0.5
Minimum Initial (s)	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)	5	5	5		5	5	5
Flash Dont Walk (s)	11	11	11		11	11	11
Dual Entry	Yes	Yes	Yes	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	41	20.5	41	53	70	70
End Time (s)	20.5	70	41	53	70	0	0
Yield/Force Off (s)	16	65.5	36.5	49	65.5	86	86
Yield/Force Off 170(s)	5	54.5	25.5	49	54.5	75	75
Local Start Time (s)	0	41	20.5	41	53	70	70
Local Yield (s)	16	65.5	36.5	49	65.5	86	86
Local Yield 170(s)	5	54.5	25.5	49	54.5	75	75

Intersection Summary	
Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 3: Florence & Cedar



3 TRAFFIC MICROSIMULATION

This report documents the Crenshaw/LAX Transit Corridor micro-simulation. The microsimulation was performed using VISSIM 5.10 by PTV Vision. The simulation analysis calculated the delay at each intersection approach, queues, and corridor travel time results. The VISSIM model was based on the new advanced conceptual designs for the Crenshaw LRT, the corridor intersection lane configurations, and the updated DEIR corridor signal timing assumptions included in the *Intersection Delay & Lane Configuration Report, October 2010*.

3.1 VISSIM Microsimulation

VISSIM is a multi-modal traffic flow microsimulation software. It allows each entity to be simulated and modeled individually based on predefined decision models that mimic the behavior of each entity. It allows the simulation of cars, buses, trucks, trams, pedestrians, and cyclists. For this Project, cars, buses, trucks, pedestrians and the Crenshaw/LAX LRT have been modeled.

3.2 VISSIM Analysis

3.2.1 Intersection Delay

Intersection delay was calculated using the VISSIM microsimulation model for the Crenshaw corridor. A delay time measurement in VISSIM determines the mean delay time calculated from all vehicles observed on a single or several network sections. Delay is expressed in average total delay per vehicle in seconds.

This VISSIM microsimulation analysis included 15 intersections within the Crenshaw LRT corridor. These intersections are ones that would be most affected by the proposed at-grade roadway crossings. The study area intersections analyzed:

- Exposition Boulevard / Crenshaw Boulevard.
- Rodeo Road / Crenshaw Boulevard.
- Rodeo Place / Crenshaw Boulevard.
- Coliseum Street / Crenshaw Boulevard.
- Coliseum Place / Crenshaw Boulevard.
- 39th Street / Crenshaw Boulevard.
- 48th Street / Crenshaw Boulevard.
- 50th Street / Crenshaw Boulevard.
- 52nd Street / Crenshaw Boulevard.
- 54th Street / Crenshaw Boulevard.
- 57th Street / Crenshaw Boulevard.
- Slauson Avenue / Crenshaw Boulevard.
- 58th Place / Crenshaw Boulevard.
- 59th Street / Crenshaw Boulevard.
- 60th Street / Crenshaw Boulevard.

The VISSIM analysis included the delay for the intersections by each approach. *Table 3-1 – AM Peak Hour Intersection Delay by Approach* shows the calculated delay for each intersection

approach in the AM peak hour. As seen in *Table 3-1*, the intersections with significant delay in the AM peak hour, on one or more approaches are:

- Exposition Boulevard / Crenshaw Boulevard – westbound.
- Rodeo Road / Crenshaw Boulevard – eastbound.
- Rodeo Place / Crenshaw Boulevard – westbound.
- Coliseum Street / Crenshaw Boulevard – westbound.
- Slauson Avenue / Crenshaw Boulevard – eastbound, westbound.

Table 3-1 – AM Peak Hour Intersection Delay by Approach

Intersection		Peak Hour	Average Approach Delay (seconds)			
			Eastbound	Westbound	Northbound	Southbound
1.	Exposition Blvd / Crenshaw Blvd	AM	42	94	12	35
2.	Rodeo Rd / Crenshaw Blvd	AM	148	35	40	20
3.	Rodeo Pl / Crenshaw Blvd	AM	2	159	33	-
4.	Coliseum St / Crenshaw Blvd	AM	54	90	49	10
5.	Coliseum Pl / Crenshaw Blvd	AM	2	7	23	-
6.	39th St / Crenshaw Blvd	AM	77	40	36	2
7.	48th St / Crenshaw Blvd	AM	41	30	6	20
8.	50th St / Crenshaw Blvd	AM	-	20	21	10
9.	52nd St / Crenshaw Blvd	AM	39	39	14	18
10.	54th St / Crenshaw Blvd	AM	42	70	13	21
11.	57th St / Crenshaw Blvd	AM	36	31	8	13
12.	Slauson Ave / Crenshaw Blvd	AM	89	102	69	49
13.	58th Pl / Crenshaw Blvd	AM	3	-	-	-
14.	59th St/ Crenshaw Blvd	AM	24	16	43	7
15.	60th St / Crenshaw Blvd	AM	28	29	68	16

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

Table 3-2 – PM Peak Hour Intersection Delay by Approach shows the calculated delay for each intersection approach in the PM peak hour. As seen in *Table 3-2*, the intersections with significant delay in the PM, on one or more approaches are:

- Exposition Boulevard / Crenshaw Boulevard – eastbound.
- Rodeo Road / Crenshaw Boulevard – eastbound, westbound.
- Rodeo Place / Crenshaw Boulevard – westbound.
- Coliseum Street / Crenshaw Boulevard – eastbound, westbound.
- 39th Street / Crenshaw Boulevard – eastbound, westbound.
- Slauson Avenue / Crenshaw Boulevard – eastbound.

The VISSIM delay analysis summary sheets are included in **Appendix A**.

Table 3-2 – PM Peak Hour Intersection Delay by Approach

Intersection		Peak Hour	Average Approach Delay (seconds)			
			Eastbound	Westbound	Northbound	Southbound
1.	Exposition Blvd / Crenshaw Blvd	PM	69	47	13	135
2.	Rodeo Rd / Crenshaw Blvd	PM	167	90	73	32
3.	Rodeo Pl / Crenshaw Blvd	PM	2	117	-	-
4.	Coliseum St / Crenshaw Blvd	PM	108	83	66	13
5.	Coliseum Pl / Crenshaw Blvd	PM	2	7	-	-
6.	39th St / Crenshaw Blvd	PM	91	86	53	10
7.	48th St / Crenshaw Blvd	PM	42	39	27	29
8.	50th St / Crenshaw Blvd	PM	-	17	11	27
9.	52nd St / Crenshaw Blvd	PM	76	30	11	60
10.	54th St / Crenshaw Blvd	PM	52	69	15	55
11.	57th St / Crenshaw Blvd	PM	40	37	12	49
12.	Slauson Ave / Crenshaw Blvd	PM	139	60	66	76
13.	58th Pl / Crenshaw Blvd	PM	3	-	-	-
14.	59th St / Crenshaw Blvd	PM	10	11	25	7
15.	60th St / Crenshaw Blvd	PM	29	31	16	18

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

3.2.2 Queue Analysis

Queue counters were placed on each approach at the study area intersections to calculate the queue at each approach. A vehicle is in queue when its speed drops below 3.1 miles per hour up until the time it accelerates to over 10 miles per hour. The queue is counted from the location of the queue counter (signal stop bar) to the final vehicle that is in queue condition. If the queue backs up onto multiple different approaches, the queue counter will record information for all of those approaches and report the longest as the maximum queue length. The queue is expressed in length in feet (not in the number of vehicles).

Table 3-3 - Intersection Queue Lengths (feet) – AM Peak Hour shows the average queue lengths (in feet) for each intersection approach in the AM peak hour. As seen in *Table 3-3*, the northbound direction of Crenshaw Boulevard experiences long queues for the majority of the corridor. In addition, there are significant queues found at the intersections of Exposition Boulevard and Crenshaw Boulevard and Rodeo Road and Crenshaw Boulevard. The queues at these two intersections are in part due to the priority given to the north and southbound traffic on Crenshaw Boulevard. The east and westbound traffic on Exposition and Rodeo are not able to traverse the intersection within the green time for a single cycle. Further south on Crenshaw Boulevard there are additional queues that build at Slauson Avenue. Slauson Avenue is a four-lane roadway but the majority of the green time for each cycle is given to Crenshaw Boulevard. This results in significant queues on Slauson Avenue for the east and westbound traffic.

Table 3-4 – Intersection Queue Lengths (feet) – PM Peak Hour shows the average queue lengths for each intersection approach in the PM peak hour. The PM peak hour experiences similar queues as seen in the AM peak hour at Exposition Boulevard, Rodeo Road, and Slauson Avenue. Crenshaw Boulevard also has long queues at several intersections both northbound and southbound.

The VISSIM queue analysis summary sheets are included in **Appendix A**.

Table 3-3 – Intersection Average Queue Lengths (feet) - AM Peak Hour

Intersection		Peak Hour	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1.	Exposition Blvd / Crenshaw Blvd	AM	5	45	20	437	939	-	16	52	-	-	187	-
2.	Rodeo Rd / Crenshaw Blvd	AM	463	277	-	11	87	5	1,012	927	-	175	44	-
3.	Rodeo Pl / Crenshaw Blvd	AM	-	-	2	-	-	59	-	-	-	-	-	-
4.	Coliseum St / Crenshaw Blvd	AM	156	104	-	410	408	-	18	785	-	64	75	-
5.	Coliseum Pl / Crenshaw Blvd	AM	-	-	1	-	-	92	-	-	-	-	-	-
6.	39th St / Crenshaw Blvd	AM	128	13	0	-	69	-	2	383	-	0	11	-
7.	48th St / Crenshaw Blvd	AM	11	15	-	48	25	22	2	33	-	27	45	-
8.	50th St / Crenshaw Blvd	AM	-	-	-	-	8	-	-	201	-	27	45	-
9.	52nd St / Crenshaw Blvd	AM	-	16	-	-	30	-	151	390	-	14	60	-
10.	54th St / Crenshaw Blvd	AM	65	65	-	-	841	-	-	88	-	-	88	-
11.	57th St / Crenshaw Blvd	AM	-	56	-	-	29	-	41	24	-	42	49	-
12.	Slauson Ave / Crenshaw Blvd	AM	399	367	-	608	1,226	-	165	402	-	164	125	-
13.	58th Pl / Crenshaw Blvd	AM	-	-	0	-	-	-	-	-	-	-	-	-
14.	59th St / Crenshaw Blvd	AM	-	0	-	-	6	-	72	608	-	14	24	-
15.	60th St / Crenshaw Blvd	AM	-	30	-	-	66	-	1	695	-	1	61	-

Note: A dash "-" is shown because there is no queue to report. This is shown for turning movements that are shared. In addition, the queue was not collected at uncontrolled movements at sections without signals.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

Table 3-4 – Intersection Average Queue Lengths (feet) - PM Peak Hour

Intersection		Peak Hour	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1.	Exposition Blvd / Crenshaw Blvd	PM	733	379	461	671	19	-	280	278	-	-	591	-
2.	Rodeo Rd / Crenshaw Blvd	PM	699	311	-	308	330	273	570	848	-	388	285	-
3.	Rodeo Pl / Crenshaw Blvd	PM	-	-	2	-	-	144	-	-	-	-	-	-
4.	Coliseum St / Crenshaw Blvd	PM	440	323	-	247	281	-	12	794	-	5	62	-
5.	Coliseum Pl / Crenshaw Blvd	PM	-	-	1	-	-	107	-	-	-	-	-	-
6.	39th St / Crenshaw Blvd	PM	423	21	0	-	297	-	2	382	-	5	44	-
7.	48th St / Crenshaw Blvd	PM	10	40	-	73	23	9	8	124	-	228	265	-
8.	50th St / Crenshaw Blvd	PM	-	-	-	-	1	-	-	53	-	228	265	-
9.	52nd St / Crenshaw Blvd	PM	-	19	-	-	12	-	89	76	-	85	590	-
10.	54th St / Crenshaw Blvd	PM	52	165	-	-	330	-	-	69	-	-	558	-
11.	57th St / Crenshaw Blvd	PM	-	67	-	-	26	-	16	40	-	856	892	-
12.	Slauson Ave / Crenshaw Blvd	PM	911	1,106	-	171	173	-	359	117	-	552	594	-
13.	58th Pl / Crenshaw Blvd	PM	-	-	0	-	-	-	-	-	-	-	-	-
14.	59th St / Crenshaw Blvd	PM	-	2	-	-	4	-	102	159	-	16	25	-
15.	60th St / Crenshaw Blvd	PM	-	35	-	-	66	-	1	73	-	5	75	-

Note: A dash "-" is shown because there is no queue to report. This is shown for turning movements that are shared. In addition, the queue was not collected at uncontrolled movements at intersections without signals.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

3.2.3 Travel Time Analysis

Travel times were evaluated on Crenshaw Boulevard for vehicular traffic and light rail. In VISSIM, the average travel time (including waiting or dwell times) is determined as the time a vehicle crosses the first cross section to when it crosses the second cross section. The Crenshaw/LAX Transit Corridor was divided into two sections to record the travel time of the northern and southern section of Crenshaw Boulevard where the light rail is at-grade. The northern travel time section was defined between Exposition Boulevard and 39th Street. The southern travel time section was defined between 48th Street and 60th Street. *Table 3-5 – Northern Corridor Travel Time (minutes) – AM Peak Hour* shows the average travel times for the northern corridor for vehicles and the light rail transit in the AM peak hour, and *Table 3-6 - Northern Corridor Travel Time (minutes) – PM Peak Hour* shows the average travel time for the PM peak hour.

As seen in *Table 3-5*, it takes almost three minutes for light rail to travel through the northern corridor of Crenshaw Boulevard. It varies more in the PM peak hour, taking approximately two minutes in the northbound direction and three minutes in the southbound direction. The travel time for cars, trucks, and buses are similar. It takes approximately five to six minutes to travel in the northern corridor during the AM and PM peak hours with the exception of the southbound direction in the northern corridor during the AM peak hour.

It should be noted that these travel times are recorded for vehicles that pass through the start and destination cross sections of the corridor marked in VISSIM.

The VISSIM travel time analysis summary sheets are included in **Appendix A**.

Table 3-5 – Northern Corridor Travel Time (minutes) - AM Peak Hour

From	To	Direction	Type	Average	Volume
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	LRT	2.62	9
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Car	2.79	962
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Truck	2.64	17
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Bus	2.91	6
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	LRT	2.72	10
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Car	5.56	1405
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Truck	5.97	22
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Bus	6.63	10

Note: Volume refers to the number of vehicles that were able to pass the start and destination markers within the VISSIM model.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

Table 3-6 – Northern Corridor Travel Time (minutes) - PM Peak Hour

From	To	Direction	Type	Average	Volume
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	LRT	3.01	11
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Car	5.21	969
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Truck	5.73	13
Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	SB	Bus	4.47	6
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	LRT	2.05	10
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Car	5.70	948
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Truck	5.31	15
39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	NB	Bus	3.61	4

Note: Volume refers to the number of vehicles that were able to pass the start and destination markers within the VISSIM model.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

Table 3-7- Southern Corridor Travel Time (minutes) – AM Peak Hour shows the average travel times for the southern corridor for vehicles and light rail transit in the AM peak hour, and *Table 3-8 – Southern Corridor Travel Time (minutes) – PM Peak Hour* shows the average travel time for the PM peak hour.

As seen in *Table 3-7*, it takes between four (NB) and four and one half minutes (SB) for the light rail to travel through the southern corridor of Crenshaw Boulevard during the morning peak. It varies less in the PM peak hour, taking approximately four minutes in both directions. The travel time for cars, trucks, and buses are similar. It takes over six minutes in the morning, and over nine minutes in the afternoon to traverse the southern corridor.

Table 3-7 – Southern Corridor Travel Time (minutes) - AM Peak Hour

From	To	Direction	Type	Average	Volume
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	LRT	4.64	12
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Car	6.21	557
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Truck	6.71	11
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Bus		

From	To	Direction	Type	Average	Volume
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	LRT	3.92	13
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Car	9.58	1031
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Truck	9.52	19
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Bus		

Note: Volume refers to the number of vehicles that were able to pass the start and destination markers within the VISSIM model.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

Table 3-8 – Southern Corridor Travel Time- PM Peak Hour

From	To	Direction	Type	Average	Volume
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	LRT	3.89	12
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Car	10.35	823
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Truck	10.58	14
48h St at Crenshaw Blvd	60th Street at Crenshaw Blvd	SB	Bus		
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	LRT	4.08	12
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Car	7.11	640
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Truck	6.97	12
60th Street at Crenshaw Blvd	48h St at Crenshaw Blvd	NB	Bus		

Note: Volume refers to the number of vehicles that were able to pass the start and destination markers within the VISSIM model.

Note: Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

3.3 VISSIM Model Observations

Significant issues were noticed with the left turns backing up at Rodeo Road and Crenshaw Boulevard as well as at the westbound queue on Exposition Boulevard. Traffic signal timing adjustments were made along the corridor based on initial VISSIM findings; however, the cycle length remained at 150 seconds to maintain the pre-timed LRT priority for through movements between stations. Due to the high volumes along Crenshaw, queues on the side streets were allowed to persist.

The operations at Exposition were experiencing breakdown conditions along Crenshaw due to high traffic volumes, heavy pedestrian usage, and the need to accommodate the two LRT operations. The delays at this intersection were adversely affecting traffic along the entire corridor. To mitigate this issue, different options were investigated that would allow the intersection to operate without impacting the remainder of the corridor. The best solution was to

prohibit the left turn movement from southbound Crenshaw to eastbound Exposition. This left turn is expected to carry low volumes, with only 39 vehicles predicted to make that movement during the morning peak hour, and 66 vehicles during the afternoon peak. The alternative for this movement is to use 36th street over to 11th Avenue. This turn restriction, along with timing changes improves the level of service at the intersection, and allows it to operate without impacting the remainder of the Crenshaw corridor. The 150 second cycle length provided better movement of the LRT between stations, and reduced overall delays along Crenshaw. Due to the high frequency of LRT vehicles planned along Crenshaw (5 minute headways in both directions) the use of active transit priority in the signal timing was not found to be feasible. Priority would need to be given at every signal cycle on average. Thus a more dependable fixed time priority was used.

In general, the northern corridor of Crenshaw Boulevard between Exposition Boulevard and 39th Street experiences significant delays and queues, especially at Exposition Boulevard and Rodeo Road. Particularly at Rodeo Road, there is an issue with the northbound and southbound left turns not having enough green time to clear the queue causing a back-up into the intersection as other cars are trying to get around the cars that are blocking the inside through lanes waiting to get into the queue for the left-turn lane. This is consistent with the Synchro delay calculations performed and with actual conditions at these overloaded intersections. The model was run several times, and these intersections reached grid-lock during some periods of time causing cars to block the intersection. This was an issue particularly with the Expo Light Rail line. The general flow of traffic is impacted for both vehicles and LRT at these intersections.

Figures 3-1 – Crenshaw Blvd at Exposition Blvd and Rodeo Rd, AM Peak Hour 1 and *Figure 3-2* are sample screen shots of the simulation for Exposition Boulevard and Rodeo Road for the AM peak hour. The PM peak hour sample screen shots of the simulation for Exposition Boulevard and Rodeo Road are shown in *Figure 3-3 - Crenshaw Blvd at Exposition Blvd and Rodeo Rd, PM Peak Hour 1* and *Figure 3-4*.

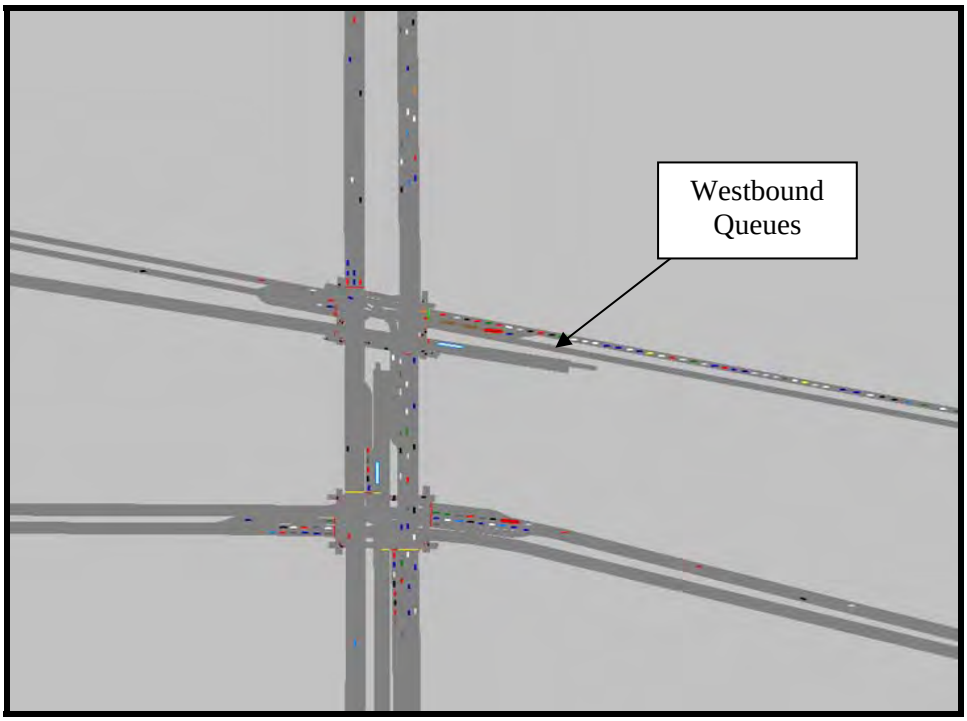


Figure 3-1 - Crenshaw Blvd at Exposition Blvd and Rodeo Rd, AM Peak Hour 1

Figure 3-2 **– Crenshaw Blvd at Exposition Blvd and Rodeo Rd, AM Peak Hour 2**

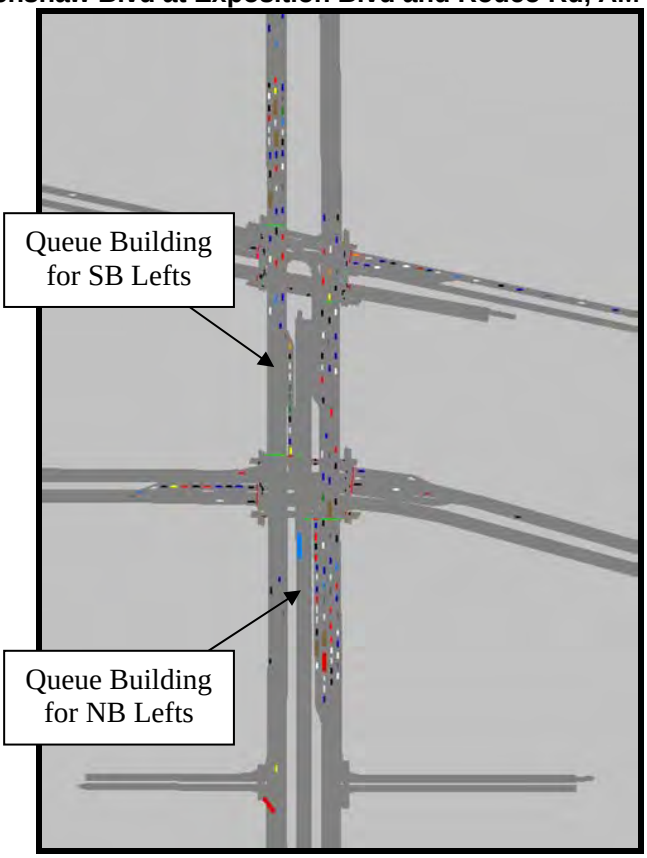


Figure 3-3 - Crenshaw Blvd at Exposition Blvd and Rodeo Rd, PM Peak Hour 1

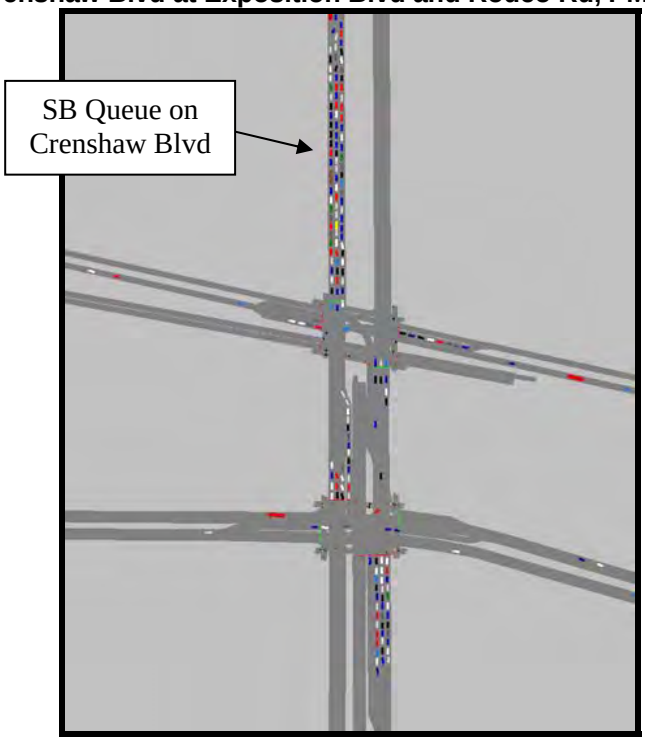
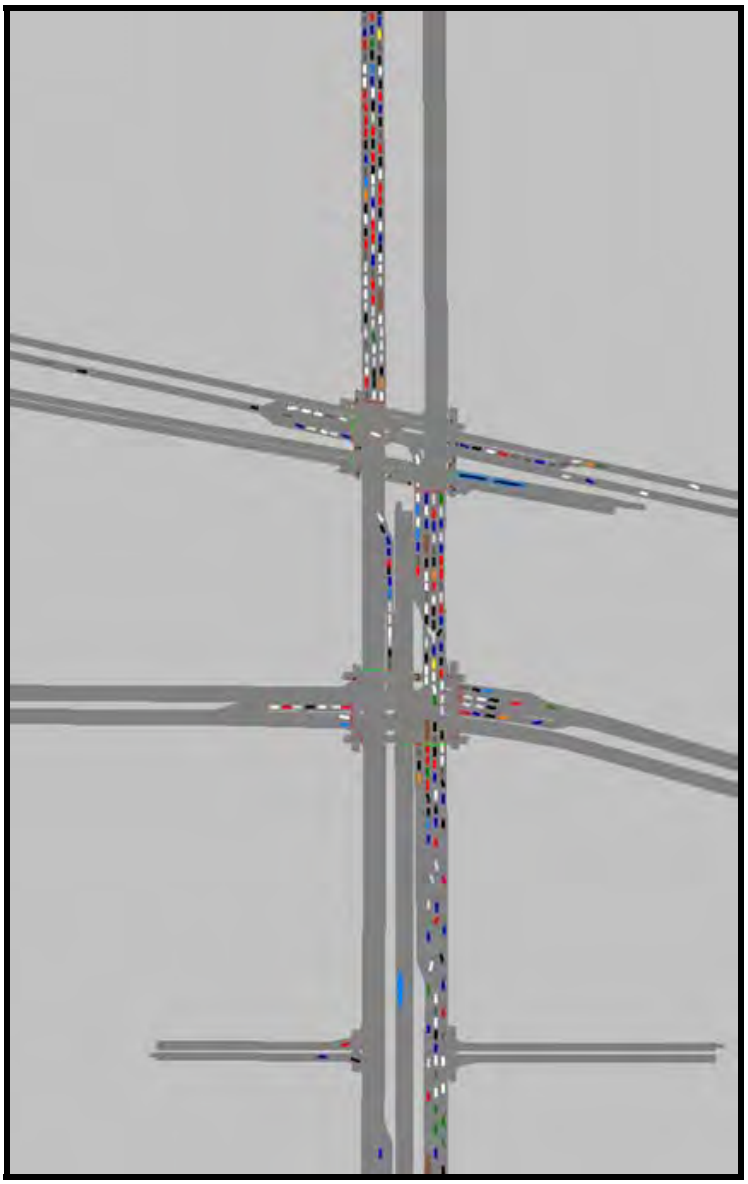


Figure 3-4 - Crenshaw Blvd at Exposition Blvd and Rodeo Rd, PM Peak Hour 2



The southern corridor of Crenshaw Boulevard between 48th Street and 60th Street also experiences delays and long queues. This is mostly seen at Slauson Avenue and Crenshaw Boulevard. This is consistent with the Synchro delay calculations performed and actual conditions at this intersection. The delays and queues caused by the Slauson Avenue intersection also affect the intersections south at 59th Street and 60th Street and those intersections to the north at 52nd Street, 54th Street, and 57th Street.

Figures 3-5 - Crenshaw Blvd at Slauson Ave, 59th and 60th Streets, AM Peak Hour and *Figure 3-6 - Crenshaw Blvd at Slauson Ave, 59th and 60th Streets, PM Peak Hour* show the sample screen shots of the simulation for Slauson Avenue at Crenshaw Boulevard for the AM and PM peak hour, respectively.

Figure 3-5 - Crenshaw Blvd at Slauson Ave, 59th and 60th Streets, AM Peak Hour

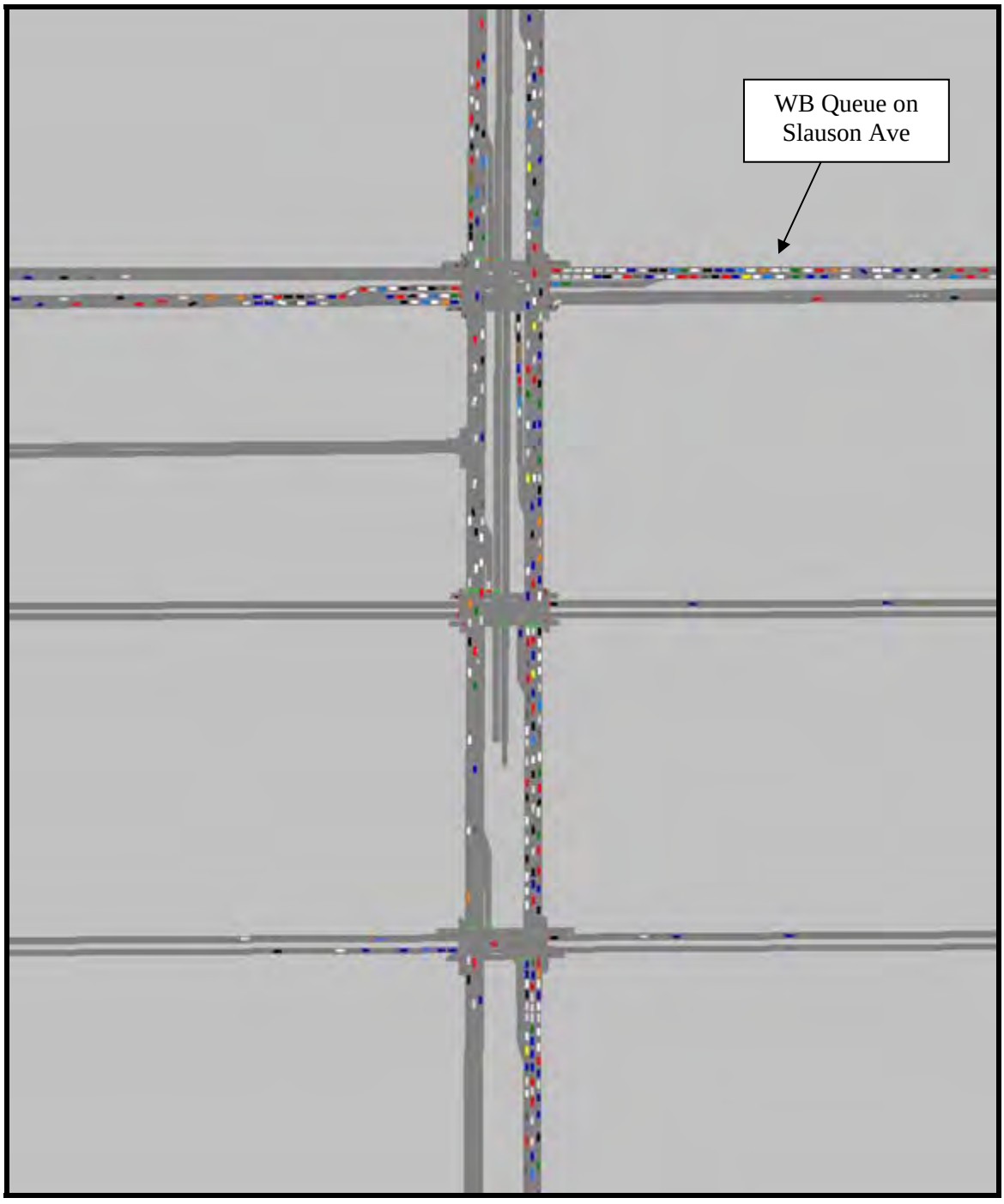
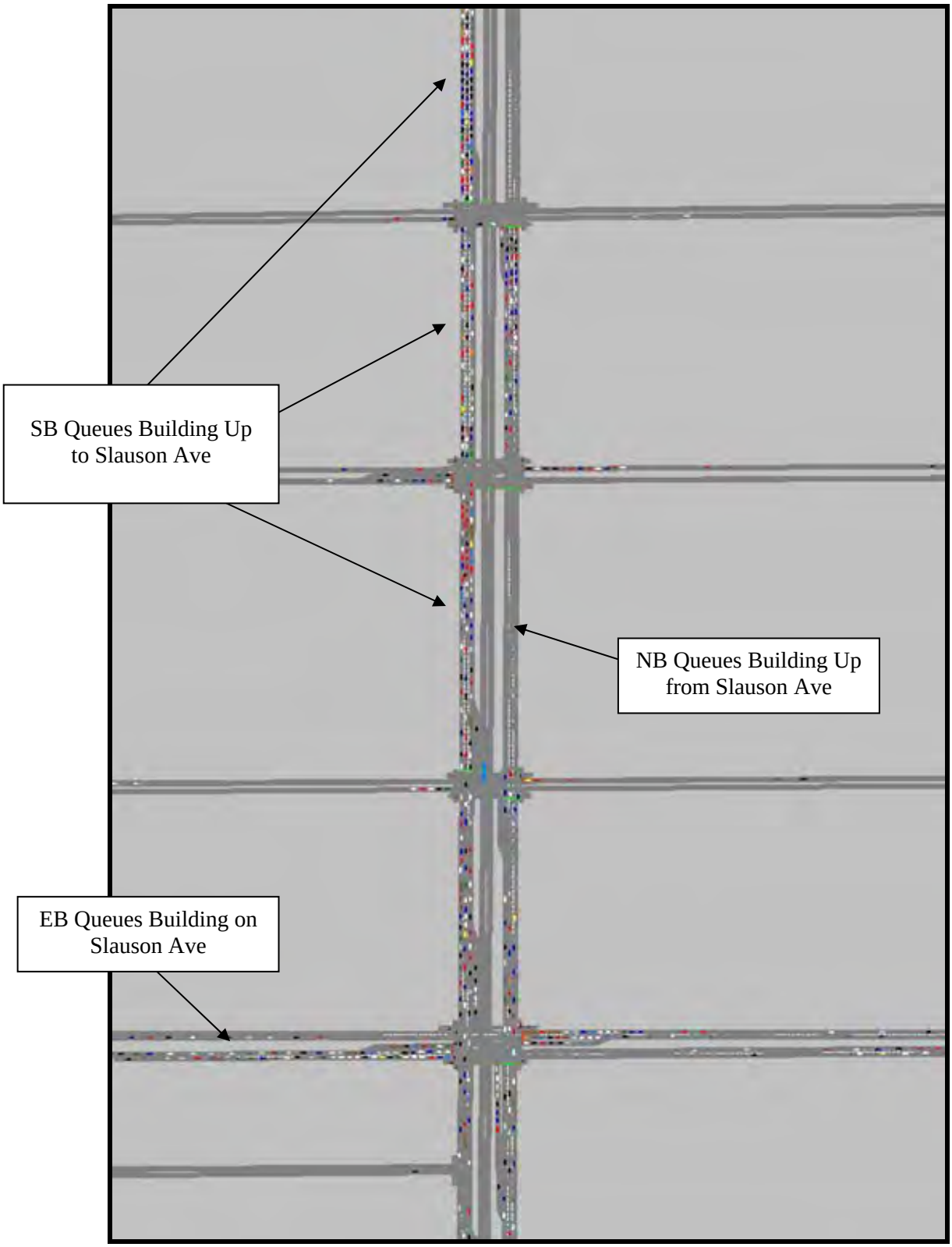


Figure 3-6 – Crenshaw Blvd at 52nd, 54th and 57th Streets, PM Peak Hour



3.4 Comparison to Earlier Analysis

Microsimulation looks at traffic flow one entity at a time and models the behavior of each vehicle, pedestrian, and train. Earlier analysis for this project was performed using a macroscopic model that looked at the intersection as a whole and estimated traffic impacts based on formulas that included traffic volumes and traffic signal systems.

The results of the microsimulation were generally consistent with the earlier traffic analysis. Significant changes were noted at Exposition Boulevard, where a turn restriction and traffic signal phasing and timing changes improved operations and avoided impact to operations on the Crenshaw Boulevards corridor. At Rodeo Road, delays to left turns from Crenshaw Boulevard, and back-ups behind vehicles turning left from Rodeo Road, created impacts not previously predicted in the analysis. These results are shown in *Table 3-9 – Synchro 7/VISSIM Comparison*.

Table 3-9 - Synchro 7/VISSIM Comparison

Crenshaw Blvd/Cross Street	Peak Hour	No Build Analysis (Synchro 7)		DEIR Analysis (Synchro 7)		Advanced Design Analysis (Synchro 7)		Microsimulation (VISSIM)		Change
		Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Δ[c]
Exposition Blvd	AM	87	F	129	F	107.6	F	60.6	E	(47.0)
Signalized	PM	23	C	62.2	E	78.3	E	72.4	E	(5.9)
Rodeo Rd	AM	58	E	113	F	100	F	131.7	F	31.7
Signalized	PM	40	D	42.0	D	87.5	F	165.6	F	78.1
Rodeo Pl	AM					13.7	B	34.1	C	20.4
Stop Control	PM					11.1	B	33.7	C	22.6
Coliseum St	AM	27	C	31.0	C	49.8	D	54.1	D	4.3
Signalized	PM	10	A	18.0	B	16.9	B	71.3	E	54.4
Coliseum Pl	AM					11.1	B	8.5	A	(2.6)
Stop Control	PM					9.7	A	13.0	B	3.3
39th St	AM					28.8	C	32.0	C	3.2
Signalized	PM					26.7	C	57.8	E	31.1
48th St	AM	19	B	22.0	C	30.1	C	31.9	C	0.9
Signalized	PM	20	C	23.0	C	28.1	C	41.1	D	13

Crenshaw Blvd/Cross Street	Peak Hour	No Build Analysis (Synchro 7)		DEIR Analysis (Synchro 7)		Advanced Design Analysis (Synchro 7)		Microsimulation (VISSIM)		Change
		Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Δ[c]
50th St	AM					11.6	B	23.5	C	11.9
Signalized	PM					4.6	A	26.8	C	22.2
52nd St	AM					30.8	C	41.0	D	10.2
Signalized	PM					15.3	B	61.6	E	46.3
54th St	AM	31	C	63.0	E	50.2	D	41.8	D	(8.4)
Signalized	PM	22	C	36.0	D	36.4	D	49.7	D	13.3
57th St	AM					21.4	C	29.2	C	7.8
Signalized	PM					27.3	C	38.7	D	11.4
Slauson Ave	AM	171	F	110.0	F	65.0	E	105.5	F	40.5
Signalized	PM	118	F	115.0	F	64.1	E	109.5	F	45.4
59th St	AM					13.2	B	33.9	C	20.7
Signalized	PM					20.5	C	29.6	C	9.1
60th St	AM					19.3	B	32.8	C	13.5
Signalized	PM					18.7	B	22.6	C	3.9

Notes:

a. Average delay expressed in seconds per vehicle.

b. Level of Service.

c. Δ denotes delay increase (decrease) from the Microsimulation Vissim results compared to the Advanced Design Synchro results.

d. Boulevard (Blvd); Road (Rd); Place (Pl); Street (St); Avenue (Ave)

4 CONCLUSIONS

The Vissim microsimulation was used to model urban traffic and public transit operations on the areas of on-street running along Crenshaw Boulevard. This analysis offers a more detailed and concise analysis and was used to validate the previously conducted Synchro analysis which does not model transit operations. The basic signal timing from the Synchro analysis was used in the Vissim analysis with the addition of the LRT. The benefit of using the Vissim microsimulation software is the ability to analyze traffic and transit operations under constraints such as unique lane configurations, detailed signal timing plans, high pedestrian volumes, grid lock conditions, transit stops, etc. In addition, Vissim has the technical ability to provide character attributes to the model such as driver behavior and aggressiveness to more accurately reflect 'real world' operations. The Vissim model provided the opportunity to identify problem areas, and adjust our proposed signal operations and timing to improve the intersection's operations.

The Vissim intersection level of service was generally consistent with the Synchro analysis reported in the *Intersection Delay and Lane Configurations Report, October 2010*. However, the intersection delay (in seconds) at the majority of the intersections increased as shown in Table 3-9.

In general, there are still significant intersection deficiencies on Crenshaw Boulevard for the at-grade LRT intersections. Based on the visual nature of Vissim, the deficiencies at intersections and reasons behind the increased intersection delays were observed. The corridor was observed to have the following operational issues:

- Cross Street Left-Turns Blocking Other Movements
- Long Queues on Crenshaw Hindering the Flow of Traffic
- LRT Delays Due to Turning Movement Delays
- High Pedestrian Volumes Delaying Cross Street Traffic

These issues are to be expected within a corridor that operates at or above capacity. As the design for the Crenshaw LRT continues, the microsimulation can be further refined and operational deficiencies observed as the design progresses or changes. There were several key intersections that were observed to dictate how smooth traffic operations flowed on the corridor: Exposition Boulevard, Rodeo Road, Coliseum Street, and Slauson Avenue. These intersections should be reviewed further to improve operations, which would ultimately improve the overall operations of the entire corridor. The benefit to the Vissim microsimulation is that it does provide a visual operational overview of the Crenshaw LRT corridor that is expected to be similar to the operations observed in the 'real world' scenario. This ability aides in the process of the decision making for the design of the corridor and ensuring the LRT and corridor operates at its maximum potential. The Vissim analysis did not directly affect the LRT right-of-way or acquisition costs, but was used as a tool to analyze and observe the traffic and transit operations of the Crenshaw LRT corridor throughout the different phases of design. As the Project progresses into preliminary engineering, we will continue to utilize the Vissim model to test LRT and traffic operational plans, and to identify workable solutions for the operation of the corridor.

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Appendix A - VISSIM Analysis Output Sheets

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DELAY SUMMARY

Period: AM
Scenario: A01lrt

AVERAGE APPROACH DELAY (Seconds)

1			2	3	4	5
			Average Approach Delay - A01lrt AM Peak			
IntersectionID	EW	NS	Eastbound	Westbound	Northbound	Southound
1	Exposition Blvd	Crenshaw Boulevard	42	94	12	35
3	Rodeo Road	Crenshaw Boulevard	148	35	40	20
4	Rodeo Place	Crenshaw Boulevard	2	159	33	0
5	Coliseum Street	Crenshaw Boulevard	54	90	49	10
6	Coliseum Place	Crenshaw Boulevard	2	7	23	0
7	39th Street	Crenshaw Boulevard	77	40	36	2

DELAY SUMMARY

Period: PM
Scenario: A01lrt

AVERAGE APPROACH DELAY (Seconds)

1			2	3	4	5
			Average Approach Delay - A01lrt PM Peak			
IntersectionID	EW	NS	Eastbound	Westbound	Northbound	Southound
1	Exposition Blvd	Crenshaw Boulevard	69	47	13	135
3	Rodeo Road	Crenshaw Boulevard	167	90	73	32
4	Rodeo Place	Crenshaw Boulevard	2	117	48	0
5	Coliseum Street	Crenshaw Boulevard	108	83	66	13
6	Coliseum Place	Crenshaw Boulevard	2	7	42	0
7	39th Street	Crenshaw Boulevard	91	86	53	10

DELAY SUMMARY

Period: AM
Scenario: A02Irt

AVERAGE APPROACH DELAY (Seconds)

1			2	3	4	5
			Average Approach Delay - A02Irt AM Peak			
IntersectionID	EW	NS	Eastbound	Westbound	Northbound	Southbound
8	48th Street	Crenshaw Boulevard	41	30	6	20
9	50th Street	Crenshaw Boulevard	N/A	20	21	10
10	52nd Street	Crenshaw Boulevard	39	39	14	18
11	54th Street	Crenshaw Boulevard	42	70	13	21
12	57th Street	Crenshaw Boulevard	36	31	8	13
13	Slauson Avenue	Crenshaw Boulevard	89	102	69	49
14	58th Place	Crenshaw Boulevard	3	N/A	N/A	0
15	59th Street	Crenshaw Boulevard	24	16	43	7
16	60th Street	Crenshaw Boulevard	28	29	68	16

DELAY SUMMARY

Period: PM
Scenario: A02Irt

AVERAGE APPROACH DELAY (Seconds)

1			2	3	4	5
			Average Approach Delay - A02Irt PM Peak			
IntersectionID	EW	NS	Eastbound	Westbound	Northbound	Southound
8	48th Street	Crenshaw Boulevard	42	39	27	29
9	50th Street	Crenshaw Boulevard	N/A	17	11	27
10	52nd Street	Crenshaw Boulevard	76	30	11	60
11	54th Street	Crenshaw Boulevard	52	69	15	55
12	57th Street	Crenshaw Boulevard	40	37	12	49
13	Slauson Avenue	Crenshaw Boulevard	139	60	66	76
14	58th Place	Crenshaw Boulevard	3	N/A	N/A	0
15	59th Street	Crenshaw Boulevard	10	11	25	7
16	60th Street	Crenshaw Boulevard	29	31	16	18

QUEUE SUMMARY

Period: AM
Scenario: A01lrt

AVERAGE QUEUE LENGTHS (Meters)

1

			EBLT 4	EBLT 5	EBLT 6	EBTH 4	EBTH 5	EBTH 6	EBRT 4	EBRT 5	EBRT 6
			Eastbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			4.66667	40.3333	16	44.6667	306.667	167	20	151.667	46
1	Exposition Blvd	Crenshaw Boulevard	5	40	16	45	307	167	20	152	46
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	463	963	597	277	940	405			
4	Rodeo Place	Crenshaw Boulevard							2	51	50
5	Coliseum Street	Crenshaw Boulevard	156	1027	117	104	727	194			
6	Coliseum Place	Crenshaw Boulevard							1	43	25
7	39th Street	Crenshaw Boulevard	128	521	330	13	107	37	0	38	19

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			WBLT 4	WBLT 5	WBLT 6	WBTH 4	WBTH 5	WBTH 6	WBRT 4	WBRT 5	WBRT 6
			Average Approach Delay - A01Irt AM Peak								
			Westbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			437	**1183**	**868.667**	**939**	**1186**	**2356.33**			
1	Exposition Blvd	Crenshaw Boulevard	437	1183	869	939	1186	2356			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	11	102	38	87	374	510	5	106	30
4	Rodeo Place	Crenshaw Boulevard							59	249	51
5	Coliseum Street	Crenshaw Boulevard	410	1183	407	408	1179	438			
6	Coliseum Place	Crenshaw Boulevard							92	330	25
7	39th Street	Crenshaw Boulevard				69	384	243			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			NBLT 4	NBLT 5	NBLT 6	NBTH 4	NBTH 5	NBTH 6	NBRT 4	NBRT 5	NBRT 6
			Northbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			16.3333	123.667	50.6667	52.3333	427.333	569.667			
1	Exposition Blvd	Crenshaw Boulevard	16	124	51	52	427	570			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	1012	1653	4405	927	1653	5276			
4	Rodeo Place	Crenshaw Boulevard									
5	Coliseum Street	Crenshaw Boulevard	18	129	38	785	1604	8137			
6	Coliseum Place	Crenshaw Boulevard									
7	39th Street	Crenshaw Boulevard	2	49	15	383	885	4467			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			SBLT 4	SBLT 5	SBLT 6	SBTH 4	SBTH 5	SBTH 6	SBRT 4	SBRT 5	SBRT 6
			Southound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
						187.333	716	1614			
1	Exposition Blvd	Crenshaw Boulevard				187	716	1614			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	175	385	426	44	453	451			
4	Rodeo Place	Crenshaw Boulevard									
5	Coliseum Street	Crenshaw Boulevard	64	478	118	75	595	706			
6	Coliseum Place	Crenshaw Boulevard									
7	39th Street	Crenshaw Boulevard	0	19	3	11	210	181			

QUEUE SUMMARY

Period: PM
Scenario: A01lrt

AVERAGE QUEUE LENGTHS (Meters)

1

			EBLT 4	EBLT 5	EBLT 6	EBTH 4	EBTH 5	EBTH 6	EBRT 4	EBRT 5	EBRT 6
			Eastbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			733.333	1252.33	95.6667	378.667	1004.67	241.667	460.667	952	141.667
1	Exposition Blvd	Crenshaw Boulevard	733	1252	96	379	1005	242	461	952	142
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	699	1207	448	311	1194	268			
4	Rodeo Place	Crenshaw Boulevard							2	58	50
5	Coliseum Street	Crenshaw Boulevard	440	1161	191	323	1146	162			
6	Coliseum Place	Crenshaw Boulevard							1	51	50
7	39th Street	Crenshaw Boulevard	423	1139	235	21	203	70	0	29	11

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			WBLT 4	WBLT 5	WBLT 6	WBTH 4	WBTH 5	WBTH 6	WBRT 4	WBRT 5	WBRT 6
			Average Approach Delay - A01lrt PM Peak								
			Westbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			671	1156.67	67.3333	19	218.667	73.3333			
1	Exposition Blvd	Crenshaw Boulevard	671	1157	67	19	219	73			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	308	1223	344	330	1224	649	273	1228	361
4	Rodeo Place	Crenshaw Boulevard							144	419	47
5	Coliseum Street	Crenshaw Boulevard	247	913	124	281	1169	193			
6	Coliseum Place	Crenshaw Boulevard							107	407	46
7	39th Street	Crenshaw Boulevard				297	945	351			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			NBLT 4	NBLT 5	NBLT 6	NBTH 4	NBTH 5	NBTH 6	NBRT 4	NBRT 5	NBRT 6
			Northbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
			280.333	455.333	336.333	278.333	446	788			
1	Exposition Blvd	Crenshaw Boulevard	280	455	336	278	446	788			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	570	1247	1131	848	1653	3165			
4	Rodeo Place	Crenshaw Boulevard									
5	Coliseum Street	Crenshaw Boulevard	12	106	17	794	1661	3026			
6	Coliseum Place	Crenshaw Boulevard									
7	39th Street	Crenshaw Boulevard	2	47	12	382	887	1963			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			SBLT 4	SBLT 5	SBLT 6	SBTH 4	SBTH 5	SBTH 6	SBRT 4	SBRT 5	SBRT 6
			Southound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
						591.333	729.667	3726.33			
1	Exposition Blvd	Crenshaw Boulevard				591	730	3726			
2	#N/A	#N/A									
3	Rodeo Road	Crenshaw Boulevard	388	477	755	285	468	853			
4	Rodeo Place	Crenshaw Boulevard									
5	Coliseum Street	Crenshaw Boulevard	5	40	5	62	595	570			
6	Coliseum Place	Crenshaw Boulevard									
7	39th Street	Crenshaw Boulevard	5	63	15	44	660	562			

QUEUE SUMMARY

Period: AM
Scenario: A02lrt

AVERAGE QUEUE LENGTHS (Meters)

1

			EBLT 4	EBLT 5	EBLT 6	EBTH 4	EBTH 5	EBTH 6	EBRT 4	EBRT 5	EBRT 6
			Eastbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
1	#N/A	#N/A									
2	#N/A	#N/A									
3	#N/A	#N/A									
4	#N/A	#N/A									
5	#N/A	#N/A									
6	#N/A	#N/A									
7	#N/A	#N/A									
8	48th Street	Crenshaw Boulevard	11	109	33	15	102	63			
9	50th Street	Crenshaw Boulevard									
10	52nd Street	Crenshaw Boulevard				16	112	55			
11	54th Street	Crenshaw Boulevard	65	272	149	65	441	239			
12	57th Street	Crenshaw Boulevard				56	343	210			
13	Slauson Avenue	Crenshaw Boulevard	399	988	1158	367	985	1433			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard				0	26	6			
16	60th Street	Crenshaw Boulevard				30	193	108			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			WBLT 4	WBLT 5	WBLT 6	WBTH 4	WBTH 5	WBTH 6	WBRT 4	WBRT 5	WBRT 6
			Average Approach Delay - A02Irt AM Peak								
			Westbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
1	#N/A	#N/A									
2	#N/A	#N/A									
3	#N/A	#N/A									
4	#N/A	#N/A									
5	#N/A	#N/A									
6	#N/A	#N/A									
7	#N/A	#N/A									
8	48th Street	Crenshaw Boulevard	48	258	168	25	226	117	22	226	129
9	50th Street	Crenshaw Boulevard				8	110	34			
10	52nd Street	Crenshaw Boulevard				30	201	84			
11	54th Street	Crenshaw Boulevard				841	1370	1574			
12	57th Street	Crenshaw Boulevard				29	188	101			
13	Slauson Avenue	Crenshaw Boulevard	608	1000	2509	1226	1412	5762			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard				6	97	51			
16	60th Street	Crenshaw Boulevard				66	367	290			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			NBLT 4	NBLT 5	NBLT 6	NBTH 4	NBTH 5	NBTH 6	NBRT 4	NBRT 5	NBRT 6
			Northbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
1	#N/A	#N/A									
2	#N/A	#N/A									
3	#N/A	#N/A									
4	#N/A	#N/A									
5	#N/A	#N/A									
6	#N/A	#N/A									
7	#N/A	#N/A									
8	48th Street	Crenshaw Boulevard	2	39	9	33	362	240			
9	50th Street	Crenshaw Boulevard				201	887	1832			
10	52nd Street	Crenshaw Boulevard	151	1571	622	390	1666	1745			
11	54th Street	Crenshaw Boulevard				88	705	1127			
12	57th Street	Crenshaw Boulevard	41	228	81	24	284	250			
13	Slauson Avenue	Crenshaw Boulevard	165	583	367	402	663	3239			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard	72	655	687	608	1010	7959			
16	60th Street	Crenshaw Boulevard	1	62	4	695	934	8129			

QUEUE SUMMARY

Period:
Scenario:

AVERAGE QUEUE LENGTHS (Meters)

1

			SBLT 4	SBLT 5	SBLT 6	SBTH 4	SBTH 5	SBTH 6	SBRT 4	SBRT 5	SBRT 6
			Southound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
1	#N/A	#N/A									
2	#N/A	#N/A									
3	#N/A	#N/A									
4	#N/A	#N/A									
5	#N/A	#N/A									
6	#N/A	#N/A									
7	#N/A	#N/A									
8	48th Street	Crenshaw Boulevard	27	165	63	45	276	498			
9	50th Street	Crenshaw Boulevard	27	165	63	45	276	498			
10	52nd Street	Crenshaw Boulevard	14	204	36	60	432	653			
11	54th Street	Crenshaw Boulevard				88	520	778			
12	57th Street	Crenshaw Boulevard	42	312	114	49	367	495			
13	Slauson Avenue	Crenshaw Boulevard	164	514	350	125	542	890			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard	14	98	31	24	131	199			
16	60th Street	Crenshaw Boulevard	1	40	6	61	308	500			

QUEUE SUMMARY **Period:** **PM**

Scenario: **A02lrt**

REMEMBER TO Table (F9)

AVERAGE QUEUE LENGTHS (Meters)

1

			EBLT 4	EBLT 5	EBLT 6	EBTH 4	EBTH 5	EBTH 6	EBRT 4	EBRT 5	EBRT 6
			Eastbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
8	48th Street	Crenshaw Boulevard	10	102	32	40	192	176			
9	50th Street	Crenshaw Boulevard									
10	52nd Street	Crenshaw Boulevard				19	142	48			
11	54th Street	Crenshaw Boulevard	52	295	144	165	717	426			
12	57th Street	Crenshaw Boulevard				67	348	232			
13	Slauson Avenue	Crenshaw Boulevard	911	1297	3362	1106	1300	4750			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard				2	50	21			
16	60th Street	Crenshaw Boulevard				35	216	128			

QUEUE SUMMARY

Period:

Scenario:

REMEMBER TO Table (F9)

AVERAGE QUEUE LENGTHS (Meters)

1

			WBLT 4	WBLT 5	WBLT 6	WBTH 4	WBTH 5	WBTH 6	WBRT 4	WBRT 5	WBRT 6
			Average Approach Delay - A02Irt PM Peak								
			Westbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
8	48th Street	Crenshaw Boulevard	73	370	144	23	321	85	9	185	40
9	50th Street	Crenshaw Boulevard				1	56	5			
10	52nd Street	Crenshaw Boulevard				12	134	41			
11	54th Street	Crenshaw Boulevard				330	1093	752			
12	57th Street	Crenshaw Boulevard				26	218	76			
13	Slauson Avenue	Crenshaw Boulevard	171	553	463	173	607	986			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard				4	92	40			
16	60th Street	Crenshaw Boulevard				66	356	267			

QUEUE SUMMARY

Period:

Scenario:

REMEMBER TO Table (F9)

AVERAGE QUEUE LENGTHS (Meters)

1

			NBLT 4	NBLT 5	NBLT 6	NBTH 4	NBTH 5	NBTH 6	NBRT 4	NBRT 5	NBRT 6
			Northbound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
8	48th Street	Crenshaw Boulevard	8	83	21	124	601	890			
9	50th Street	Crenshaw Boulevard				53	317	631			
10	52nd Street	Crenshaw Boulevard	89	487	330	76	500	987			
11	54th Street	Crenshaw Boulevard				69	351	832			
12	57th Street	Crenshaw Boulevard	16	114	43	40	209	305			
13	Slauson Avenue	Crenshaw Boulevard	359	666	809	117	563	809			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard	102	716	685	159	864	2083			
16	60th Street	Crenshaw Boulevard	1	49	3	73	428	862			

QUEUE SUMMARY

Period:

Scenario:

REMEMBER TO Table (F9)

AVERAGE QUEUE LENGTHS (Meters)

1

			SBLT 4	SBLT 5	SBLT 6	SBTH 4	SBTH 5	SBTH 6	SBRT 4	SBRT 5	SBRT 6
			Southound								
			LT			TH			RT		
IntersectionID	EW	NS	Avg	Max	Stops	Avg	Max	Stops	Avg	Max	Stops
8	48th Street	Crenshaw Boulevard	228	876	1311	265	871	2854			
9	50th Street	Crenshaw Boulevard	228	876	1311	265	871	2854			
10	52nd Street	Crenshaw Boulevard	85	525	828	590	1031	7800			
11	54th Street	Crenshaw Boulevard				558	1177	6922			
12	57th Street	Crenshaw Boulevard	856	1668	5724	892	1666	8044			
13	Slauson Avenue	Crenshaw Boulevard	552	971	2880	594	966	4268			
14	58th Place	Crenshaw Boulevard									
15	59th Street	Crenshaw Boulevard	16	91	40	25	208	230			
16	60th Street	Crenshaw Boulevard	5	84	21	75	356	646			

Date/Time Aug-21-2010 0:21

Scenario: A01IrtAM

Type	Direction	From	To	Trimmed Average Time (Minutes)				
				Average	Max	Min	Std Dev	Volume
Type	Dir	from	to					
400	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	2.72	3.13	2.54	0.22	10
300	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	6.63	13.62	2.58	3.99	10
200	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	5.97	15.51	2.44	4.08	22
100	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	5.56	19.09	1.78	3.60	1405
400	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	2.62	2.72	2.50	0.07	9
300	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	2.91	4.78	1.73	1.07	6
200	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	2.64	5.10	1.57	0.99	17
100	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	2.79	11.17	1.46	1.23	962
400	WB	Exposition Blvd at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	1.35	1.62	1.23	0.13	12
400	EB	Exposition Blvd at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	1.28	1.38	1.22	0.05	12

Date/Time Aug-21-2010 0:31

Scenario: A01lrtPM

Type	Direction	From	To	Trimmed Average Time (Minutes)				
Type	Dir	from	to	Average	Max	Min	Std Dev	Volume
400	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**2.05**	**3.56**	**1.48**	**0.72**	**10**
300	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**3.61**	**5.38**	**2.36**	**1.45**	**4**
200	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**5.31**	**14.56**	**2.10**	**4.26**	**15**
100	NB	39th St at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**5.70**	**29.42**	**1.64**	**5.66**	**948**
400	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	**3.01**	**5.62**	**2.28**	**1.26**	**11**
300	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	**4.47**	**7.13**	**2.66**	**1.92**	**6**
200	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	**5.73**	**16.18**	**2.17**	**4.29**	**13**
100	SB	Exposition Blvd at Crenshaw Blvd	39th St at Crenshaw Blvd	**5.21**	**24.19**	**1.60**	**3.93**	**969**
400	WB	Exposition Blvd at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**1.83**	**3.73**	**1.26**	**1.00**	**6**
400	EB	Exposition Blvd at Crenshaw Blvd	Exposition Blvd at Crenshaw Blvd	**2.91**	**5.72**	**1.24**	**1.89**	**7**

Date/Time: Aug-23-2010 10:16

Scenario: A02lrtAM

Type	Direction	From	To	Trimmed Average Time (Minutes)				
Type	Dir	from	to	Average	Max	Min	Std Dev	Volume
400	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	3.92	5.91	3.41	0.72	13
300	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	0.00	0.00	0.00	0.00	0
200	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	9.52	11.63	7.42	1.30	19
100	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	9.58	15.35	6.34	1.29	1031
400	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	4.64	6.03	3.88	0.96	12
300	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	0.00	0.00	0.00	0.00	0
200	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	6.71	8.32	5.59	0.81	11
100	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	6.21	9.42	4.09	0.69	557

Date/Time Aug-23-2010 10:17

Scenario: A02lrtPM

Type	Direction	From	To	Trimmed Average Time (Minutes)				
Type	Dir	from	to	Average	Max	Min	Std Dev	Volume
400	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	4.08	5.02	3.48	0.46	12
300	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	0.00	0.00	0.00	0.00	0
200	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	6.97	8.77	5.74	0.95	12
100	NB	60th St at Crenshaw Boulevard	48th St at Crenshaw Boulevard	7.11	14.85	5.36	0.96	640
400	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	3.89	3.94	3.84	0.03	12
300	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	0.00	0.00	0.00	0.00	0
200	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	10.58	15.49	6.43	3.09	14
100	SB	48th St at Crenshaw Boulevard	60th St at Crenshaw Boulevard	10.35	17.18	5.18	3.34	823

Metro

Design Studies 19 and 20 Construction Staging and Traffic Impacts during Construction

Crenshaw/LAX Transit Corridor Project
Advanced Conceptual Engineering
Contract E0117

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ISSUE AND REVISION RECORD

Rev	Date	Originator	Checker	Approver	Description
0	10/04/10	D. Penrice J. Levy	F. Nourbakhsh	L. Abramson	Draft

3 CONSTRUCTION STAGING REQUIREMENTS FOR MAJOR STRUCTURES

Each of the major structures on the Crenshaw/LAX Transit Corridor alignment requires dedicated staging areas to support the construction process. The requirements for each area may vary depending upon the type of construction—bridge versus tunnel, and the proposed methods of construction. As far as practicably possible, the proposed construction staging sites should be coincident with identified sites for permanent project infrastructure – such as stations, traction power substations, etc., to minimize requirements for additional land take.

In general a site of approximately 2 acres in size has been sought at each bridge structure, and a site of similar size has been generally sought at each tunnel portal location for cut and cover construction.

However, where the use of a tunnel boring machine (TBM) is proposed, the portal staging area requirement must be increased to approximately 3-4 acres at the TBM launch site to support the additional requirements of the construction process. The particular requirements at the primary staging areas for each of the structures, and the approximate areas associated with each of these requirements are provided in *Table 3-1 – Proposed Crenshaw Bridge/Cut-and-Cover Staging Area* and *Table 3-2 – Proposed Crenshaw TBM Staging Area.*

However, based upon the shapes of potential staging areas, it is unlikely that the identified requirements will fit neatly into the boundaries of any given site. Therefore, some provision for inefficient use and some separation or clearance between the various requirements should be made in the determination of the appropriate staging area size and preferred location. To account for such inefficiency, a factor of 25% has been included in the calculation of the total staging area requirements presented in Tables 3-1 and 3-2.

No provision for a concrete batching plant has been made within these areas. It is assumed that concrete batching for the cut and cover tunnels and bridges will be performed by a ready-mix supplier. Mined tunnels are expected to utilize precast concrete segmental linings fabricated off site and delivered as necessary.

Table 3-1 - Proposed Crenshaw Bridge/Cut-and-Cover Staging Area

Requirement	*Approximate Area (square feet)*	*Notes*
Site offices /dry house	3,000	Includes contractor and construction manager
Parking	18,000	Sufficient space for approximately 60 spaces to include contractor and construction management personnel, plus site visitors –owner, designer for meetings
Site access/egress	2,000	Provide direct route for delivery trucks to access and exit material storage areas
Crane	3,000	Area includes crane, and clear distance required for safe crane operation
Equipment maintenance shop	3,000	Includes 4 conex containers
Water treatment plant	3,000	Package plant and baker storage tanks
Equipment and material storage	25,000	Miscellaneous surface and tunnel equipment and materials including augers, excavators, gradalls, precast decking, soldier piles, casings, lagging, bracing, etc.
Grout plant	1,000	

Slurry plant	15,000	Or similar, deep soil mixing or slurry wall plant, etc. for support of sites where rigid, impermeable support of excavation is proposed.
Subtotal area	58,000 – 73,000	With and without slurry plant
Factor (25%)	14,500 – 18,250	
Total area	**72,500 – 91,250**	

Table 3-2 - Proposed Crenshaw TBM Staging Area

Requirement	***Approximate Area (square feet)***	***Notes***
Site Offices/ Dry house	3,000	Includes contractor and construction manager
Parking	18,000	Sufficient space for approximately 60 spaces to include contractor and construction management personnel, plus site visitors – owner, designer for meetings
Site access/egress	2,000	Provide direct route for delivery trucks to access and exit material storage areas
Crane	3,000	Area includes crane, and clear distance required for safe crane operation
Electrical Shop and Substation	3,000	
Shop	3,000	Includes 4 conex containers
Water Treatment Plant	3,000	Package plant and baker storage tanks
Equipment and Material Storage	25,000	Miscellaneous surface and tunnel equipment, such as flat cars, locomotive, linear plant including rail, air line, water line, power line, and utilities
TBM Supplies	4,000	Annulus grout plant, cooling water, grease and conditioners
Muck	25,000	200 ft of production, 3,100 CY, 100x100ft bin, times 2 for truck washing cueing and loading, plus 5,000 for loader. For problem spoil, additional off site spoil stockpiling is required.
Segment Storage	10,000	Segment storage 200 ft, 5ft rings, x 2 for crane and truck unloading area. Additional off site segment storage required
Slurry Plant	15,000	Separation plant required only if slurry TBM used.
Subtotal area	99,000- 114,000	With and without slurry plant
Factor (25%)	25,000 – 28,500	
Total area	**124,000 – 142,500**	

By inspection, it can be seen that a site of between 72,500 – 91,250 square feet, or approximately 2 acres should be sufficient to accommodate cut and cover and bridge staging, and an area of approximately 124,000 – 142,500 square feet or between 3-4 acres is necessary for the TBM site.

These required areas can be reduced by finding alternative sites for offices and parking, but these alternative sites should be local to the project site to maintain contractor productivity. The removal of offices and parking from the staging area will reduce the space requirement at these sites by approximately 20,000 feet or slightly less than half an acre.

Where a single area of 2 or 3-4 acres in size does not appear to be available at any particular location, several smaller sites can be procured to produce the net required area. While it may be

possible for a contractor to develop on street staging areas, the use of such on-street staging has not been assumed at this stage.

Individual staging area requirements have been assessed for the following major structures on the alignment (October 2010 Plan Submittal):

- Green Line Connector Bridge
- Aviation Boulevard Tunnel
- Century Boulevard Grade Crossing
- Manchester Avenue Grade Crossing
- I-405 Crossing
- Florence/La Brea Open Trench Station
- Harbor Subdivision/Crenshaw Boulevard Tunnel
- Crenshaw/MLK Tunnel

The proposed ROW drawings (see Appendix A) show anticipated areas suitable for construction staging. This plan set reflects a project goal to minimize requirements for property takes for construction staging purposes. Correspondingly, the available staging area at any location is limited to approximately 1-2 acres. The assessment compares the sufficiency of the proposed sites for staging purposes relative to the desired staging area size. A summary of the assessment is provided in *Table 3-3 – Proposed Staging Areas for Major Structures*.

In addition to the structures listed above, staging requirements for various construction Options are presented in *Table 3-4 – Proposed Staging Areas for Major Structures for Options*. Requirements for the following options/structures are considered:

- Centinela Option 3, Trench Structure
- Vernon Option 5, Crenshaw/MLK Tunnel, Extended South
- Exposition East Option 6, Crenshaw/MLK Tunnel, Extended North
- Exposition West Option 6, Crenshaw/MLK Tunnel, Extended North

The proposed construction staging areas for each of the identified major structures are indicated in the right of way drawings included as **Appendix A**.

3.1 Traffic Staging Plans

During preliminary engineering, a Traffic Management Plan (TMP) will be prepared. The work will impact traffic and parking along the corridor in a number of areas. The main impact will occur at the crossing locations along the Harbor Subdivision, and along the cut and cover portions and tunnel portal entries along Crenshaw Boulevard. In order to reduce the impacts of the cut and cover construction process, temporary roadway decking will be provided to maintain normal operation during the construction process. However, in order to install the decking, and to restore the roadways following the construction process, lane reductions, and infrequent temporary roadway closures will be required during construction. More lengthy impacts will occur near 67th Street where the cut and cover alignment swings across Crenshaw Boulevard, and near 36th Street where the temporary TBM access portal is to be constructed. The latter is in an area where Crenshaw Boulevard is at its minimum width. The intent of the design will be to provide 4 lanes on Crenshaw Boulevard during construction whenever possible. Other work in the corridor, such

as utility relocations, construction of below ground ventilation structure lateral connections, and other activities will also require lane reductions and closures at times.

Unfortunately, the Crenshaw Boulevard corridor does not have any feasible local detours. All parallel roads within one mile on either side of Crenshaw Boulevard are single family residential streets. As part of the development of the TMP, the need to provide temporary traffic calming measures will be investigated to discourage detour traffic on parallel streets, and provide guidance to through traffic to use the major parallel streets such as La Cienega Boulevard, La Brea Avenue and Western Avenue.

Tables 3-3- and 3-4 include a summary of traffic and parking impacts for each structure shown in the plan. The construction durations indicated in the tables for the Tunnels are taken from Design Study 23 – Tunnel Construction Methods. The durations for construction of trench and aerial structures are estimated, based on the calculated tunnel durations and prior experience with similar projects. The terminology used in the tables is described in Section 3.2.

3.2 Definitions – Traffic Impacts

Occasional Closures – Closures will be required for certain activities such as the placement and removal of overhead concrete forms and falsework, installation of tracks across crossings, installation/removal of temporary traffic decking and similar activities.

Intermittent Closures – Off peak – Lanes will be closed to perform short term work adjacent to the longer term work area, such as installing utility laterals, delivering large items, pour of concrete and similar activities. These closures will vary in length and will be planned at times to reduce impacts to traffic whenever possible.

Lane Reduction – The number of through lanes will be reduced due to construction for extended periods of time.

Temporary Roadway Decking – Streets will be restored to previous operation by the installation of temporary roadway decking above the underground construction activities. Access points to the construction will still need to be provided to the street at locations along the corridor which will impact traffic flow near those access points.

Table 3-3 – Proposed Staging Areas for Major Structures

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Green Line Connector	P-001 P-002	4138-001-908	34,300 / 0.78	The identified area is suitable for staging during construction of 105 structure and storage and offices during project construction duration	Timeframe: 105 Bridge Construction duration 10-12 months for 105 structure Occasional Closures
Aviation Boulevard Tunnel	P-003	4129-037-913	81,023 / 1.86	The area of the combined sites is sufficient for construction purposes. Parcel 4129-036-908 is used partially as shown on the referenced drawings.	Timeframe: 21-24 Months Parking: Reduced Spaces within LAX property
	P-005 P-006	4129-036-905 4129-036-908	92,000 / 2.1		
Century Boulevard Crossing	P-007 P-008	4125-026-007	83,573 / 1.9	The proposed staging area site is also identified for use as a park and ride facility. Additional staging is also available in the same location. Parcel 4125-026-010 is also identified to be used as a park and ride facility. This area is adequate for staging purposes.	Timeframe: Construction duration Occasional Closures on Century Boulevard Intermittent Closures on Southbound Aviation Boulevard
Manchester Avenue Crossing	P-012	4126-001-011 4126-001-010	62,900 / 1.44	The identified area should be sufficient for staging purposes. The contractor might need to find additional space for parking and offices.	Timeframe: 8- 10 Months Occasional Closures on Manchester Street
I-405 Crossing	P-015 P-016	Construction easement on BNSF right of way	33,400 / 0.75	The site does not meet minimum indicated requirements for staging. The contractor may need to find additional space for parking and offices.	Timeframe: 12 – 18 Months Occasional Closures on Florence Avenue, La Cienega Boulevard & I-405

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Florence/La Brea Open Trench Station	P-020 P-021	4016-030-013 4016-030-014 4016-030-900 4015-018-007	169,800 / 3.9	The staging area is on the site of the proposed Florence/La Brea Station and on adjacent area identified as a park and ride facility. This area is adequate for staging purposes. Only part of parcel 4015-018-007 is considered in the calculations.	Timeframe: 12 – 18 months Occasional lane Closures on Florence Avenue, & La Brea Avenue Lane Reduction to 2 lanes on La Brea Avenue during Vertical Realignment
Harbor Subdivision / Crenshaw Boulevard Tunnel	P-027	4013-008-003 4013-008-005 4013-008-011	65,763 / 1.5	Parcels 4013-008-003, 005 and 011 are proposed as permanent park and ride facility. Part of 003 is proposed as Traction Power Substation (TPSS) facility. Approximately 2.7 acres of land are provided at the south portal of the tunnel. (P-027-P-029) Part of parcel 4006-024-029, mid-tunnel parcel 4006-009-011 (P-030), and north portal parcels (P-031 and P-032) are proposed as a permanent ventilation facility. While overall, sufficient area is provided to stage the construction, the areas are skewed to the southern end of the project. This is not ideal, but should be workable.	Timeframe: 24-30 months Traffic will operate on temporary decking during construction Lane Reduction to 4 lanes on Crenshaw Boulevard & left turn restrictions to and from Crenshaw Boulevard to side streets for periods up to 2 months. Occasional Closures on Crenshaw Boulevard to install & remove decking during off-peak periods, and for other activities. Closure of approximately one month near 67th Street. Parking will be restricted for up to 2 months, and at other times on an intermittent basis.
	P-028 P-029	4006-024-026 4006-024-024 4006-024-029	52,640 / 1.2		
	P-030	4006-009-011	10,800 / 0.25		
	P-031 P-032	4005-007-026 4005-007-024	15,600 / 0.36		

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Crenshaw/MLK Tunnel	P-037 P-038	5013-023-005 5013-023-006 5013-023-007 5013-023-008 5013-023-012	41,336 / 0.95	The parcel size as indicated is insufficient to support TBM launch operation. An additional 1 acre may be available from closing Leimert Boulevard from 46th Street and Vernon Avenue during construction (refer to P-038).	Timeframe: 30-36 months Lane Reduction to 4 lanes at 48th and 39th Streets for periods up to 2 months. Left turns at 48th and 39th Street intersections occasionally restricted to and from Crenshaw Boulevard. Occasional Closures on Crenshaw Boulevard to install ventilation structures during off-peak periods, and for other activities. Parking will be restricted near the intersections for up to 2 months, and at other times on an intermittent basis.
	P-040 P-041	5032-009-030 5032-009-004 5032-009-005 5032-009-006 5032-009-007 5032-009-008 5032-009-009 5032-009-010 5032-009-011 5032-009-012 5032-009-013	70,486 / 1.62	In addition to the properties shown a 0.23 acres might be available from the alley behind the parcels indicated, so a total of approximately 1.85 acres of staging is provided in the vicinity of the Crenshaw/MLK Station site. Combining all parcels shown and areas mentioned above, a total of 3.8 acres could be available in this area. This combined area is sufficient to stage the station construction and TBM operation.	

Table 3-4 – Proposed Staging Areas for Major Structures Options

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Centinela, Option 3	P-322 P-323 P-324	-	N/A	The Centinela Avenue Trench/grade separation is located between stations 220+74 and 234+70. This construction may be staged from the La Brea site which is relatively close.	Timeframe: 12 Months Occasional Closures on Florence Avenue & Centinela Avenue Lane Reduction to 2 lanes on Centinela Avenue Parking restricted near the intersection

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Vernon, Option 5	P-537 P-538	5013-023-005 5013-023-006 5013-023-007 5013-023-008 5013-023-012	41,336 / 0.95	As above, parcel size as indicated is insufficient to support TBM launch operation. An additional 1 acre may be available from closing Leimert Boulevard from 46th Street and Vernon Avenue during construction.	Timeframe: 30-36 Months Lane Reduction to 4 lanes at 48th Street for periods up to 2 months. Left turns at 48th Street and Vernon Avenue intersections occasionally restricted to and from Crenshaw Boulevard. Occasional Closures on Crenshaw Boulevard to install ventilation structures during off-peak periods, and for other activities. Parking will be restricted near the intersections for up to 2 months, and at other times on an intermittent basis.

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Exposition East, Option 6	P-645E	5044-002-006 5044-002-007 5044-002-008 5044-002-009 5044-002-010	84,630 / 1.90	The staging site is also proposed as permanent station location/park and ride facility and TPSS. The site is large enough to facilitate station construction and provide support to TBM operation. The site is also close enough to support the construction of the end of line ventilation/egress structure (P-646E)	Timeframe: Construction duration Lane Reduction to 4 lanes on Crenshaw Boulevard at 48th Street, Coliseum Street and 39th Street for up to 2 months. Left turns at 48th Street, Coliseum Street and 36th Street intersections restricted to and from Crenshaw Boulevard for periods up to 2 months. Occasional Closures on Crenshaw Boulevard to install ventilation structures during off-peak periods, and for other activities. Lane Closures on Crenshaw Boulevard at 36th Street for up to two months to construct TBM Access Point at beginning of project and for one month to restore the roadway Parking will be restricted near the intersections at 48th Street, Coliseum Street and 39th Street for up to 2 months, and at other times on an intermittent basis.

Structure Name	Proposed Staging Areas				Traffic Impacts
	Drawing Ref.	Reference (APN) No.	Parcel Size (square feet/acres)	Comment	
Exposition West Option 6	P-645W	5046-022-016 5046-022-900	89,616 / 2.0	The staging site is also proposed as permanent station location/park and ride facility and TPSS. The site is large enough to facilitate station construction and provide support to TBM operation.	Timeframe: Construction duration Lane Reduction to 4 lanes on Crenshaw Boulevard at 48th Street, Coliseum Street and 39th Street for up to 2 months. Left turns at 48th Street, Coliseum Boulevard and 36th Street intersections restricted to and from Crenshaw Boulevard for periods up to 2 months. Occasional Closures on Crenshaw Boulevard to install ventilation structures during off-peak periods, and for other activities. Closure of Crenshaw Boulevard at 36th Street for up to two months to construct TBM Access Point at beginning of project and for one month to restore the roadway Parking will be restricted near the intersections at 48th Street, Coliseum Street and 39th Street for up to 2 months, and at other times on an intermittent basis.

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