



ARLINGTON DOWNS TRAFFIC MEMORANDUM

DATE: October 7, 2015

TO: Jeffrey Funke, Funke Architects
Vince Bertucci, ChiArc

FROM: Peter Reinhofer, P.E.

RE: Arlington Downs Traffic Memorandum
Euclid Avenue and Rohlwing Road Proposed Intersection Improvements
Arlington Heights, Illinois

V3 Companies has prepared this traffic memorandum to present the conclusions of the capacity analysis conducted at the signalized intersection of Euclid Avenue and Rohlwing Road as part of the traffic analysis for the mixed-use Arlington Downs development. Arlington Downs, located at the northeast corner of Rohlwing Road and Euclid Avenue in Arlington Heights, Illinois, is a mixed use project that will include residential, restaurant, hotel, retail, and entertainment land uses.

It is our understanding that as part of the approved Planned Unit Development (PUD), a southbound right turn lane has been required at the signalized intersection of Euclid Avenue and Rohlwing Road. This requirement was likely determined to be needed based on the previously approved traffic study for the PUD that had a different site plan than currently proposed. V3 does not have the previously approved traffic study.

As part of the PUD update for Arlington Downs, V3 submitted a Traffic Impact Study (TIS) dated August 20, 2015 to the Village of Arlington Heights. The TIS included the southbound right turn lane for the 2022 future plus project scenario, which projects weekday am, weekday pm, and Saturday peak hour volumes for the study area intersections, including Euclid Avenue and Rohlwing Road.

The intersection of Euclid Avenue and Rohlwing Road is currently signalized. The eastbound and westbound approaches on Euclid Avenue each consist of one left turn lane, two through lanes, and one right turn lane. The northbound and southbound approaches on Rohlwing Road both consist of one left turn lane and one shared through/right turn lane.



As part of the August 20, 2015 TIS, V3 collected weekday am, weekday pm, and Saturday peak hour volumes at the study area intersections, including Euclid Avenue and Rohlwing Road. V3 also projected the same peak hour volumes for 2022 at the study area intersections, which is five years after Arlington Downs is anticipated to be built out. The projected am, pm, and Saturday peak hour volumes for the southbound right turn are 58, 196, and 67 vehicles, respectively. The TIS then calculated the number of vehicle trips that Arlington Downs will generate and distributed those trips to the site driveways and surrounding roadway network. During the am peak hour, the pm peak hour, and the Saturday peak hour, the Arlington Downs redevelopment will add 24, 18, and 24 vehicle trips to the southbound right turn movement, respectively.

As part of the TIS completed, a capacity analysis was conducted at the intersection for the existing, 2022 background, and 2022 future with project traffic volumes. The capacity analysis was performed using Synchro 9 (build 902, revision 140), a macrosimulation tool based on the methodologies found in the Highway Capacity Manual. Models were created for the weekday am, weekday pm, and Saturday midday peak hours for the existing, background, and future with project conditions. The 2022 future with project scenario assumed the construction of the southbound right turn lane at the intersection. Table 1 provides a summary of the results for the capacity analysis conducted at Euclid Avenue and Rohlwing Road, as reported in the TIS.

Table 1 – Euclid Avenue and Rohlwing Road Capacity Analysis Results from TIS

Time Period	Scenario	Eastbound		Westbound		Northbound		Southbound		Intersection	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Weekday AM Peak Hour	Existing	23.1	C	26.8	C	41.4	D	32.1	C	27.2	C
	Background	24.3	C	25.4	C	42.5	D	32.2	C	27.5	C
	Future with SB RTL	31.1	C	31.9	C	43.3	D	27.3	C	32.3	C
Weekday PM Peak Hour	Existing	18.9	B	19.2	B	44.5	D	39.1	D	24.0	C
	Background	19.9	B	22.7	C	47.0	D	39.8	D	26.3	C
	Future with SB RTL	24.3	C	25.4	C	42.8	D	21.8	C	26.3	C
Saturday MD Peak Hour	Existing	17.7	B	15.1	B	37.5	D	32.8	C	19.8	B
	Background	18.1	B	16.3	B	38.8	D	33.8	C	20.6	C
	Future with SB RTL	22.4	C	16.6	B	38.0	D	26.7	C	22.5	C

As illustrated, the overall intersection currently operates at LOS C for the weekday am and weekday pm peak hours and LOS B for the Saturday peak hour. Each of the approaches also operates at LOS D or better for all peak hours. For the future 2022 background condition, which takes into account future non-project related growth in the area, the average delays slightly increase but the overall intersection is projected to operate at LOS C for the weekday am, weekday pm, and Saturday peak hours.

The TIS analyzed the 2022 future with project scenario with the construction of the southbound right turn lane, which generally results in reduced average delays for the northbound and southbound approaches but still results in higher delays for the overall intersection when compared to the background scenario. During the am peak hour, the overall intersection continues to operate at LOS C with a higher average delay. Each approach continues to



operate at the same LOS as the background scenario. During the pm peak hour, the overall average delay time is unchanged and will operate at LOS C. The eastbound and westbound approach delays increase with the eastbound approach changing to LOS C. The northbound and southbound approaches will experience a reduction in average delay with the southbound approach operating at LOS C. During the Saturday peak hour, the overall intersection continues to operate at LOS C with a higher average delay. Each approach continues to operate at the same LOS as the background scenario with the exception of the eastbound approach will operates at LOS C.

After reviewing the limited improvements to the capacity analysis results, V3 analyzed another future with project scenario that used the existing intersection lane configuration. Results of the capacity analysis are illustrated in Table 2, labeled “Future No Improvements” in the table and will be compared to the background and the future with southbound right turn lane scenarios.

Table 2 – Euclid Avenue and Rohlwing Road Capacity Analysis with New Scenario

Time Period	Scenario	Eastbound		Westbound		Northbound		Southbound		Intersection	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Weekday AM Peak Hour	Existing	23.1	C	26.8	C	41.4	D	32.1	C	27.2	C
	Background	24.3	C	25.4	C	42.5	D	32.2	C	27.5	C
	Future with SB RTL	31.1	C	31.9	C	43.3	D	27.3	C	32.3	C
	Future No Improvements	31.1	C	31.9	C	43.6	D	33.0	C	32.9	C
Weekday PM Peak Hour	Existing	18.9	B	19.2	B	44.5	D	39.1	D	24.0	C
	Background	19.9	B	22.7	C	47.0	D	39.8	D	26.3	C
	Future with SB RTL	24.3	C	25.4	C	42.8	D	21.8	C	26.3	C
	Future No Improvements	25.2	C	28.4	C	51.7	D	40.8	D	31.0	C
Saturday MD Peak Hour	Existing	17.7	B	15.1	B	37.5	D	32.8	C	19.8	B
	Background	18.1	B	16.3	B	38.8	D	33.8	C	20.6	C
	Future with SB RTL	22.4	C	16.6	B	38.0	D	26.7	C	22.5	C
	Future No Improvements	22.8	C	16.9	B	39.8	D	37.5	D	23.7	C

When analyzing the intersection with the existing geometry, the delays slightly increase for each approach and for the overall intersection during each of the peak hours. The overall intersection still projects to operate at LOS C for the weekday am, weekday pm, and Saturday peak hours. When compared to the scenario with the construction of the southbound right turn lane, the am peak hour, pm peak hour, and Saturday peak hour average delay increases by 0.6 seconds, 4.7 seconds, and 1.2 seconds, respectively.

When compared to the background scenario, the average delays for each approach and the overall intersection slightly increase for each peak hour and the overall intersection LOS does not change and will continue to operate at LOS C. The LOS for each approach during each peak hour remains the same with the exception of the eastbound approach during the pm peak hour (LOS B to LOS C), the eastbound approach during the Saturday peak hour (LOS B to LOS C) and the southbound approach during the Saturday peak hour (LOS C to LOS D).



Based on the low volumes that the Arlington Downs redevelopment will be adding to the southbound right turn at Euclid Avenue and Rohlwing Road, and that the capacity analysis assuming the existing intersection configuration results in the intersection operating at LOS C during each peak hour and each approach operating at LOS D or better, we are requesting that the Village of Arlington Heights reconsider the requirement of the construction of the southbound right turn lane.

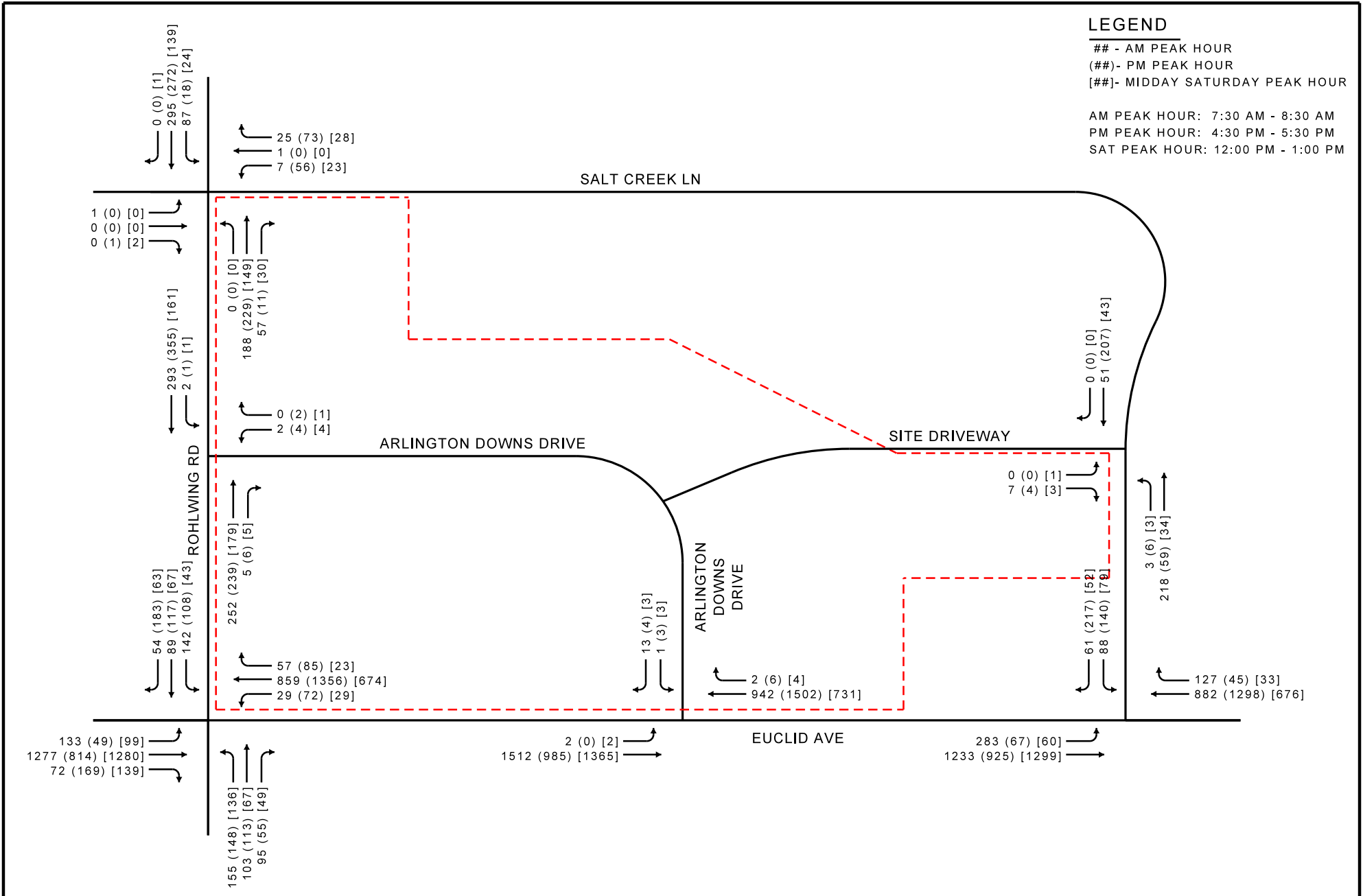
Attachments:

- Existing Traffic Volume (Figure 6 from August 20, 2015 TIS)
- Total Project Trips (Figure 9 from August 20, 2015 TIS)
- Background Traffic Volume (Figure 10 from August 20, 2015 TIS)
- Future with Project Traffic Volume (Figure 11 from August 20, 2015 TIS)
- Capacity Analysis Results at Euclid Avenue/Rohlwing Road for Future with Project scenario with no intersection improvements

LEGEND

- AM PEAK HOUR
 (##) - PM PEAK HOUR
 [##] - MIDDAY SATURDAY PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
 PM PEAK HOUR: 4:30 PM - 5:30 PM
 SAT PEAK HOUR: 12:00 PM - 1:00 PM



ARLINGTON DOWNS

**FIGURE 6
 EXISTING TRAFFIC VOLUME**

ARLINGTON HEIGHTS

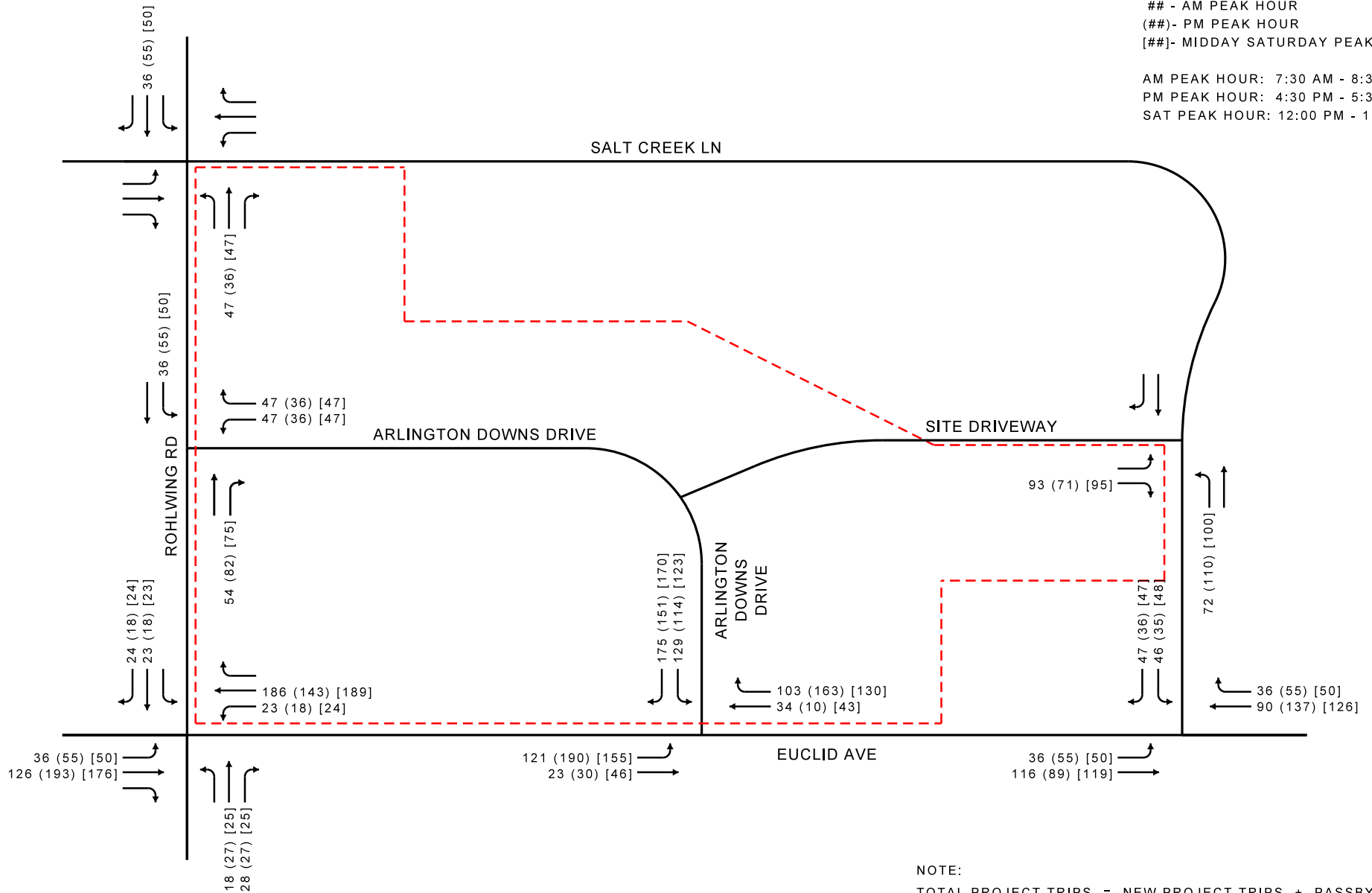
ILLINOIS



LEGEND

- AM PEAK HOUR
 (##) - PM PEAK HOUR
 [##] - MIDDAY SATURDAY PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
 PM PEAK HOUR: 4:30 PM - 5:30 PM
 SAT PEAK HOUR: 12:00 PM - 1:00 PM



NOTE:

TOTAL PROJECT TRIPS = NEW PROJECT TRIPS + PASSBY TRIPS
 (FIGURE 7) (FIGURE 8)

ARLINGTON DOWNS

FIGURE 9
TOTAL PROJECT TRIPS

ARLINGTON HEIGHTS

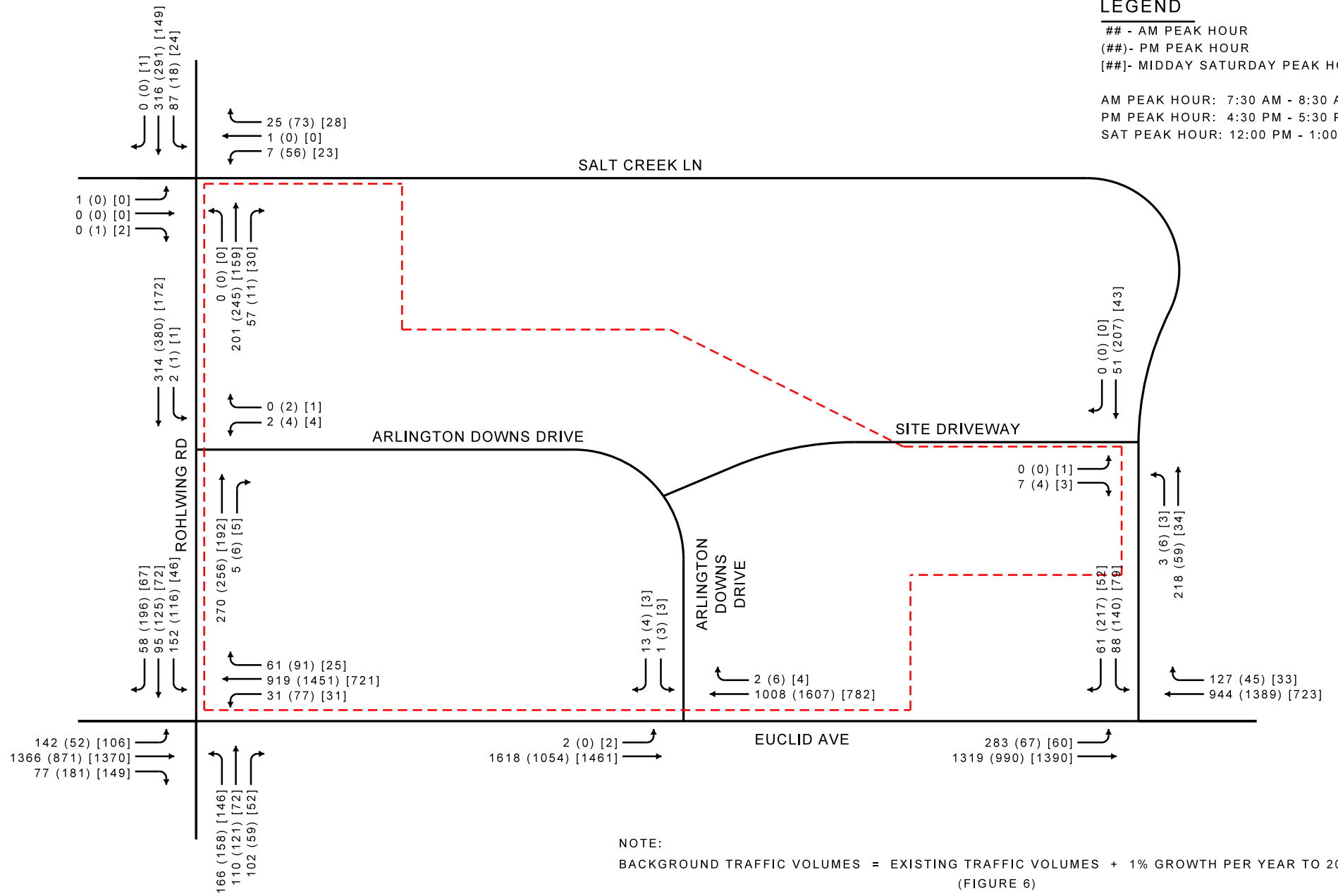
ILLINOIS



LEGEND

- AM PEAK HOUR
 (##) - PM PEAK HOUR
 [##] - MIDDAY SATURDAY PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
 PM PEAK HOUR: 4:30 PM - 5:30 PM
 SAT PEAK HOUR: 12:00 PM - 1:00 PM



NOTE:
 BACKGROUND TRAFFIC VOLUMES = EXISTING TRAFFIC VOLUMES + 1% GROWTH PER YEAR TO 2022
 (FIGURE 6)

ARLINGTON DOWNS

**FIGURE 10
 BACKGROUND TRAFFIC VOLUME**

ARLINGTON HEIGHTS

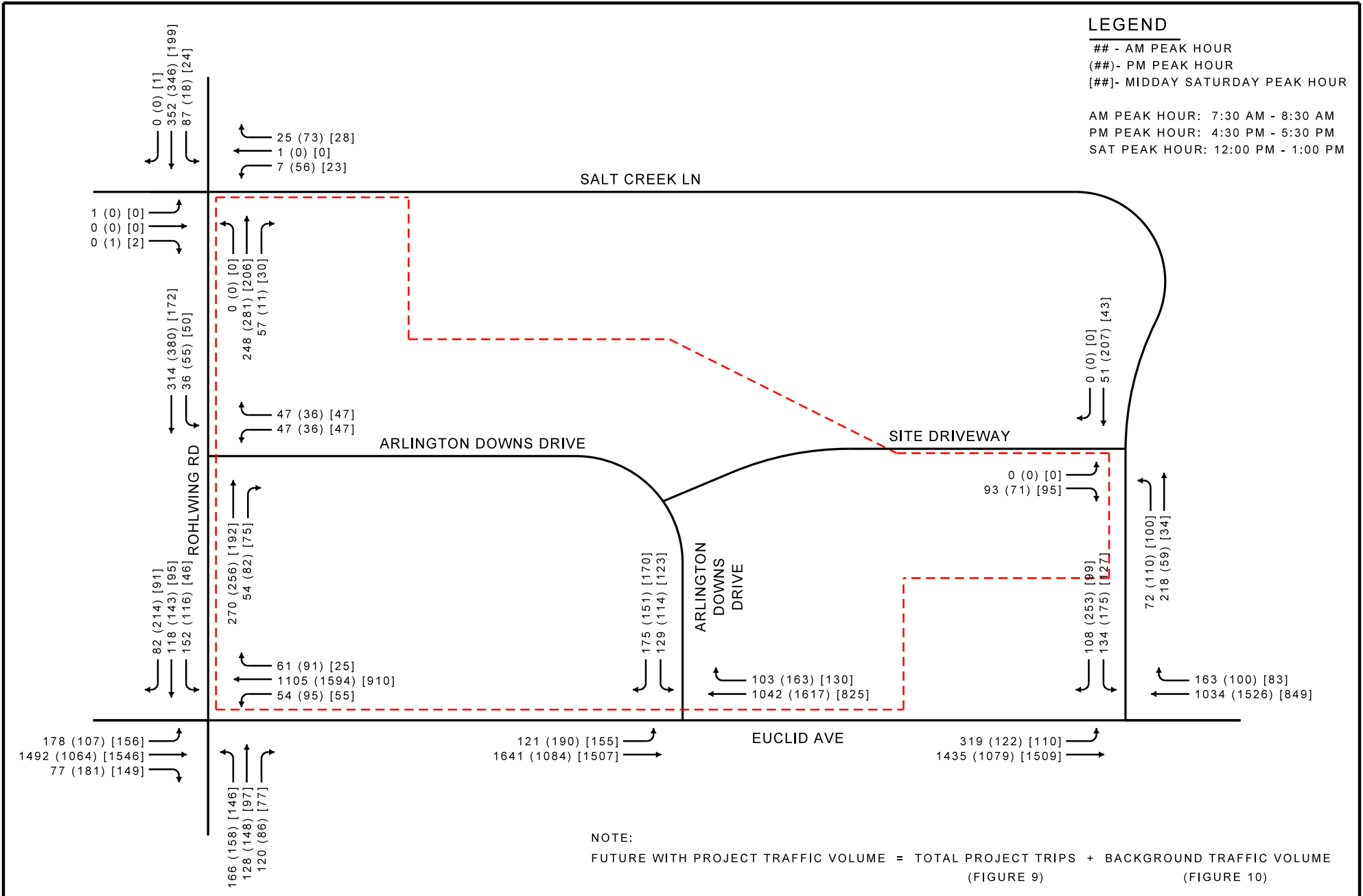
ILLINOIS



LEGEND

- AM PEAK HOUR
 (##) - PM PEAK HOUR
 [##] - MIDDAY SATURDAY PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
 PM PEAK HOUR: 4:30 PM - 5:30 PM
 SAT PEAK HOUR: 12:00 PM - 1:00 PM



ARLINGTON DOWNS

FIGURE 11
FUTURE WITH PROJECT TRAFFIC VOLUME

ARLINGTON HEIGHTS

ILLINOIS



2022 Future with Project - No Right Turn Lane
4: Rohlwing Rd & Euclid Ave

Timing Plan: AM
8/12/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	178	1492	77	54	1105	61	166	128	120	152	118	82
Ideal Flow (vphpl)	1900	2000	1900	1900	2000	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		225	100		200	145		0	130		130
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.928			0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3725	1583	1770	3725	1583	1770	1729	0	1770	1749	0
Flt Permitted	0.115			0.073			0.626			0.282		
Satd. Flow (perm)	214	3725	1583	136	3725	1583	1166	1729	0	525	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			109		38			33	
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		735			790			441			644	
Travel Time (s)		12.5			13.5			10.0			11.0	
Peak Hour Factor	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)	187	1571	81	57	1163	64	175	135	126	160	124	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	1571	81	57	1163	64	175	261	0	160	210	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.94	1.00	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.0	24.0	9.5	35.0	35.0	9.5	24.0		9.5	51.0	
Total Split (s)	16.0	43.0	43.0	16.0	43.0	43.0	10.0	37.0		24.0	51.0	
Total Split (%)	13.3%	35.8%	35.8%	13.3%	35.8%	35.8%	8.3%	30.8%		20.0%	42.5%	
Maximum Green (s)	13.0	37.0	37.0	13.0	37.0	37.0	7.0	31.0		21.0	45.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min		None	Min	
Walk Time (s)					7.0	7.0					7.0	
Flash Dont Walk (s)					22.0	22.0					38.0	

2022 Future with Project - No Right Turn Lane
4: Rohlwing Rd & Euclid Ave

Timing Plan: AM
8/12/2015

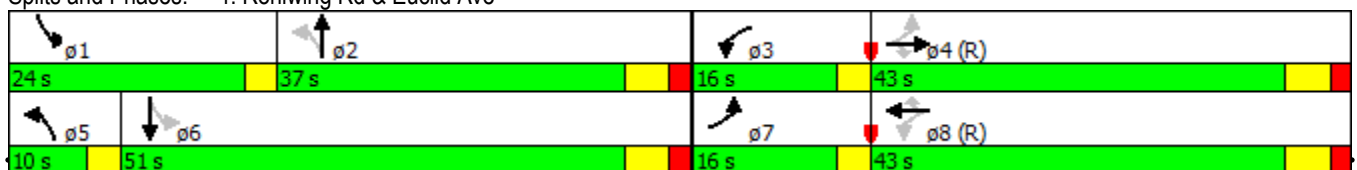


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)					1	1						1
Act Effct Green (s)	72.2	60.6	60.6	65.2	54.9	54.9	32.6	22.6		41.7	28.8	
Actuated g/C Ratio	0.60	0.50	0.50	0.54	0.46	0.46	0.27	0.19		0.35	0.24	
v/c Ratio	0.68	0.83	0.09	0.33	0.68	0.08	0.50	0.73		0.50	0.47	
Control Delay	29.0	32.8	2.6	26.5	33.5	7.5	33.9	50.2		31.6	34.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	29.0	32.8	2.6	26.5	33.5	7.5	33.9	50.2		31.6	34.2	
LOS	C	C	A	C	C	A	C	D		C	C	
Approach Delay		31.1			31.9			43.6			33.0	
Approach LOS		C			C			D			C	
90th %ile Green (s)	13.0	40.3	40.3	9.7	37.0	37.0	7.0	36.4		15.6	45.0	
90th %ile Term Code	Max	Coord	Coord	Gap	Coord	Coord	Max	Hold		Gap	Ped	
70th %ile Green (s)	14.4	54.6	54.6	7.9	48.1	48.1	7.0	24.3		15.2	32.5	
70th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Gap		Gap	Hold	
50th %ile Green (s)	11.5	60.2	60.2	7.0	55.7	55.7	7.0	21.1		13.7	27.8	
50th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Gap		Gap	Hold	
30th %ile Green (s)	9.7	65.7	65.7	6.3	62.3	62.3	7.0	17.9		12.1	23.0	
30th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Gap		Gap	Hold	
10th %ile Green (s)	7.8	82.4	82.4	0.0	71.6	71.6	7.0	13.2		9.4	15.6	
10th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Coord	Max	Gap		Gap	Hold	
Queue Length 50th (ft)	59	534	0	16	256	0	99	168		89	119	
Queue Length 95th (ft)	#170	#941	19	71	#622	28	121	222		112	158	
Internal Link Dist (ft)		655			710			361			564	
Turn Bay Length (ft)	200		225	100		200	145			130		
Base Capacity (vph)	300	1882	854	256	1705	783	351	489		400	676	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.62	0.83	0.09	0.22	0.68	0.08	0.50	0.53		0.40	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 32.9
 Intersection LOS: C
 Intersection Capacity Utilization 82.5%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Rohlwing Rd & Euclid Ave



2022 Future with Project - No Right Turn Lane
2: Euclid Ave & Salt Creek Ln

Timing Plan: PM
8/13/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	122	1079	1526	100	175	253
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900
Storage Length (ft)	150			0	200	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.991			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3725	3507	0	1770	1583
Flt Permitted	0.071				0.950	
Satd. Flow (perm)	132	3725	3507	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			10			29
Link Speed (mph)		40	40		30	
Link Distance (ft)		842	459		580	
Travel Time (s)		14.4	7.8		13.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	1136	1606	105	184	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	1136	1711	0	184	266
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane					Yes	
Headway Factor	1.00	0.94	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Turn Type	pm+pt	NA	NA		Prot	pt+ov
Protected Phases	7	4	8		6	6 7
Permitted Phases	4					
Detector Phase	7	4	8		6	6 7
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	9.5	24.0	35.0		24.0	
Total Split (s)	16.0	94.0	78.0		26.0	
Total Split (%)	13.3%	78.3%	65.0%		21.7%	
Maximum Green (s)	13.0	88.0	72.0		20.0	
Yellow Time (s)	3.0	4.0	4.0		4.0	
All-Red Time (s)	0.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	3.0	6.0	6.0		6.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Max	C-Max		Min	
Walk Time (s)			7.0			
Flash Dont Walk (s)			22.0			

2022 Future with Project - No Right Turn Lane
 2: Euclid Ave & Salt Creek Ln

Timing Plan: PM
 8/13/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Pedestrian Calls (#/hr)			2			
Act Effct Green (s)	92.6	89.6	77.3		18.4	30.7
Actuated g/C Ratio	0.77	0.75	0.64		0.15	0.26
v/c Ratio	0.56	0.41	0.76		0.68	0.62
Control Delay	28.4	7.4	18.4		60.8	41.2
Queue Delay	0.0	0.0	0.2		0.0	0.0
Total Delay	28.4	7.4	18.5		60.8	41.2
LOS	C	A	B		E	D
Approach Delay		9.6	18.5		49.2	
Approach LOS		A	B		D	
90th %ile Green (s)	13.0	88.0	72.0		20.0	
90th %ile Term Code	Max	Coord	Coord		Max	
70th %ile Green (s)	11.3	88.0	73.7		20.0	
70th %ile Term Code	Gap	Coord	Coord		Max	
50th %ile Green (s)	8.9	88.0	76.1		20.0	
50th %ile Term Code	Gap	Coord	Coord		Max	
30th %ile Green (s)	7.0	89.6	79.6		18.4	
30th %ile Term Code	Gap	Coord	Coord		Gap	
10th %ile Green (s)	6.1	94.2	85.1		13.8	
10th %ile Term Code	Gap	Coord	Coord		Gap	
Queue Length 50th (ft)	50	108	460		134	161
Queue Length 95th (ft)	102	276	616		213	241
Internal Link Dist (ft)		762	379		500	
Turn Bay Length (ft)	150				200	
Base Capacity (vph)	279	2780	2262		295	463
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	89		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.46	0.41	0.79		0.62	0.57

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 90 (75%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 19.3
 Intersection LOS: B
 Intersection Capacity Utilization 75.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: Euclid Ave & Salt Creek Ln



2022 Future with Project - No Right Turn Lane
4: Rohlwing Rd & Euclid Ave

Timing Plan: MD Sat
10/7/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1546	149	55	910	25	146	97	77	46	95	91
Future Volume (vph)	156	1546	149	55	910	25	146	97	77	46	95	91
Ideal Flow (vphpl)	1900	2000	1900	1900	2000	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		225	100		200	145		0	130		130
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.934			0.927	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3725	1583	1770	3725	1583	1770	1740	0	1770	1727	0
Flt Permitted	0.216			0.063			0.423			0.531		
Satd. Flow (perm)	402	3725	1583	117	3725	1583	788	1740	0	989	1727	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		38			46	
Link Speed (mph)		40			40			30			40	
Link Distance (ft)		735			790			441			644	
Travel Time (s)		12.5			13.5			10.0			11.0	
Peak Hour Factor	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)	164	1627	157	58	958	26	154	102	81	48	100	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	1627	157	58	958	26	154	183	0	48	196	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.94	1.00	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.0	24.0	9.5	35.0	35.0	9.5	24.0		9.5	51.0	
Total Split (s)	16.0	43.0	43.0	16.0	43.0	43.0	10.0	51.0		10.0	51.0	
Total Split (%)	13.3%	35.8%	35.8%	13.3%	35.8%	35.8%	8.3%	42.5%		8.3%	42.5%	
Maximum Green (s)	13.0	37.0	37.0	13.0	37.0	37.0	7.0	45.0		7.0	45.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min		None	Min	
Walk Time (s)					7.0	7.0						7.0

2022 Future with Project - No Right Turn Lane
4: Rohlwing Rd & Euclid Ave

Timing Plan: MD Sat
10/7/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)					22.0	22.0						38.0
Pedestrian Calls (#/hr)					2	2						2
Act Effct Green (s)	80.1	69.1	69.1	75.1	65.1	65.1	31.1	22.5		30.2	20.5	
Actuated g/C Ratio	0.67	0.58	0.58	0.63	0.54	0.54	0.26	0.19		0.25	0.17	
v/c Ratio	0.44	0.76	0.17	0.34	0.47	0.03	0.59	0.51		0.16	0.59	
Control Delay	13.7	25.0	9.6	27.9	16.6	0.2	42.2	37.9		28.8	39.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.7	25.0	9.6	27.9	16.6	0.2	42.2	37.9		28.8	39.7	
LOS	B	C	A	C	B	A	D	D		C	D	
Approach Delay		22.8			16.9			39.8			37.5	
Approach LOS		C			B			D			D	
90th %ile Green (s)	13.0	40.3	40.3	9.7	37.0	37.0	7.0	45.0		7.0	45.0	
90th %ile Term Code	Max	Coord	Coord	Gap	Coord	Coord	Max	Hold		Max	Ped	
70th %ile Green (s)	10.3	68.6	68.6	7.3	65.6	65.6	7.0	19.1		7.0	19.1	
70th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Hold		Max	Gap	
50th %ile Green (s)	9.0	72.2	72.2	6.6	69.8	69.8	7.0	16.2		7.0	16.2	
50th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Hold		Max	Gap	
30th %ile Green (s)	7.9	75.6	75.6	6.1	73.8	73.8	7.0	13.3		7.0	13.3	
30th %ile Term Code	Gap	Coord	Coord	Gap	Coord	Coord	Max	Hold		Max	Gap	
10th %ile Green (s)	6.7	88.9	88.9	0.0	79.2	79.2	7.0	19.1		0.0	9.1	
10th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Coord	Max	Hold		Skip	Gap	
Queue Length 50th (ft)	37	441	23	11	135	0	99	108		29	113	
Queue Length 95th (ft)	118	#988	93	60	452	m1	108	133		41	138	
Internal Link Dist (ft)		655			710			361			564	
Turn Bay Length (ft)	200		225	100		200	145			130		
Base Capacity (vph)	417	2145	946	256	2020	896	261	676		297	676	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.39	0.76	0.17	0.23	0.47	0.03	0.59	0.27		0.16	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 135
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 23.7
 Intersection LOS: C
 Intersection Capacity Utilization 80.1%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Rohlwing Rd & Euclid Ave

