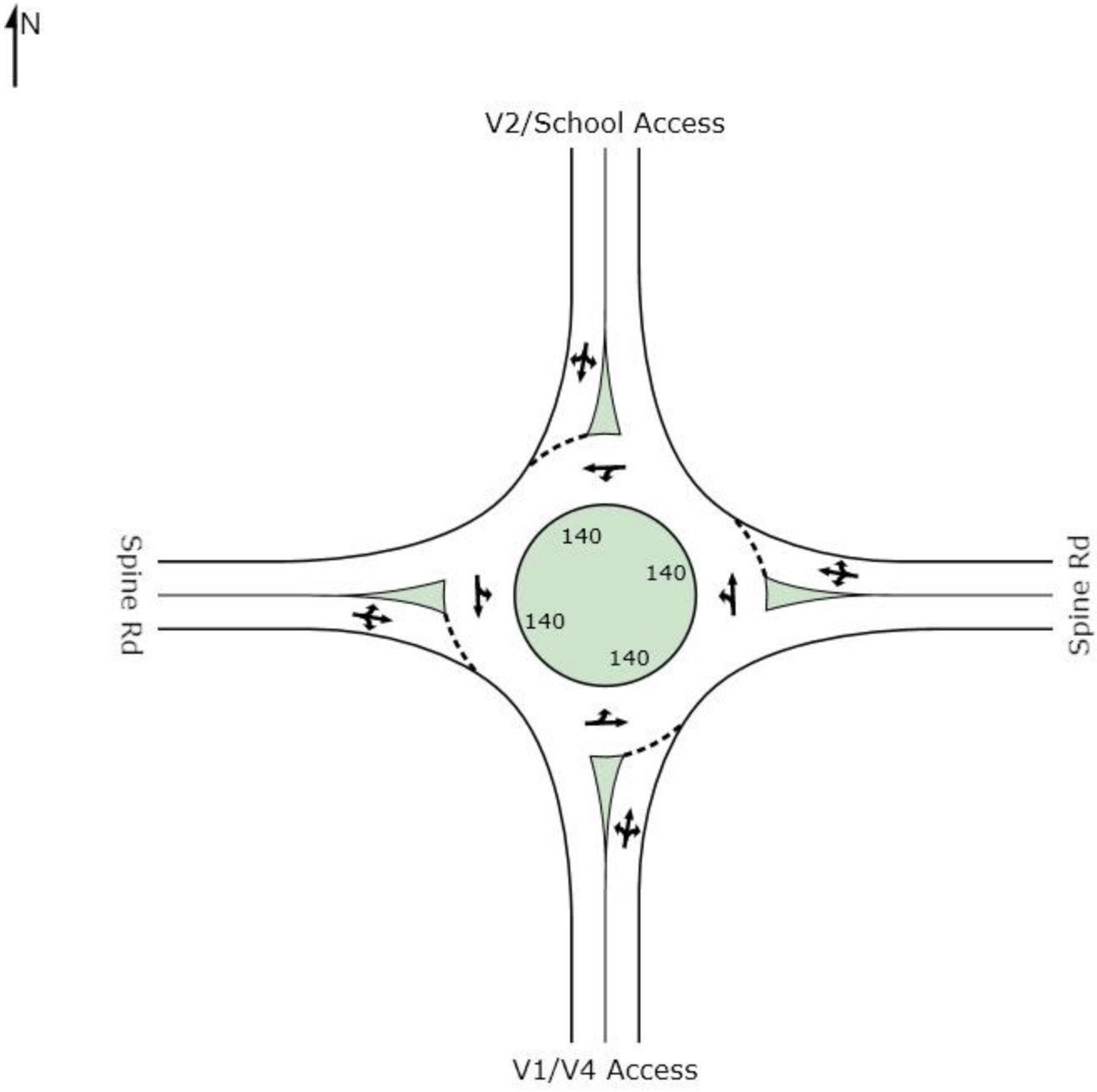
TRACY HILLS SPECIFIC PLAN
RECIRCULATED
DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT
VOLUME III
OCTOBER 2015

APPENDIX H-5

INTERCHANGE ROUNDABOUT ANALYSIS (SIDRA), DATED FALL 2014


N
V2/School Access
Spine Rd
Spine Rd
140
140
140
140
V1/V4 Access

MOVEMENT SUMMARY

Site: Intersection 6 No Connection AM

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: V1/V4 Access											
3	L	8	1.0	0.174	17.6	LOS B	1.1	26.9	0.77	0.90	28.2
8	T	42	1.0	0.174	9.3	LOS A	1.1	26.9	0.77	0.76	30.8
18	R	61	1.0	0.174	10.6	LOS B	1.1	26.9	0.77	0.79	30.7
Approach		110	1.0	0.174	10.6	LOS B	1.1	26.9	0.77	0.78	30.6
East: Spine Rd											
1	L	45	1.0	0.261	13.4	LOS B	1.6	39.8	0.42	0.84	30.2
6	T	214	1.0	0.261	5.1	LOS A	1.6	39.8	0.42	0.45	33.0
16	R	32	1.0	0.261	6.4	LOS A	1.6	39.8	0.42	0.54	32.6
Approach		291	1.0	0.261	6.5	LOS A	1.6	39.8	0.42	0.52	32.5
North: V2/School Access											
7	L	152	1.0	0.184	13.9	LOS B	1.0	26.1	0.48	0.72	29.1
4	T	10	1.0	0.184	5.6	LOS A	1.0	26.1	0.48	0.48	32.0
14	R	24	1.0	0.184	6.9	LOS A	1.0	26.1	0.48	0.54	31.7
Approach		186	1.0	0.184	12.5	LOS B	1.0	26.1	0.48	0.68	29.5
West: Spine Rd											
5	L	128	1.0	0.530	14.0	LOS B	4.2	106.5	0.58	0.82	30.0
2	T	468	1.0	0.530	5.7	LOS A	4.2	106.5	0.58	0.51	32.0
12	R	2	1.0	0.530	7.0	LOS A	4.2	106.5	0.58	0.60	31.9
Approach		599	1.0	0.530	7.5	LOS A	4.2	106.5	0.58	0.58	31.5
All Vehicles		1186	1.0	0.530	8.4	LOS A	4.2	106.5	0.54	0.60	31.3

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Intersection 6 No Connection PM

New Site
Roundabout

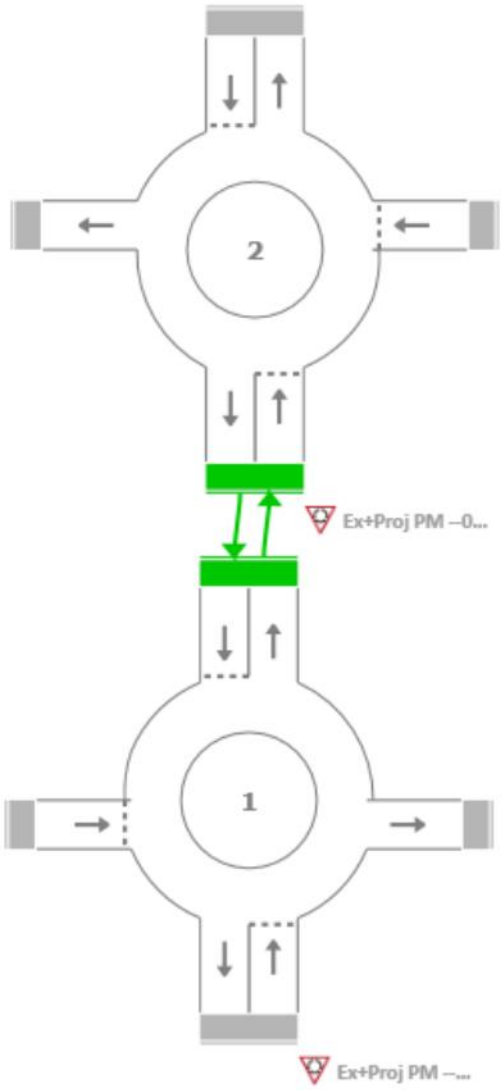
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: V1/V4 Access											
3	L	5	1.0	0.125	16.0	LOS B	0.7	18.3	0.68	0.84	28.7
8	T	6	1.0	0.125	7.7	LOS A	0.7	18.3	0.68	0.66	31.1
18	R	80	1.0	0.125	9.1	LOS A	0.7	18.3	0.68	0.70	31.1
Approach		92	1.0	0.125	9.4	LOS A	0.7	18.3	0.68	0.71	31.0
East: Spine Rd											
1	L	142	1.0	0.636	12.5	LOS B	7.0	177.0	0.23	0.84	30.2
6	T	752	1.0	0.636	4.2	LOS A	7.0	177.0	0.23	0.33	34.3
16	R	98	1.0	0.636	5.6	LOS A	7.0	177.0	0.23	0.44	33.5
Approach		993	1.0	0.636	5.6	LOS A	7.0	177.0	0.23	0.42	33.5
North: V2/School Access											
7	L	52	1.0	0.172	19.5	LOS B	1.0	26.3	0.80	0.89	26.8
4	T	12	1.0	0.172	11.2	LOS B	1.0	26.3	0.80	0.79	29.1
14	R	36	1.0	0.172	12.6	LOS B	1.0	26.3	0.80	0.81	28.9
Approach		100	1.0	0.172	16.0	LOS B	1.0	26.3	0.80	0.85	27.7
West: Spine Rd											
5	L	14	1.0	0.491	14.0	LOS B	3.6	91.9	0.54	0.87	30.2
2	T	537	1.0	0.491	5.7	LOS A	3.6	91.9	0.54	0.50	32.5
12	R	4	1.0	0.491	7.0	LOS A	3.6	91.9	0.54	0.59	32.3
Approach		555	1.0	0.491	5.9	LOS A	3.6	91.9	0.54	0.51	32.4
All Vehicles		1740	1.0	0.636	6.5	LOS A	7.0	177.0	0.39	0.49	32.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

NETWORK LAYOUT

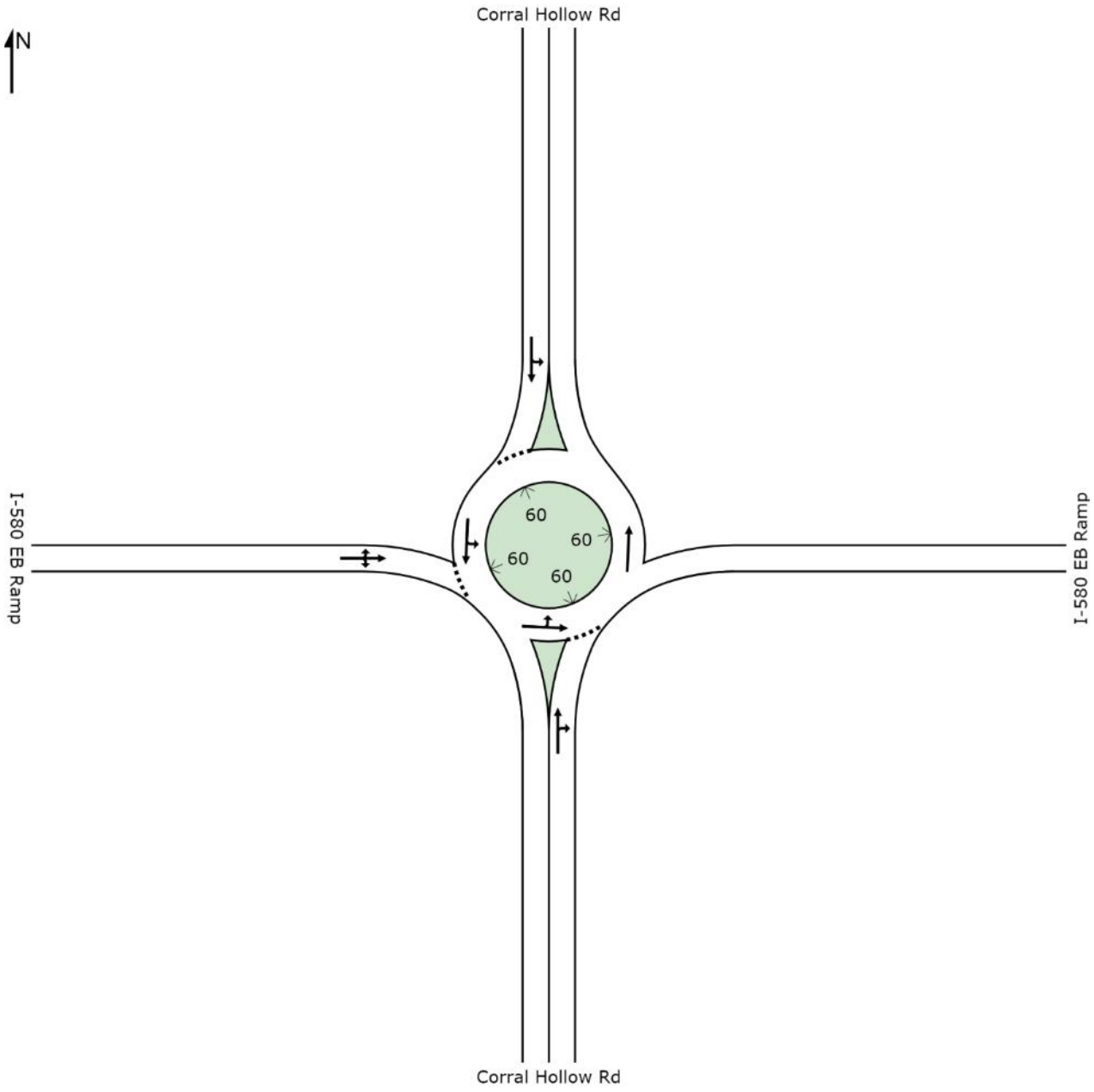
Network: Ex+Proj PM - Corral Hollow/I-580 Interchange



SITE LAYOUT

Site: Ex+Proj PM -- 01 Corral Hollow/I-580 EB Ramps

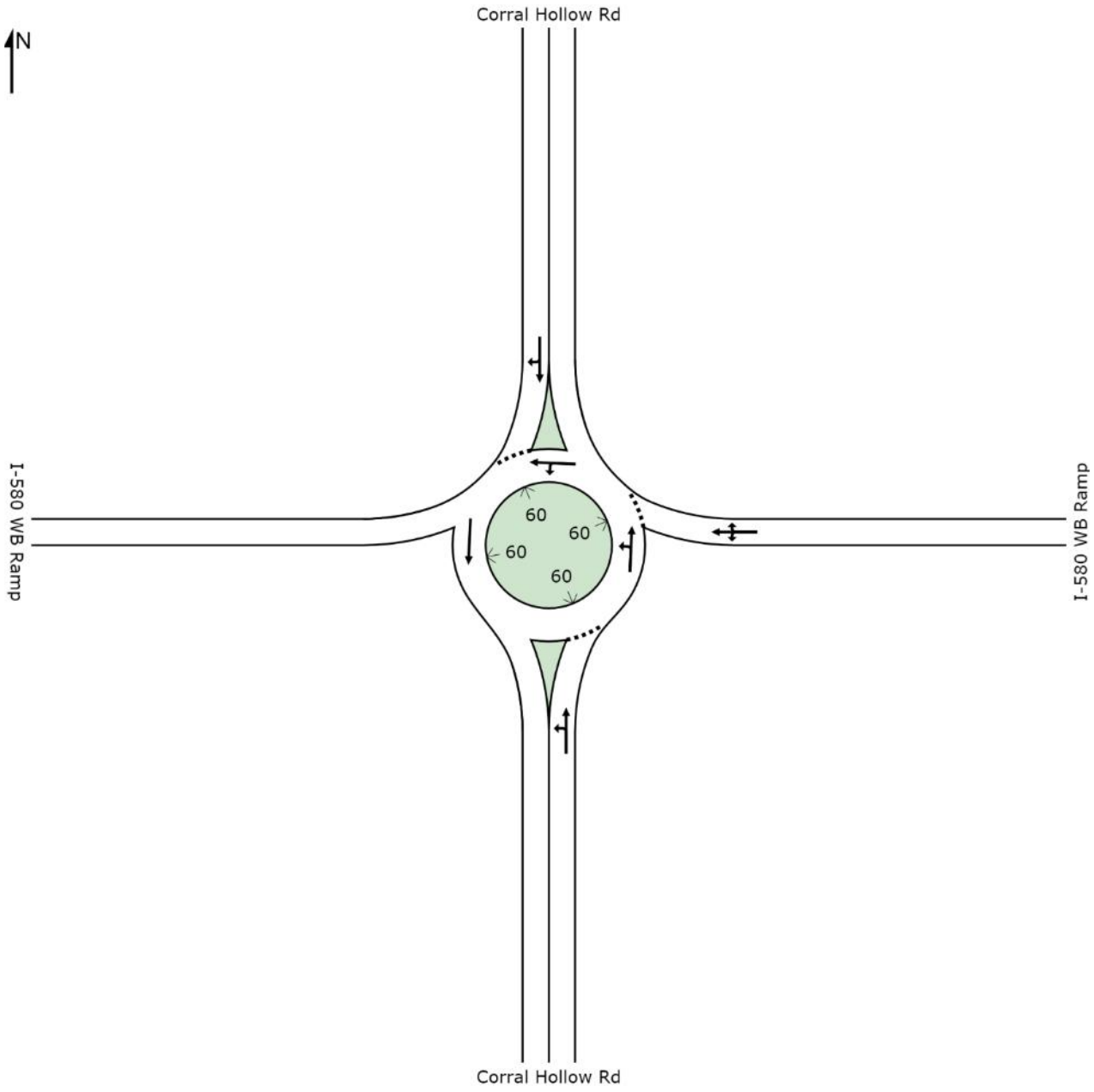
Roundabout



SITE LAYOUT

Site: Ex+Proj PM --02 Corral Hollow/I-580 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Ex+Proj PM - Corral Hollow/I-580 Interchange

New Network

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS F						
Travel Time Index	0.00						
Speed Efficiency	0.09						
Congestion Coefficient	10.56						
Travel Speed	3.8	mph				3.8	mph
Travel Distance (Total)	1710.1	veh-mi/h				2052.2	pers-mi/h
Travel Time (Total)	451.6	veh-h/h				542.0	pers-h/h
Travel Distance (Average)	1783	ft				1590	ft
Travel Time (Average)	321.1	sec	950.7	sec/mi		286.4	sec
Idling Time (Average)	206.7	sec	612.1	sec/mi	64.39 %		
Running Time (Average)	114.3	sec	338.6	sec/mi	35.61 %		
Desired Speed	40.0	mph					
Desired Trip Time	30.4	sec	90.0	sec/mi			
Travel Delay	290.7	sec	860.7	sec/mi	90.53 %		
Demand Flows (Total)	5677	veh/h				6813	pers/h
Arrival Flows (Total)	5064	veh/h				6813	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.4	%					
Degree of Saturation	2.230						
Control Delay (Total)	408.85	veh-h/h				490.62	pers-h/h
Control Delay (Average)	290.6	sec				259.3	sec
Control Delay (Worst Lane)	583.1	sec					
Control Delay (Worst Movement)	586.0	sec				586.0	sec
Geometric Delay (Average)	6.6	sec					
Stop-Line Delay (Average)	251.7	sec					
Queue Storage Ratio (Worst Lane)	4.48						
Total Effective Stops	18259	veh/h				21911	pers/h
Effective Stop Rate	3.61	per veh	10.7	per mi		3.22	per pers
Proportion Queued	0.69					0.69	
Performance Index	1692.0					1692.0	
Cost (Total)	6519.15	$/h	3.81	$/mi		6519.15	$/h
Fuel Consumption (Total)	169.3	gal/h	0.099	gal/mi			
Fuel Economy	10.1	mpg					
Carbon Dioxide (Total)	1511.7	kg/h	884.0	g/mi			
Hydrocarbons (Total)	1.116	kg/h	0.653	g/mi			
Carbon Monoxide (Total)	5.363	kg/h	3.136	g/mi			
NOx (Total)	1.270	kg/h	0.743	g/mi			

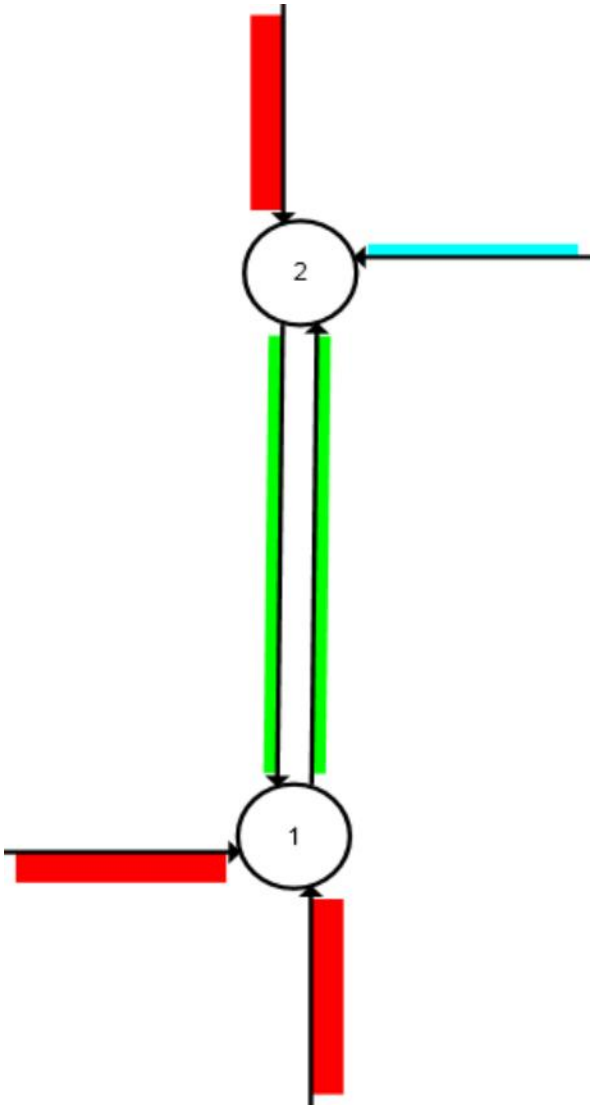
Network Model Accuracy Level (variations in lane degrees of saturation): -0.8 % to 0.9 %
Number of Iterations: 5
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,725,044	veh/y	3,270,052	pers/y
Delay	196,248	veh-h/y	235,498	pers-h/y
Effective Stops	8,764,547	veh/y	10,517,460	pers/y
Travel Distance	820,866	veh-mi/y	985,039	pers-mi/y
Travel Time	216,781	veh-h/y	260,137	pers-h/y
Cost	3,129,194	$/y	3,129,194	$/y
Fuel Consumption	81,277	gal/y		
Carbon Dioxide	725,631	kg/y		
Hydrocarbons	536	kg/y		
Carbon Monoxide	2,574	kg/y		
NOx	610	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

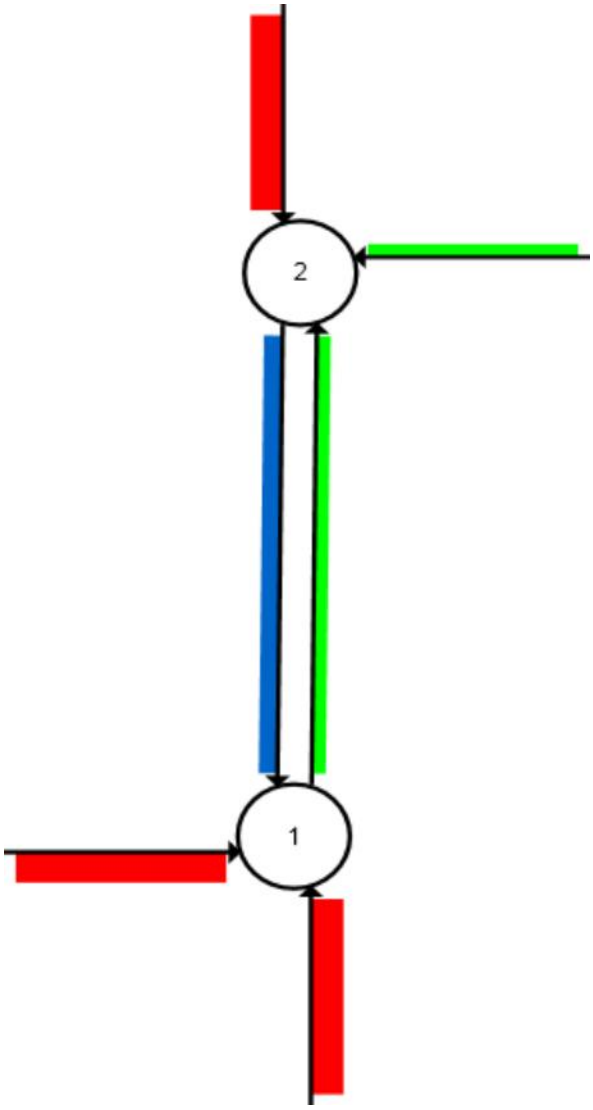
Network: Ex+Proj PM - Corral Hollow/I-580 Interchange



DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

Network: Ex+Proj PM - Corral Hollow/I-580 Interchange



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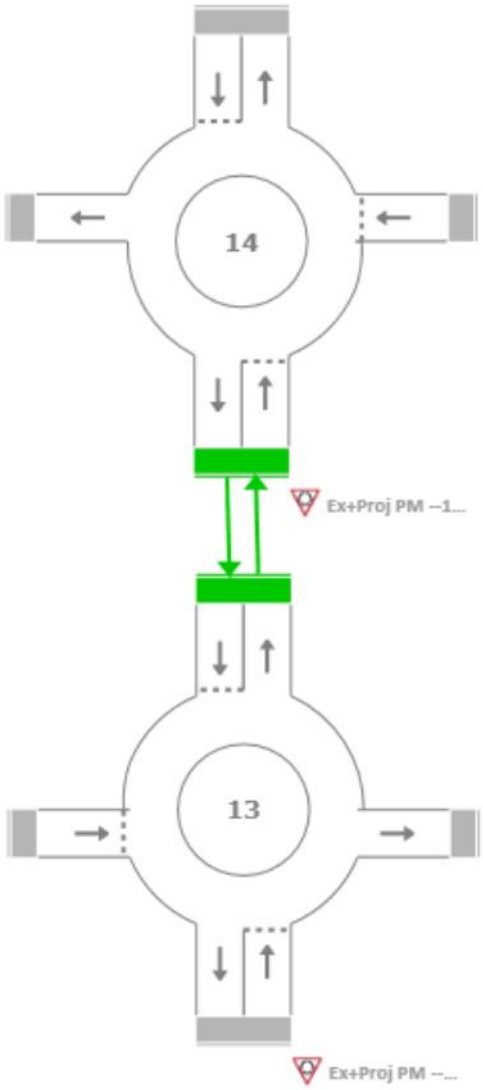
NETWORK LAYOUT

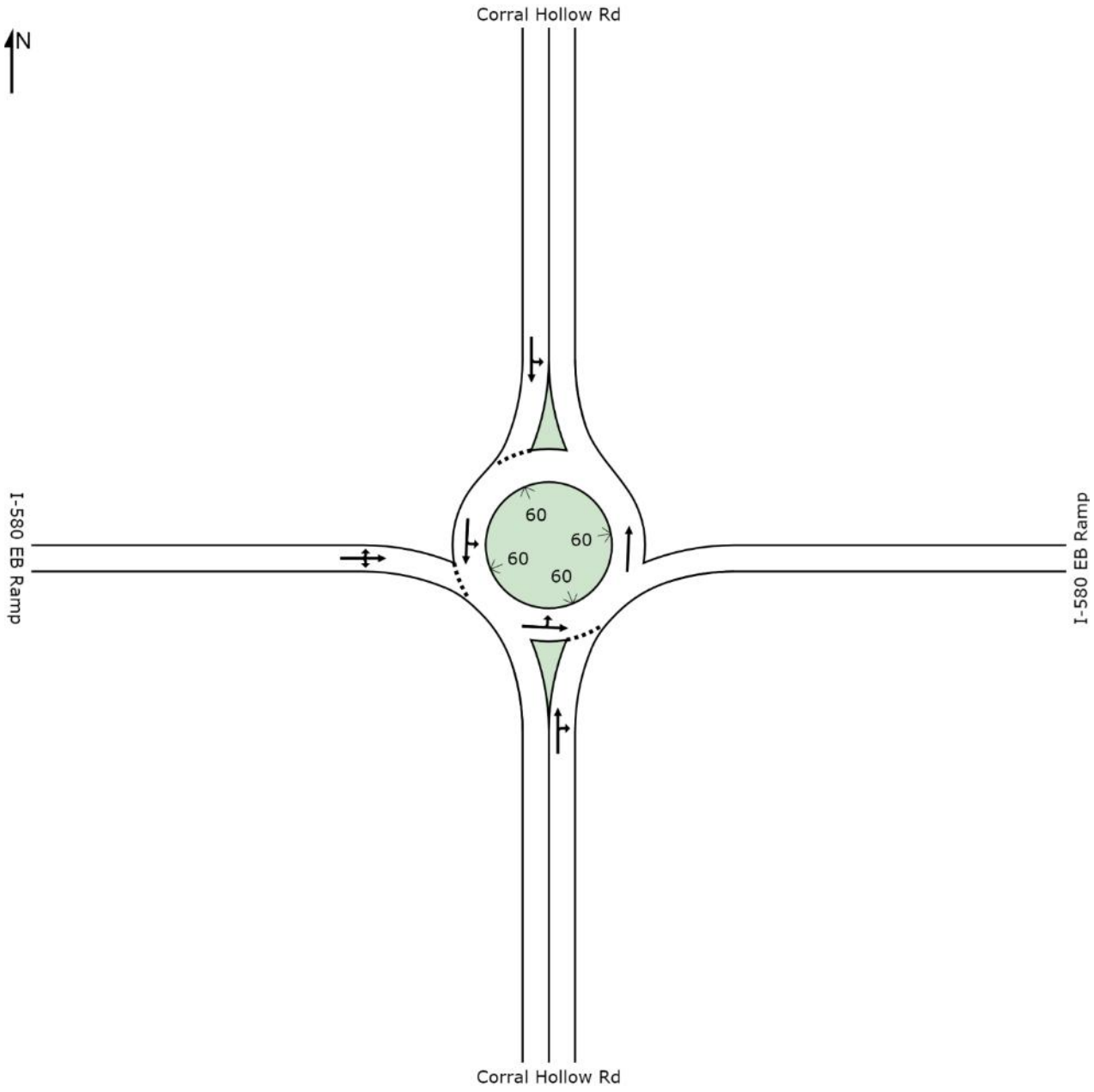
Network: Ex+Proj PM - Mtn House/I-580 Interchange



SITE LAYOUT

Site: Ex+Proj PM -- 13 Mtn House/I-580 EB Ramps

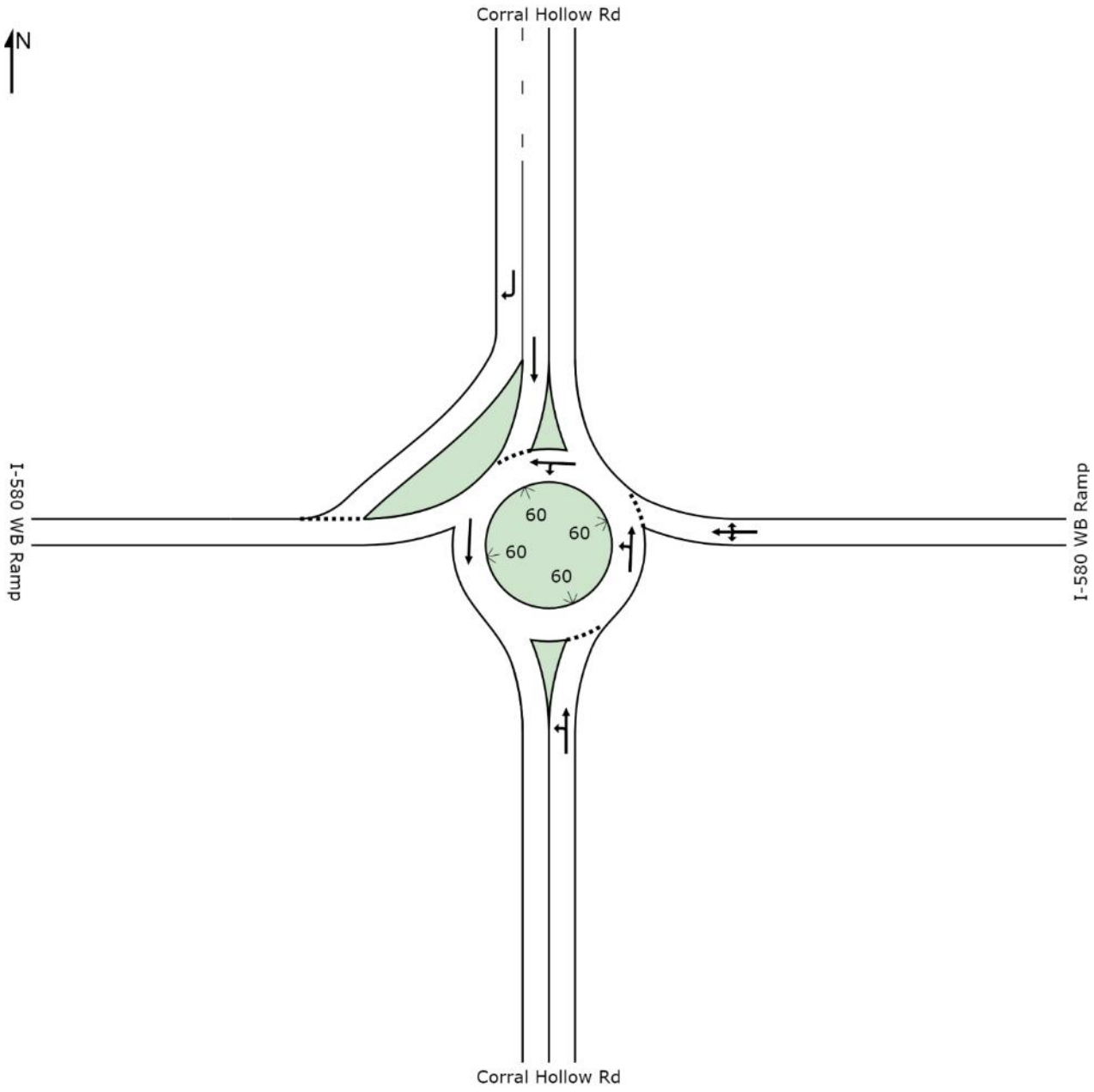
Roundabout



SITE LAYOUT

Site: Ex+Proj PM --14 Mtn House/I-580 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Ex+Proj PM - Mtn House/I-580 Interchange

New Network

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS D						
Travel Time Index	3.59						
Speed Efficiency	0.42						
Congestion Coefficient	2.36						
Travel Speed	16.9	mph				16.9	mph
Travel Distance (Total)	946.3	veh-mi/h				1135.5	pers-mi/h
Travel Time (Total)	55.9	veh-h/h				67.0	pers-h/h
Travel Distance (Average)	1534	ft				1495	ft
Travel Time (Average)	61.8	sec	212.5	sec/mi		60.2	sec
Idling Time (Average)	18.5	sec	63.7	sec/mi	29.97 %		
Running Time (Average)	43.2	sec	148.8	sec/mi	70.03 %		
Desired Speed	40.0	mph					
Desired Trip Time	26.2	sec	90.0	sec/mi			
Travel Delay	35.6	sec	122.5	sec/mi	57.65 %		
Demand Flows (Total)	3342	veh/h				4011	pers/h
Arrival Flows (Total)	3256	veh/h				4011	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.1	%					
Degree of Saturation	1.202						
Control Delay (Total)	31.92	veh-h/h				38.31	pers-h/h
Control Delay (Average)	35.3	sec				34.4	sec
Control Delay (Worst Lane)	119.3	sec					
Control Delay (Worst Movement)	119.8	sec				119.8	sec
Geometric Delay (Average)	7.3	sec					
Stop-Line Delay (Average)	27.8	sec					
Queue Storage Ratio (Worst Lane)	1.30						
Total Effective Stops	3623	veh/h				4348	pers/h
Effective Stop Rate	1.11	per veh	3.8	per mi		1.08	per pers
Proportion Queued	0.40					0.40	
Performance Index	190.2					190.2	
Cost (Total)	866.35	$/h	0.92	$/mi		866.35	$/h
Fuel Consumption (Total)	29.0	gal/h	0.031	gal/mi			
Fuel Economy	32.7	mpg					
Carbon Dioxide (Total)	258.6	kg/h	273.2	g/mi			
Hydrocarbons (Total)	0.139	kg/h	0.147	g/mi			
Carbon Monoxide (Total)	0.893	kg/h	0.943	g/mi			
NOx (Total)	0.335	kg/h	0.354	g/mi			

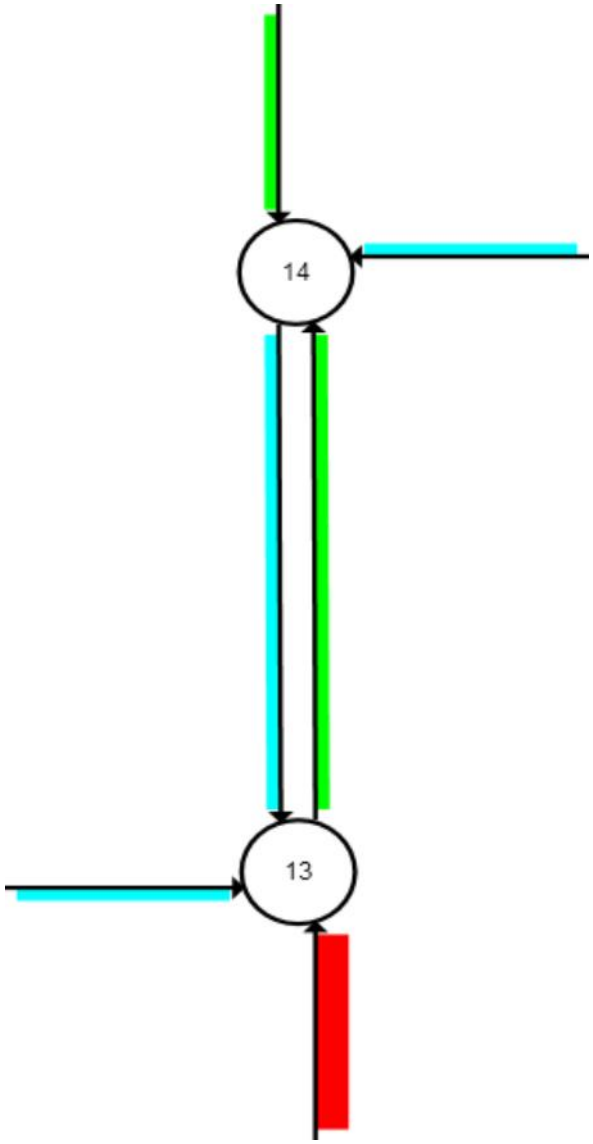
Network Model Accuracy Level (variations in lane degrees of saturation): 0.0 % to 0.0 %
Number of Iterations: 2
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,604,348	veh/y	1,925,217	pers/y
Delay	15,322	veh-h/y	18,386	pers-h/y
Effective Stops	1,739,069	veh/y	2,086,883	pers/y
Travel Distance	454,212	veh-mi/y	545,054	pers-mi/y
Travel Time	26,810	veh-h/y	32,173	pers-h/y
Cost	415,849	$/y	415,849	$/y
Fuel Consumption	13,902	gal/y		
Carbon Dioxide	124,110	kg/y		
Hydrocarbons	67	kg/y		
Carbon Monoxide	428	kg/y		
NOx	161	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

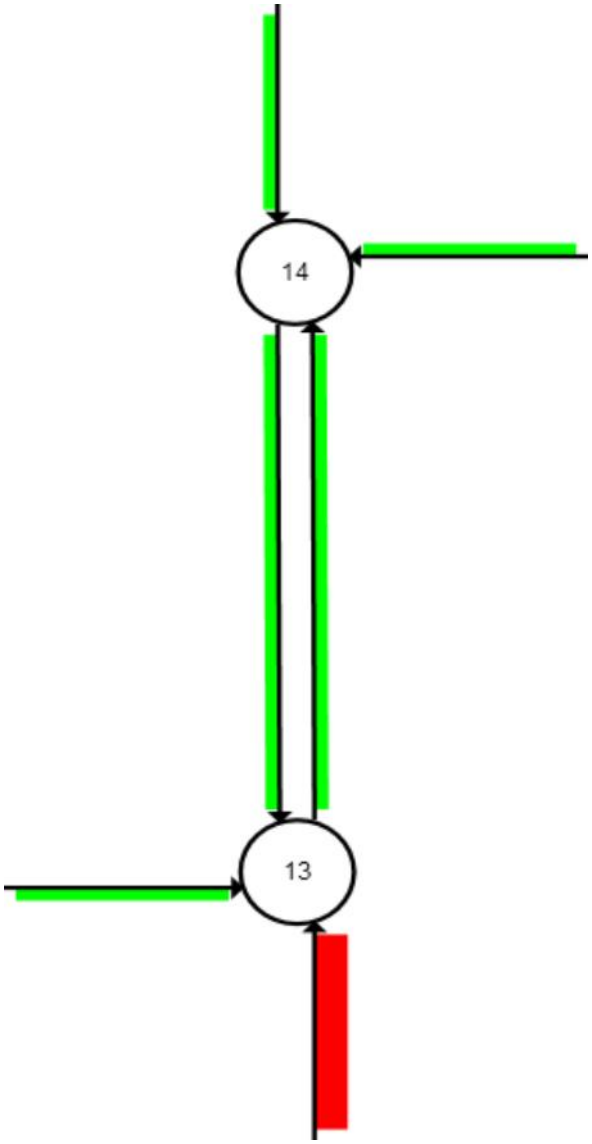
Network: Ex+Proj PM - Mtn House/I-580 Interchange



DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

Network: Ex+Proj PM - Mtn House/I-580 Interchange



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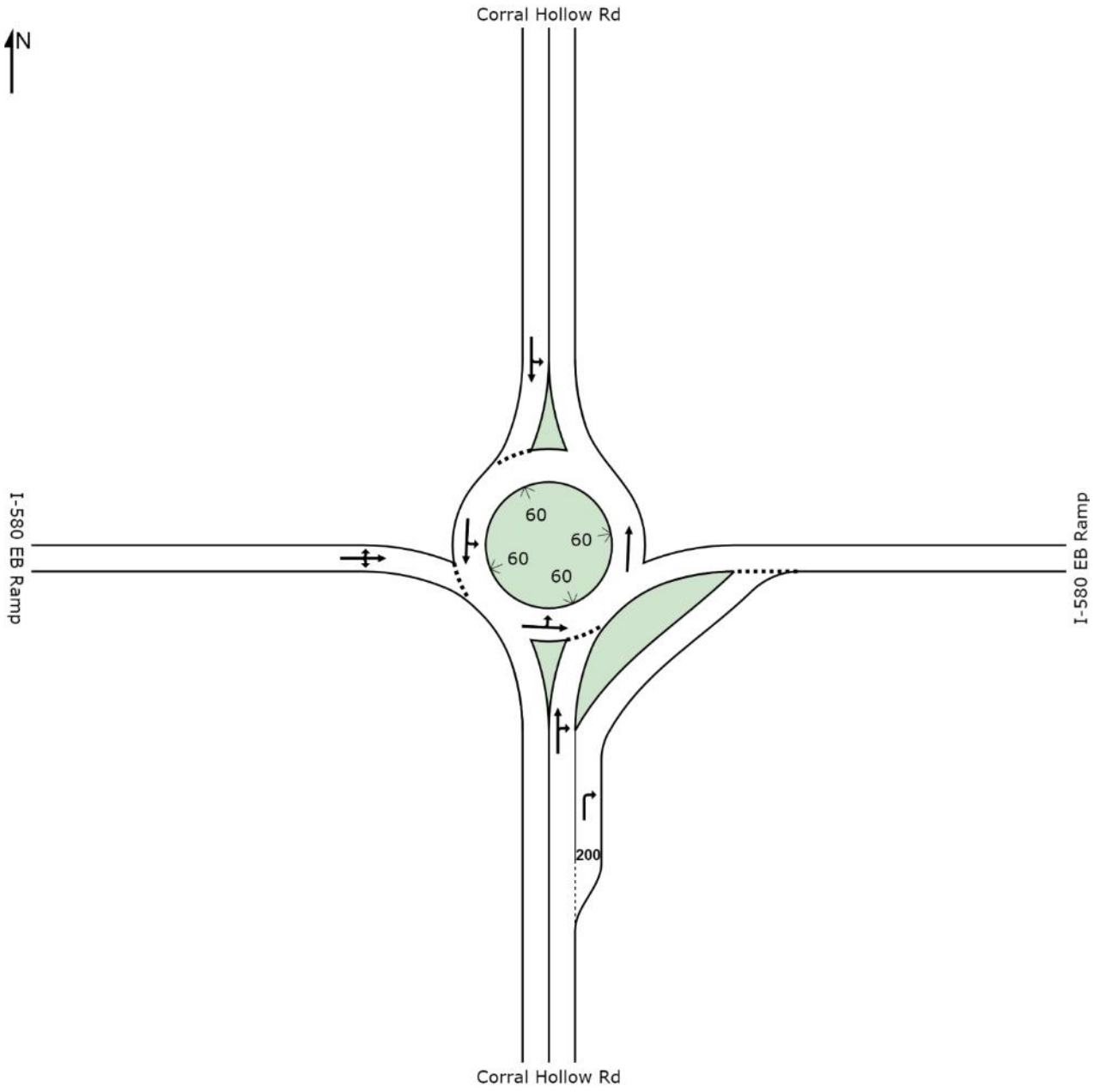
SITE LAYOUT

Site: Ex+Proj PM -- Modified 13 Mtn House/I-580 EB Ramps

Modified Intersection 13
Roundabout



NETWORK SUMMARY

Network: Existing+Proj PM - 13 Modified

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS B						
Travel Time Index	6.71						
Speed Efficiency	0.70						
Congestion Coefficient	1.42						
Travel Speed	28.1	mph				28.1	mph
Travel Distance (Total)	959.5	veh-mi/h				1151.4	pers-mi/h
Travel Time (Total)	34.1	veh-h/h				40.9	pers-h/h
Travel Distance (Average)	1516	ft				1516	ft
Travel Time (Average)	36.7	sec	127.9	sec/mi		36.7	sec
Idling Time (Average)	0.8	sec	2.7	sec/mi	2.12 %		
Running Time (Average)	35.9	sec	125.2	sec/mi	97.88 %		
Desired Speed	40.0	mph					
Desired Trip Time	25.8	sec	90.0	sec/mi			
Travel Delay	10.9	sec	37.9	sec/mi	29.63 %		
Demand Flows (Total)	3342	veh/h				4011	pers/h
Arrival Flows (Total)	3342	veh/h				4011	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.0	%					
Degree of Saturation	0.777						
Control Delay (Total)	9.80	veh-h/h				11.76	pers-h/h
Control Delay (Average)	10.6	sec				10.6	sec
Control Delay (Worst Lane)	18.0	sec					
Control Delay (Worst Movement)	20.1	sec				20.1	sec
Geometric Delay (Average)	7.4	sec					
Stop-Line Delay (Average)	3.1	sec					
Queue Storage Ratio (Worst Lane)	0.23						
Total Effective Stops	2325	veh/h				2790	pers/h
Effective Stop Rate	0.70	per veh	2.4	per mi		0.70	per pers
Proportion Queued	0.37					0.37	
Performance Index	75.9					75.9	
Cost (Total)	556.07	$/h	0.58	$/mi		556.07	$/h
Fuel Consumption (Total)	21.7	gal/h	0.023	gal/mi			
Fuel Economy	44.2	mpg					
Carbon Dioxide (Total)	193.9	kg/h	202.1	g/mi			
Hydrocarbons (Total)	0.085	kg/h	0.088	g/mi			
Carbon Monoxide (Total)	0.660	kg/h	0.688	g/mi			
NOx (Total)	0.294	kg/h	0.306	g/mi			

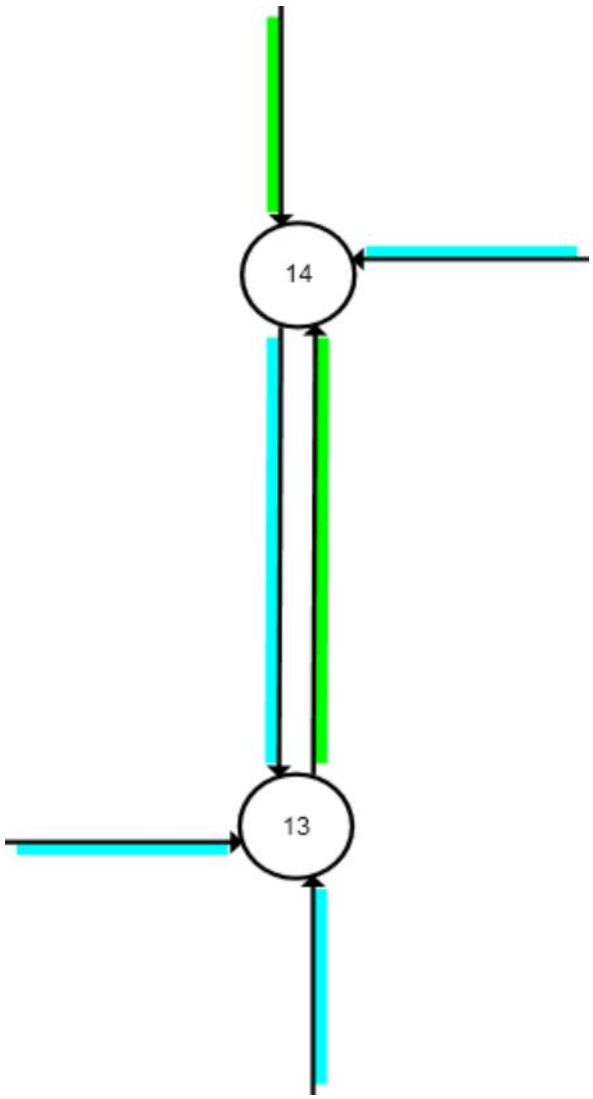
Network Model Accuracy Level (variations in lane degrees of saturation): 0.0 % to 0.0 %
Number of Iterations: 2
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,604,348	veh/y	1,925,217	pers/y
Delay	4,706	veh-h/y	5,647	pers-h/y
Effective Stops	1,115,927	veh/y	1,339,113	pers/y
Travel Distance	460,545	veh-mi/y	552,654	pers-mi/y
Travel Time	16,361	veh-h/y	19,634	pers-h/y
Cost	266,915	$/y	266,915	$/y
Fuel Consumption	10,427	gal/y		
Carbon Dioxide	93,090	kg/y		
Hydrocarbons	41	kg/y		
Carbon Monoxide	317	kg/y		
NOx	141	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

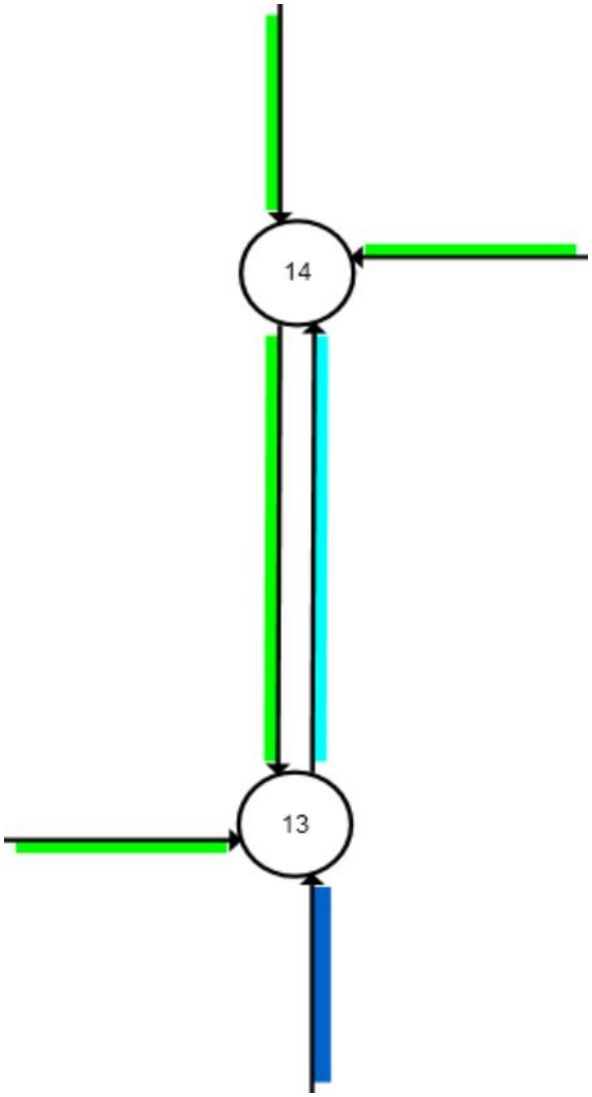
Network: Existing+Proj PM - 13 Modified

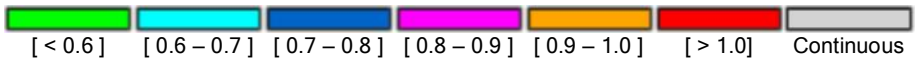


DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

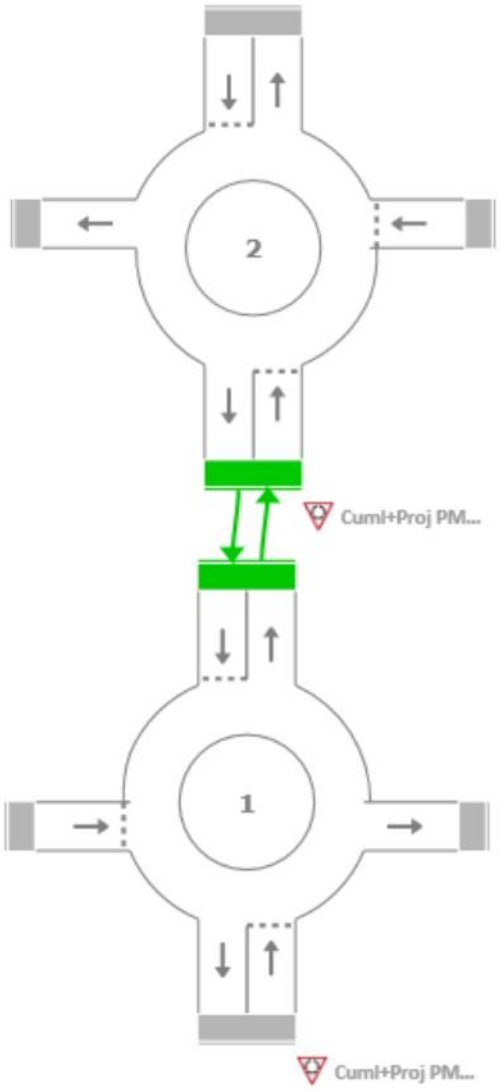
Network: Existing+Proj PM - 13 Modified





NETWORK LAYOUT

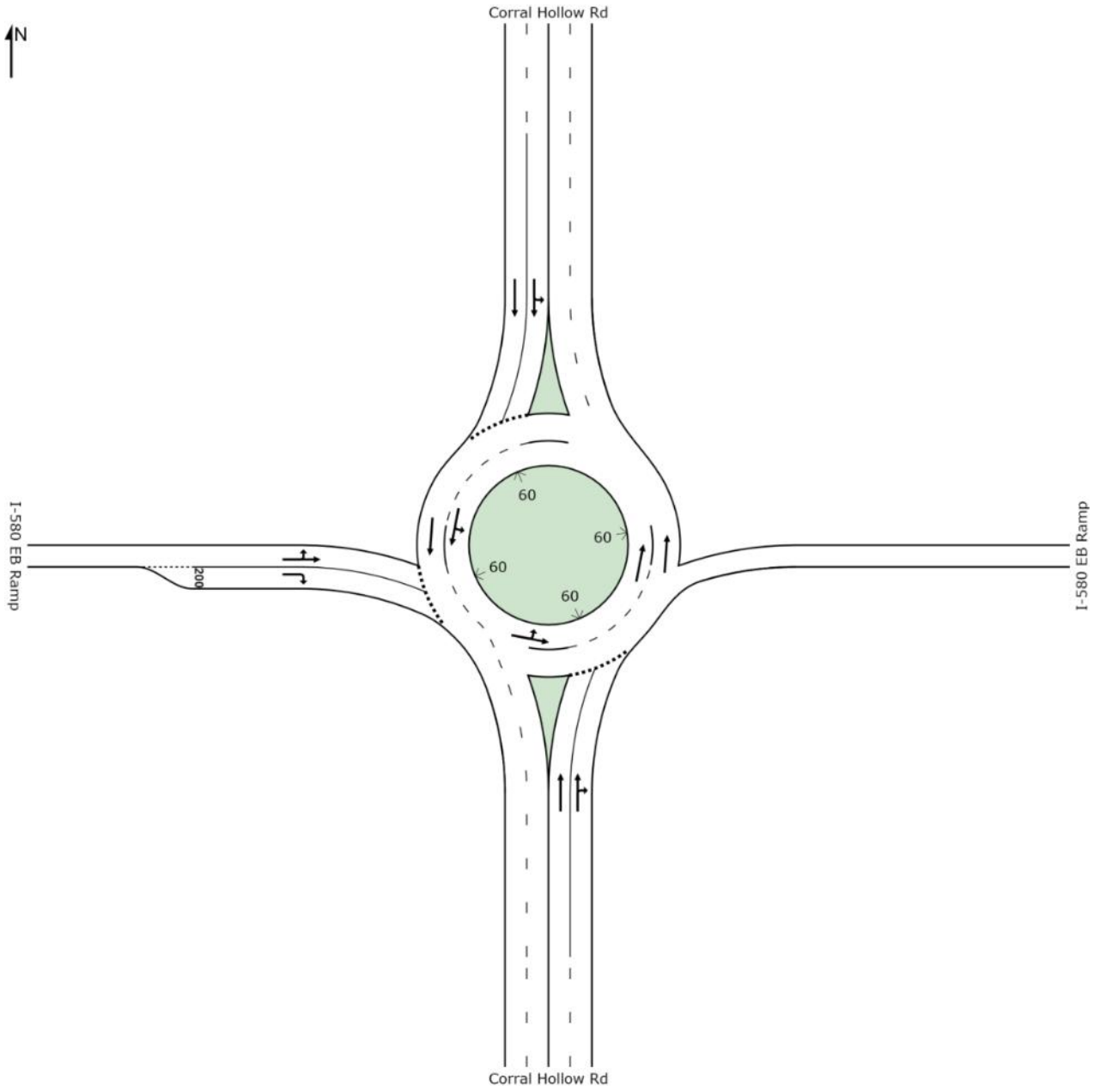
Network: Cuml+Proj PM - Corral Hollow/I-580 Interchange



SITE LAYOUT

Site: Cuml+Proj PM -- 01 Corral Hollow/I-580 EB Ramps

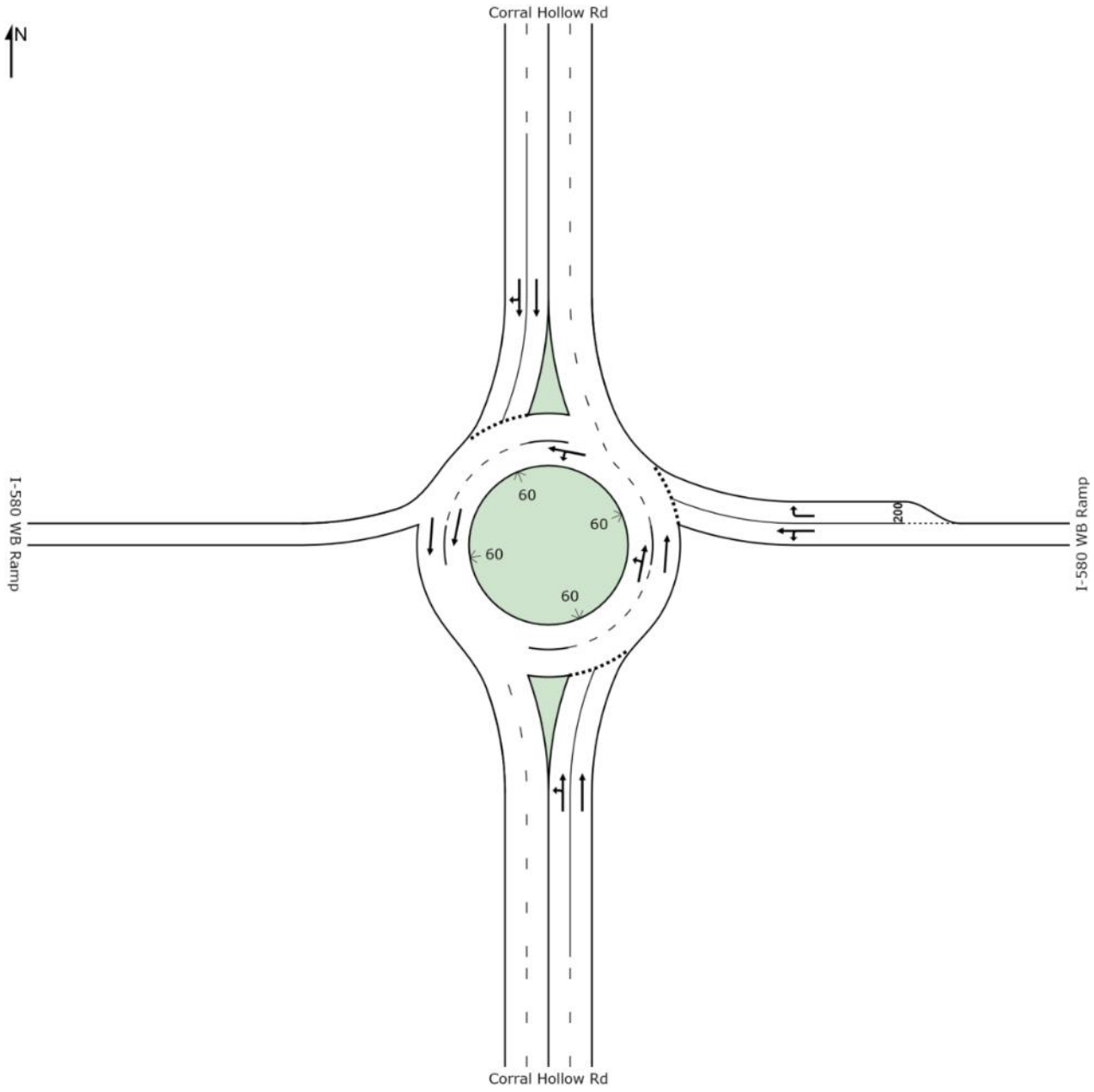
Cuml+Proj PM Corral Hollow Ramps
Roundabout



SITE LAYOUT

Site: Cuml+Proj PM --02 Corral Hollow/I-580 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Cuml+Proj PM - Corral Hollow/I-580 Interchange

New Network

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS E						
Travel Time Index	2.39						
Speed Efficiency	0.32						
Congestion Coefficient	3.17						
Travel Speed	12.6	mph				12.6	mph
Travel Distance (Total)	1533.8	veh-mi/h				1840.6	pers-mi/h
Travel Time (Total)	121.5	veh-h/h				145.9	pers-h/h
Travel Distance (Average)	1610	ft				1554	ft
Travel Time (Average)	87.0	sec	285.3	sec/mi		84.0	sec
Idling Time (Average)	38.5	sec	126.4	sec/mi	44.31 %		
Running Time (Average)	48.4	sec	158.9	sec/mi	55.69 %		
Desired Speed	40.0	mph					
Desired Trip Time	27.4	sec	90.0	sec/mi			
Travel Delay	59.5	sec	195.3	sec/mi	68.45 %		
Demand Flows (Total)	5210	veh/h				6252	pers/h
Arrival Flows (Total)	5031	veh/h				6252	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.1	%					
Degree of Saturation	1.379						
Control Delay (Total)	82.86	veh-h/h				99.43	pers-h/h
Control Delay (Average)	59.3	sec				57.3	sec
Control Delay (Worst Lane)	201.2	sec					
Control Delay (Worst Movement)	201.2	sec				201.2	sec
Geometric Delay (Average)	7.6	sec					
Stop-Line Delay (Average)	51.5	sec					
Queue Storage Ratio (Worst Lane)	1.49						
Total Effective Stops	6761	veh/h				8113	pers/h
Effective Stop Rate	1.34	per veh	4.4	per mi		1.30	per pers
Proportion Queued	0.49					0.48	
Performance Index	292.8					292.8	
Cost (Total)	1835.70	$/h	1.20	$/mi		1835.70	$/h
Fuel Consumption (Total)	57.0	gal/h	0.037	gal/mi			
Fuel Economy	26.9	mpg					
Carbon Dioxide (Total)	508.7	kg/h	331.7	g/mi			
Hydrocarbons (Total)	0.301	kg/h	0.196	g/mi			
Carbon Monoxide (Total)	1.772	kg/h	1.155	g/mi			
NOx (Total)	0.590	kg/h	0.384	g/mi			

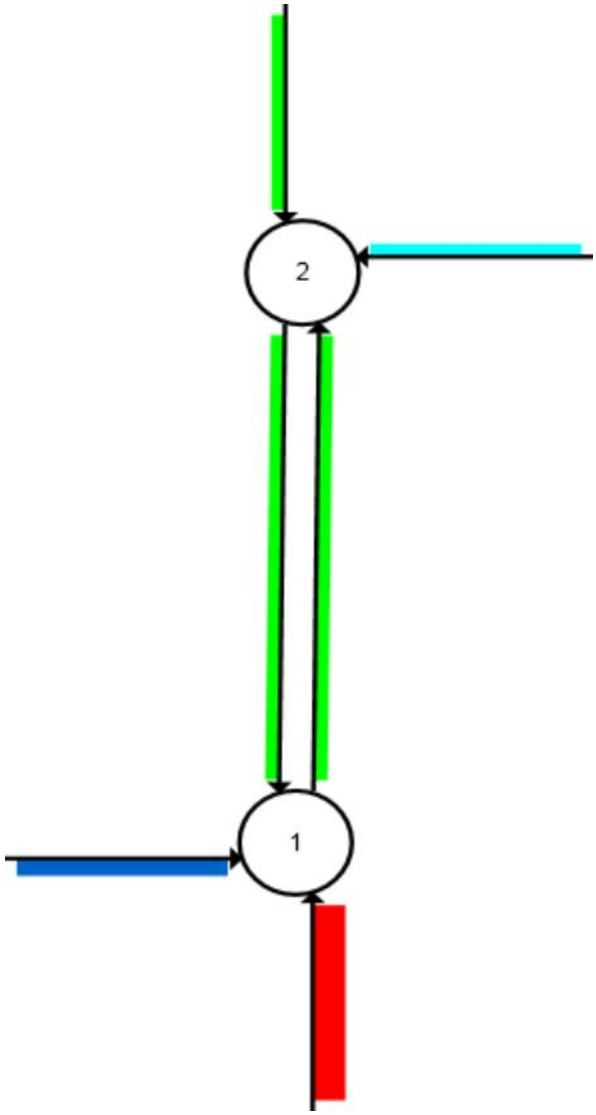
Network Model Accuracy Level (variations in lane degrees of saturation): 0.0 % to 0.0 %
Number of Iterations: 2
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

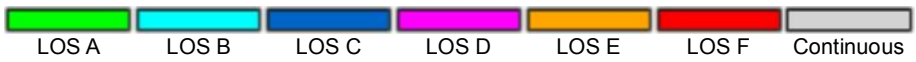
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,500,696	veh/y	3,000,835	pers/y
Delay	39,772	veh-h/y	47,727	pers-h/y
Effective Stops	3,245,259	veh/y	3,894,310	pers/y
Travel Distance	736,222	veh-mi/y	883,466	pers-mi/y
Travel Time	58,342	veh-h/y	70,010	pers-h/y
Cost	881,135	$/y	881,135	$/y
Fuel Consumption	27,352	gal/y		
Carbon Dioxide	244,190	kg/y		
Hydrocarbons	144	kg/y		
Carbon Monoxide	851	kg/y		
NOx	283	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

Network: Cuml+Proj PM - Corral Hollow/I-580 Interchange

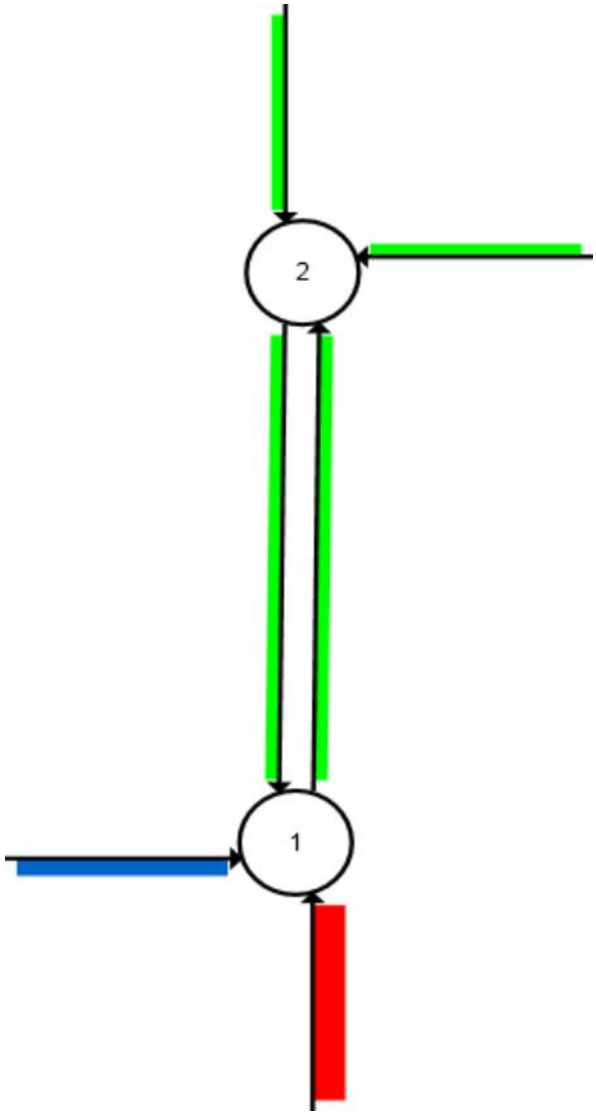


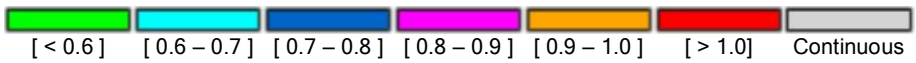


DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

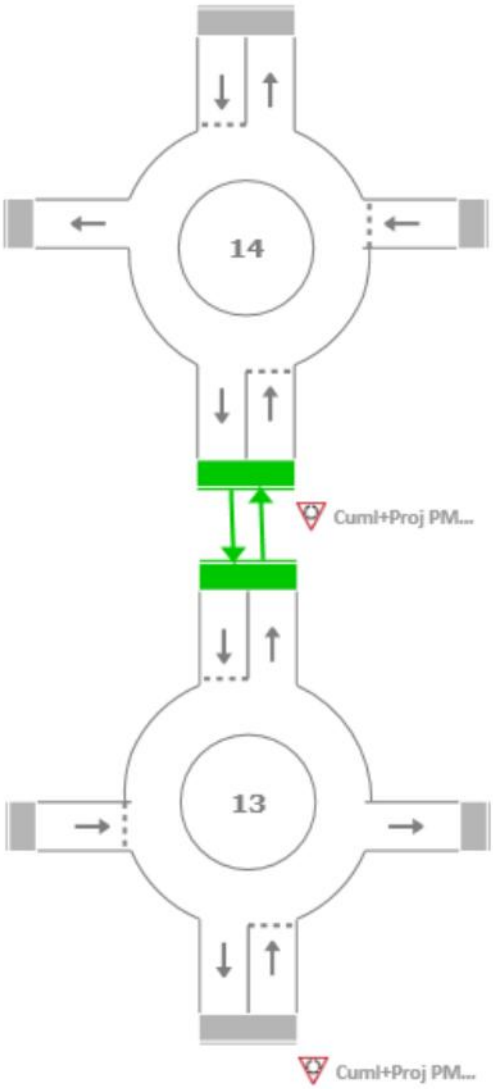
Network: Cuml+Proj PM - Corral Hollow/I-580 Interchange





NETWORK LAYOUT

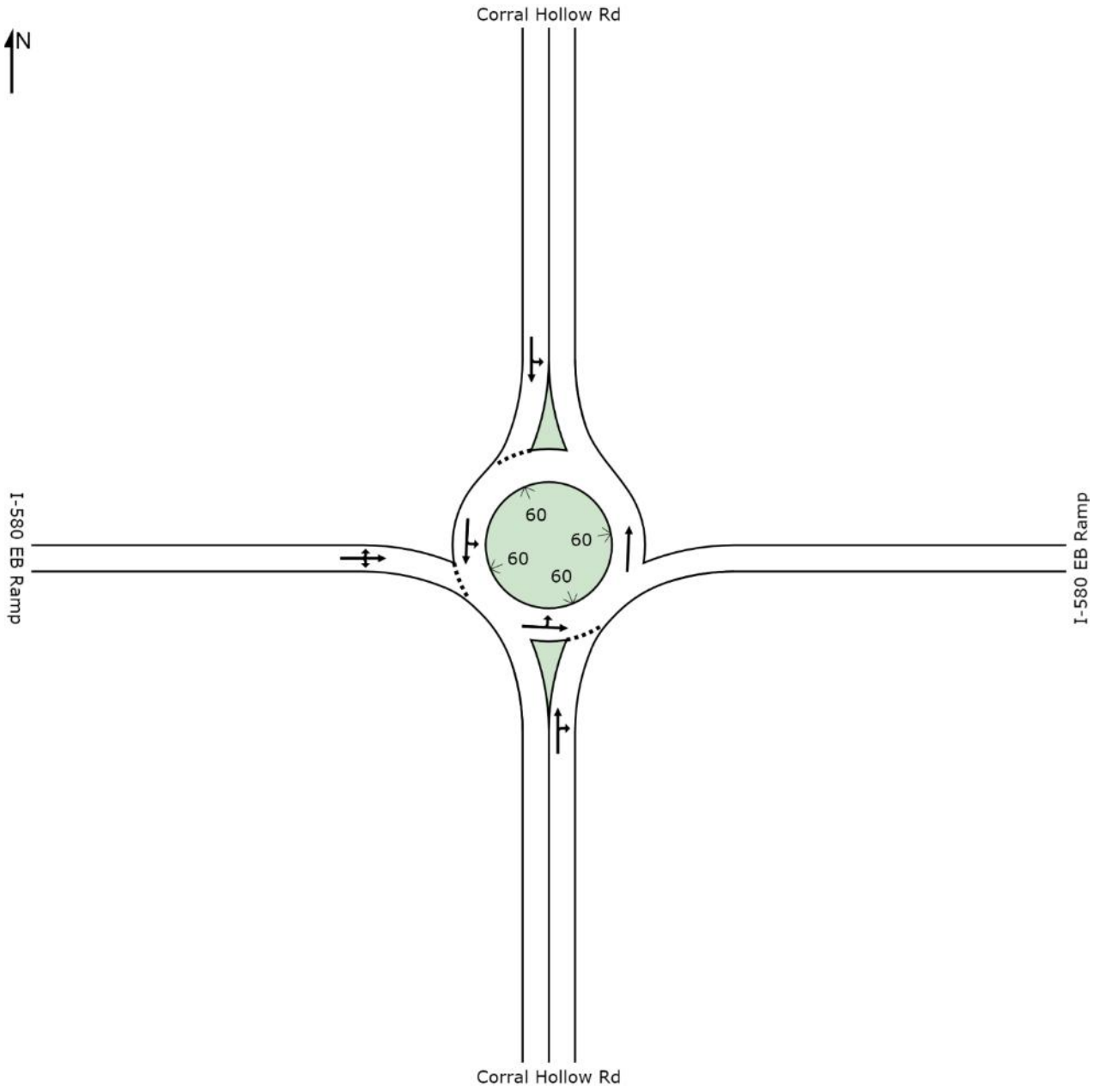
Network: Cuml+Proj PM - Mtn House/I-580 Ramps



SITE LAYOUT

Site: Cuml+Proj PM -- 13 Mtn House/I-580 EB Ramps

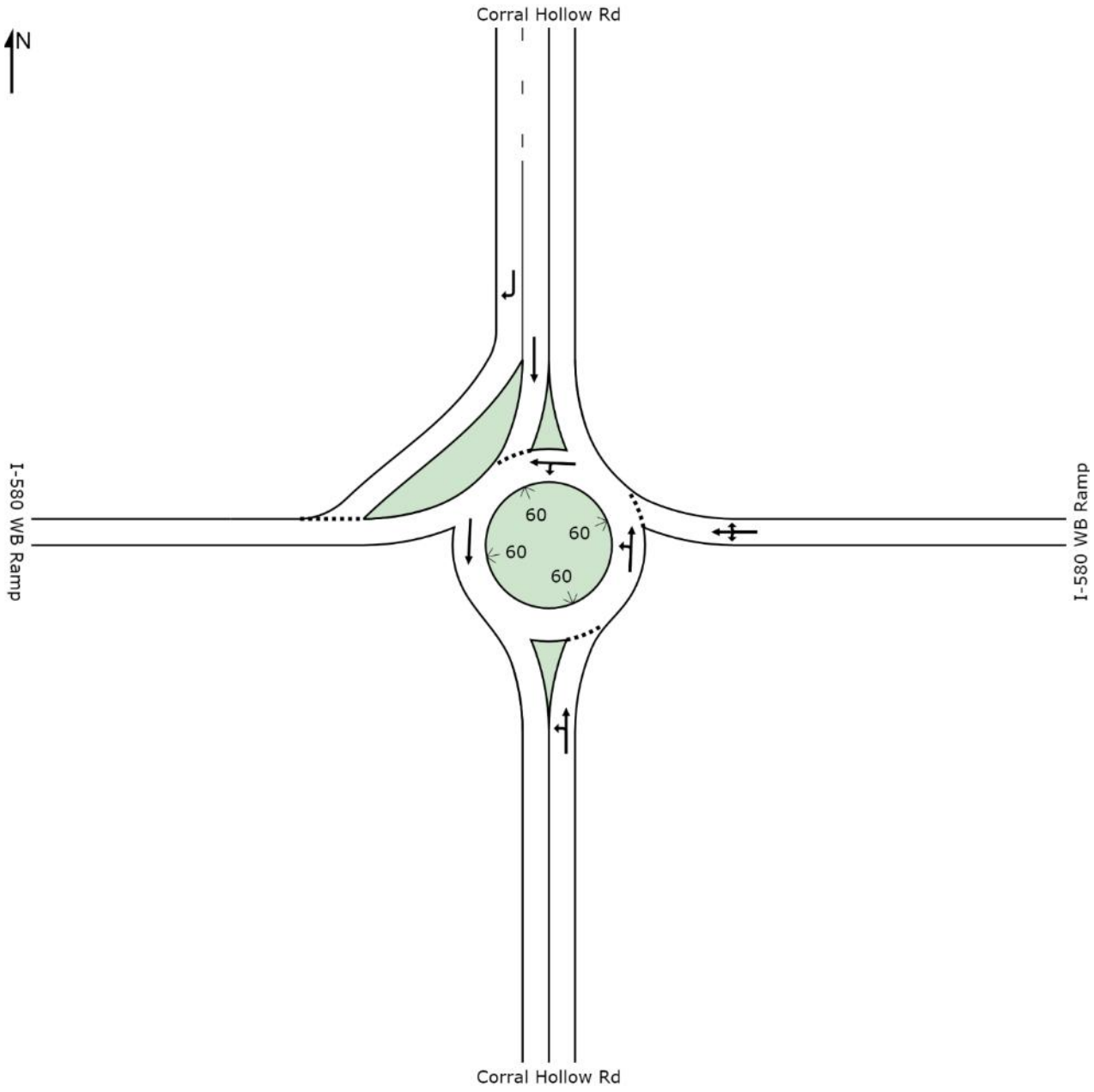
Roundabout



SITE LAYOUT

Site: Cuml+Proj PM --14 Mtn House/I-580 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Cuml+Proj PM - Mtn House/I-580 Ramps

New Network

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS F						
Travel Time Index	0.75						
Speed Efficiency	0.17						
Congestion Coefficient	5.97						
Travel Speed	6.7	mph				6.7	mph
Travel Distance (Total)	1139.1	veh-mi/h				1366.9	pers-mi/h
Travel Time (Total)	170.1	veh-h/h				204.1	pers-h/h
Travel Distance (Average)	1539	ft				1433	ft
Travel Time (Average)	156.7	sec	537.6	sec/mi		145.9	sec
Idling Time (Average)	102.2	sec	350.9	sec/mi	65.26 %		
Running Time (Average)	54.4	sec	186.7	sec/mi	34.74 %		
Desired Speed	40.0	mph					
Desired Trip Time	26.2	sec	90.0	sec/mi			
Travel Delay	130.4	sec	447.6	sec/mi	83.26 %		
Demand Flows (Total)	4198	veh/h				5037	pers/h
Arrival Flows (Total)	3909	veh/h				5037	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.2	%					
Degree of Saturation	2.041						
Control Delay (Total)	141.22	veh-h/h				169.46	pers-h/h
Control Delay (Average)	130.1	sec				121.1	sec
Control Delay (Worst Lane)	495.4	sec					
Control Delay (Worst Movement)	496.0	sec				496.0	sec
Geometric Delay (Average)	7.5	sec					
Stop-Line Delay (Average)	122.1	sec					
Queue Storage Ratio (Worst Lane)	3.59						
Total Effective Stops	6794	veh/h				8152	pers/h
Effective Stop Rate	1.74	per veh	6.0	per mi		1.62	per pers
Proportion Queued	0.51					0.50	
Performance Index	525.9					525.9	
Cost (Total)	2482.41	$/h	2.18	$/mi		2482.41	$/h
Fuel Consumption (Total)	68.8	gal/h	0.060	gal/mi			
Fuel Economy	16.5	mpg					
Carbon Dioxide (Total)	614.5	kg/h	539.5	g/mi			
Hydrocarbons (Total)	0.419	kg/h	0.368	g/mi			
Carbon Monoxide (Total)	2.163	kg/h	1.899	g/mi			
NOx (Total)	0.592	kg/h	0.520	g/mi			

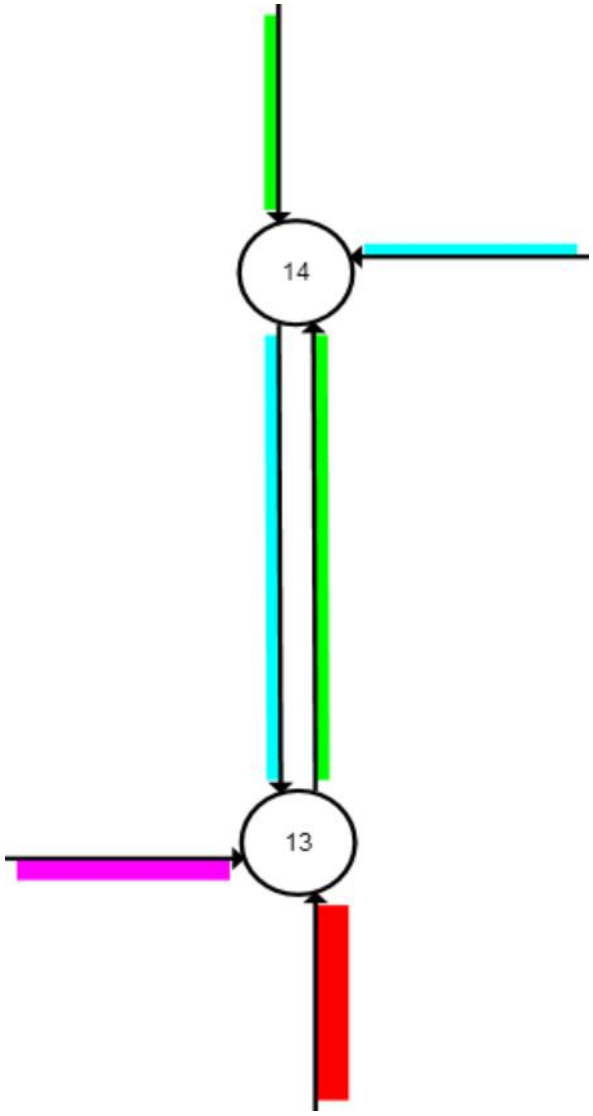
Network Model Accuracy Level (variations in lane degrees of saturation): 0.0 % to 0.0 %
Number of Iterations: 2
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

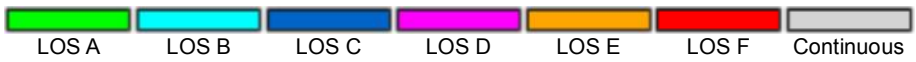
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,014,957	veh/y	2,417,948	pers/y
Delay	67,783	veh-h/y	81,340	pers-h/y
Effective Stops	3,260,985	veh/y	3,913,183	pers/y
Travel Distance	546,753	veh-mi/y	656,103	pers-mi/y
Travel Time	81,649	veh-h/y	97,979	pers-h/y
Cost	1,191,556	$/y	1,191,556	$/y
Fuel Consumption	33,039	gal/y		
Carbon Dioxide	294,963	kg/y		
Hydrocarbons	201	kg/y		
Carbon Monoxide	1,038	kg/y		
NOx	284	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

Network: Cuml+Proj PM - Mtn House/I-580 Ramps

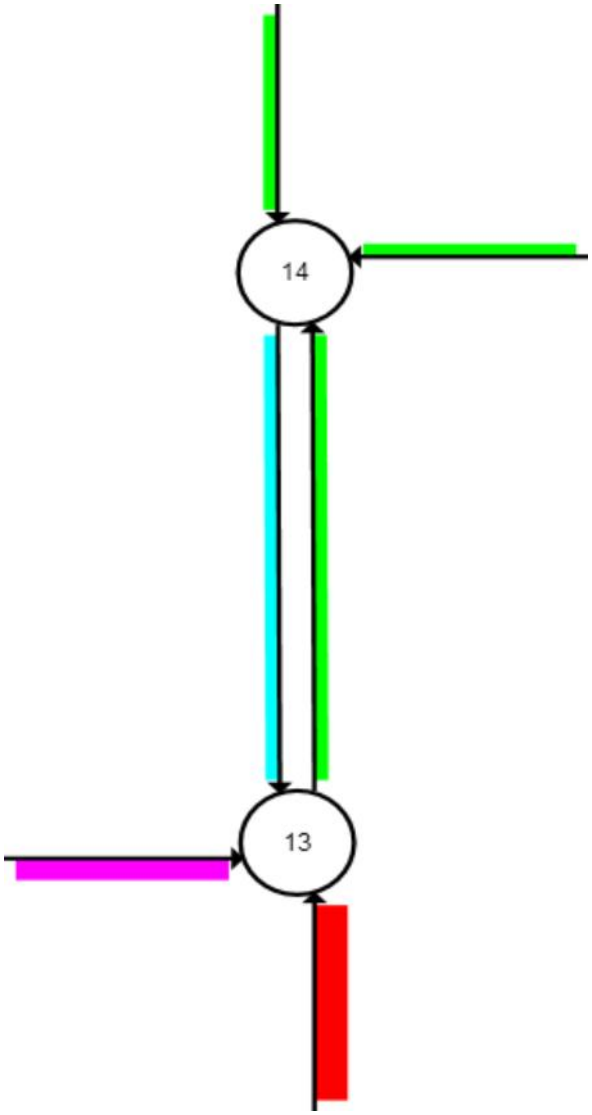


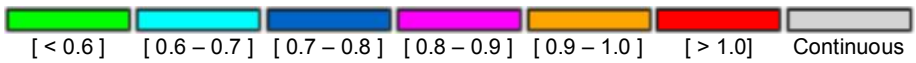


DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

Network: Cuml+Proj PM - Mtn House/I-580 Ramps

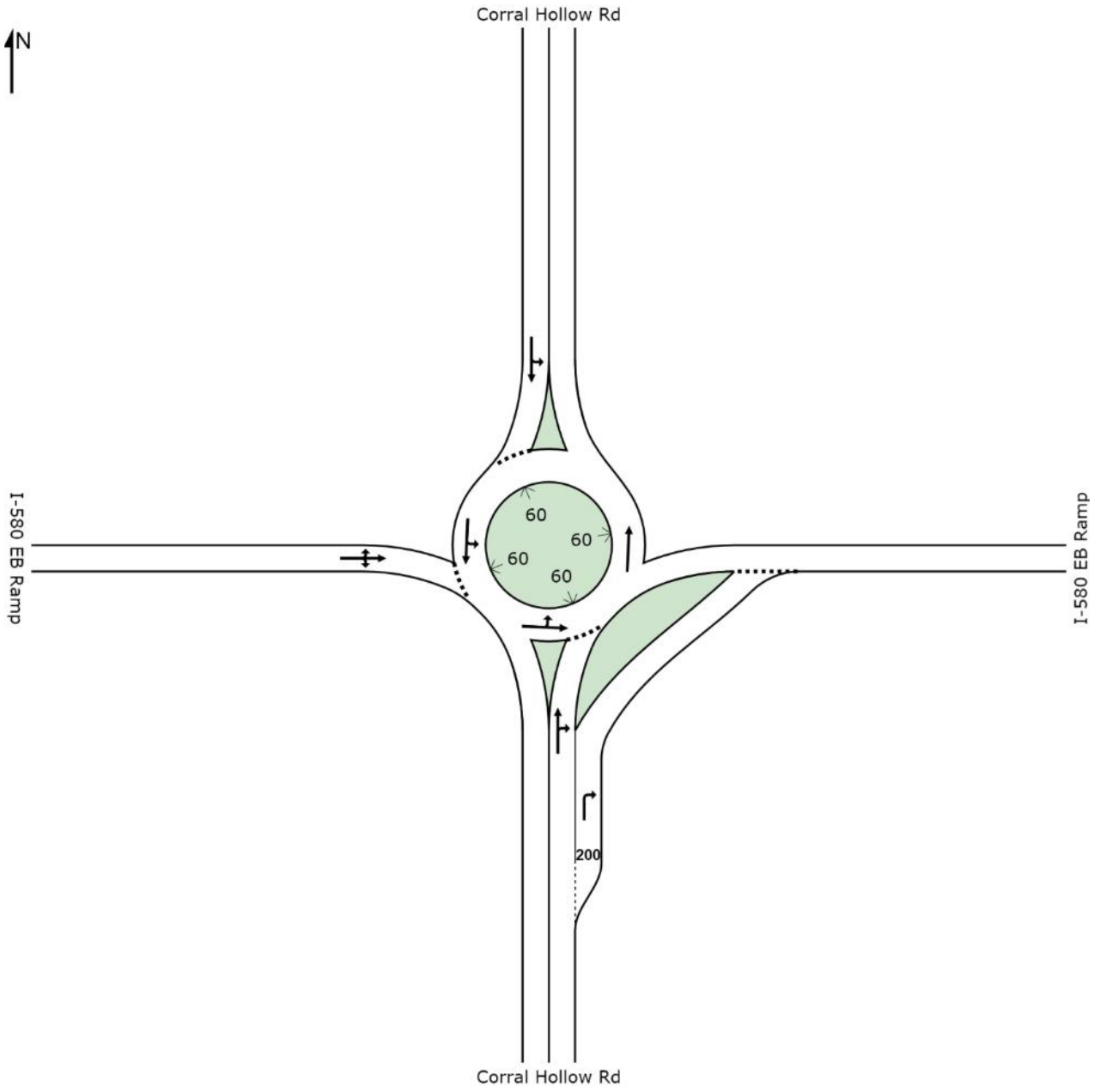




SITE LAYOUT

Site: Cuml+Proj PM -- Modified 13 Mtn House/I-580 EB Ramps

Modified Intersetion 13
Roundabout



NETWORK SUMMARY

Network: Cuml+Proj PM - 13 Modified

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS E						
Travel Time Index	3.22						
Speed Efficiency	0.39						
Congestion Coefficient	2.57						
Travel Speed	15.6	mph				15.6	mph
Travel Distance (Total)	1165.1	veh-mi/h				1398.1	pers-mi/h
Travel Time (Total)	74.8	veh-h/h				89.7	pers-h/h
Travel Distance (Average)	1508	ft				1465	ft
Travel Time (Average)	66.0	sec	231.1	sec/mi		64.1	sec
Idling Time (Average)	21.6	sec	75.8	sec/mi	32.79 %		
Running Time (Average)	44.4	sec	155.3	sec/mi	67.21 %		
Desired Speed	40.0	mph					
Desired Trip Time	25.7	sec	90.0	sec/mi			
Travel Delay	40.3	sec	141.1	sec/mi	61.05 %		
Demand Flows (Total)	4198	veh/h				5037	pers/h
Arrival Flows (Total)	4078	veh/h				5037	pers/h
Percent Heavy Vehicles (Demand)	3.0	%					
Percent Heavy Vehicles (Arrival)	3.1	%					
Degree of Saturation	1.267						
Control Delay (Total)	45.23	veh-h/h				54.28	pers-h/h
Control Delay (Average)	39.9	sec				38.8	sec
Control Delay (Worst Lane)	153.6	sec					
Control Delay (Worst Movement)	153.4	sec				153.4	sec
Geometric Delay (Average)	7.6	sec					
Stop-Line Delay (Average)	32.0	sec					
Queue Storage Ratio (Worst Lane)	1.48						
Total Effective Stops	4945	veh/h				5934	pers/h
Effective Stop Rate	1.21	per veh	4.2	per mi		1.18	per pers
Proportion Queued	0.50					0.50	
Performance Index	235.2					235.2	
Cost (Total)	1151.32	$/h	0.99	$/mi		1151.32	$/h
Fuel Consumption (Total)	37.7	gal/h	0.032	gal/mi			
Fuel Economy	30.9	mpg					
Carbon Dioxide (Total)	336.5	kg/h	288.8	g/mi			
Hydrocarbons (Total)	0.186	kg/h	0.159	g/mi			
Carbon Monoxide (Total)	1.163	kg/h	0.998	g/mi			
NOx (Total)	0.427	kg/h	0.366	g/mi			

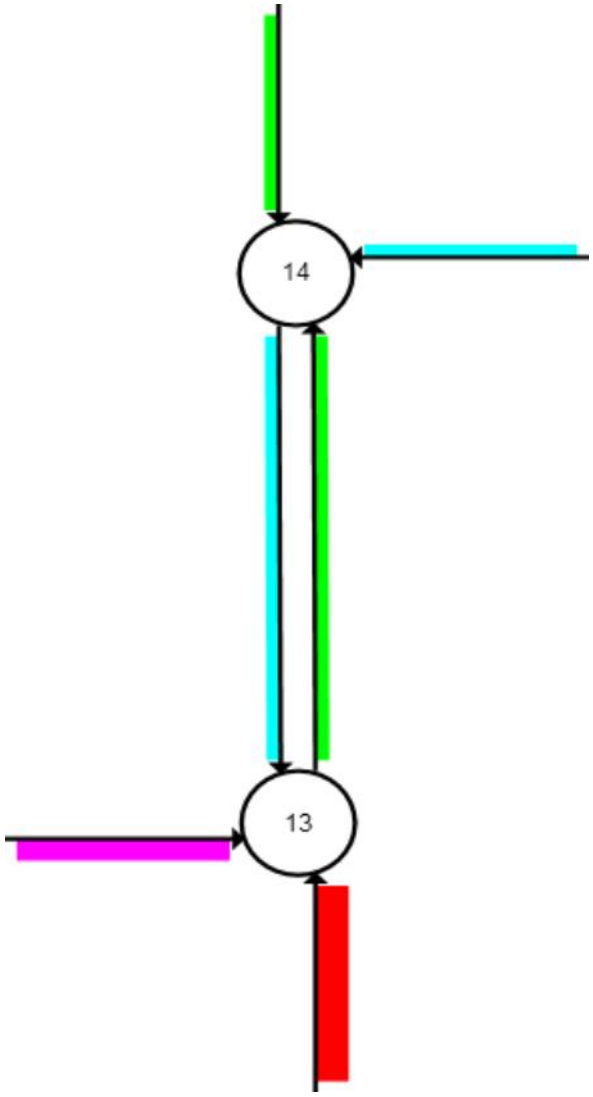
Network Model Accuracy Level (variations in lane degrees of saturation): 0.0 % to 0.0 %
Number of Iterations: 2
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,014,957	veh/y	2,417,948	pers/y
Delay	21,712	veh-h/y	26,054	pers-h/y
Effective Stops	2,373,644	veh/y	2,848,373	pers/y
Travel Distance	559,257	veh-mi/y	671,109	pers-mi/y
Travel Time	35,894	veh-h/y	43,073	pers-h/y
Cost	552,635	$/y	552,635	$/y
Fuel Consumption	18,090	gal/y		
Carbon Dioxide	161,507	kg/y		
Hydrocarbons	89	kg/y		
Carbon Monoxide	558	kg/y		
NOx	205	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

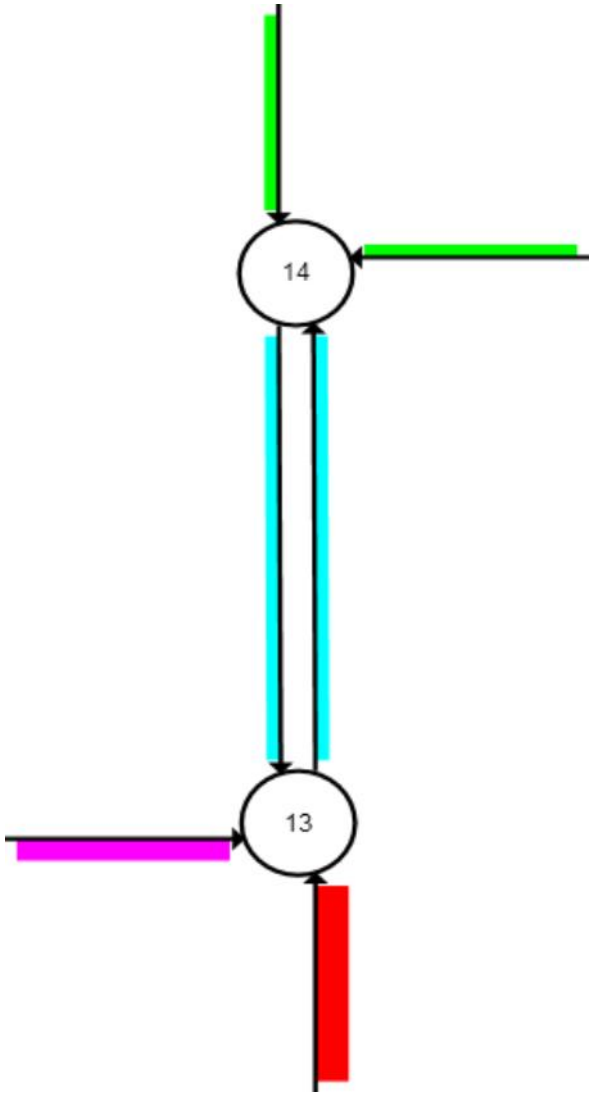
Network: Cuml+Proj PM - 13 Modified



DEGREE OF SATURATION

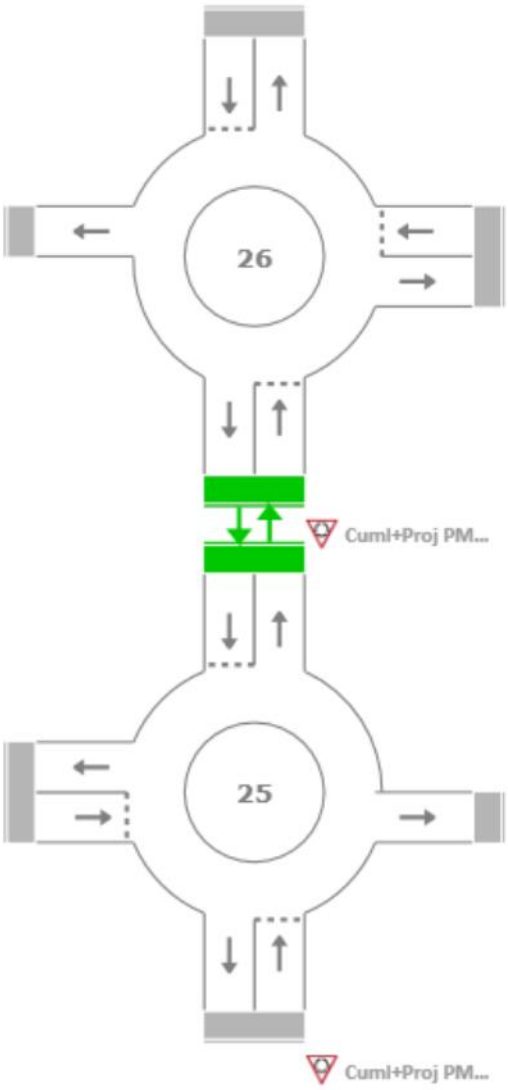
Ratio of Demand Volume to Capacity (v/c ratio)

Network: Cuml+Proj PM - 13 Modified



NETWORK LAYOUT

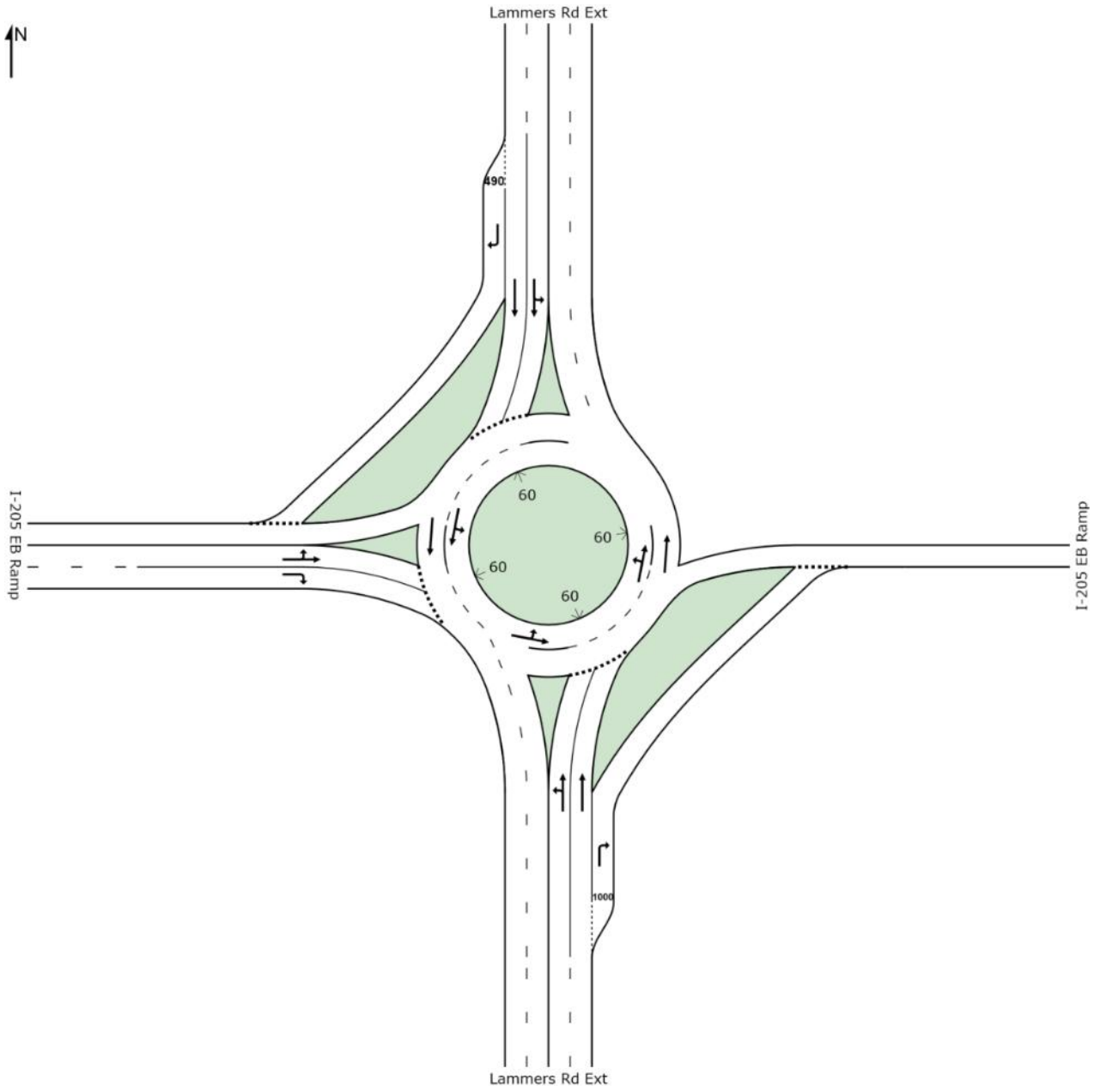
Network: Cuml+Proj PM - LammersExt/I-205 Ramps



SITE LAYOUT

Site: Cuml+Proj PM -- 25 Lammers/I-205 EB Ramps

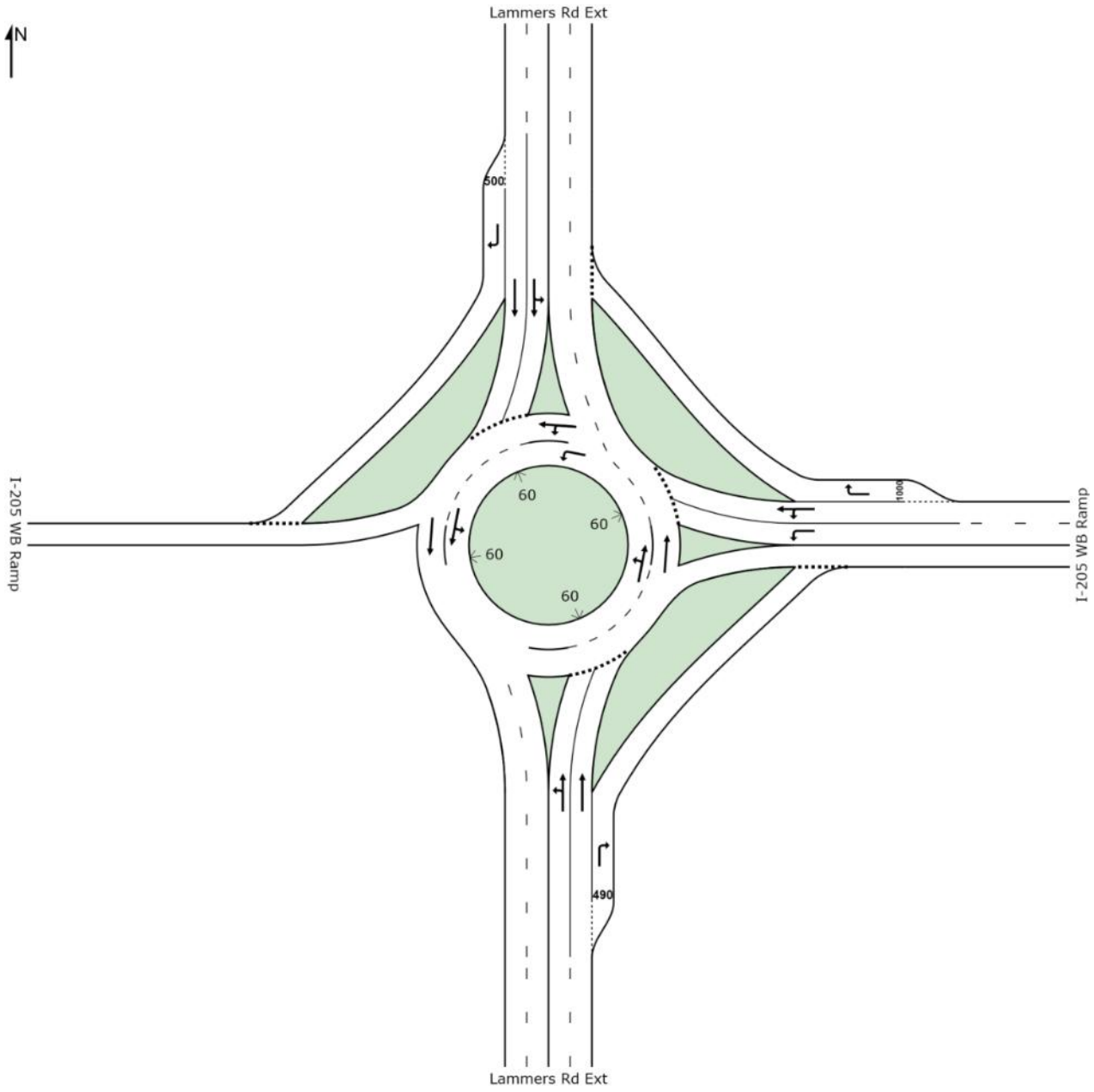
Roundabout



SITE LAYOUT

Site: Cuml+Proj PM -- 26 Lammers/I-205 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Cuml+Proj PM - LammersExt/I-205 Ramps

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS F						
Travel Time Index	0.10						
Speed Efficiency	0.11						
Congestion Coefficient	9.19						
Travel Speed	4.4	mph				4.4	mph
Travel Distance (Total)	4653.3	veh-mi/h				5584.0	pers-mi/h
Travel Time (Total)	1069.0	veh-h/h				1282.8	pers-h/h
Travel Distance (Average)	1695	ft				1466	ft
Travel Time (Average)	265.5	sec	827.0	sec/mi		229.7	sec
Idling Time (Average)	167.3	sec	521.1	sec/mi	63.00 %		
Running Time (Average)	98.2	sec	306.0	sec/mi	37.00 %		
Desired Speed	40.0	mph					
Desired Trip Time	28.9	sec	90.0	sec/mi			
Travel Delay	236.6	sec	737.0	sec/mi	89.12 %		
Demand Flows (Total)	16757	veh/h				20108	pers/h
Arrival Flows (Total)	14498	veh/h				20108	pers/h
Percent Heavy Vehicles (Demand)	8.7	%					
Percent Heavy Vehicles (Arrival)	10.1	%					
Degree of Saturation	2.549						
Control Delay (Total)	952.52	veh-h/h				1143.03	pers-h/h
Control Delay (Average)	236.5	sec				204.6	sec
Control Delay (Worst Lane)	715.2	sec					
Control Delay (Worst Movement)	720.7	sec				720.7	sec
Geometric Delay (Average)	6.8	sec					
Stop-Line Delay (Average)	204.8	sec					
Queue Storage Ratio (Worst Lane)	4.63						
Total Effective Stops	40271	veh/h				48325	pers/h
Effective Stop Rate	2.78	per veh	8.7	per mi		2.40	per pers
Proportion Queued	0.67					0.66	
Performance Index	2636.6					2636.6	
Cost (Total)	15815.50	$/h	3.40	$/mi		15815.50	$/h
Fuel Consumption (Total)	429.5	gal/h	0.092	gal/mi			
Fuel Economy	10.8	mpg					
Carbon Dioxide (Total)	3861.7	kg/h	829.9	g/mi			
Hydrocarbons (Total)	2.687	kg/h	0.577	g/mi			
Carbon Monoxide (Total)	13.269	kg/h	2.852	g/mi			
NOx (Total)	4.431	kg/h	0.952	g/mi			

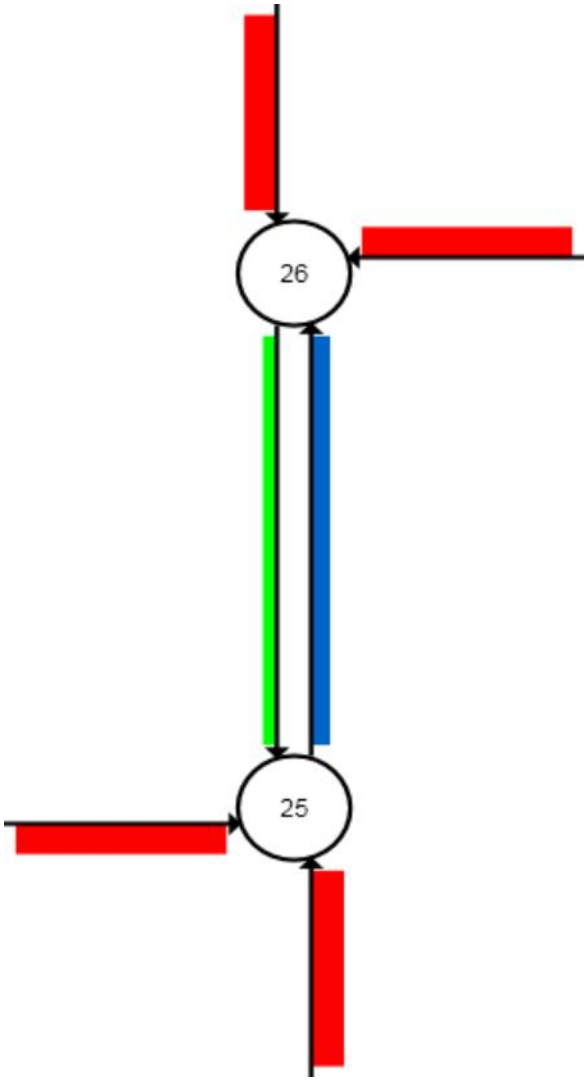
Network Model Accuracy Level (variations in lane degrees of saturation): -1.3 % to 1.2 %
Number of Iterations: 10
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	8,043,131	veh/y	9,651,756	pers/y
Delay	457,211	veh-h/y	548,654	pers-h/y
Effective Stops	19,329,980	veh/y	23,195,970	pers/y
Travel Distance	2,233,599	veh-mi/y	2,680,319	pers-mi/y
Travel Time	513,128	veh-h/y	615,754	pers-h/y
Cost	7,591,438	$/y	7,591,438	$/y
Fuel Consumption	206,136	gal/y		
Carbon Dioxide	1,853,614	kg/y		
Hydrocarbons	1,290	kg/y		
Carbon Monoxide	6,369	kg/y		
NOx	2,127	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

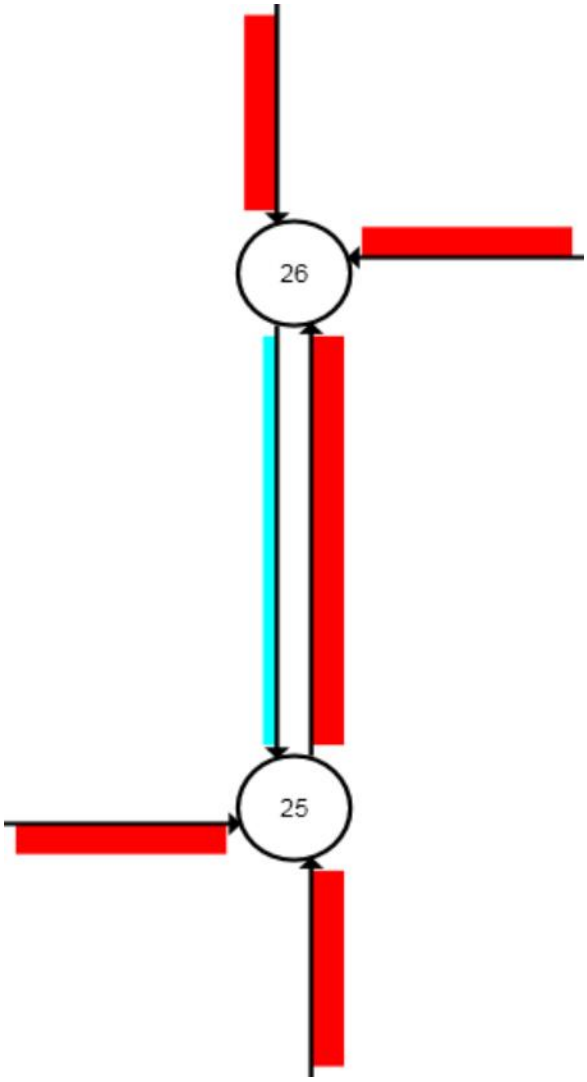
Network: Cuml+Proj PM - LammersExt/I-205 Ramps

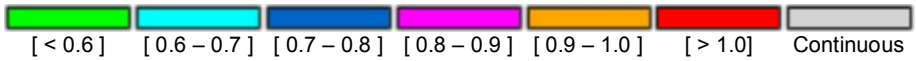


DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

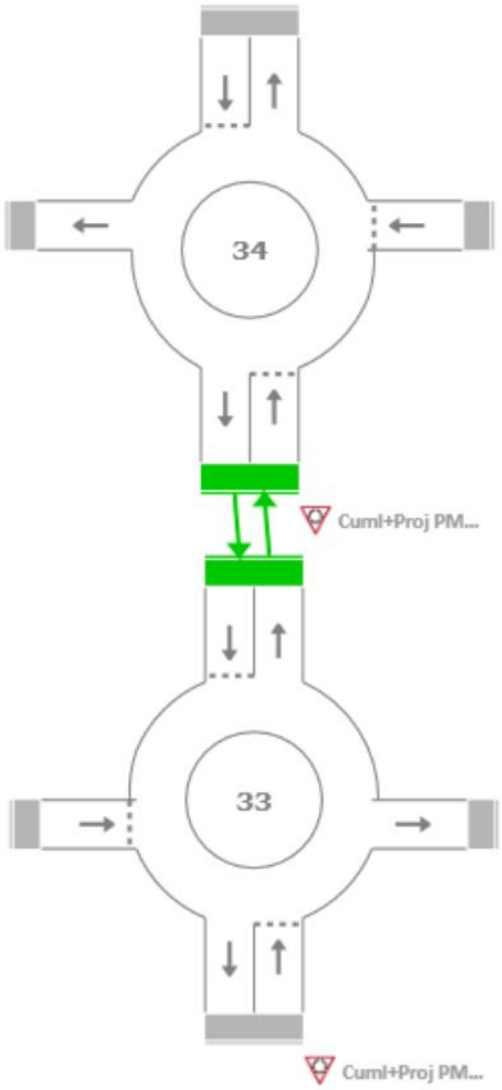
Network: Cuml+Proj PM - LammersExt/I-205 Ramps





NETWORK LAYOUT

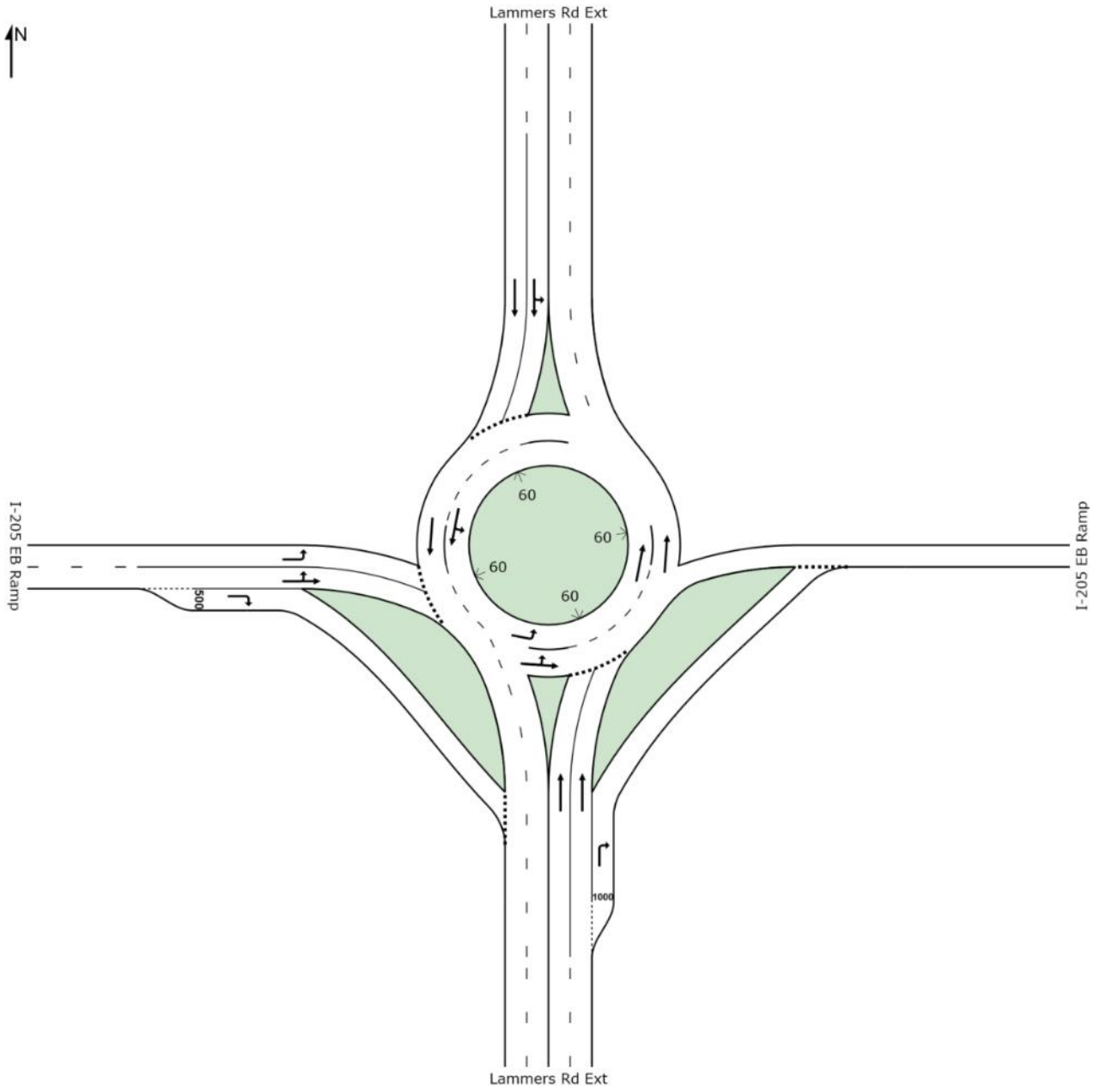
Network: Cuml+Proj PM - Chrisman/I-205 Ramps



SITE LAYOUT

Site: Cuml+Proj PM -- 33 Chrisman/I-205 EB Ramps

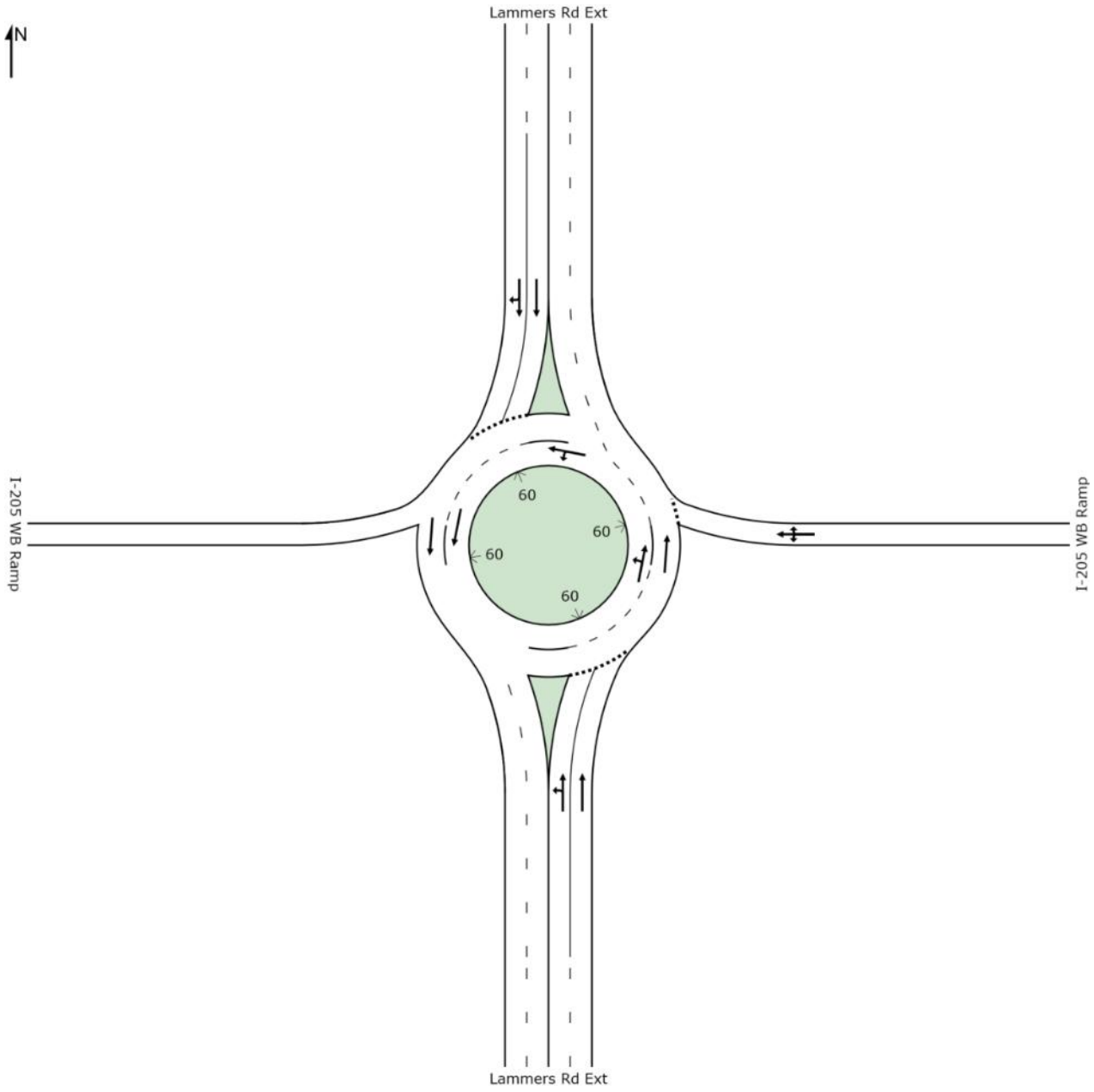
Roundabout



SITE LAYOUT

Site: Cuml+Proj PM -- 34 Chrisman/I-205 WB Ramps

Roundabout



NETWORK SUMMARY

Network: Cuml+Proj PM - Chrisman/I-205 Ramps

Network Performance - Hourly Values								
Performance Measure	**Vehicles**		**Per Unit Distance**		**Percent**	**Persons**	
Network Level of Service (LOS)	LOS F						
Travel Time Index	0.00						
Speed Efficiency	0.04						
Congestion Coefficient	28.20						
Travel Speed	1.4	mph				1.4	mph
Travel Distance (Total)	4500.8	veh-mi/h				5401.0	pers-mi/h
Travel Time (Total)	3173.4	veh-h/h				3808.1	pers-h/h
Travel Distance (Average)	1803	ft				1556	ft
Travel Time (Average)	866.7	sec	2538.3	sec/mi		748.1	sec
Idling Time (Average)	767.7	sec	2248.2	sec/mi	88.57 %		
Running Time (Average)	99.1	sec	290.1	sec/mi	11.43 %		
Desired Speed	40.0	mph					
Desired Trip Time	30.7	sec	90.0	sec/mi			
Travel Delay	836.0	sec	2448.3	sec/mi	96.45 %		
Demand Flows (Total)	15270	veh/h				18324	pers/h
Arrival Flows (Total)	13181	veh/h				18324	pers/h
Percent Heavy Vehicles (Demand)	4.3	%					
Percent Heavy Vehicles (Arrival)	5.0	%					
Degree of Saturation	7.770						
Control Delay (Total)	3060.11	veh-h/h				3672.14	pers-h/h
Control Delay (Average)	835.8	sec				721.4	sec
Control Delay (Worst Lane)	3069.2	sec					
Control Delay (Worst Movement)	3070.5	sec				3070.5	sec
Geometric Delay (Average)	6.9	sec					
Stop-Line Delay (Average)	819.7	sec					
Queue Storage Ratio (Worst Lane)	18.94						
Total Effective Stops	45768	veh/h				54921	pers/h
Effective Stop Rate	3.47	per veh	10.2	per mi		3.00	per pers
Proportion Queued	0.70					0.69	
Performance Index	6212.2					6212.2	
Cost (Total)	44902.03	$/h	9.98	$/mi		44902.03	$/h
Fuel Consumption (Total)	1111.5	gal/h	0.247	gal/mi			
Fuel Economy	4.0	mpg					
Carbon Dioxide (Total)	9934.7	kg/h	2207.3	g/mi			
Hydrocarbons (Total)	7.777	kg/h	1.728	g/mi			
Carbon Monoxide (Total)	35.352	kg/h	7.855	g/mi			
NOx (Total)	8.267	kg/h	1.837	g/mi			

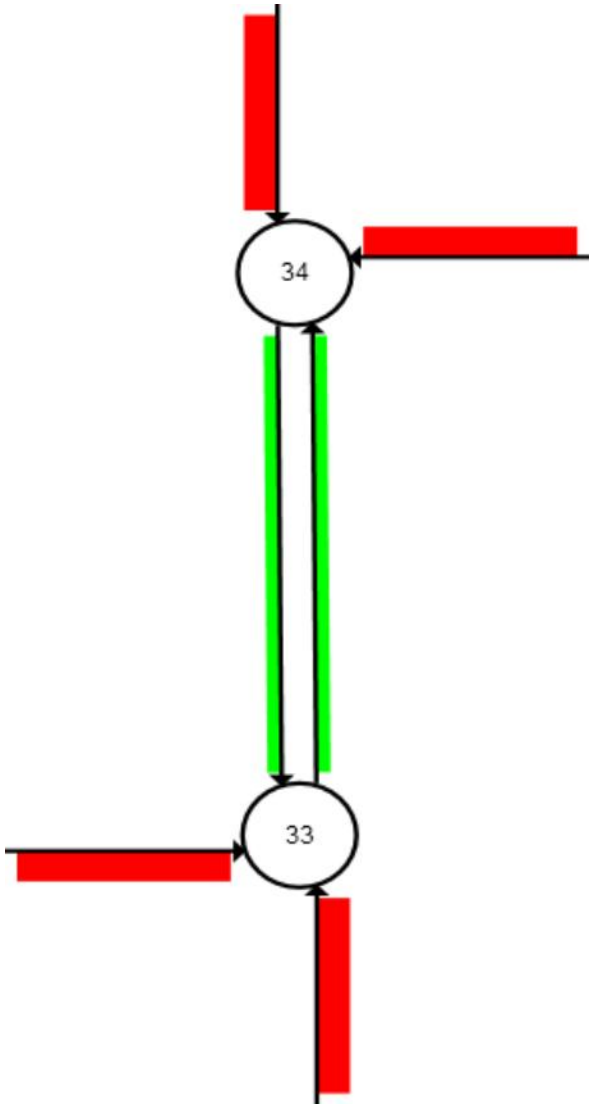
Network Model Accuracy Level (variations in lane degrees of saturation): -0.9 % to 0.8 %
Number of Iterations: 4
Network Level of Service (LOS) Method: HCM 2010.
Model used: US HCM (Customary).

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	7,329,693	veh/y	8,795,632	pers/y
Delay	1,468,854	veh-h/y	1,762,625	pers-h/y
Effective Stops	21,968,530	veh/y	26,362,230	pers/y
Travel Distance	2,160,386	veh-mi/y	2,592,463	pers-mi/y
Travel Time	1,523,247	veh-h/y	1,827,896	pers-h/y
Cost	21,552,980	$/y	21,552,980	$/y
Fuel Consumption	533,518	gal/y		
Carbon Dioxide	4,768,655	kg/y		
Hydrocarbons	3,733	kg/y		
Carbon Monoxide	16,969	kg/y		
NOx	3,968	kg/y		

SITE LEVEL OF SERVICE

Approach Level of Service for Network Sites

Network: Cuml+Proj PM - Chrisman/I-205 Ramps



DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

Network: Cuml+Proj PM - Chrisman/I-205 Ramps