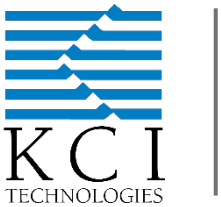
NORTHSHORE DRIVE
CORRIDOR STUDY

Appendices

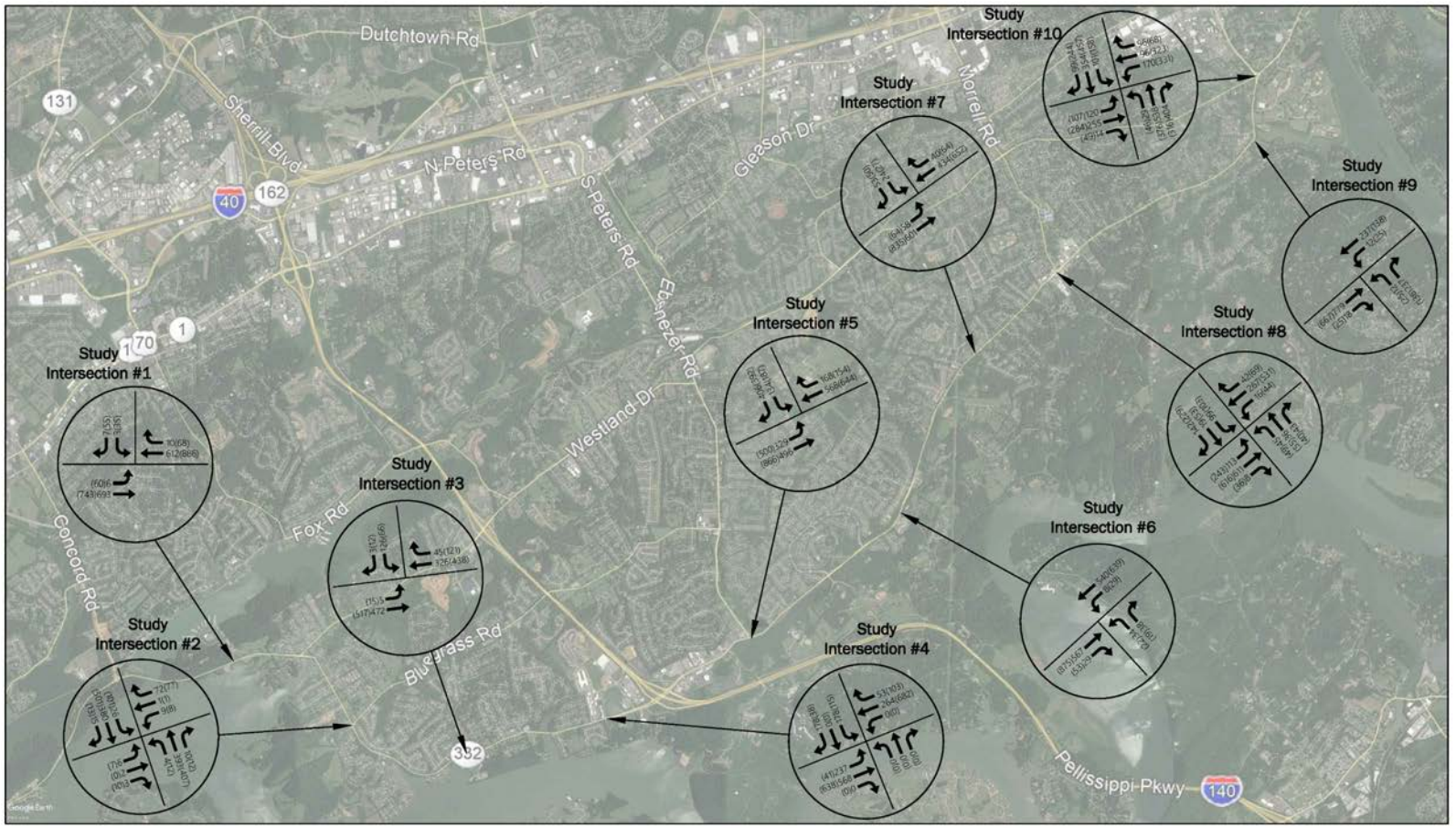
Prepared by



APPENDIX A
EXISTING CONDITIONS

Peak Hour Traffic Volumes, Background Growth Data, Planned Developments, Trip Generations, Trip Distributions, Total Trip Assignment

1. EXISTING PEAK HOUR VOLUMES

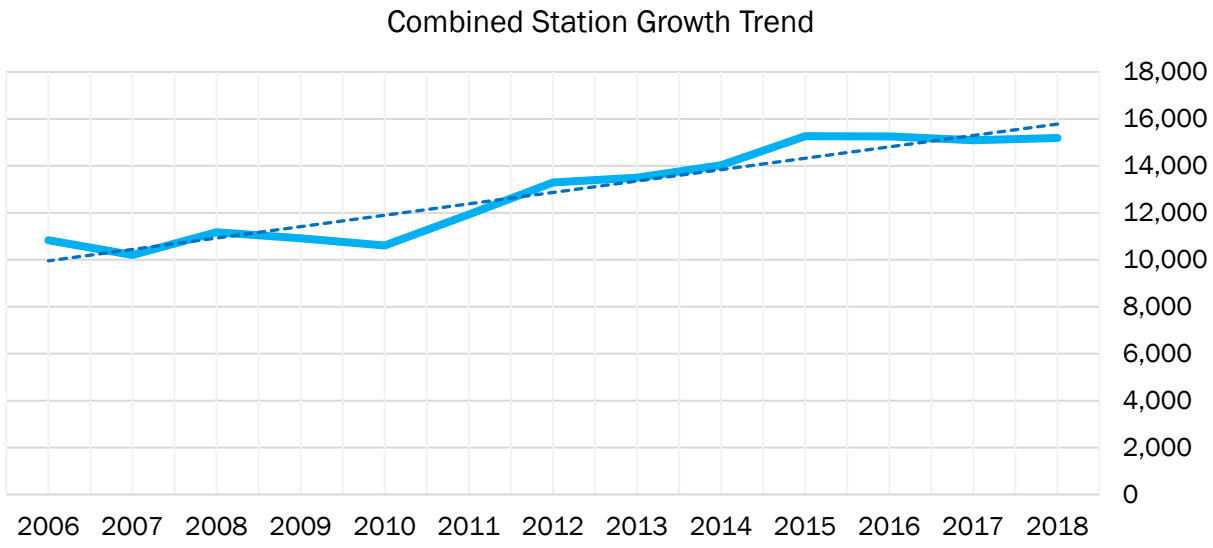


Existing Peak Hour Traffic Volumes
(Not to Scale)

2. BACKGROUND GROWTH DATA

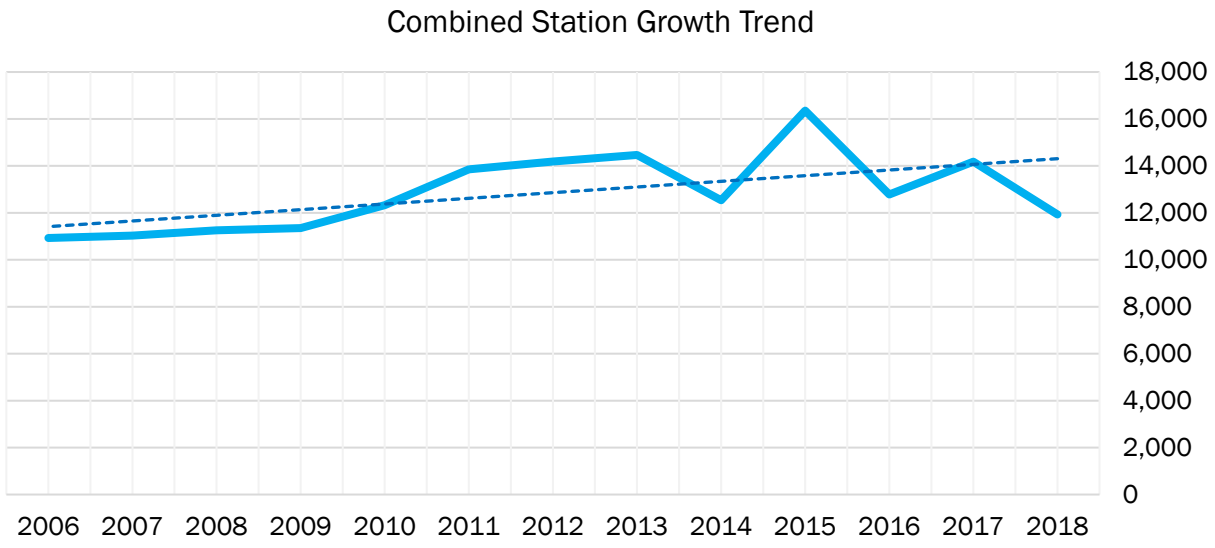
TDOT Count Data for Study Locations #1 and #2

Station	47000361	47000131
Route	Northshore	Bluegrass Road
Location	West of Pool Road	East of Northshore
2018	13,793	1,396
2017	13,523	1,572
2016	13,682	1,576
2015	13,709	1,556
2014	12,576	1,455
2013	12,099	1,400
2012	11,846	1,447
2011	10,453	1,479
2010	9,372	1,235
2009	9,621	1,297
2008	9,802	1,374
2007	8,802	1,403
2006	9,411	1,423



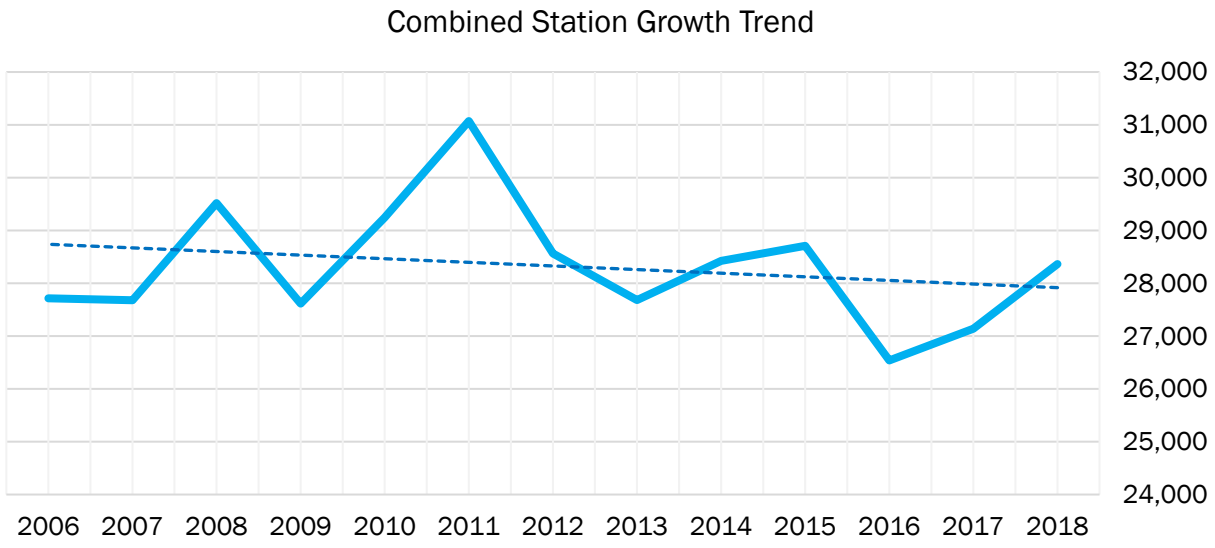
TDOT Count Data for Study Locations #3 and #4

Station	47000542	47000130
Route	Hart Road	Northshore
Location	North of Garland	West of Town Center
2018	1,377	10,553
2017	1,344	12,833
2016	1,280	11,506
2015	1,435	14,920
2014	1,421	11,116
2013		14,465
2012		14,184
2011		13,852
2010		12,328
2009		11,352
2008		11,255
2007		11,031
2006		10,929



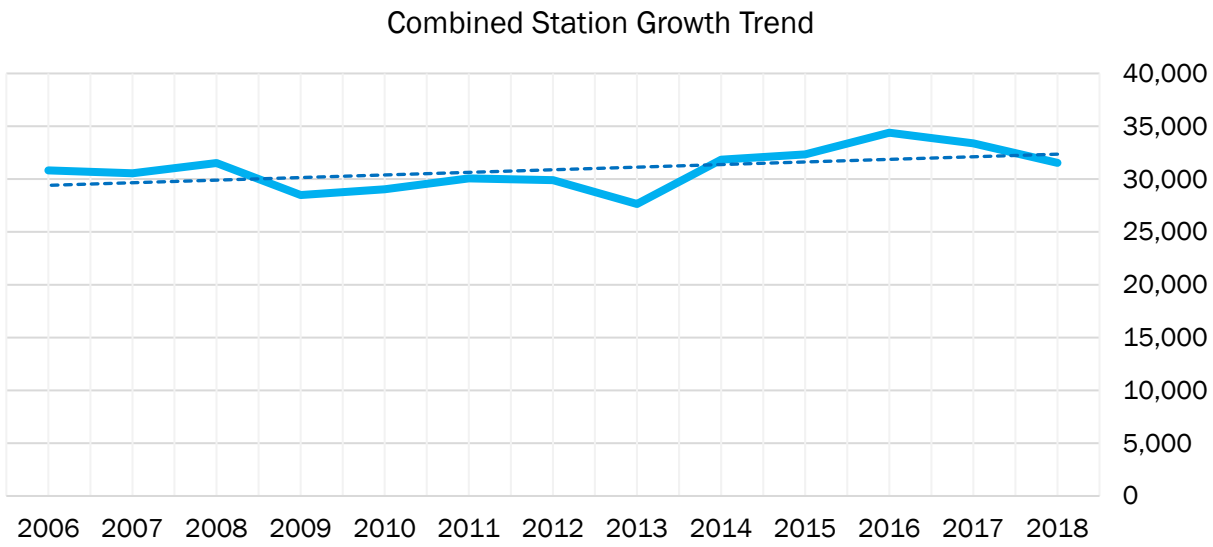
TDOT Count Data for Study Locations #5 and #6

Station	47000286	47000287
Route	Ebenezer Road	Northshore
Location	South of Shoreham Boulevard	North of Whitting Creek Boulevard
2018	14,650	13,713
2017	13,806	13,333
2016	12,863	13,676
2015	14,691	14,018
2014	14,546	13,879
2013	14,550	13,133
2012	14,456	14,108
2011	16,555	14,516
2010	15,634	13,611
2009	14,717	12,898
2008	15,533	13,984
2007	14,530	13,148
2006	15,111	12,603

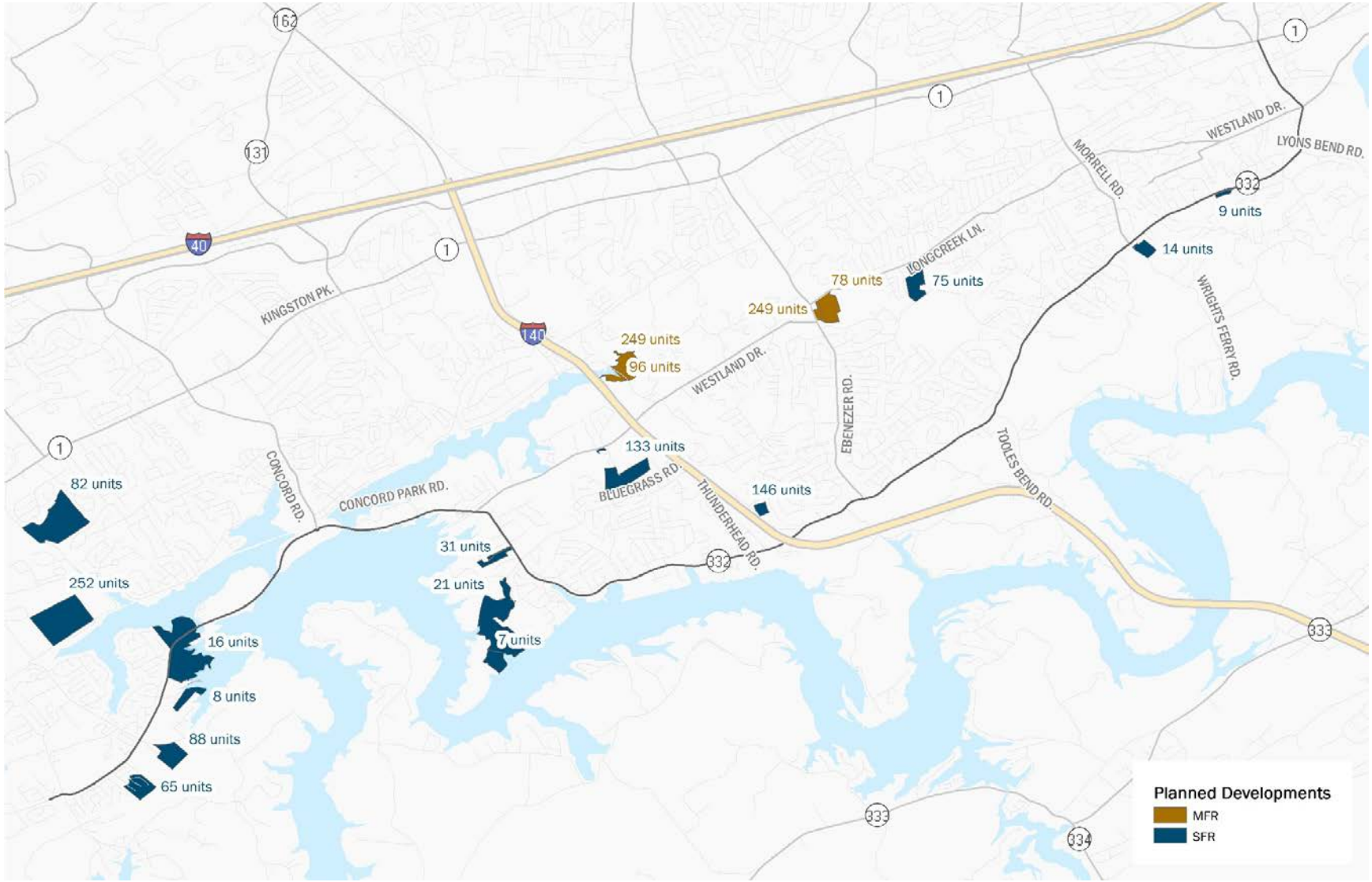


TDOT Count Data for Study Locations #7 and #8

Station	47000540	47000121	47000120
Route	Wallace Road	Northshore	Northshore Drive
Location	North of Northshore	South of Morrell Road	South of Lyons View Drive
2018	2,036	14,164	15,331
2017	2,046	14,701	16,638
2016	1,624	16,409	16,358
2015	1,998	14,093	16,250
2014	1,978	13,652	16,214
2013		12,377	15,267
2012		14,658	15,240
2011		15,233	14,831
2010		13,580	15,456
2009		13,573	14,911
2008		14,568	16,947
2007		13,965	16,580
2006		14,464	16,354



3. PLANNED DEVELOPMENTS

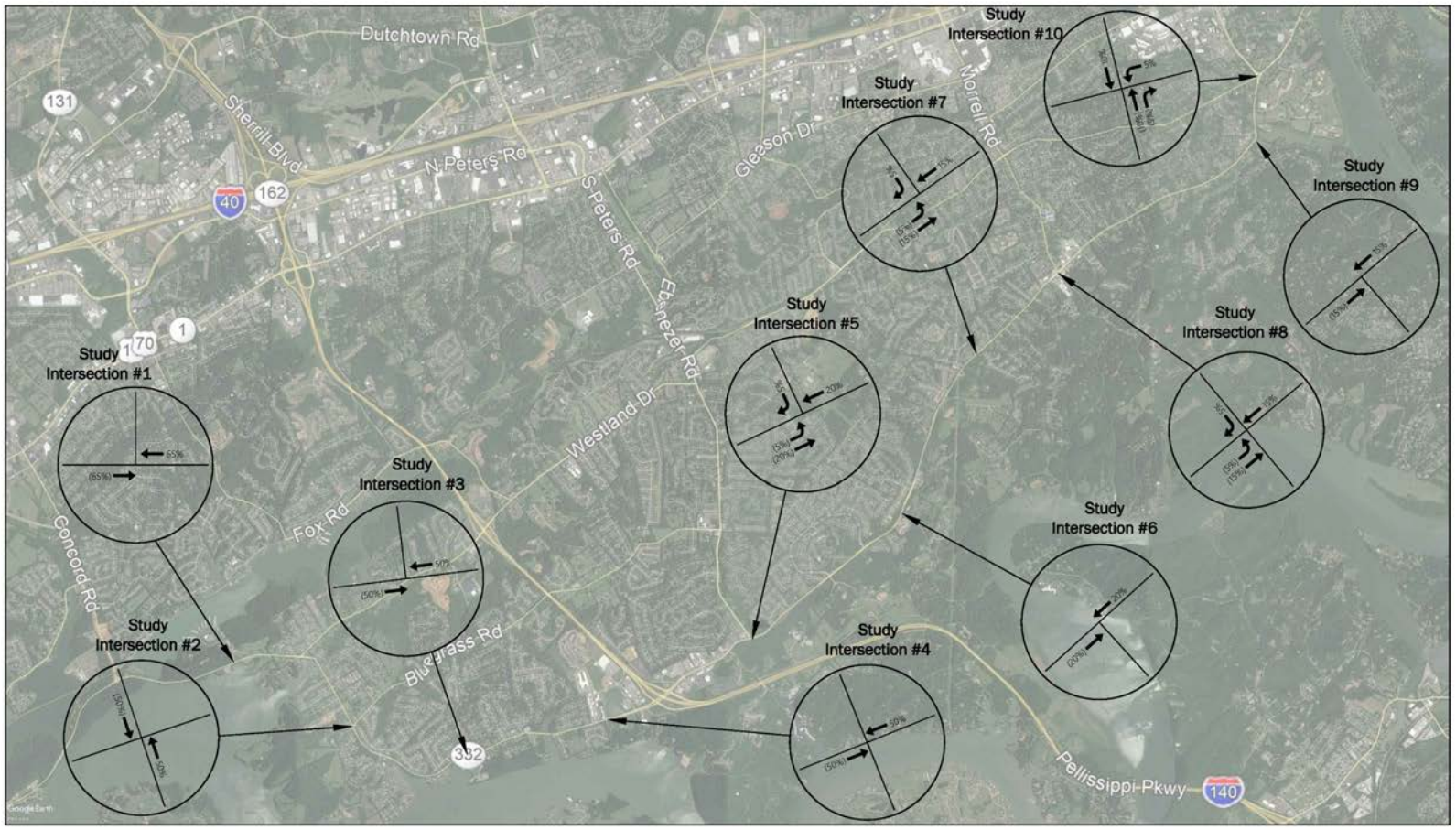

162
1
131
40
KINGSTON PK.
CONCORD RD.
CONCORD PARK RD.
82 units
252 units
16 units
8 units
88 units
65 units
31 units
21 units
7 units
140
249 units
96 units
WESTLAND DR.
133 units
BLUEGRASS RD.
THUNDERHEAD RD.
146 units
78 units
249 units
EBENEZER RD.
IONGCREEK LN.
75 units
MORRELL RD.
WESTLAND DR.
LYONS BEND RD.
332
9 units
14 units
WRIGHTS FERRY RD.
TOOLES BEND RD.
333
334
Planned Developments
MFR
SFR

4. TRIP GENERATION

Table A-1. Trip Generation

Zone	ITE Code	Land Use	# Units	ADT	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
1	210	Single-Family Detached Housing	177	1,758	33	97	130	111	65	176
2	210	Single-Family Detached Housing	334	3,153	61	181	242	203	120	323
3	-									
4										
5	210	Single-Family Detached Housing	59	640	12	35	47	38	23	61
6	210	Single-Family Detached Housing	133	1,352	25	74	99	84	50	134
7	221	Multi-Family Housing (Mid-Rise)	672	3,656	63	179	242	181	115	296
8	210	Single-Family Detached Housing	146	1,473	27	81	108	92	54	146
9										
10	210	Single-Family Detached Housing	75	798	14	44	58	49	28	77
11	210	Single-Family Detached Housing	14	170	4	11	15	9	6	15
12	210	Single-Family Detached Housing	9	113	3	8	11	6	4	10
		TOTAL	**1,619**	**13,113**	**242**	**710**	**952**	**773**	**465**	**1,238**

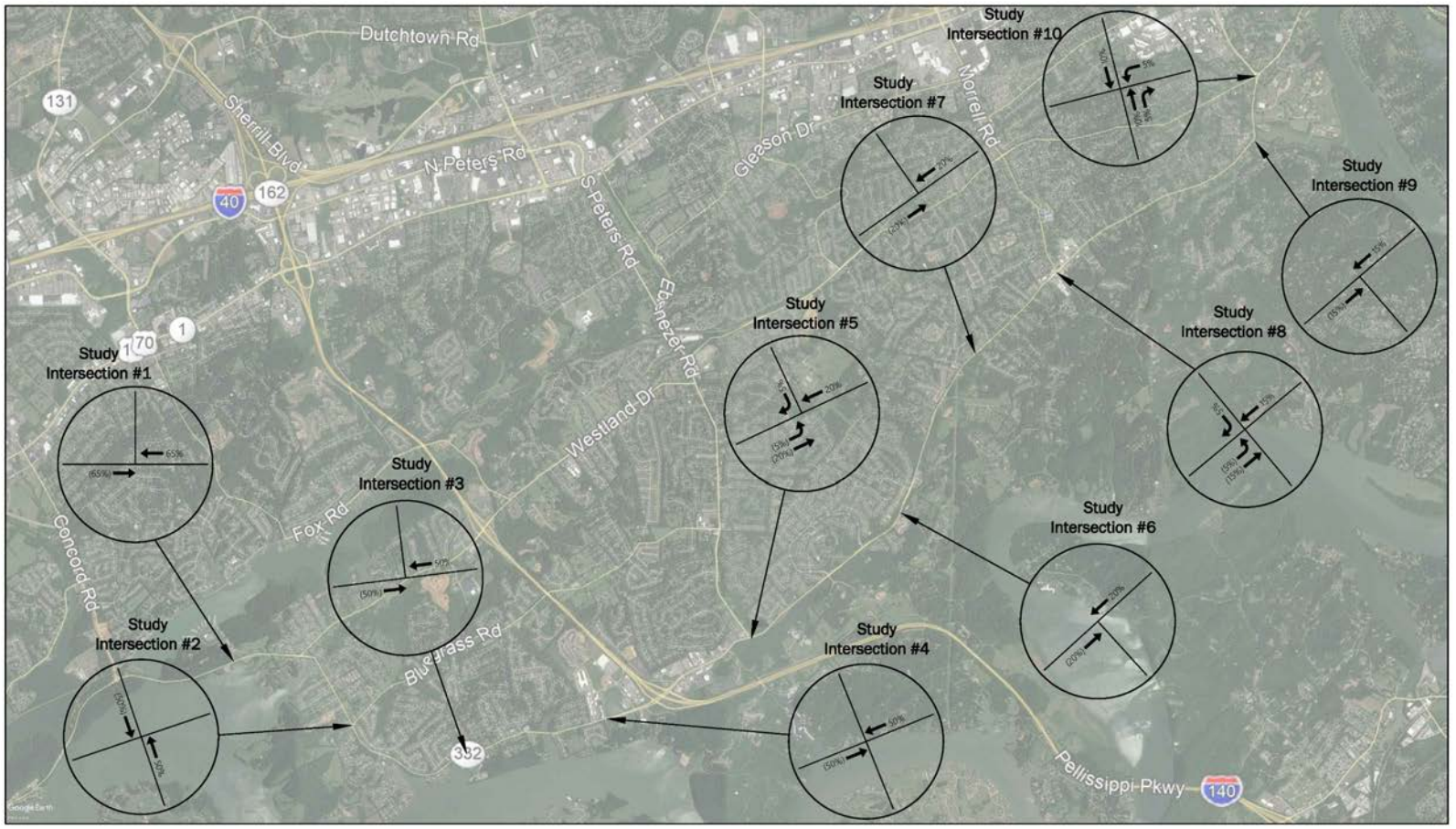
5. TRIP DISTRIBUTIONS



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

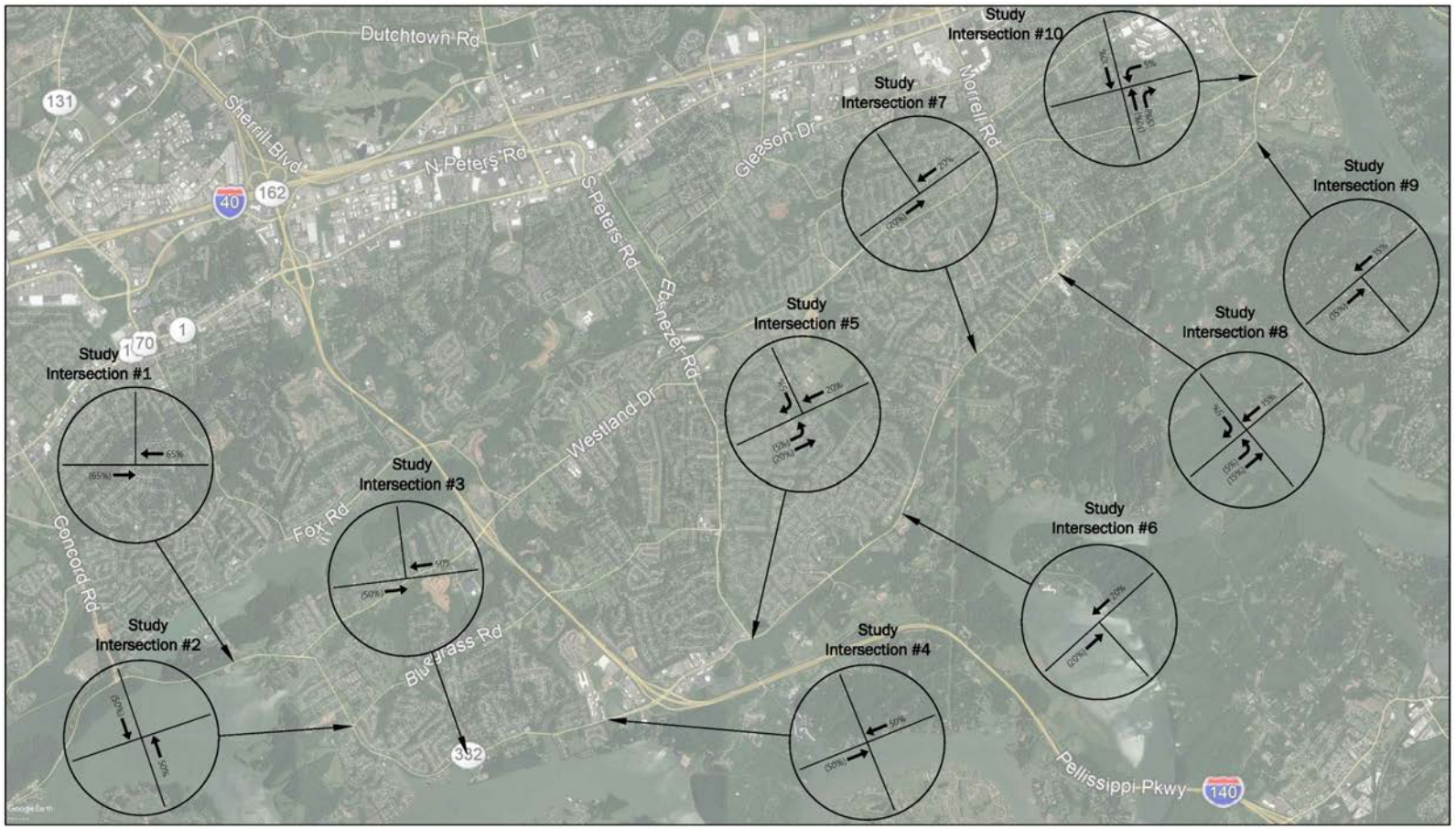
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 1)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

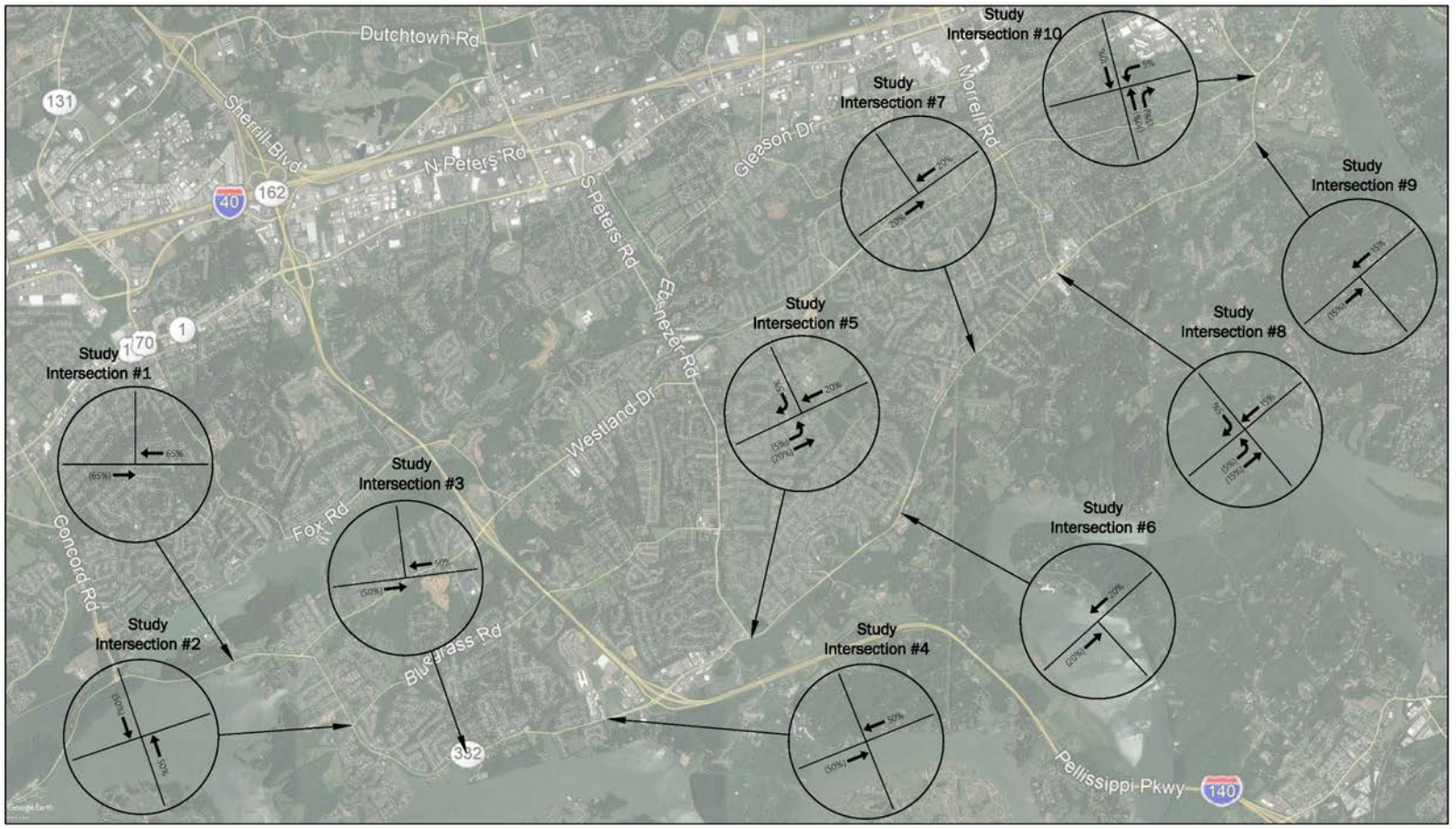
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 2)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

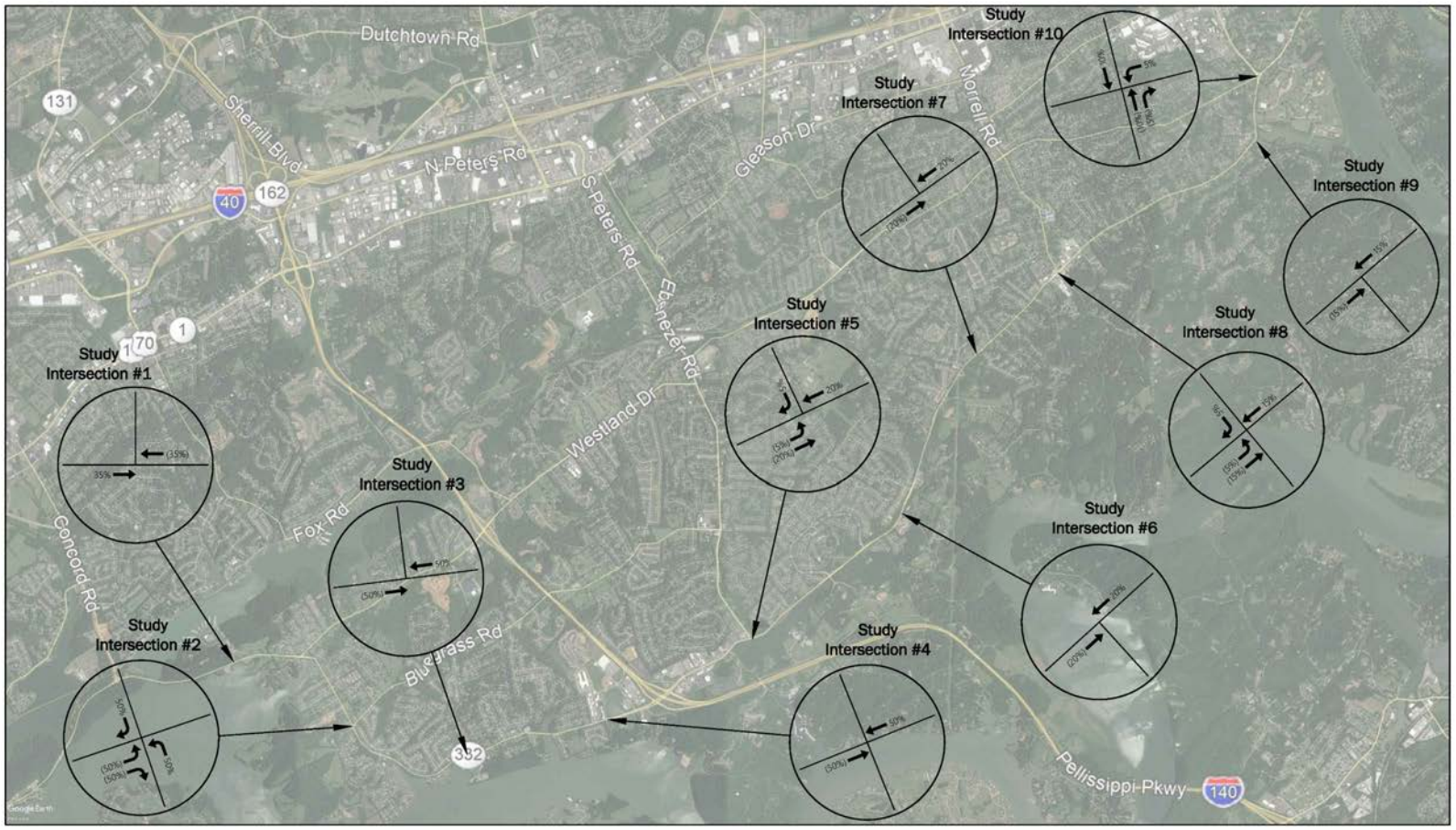
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 3)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

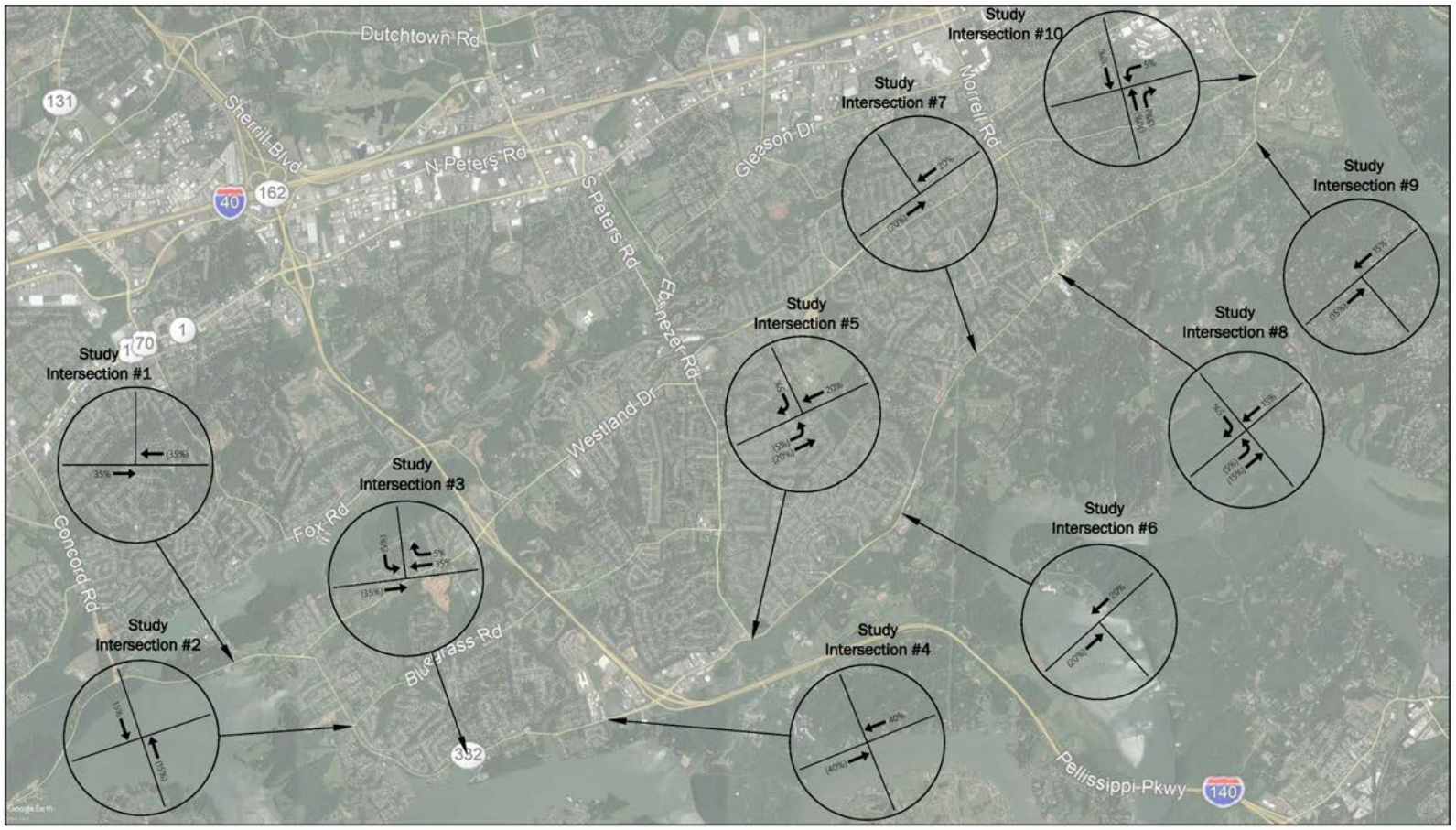
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 4)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

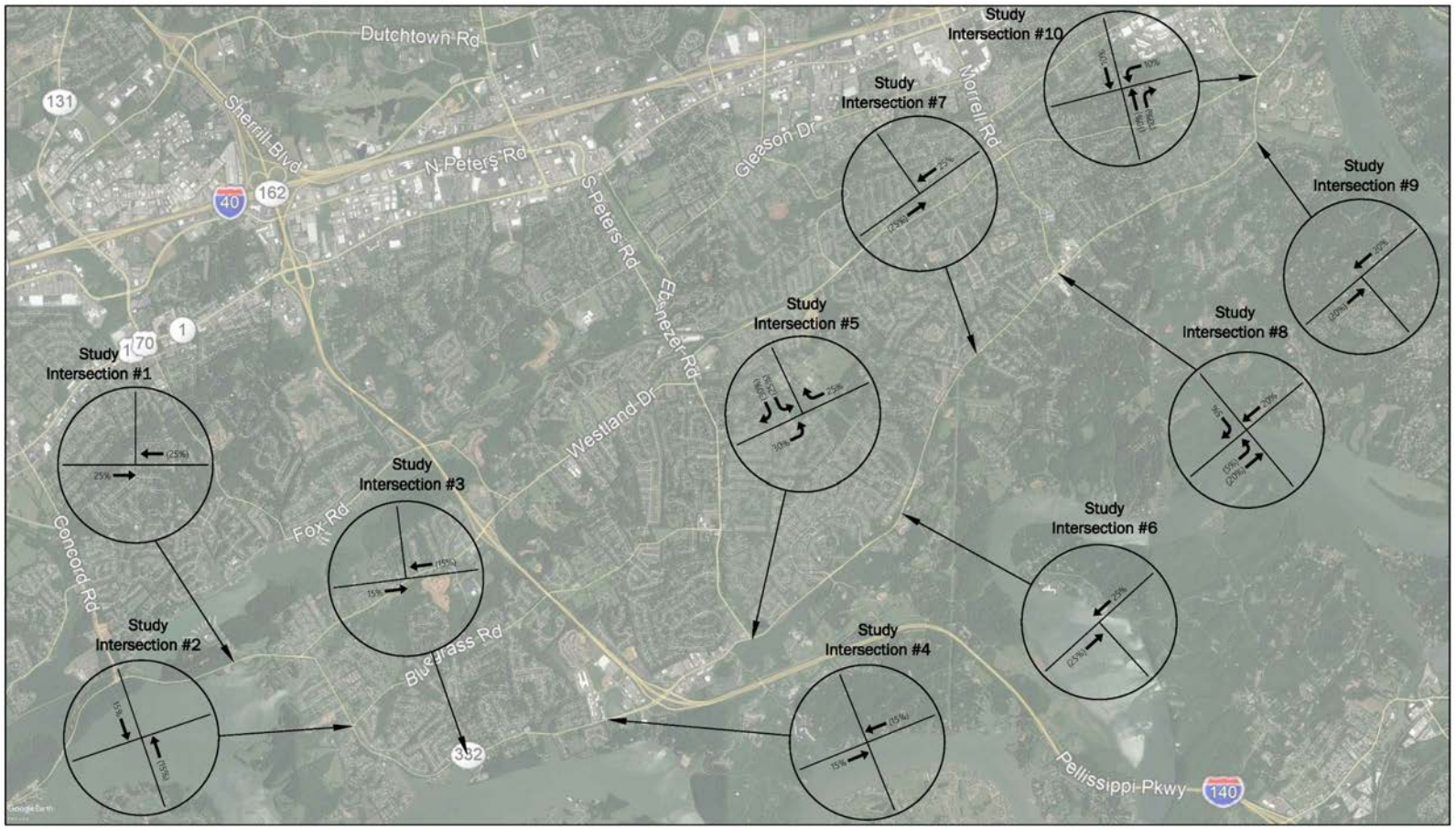
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 5)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

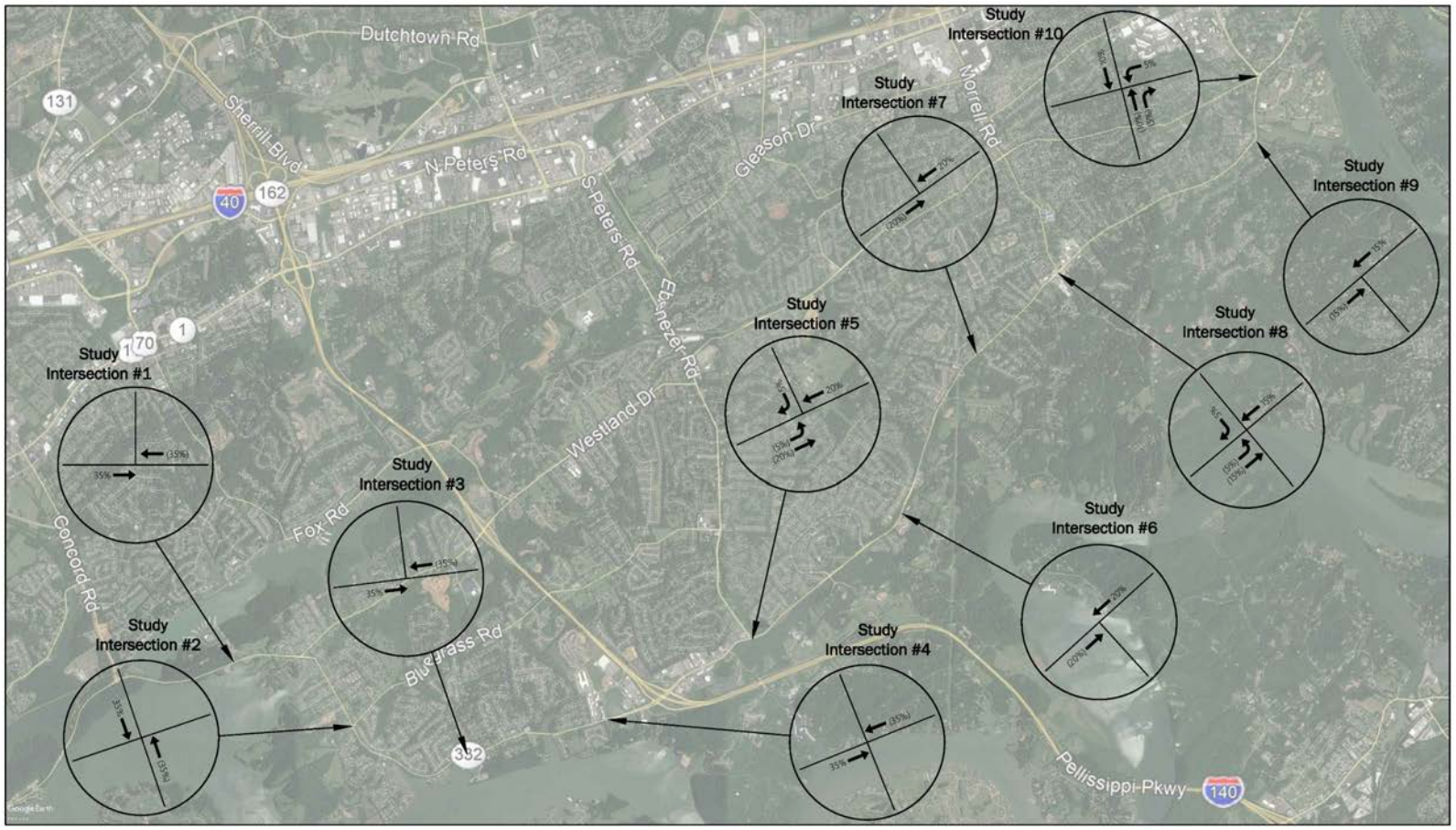
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 6)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

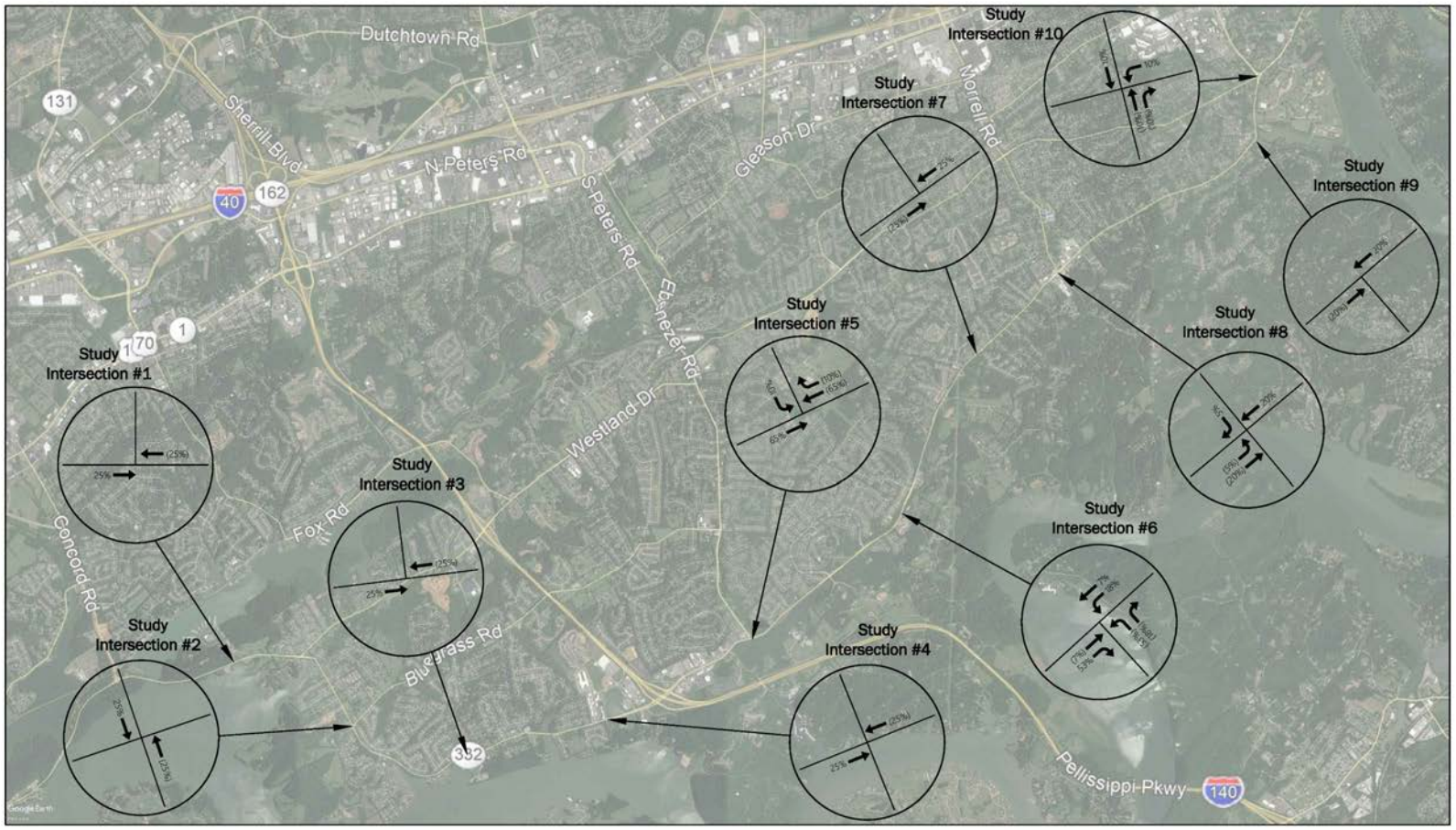
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 7)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

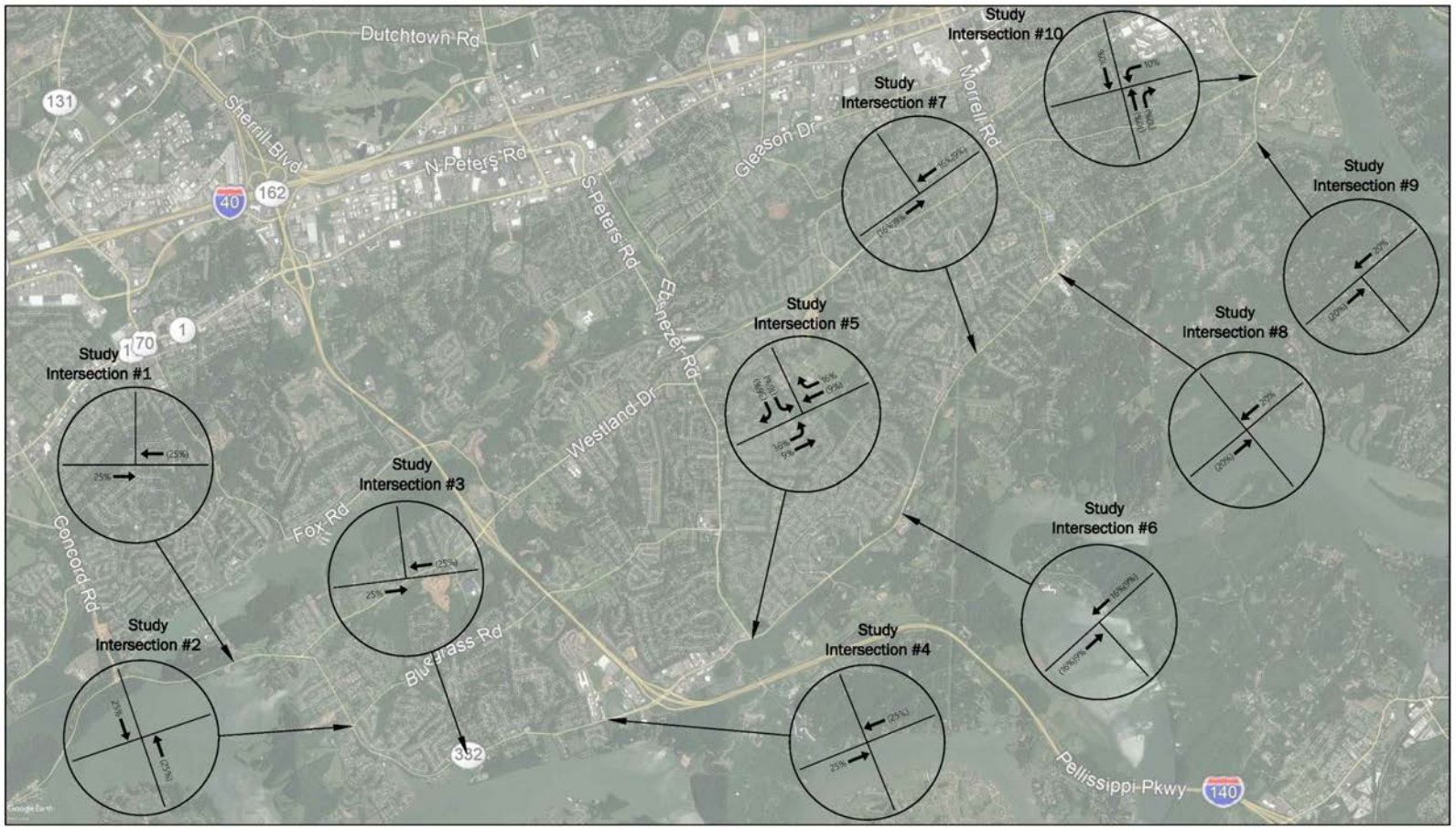
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 8)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

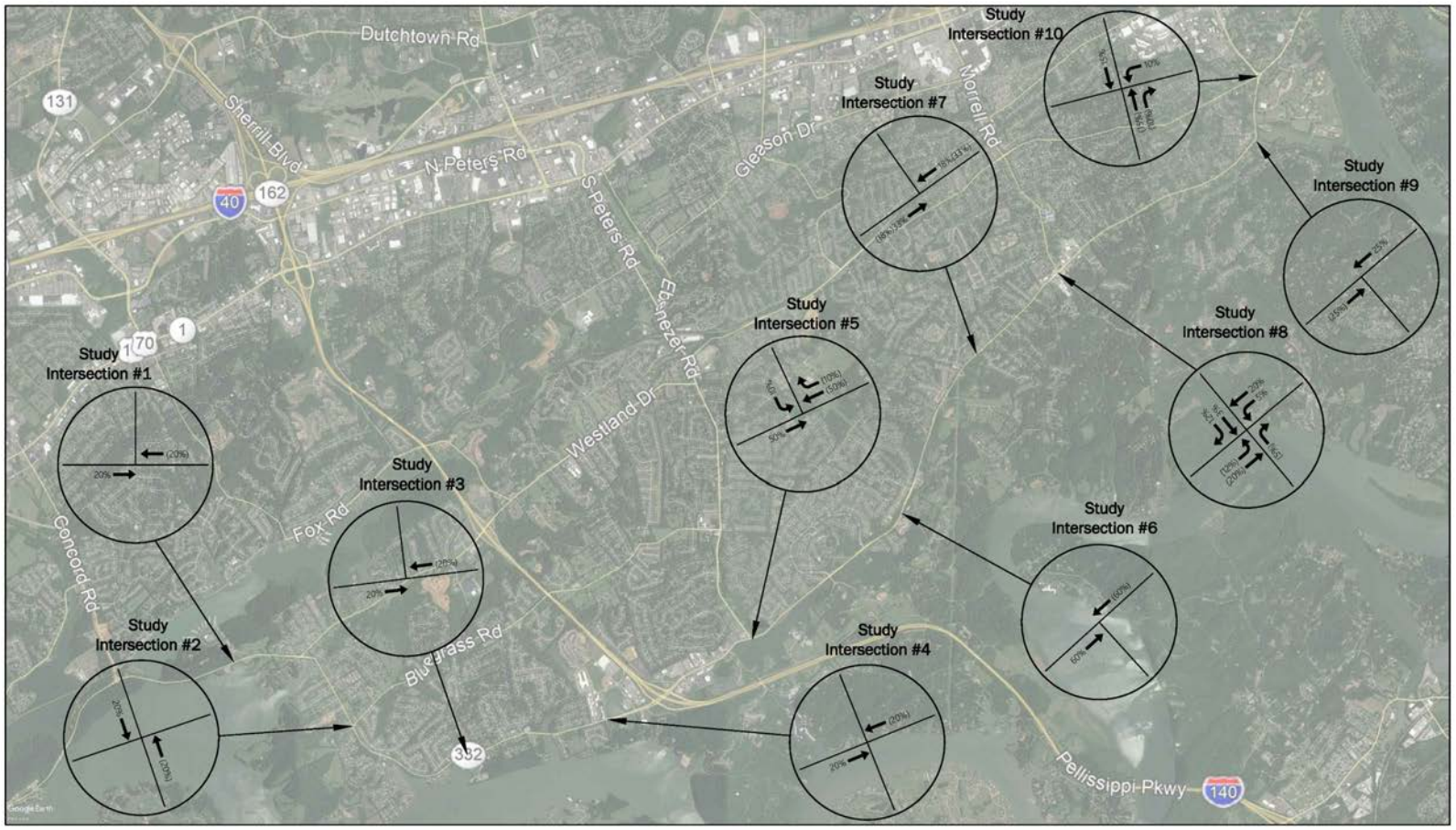
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 9)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

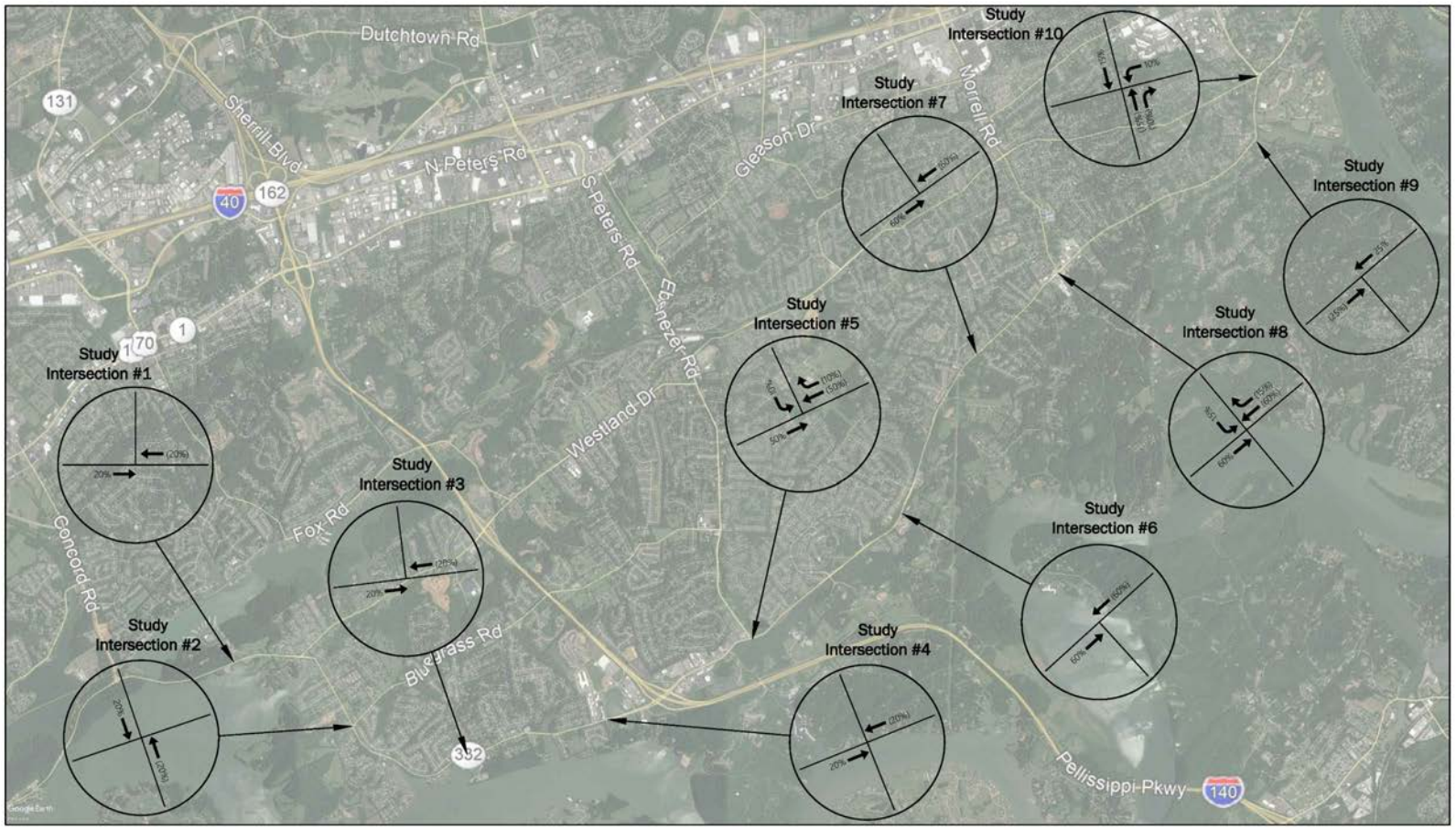
Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 10)
(Not to Scale)



*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 11)
(Not to Scale)

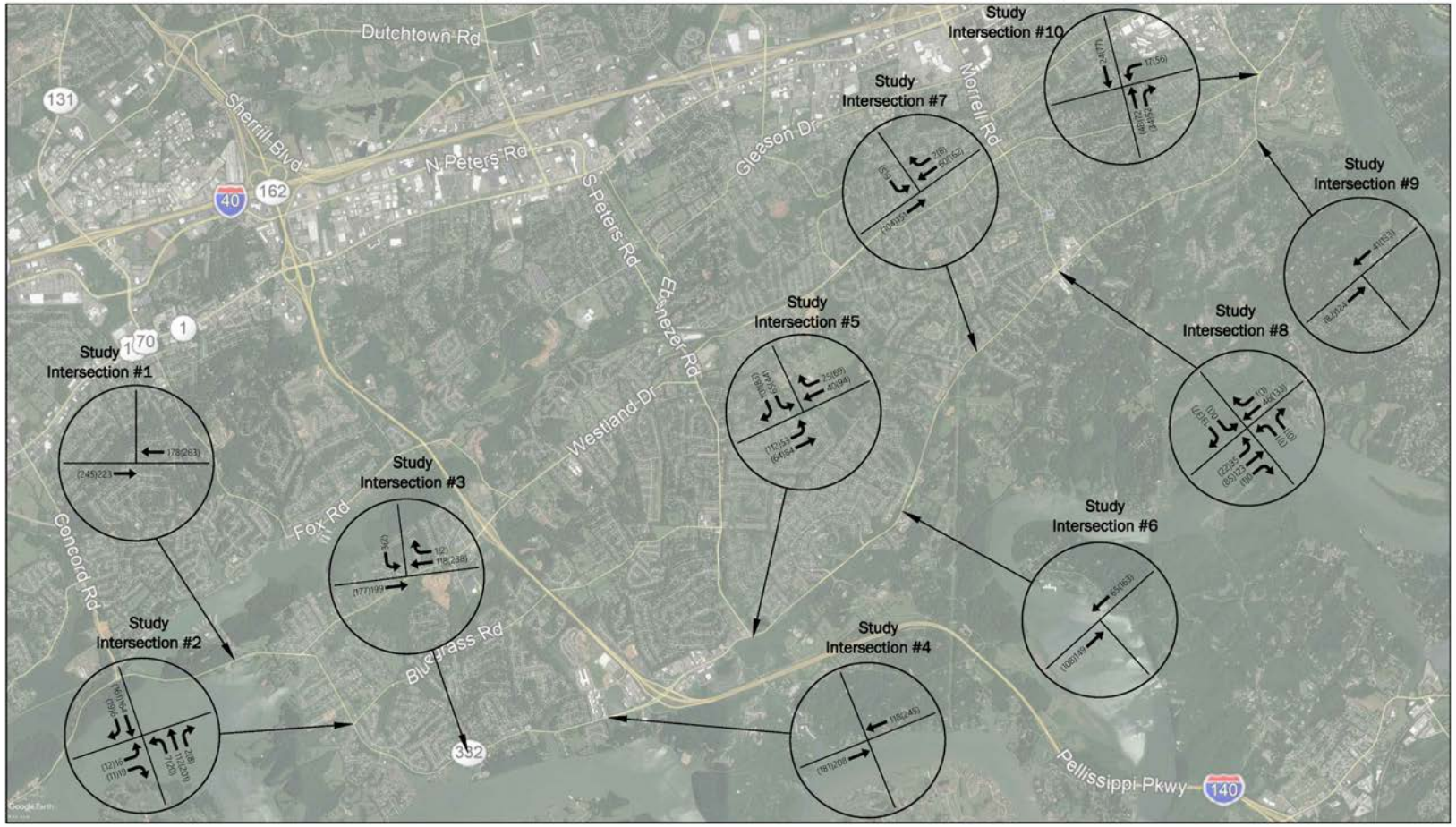


*Distribution numbers may not balance. Traffic is expected to enter and exit the system via roads outside the study area.

XX% - Enter
(XX%) - Exit

Distribution of Peak Hour Traffic Volumes Generated by Future Development (Zone 12)
(Not to Scale)

6. TOTAL TRIP ASSIGNMENT



Total Assignment of Peak Hour Traffic Volumes Generated by Approved Development
(Not to Scale)

7. EXISTING CONDITIONS – VISTRO REPORTS

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Version 2021 (SP 0-6)

Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	26.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	3	7	6	693	612	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	7	6	693	612	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	2	2	173	153	3
Total Analysis Volume [veh/h]	3	7	6	693	612	10
Pedestrian Volume [ped/h]	0		0		0	

Report File: M:\...\Northshore Corridor Study - Existing AM - Semi Actuated.pdf
Vistro File: M:\...\Base Model.vistro 7/26/2021 Scenario 1: 1 1 Existing AM

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Northshore Corridor Study
KCI Technologies

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	26.46	12.46	8.78	0.00	0.00	0.00
Movement LOS	D	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.04	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.34	1.09	0.47	0.47	0.00	0.00
d_A, Approach Delay [s/veh]	16.66		0.08		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.16					
Intersection LOS	D					

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Two-way stop	Delay (sec / veh):	21.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.026

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	6	2	3	9	1	72	26	380	15	4	393	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	2	3	9	1	72	26	380	15	4	393	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	1	2	0	18	7	95	4	1	98	3
Total Analysis Volume [veh/h]	6	2	3	9	1	72	26	380	15	4	393	10
Pedestrian Volume [ped/h]	0			0			0			0		

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Vistro File: M:\...\Base Model.vistro 7/26/2021 Scenario 1: 1 1 Existing AM

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Northshore Corridor Study
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Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.01	0.00	0.03	0.00	0.11	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	21.08	18.00	10.93	19.37	18.68	11.64	8.19	0.00	0.00	8.10	0.00	0.00
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.12	0.51	0.51	0.51	0.07	0.07	0.07	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	2.91	2.91	2.91	12.83	12.83	12.83	1.73	1.73	1.73	0.26	0.26	0.26
d_A, Approach Delay [s/veh]	17.75			12.57			0.51			0.08		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	1.60											
Intersection LOS	C											

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Version 2021 (SP 0-6)

Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 3: Northshore and Hart Road

Control Type:	Two-way stop	Delay (sec / veh):	21.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.373

Intersection Setup

Name	Hart Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hart Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	126	3	5	472	326	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	126	3	5	472	326	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	1	1	118	82	11
Total Analysis Volume [veh/h]	126	3	5	472	326	45
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.37	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	21.90	16.42	8.04	0.00	0.00	0.00
Movement LOS	C	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.71	1.71	0.01	0.01	0.00	0.00
95th-Percentile Queue Length [ft/ln]	42.70	42.70	0.32	0.32	0.00	0.00
d_A, Approach Delay [s/veh]	21.77		0.08		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	2.92					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 4: Northshore and Thunderhead Road

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.474

Intersection Setup

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	110.00	120.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			No		

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Volumes

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	0	0	0	178	0	178	237	568	0	0	264	53
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	178	0	178	237	568	0	0	264	53
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	45	0	45	59	142	0	0	66	13
Total Analysis Volume [veh/h]	0	0	0	178	0	178	237	568	0	0	264	53
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	93.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	0	15	0
Maximum Green [s]	0	25	0	0	25	0	15	60	0	0	45	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	30	0	0	30	0	36	90	0	0	54	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	5	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	Yes			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	C	R	L	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	0.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	19	19	19	90	90	78	78
g / C, Green / Cycle	0.15	0.15	0.15	0.75	0.75	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.00	0.14	0.12	0.22	0.34	0.16	0.04
s, saturation flow rate [veh/h]	1568	1309	1431	1075	1683	1683	1431
c, Capacity [veh/h]	272	262	221	825	1269	1120	926
d1, Uniform Delay [s]	0.00	49.41	48.99	4.67	5.49	8.84	7.74
k, delay calibration	0.11	0.17	0.13	0.33	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	4.86	8.27	0.57	1.14	0.50	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.68	0.81	0.29	0.45	0.24	0.06
d, Delay for Lane Group [s/veh]	0.00	54.28	57.26	5.24	6.63	9.34	7.86
Lane Group LOS	A	D	E	A	A	A	A
Critical Lane Group	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.00	5.56	5.65	1.48	4.57	2.78	0.49
50th-Percentile Queue Length [ft/ln]	0.00	139.05	141.32	37.06	114.22	69.49	12.30
95th-Percentile Queue Length [veh/ln]	0.00	9.43	9.55	2.67	8.07	5.00	0.89
95th-Percentile Queue Length [ft/ln]	0.00	235.74	238.80	66.71	201.85	125.08	22.13

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	54.28	54.28	57.26	5.24	6.63	6.63	9.34	9.34	7.86
Movement LOS	A	A	A	D	D	E	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	0.00			55.77			6.22			9.09		
Approach LOS	A			E			A			A		
d_I, Intersection Delay [s/veh]	18.77											
Intersection LOS	B											
Intersection V/C	0.474											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	9.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	51.34	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.390	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	417	417	1400	800
d_b, Bicycle Delay [s]	37.60	37.60	5.40	21.60
l_b,int, Bicycle LOS Score for Intersection	1.560	2.147	2.888	2.083
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	61.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.632

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	134	406	329	496	568	168
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	134	406	329	496	568	168
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	102	82	124	142	42
Total Analysis Volume [veh/h]	134	406	329	496	568	168
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	0
Maximum Green [s]	25	0	20	50	50	0
Amber [s]	4.0	0.0	4.0	4.5	4.5	0.0
All red [s]	2.0	0.0	1.5	2.0	2.0	0.0
Split [s]	25	0	20	70	50	0
Vehicle Extension [s]	4.0	0.0	3.0	4.0	4.0	0.0
Walk [s]	5	0	0	7	5	0
Pedestrian Clearance [s]	10	0	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	0.0	3.5	4.5	4.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	6.00	6.00	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	19	19	59	59	41	41
g / C, Green / Cycle	0.20	0.20	0.62	0.62	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.08	0.28	0.37	0.15	0.22	0.24
s, saturation flow rate [veh/h]	1603	1431	895	3204	1683	1558
c, Capacity [veh/h]	321	286	551	1976	734	680
d1, Uniform Delay [s]	33.17	38.00	11.59	8.26	19.31	19.75
k, delay calibration	0.15	0.45	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.24	206.16	4.72	0.31	2.43	3.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	1.42	0.60	0.25	0.50	0.54
d, Delay for Lane Group [s/veh]	34.41	244.16	16.32	8.57	21.74	22.83
Lane Group LOS	C	F	B	A	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	2.78	22.90	3.53	2.08	5.94	6.15
50th-Percentile Queue Length [ft/ln]	69.38	572.58	88.35	51.90	148.44	153.70
95th-Percentile Queue Length [veh/ln]	5.00	35.91	6.36	3.74	9.93	10.21
95th-Percentile Queue Length [ft/ln]	124.89	897.87	159.02	93.43	248.35	255.36

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	34.41	244.16	16.32	8.57	22.13	22.83
Movement LOS	C	F	B	A	C	C
d_A, Approach Delay [s/veh]	192.11		11.66		22.29	
Approach LOS	F		B		C	
d_I, Intersection Delay [s/veh]	61.76					
Intersection LOS	E					
Intersection V/C	0.632					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	1337	916
d_b, Bicycle Delay [s]	30.40	5.22	13.96
l_b,int, Bicycle LOS Score for Intersection	1.560	2.240	2.167
Bicycle LOS	A	B	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 6: Northshore and Tooles Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	24.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.154

Intersection Setup

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	34	38	567	29	8	540
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	38	567	29	8	540
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	10	142	7	2	135
Total Analysis Volume [veh/h]	34	38	567	29	8	540
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.07	0.01	0.00	0.01	0.01
d_M, Delay for Movement [s/veh]	24.68	15.36	0.00	0.00	8.70	0.00
Movement LOS	C	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.86	0.86	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	21.58	21.58	0.00	0.00	0.62	0.62
d_A, Approach Delay [s/veh]	19.76		0.00		0.13	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.23					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	26.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.123

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	24	53	58	601	434	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	53	58	601	434	40
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	13	15	150	109	10
Total Analysis Volume [veh/h]	24	53	58	601	434	40
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.09	0.05	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	25.97	13.53	8.50	0.00	0.00	0.00
Movement LOS	D	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.78	0.78	0.17	0.17	0.00	0.00
95th-Percentile Queue Length [ft/ln]	19.52	19.52	4.22	4.22	0.00	0.00
d_A, Approach Delay [s/veh]	17.41		0.75		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.52					
Intersection LOS	D					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	25.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.466

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	45	36	43	99	19	142	113	611	8	16	267	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	36	43	99	19	142	113	611	8	16	267	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	9	11	25	5	36	28	153	2	4	67	11
Total Analysis Volume [veh/h]	45	36	43	99	19	142	113	611	8	16	267	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	3	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	0	5	0	5	18	0	0	18	0
Maximum Green [s]	15	30	0	0	30	0	15	75	0	0	60	0
Amber [s]	4.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	20	0	0	32	0	20	78	0	0	58	0
Vehicle Extension [s]	3.0	5.0	0.0	0.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	No			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	R	C	R	L	C	L	C
C, Cycle Length [s]	130	130	130	130	130	130	130	130
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	8	8	15	15	92	92	82	82
g / C, Green / Cycle	0.06	0.06	0.11	0.11	0.71	0.71	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.07	0.09	0.10	0.33	0.02	0.17
s, saturation flow rate [veh/h]	1819	1589	1795	1589	1132	1866	804	1826
c, Capacity [veh/h]	111	97	205	182	797	1323	428	1154
d1, Uniform Delay [s]	59.96	58.88	54.56	55.97	6.38	8.24	19.12	10.60
k, delay calibration	0.23	0.23	0.23	0.23	0.28	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.51	6.62	5.32	14.21	0.21	1.19	0.16	0.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.44	0.57	0.78	0.14	0.47	0.04	0.27
d, Delay for Lane Group [s/veh]	77.47	65.50	59.87	70.17	6.59	9.43	19.29	11.17
Lane Group LOS	E	E	E	E	A	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.17	1.55	3.98	5.26	0.91	7.07	0.28	3.87
50th-Percentile Queue Length [ft/ln]	79.28	38.75	99.47	131.39	22.76	176.76	7.03	96.87
95th-Percentile Queue Length [veh/ln]	5.71	2.79	7.16	9.02	1.64	11.43	0.51	6.97
95th-Percentile Queue Length [ft/ln]	142.70	69.74	179.05	225.38	40.97	285.77	12.65	174.36

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.47	77.47	65.50	59.87	59.87	70.17	6.59	9.43	9.43	19.29	11.17	11.17
Movement LOS	E	E	E	E	E	E	A	A	A	B	B	B
d_A, Approach Delay [s/veh]	73.32			65.50			8.99			11.57		
Approach LOS	E			E			A			B		
d_I, Intersection Delay [s/veh]	25.30											
Intersection LOS	C											
Intersection V/C	0.466											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	231	415	1123	815
d_b, Bicycle Delay [s]	50.87	40.80	12.50	22.80
l_b,int, Bicycle LOS Score for Intersection	1.764	1.989	2.767	2.096
Bicycle LOS	A	A	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	53.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.093

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	237	779	18	104	407
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	59	195	5	26	102
Total Analysis Volume [veh/h]	12	237	779	18	104	407
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.61	0.01	0.00	0.13	0.00
d_M, Delay for Movement [s/veh]	53.31	34.60	0.00	0.00	9.99	0.00
Movement LOS	F	D	A	A	A	A
95th-Percentile Queue Length [veh/ln]	5.06	5.06	0.00	0.00	0.43	0.43
95th-Percentile Queue Length [ft/ln]	126.44	126.44	0.00	0.00	10.77	10.77
d_A, Approach Delay [s/veh]	35.50		0.00		2.03	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	6.34					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 10: Northshore and Lyons View Pike/Westland Drive

Control Type:	Signalized	Delay (sec / veh):	37.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.591

Intersection Setup

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	120.00	100.00	120.00	90.00	100.00	120.00	175.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	170	96	96	120	255	14	29	538	404	101	354	99
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	96	96	120	255	14	29	538	404	101	354	99
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	24	24	30	64	4	7	135	101	25	89	25
Total Analysis Volume [veh/h]	170	96	96	120	255	14	29	538	404	101	354	99
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	0	3	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	6	15	0
Maximum Green [s]	0	30	0	0	30	0	20	60	0	20	40	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	28	0	18	48	0	18	48	0
Vehicle Extension [s]	0.0	6.0	0.0	0.0	6.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	5	0	0	5	0	5	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	10	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	16	16	16	22	22	22	68	57	57	68	59	59
g / C, Green / Cycle	0.13	0.13	0.13	0.18	0.18	0.18	0.56	0.47	0.47	0.56	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.11	0.06	0.07	0.07	0.15	0.01	0.03	0.30	0.30	0.15	0.21	0.07
s, saturation flow rate [veh/h]	1603	1683	1431	1603	1683	1431	993	1683	1446	676	1683	1431
c, Capacity [veh/h]	213	223	190	287	302	256	513	795	683	342	823	700
d1, Uniform Delay [s]	50.50	47.87	48.39	43.69	47.64	40.82	12.95	23.91	23.91	16.31	19.82	16.81
k, delay calibration	0.39	0.39	0.39	0.39	0.40	0.39	0.50	0.50	0.50	0.30	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.49	4.70	7.40	3.49	20.38	0.32	0.21	3.89	4.51	1.31	1.64	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.43	0.51	0.42	0.85	0.05	0.06	0.64	0.64	0.30	0.43	0.14
d, Delay for Lane Group [s/veh]	71.99	52.58	55.79	47.18	68.02	41.14	13.16	27.80	28.42	17.62	21.46	17.24
Lane Group LOS	E	D	E	D	E	D	B	C	C	B	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.13	2.90	3.02	3.39	8.93	0.36	0.36	11.18	9.72	1.33	6.50	1.54
50th-Percentile Queue Length [ft/ln]	153.34	72.40	75.56	84.84	223.15	9.06	9.03	279.43	243.05	33.35	162.50	38.39
95th-Percentile Queue Length [veh/ln]	10.20	5.21	5.44	6.11	13.83	0.65	0.65	16.66	14.84	2.40	10.68	2.76
95th-Percentile Queue Length [ft/ln]	254.88	130.32	136.01	152.71	345.64	16.30	16.26	416.51	370.89	60.03	267.03	69.10

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.99	52.58	55.79	47.18	68.02	41.14	13.16	27.83	28.42	17.62	21.46	17.24
Movement LOS	E	D	E	D	E	D	B	C	C	B	C	B
d_A, Approach Delay [s/veh]	62.54			60.62			27.64			20.00		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	36.97											
Intersection LOS	D											
Intersection V/C	0.591											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	350	383	717	717
d_b, Bicycle Delay [s]	40.84	39.20	24.70	24.70
l_b,int, Bicycle LOS Score for Intersection	2.157	2.201	2.361	2.474
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Futuree?

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Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	85.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.454

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	35	55	60	743	886	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	55	60	743	886	68
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	14	15	186	222	17
Total Analysis Volume [veh/h]	35	55	60	743	886	68
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.45	0.17	0.08	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	85.68	18.16	10.45	0.00	0.00	0.00
Movement LOS	F	C	B	A	A	A
95th-Percentile Queue Length [veh/ln]	1.84	0.59	0.27	0.27	0.00	0.00
95th-Percentile Queue Length [ft/ln]	46.12	14.84	6.79	6.79	0.00	0.00
d_A, Approach Delay [s/veh]	44.42		0.78		0.00	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	2.50					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Two-way stop	Delay (sec / veh):	32.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.052

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	7	0	10	8	1	77	101	501	13	4	407	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	0	10	8	1	77	101	501	13	4	407	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	3	2	0	19	25	125	3	1	102	3
Total Analysis Volume [veh/h]	7	0	10	8	1	77	101	501	13	4	407	12
Pedestrian Volume [ped/h]	0			0			0			0		

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Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.02	0.05	0.01	0.12	0.09	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	32.94	26.57	12.48	29.25	27.06	12.21	8.46	0.00	0.00	8.44	0.00	0.00
Movement LOS	D	D	B	D	D	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.22	0.22	0.22	0.64	0.64	0.64	0.29	0.29	0.29	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	5.59	5.59	5.59	15.88	15.88	15.88	7.27	7.27	7.27	0.29	0.29	0.29
d_A, Approach Delay [s/veh]	20.91			13.97			1.39			0.08		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	2.14											
Intersection LOS	D											

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 3: Northshore and Hart Road

Control Type:	Two-way stop	Delay (sec / veh):	24.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.266

Intersection Setup

Name	Hart Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hart Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	66	12	15	517	438	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	12	15	517	438	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	3	4	129	110	30
Total Analysis Volume [veh/h]	66	12	15	517	438	121
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.27	0.02	0.01	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	24.78	16.55	8.61	0.00	0.00	0.00
Movement LOS	C	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.15	1.15	0.05	0.05	0.00	0.00
95th-Percentile Queue Length [ft/ln]	28.85	28.85	1.13	1.13	0.00	0.00
d_A, Approach Delay [s/veh]	23.51		0.24		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.68					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 4: Northshore and Thunderhead Road

Control Type:	Signalized	Delay (sec / veh):	16.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.501

Intersection Setup

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	110.00	120.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	0	0	0	115	0	38	41	638	0	0	682	103
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	115	0	38	41	638	0	0	682	103
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	29	0	10	10	160	0	0	171	26
Total Analysis Volume [veh/h]	0	0	0	115	0	38	41	638	0	0	682	103
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	8.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	0	15	0
Maximum Green [s]	0	25	0	0	25	0	15	60	0	0	45	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	30	0	0	30	0	20	80	0	0	60	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	5	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	Yes			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	C	R	L	C	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	0.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	12	12	12	78	78	68	68
g / C, Green / Cycle	0.10	0.10	0.10	0.70	0.70	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.00	0.09	0.03	0.05	0.38	0.41	0.07
s, saturation flow rate [veh/h]	1489	1323	1431	770	1683	1683	1431
c, Capacity [veh/h]	190	205	151	454	1185	1074	885
d1, Uniform Delay [s]	0.00	47.97	45.19	9.14	7.75	13.43	8.61
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	2.39	0.86	0.09	1.76	2.86	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.56	0.25	0.09	0.54	0.63	0.12
d, Delay for Lane Group [s/veh]	0.00	50.36	46.05	9.23	9.51	16.29	8.87
Lane Group LOS	A	D	D	A	A	B	A
Critical Lane Group	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.00	3.21	0.99	0.25	6.42	10.35	0.98
50th-Percentile Queue Length [ft/ln]	0.00	80.34	24.78	6.25	160.58	258.70	24.62
95th-Percentile Queue Length [veh/ln]	0.00	5.78	1.78	0.45	10.58	15.62	1.77
95th-Percentile Queue Length [ft/ln]	0.00	144.61	44.61	11.25	264.49	390.59	44.31

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	50.36	50.36	46.05	9.23	9.51	9.51	16.29	16.29	8.87
Movement LOS	A	A	A	D	D	D	A	A	A	B	B	A
d_A, Approach Delay [s/veh]	0.00			49.29			9.49			15.32		
Approach LOS	A			D			A			B		
d_I, Intersection Delay [s/veh]	16.09											
Intersection LOS	B											
Intersection V/C	0.501											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	9.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	46.37	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.085	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	455	455	1345	982
d_b, Bicycle Delay [s]	32.84	32.84	5.89	14.25
l_b,int, Bicycle LOS Score for Intersection	1.560	1.812	2.680	2.855
Bicycle LOS	A	A	B	C

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	51.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.706

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	187	392	500	866	644	154
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	187	392	500	866	644	154
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	98	125	217	161	39
Total Analysis Volume [veh/h]	187	392	500	866	644	154
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	0
Maximum Green [s]	25	0	20	50	50	0
Amber [s]	4.0	0.0	4.0	4.5	4.5	0.0
All red [s]	2.0	0.0	1.5	2.0	2.0	0.0
Split [s]	25	0	20	70	50	0
Vehicle Extension [s]	4.0	0.0	3.0	4.0	4.0	0.0
Walk [s]	5	0	0	7	5	0
Pedestrian Clearance [s]	10	0	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	0.0	3.5	4.5	4.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	6.00	6.00	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	19	19	59	59	39	39
g / C, Green / Cycle	0.20	0.20	0.62	0.62	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.12	0.27	0.55	0.27	0.24	0.25
s, saturation flow rate [veh/h]	1603	1431	917	3204	1683	1576
c, Capacity [veh/h]	321	286	557	1979	685	641
d1, Uniform Delay [s]	34.42	38.00	15.60	9.53	21.90	22.37
k, delay calibration	0.15	0.43	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.39	184.59	19.82	0.71	3.60	4.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	1.37	0.90	0.44	0.58	0.62
d, Delay for Lane Group [s/veh]	36.81	222.59	35.42	10.23	25.50	26.88
Lane Group LOS	D	F	D	B	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.07	21.19	7.99	4.22	7.14	7.39
50th-Percentile Queue Length [ft/ln]	101.79	529.72	199.83	105.42	178.40	184.83
95th-Percentile Queue Length [veh/ln]	7.33	33.14	12.63	7.58	11.52	11.85
95th-Percentile Queue Length [ft/ln]	183.22	828.50	315.75	189.61	287.92	296.31

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.81	222.59	35.42	10.23	26.03	26.88
Movement LOS	D	F	D	B	C	C
d_A, Approach Delay [s/veh]	162.59		19.45		26.19	
Approach LOS	F		B		C	
d_I, Intersection Delay [s/veh]	51.63					
Intersection LOS	D					
Intersection V/C	0.706					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	1337	916
d_b, Bicycle Delay [s]	30.40	5.22	13.96
l_b,int, Bicycle LOS Score for Intersection	1.560	2.687	2.218
Bicycle LOS	A	B	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 6: Northshore and Tooles Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	45.4
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.200

Intersection Setup

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	22	19	875	53	29	639
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	19	875	53	29	639
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	5	219	13	7	160
Total Analysis Volume [veh/h]	22	19	875	53	29	639
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.06	0.01	0.00	0.04	0.01
d_M, Delay for Movement [s/veh]	45.41	23.32	0.00	0.00	10.09	0.00
Movement LOS	E	C	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.97	0.97	0.00	0.00	0.12	0.12
95th-Percentile Queue Length [ft/ln]	24.33	24.33	0.00	0.00	3.07	3.07
d_A, Approach Delay [s/veh]	35.17		0.00		0.44	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	1.06					
Intersection LOS	E					

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	54.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.286

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	27	50	64	835	652	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	50	64	835	652	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	13	16	209	163	16
Total Analysis Volume [veh/h]	27	50	64	835	652	64
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.29	0.11	0.07	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	54.87	24.77	9.39	0.00	0.00	0.00
Movement LOS	F	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.77	1.77	0.23	0.23	0.00	0.00
95th-Percentile Queue Length [ft/ln]	44.13	44.13	5.84	5.84	0.00	0.00
d_A, Approach Delay [s/veh]	35.33		0.67		0.00	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	1.96					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	31.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.591

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	49	55	40	103	53	229	243	616	36	44	531	69
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	49	55	40	103	53	229	243	616	36	44	531	69
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	14	10	26	13	57	61	154	9	11	133	17
Total Analysis Volume [veh/h]	49	55	40	103	53	229	243	616	36	44	531	69
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	3	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	0	5	0	5	18	0	0	18	0
Maximum Green [s]	15	30	0	0	30	0	15	75	0	0	60	0
Amber [s]	4.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	20	0	0	32	0	20	78	0	0	58	0
Vehicle Extension [s]	3.0	5.0	0.0	0.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	No			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	L	C
C, Cycle Length [s]	130	130	130	130	130	130	130	130
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	10	10	22	22	83	83	69	69
g / C, Green / Cycle	0.07	0.07	0.17	0.17	0.64	0.64	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.06	0.03	0.09	0.14	0.25	0.35	0.06	0.33
s, saturation flow rate [veh/h]	1827	1589	1810	1589	966	1852	780	1833
c, Capacity [veh/h]	134	117	308	270	508	1187	299	967
d1, Uniform Delay [s]	59.16	57.23	49.00	52.31	14.86	12.93	32.59	21.56
k, delay calibration	0.23	0.23	0.23	0.25	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.01	3.66	2.74	14.97	3.20	1.83	1.04	2.99
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.34	0.51	0.85	0.48	0.55	0.15	0.62
d, Delay for Lane Group [s/veh]	77.16	60.89	51.74	67.28	18.06	14.76	33.62	24.55
Lane Group LOS	E	E	D	E	B	B	C	C
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.04	1.37	4.86	8.37	3.16	10.29	1.09	13.03
50th-Percentile Queue Length [ft/ln]	101.10	34.33	121.47	209.27	78.98	257.15	27.19	325.66
95th-Percentile Queue Length [veh/ln]	7.28	2.47	8.47	13.12	5.69	15.55	1.96	18.95
95th-Percentile Queue Length [ft/ln]	181.98	61.80	211.84	327.90	142.16	388.65	48.95	473.63

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.16	77.16	60.89	51.74	51.74	67.28	18.06	14.76	14.76	33.62	24.55	24.55
Movement LOS	E	E	E	D	D	E	B	B	B	C	C	C
d_A, Approach Delay [s/veh]	72.64			60.98			15.66			25.17		
Approach LOS	E			E			B			C		
d_I, Intersection Delay [s/veh]	31.03											
Intersection LOS	C											
Intersection V/C	0.591											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	231	415	1123	815
d_b, Bicycle Delay [s]	50.87	40.80	12.50	22.80
I_b,int, Bicycle LOS Score for Intersection	1.797	2.195	3.036	2.622
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	63.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.286

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	138	667	25	149	622
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	35	167	6	37	156
Total Analysis Volume [veh/h]	25	138	667	25	149	622
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.29	0.31	0.01	0.00	0.17	0.01
d_M, Delay for Movement [s/veh]	63.57	30.32	0.00	0.00	9.77	0.00
Movement LOS	F	D	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.49	3.49	0.00	0.00	0.59	0.59
95th-Percentile Queue Length [ft/ln]	87.20	87.20	0.00	0.00	14.73	14.73
d_A, Approach Delay [s/veh]	35.42		0.00		1.89	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	4.45					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 10: Northshore and Lyons View Pike/Westland Drive

Control Type:	Signalized	Delay (sec / veh):	61.0
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.664

Intersection Setup

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	120.00	100.00	120.00	90.00	100.00	120.00	175.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Northshore Corridor Study
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Volumes

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	331	323	68	107	284	49	46	376	316	158	457	244
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	331	323	68	107	284	49	46	376	316	158	457	244
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	83	81	17	27	71	12	12	94	79	40	114	61
Total Analysis Volume [veh/h]	331	323	68	107	284	49	46	376	316	158	457	244
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	0	3	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	6	15	0
Maximum Green [s]	0	30	0	0	30	0	20	60	0	20	40	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	21	0	0	34	0	19	21	0	19	21	0
Vehicle Extension [s]	0.0	6.0	0.0	0.0	6.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	5	0	0	5	0	5	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	10	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	16	16	16	20	20	20	44	31	31	44	35	35
g / C, Green / Cycle	0.17	0.17	0.17	0.21	0.21	0.21	0.46	0.33	0.33	0.46	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.21	0.19	0.05	0.07	0.17	0.03	0.05	0.22	0.22	0.18	0.27	0.17
s, saturation flow rate [veh/h]	1603	1683	1431	1603	1683	1431	967	1683	1433	900	1683	1431
c, Capacity [veh/h]	270	283	241	338	355	301	353	556	473	392	614	522
d1, Uniform Delay [s]	39.50	39.50	34.49	31.70	35.59	30.64	17.07	27.37	27.44	17.63	26.29	23.09
k, delay calibration	0.41	0.40	0.39	0.39	0.39	0.39	0.50	0.50	0.50	0.25	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	125.92	91.56	2.29	1.93	13.88	0.91	0.76	6.31	7.54	1.52	7.95	2.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.23	1.14	0.28	0.32	0.80	0.16	0.13	0.67	0.68	0.40	0.74	0.47
d, Delay for Lane Group [s/veh]	165.42	131.06	36.78	33.63	49.48	31.55	17.83	33.68	34.98	19.15	34.24	26.07
Lane Group LOS	F	F	D	C	D	C	B	C	C	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	15.48	13.55	1.48	2.19	7.34	0.96	0.59	7.82	6.89	2.06	9.77	4.38
50th-Percentile Queue Length [ft/ln]	387.07	338.78	37.05	54.67	183.61	24.09	14.69	195.53	172.18	51.61	244.16	109.40
95th-Percentile Queue Length [veh/ln]	24.05	20.83	2.67	3.94	11.79	1.73	1.06	12.41	11.19	3.72	14.89	7.81
95th-Percentile Queue Length [ft/ln]	601.25	520.67	66.69	98.40	294.72	43.36	26.45	310.19	279.78	92.90	372.28	195.17

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	165.42	131.06	36.78	33.63	49.48	31.55	17.83	33.69	34.98	19.15	34.24	26.07
Movement LOS	F	F	D	C	D	C	B	C	C	B	C	C
d_A, Approach Delay [s/veh]	137.93			43.63			33.25			29.14		
Approach LOS	F			D			C			C		
d_I, Intersection Delay [s/veh]	61.02											
Intersection LOS	E											
Intersection V/C	0.664											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	337	611	337	337
d_b, Bicycle Delay [s]	32.85	22.93	32.85	32.85
l_b,int, Bicycle LOS Score for Intersection	2.751	2.286	2.168	2.977
Bicycle LOS	C	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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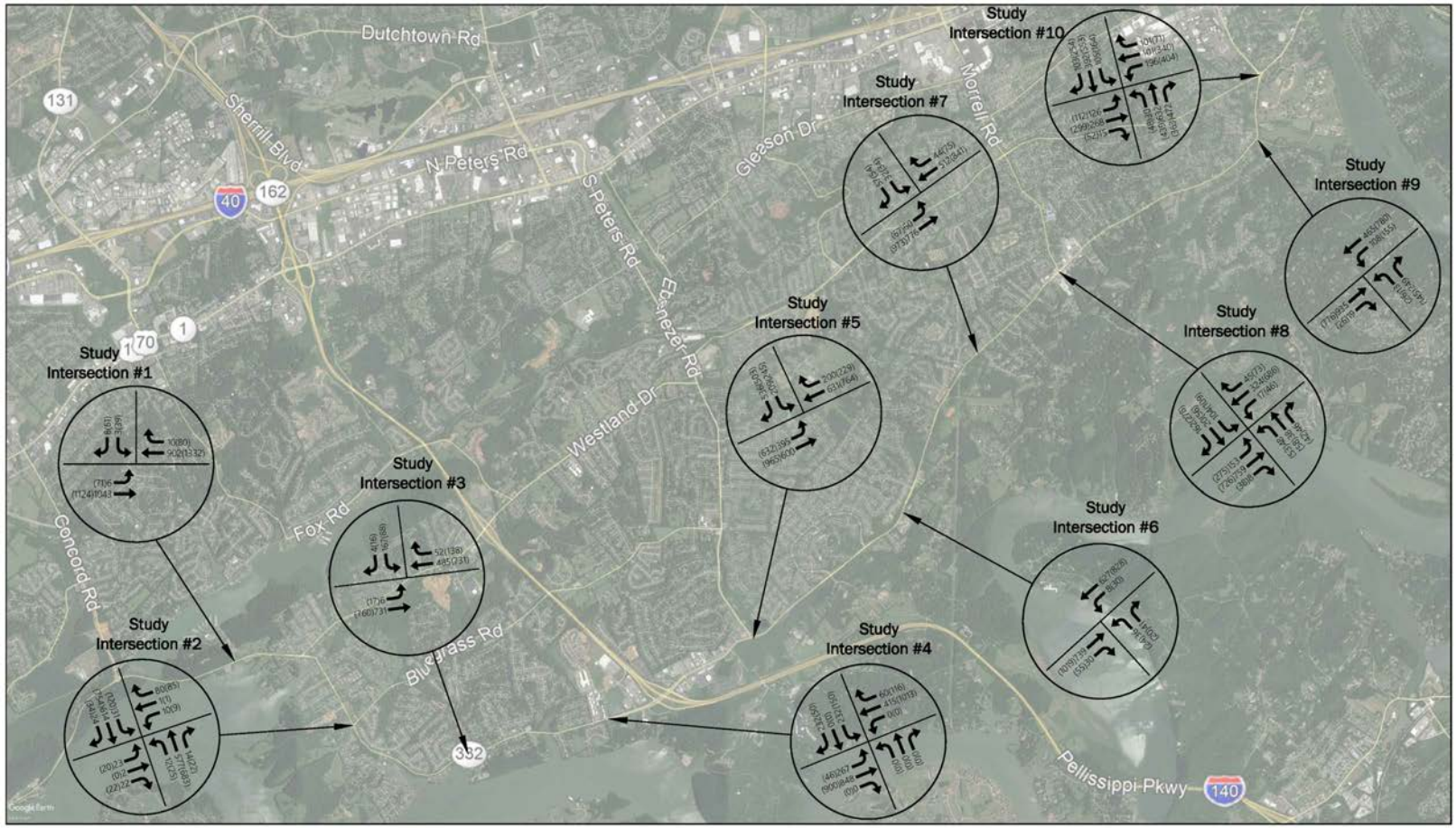
Vistro File: M:\...\Base Model.vistro 7/26/2021 Scenario 2: 2 Existing PM

APPENDIX B
FUTURE CONDITIONS

Peak Hour Traffic Volumes, Vistro Reports,
Traffic Analysis with Improvements,
Additional Alternatives

1. FUTURE PEAK HOUR TRAFFIC VOLUMES



Future Peak Hour Traffic Volumes
(Not to Scale)

2. FUTURE CONDITIONS – VISTRO REPORTS

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	60.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.044

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	3	7	6	693	612	10
Base Volume Adjustment Factor	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	223	178	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	8	7	1043	902	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	2	2	261	226	3
Total Analysis Volume [veh/h]	3	8	7	1043	902	12
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.02	0.01	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	60.64	16.06	9.87	0.00	0.00	0.00
Movement LOS	F	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.07	0.03	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.42	1.84	0.71	0.71	0.00	0.00
d_A, Approach Delay [s/veh]	28.21		0.07		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	0.19					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Two-way stop	Delay (sec / veh):	47.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.222

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	6	2	3	9	1	72	26	380	15	4	393	10
Base Volume Adjustment Factor	1.1046	1.1046	1.1046	1.1046	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	0	19	0	0	0	0	164	6	7	112	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	22	10	1	80	31	614	24	12	577	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	6	3	0	20	8	154	6	3	144	4
Total Analysis Volume [veh/h]	23	2	22	10	1	80	31	614	24	12	577	14
Pedestrian Volume [ped/h]	0			0			0			0		

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Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.01	0.05	0.08	0.01	0.16	0.03	0.01	0.00	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	47.83	37.19	20.59	37.55	32.31	15.15	8.78	0.00	0.00	8.86	0.00	0.00
Movement LOS	E	E	C	E	D	C	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.09	1.09	1.09	0.95	0.95	0.95	0.10	0.10	0.10	0.04	0.04	0.04
95th-Percentile Queue Length [ft/ln]	27.24	27.24	27.24	23.68	23.68	23.68	2.44	2.44	2.44	0.96	0.96	0.96
d_A, Approach Delay [s/veh]	34.63			17.80			0.41			0.18		
Approach LOS	D			C			A			A		
d_I, Intersection Delay [s/veh]	2.57											
Intersection LOS	E											

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 3: Northshore and Hart Road

Control Type:	Two-way stop	Delay (sec / veh):	91.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.889

Intersection Setup

Name	Hart Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hart Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	126	3	5	472	326	45
Base Volume Adjustment Factor	1.3053	1.3053	1.1267	1.1267	1.1267	1.1267
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	0	0	199	118	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	167	4	6	731	485	52
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	1	2	183	121	13
Total Analysis Volume [veh/h]	167	4	6	731	485	52
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.89	0.01	0.01	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	91.11	78.34	8.51	0.00	0.00	0.00
Movement LOS	F	F	A	A	A	A
95th-Percentile Queue Length [veh/ln]	6.86	6.86	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	171.62	171.62	0.44	0.44	0.00	0.00
d_A, Approach Delay [s/veh]	90.81		0.07		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	10.78					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 4: Northshore and Thunderhead Road

Control Type:	Signalized	Delay (sec / veh):	23.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.682

Intersection Setup

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	110.00	120.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			No		

Volumes

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	0	0	0	178	0	178	237	568	0	0	264	53
Base Volume Adjustment Factor	1.3053	1.3053	1.3053	1.3053	1.3053	1.3053	1.1267	1.1267	1.1267	1.1267	1.1267	1.1267
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	208	0	0	118	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	232	0	232	267	848	0	0	415	60
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	58	0	58	67	212	0	0	104	15
Total Analysis Volume [veh/h]	0	0	0	232	0	232	267	848	0	0	415	60
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	93.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	0	15	0
Maximum Green [s]	0	25	0	0	25	0	15	60	0	0	45	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	30	0	0	30	0	36	90	0	0	54	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	5	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	Yes			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	C	R	L	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	0.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	23	23	23	86	86	71	71
g / C, Green / Cycle	0.19	0.19	0.19	0.71	0.71	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.00	0.18	0.16	0.27	0.50	0.25	0.04
s, saturation flow rate [veh/h]	1566	1303	1431	980	1683	1683	1431
c, Capacity [veh/h]	333	312	277	667	1203	1029	849
d1, Uniform Delay [s]	0.00	47.22	46.56	7.51	9.85	13.15	10.34
k, delay calibration	0.11	0.31	0.26	0.47	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	9.65	14.56	1.68	3.49	1.18	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.74	0.84	0.40	0.71	0.40	0.07
d, Delay for Lane Group [s/veh]	0.00	56.86	61.12	9.20	13.33	14.32	10.50
Lane Group LOS	A	E	E	A	B	B	B
Critical Lane Group	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.00	7.60	7.77	2.29	11.71	5.95	0.68
50th-Percentile Queue Length [ft/ln]	0.00	190.05	194.13	57.23	292.83	148.75	16.91
95th-Percentile Queue Length [veh/ln]	0.00	12.12	12.34	4.12	17.33	9.95	1.22
95th-Percentile Queue Length [ft/ln]	0.00	303.09	308.38	103.01	433.15	248.75	30.43

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	56.86	56.86	61.12	9.20	13.33	13.33	14.32	14.32	10.50
Movement LOS	A	A	A	E	E	E	A	B	B	B	B	B
d_A, Approach Delay [s/veh]	0.00			58.99			12.34			13.84		
Approach LOS	A			E			B			B		
d_I, Intersection Delay [s/veh]	23.23											
Intersection LOS	C											
Intersection V/C	0.682											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	9.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	51.34	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.445	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	417	417	1400	800
d_b, Bicycle Delay [s]	37.60	37.60	5.40	21.60
l_b,int, Bicycle LOS Score for Intersection	1.560	2.325	3.399	2.343
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	109.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	134	406	329	496	568	168
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	65	101	53	84	40	25
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	536	395	600	631	200
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	134	99	150	158	50
Total Analysis Volume [veh/h]	209	536	395	600	631	200
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	0
Maximum Green [s]	25	0	20	50	50	0
Amber [s]	4.0	0.0	4.0	4.5	4.5	0.0
All red [s]	2.0	0.0	1.5	2.0	2.0	0.0
Split [s]	25	0	20	70	50	0
Vehicle Extension [s]	4.0	0.0	3.0	4.0	4.0	0.0
Walk [s]	5	0	0	7	5	0
Pedestrian Clearance [s]	10	0	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	0.0	3.5	4.5	4.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	6.00	6.00	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	19	19	59	59	39	39
g / C, Green / Cycle	0.20	0.20	0.62	0.62	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.13	0.37	0.44	0.19	0.25	0.27
s, saturation flow rate [veh/h]	1603	1431	893	3204	1683	1551
c, Capacity [veh/h]	321	286	536	1976	694	640
d1, Uniform Delay [s]	34.96	38.00	14.58	8.59	21.76	22.39
k, delay calibration	0.15	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.17	406.10	8.72	0.40	3.78	5.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	1.87	0.74	0.30	0.60	0.65
d, Delay for Lane Group [s/veh]	38.13	444.10	23.30	8.99	25.55	27.43
Lane Group LOS	D	F	C	A	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.66	38.79	4.86	2.62	7.45	7.81
50th-Percentile Queue Length [ft/ln]	116.58	969.83	121.49	65.38	186.36	195.35
95th-Percentile Queue Length [veh/ln]	8.20	61.73	8.47	4.71	11.93	12.40
95th-Percentile Queue Length [ft/ln]	205.12	1543.29	211.87	117.69	298.30	309.96

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	38.13	444.10	23.30	8.99	26.19	27.43
Movement LOS	D	F	C	A	C	C
d_A, Approach Delay [s/veh]	330.21		14.67		26.49	
Approach LOS	F		B		C	
d_I, Intersection Delay [s/veh]	109.93					
Intersection LOS	F					
Intersection V/C	0.782					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	1337	916
d_b, Bicycle Delay [s]	30.40	5.22	13.96
l_b,int, Bicycle LOS Score for Intersection	1.560	2.380	2.245
Bicycle LOS	A	B	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 6: Northshore and Tooles Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	36.2
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.235

Intersection Setup

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	34	38	567	29	8	540
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	149	0	0	65
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	36	41	739	30	8	627
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	10	185	8	2	157
Total Analysis Volume [veh/h]	36	41	739	30	8	627
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.24	0.10	0.01	0.00	0.01	0.01
d_M, Delay for Movement [s/veh]	36.23	21.51	0.00	0.00	9.30	0.00
Movement LOS	E	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.41	1.41	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	35.24	35.24	0.00	0.00	0.72	0.72
d_A, Approach Delay [s/veh]	28.39		0.00		0.12	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	1.53					
Intersection LOS	E					

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	39.3
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.241

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	24	53	58	601	434	40
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	0	151	60	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	57	60	776	512	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	14	15	194	128	11
Total Analysis Volume [veh/h]	32	57	60	776	512	44
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.24	0.10	0.06	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	39.28	18.78	8.77	0.00	0.00	0.00
Movement LOS	E	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.48	1.48	0.19	0.19	0.00	0.00
95th-Percentile Queue Length [ft/ln]	36.95	36.95	4.71	4.71	0.00	0.00
d_A, Approach Delay [s/veh]	26.15		0.63		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	1.93					
Intersection LOS	E					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	25.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.560

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	45	36	43	99	19	142	113	611	8	16	267	42
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	1	0	0	13	35	123	0	0	46	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	38	46	104	20	162	153	759	8	17	324	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	10	12	26	5	41	38	190	2	4	81	11
Total Analysis Volume [veh/h]	48	38	46	104	20	162	153	759	8	17	324	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	3	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	0	5	0	5	18	0	0	18	0
Maximum Green [s]	15	30	0	0	30	0	15	75	0	0	60	0
Amber [s]	4.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	20	0	0	32	0	20	78	0	0	58	0
Vehicle Extension [s]	3.0	5.0	0.0	0.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	No			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	L	C
C, Cycle Length [s]	130	130	130	130	130	130	130	130
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	8	8	17	17	90	90	79	79
g / C, Green / Cycle	0.06	0.06	0.13	0.13	0.69	0.69	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.05	0.03	0.07	0.10	0.14	0.41	0.02	0.20
s, saturation flow rate [veh/h]	1819	1589	1795	1589	1090	1867	701	1831
c, Capacity [veh/h]	116	102	229	202	733	1294	318	1114
d1, Uniform Delay [s]	59.78	58.65	53.17	55.11	7.51	10.38	26.10	12.46
k, delay calibration	0.23	0.23	0.23	0.23	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.62	6.59	4.23	14.22	0.65	2.00	0.32	0.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.45	0.54	0.80	0.21	0.59	0.05	0.33
d, Delay for Lane Group [s/veh]	77.40	65.24	57.40	69.33	8.15	12.38	26.42	13.26
Lane Group LOS	E	E	E	E	A	B	C	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.36	1.65	4.08	5.96	1.43	10.79	0.36	5.23
50th-Percentile Queue Length [ft/ln]	84.02	41.27	102.05	149.10	35.65	269.73	9.09	130.69
95th-Percentile Queue Length [veh/ln]	6.05	2.97	7.35	9.97	2.57	16.18	0.65	8.98
95th-Percentile Queue Length [ft/ln]	151.23	74.29	183.70	249.23	64.17	404.40	16.37	224.43

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.40	77.40	65.24	57.40	57.40	69.33	8.15	12.38	12.38	26.42	13.26	13.26
Movement LOS	E	E	E	E	E	E	A	B	B	C	B	B
d_A, Approach Delay [s/veh]	73.16			64.16			11.68			13.84		
Approach LOS	E			E			B			B		
d_I, Intersection Delay [s/veh]	25.58											
Intersection LOS	C											
Intersection V/C	0.560											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	231	415	1123	815
d_b, Bicycle Delay [s]	50.87	40.80	12.50	22.80
l_b,int, Bicycle LOS Score for Intersection	1.777	2.032	3.078	2.197
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	103.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.145

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	124	0	0	41
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	249	935	19	108	465
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	62	234	5	27	116
Total Analysis Volume [veh/h]	13	249	935	19	108	465
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.78	0.01	0.00	0.15	0.00
d_M, Delay for Movement [s/veh]	103.74	74.97	0.00	0.00	10.88	0.00
Movement LOS	F	F	A	A	B	A
95th-Percentile Queue Length [veh/ln]	8.73	8.73	0.00	0.00	0.53	0.53
95th-Percentile Queue Length [ft/ln]	218.23	218.23	0.00	0.00	13.14	13.14
d_A, Approach Delay [s/veh]	76.40		0.00		2.05	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	11.85					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 10: Northshore and Lyons View Pike/Westland Drive

Control Type:	Signalized	Delay (sec / veh):	40.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	120.00	100.00	120.00	90.00	100.00	120.00	175.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	170	96	96	120	255	14	29	538	404	101	354	99
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	17	0	0	0	0	0	0	72	52	0	24	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	196	101	101	126	268	15	30	632	472	105	392	103
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	25	25	32	67	4	8	158	118	26	98	26
Total Analysis Volume [veh/h]	196	101	101	126	268	15	30	632	472	105	392	103
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	0	3	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	6	15	0
Maximum Green [s]	0	30	0	0	30	0	20	60	0	20	40	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	26	0	0	28	0	18	48	0	18	48	0
Vehicle Extension [s]	0.0	6.0	0.0	0.0	6.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	5	0	0	5	0	5	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	10	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	18	18	18	22	22	22	65	54	54	65	56	56
g / C, Green / Cycle	0.15	0.15	0.15	0.18	0.18	0.18	0.54	0.45	0.45	0.54	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.12	0.06	0.07	0.08	0.16	0.01	0.03	0.35	0.35	0.17	0.23	0.07
s, saturation flow rate [veh/h]	1603	1683	1431	1603	1683	1431	968	1683	1447	616	1683	1431
c, Capacity [veh/h]	235	247	210	295	310	263	463	763	656	281	791	672
d1, Uniform Delay [s]	49.79	46.49	47.02	43.35	47.51	40.37	14.45	27.68	27.74	20.62	21.98	18.17
k, delay calibration	0.39	0.39	0.39	0.39	0.41	0.39	0.50	0.50	0.50	0.40	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	23.15	3.92	6.11	3.53	22.35	0.32	0.27	7.63	8.91	3.00	2.22	0.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.41	0.48	0.43	0.87	0.06	0.06	0.78	0.78	0.37	0.50	0.15
d, Delay for Lane Group [s/veh]	72.94	50.41	53.13	46.88	69.86	40.69	14.72	35.31	36.65	23.62	24.20	18.65
Lane Group LOS	E	D	D	D	E	D	B	D	D	C	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.12	2.97	3.09	3.55	9.53	0.39	0.40	15.22	13.39	1.57	7.80	1.68
50th-Percentile Queue Length [ft/ln]	177.97	74.18	77.13	88.79	238.18	9.63	9.92	380.40	334.71	39.16	195.02	41.97
95th-Percentile Queue Length [veh/ln]	11.49	5.34	5.55	6.39	14.59	0.69	0.71	21.61	19.39	2.82	12.38	3.02
95th-Percentile Queue Length [ft/ln]	287.36	133.52	138.84	159.82	364.73	17.34	17.86	540.33	484.72	70.48	309.53	75.55

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.94	50.41	53.13	46.88	69.86	40.69	14.72	35.40	36.65	23.62	24.20	18.65
Movement LOS	E	D	D	D	E	D	B	D	D	C	C	B
d_A, Approach Delay [s/veh]	62.19			61.71			35.37			23.14		
Approach LOS	E			E			D			C		
d_I, Intersection Delay [s/veh]	40.93											
Intersection LOS	D											
Intersection V/C	0.670											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	350	383	717	717
d_b, Bicycle Delay [s]	40.84	39.20	24.70	24.70
l_b,int, Bicycle LOS Score for Intersection	2.216	2.234	2.495	2.550
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	1,171.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	2.479

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	35	55	60	743	886	68
Base Volume Adjustment Factor	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	245	283	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	39	61	71	1124	1332	80
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	15	18	281	333	20
Total Analysis Volume [veh/h]	39	61	71	1124	1332	80
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	2.48	0.34	0.15	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	1171.86	35.26	13.74	0.00	0.00	0.00
Movement LOS	F	E	B	A	A	A
95th-Percentile Queue Length [veh/ln]	5.55	1.42	0.51	0.51	0.00	0.00
95th-Percentile Queue Length [ft/ln]	138.65	35.47	12.80	12.80	0.00	0.00
d_A, Approach Delay [s/veh]	478.53		0.82		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	18.04					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Two-way stop	Delay (sec / veh):	148.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.515

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	7	0	10	8	1	77	101	501	13	4	407	12
Base Volume Adjustment Factor	1.1046	1.1046	1.1046	1.1046	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	12	0	11	0	0	0	0	161	19	20	201	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	22	9	1	85	120	754	34	25	683	22
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	6	2	0	21	30	189	9	6	171	6
Total Analysis Volume [veh/h]	20	0	22	9	1	85	120	754	34	25	683	22
Pedestrian Volume [ped/h]	0			0			0			0		

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Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.51	0.00	0.05	0.19	0.02	0.19	0.13	0.01	0.00	0.03	0.01	0.00
d_M, Delay for Movement [s/veh]	148.71	115.65	65.10	88.67	74.46	22.53	9.66	0.00	0.00	9.46	0.00	0.00
Movement LOS	F	F	F	F	F	C	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	2.45	2.45	2.45	1.78	1.78	1.78	0.46	0.46	0.46	0.09	0.09	0.09
95th-Percentile Queue Length [ft/ln]	61.32	61.32	61.32	44.49	44.49	44.49	11.59	11.59	11.59	2.32	2.32	2.32
d_A, Approach Delay [s/veh]	104.91			29.35			1.28			0.32		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	4.84											
Intersection LOS	F											

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Intersection Level Of Service Report
Intersection 3: Northshore and Hart Road

Control Type:	Two-way stop	Delay (sec / veh):	106.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	Hart Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Hart Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	66	12	15	517	438	121
Base Volume Adjustment Factor	1.3053	1.3053	1.1267	1.1267	1.1267	1.1267
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	177	238	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	16	17	760	731	138
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	4	4	190	183	35
Total Analysis Volume [veh/h]	88	16	17	760	731	138
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.78	0.04	0.02	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	106.09	83.64	9.75	0.00	0.00	0.00
Movement LOS	F	F	A	A	A	A
95th-Percentile Queue Length [veh/ln]	4.97	4.97	0.07	0.07	0.00	0.00
95th-Percentile Queue Length [ft/ln]	124.27	124.27	1.68	1.68	0.00	0.00
d_A, Approach Delay [s/veh]	102.63		0.21		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	6.19					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 4: Northshore and Thunderhead Road

Control Type:	Signalized	Delay (sec / veh):	34.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.727

Intersection Setup

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	110.00	120.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			No			No		

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Volumes

Name	Private Drive			Thunderhead Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	0	0	0	115	0	38	41	638	0	0	682	103
Base Volume Adjustment Factor	1.3053	1.3053	1.3053	1.3053	1.3053	1.3053	1.1267	1.1267	1.1267	1.1267	1.1267	1.1267
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	181	0	0	245	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	50	46	900	0	0	1013	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	13	12	225	0	0	253	29
Total Analysis Volume [veh/h]	0	0	0	150	0	50	46	900	0	0	1013	116
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	8.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	0	15	0
Maximum Green [s]	0	25	0	0	25	0	15	60	0	0	45	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	30	0	0	30	0	20	80	0	0	60	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	5	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	Yes			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	0.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	74	74	65	65
g / C, Green / Cycle	0.13	0.13	0.13	0.68	0.68	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.00	0.11	0.03	0.07	0.53	0.60	0.08
s, saturation flow rate [veh/h]	1534	1314	1431	613	1683	1683	1431
c, Capacity [veh/h]	237	241	191	216	1139	1024	843
d1, Uniform Delay [s]	0.00	46.43	42.81	25.96	12.37	23.28	10.10
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	2.64	0.72	0.49	5.63	25.59	0.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.62	0.26	0.21	0.79	0.99	0.14
d, Delay for Lane Group [s/veh]	0.00	49.06	43.54	26.44	18.00	48.87	10.44
Lane Group LOS	A	D	D	C	B	D	B
Critical Lane Group	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.00	4.17	1.26	0.34	14.43	30.68	1.24
50th-Percentile Queue Length [ft/ln]	0.00	104.25	31.55	8.47	360.63	767.01	31.01
95th-Percentile Queue Length [veh/ln]	0.00	7.51	2.27	0.61	20.65	39.76	2.23
95th-Percentile Queue Length [ft/ln]	0.00	187.66	56.79	15.25	516.36	994.10	55.82

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	49.06	49.06	43.54	26.44	18.00	18.00	48.87	48.87	10.44
Movement LOS	A	A	A	D	D	D	C	B	B	D	D	B
d_A, Approach Delay [s/veh]	0.00			47.68			18.41			44.93		
Approach LOS	A			D			B			D		
d_I, Intersection Delay [s/veh]	34.14											
Intersection LOS	C											
Intersection V/C	0.727											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	9.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	46.37	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	2.109	0.000	0.000
Crosswalk LOS	F	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	455	455	1345	982
d_b, Bicycle Delay [s]	32.84	32.84	5.89	14.25
l_b,int, Bicycle LOS Score for Intersection	1.560	1.890	3.121	3.422
Bicycle LOS	A	A	C	C

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	106.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.881

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	187	392	500	866	644	154
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	44	83	112	64	94	69
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	503	632	965	764	229
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	126	158	241	191	57
Total Analysis Volume [veh/h]	245	503	632	965	764	229
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	0
Maximum Green [s]	25	0	20	50	50	0
Amber [s]	4.0	0.0	4.0	4.5	4.5	0.0
All red [s]	2.0	0.0	1.5	2.0	2.0	0.0
Split [s]	25	0	20	70	50	0
Vehicle Extension [s]	4.0	0.0	3.0	4.0	4.0	0.0
Walk [s]	5	0	0	7	5	0
Pedestrian Clearance [s]	10	0	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	0.0	3.5	4.5	4.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	6.00	6.00	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	19	19	59	59	39	39
g / C, Green / Cycle	0.20	0.20	0.62	0.62	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.15	0.35	0.75	0.30	0.30	0.32
s, saturation flow rate [veh/h]	1603	1431	846	3204	1683	1556
c, Capacity [veh/h]	321	286	495	1979	685	633
d1, Uniform Delay [s]	35.89	38.00	26.23	9.95	23.70	24.54
k, delay calibration	0.15	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.35	355.15	139.91	0.86	6.58	9.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.76	1.76	1.28	0.49	0.73	0.78
d, Delay for Lane Group [s/veh]	41.24	393.15	166.14	10.81	30.28	33.94
Lane Group LOS	D	F	F	B	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.75	34.74	24.07	4.92	9.94	10.65
50th-Percentile Queue Length [ft/ln]	143.70	868.60	601.86	122.95	248.47	266.21
95th-Percentile Queue Length [veh/ln]	9.68	55.18	38.03	8.55	15.11	16.00
95th-Percentile Queue Length [ft/ln]	242.00	1379.56	950.76	213.87	377.73	400.00

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	41.24	393.15	166.14	10.81	31.56	33.94
Movement LOS	D	F	F	B	C	C
d_A, Approach Delay [s/veh]	277.89		72.28		32.11	
Approach LOS	F		E		C	
d_I, Intersection Delay [s/veh]	106.41					
Intersection LOS	F					
Intersection V/C	0.881					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	1337	916
d_b, Bicycle Delay [s]	30.40	5.22	13.96
l_b,int, Bicycle LOS Score for Intersection	1.560	2.877	2.379
Bicycle LOS	A	C	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 6: Northshore and Tooles Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	84.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.363

Intersection Setup

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Tooles Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	22	19	875	53	29	639
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	108	0	0	163
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	20	1019	55	30	828
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	5	255	14	8	207
Total Analysis Volume [veh/h]	24	20	1019	55	30	828
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.36	0.07	0.01	0.00	0.05	0.01
d_M, Delay for Movement [s/veh]	84.36	42.93	0.00	0.00	10.81	0.00
Movement LOS	F	E	A	A	B	A
95th-Percentile Queue Length [veh/ln]	1.84	1.84	0.00	0.00	0.15	0.15
95th-Percentile Queue Length [ft/ln]	45.92	45.92	0.00	0.00	3.63	3.63
d_A, Approach Delay [s/veh]	65.53		0.00		0.38	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	1.62					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	140.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.629

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	27	50	64	835	652	64
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	104	162	8
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	54	67	973	841	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	14	17	243	210	19
Total Analysis Volume [veh/h]	34	54	67	973	841	75
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.63	0.16	0.09	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	140.13	83.90	10.31	0.00	0.00	0.00
Movement LOS	F	F	B	A	A	A
95th-Percentile Queue Length [veh/ln]	4.43	4.43	0.30	0.30	0.00	0.00
95th-Percentile Queue Length [ft/ln]	110.76	110.76	7.39	7.39	0.00	0.00
d_A, Approach Delay [s/veh]	105.63		0.66		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	4.89					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	39.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.726

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	49	55	40	103	53	229	243	616	36	44	531	69
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	0	1	0	37	22	85	1	0	133	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	58	42	109	56	278	275	726	38	46	686	73
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	15	11	27	14	70	69	182	10	12	172	18
Total Analysis Volume [veh/h]	53	58	42	109	56	278	275	726	38	46	686	73
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	3	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	0	5	0	5	18	0	0	18	0
Maximum Green [s]	15	30	0	0	30	0	15	75	0	0	60	0
Amber [s]	4.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	20	0	0	32	0	20	78	0	0	58	0
Vehicle Extension [s]	3.0	5.0	0.0	0.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No		No	No			No	
Maximum Recall		No			No		No	No			Yes	
Pedestrian Recall		No			No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	L	C
C, Cycle Length [s]	130	130	130	130	130	130	130	130
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	10	10	26	26	79	79	63	63
g / C, Green / Cycle	0.08	0.08	0.20	0.20	0.61	0.61	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.06	0.03	0.09	0.17	0.30	0.41	0.07	0.41
s, saturation flow rate [veh/h]	1826	1589	1810	1589	906	1854	703	1839
c, Capacity [veh/h]	141	123	360	316	372	1128	188	883
d1, Uniform Delay [s]	58.92	56.85	45.92	50.58	25.14	16.94	45.86	29.91
k, delay calibration	0.23	0.23	0.23	0.31	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.26	3.48	1.95	19.25	12.38	3.27	3.09	10.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.34	0.46	0.88	0.74	0.68	0.25	0.86
d, Delay for Lane Group [s/veh]	77.19	60.33	47.86	69.83	37.52	20.21	48.95	40.58
Lane Group LOS	E	E	D	E	D	C	D	D
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.31	1.43	4.92	10.47	4.79	15.06	1.44	22.54
50th-Percentile Queue Length [ft/ln]	107.83	35.80	123.09	261.65	119.76	376.40	35.97	563.38
95th-Percentile Queue Length [veh/ln]	7.72	2.58	8.56	15.77	8.38	21.42	2.59	30.32
95th-Percentile Queue Length [ft/ln]	192.98	64.43	214.07	394.29	209.50	535.49	64.75	758.01

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.19	77.19	60.33	47.86	47.86	69.83	37.52	20.21	20.21	48.95	40.58	40.58
Movement LOS	E	E	E	D	D	E	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	72.56			61.65			24.79			41.06		
Approach LOS	E			E			C			D		
d_I, Intersection Delay [s/veh]	39.84											
Intersection LOS	D											
Intersection V/C	0.726											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	231	415	1123	815
d_b, Bicycle Delay [s]	50.87	40.80	12.50	22.80
l_b,int, Bicycle LOS Score for Intersection	1.812	2.291	3.274	2.888
Bicycle LOS	A	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	133.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.497

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	82	0	0	133
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	145	776	26	155	780
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	36	194	7	39	195
Total Analysis Volume [veh/h]	26	145	776	26	155	780
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.37	0.01	0.00	0.19	0.01
d_M, Delay for Movement [s/veh]	133.88	74.22	0.00	0.00	10.40	0.00
Movement LOS	F	F	A	A	B	A
95th-Percentile Queue Length [veh/ln]	6.55	6.55	0.00	0.00	0.69	0.69
95th-Percentile Queue Length [ft/ln]	163.82	163.82	0.00	0.00	17.30	17.30
d_A, Approach Delay [s/veh]	83.29		0.00		1.72	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	8.31					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 10: Northshore and Lyons View Pike/Westland Drive

Control Type:	Signalized	Delay (sec / veh):	84.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Entry Pocket Length [ft]	150.00	100.00	150.00	120.00	100.00	120.00	90.00	100.00	120.00	175.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Lyons View Pike			Westland Drive			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	331	323	68	107	284	49	46	376	316	158	457	244
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	56	0	0	0	0	0	0	48	34	0	77	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	404	340	71	112	299	52	48	439	363	164	553	254
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	101	85	18	28	75	13	12	110	91	41	138	64
Total Analysis Volume [veh/h]	404	340	71	112	299	52	48	439	363	164	553	254
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	0	3	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	15	0	6	15	0
Maximum Green [s]	0	30	0	0	30	0	20	60	0	20	40	0
Amber [s]	0.0	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	21	0	0	34	0	19	21	0	19	21	0
Vehicle Extension [s]	0.0	6.0	0.0	0.0	6.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Walk [s]	0	5	0	0	5	0	5	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	10	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	16	16	16	21	21	21	43	30	30	43	34	34
g / C, Green / Cycle	0.17	0.17	0.17	0.22	0.22	0.22	0.45	0.32	0.32	0.45	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.25	0.20	0.05	0.07	0.18	0.04	0.05	0.26	0.26	0.19	0.33	0.18
s, saturation flow rate [veh/h]	1603	1683	1431	1603	1683	1431	914	1683	1434	864	1683	1431
c, Capacity [veh/h]	270	283	241	352	370	314	278	533	454	353	596	507
d1, Uniform Delay [s]	39.50	39.50	34.56	31.09	35.16	30.01	19.81	29.84	29.87	19.66	29.49	24.08
k, delay calibration	0.44	0.41	0.39	0.39	0.40	0.39	0.50	0.50	0.50	0.30	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	239.97	114.39	2.44	1.86	13.98	0.89	1.35	12.64	14.69	2.64	22.73	3.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.50	1.20	0.29	0.32	0.81	0.17	0.17	0.81	0.81	0.47	0.93	0.50
d, Delay for Lane Group [s/veh]	279.47	153.89	37.00	32.95	49.14	30.90	21.16	42.48	44.56	22.31	52.23	27.59
Lane Group LOS	F	F	D	C	D	C	C	D	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	24.03	15.35	1.55	2.26	7.71	1.01	0.65	10.41	9.15	2.28	15.03	4.72
50th-Percentile Queue Length [ft/ln]	600.87	383.72	38.83	56.51	192.78	25.22	16.29	260.23	228.82	57.02	375.69	117.94
95th-Percentile Queue Length [veh/ln]	37.75	23.67	2.80	4.07	12.27	1.82	1.17	15.70	14.11	4.11	21.39	8.28
95th-Percentile Queue Length [ft/ln]	943.87	591.74	69.89	101.71	306.63	45.40	29.33	392.51	352.86	102.64	534.63	206.99

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	279.47	153.89	37.00	32.95	49.14	30.90	21.16	42.52	44.56	22.31	52.23	27.59
Movement LOS	F	F	D	C	D	C	C	D	D	C	D	C
d_A, Approach Delay [s/veh]	205.96			43.17			42.18			40.73		
Approach LOS	F			D			D			D		
d_I, Intersection Delay [s/veh]	84.95											
Intersection LOS	F											
Intersection V/C	0.777											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	337	611	337	337
d_b, Bicycle Delay [s]	32.85	22.93	32.85	32.85
l_b,int, Bicycle LOS Score for Intersection	2.904	2.324	2.261	3.162
Bicycle LOS	C	B	B	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Report File: M:\...\Northshore Corridor Study - Future PM - Approved Only.pdf
Vistro File: M:\...\Base Model.vistro 7/23/2021 Scenario 7: 7 Revised Future PM

3. Future Conditions Traffic Analysis – With Improvements

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Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	59.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.044

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	200.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	3	7	6	693	612	10
Base Volume Adjustment Factor	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	223	178	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	8	7	1043	902	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	2	2	261	226	3
Total Analysis Volume [veh/h]	3	8	7	1043	902	12
Pedestrian Volume [ped/h]	0		0		0	

Report File: M:\...\Northshore Corridor Study - Improvements AM.pdf
Vistro File: M:\...\Base Model.vistro 8/20/2021 Scenario 8: 8 Improvments AM

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.02	0.01	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	59.88	16.06	9.87	0.00	0.00	0.00
Movement LOS	F	C	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.07	0.03	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.38	1.84	0.71	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	28.01		0.07		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	0.19					
Intersection LOS	F					

DELAY (CONTROL)

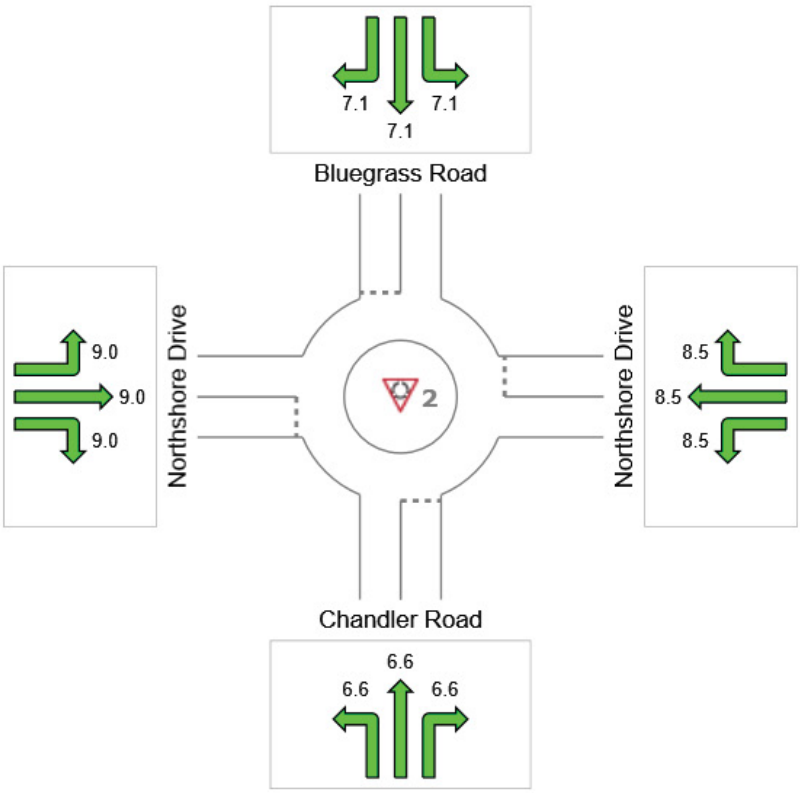
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 2 [AM Bluegrass/Chandler]

Bluegrass/Chandler
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	6.6	8.5	7.1	9.0	8.6
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	18.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.576

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	134	406	329	496	568	168
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	65	101	53	84	40	25
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	536	395	600	631	200
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	134	99	150	158	50
Total Analysis Volume [veh/h]	209	536	395	600	631	200
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Overlap	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	4	1	6	2	0
Auxiliary Signal Groups		1,4				
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	5	5	10	10	0
Maximum Green [s]	25	25	20	50	50	0
Amber [s]	4.0	4.0	4.0	4.5	4.5	0.0
All red [s]	2.0	2.0	1.5	2.0	2.0	0.0
Split [s]	35	35	23	50	27	0
Vehicle Extension [s]	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	5	5	0	7	5	0
Pedestrian Clearance [s]	10	10	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	3.5	4.5	4.5	0.0
Minimum Recall	No	No	No	Yes	Yes	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	85	85	85	85	85	85
L, Total Lost Time per Cycle [s]	6.00	5.50	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	17	38	56	56	35	35
g / C, Green / Cycle	0.20	0.45	0.66	0.66	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.13	0.21	0.42	0.19	0.25	0.27
s, saturation flow rate [veh/h]	1603	2532	938	3204	1683	1551
c, Capacity [veh/h]	318	1141	600	2098	687	633
d1, Uniform Delay [s]	31.43	16.26	12.04	6.23	19.77	20.34
k, delay calibration	0.15	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.29	0.30	5.58	0.34	3.93	5.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.47	0.66	0.29	0.60	0.66
d, Delay for Lane Group [s/veh]	34.72	16.57	17.62	6.57	23.70	25.59
Lane Group LOS	C	B	B	A	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	4.15	3.48	3.45	1.87	6.61	6.96
50th-Percentile Queue Length [ft/ln]	103.75	86.96	86.16	46.80	165.36	173.93
95th-Percentile Queue Length [veh/ln]	7.47	6.26	6.20	3.37	10.83	11.28
95th-Percentile Queue Length [ft/ln]	186.76	156.53	155.09	84.24	270.81	282.07

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	34.72	16.57	17.62	6.57	24.35	25.59
Movement LOS	C	B	B	A	C	C
d_A, Approach Delay [s/veh]	21.66		10.96		24.65	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	18.48					
Intersection LOS	B					
Intersection V/C	0.576					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	682	1024	482
d_b, Bicycle Delay [s]	18.45	10.13	24.47
l_b,int, Bicycle LOS Score for Intersection	1.560	2.380	2.245
Bicycle LOS	A	B	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	38.3
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.229

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	0
Entry Pocket Length [ft]	100.00	75.00	75.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	24	53	58	601	434	40
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	0	0	151	60	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	57	60	776	512	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	14	15	194	128	11
Total Analysis Volume [veh/h]	32	57	60	776	512	44
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.10	0.06	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	38.33	12.36	8.77	0.00	0.00	0.00
Movement LOS	E	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.84	0.35	0.19	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	21.02	8.69	4.71	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	21.70		0.63		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.66					
Intersection LOS	E					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.528

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	45	36	43	99	19	142	113	611	8	16	267	42
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	1	0	0	13	35	123	0	0	46	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	38	46	104	20	162	153	759	8	17	324	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	10	12	26	5	41	38	190	2	4	81	11
Total Analysis Volume [veh/h]	48	38	46	104	20	162	153	759	8	17	324	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	8	0	7	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	5	5	0	5	18	0	0	18	0
Maximum Green [s]	30	30	0	30	30	0	15	75	0	0	60	0
Amber [s]	4.0	3.0	0.0	3.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	33	0	9	32	0	10	33	0	0	23	0
Vehicle Extension [s]	5.0	3.0	0.0	3.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	5	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	10	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	2.0	0.0	2.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No			No	
Maximum Recall	No	No		No	No		No	No			Yes	
Pedestrian Recall	No	No		No	No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	75	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.50	4.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	12	12	11	11	45	45	36	36
g / C, Green / Cycle	0.16	0.16	0.15	0.15	0.60	0.60	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.07	0.11	0.13	0.41	0.02	0.20
s, saturation flow rate [veh/h]	1754	1705	1597	1616	1145	1867	701	1831
c, Capacity [veh/h]	316	267	342	248	686	1127	203	866
d1, Uniform Delay [s]	27.14	28.07	28.58	30.27	7.40	9.99	27.62	13.05
k, delay calibration	0.23	0.11	0.23	0.23	0.15	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.47	0.67	1.06	8.59	0.23	3.33	0.81	1.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.15	0.32	0.30	0.73	0.22	0.68	0.08	0.43
d, Delay for Lane Group [s/veh]	27.61	28.74	29.64	38.86	7.63	13.32	28.43	14.58
Lane Group LOS	C	C	C	D	A	B	C	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.77	1.35	1.73	3.62	0.86	7.41	0.29	3.89
50th-Percentile Queue Length [ft/ln]	19.18	33.74	43.29	90.52	21.57	185.34	7.37	97.24
95th-Percentile Queue Length [veh/ln]	1.38	2.43	3.12	6.52	1.55	11.88	0.53	7.00
95th-Percentile Queue Length [ft/ln]	34.52	60.74	77.92	162.93	38.83	296.97	13.27	175.03

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.61	28.74	28.74	29.64	38.86	38.86	7.63	13.32	13.32	28.43	14.58	14.58
Movement LOS	C	C	C	C	D	D	A	B	B	C	B	B
d_A, Approach Delay [s/veh]	28.33			35.50			12.37			15.19		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	18.06											
Intersection LOS	B											
Intersection V/C	0.528											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	773	720	747	480
d_b, Bicycle Delay [s]	14.11	15.36	14.73	21.66
l_b,int, Bicycle LOS Score for Intersection	1.777	2.032	3.078	2.197
Bicycle LOS	A	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	25.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.744

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	1	0
Entry Pocket Length [ft]	100.00	160.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	124	0	0	41
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	249	935	19	108	465
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	62	234	5	27	116
Total Analysis Volume [veh/h]	13	249	935	19	108	465
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Permissive	Permissive	ProtPerm	Permissive
Signal Group	4	4	6	0	5	2
Auxiliary Signal Groups		4,5				
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	10	0	5	10
Maximum Green [s]	30	30	30	0	30	30
Amber [s]	3.0	3.0	3.0	0.0	3.0	3.0
All red [s]	1.5	1.5	1.5	0.0	1.5	1.5
Split [s]	25	25	95	0	20	115
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	3.0
Walk [s]	5	5	5	0	0	5
Pedestrian Clearance [s]	10	10	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.5	2.5	2.5	0.0	2.5	2.5
Minimum Recall	No	No	No		No	No
Maximum Recall	No	No	Yes		No	Yes
Pedestrian Recall	No	No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Northshore Corridor Study
KCI Technologies

Lane Group Calculations

Lane Group	L	R	C	L	C
C, Cycle Length [s]	140	140	140	140	140
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	2.50	0.00	2.50
g_i, Effective Green Time [s]	21	41	91	111	111
g / C, Green / Cycle	0.15	0.29	0.65	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.01	0.17	0.57	0.15	0.28
s, saturation flow rate [veh/h]	1603	1431	1677	704	1683
c, Capacity [veh/h]	235	414	1084	385	1328
d1, Uniform Delay [s]	51.42	42.81	20.30	22.22	4.29
k, delay calibration	0.11	0.30	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.10	3.91	10.23	1.81	0.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.60	0.88	0.28	0.35
d, Delay for Lane Group [s/veh]	51.52	46.72	30.53	24.03	5.02
Lane Group LOS	D	D	C	C	A
Critical Lane Group	No	Yes	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.40	7.91	26.12	0.76	3.39
50th-Percentile Queue Length [ft/ln]	10.09	197.80	653.02	18.91	84.73
95th-Percentile Queue Length [veh/ln]	0.73	12.53	34.50	1.36	6.10
95th-Percentile Queue Length [ft/ln]	18.16	313.13	862.56	34.04	152.51

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Northshore Corridor Study
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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.52	46.72	30.53	30.53	24.03	5.02
Movement LOS	D	D	C	C	C	A
d_A, Approach Delay [s/veh]	46.96		30.53		8.61	
Approach LOS	D		C		A	
d_I, Intersection Delay [s/veh]	25.91					
Intersection LOS	C					
Intersection V/C	0.744					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	293	1293	1579
d_b, Bicycle Delay [s]	51.00	8.75	3.11
l_b,int, Bicycle LOS Score for Intersection	1.560	3.134	2.505
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Scenario 8: 8 Improvments AM

DELAY (CONTROL)

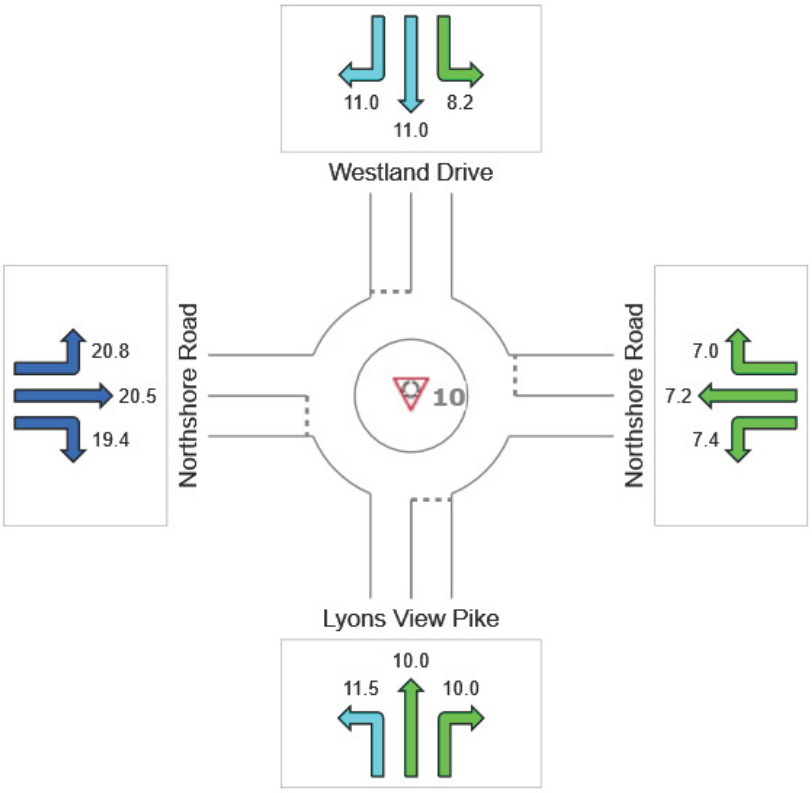
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 10 [AM Lyon View Pike]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	10.8	7.2	10.1	20.1	14.0
LOS	B	A	B	C	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 1: Northshore and Concord Park Road

Control Type:	Two-way stop	Delay (sec / veh):	741.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.769

Intersection Setup

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	200.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Concord Park Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	35	55	60	743	886	68
Base Volume Adjustment Factor	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	245	283	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	39	61	71	1124	1332	80
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	15	18	281	333	20
Total Analysis Volume [veh/h]	39	61	71	1124	1332	80
Pedestrian Volume [ped/h]	0		0		0	

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Northshore Corridor Study
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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.77	0.34	0.15	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	741.31	35.26	13.74	0.00	0.00	0.00
Movement LOS	F	E	B	A	A	A
95th-Percentile Queue Length [veh/ln]	5.03	1.42	0.51	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	125.70	35.47	12.80	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	310.62		0.82		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	11.84					
Intersection LOS	F					

DELAY (CONTROL)

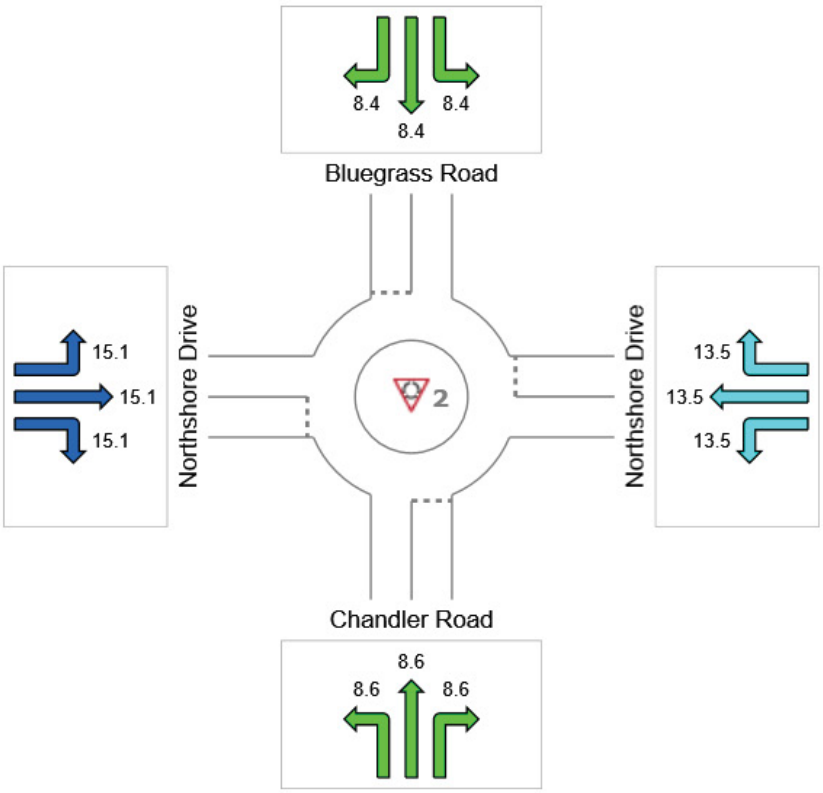
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 2 [PM Bluegrass/Chandler]

Bluegrass/Chandler
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	8.6	13.5	8.4	15.1	13.9
LOS	A	B	A	C	B



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 5: Northshore and Ebenezer Road

Control Type:	Signalized	Delay (sec / veh):	29.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	205.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	170.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Northshore Corridor Study
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Volumes

Name	Ebenezer Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	187	392	500	866	644	154
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	44	83	112	64	94	69
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	503	632	965	764	229
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	126	158	241	191	57
Total Analysis Volume [veh/h]	245	503	632	965	764	229
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Overlap	ProtPerm	Permissive	Permissive	Permissive
Signal Group	4	4	1	6	2	0
Auxiliary Signal Groups		1,4				
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	5	5	10	10	0
Maximum Green [s]	25	25	20	50	50	0
Amber [s]	4.0	4.0	4.0	4.5	4.5	0.0
All red [s]	2.0	2.0	1.5	2.0	2.0	0.0
Split [s]	17	17	23	53	30	0
Vehicle Extension [s]	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	5	5	0	7	5	0
Pedestrian Clearance [s]	10	10	0	20	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	3.5	4.5	4.5	0.0
Minimum Recall	No	No	No	Yes	Yes	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C	C
C, Cycle Length [s]	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	6.00	6.00	6.50	6.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	0.00	4.50	4.50	4.50
g_i, Effective Green Time [s]	11	35	47	47	24	24
g / C, Green / Cycle	0.16	0.49	0.66	0.66	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.15	0.20	0.63	0.30	0.30	0.32
s, saturation flow rate [veh/h]	1603	2532	1004	3204	1683	1556
c, Capacity [veh/h]	252	1248	664	2129	565	522
d1, Uniform Delay [s]	29.35	11.23	17.77	5.64	21.91	22.68
k, delay calibration	0.15	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.50	0.21	24.92	0.70	17.49	28.79
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.40	0.95	0.45	0.88	0.95
d, Delay for Lane Group [s/veh]	54.85	11.44	42.68	6.34	39.39	51.47
Lane Group LOS	D	B	D	A	D	D
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	5.69	2.23	7.92	2.41	9.49	11.16
50th-Percentile Queue Length [ft/ln]	142.24	55.65	198.10	60.23	237.26	279.07
95th-Percentile Queue Length [veh/ln]	9.60	4.01	12.54	4.34	14.54	16.64
95th-Percentile Queue Length [ft/ln]	240.03	100.18	313.52	108.41	363.57	416.06

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.85	11.44	42.68	6.34	43.62	51.47
Movement LOS	D	B	D	A	D	D
d_A, Approach Delay [s/veh]	25.66		20.72		45.43	
Approach LOS	C		C		D	
d_I, Intersection Delay [s/veh]	29.18					
Intersection LOS	C					
Intersection V/C	0.723					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	314	1329	671
d_b, Bicycle Delay [s]	24.86	3.94	15.44
l_b,int, Bicycle LOS Score for Intersection	1.560	2.877	2.379
Bicycle LOS	A	C	B

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 7: Northshore and Wallace Road

Control Type:	Two-way stop	Delay (sec / veh):	121.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.557

Intersection Setup

Name	Wallace Road		Northshore Drive		Northshore Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	1	0	0	0
Entry Pocket Length [ft]	100.00	75.00	75.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wallace Road		Northshore Drive		Northshore Road	
Base Volume Input [veh/h]	27	50	64	835	652	64
Base Volume Adjustment Factor	1.0722	1.0722	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	104	162	8
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	54	67	973	841	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	14	17	243	210	19
Total Analysis Volume [veh/h]	34	54	67	973	841	75
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.56	0.16	0.09	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	121.55	17.28	10.31	0.00	0.00	0.00
Movement LOS	F	C	B	A	A	A
95th-Percentile Queue Length [veh/ln]	2.26	0.54	0.30	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	56.52	13.62	7.39	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	57.57		0.66		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	2.82					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 8: Northshore and Wrights Ferry Road/Morrell Road

Control Type:	Signalized	Delay (sec / veh):	35.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.697

Intersection Setup

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	70.00	100.00	100.00	115.00	175.00	100.00	100.00	130.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Volumes

Name	Wrights Ferry Road			Morrell Road			Northshore Road			Northshore Drive		
Base Volume Input [veh/h]	49	55	40	103	53	229	243	616	36	44	531	69
Base Volume Adjustment Factor	1.0511	1.0511	1.0511	1.0511	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	0	1	0	37	22	85	1	0	133	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	58	42	109	56	278	275	726	38	46	686	73
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	15	11	27	14	70	69	182	10	12	172	18
Total Analysis Volume [veh/h]	53	58	42	109	56	278	275	726	38	46	686	73
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	125
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	8	0	7	4	0	1	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	5	5	0	5	5	0	5	18	0	0	18	0
Maximum Green [s]	5	30	0	5	30	0	15	75	0	0	60	0
Amber [s]	4.0	3.0	0.0	3.0	4.0	0.0	4.0	4.0	0.0	0.0	4.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	78	0	9	77	0	15	38	0	0	23	0
Vehicle Extension [s]	5.0	3.0	0.0	3.0	5.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	5	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	10	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	2.0	0.0	2.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall	Yes	No		Yes	No		No	No			No	
Maximum Recall	No	No		No	No		No	No			Yes	
Pedestrian Recall	No	No		No	No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	125	125	125	125	125	125	125	125
L, Total Lost Time per Cycle [s]	4.50	4.00	5.00	5.00	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	3.00	0.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	31	31	30	30	76	76	61	61
g / C, Green / Cycle	0.25	0.25	0.24	0.24	0.61	0.61	0.49	0.49
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.08	0.20	0.31	0.41	0.07	0.41
s, saturation flow rate [veh/h]	1334	1741	1408	1630	890	1854	703	1839
c, Capacity [veh/h]	212	435	376	391	364	1124	182	894
d1, Uniform Delay [s]	50.78	37.32	38.55	45.40	24.45	16.49	45.22	28.09
k, delay calibration	0.23	0.11	0.23	0.24	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.30	0.27	0.90	10.97	13.57	3.32	3.29	9.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.25	0.23	0.29	0.85	0.76	0.68	0.25	0.85
d, Delay for Lane Group [s/veh]	52.08	37.59	39.45	56.36	38.02	19.81	48.51	37.97
Lane Group LOS	D	D	D	E	D	B	D	D
Critical Lane Group	Yes	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.34	2.49	2.83	11.07	4.73	14.44	1.41	21.17
50th-Percentile Queue Length [ft/ln]	33.58	62.30	70.64	276.83	118.18	361.06	35.17	529.25
95th-Percentile Queue Length [veh/ln]	2.42	4.49	5.09	16.53	8.29	20.67	2.53	28.72
95th-Percentile Queue Length [ft/ln]	60.44	112.15	127.15	413.26	207.32	516.87	63.31	717.89

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.08	37.59	37.59	39.45	56.36	56.36	38.02	19.81	19.81	48.51	37.97	37.97
Movement LOS	D	D	D	D	E	E	D	B	B	D	D	D
d_A, Approach Delay [s/veh]	42.61			52.20			24.63			38.58		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	35.36											
Intersection LOS	D											
Intersection V/C	0.697											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1184	1152	528	288
d_b, Bicycle Delay [s]	10.40	11.24	33.86	46.80
l_b,int, Bicycle LOS Score for Intersection	1.812	2.291	3.274	2.888
Bicycle LOS	A	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	13.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.595

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	1	0
Entry Pocket Length [ft]	100.00	160.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	82	0	0	133
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	145	776	26	155	780
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	36	194	7	39	195
Total Analysis Volume [veh/h]	26	145	776	26	155	780
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Permissive	Permissive	ProtPerm	Permissive
Signal Group	4	4	6	0	5	2
Auxiliary Signal Groups		4,5				
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	10	0	5	10
Maximum Green [s]	30	30	30	0	30	30
Amber [s]	3.0	3.0	3.0	0.0	3.0	3.0
All red [s]	1.0	1.0	1.0	0.0	1.0	1.0
Split [s]	20	20	104	0	26	130
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	3.0
Walk [s]	5	5	5	0	0	5
Pedestrian Clearance [s]	10	10	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	2.0
Minimum Recall	No	No	No		No	No
Maximum Recall	No	No	Yes		No	Yes
Pedestrian Recall	No	No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	C	L	C
C, Cycle Length [s]	150	150	150	150	150
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	0.00	2.00	0.00	2.00
g_i, Effective Green Time [s]	15	35	107	127	127
g / C, Green / Cycle	0.10	0.23	0.72	0.85	0.85
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.48	0.21	0.46
s, saturation flow rate [veh/h]	1603	1431	1673	748	1683
c, Capacity [veh/h]	160	330	1199	538	1425
d1, Uniform Delay [s]	61.75	49.43	11.60	9.26	3.29
k, delay calibration	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.47	0.92	2.98	1.35	1.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.44	0.67	0.29	0.55
d, Delay for Lane Group [s/veh]	62.22	50.35	14.58	10.61	4.80
Lane Group LOS	E	D	B	B	A
Critical Lane Group	No	Yes	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.94	4.79	14.04	0.73	5.05
50th-Percentile Queue Length [ft/ln]	23.39	119.87	351.06	18.16	126.16
95th-Percentile Queue Length [veh/ln]	1.68	8.39	20.19	1.31	8.73
95th-Percentile Queue Length [ft/ln]	42.10	209.65	504.71	32.69	218.26

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.22	50.35	14.58	14.58	10.61	4.80
Movement LOS	E	D	B	B	B	A
d_A, Approach Delay [s/veh]	52.16		14.58		5.77	
Approach LOS	D		B		A	
d_I, Intersection Delay [s/veh]	13.63					
Intersection LOS	B					
Intersection V/C	0.595					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	213	1333	1680
d_b, Bicycle Delay [s]	59.85	8.33	1.92
l_b,int, Bicycle LOS Score for Intersection	1.560	2.883	3.102
Bicycle LOS	A	C	C

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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DELAY (CONTROL)

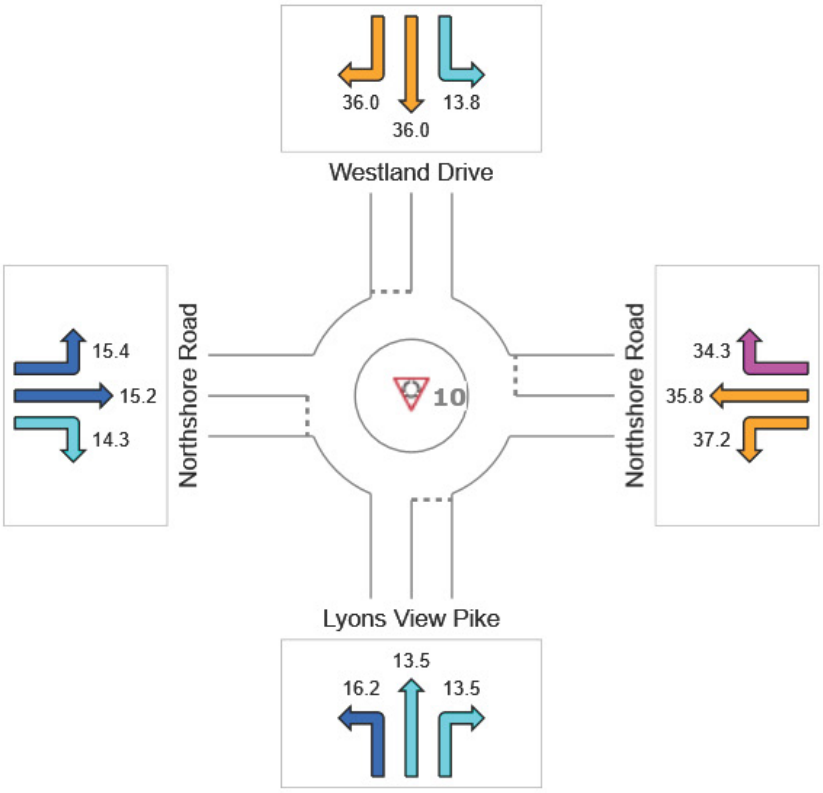
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 10 [PM Lyon View Pike]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	14.8	35.6	30.6	14.8	23.7
LOS	B	E	D	B	C



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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Project: M:\2020\1902800.05 (TDOT Knoxville Regional TPO 2045 MTP)\Task 9 - Northshore Drive Corridor Study\Task 2 - Existing and Future

4. Future Conditions Traffic Analysis – Additional Alternatives Explored

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Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Signalized	Delay (sec / veh):	6.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.469

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Northshore Corridor Study

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Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	6	2	3	9	1	72	26	380	15	4	393	10
Base Volume Adjustment Factor	1.1046	1.1046	1.1046	1.1046	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	0	19	0	0	0	0	164	6	7	112	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	22	10	1	80	31	614	24	12	577	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	6	3	0	20	8	154	6	3	144	4
Total Analysis Volume [veh/h]	23	2	22	10	1	80	31	614	24	12	577	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Scenario 8: 8 Signal at Bluegrass AM

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	10	0	0	10	0	0	50	0	0	50	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			Yes			Yes	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
C, Cycle Length [s]	60	60	60	60
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	4	4	46	46
g / C, Green / Cycle	0.07	0.07	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.41	0.36
s, saturation flow rate [veh/h]	1626	1560	1628	1662
c, Capacity [veh/h]	206	179	1303	1327
d1, Uniform Delay [s]	26.64	27.47	2.84	2.66
k, delay calibration	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.56	2.24	1.45	1.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.51	0.51	0.45
d, Delay for Lane Group [s/veh]	27.19	29.71	4.29	3.79
Lane Group LOS	C	C	A	A
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	0.64	1.33	1.22	1.00
50th-Percentile Queue Length [ft/ln]	16.05	33.20	30.41	24.98
95th-Percentile Queue Length [veh/ln]	1.16	2.39	2.19	1.80
95th-Percentile Queue Length [ft/ln]	28.89	59.77	54.74	44.96

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Northshore Corridor Study
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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.19	27.19	27.19	29.71	29.71	29.71	4.29	4.29	4.29	3.79	3.79	3.79
Movement LOS	C	C	C	C	C	C	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	27.19			29.71			4.29			3.79		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	6.48											
Intersection LOS	A											
Intersection V/C	0.469											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	167	167	1500	1500
d_b, Bicycle Delay [s]	25.21	25.21	1.88	1.88
l_b,int, Bicycle LOS Score for Intersection	1.637	1.710	2.663	2.555
Bicycle LOS	A	A	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Scenario 8: 8 Signal at Bluegrass AM

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 2: Northshore and Chandler/Bluegrass

Control Type:	Signalized	Delay (sec / veh):	10.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

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Northshore Corridor Study

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Volumes

Name	Chandler Road			Bluegrass Road			Northshore Drive			Northshore Drive		
Base Volume Input [veh/h]	7	0	10	8	1	77	101	501	13	4	407	12
Base Volume Adjustment Factor	1.1046	1.1046	1.1046	1.1046	1.1046	1.1046	1.1836	1.1836	1.1836	1.1836	1.1836	1.1836
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	12	0	11	0	0	0	0	161	19	20	201	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	22	9	1	85	120	754	34	25	683	22
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	6	2	0	21	30	189	9	6	171	6
Total Analysis Volume [veh/h]	20	0	22	9	1	85	120	754	34	25	683	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Scenario 9: 9 Signal at Bluegrass PM

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	12	0	0	12	0	0	98	0	0	98	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			Yes			Yes	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
C, Cycle Length [s]	110	110	110	110
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	7	7	93	93
g / C, Green / Cycle	0.06	0.06	0.85	0.85
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.63	0.45
s, saturation flow rate [veh/h]	1431	1513	1439	1624
c, Capacity [veh/h]	139	132	1254	1407
d1, Uniform Delay [s]	49.60	51.45	2.93	2.33
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.48	28.48	3.66	1.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.30	0.72	0.72	0.52
d, Delay for Lane Group [s/veh]	55.07	79.93	6.60	3.70
Lane Group LOS	E	E	A	A
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	1.32	3.65	4.03	2.33
50th-Percentile Queue Length [ft/ln]	33.10	91.28	100.67	58.20
95th-Percentile Queue Length [veh/ln]	2.38	6.57	7.25	4.19
95th-Percentile Queue Length [ft/ln]	59.58	164.30	181.21	104.76

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Northshore Corridor Study
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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.07	55.07	55.07	79.93	79.93	79.93	6.60	6.60	6.60	3.70	3.70	3.70
Movement LOS	E	E	E	E	E	E	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	55.07			79.93			6.60			3.70		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	10.48											
Intersection LOS	B											
Intersection V/C	0.694											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	127	127	1691	1691
d_b, Bicycle Delay [s]	48.22	48.22	1.31	1.31
l_b,int, Bicycle LOS Score for Intersection	1.629	1.716	3.058	2.764
Bicycle LOS	A	A	C	C

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Scenario 9: 9 Signal at Bluegrass PM

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Northshore Corridor Study

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Intersection Level Of Service Report
Intersection 1: New Intersection

Control Type:	Signalized	Delay (sec / veh):	88.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.045

Intersection Setup

Name	Ebenezer		Northshore		Northshore	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Northshore Corridor Study
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Volumes

Name	Ebenezer		Northshore		Northshore	
Base Volume Input [veh/h]	209	536	395	600	631	200
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	536	395	600	631	200
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	134	99	150	158	50
Total Analysis Volume [veh/h]	209	536	395	600	631	200
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	ProtPerm	Overlap	Permissive	Permissive
Signal Group	4	4	1	6	2	0
Auxiliary Signal Groups		1,4		4,6		
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	5	5	10	10	0
Maximum Green [s]	25	25	20	50	50	0
Amber [s]	4.0	4.0	4.0	4.5	4.5	0.0
All red [s]	2.0	2.0	1.5	2.0	2.0	0.0
Split [s]	39	39	38	111	73	0
Vehicle Extension [s]	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	3.5	4.5	4.5	0.0
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Northshore Corridor Study
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Lane Group Calculations

Lane Group	L	R	L	C	C
C, Cycle Length [s]	150	150	150	150	150
L, Total Lost Time per Cycle [s]	6.00	5.50	5.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	3.50	0.00	4.50
g_i, Effective Green Time [s]	33	72	33	144	67
g / C, Green / Cycle	0.22	0.48	0.22	0.96	0.44
(v / s)_i Volume / Saturation Flow Rate	0.28	0.37	0.25	0.36	0.51
s, saturation flow rate [veh/h]	737	1431	1603	1683	1614
c, Capacity [veh/h]	183	682	347	1610	716
d1, Uniform Delay [s]	64.90	32.85	58.75	0.22	41.75
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	110.93	8.88	90.99	0.66	87.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.14	0.79	1.14	0.37	1.16
d, Delay for Lane Group [s/veh]	175.83	41.73	149.74	0.88	129.25
Lane Group LOS	F	D	F	A	F
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	12.58	17.32	21.77	0.30	42.93
50th-Percentile Queue Length [ft/ln]	314.55	432.93	544.19	7.41	1073.14
95th-Percentile Queue Length [veh/ln]	19.70	24.14	31.55	0.53	59.78
95th-Percentile Queue Length [ft/ln]	492.39	603.54	788.82	13.33	1494.43

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Scenario 1: 1 Future AM

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	175.83	41.73	149.74	0.88	129.25	129.25
Movement LOS	F	D	F	A	F	F
d_A, Approach Delay [s/veh]	79.35		59.98		129.25	
Approach LOS	E		E		F	
d_I, Intersection Delay [s/veh]	87.98					
Intersection LOS	F					
Intersection V/C	1.045					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	440	1913	887
d_b, Bicycle Delay [s]	45.63	0.14	23.24
l_b,int, Bicycle LOS Score for Intersection	1.560	3.201	2.931
Bicycle LOS	A	C	C

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Scenario 1: 1 Future AM

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 1: New Intersection

Control Type:	Signalized	Delay (sec / veh):	148.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.285

Intersection Setup

Name	Ebenezer		Northshore		Northshore	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	2	0	0	0
Entry Pocket Length [ft]	100.00	100.00	500.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Scenario 2: 2 Future PM

Volumes

Name	Ebenezer		Northshore		Northshore	
Base Volume Input [veh/h]	245	503	632	965	764	229
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	503	632	965	764	229
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	126	158	241	191	57
Total Analysis Volume [veh/h]	245	503	632	965	764	229
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	ProtPerm	Overlap	Permissive	Permissive
Signal Group	4	4	1	6	2	0
Auxiliary Signal Groups		1,4		4,6		
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	5	5	10	10	0
Maximum Green [s]	25	25	20	50	50	0
Amber [s]	4.0	4.0	4.0	4.5	4.5	0.0
All red [s]	2.0	2.0	1.5	2.0	2.0	0.0
Split [s]	52	52	27	98	71	0
Vehicle Extension [s]	4.0	4.0	3.0	4.0	4.0	0.0
Walk [s]	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	4.0	4.0	3.5	4.5	4.5	0.0
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	L	R	L	C	C
C, Cycle Length [s]	150	150	150	150	150
L, Total Lost Time per Cycle [s]	6.00	5.50	5.50	6.50	6.50
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	0.00	3.50	0.00	4.50
g_i, Effective Green Time [s]	46	74	22	144	65
g / C, Green / Cycle	0.31	0.49	0.14	0.96	0.43
(v / s)_i Volume / Saturation Flow Rate	0.47	0.35	0.20	0.57	0.61
s, saturation flow rate [veh/h]	524	1431	3113	1683	1617
c, Capacity [veh/h]	171	701	446	1610	695
d1, Uniform Delay [s]	62.31	30.09	64.25	0.33	42.75
k, delay calibration	0.50	0.50	0.19	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	224.32	6.22	192.61	1.66	200.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.43	0.72	1.42	0.60	1.43
d, Delay for Lane Group [s/veh]	286.63	36.31	256.86	1.99	243.63
Lane Group LOS	F	D	F	A	F
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	17.19	14.93	20.36	0.74	63.70
50th-Percentile Queue Length [ft/ln]	429.67	373.27	509.03	18.53	1592.60
95th-Percentile Queue Length [veh/ln]	28.53	21.27	31.86	1.33	95.53
95th-Percentile Queue Length [ft/ln]	713.25	531.69	796.45	33.35	2388.26

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Scenario 2: 2 Future PM

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	286.63	36.31	256.86	1.99	243.63	243.63
Movement LOS	F	D	F	A	F	F
d_A, Approach Delay [s/veh]	118.30		102.85		243.63	
Approach LOS	F		F		F	
d_I, Intersection Delay [s/veh]	148.19					
Intersection LOS	F					
Intersection V/C	1.285					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	613	1913	860
d_b, Bicycle Delay [s]	36.05	0.14	24.37
l_b,int, Bicycle LOS Score for Intersection	1.560	4.195	3.198
Bicycle LOS	A	D	C

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	48.5
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.136

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	1	0
Entry Pocket Length [ft]	100.00	160.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	124	0	0	41
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	249	935	19	108	465
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	62	234	5	27	116
Total Analysis Volume [veh/h]	13	249	935	19	108	465
Pedestrian Volume [ped/h]	0		0		0	

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Northshore Corridor Study
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Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.78	0.01	0.00	0.15	0.00
d_M, Delay for Movement [s/veh]	48.47	47.42	0.00	0.00	10.88	0.00
Movement LOS	E	E	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.45	6.28	0.00	0.00	0.53	0.00
95th-Percentile Queue Length [ft/ln]	11.30	156.95	0.00	0.00	13.14	0.00
d_A, Approach Delay [s/veh]	47.47		0.00		2.05	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	7.61					
Intersection LOS	E					

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Northshore Corridor Study
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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Two-way stop	Delay (sec / veh):	96.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.409

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	1	0	0	1	0
Entry Pocket Length [ft]	100.00	160.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	82	0	0	133
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	145	776	26	155	780
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	36	194	7	39	195
Total Analysis Volume [veh/h]	26	145	776	26	155	780
Pedestrian Volume [ped/h]	0		0		0	

Report File: M:\...\Unsignalized Lyons Bend PM.pdf
Vistro File: M:\...\Other Concepts.vistro 9/20/2021 Scenario 11: 11 Unsignalized Lyons Bend PM

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Northshore Corridor Study
KCI Technologies

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.37	0.01	0.00	0.19	0.01
d_M, Delay for Movement [s/veh]	96.35	19.56	0.00	0.00	10.40	0.00
Movement LOS	F	C	A	A	B	A
95th-Percentile Queue Length [veh/ln]	1.56	1.68	0.00	0.00	0.69	0.00
95th-Percentile Queue Length [ft/ln]	38.98	41.98	0.00	0.00	17.30	0.00
d_A, Approach Delay [s/veh]	31.23		0.00		1.72	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	3.64					
Intersection LOS	F					

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Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	40.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.970

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Northshore Corridor Study
KCI Technologies

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	124	0	0	41
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	249	935	19	108	465
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	62	234	5	27	116
Total Analysis Volume [veh/h]	13	249	935	19	108	465
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

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Northshore Corridor Study
KCI Technologies

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	4	0	6	0	0	2
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	-	-
Minimum Green [s]	5	0	10	0	0	10
Maximum Green [s]	30	0	30	0	0	30
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0
Split [s]	48	0	92	0	0	92
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	10	0	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0
Minimum Recall	No		No			No
Maximum Recall	No		Yes			Yes
Pedestrian Recall	No		No			No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Northshore Corridor Study
KCI Technologies

Lane Group Calculations

Lane Group	C	C	C
C, Cycle Length [s]	140	140	140
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	104	104
g / C, Green / Cycle	0.20	0.74	0.74
(v / s)_i Volume / Saturation Flow Rate	0.18	0.57	0.79
s, saturation flow rate [veh/h]	1438	1677	727
c, Capacity [veh/h]	286	1248	572
d1, Uniform Delay [s]	54.97	10.62	32.26
k, delay calibration	0.15	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00
d2, Incremental Delay [s]	15.02	4.49	38.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.76	1.00
d, Delay for Lane Group [s/veh]	69.99	15.10	70.46
Lane Group LOS	E	B	F
Critical Lane Group	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	10.26	16.12	25.70
50th-Percentile Queue Length [ft/ln]	256.50	402.99	642.54
95th-Percentile Queue Length [veh/ln]	15.51	22.70	34.09
95th-Percentile Queue Length [ft/ln]	387.83	567.61	852.21

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Northshore Corridor Study
KCI Technologies

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.99	69.99	15.10	15.10	70.46	70.46
Movement LOS	E	E	B	B	E	E
d_A, Approach Delay [s/veh]	69.99		15.10		70.46	
Approach LOS	E		B		E	
d_I, Intersection Delay [s/veh]	40.87					
Intersection LOS	D					
Intersection V/C	0.970					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	629	1257	1257
d_b, Bicycle Delay [s]	32.91	9.66	9.66
l_b,int, Bicycle LOS Score for Intersection	1.992	3.134	2.505
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	45.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.009

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Northshore Corridor Study
KCI Technologies

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	82	0	0	133
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	145	776	26	155	780
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	36	194	7	39	195
Total Analysis Volume [veh/h]	26	145	776	26	155	780
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Report File: M:\...\Signalized - No Improvements - Lyons Bend PM.pdf
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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	4	0	6	0	0	2
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	-	-
Minimum Green [s]	5	0	10	0	0	10
Maximum Green [s]	30	0	30	0	0	30
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0
Split [s]	85	0	65	0	0	65
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	10	0	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0
Minimum Recall	No		No			No
Maximum Recall	No		Yes			Yes
Pedestrian Recall	No		No			No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Northshore Corridor Study
KCI Technologies

Lane Group Calculations

Lane Group	C	C	C
C, Cycle Length [s]	150	150	150
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	122	122
g / C, Green / Cycle	0.13	0.81	0.81
(v / s)_i Volume / Saturation Flow Rate	0.12	0.48	0.89
s, saturation flow rate [veh/h]	1454	1673	1049
c, Capacity [veh/h]	194	1361	881
d1, Uniform Delay [s]	63.87	5.01	25.72
k, delay calibration	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00
d2, Incremental Delay [s]	12.32	1.88	47.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.59	1.06
d, Delay for Lane Group [s/veh]	76.19	6.88	73.65
Lane Group LOS	E	A	F
Critical Lane Group	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	7.11	7.49	41.72
50th-Percentile Queue Length [ft/ln]	177.71	187.28	1043.02
95th-Percentile Queue Length [veh/ln]	11.48	11.98	55.35
95th-Percentile Queue Length [ft/ln]	287.03	299.49	1383.79

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Northshore Corridor Study
KCI Technologies

Movement, Approach, & Intersection Results

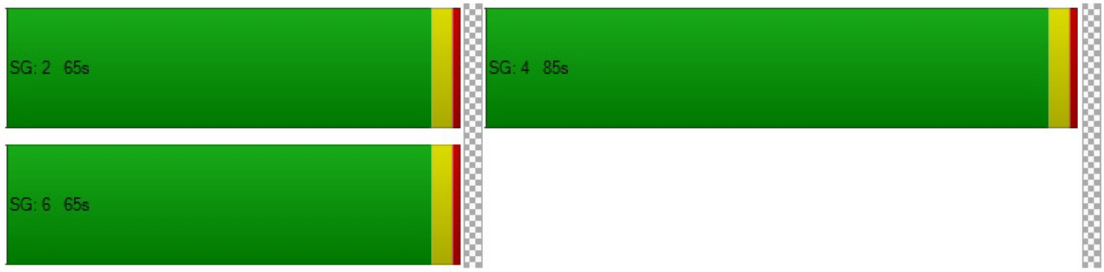
d_M, Delay for Movement [s/veh]	76.19	76.19	6.88	6.88	73.65	73.65
Movement LOS	E	E	A	A	E	E
d_A, Approach Delay [s/veh]	76.19		6.88		73.65	
Approach LOS	E		A		E	
d_I, Intersection Delay [s/veh]	45.81					
Intersection LOS	D					
Intersection V/C	1.009					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1080	813	813
d_b, Bicycle Delay [s]	15.87	26.40	26.40
l_b,int, Bicycle LOS Score for Intersection	1.842	2.883	3.102
Bicycle LOS	A	C	C

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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9/27/2021
Scenario 13: 13 - Revised Future PM - Lyons Bend 1

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Northshore Corridor Study
KCI Technologies

Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	28.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Northshore Corridor Study
KCI Technologies

Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	12	237	779	18	104	407
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	124	0	0	41
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	249	935	19	108	465
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	62	234	5	27	116
Total Analysis Volume [veh/h]	13	249	935	19	108	465
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	ProtPerm	Permissive
Signal Group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	0	10	0	5	10
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	32	0	88	0	20	108
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	10	0	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		Yes		No	Yes
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	C	L	C
C, Cycle Length [s]	140	140	140	140
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00
g_i, Effective Green Time [s]	27	96	105	105
g / C, Green / Cycle	0.19	0.68	0.75	0.75
(v / s)_i Volume / Saturation Flow Rate	0.18	0.57	0.18	0.28
s, saturation flow rate [veh/h]	1438	1677	602	1683
c, Capacity [veh/h]	279	1146	297	1260
d1, Uniform Delay [s]	55.57	16.25	21.11	6.11
k, delay calibration	0.34	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	31.25	7.11	3.43	0.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.94	0.83	0.36	0.37
d, Delay for Lane Group [s/veh]	86.81	23.37	24.55	6.95
Lane Group LOS	F	C	C	A
Critical Lane Group	Yes	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	11.54	22.05	1.03	4.43
50th-Percentile Queue Length [ft/ln]	288.49	551.30	25.71	110.73
95th-Percentile Queue Length [veh/ln]	17.11	29.75	1.85	7.88
95th-Percentile Queue Length [ft/ln]	427.77	743.84	46.29	197.01

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	86.81	86.81	23.37	23.37	24.55	6.95
Movement LOS	F	F	C	C	C	A
d_A, Approach Delay [s/veh]	86.81		23.37		10.27	
Approach LOS	F		C		B	
d_I, Intersection Delay [s/veh]	28.46					
Intersection LOS	C					
Intersection V/C	0.771					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	400	1200	1486
d_b, Bicycle Delay [s]	44.80	11.20	4.63
I_b,int, Bicycle LOS Score for Intersection	1.992	3.134	2.505
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Intersection Level Of Service Report
Intersection 9: Northshore and Lyons Bend Road

Control Type:	Signalized	Delay (sec / veh):	15.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		No	

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Volumes

Name	Lyons Bend Road		Northshore Drive		Northshore Drive	
Base Volume Input [veh/h]	25	138	667	25	149	622
Base Volume Adjustment Factor	1.0511	1.0511	1.0407	1.0407	1.0407	1.0407
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	82	0	0	133
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	145	776	26	155	780
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	36	194	7	39	195
Total Analysis Volume [veh/h]	26	145	776	26	155	780
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0		0		0	
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	ProtPerm	Permissive
Signal Group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	0	10	0	5	10
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	30	0	100	0	20	120
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	10	0	10	0	0	10
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		Yes		No	Yes
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

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Lane Group Calculations

Lane Group	C	C	L	C
C, Cycle Length [s]	150	150	150	150
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00
g_i, Effective Green Time [s]	20	113	122	122
g / C, Green / Cycle	0.13	0.75	0.82	0.82
(v / s)_i Volume / Saturation Flow Rate	0.12	0.48	0.23	0.46
s, saturation flow rate [veh/h]	1454	1673	669	1683
c, Capacity [veh/h]	190	1262	472	1373
d1, Uniform Delay [s]	64.24	8.70	8.36	4.73
k, delay calibration	0.15	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.05	2.45	1.85	1.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.64	0.33	0.57
d, Delay for Lane Group [s/veh]	82.28	11.15	10.21	6.44
Lane Group LOS	F	B	B	A
Critical Lane Group	Yes	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	7.41	11.47	0.98	6.94
50th-Percentile Queue Length [ft/ln]	185.34	286.63	24.62	173.46
95th-Percentile Queue Length [veh/ln]	11.88	17.02	1.77	11.26
95th-Percentile Queue Length [ft/ln]	296.98	425.46	44.32	281.46

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	82.28	82.28	11.15	11.15	10.21	6.44
Movement LOS	F	F	B	B	B	A
d_A, Approach Delay [s/veh]	82.28		11.15		7.06	
Approach LOS	F		B		A	
d_I, Intersection Delay [s/veh]	15.52					
Intersection LOS	B					
Intersection V/C	0.619					

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00
l_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000
Crosswalk LOS	F	F	F
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	347	1280	1547
d_b, Bicycle Delay [s]	51.25	9.72	3.85
l_b,int, Bicycle LOS Score for Intersection	1.842	2.883	3.102
Bicycle LOS	A	C	C

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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APPENDIX C
TRAFFIC SIGNAL ANALYSIS

Traffic Signal Warrant Analysis and Results

As noted in the capacity analysis, the intersection of Northshore Drive and Lyons View Road is expected to operate at poor LOS under unsignalized projected conditions in the AM and PM peak hours. A traffic signal should normally be installed at an intersection only when specific warrants are satisfied. Therefore, traffic signal warrant analyses were performed with available data for the intersections based on the anticipated traffic conditions at completion of the development.

The *Manual on Uniform Traffic Control Devices* (MUTCD) sets forth nine different warrants that have been developed by the traffic engineering profession to facilitate the determination of whether a signal is warranted. These warrants include minimum conditions that normally indicate when a traffic signal is justified at a particular location. The MUTCD states "traffic control signals should not be installed unless one or more of the signal warrants in the manual are met."

Although the MUTCD provides nine different warrants, only three of these are potentially applicable at the intersection under study. These three warrants, described in the MUTCD, are the volume-related signal warrants, which are described as follows:

Warrant 1A, Minimum Vehicular Volume

The Minimum Vehicular Volume warrant is intended for application where the volume of intersecting traffic is the principal reason for consideration of signal installation. The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given below in Table 1 exist on the major street and on the higher volume minor street approach to the intersection.

Table C-1. Minimum Vehicular Volumes for Warrant 1a

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour on Major Street	Vehicles Per Hour on Higher Volume Minor Approach
Major Street	*Minor Street*	*Total of Both Approaches*	*One Direction Only*
1 Lane	1 Lane	500	150
2 Lanes or more	1 Lane	600	150
2 Lanes or more	2 Lanes or more	600	200
1 Lane	2 Lanes or more	500	200

When the 85th percentile speed of the major street traffic exceeds 40 mph in either an urban or a rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Minimum Vehicular Volume warrant is 70 percent of the requirements state in Table 1. The speed limit on Northshore Drive is 40 mph; therefore, the intersection of Northshore Drive and Lyons Bend Road does qualify for this reduction.

Warrant 1B, Interruption of Continuous Traffic

The Interruption of Continuous Traffic warrant applies to operating conditions where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or hazard when entering or crossing the major street. The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given below in Table 2 exist on the major street and on the higher volume minor street approach to an intersection. In addition, the signal installation shall not seriously disrupt progressive traffic flow.

Table C-2. Minimum Vehicular Volumes for Warrant 1b

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour on Major Street	Vehicles Per Hour on Higher Volume Minor Approach
Major Street	*Minor Street*	*Total of Both Approaches*	*One Direction Only*
1 Lane	1 Lane	750	75
2 Lanes or more	1 Lane	900	75
2 Lanes or more	2 Lanes or more	900	100
1 Lane	2 Lanes or more	750	100

When the 85th percentile speed of the major street traffic exceeds 40 mph in either an urban or a rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Minimum Vehicular Volume warrant is 70 percent of the requirements state in Table 2. The speed limit on Northshore Drive is 40 mph; therefore, the intersection of Northshore Drive and Lyons Bend Road does qualify for this reduction.

Warrant 1C, Combination Warrant

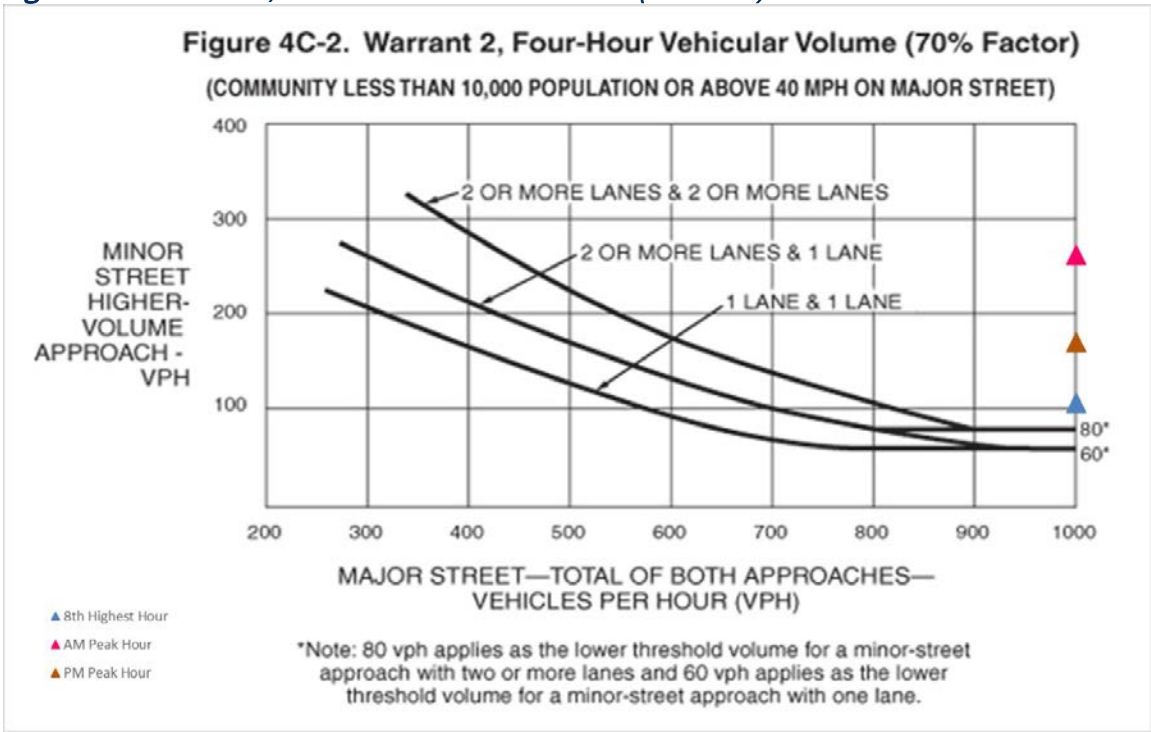
In exceptional cases, traffic signals occasionally may be justified where no single warrant is satisfied but where Warrants 1A and 1B are satisfied to the extent of 80 percent or more of the stated values. This warrant is referred to as Warrant 1C (Combination Warrant).

When only peak hour data is collected, preliminary traffic signal warrant analyses can be based on estimates of the eighth highest hour of a typical day, based off the highest peak hour. The method for this estimation is described in the Manual of Traffic Signal Design, by Iris Fullerton and James H. Kell. This estimation procedure is based on the assumption that the eight highest hours will each exceed 6.25% of the ADT and that the peak hour traffic volume is approximately 10% of the ADT.

Warrant 2, Four Hour Volume

The Four Hour Volume warrant is satisfied when for each of any four high hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 1, for the appropriate combination of approach lanes. It should be noted that when the 85th percentile speed of the major street traffic exceeds 40 mph or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirements are reduced by 30%. Figure 1 shows the future traffic volumes at the study intersection as applied to Warrant 2 thresholds.

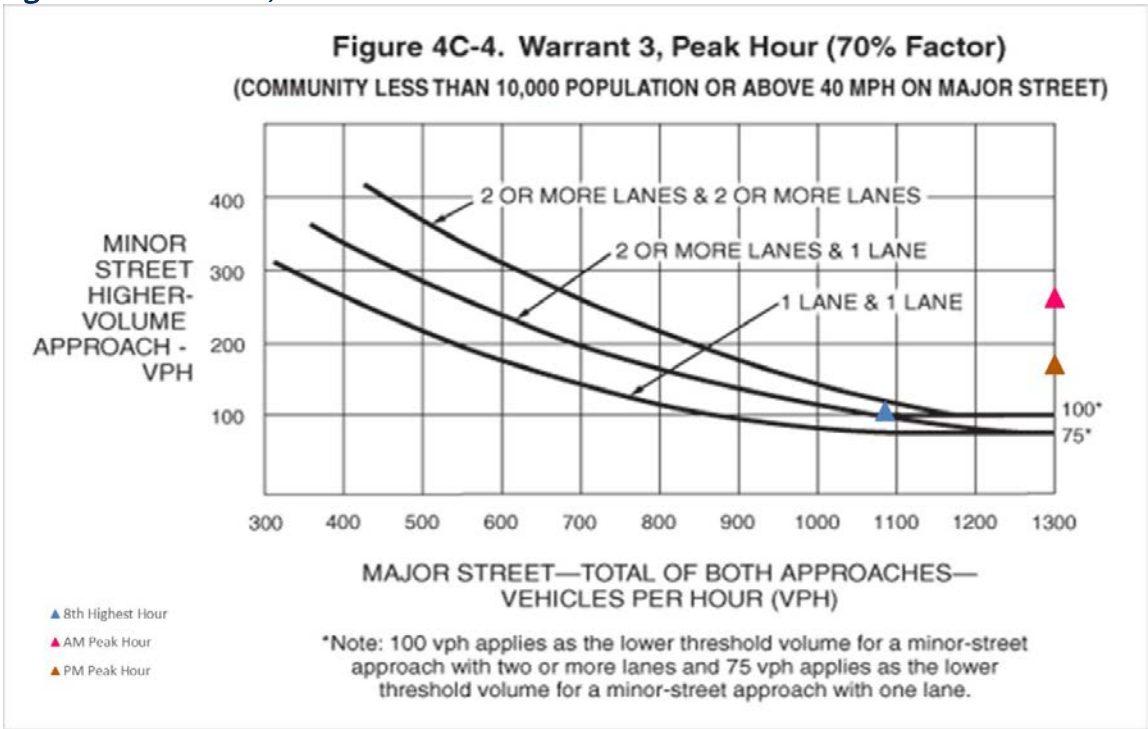
Figure C-1. Warrant 2, Four-Hour Vehicular Volume (Reduced)



Warrant 3, Peak Hour Volume

The Peak Hour Volume warrant is intended for application when traffic conditions are such that for one hour of the day, minor street traffic suffers undue traffic delay in entering or crossing the major street. The Peak Hour Volume warrant is satisfied when the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 2 for the appropriate combination of approach lanes. It should be noted that when the 85th percentile speed of the major street traffic exceeds 40 mph or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirements are reduced by 30%. Figure 2 shows the future traffic volumes at the study intersection as applied to Warrant 3 thresholds.

Figure C-2. Warrant 3, Peak-Hour Vehicular Volume



Traffic Signal Warrant Analysis Results

Based on the geometry of the intersection, the analyses were performed based on one lane on the major street (Northshore Drive) and one lane on the minor street (Lyons Bend Road). The results of the warrant analyses indicated that at the completion of the development, the projected traffic volumes at the intersection of Northshore Drive and Lyons Bend Road will warrant a traffic signal. Specifically, the intersection is expected to meet Warrant 1B for the eighth highest hour, Warrant 2 in the AM and PM peak hours, and Warrant 3 in the AM and PM peak hours. Results of the warrant analyses are shown in Table 3.

Table C-3. Traffic Signal Warrant Analysis

Hour	Main Street Both Directions	Minor Street Highest Approach	1A	1B	1C	2	3
8th Highest Hour	1,086	107	--	Yes	--	Yes	Yes
AM Peak Hour	1,527	262	Yes	Yes	Yes	Yes	Yes
PM Peak Hour	1,737	171	Yes	Yes	Yes	Yes	Yes

With the recommendation to provide separate left- and right-turning lanes on the minor street approach, additional analysis was undertaken to explore whether this location would still meet traffic signal warrants. Specifically, it is common to reduce a portion of right-turning vehicles from the minor street approach volumes since they are able to turn right on red. The warrant analysis and results presented above do not account for any reduction in right turn volumes. However, it was determined that a traffic signal would still be warranted at this location based on Warrants 1A and 1B even with approximately 35% of right turns removed from the analysis volume.

APPENDIX D
KNOX COUNTY GREENWAY CORRIDOR STUDY

Recommendations

Section 5.0
Northshore Drive

5.1 Recommended Alignments

The Northshore Drive corridor traverses the southwestern portion of Knox County, providing access to both well-established and new residential development. The corridor's namesake location, along the north shore of the Tennessee River/Fort Loudoun Lake, provides scenic views for travelers in addition to access to numerous recreational opportunities in one of the many parks that dot the lake shore. The corridor is served by neighborhood-scale retail centers, including the Rocky Hill Center and the new Northshore Town Center.

The recommended alignments, including the preferred, alternate, and connector routes, are organized around the key destinations – residential, commercial, and recreational – and take advantage of existing and planned greenways. Figures 5-1 through 5-4 depict the recommended alignments in the Northshore Drive corridor, and Appendix B includes the full set of typical greenway cross sections represented by the numbers (see red boxes) on the maps.

For each corridor, it is also important to note that the study recommends a preferred location for the proposed alignment (i.e., side of road or creek). To learn more about the recommended greenway alignments found in the following summary maps, please contact the Knox County Department of Parks and Recreation.

Figure 5-1. Northshore Drive: County Line to Concord Park

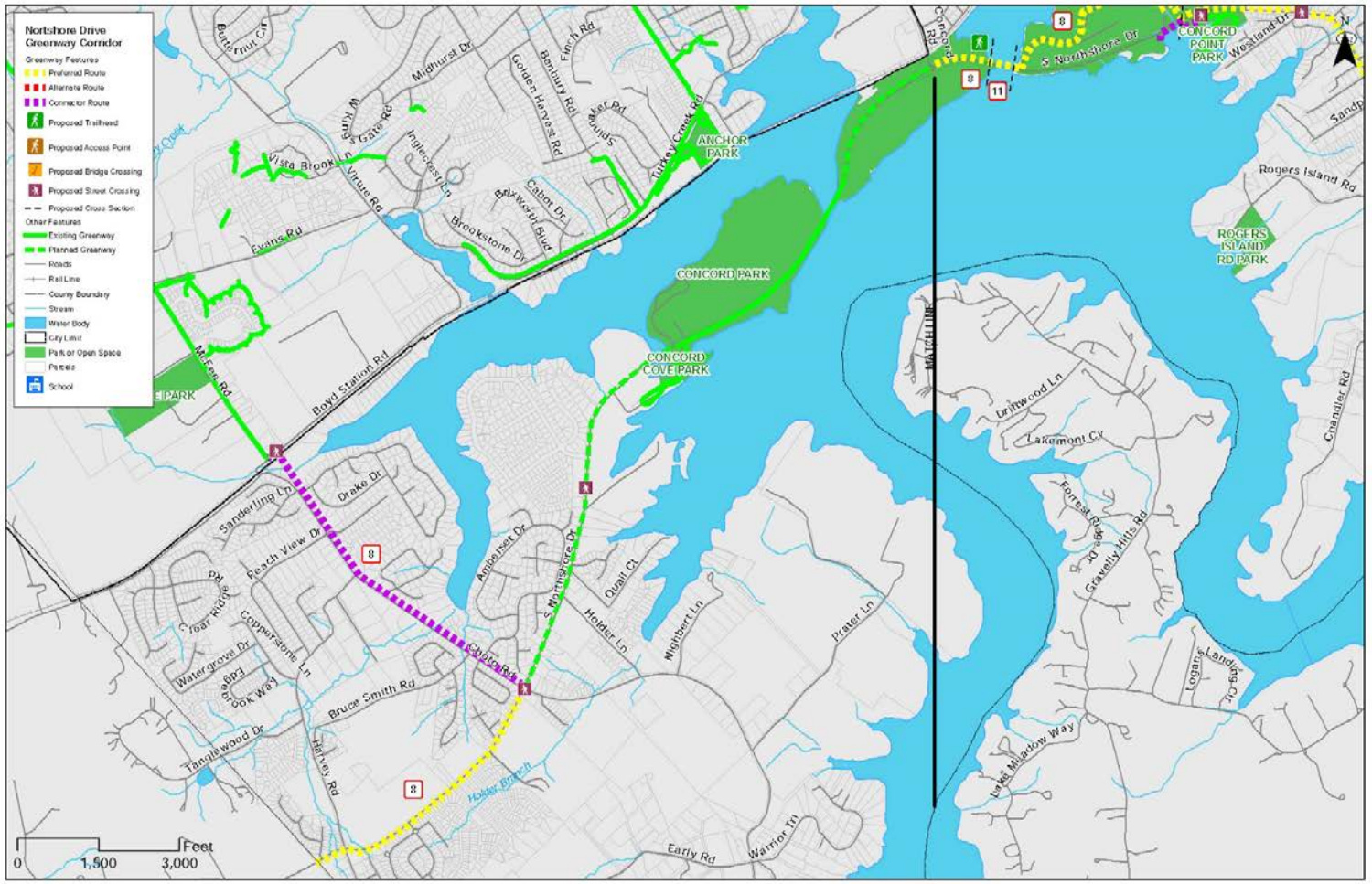


Figure 5-2. Northshore Drive: Concord Park to Pellissippi Parkway

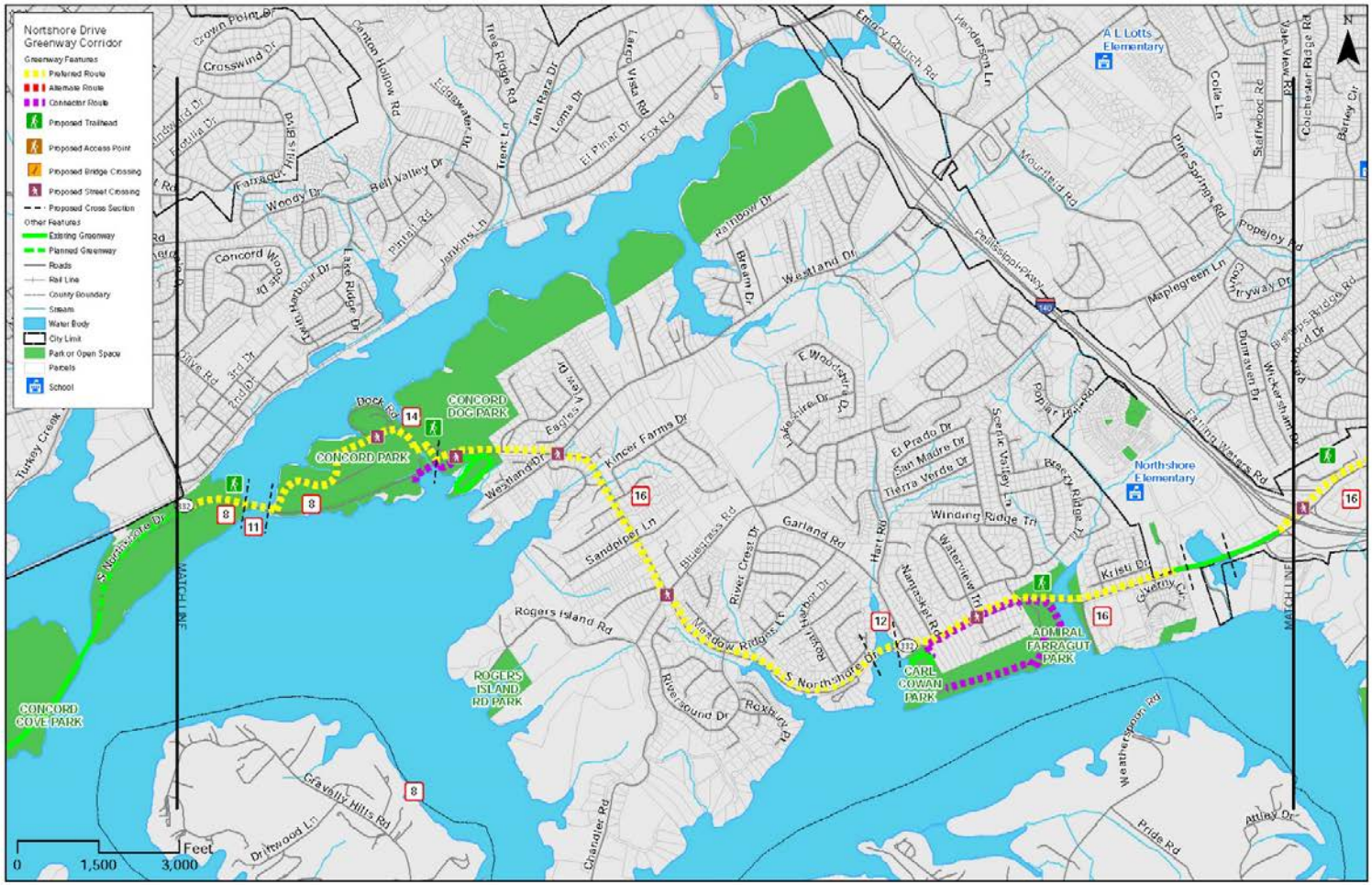


Figure 5-3. Northshore Drive: Pellissippi Parkway to Wallace Road

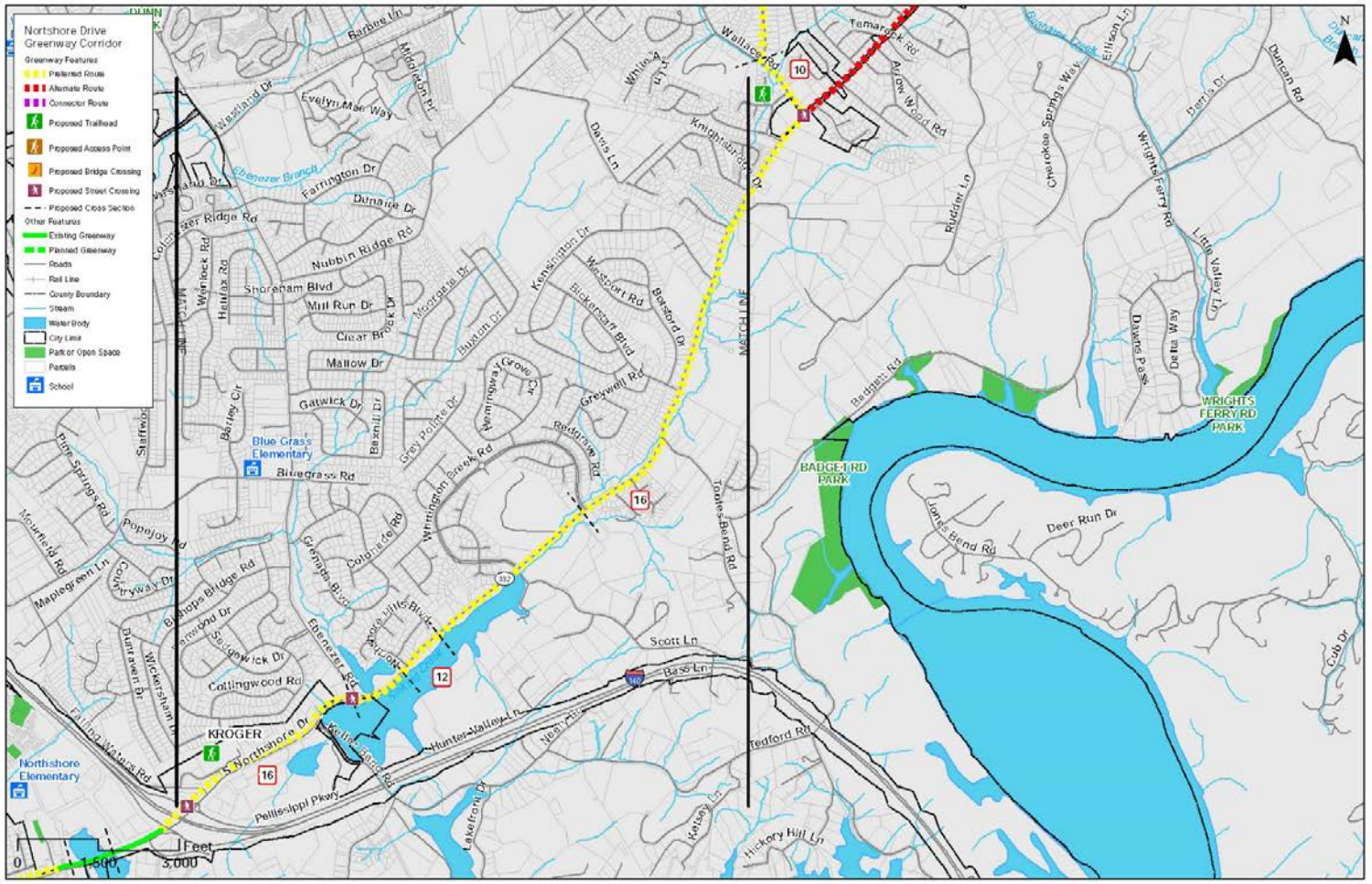
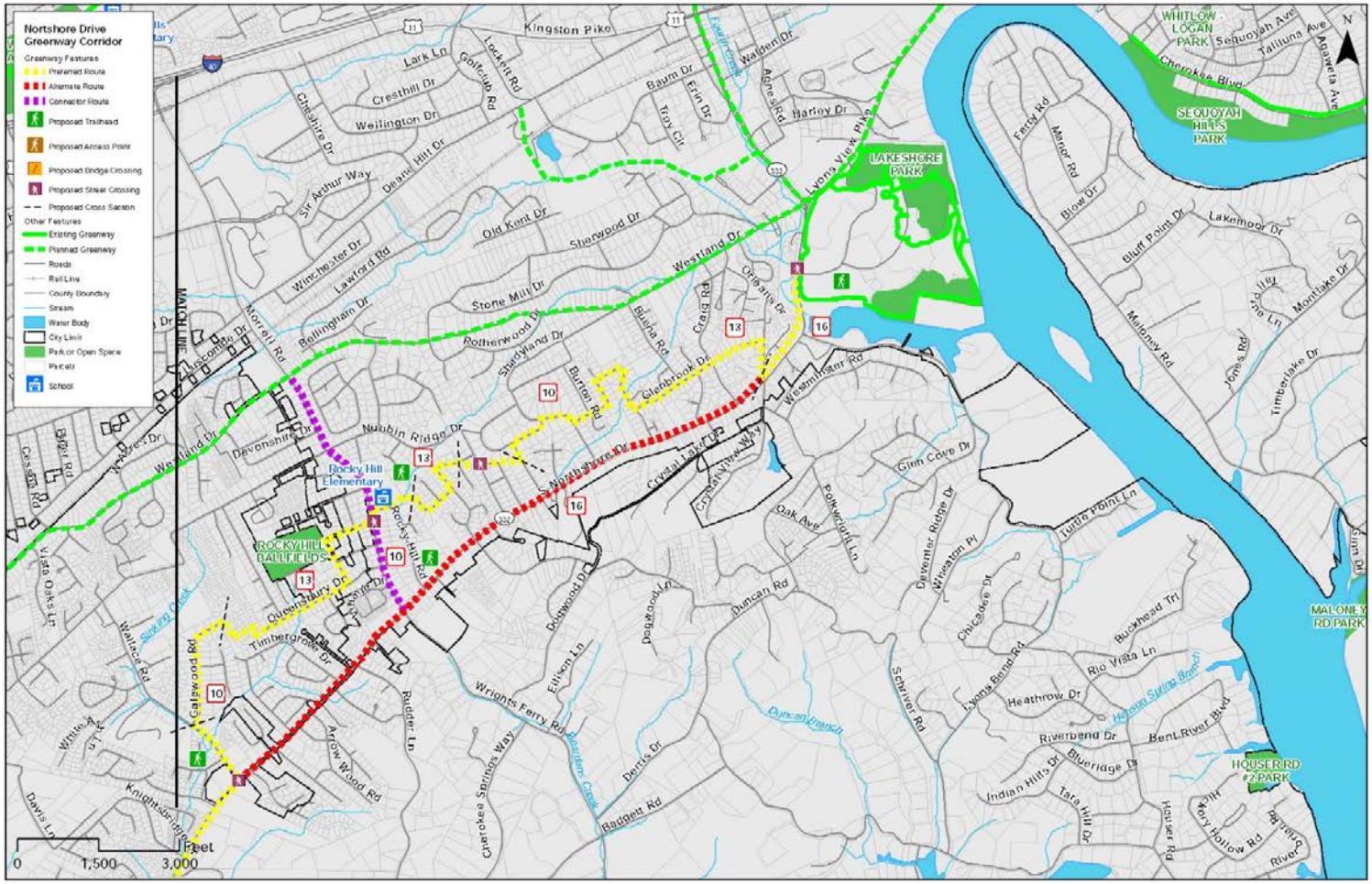


Figure 5-4. Northshore Drive: Wallace Road to Lakeshore Park



5.2 General Constraints

The recommended routes in the Northshore corridor are generally along roads or on streets in the corridor. Below are general constraints affecting the alignments in the Northshore Drive corridor.

- County Line to Concord Park
  - Existing development on both the north and south sides of Northshore Drive (preferred route)
  - Connection to the planned greenway along Northshore Drive between Choto Road and Concord Park and existing greenways in Concord Park (preferred route)
  - Connection to McFee Road greenway (connector route)
- Concord Park to Pellissippi Parkway
  - Existing development on both the north and south sides of Northshore Drive (preferred route)
- Pellissippi Parkway to Wallace Road
  - Topography and environmental features along north side of Northshore Drive (preferred route)
  - No suitable signalized or otherwise safe crossings of Northshore Drive (preferred route)
- Wallace Road to Lakeshore Park
  - Coordination with Rocky Hill Elementary (preferred route)
  - Connection between Westland Drive and Rocky Hill Center (connector route)
  - Topography, environmental features, and utilities along south side of Northshore Drive (alternate route)

Please see Appendix C for corridor constraint maps.

5.3 Design Character

Whether adjacent to Northshore Drive (Figure 5-5) or as an advisory lane along neighborhood streets (Figure 5-6), the preferred greenway route provides a way to access local schools, neighborhood retail, and recreational attractions. Adjacent to Northshore Drive, important design features include:

- Creating a sense of safety and comfort for greenway users from motor vehicle traffic through well designed, planted buffers;
- Providing an easily understood wayfinding system (Appendix A), including signage showing distances to trailheads and popular destinations such as commercial districts, parks, and schools;
- Constructing boardwalks to maintain adequate user separation from traffic in areas with hard constraints (i.e., water body) or narrow rights-of-way; and
- Supporting safe access with pedestrian-oriented intersections, including high visibility crosswalks, pedestrian signal countdown heads, and nighttime lighting.

Similarly, ensuring a safe and comfortable user experience on advisory bike lanes through neighborhoods requires:

- Designating a specific space within the roadway for greenway users; and
- Encouraging slower speeds and increased driver awareness with pavement markings and signage.

What is an **Advisory Bike Lane?**

An Advisory Bike Lane defines a preferred space for bicyclists and motorists to operate on narrow streets that would otherwise be a shared roadway environment. Roads with Advisory Bike Lanes accommodate low to moderate volumes of low-speed, two-way motor vehicle traffic and provide a prioritized space for bicyclists with little or no widening of the paved roadway surface.

Figure 5-5. Illustrative Concept: Northshore Drive

Figure 5-6. Illustrative Concept: Queensbury Drive

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5.4 Cost Estimates

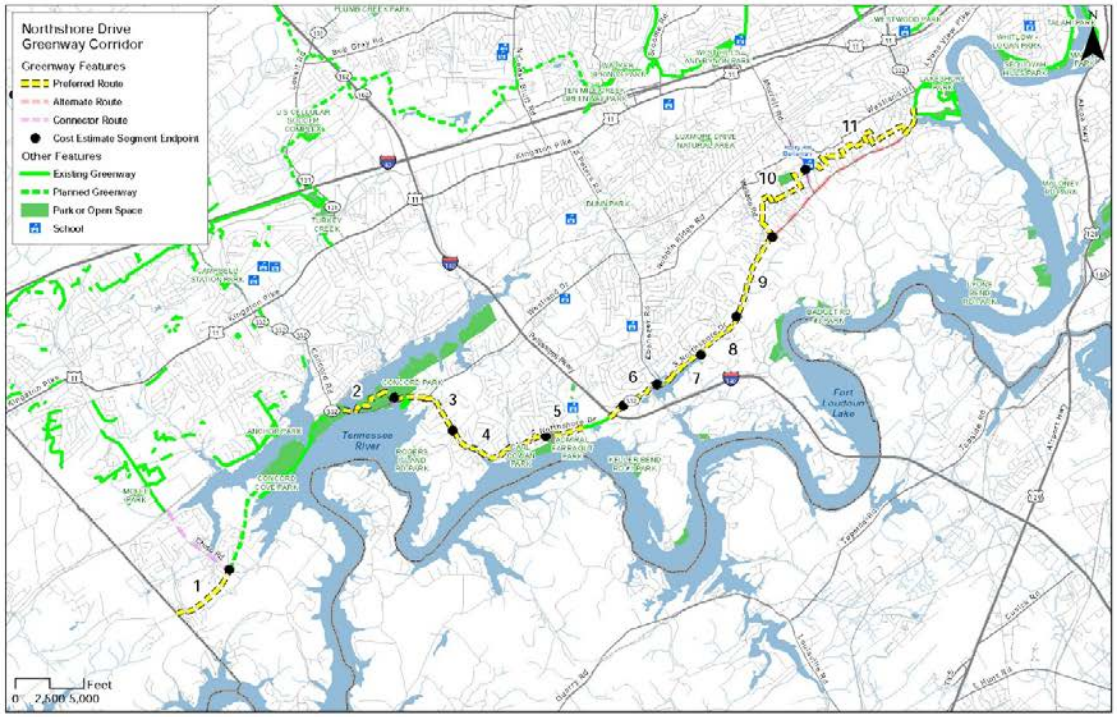
For cost estimating purposes, the preferred route for Northshore Drive was divided into seven segments, corresponding with logical termini and reasonable distances relative to funding design and construction (approximately 1-2 miles in length). Table 5-1 summarizes the estimated costs for each of the segments shown in Figure 5-7.

Estimated costs do not include utility coordination and relocation, property acquisition, permit fees, environmental impact costs, traffic control, signing, lighting, or erosion control.

Table 5-1. Cost Estimate by Segment: Northshore Drive

Segment Name	Length (LF)	Estimated Cost
Segment 1 - County Line to Choto Roundabout Trailhead	5,228	$676,582
Segment 2 - Concord Roundabout to Concord Dog Park Trailhead	5,881	$1,146,914
Segment 3 - Concord Dog Park Trailhead to Bluegrass Road	5,901	$1,528,718
Segment 4 - Bluegrass Road to Admiral Farragut Park Trailhead	8,271	$2,990,851
Segment 5 - Admiral Farragut Park Trailhead to Kroger Trailhead	5,990	$2,076,755
Segment 6 - Kroger Trailhead to Ebenezer Road	2,799	$1,362,500
Segment 7 - Ebenezer Road to Scott Lane	3,936	$3,478,956
Segment 8 - Scott Lane to Tooles Bend Road	3,670	$1,841,306
Segment 9 - Tooles Bend Road to Wallace Road	8,680	$1,891,549
Segment 10 - Wallace Road to Rocky Hill Elementary Trailhead	9,103	$1,452,549
Segment 11 - Rocky Hill Elementary Trailhead to Lakeshore Park	13,402	$2,034,313

Figure 5-7. Northshore Drive Preferred Alignment Segments



APPENDIX E
COST ESTIMATES

Recommended Improvements

Route:	Northshore Drive
Description:	Northshore Drive and Concord Park Road
Project Type of Work:	Wide
County:	Knox
Length:	0.50 Miles
Date:	September 24, 2021
Estimate Type:	Concept

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$0
Asphalt Paving		$0	$0	$0	$437,000
Concrete Pavement		$0	$0	$0	$6,600
Drainage		$0	$0	$0	$59,800
Appurtenances		$0	$0	$0	$12,700
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$50,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$18,500
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$13,300
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$50,800
Signing		$0	$0	$0	$2,600
Pavement Markings		$0	$0	$0	$5,500
Maintenance of Traffic		$0	$0	$0	$41,200
Mobilization	5%	$0	$0	$0	$34,900
Other Items	10%	$0	$0	$0	$73,300
Const. Contingency	30%	$0	$0	$0	$242,000
Const. Eng. & Inspec.	20%	$0	$0	$0	$210,000
Construction Estimate		$0	$0	$0	$1,260,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$25,000	$0	$0	$50,000
Utilities		$150,000	$0	$0	$300,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$126,000
Total Project Cost (2020)		$ 175,000	$ -	$ -	$ 1,740,000

Route:	**Northshore**
Description:	**Northshore Drive and Chandler Road/Bluegrass Road**
Project Type of Work:	**Roundabout**
County:	**Knox**
Length:	**0.10 Miles**
Date:	**September 24, 2021**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$0
Asphalt Paving		$0	$0	$0	$10,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$0
Appurtenances		$0	$0	$0	$24,000
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$0
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$21,100
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$0
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$4,300
Signing		$0	$0	$0	$2,500
Pavement Markings		$0	$0	$0	$5,000
Maintenance of Traffic		$0	$0	$0	$13,600
Mobilization	5%	$0	$0	$0	$4,030
Other Items	10%	$0	$0	$0	$8,450
Const. Contingency	30%	$0	$0	$0	$27,900
Const. Eng. & Inspec.	20%	$0	$0	$0	$224,000
Construction Estimate		$0	$0	$0	$345,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$1,000,000
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$5,000	$0	$0	$10,000
Utilities		$12,500	$0	$0	$25,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$134,000
Total Project Cost (2020)		$ 17,500	$ -	$ -	$ 1,510,000

Route:	**Northshore Drive**
Description:	**Northshore Drive and Thunderhead Road**
Project Type of Work:	**Sidewalk Improvements**
County:	**Knox**
Length:	**0.10 Miles**
Date:	**September 24, 2021**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$0
Asphalt Paving		$0	$0	$0	$2,100
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$48,800
Appurtenances		$0	$0	$0	$38,800
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$15,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$11,300
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$1,900
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$9,600
Signing		$0	$0	$0	$1,100
Pavement Markings		$0	$0	$0	$0
Maintenance of Traffic		$0	$0	$0	$5,200
Mobilization	5%	$0	$0	$0	$6,690
Other Items	10%	$0	$0	$0	$14,000
Const. Contingency	30%	$0	$0	$0	$46,300
Const. Eng. & Inspec.	20%	$0	$0	$0	$40,200
Construction Estimate		$0	$0	$0	$241,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$1,250	$0	$0	$2,500
Utilities		$18,750	$0	$0	$37,500
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$24,100
Total Project Cost (2020)		$ 20,000	$ -	$ -	$ 305,000

Route:	**Northshore Drive**
Description:	**Northshore Drive and Ebenezer Road**
Project Type of Work:	**Intersection Improvements and Signals**
County:	**Knox**
Length:	**0.25 Miles**
Date:	**September 24, 2021**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$0
Asphalt Paving		$0	$0	$0	$4,900
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$122,000
Appurtenances		$0	$0	$0	$98,800
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$62,500
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$13,700
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$4,800
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$0
Signing		$0	$0	$0	$1,300
Pavement Markings		$0	$0	$0	$3,500
Maintenance of Traffic		$0	$0	$0	$12,500
Mobilization	5%	$0	$0	$0	$16,200
Other Items	10%	$0	$0	$0	$34,000
Const. Contingency	30%	$0	$0	$0	$112,000
Const. Eng. & Inspec.	20%	$0	$0	$0	$97,200
Construction Estimate		$0	$0	$0	$583,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$5,000	$0	$0	$10,000
Utilities		$37,500	$0	$0	$75,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$58,300
Total Project Cost (2020)		$ 42,500	$ -	$ -	$ 726,000

Route:	Northshore Drive
Description:	Northshore Drive and Wallace Road
Project Type of Work:	Widen
County:	Knox
Length:	0.35 Miles
Date:	September 24, 2021
Estimate Type:	Concept

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$20,800
Asphalt Paving		$0	$0	$0	$355,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$47,800
Appurtenances		$0	$0	$0	$5,300
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$60,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$16,700
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$9,300
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$5,900
Signing		$0	$0	$0	$1,500
Pavement Markings		$0	$0	$0	$8,500
Maintenance of Traffic		$0	$0	$0	$24,100
Mobilization	5%	$0	$0	$0	$27,700
Other Items	10%	$0	$0	$0	$58,300
Const. Contingency	30%	$0	$0	$0	$192,000
Const. Eng. & Inspec.	20%	$0	$0	$0	$167,000
Construction Estimate		$0	$0	$0	$1,000,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$0	$0	$0	$0
Utilities		$150,000	$0	$0	$300,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$100,000
Total Project Cost (2020)		$ 150,000	$ -	$ -	$ 1,400,000

Route:	Northshore Drive
Description:	Northshore Drive and Morrell Road / Wrights Ferry Road
Project Type of Work:	Intersection Improvements
County:	Knox
Length:	0.01 Miles
Date:	September 24, 2021
Estimate Type:	Concept

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$3,700
Asphalt Paving		$0	$0	$0	$47,300
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$1,700
Appurtenances		$0	$0	$0	$0
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$10,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$10,500
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$300
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$0
Signing		$0	$0	$0	$600
Pavement Markings		$0	$0	$0	$2,200
Maintenance of Traffic		$0	$0	$0	$3,200
Mobilization	5%	$0	$0	$0	$3,980
Other Items	10%	$0	$0	$0	$8,350
Const. Contingency	30%	$0	$0	$0	$27,500
Const. Eng. & Inspec.	20%	$0	$0	$0	$23,900
Construction Estimate		$0	$0	$0	$143,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$0	$0	$0	$0
Utilities		$0	$0	$0	$0
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$14,300
Total Project Cost (2020)		$ -	$ -	$ -	$ 157,000

Route:	**Northshore Drive**
Description:	**Northshore Drive and Lyons Bend Road**
Project Type of Work:	**Signalization**
County:	**Knox**
Length:	**0.30 Miles**
Date:	**September 24, 2021**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$19,300
Asphalt Paving		$0	$0	$0	$309,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$41,200
Appurtenances		$0	$0	$0	$0
Structures		$0	$0	$0	$416,000
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$250,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$25,600
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$8,000
Rip-Rap or Slope Protection		$0	$0	$0	$31,900
Guardrail		$0	$0	$0	$60,200
Signing		$0	$0	$0	$3,200
Pavement Markings		$0	$0	$0	$6,300
Maintenance of Traffic		$0	$0	$0	$49,300
Mobilization	5%	$0	$0	$0	$61,000
Other Items	10%	$0	$0	$0	$128,000
Const. Contingency	30%	$0	$0	$0	$298,000
Const. Eng. & Inspec.	20%	$0	$0	$0	$341,000
Construction Estimate		$0	$0	$0	$2,050,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$0	$0	$0	$0
Utilities		$122,500	$0	$0	$245,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$205,000
Total Project Cost (2020)		$ 122,500	$ -	$ -	$ 2,500,000

Route:	**Northshore**
Description:	**Northshore Drive and Westland Drive/Lyons View Road**
Project Type of Work:	**Roundabout**
County:	**Knox**
Length:	**0.10 Miles**
Date:	**September 24, 2021**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$10,000
Asphalt Paving		$0	$0	$0	$15,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$10,000
Appurtenances		$0	$0	$0	$47,900
Structures		$0	$0	$0	$58,800
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$25,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$33,000
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$0
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$4,300
Signing		$0	$0	$0	$5,100
Pavement Markings		$0	$0	$0	$10,000
Maintenance of Traffic		$0	$0	$0	$30,500
Mobilization	5%	$0	$0	$0	$12,500
Other Items	10%	$0	$0	$0	$26,200
Const. Contingency	30%	$0	$0	$0	$68,900
Const. Eng. & Inspec.	20%	$0	$0	$0	$311,000
Construction Estimate		$0	$0	$0	$668,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$1,200,000
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		50%	0%	0%	
Right-of-Way		$12,500	$0	$0	$25,000
Utilities		$12,500	$0	$0	$25,000
Preliminary & Construction Engineering and Inspection					
Prelim. Eng.	10%	$0	$0	$0	$187,000
Total Project Cost (2020)		$ 25,000	$ -	$ -	$ 2,110,000