



Traffic Study  
Intersection Improvement Project

Palmetto Road at  
Arrowood Road/Spencer Road  
Tyrone, GA

January 20, 2021

Submitted by  
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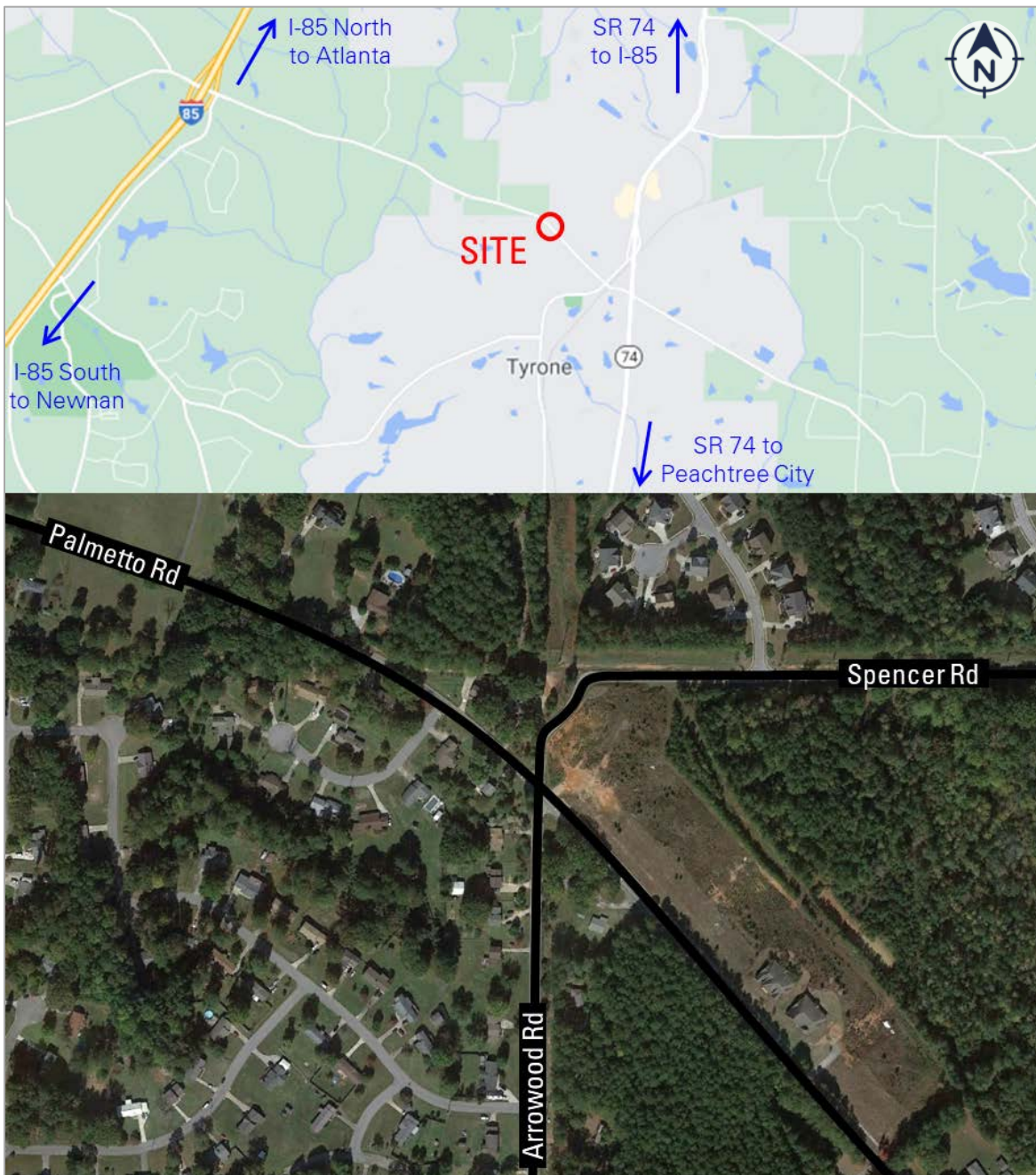
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# 1. Introduction

The purpose of this study is to evaluate potential improvements at the intersection of Palmetto Road and Arrowood Road/Spencer Lane in Tyrone, Georgia. The location of the intersection is shown below in Figure 1.

Figure 1: Study Area



## 2. Methodology

In this section, the methodology for this study is discussed in detail. The main elements in the study included Existing Conditions, Future Conditions, Improvement Alternatives, Operational Analysis, and Benefit-Cost Analysis.

### Existing Conditions

Existing conditions were inventoried including geometric conditions, traffic control, and traffic volumes. Traffic data for the study intersection were obtained from traffic counts previously conducted in 2018 for the Town of Tyrone. Crash data was obtained from the Georgia Electronic Accident Reporting System (GEARS) for the five most recent years of data, 2015 to 2019.

### Future Conditions

The estimated completion year (Base Year) for this project is 2022. Projected future conditions for this study were developed for the Design Year of the project, 2042. Base Year and Design Year conditions include the growth in traffic volumes expected to occur through the Year 2022 and 2042, respectively. The expected 2022 and 2042 volumes were estimated using historic traffic data collected and maintained by the Georgia Department of Transportation (GDOT). Historic traffic counts at nearby GDOT count stations, the data for which is provided in Appendix A, were examined and a growth rate of 1.0% annually was adopted. Applying this growth rate to the existing traffic volumes over a period of two and twenty-two years yielded the estimated traffic volumes for the Years 2022 and 2042, respectively.

## Improvement Alternatives

The Town of Tyrone indicated that both a roundabout and conventional intersection improvements should be included as alternatives for the study intersection. A preliminary and iterative process was conducted using capacity analysis to determine the most feasible and effective potential improvements at the study intersection, in addition to those suggested by Tyrone. The Improvement Alternatives chapter provides details for all the potential improvements included in the evaluation.

## Alternatives Evaluation

This chapter provides details of the in-depth operational analysis of the improvement alternatives. Operational analysis was conducted using capacity analysis and simulation. Evaluation of the study intersection was conducted under four different sets of conditions:

- **Existing (2020) Conditions:** Current geometric and traffic control conditions, existing traffic volumes
- **Base Year (2022) No-Build Conditions:** Current geometric and traffic control conditions, projected 2022 volumes (if no improvement were to be completed at the study intersection)
- **Base Year (2022) Build Conditions:** Improvements implemented, projected 2022 volumes
- **Design Year (2042) No-Build Conditions:** Current geometric and traffic control conditions, projected 2042 volumes (if no improvement were to be completed at the study intersection)
- **Design Year (2042) Build Conditions:** Improvements implemented, projected 2042 volumes

Signal warrant analysis was conducted for the traffic signal improvement alternative under 2022 and 2042 Build conditions to determine if a signal would be warranted at the study intersection at any point through the design life of the project. This analysis was performed in accordance with guidance provided in Chapter 4 of the Manual on Uniform Traffic Control Devices (MUTCD).

Capacity analysis was conducted for the study intersection under each set of analysis conditions using *Sidra 7* software for roundabout improvement alternatives and using *Synchro 10* software for non-roundabout improvement alternatives. The results of capacity analysis are reported in terms of Level of Service, which is a function of average delay per vehicle, in seconds. The Level of Service Scale according to the *Highway Capacity Manual* (HCM) is shown on the following page in Table 1.

Table 1: HCM Level of Service Scale

LEVEL OF SERVICE	AVERAGE DELAY PER VEHICLE (SECONDS)	
	STOP CONTROL	SIGNAL CONTROL
A	≤10.0	≤10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	>50.0	>80.0

Simulation was conducted for the study intersection using *Simtraffic* software by Trafficware. Using *SimTraffic*, the intersection improvement alternatives were simulated to evaluate total delay, total travel time, and total fuel used. Total delay and total travel time are given in hours and include all vehicles in the network. Total fuel used is given in gallons of fuel used by all vehicles in the study network.

## Benefit-Cost Analysis

The benefit-cost analysis examined the financial savings from reductions in travel time and fuel consumption. These were compared to the estimated construction cost for each recommended improvement. There are other benefits of traffic improvement projects, but travel time and fuel consumption can be readily quantified.

The value of time used in this analysis was the average Fayette County hourly wage obtained from the Bureau of Labor Statistics. The average hourly wage used was \$23.55 per hour.

The average cost of a gallon of fuel in Georgia was obtained from AAA. The current value of regular gasoline used was \$1.97 per gallon.

Cost estimates for each recommended improvement were then converted to annual costs based on a 20-year project life cycle and a two percent annual compounded value of money. The total annual benefit found as described above was compared to the total annual cost to result in the Benefit-to-Cost or 'B/C' ratio. The higher the B/C ratio, the more benefit is expected from a project relative to its cost.



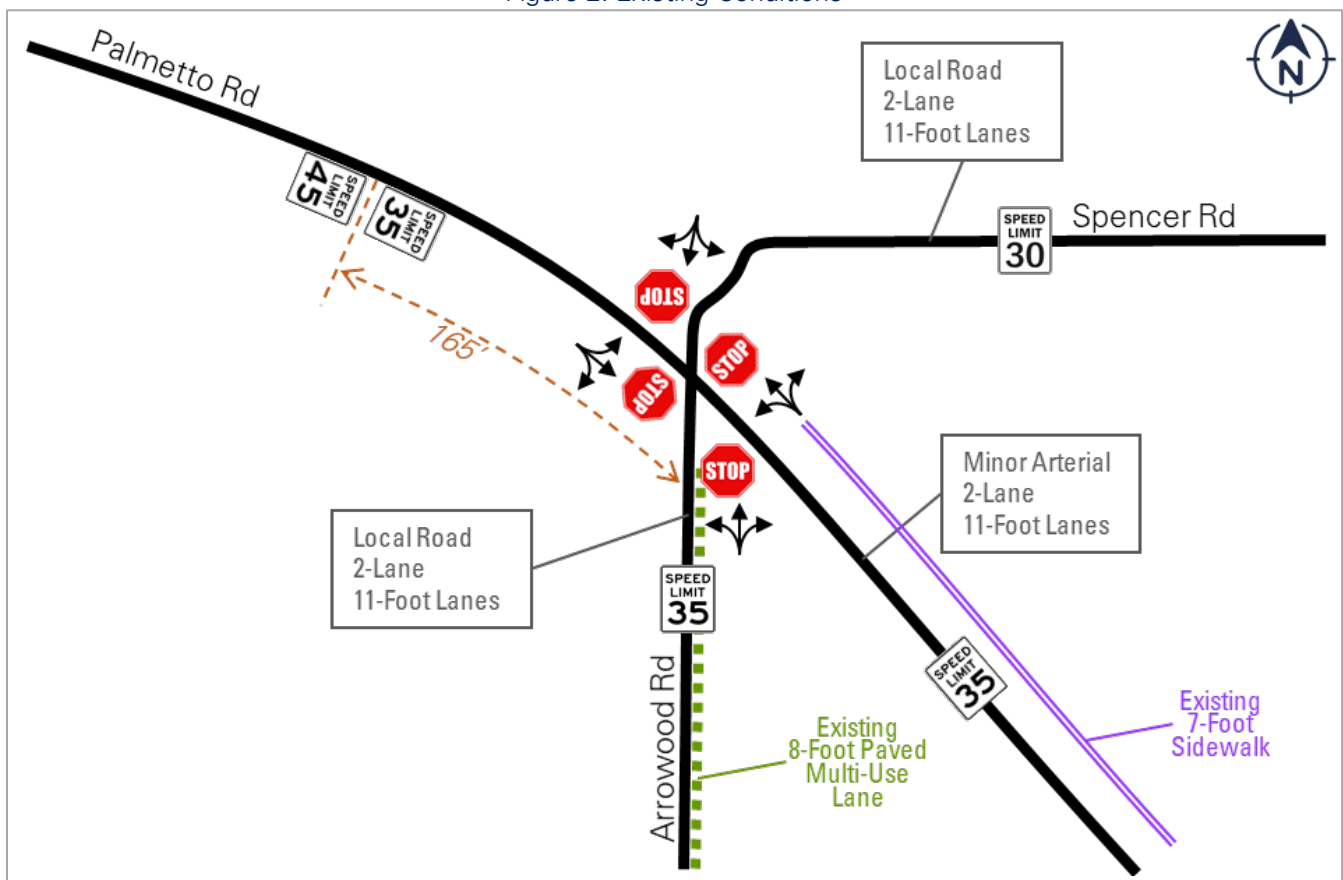
### 3. Existing Conditions

Existing geometry, traffic control conditions, and traffic volumes for the study intersection are provided in this chapter.

#### Intersection Geometry and Traffic Control

Existing intersection geometry and traffic control for the study intersection are summarized below in Figure 2.

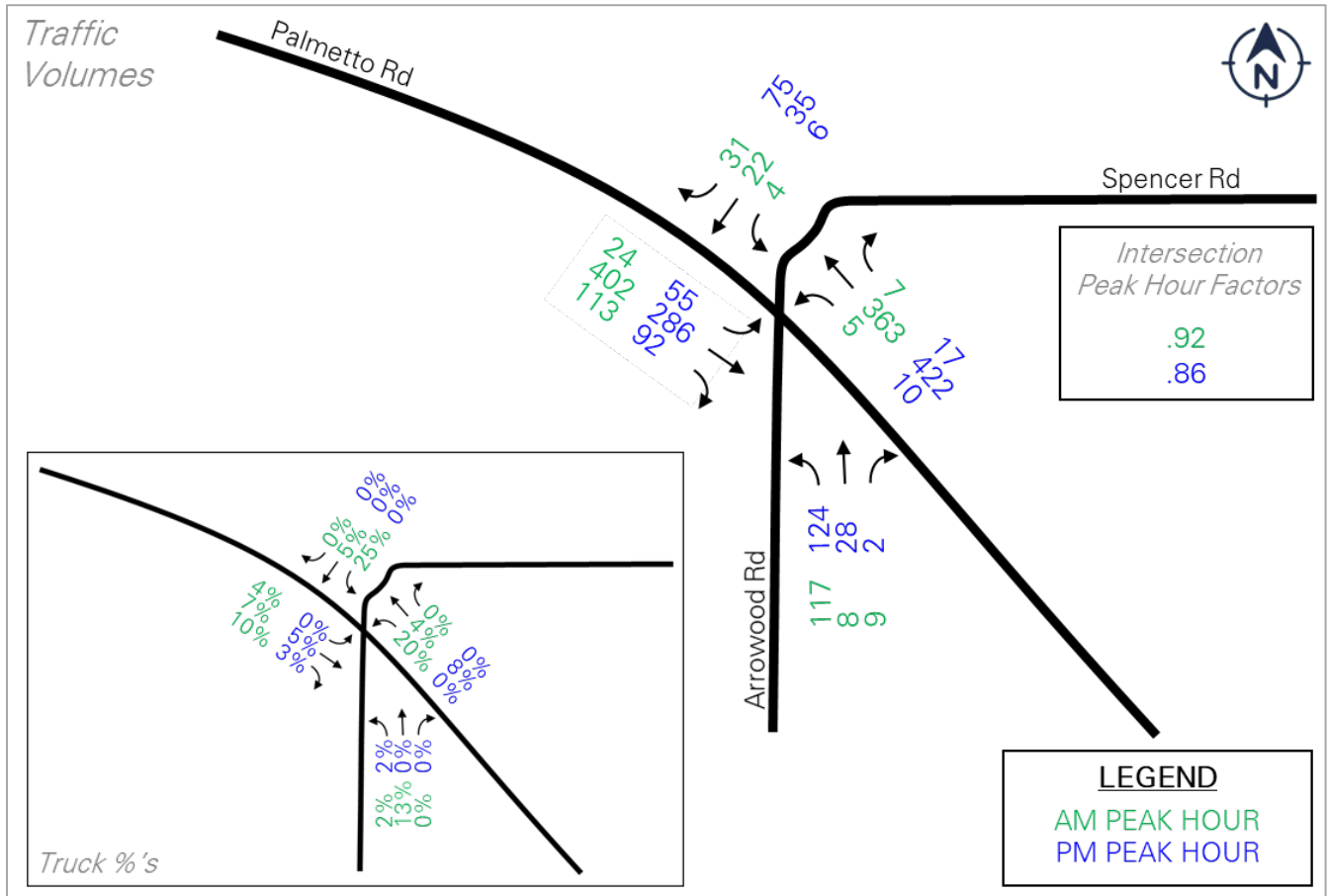
Figure 2: Existing Conditions



## Traffic Volume Data

Existing traffic volumes and associated data for the study intersection are shown below in Figure 3. This data was collected in 2018 as part of the SPLOST study for the Town of Tyrone. Traffic data reports for the study intersections are provided in Appendix B.

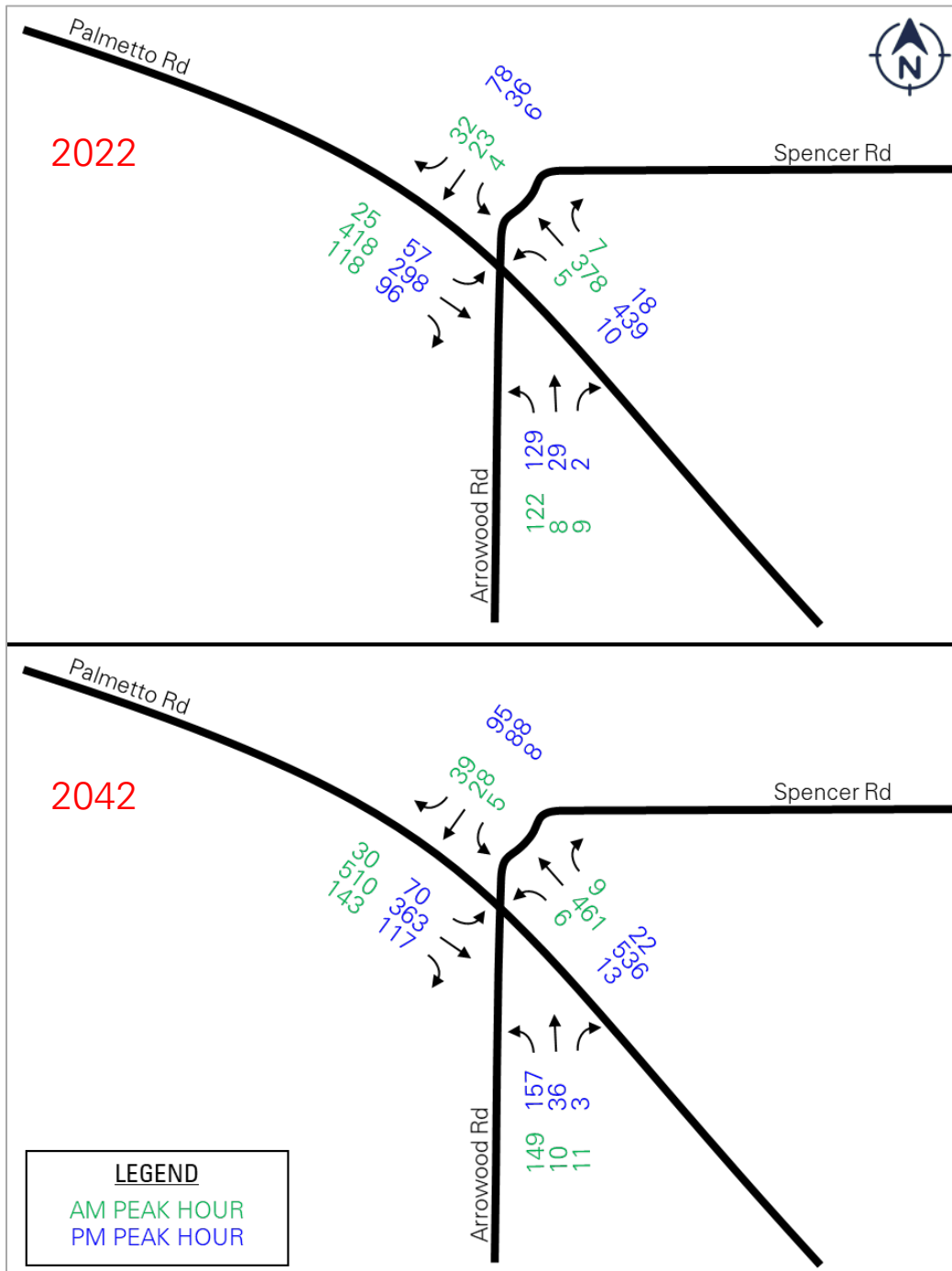
Figure 3: Existing Traffic Volume Data



# 4. Future Conditions

The Base Year (2022) and Design Year (2042) projected traffic volumes which were used to evaluate future conditions are shown below in Figure 4.

Figure 4: Projected Traffic Volumes



## 5. Improvement Alternatives

Multiple options were considered for improvement of the study intersection, including changes to geometric conditions and/or traffic control at the study intersection. The improvement alternatives determined to be most feasible through preliminary analysis and discussion with the Town of Tyrone are as follows:

- Installation of a traffic signal, with current geometric conditions
- Installation of a single-lane roundabout, centered at the current location of the intersection
- Installation of a single-lane roundabout, shifted northeast from the current location of the intersection

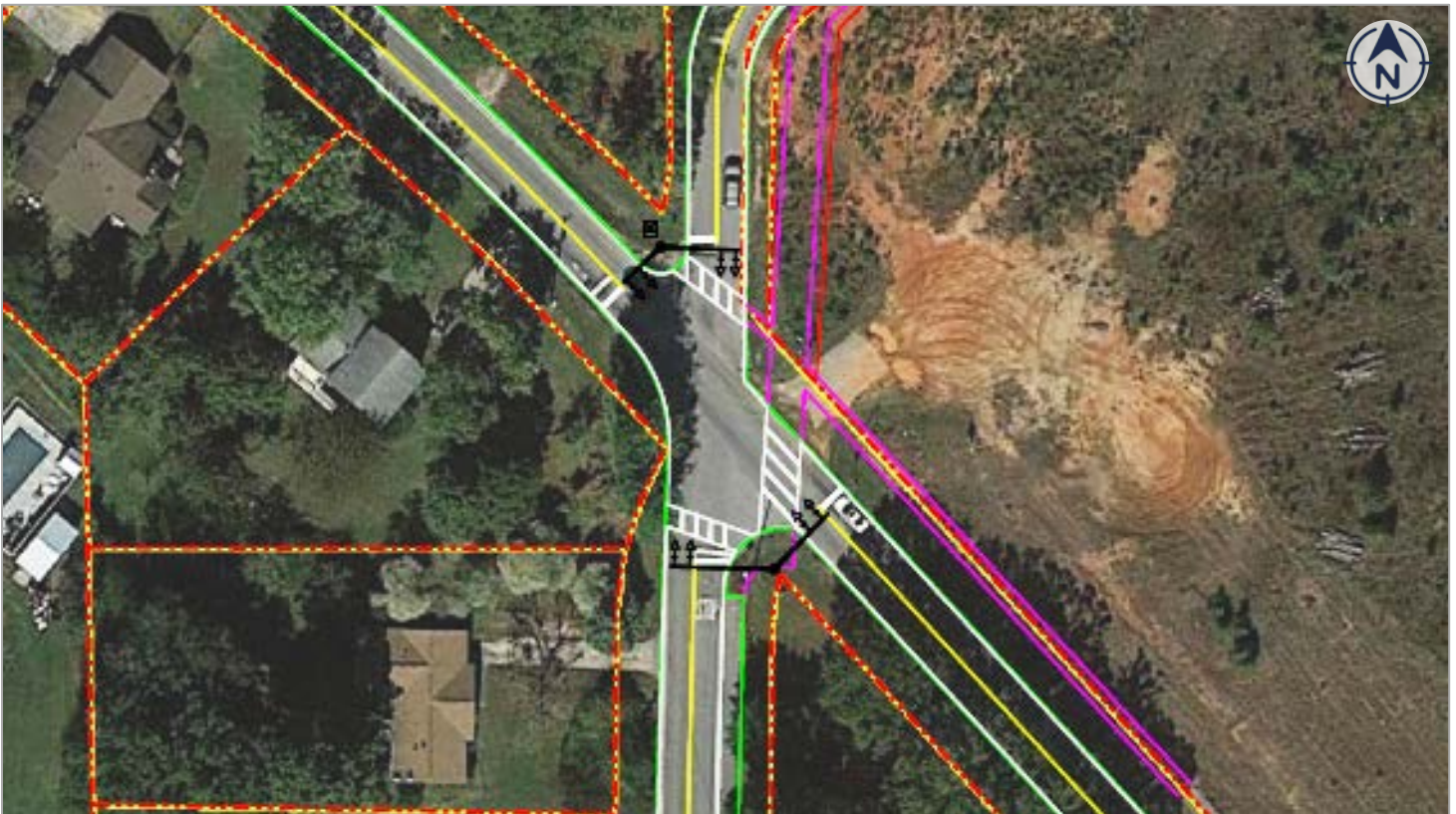
These improvement alternatives are described in the following sections. Details of the evaluation of these alternatives is provided in the next chapter. Concepts are provided in Appendix C.

### Traffic Signal

For this alternative, the study intersection would be converted to traffic signal control and would maintain the current intersection geometry, as shown below in Figure 5.

Pedestrian facilities would include signalized pedestrian crossings on the north, south, and east legs of the intersection. The planned 14-foot multi-use path would run along the east/south side of Spencer Lane, cross the east leg of the intersection, and connect into the existing path on the east side of Arrowwood Road, south of Palmetto Road.

Figure 5: Improvement Concept – Traffic Signal



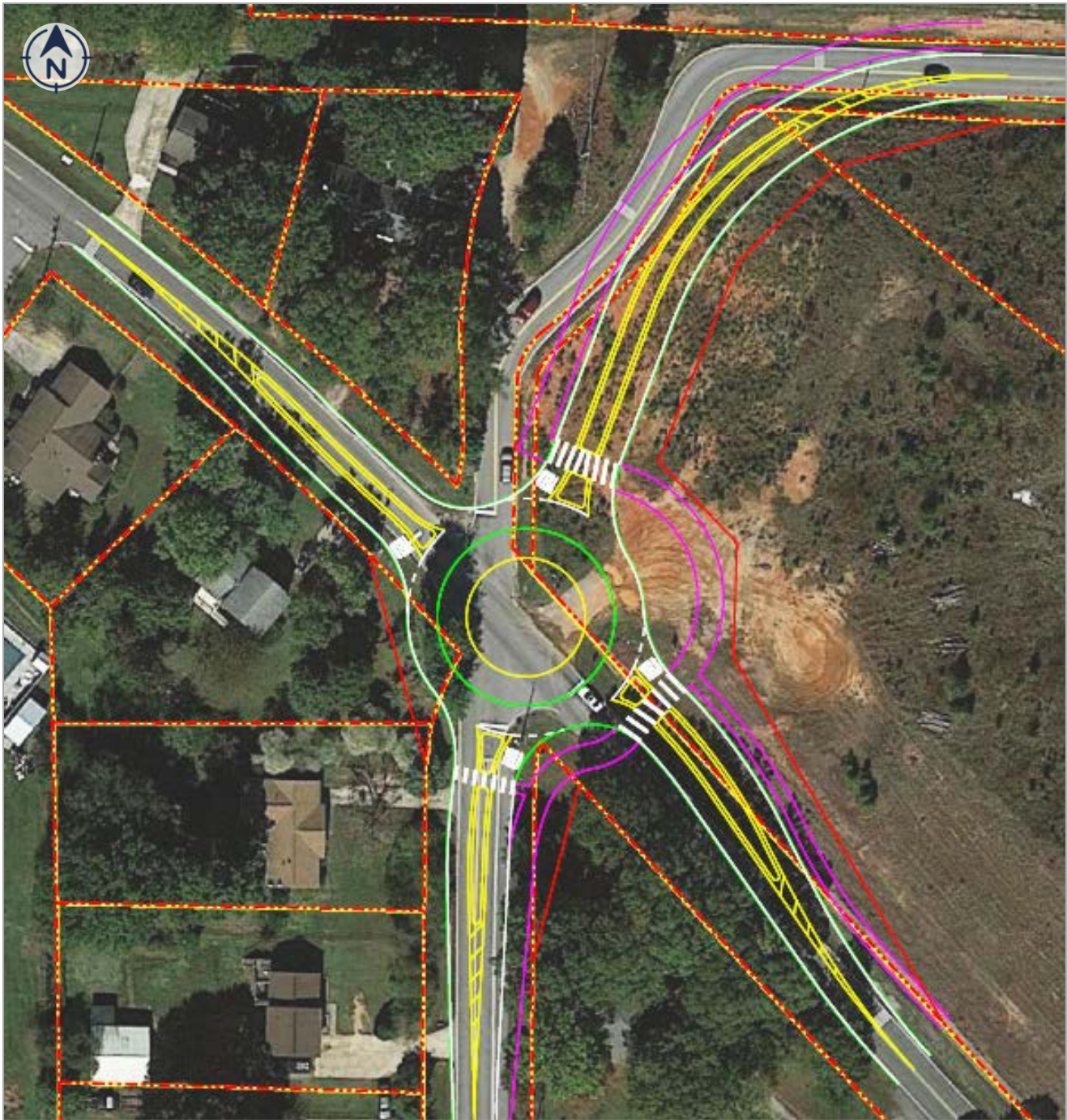
#### Roundabout, Current Intersection Location

The concept for the roundabout improvement centered at the current intersection location is shown on the following page in Figure 6.

Pedestrian facilities would include unsignalized pedestrian crossings on the north, south, and east legs of the intersection. The planned 14-foot multi-use path would run along the north/west side of Spencer Lane, cross the north and east legs of the intersection, and connect into the existing path on the east side of Arrowood Road, south of Palmetto Road.



Figure 6: Improvement Concept – Roundabout, Current Intersection Location



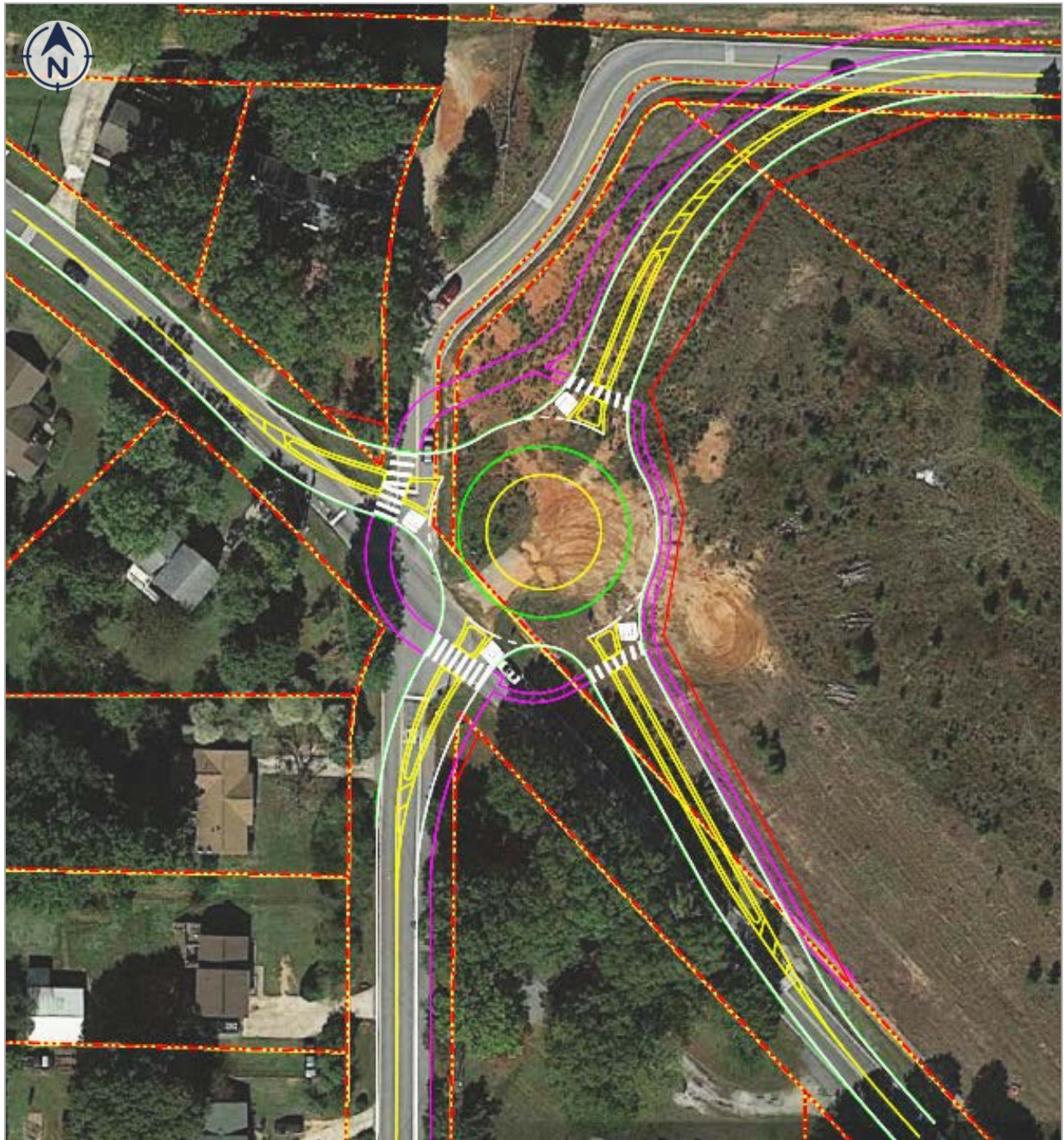
### Roundabout, Shifted Northeast

The concept for the roundabout improvement shifted northeast of the current intersection location is shown on the following page in Figure 7. This roundabout concept was designed to minimize right-of-way acquisition in properties that are currently developed.

Pedestrian facilities would include unsignalized pedestrian crossings on all four legs of the intersection. The planned 14-foot multi-use path would run along the north/west side of Spencer Lane, cross the west and south legs of the intersection, and connect into the existing path on the east side of Arrowood Road, South of Palmetto Road.



Figure 7: Improvement Concept – Roundabout, Shifted Northeast



## 6. Alternatives Evaluation

The results of capacity analysis, simulation, and benefit-cost analysis are provided in this section.

### Signal Warrant Analysis

The results of signal warrant analysis are summarized below in Table 2. For each warrant examined, the result is provided in terms of ‘actual hours met / hours required to be met to satisfy warrant’.

Table 2: Signal Warrant Analysis Results

Signal Warrant	Method	Base Year (2022)		Design Year (2042)	
		Hours Met	Warrant Satisfied? (Y or N)	Hours Met	Warrant Satisfied? (Y or N)
Warrant 1 – Condition A Eight Highest Hours	Conventional	1/8	N	4/8	N
Warrant 1 – Condition B Eight Highest Hours	Conventional	3/8	N	5/8	N
Warrant 2 Four Highest Hours	Conventional	2/4	N	4/4	Y

Signal warrant analysis results indicate Signal Warrant 2 is expected to be warranted by the Design Year of the project, but not by the Base Year of the project. Signal warrant analysis was then conducted for multiple years between the base and design years of the project to get a better idea of when exactly the intersection is expected to warrant installation of a traffic signal. It was determined that the intersection is expected to warrant installation of a traffic signal based on Signal Warrant 2 by 2037.

## Capacity Analysis

Capacity analysis results for the study intersection under existing and No-Build conditions are shown below in Table 3. Capacity analysis reports are provided in Appendix D.

Table 3: Capacity Analysis Results – Existing and No-Build Conditions

	Approach	AM Peak Hour			PM Peak Hour		
		Existing (2020)	No-Build (2022)	No-Build (2042)	Existing (2020)	No-Build (2022)	No-Build (2042)
Palmetto Road	EB	D (30.9)	E (37.6)	F (129.6)	D (32.0)	E (43.0)	F (154.5)
	WB	C (19.4)	C (21.5)	E (44.4)	E (36.6)	F (50.1)	F (179.6)
Arrowood Road/ Spencer Road	NB	B (12.5)	B (13.0)	C (15.8)	B (14.9)	C (16.0)	C (23.3)
	SB	B (11.1)	B (11.4)	B (13.2)	B (12.8)	B (13.6)	C (21.3)
	<b>Intersection</b>	<b>C (23.7)</b>	<b>D (27.8)</b>	<b>F (80.9)</b>	<b>D (29.6)</b>	<b>E (39.2)</b>	<b>F (130.1)</b>

Capacity analysis results indicate that under existing conditions, the study intersection is operating at LOS ‘C’ and LOS ‘D’ in the AM Peak Hour and PM Peak Hour, respectively. If no improvement is made to the intersection, operation is expected to degrade to LOS ‘F’ with a delay per vehicle of 81 seconds and 130 seconds in the AM Peak Hour and PM Peak Hour, respectively, in the Year 2042.

Capacity analysis results for the study intersection under Build conditions with the different improvement alternatives discussed in Chapter 5 are shown on the following page in Table 4. The results for Build conditions are shown side-by-side with the results for No-Build conditions for ease of comparison.

Table 4: Capacity Analysis Results – Improvement Alternatives

Approach	AM Peak Hour						PM Peak Hour					
	2022			2042			2022			2042		
	No-Build	Traffic Signal	Round-about	No-Build	Traffic Signal	Round-about	No-Build	Traffic Signal	Round-about	No-Build	Traffic Signal	Round-about
EB	E (37.6)	B (11.8)	A (9.2)	F (129.6)	B (17.4)	B (12.0)	E (43.0)	B (17.6)	A (8.9)	F (154.5)	C (30.1)	B (13.2)
WB	C (21.5)	A (9.3)	A (8.4)	E (44.4)	B (10.9)	B (10.9)	F (50.1)	B (16.5)	B (14.8)	F (179.6)	C (23.6)	C (27.3)
NB	B (13.0)	C (21.1)	A (7.2)	C (15.8)	C (31.2)	A (9.1)	C (16.0)	C (23.4)	A (7.4)	C (23.3)	C (31.9)	A (9.8)
SB	B (11.4)	B (10.2)	A (6.4)	B (13.2)	B (12.7)	A (7.9)	B (13.6)	A (8.8)	A (9.6)	C (21.3)	B (17.6)	B (19.5)
<b>Intersection</b>	<b>D (27.8)</b>	<b>B (12.0)</b>	<b>A (8.5)</b>	<b>F (80.9)</b>	<b>B (16.6)</b>	<b>B (11.1)</b>	<b>E (39.2)</b>	<b>B (17.0)</b>	<b>B (11.0)</b>	<b>F (130.1)</b>	<b>C (26.3)</b>	<b>B (18.9)</b>

Capacity analysis results indicate both the traffic signal alternative and the roundabout alternative yield considerably improved traffic operation compared to No-Build conditions during both peak hours through the design year of the project. The roundabout alternative is the superior option from a traffic operation standpoint, as it yields the lower delays per vehicle during every analysis period.

## Simulation

Simulation results for the study intersection under Build conditions with the different improvement alternatives are shown below in Table 5, provided side-by-side with No-Build results for ease of comparison. Simulation reports are provided in Appendix E.

Table 5: Simulation Results

Simulation Metric	AM Peak Hour						PM Peak Hour					
	2022			2042			2022			2042		
	No-Build	Traffic Signal	Roundabout	No-Build	Traffic Signal	Roundabout	No-Build	Traffic Signal	Roundabout	No-Build	Traffic Signal	Roundabout
Travel Time (hr)	10.9	10.5	8.8	25.7	20.8	11.5	14.7	14.5	9.8	101.1	25.6	12.8
Total Delay (hr)	4.9	4.5	1.9	18.2	13.2	2.8	8.0	7.9	2.2	93.8	17.7	3.7
Fuel Used (gal)	8.8	8.2	8.3	13.7	12.6	10.5	10.4	10.2	9.2	30.4	14.3	11.4

Simulation results indicate the roundabout alternative yields the lower travel time, total delay, and fuel used during every analysis period.

## Benefit-Cost Analysis

The benefit-cost analysis examined the present value of total benefits to be gained through the design life of each improvement alternative in comparison to the estimated present cost of each alternative. The results of the benefit-cost analysis are summarized below in Table 6. The higher the B-C ratio, the more benefit is gained per dollar of cost. Cost estimates for each improvement alternative are provided in Appendix F. Detailed calculations of benefits are included in Appendix G.

Table 6: Benefit-Cost Analysis Summary

Improvement Alternative	Present Value of Total Benefits Through Design Life	Present Value of Estimated Cost	B-C Ratio
Traffic Signal	\$12,180,303.36	\$265,005.00	46
Roundabout (Current Location)	\$16,605,804.55	\$1,288,609.00	13
Roundabout (Shifted NE)	\$16,605,804.55	\$1,393,213.00	12

The traffic signal alternative yields the highest B-C ratio, with the roundabout alternative at the current intersection location second, and the roundabout alternative shifted to the northeast third.



## 7. Summary

The purpose of this study was to evaluate traffic improvements at the intersection of Palmetto Road and Arrowood Road/Spencer Road in Tyrone, Georgia.

Multiple alternatives were evaluated using capacity analysis and simulation under No-Build and Build conditions for the Base Year (2022) and the Design Year (2042) of the project. Design year volumes were projected using a 1% annually compounding growth rate over the period between the existing year and the Base and Design Years. Based on the results of capacity analysis and simulation, a Benefit-Cost (B-C) ratio was determined for each improvement alternative.

The alternatives evaluated include a traffic signal with the current intersection geometry, a single-lane roundabout at the current location of the intersection, and a single-lane roundabout shifted to the northeast from the current intersection location. Each of these alternatives provides pedestrian and multi-use trail connection to the existing paved multi-use lane along the east side of Arrowood Road. The traffic signal is expected to be warranted in the Year 2037.

Both the traffic signal and roundabout improvement alternatives provide significantly improved capacity analysis results compared to No-Build conditions through the design life of the project. The roundabout alternative yields slightly better results, with between 4 and 8 seconds less delay per vehicle than the traffic signal alternative through the design life of the project.

Both the traffic signal and roundabout improvement alternatives provide significantly improved simulation results compared to No-Build conditions through the design life of the project. The roundabout alternative yields slightly better results, with between 3 and 14 hours less of total delay at the intersection than the traffic signal alternative through the design life of the project.

The traffic signal alternative yields the highest B-C ratio of the three alternatives.

# Appendices

- A. GDOT Count Station Data
- B. Traffic Data Reports
- C. Improvement Alternative Concepts
- D. Capacity Analysis Reports
- E. Simulation Reports
- F. Cost Estimate Sheets
- G. Benefit Calculations

Appendix A  
GDOT Count Station Data



2010

2011

2015

2019

12:00 am	19	12:00 am	33	12:00 am	22	12:00 am	26
01:00 am	13	01:00 am	21	01:00 am	14	01:00 am	13
02:00 am	13	02:00 am	8	02:00 am	12	02:00 am	9
03:00 am	14	03:00 am	13	03:00 am	18	03:00 am	22
04:00 am	20	04:00 am	32	04:00 am	48	04:00 am	44
05:00 am	111	05:00 am	115	05:00 am	130	05:00 am	152
06:00 am	319	06:00 am	293	06:00 am	414	06:00 am	464
07:00 am	587	07:00 am	548	07:00 am	830	07:00 am	963
08:00 am	427	08:00 am	448	08:00 am	698	08:00 am	823
09:00 am	282	09:00 am	356	09:00 am	496	09:00 am	489
10:00 am	288	10:00 am	304	10:00 am	384	10:00 am	481
11:00 am	282	11:00 am	321	11:00 am	378	11:00 am	481
12:00 pm	310	12:00 pm	362	12:00 pm	460	12:00 pm	512
01:00 pm	287	01:00 pm	416	01:00 pm	438	01:00 pm	560
02:00 pm	374	02:00 pm	380	02:00 pm	558	02:00 pm	545
03:00 pm	460	03:00 pm	422	03:00 pm	616	03:00 pm	815
04:00 pm	489	04:00 pm	503	04:00 pm	774	04:00 pm	842
05:00 pm	613	05:00 pm	692	05:00 pm	1042	05:00 pm	1005
06:00 pm	415	06:00 pm	512	06:00 pm	690	06:00 pm	663
07:00 pm	312	07:00 pm	302	07:00 pm	418	07:00 pm	370
08:00 pm	224	08:00 pm	209	08:00 pm	328	08:00 pm	260
09:00 pm	172	09:00 pm	176	09:00 pm	234	09:00 pm	191
10:00 pm	83	10:00 pm	153	10:00 pm	102	10:00 pm	98
11:00 pm	50	11:00 pm	68	11:00 pm	64	11:00 pm	51
7am-7pm	4814	7am-7pm	5264	7am-7pm	7364	7am-7pm	8179
6am-10pm	5841	6am-10pm	6244	6am-10pm	8758	6am-10pm	9464
6am-12am	5974	6am-12am	6465	6am-12am	8924	6am-12am	9613
12am-12am	6164	12am-12am	6687	12am-12am	9168	12am-12am	9879
am Peak	07:00 am	am Peak	07:00 am	am Peak	07:00 am	am Peak	07:00 am
Peak Volume	587	Peak Volume	548	Peak Volume	830	Peak Volume	963
pm Peak	05:00 pm	pm Peak	05:00 pm	pm Peak	05:00 pm	Peak Factor	0.789
Peak Volume	613	Peak Volume	692	Peak Volume	1042	pm Peak	05:00 pm
						Peak Volume	1005
						Peak Factor	0.938

2012

2016

2019

12:00 am	28	12:00 am	20	12:00 am	14
01:00 am	11	01:00 am	8	01:00 am	8
02:00 am	5	02:00 am	4	02:00 am	2
03:00 am	3	03:00 am	16	03:00 am	6
04:00 am	19	04:00 am	40	04:00 am	30
05:00 am	46	05:00 am	118	05:00 am	53
06:00 am	104	06:00 am	320	06:00 am	146
07:00 am	266	07:00 am	416	07:00 am	370
08:00 am	347	08:00 am	332	08:00 am	444
09:00 am	331	09:00 am	354	09:00 am	400
10:00 am	388	10:00 am	402	10:00 am	379
11:00 am	411	11:00 am	466	11:00 am	411
12:00 pm	426	12:00 pm	432	12:00 pm	477
01:00 pm	440	01:00 pm	456	01:00 pm	469
02:00 pm	418	02:00 pm	528	02:00 pm	386
03:00 pm	440	03:00 pm	602	03:00 pm	455
04:00 pm	421	04:00 pm	580	04:00 pm	533
05:00 pm	480	05:00 pm	428	05:00 pm	593
06:00 pm	365	06:00 pm	360	06:00 pm	466
07:00 pm	237	07:00 pm	278	07:00 pm	337
08:00 pm	242	08:00 pm	164	08:00 pm	258
09:00 pm	123	09:00 pm	48	09:00 pm	125
10:00 pm	57	10:00 pm	40	10:00 pm	36
11:00 pm	52	11:00 pm	18	11:00 pm	29
7am-7pm	4733	7am-7pm	5356	7am-7pm	5383
6am-10pm	5439	6am-10pm	6166	6am-10pm	6249
6am-12am	5548	6am-12am	6224	6am-12am	6314
12am-12am	5660	12am-12am	6430	12am-12am	6427
am Peak	11:00 am	am Peak	11:00 am	am Peak	08:00 am
Peak Volume	411	Peak Volume	466	Peak Volume	444
pm Peak	05:00 pm	pm Peak	03:00 pm	pm Peak	05:00 pm
Peak Volume	480	Peak Volume	602	Peak Volume	593

2017

12:00 am	18
01:00 am	10
02:00 am	6
03:00 am	16
04:00 am	42
05:00 am	116
06:00 am	354
07:00 am	990
08:00 am	810
09:00 am	498
10:00 am	408
11:00 am	478
12:00 pm	498
01:00 pm	500
02:00 pm	554
03:00 pm	676
04:00 pm	882
05:00 pm	1104
06:00 pm	782
07:00 pm	366
08:00 pm	270
09:00 pm	168
10:00 pm	114
11:00 pm	42
7am-7pm	8180
6am-10pm	9338
6am-12am	9494
12am-12am	9702
am Peak	07:00 am
Peak Volume	990
pm Peak	05:00 pm
Peak Volume	1104

2010

2018

12:00 am	42	12:00 am	13
01:00 am	21	01:00 am	20
02:00 am	22	02:00 am	11
03:00 am	38	03:00 am	19
04:00 am	33	04:00 am	45
05:00 am	98	05:00 am	106
06:00 am	201	06:00 am	215
07:00 am	453	07:00 am	435
08:00 am	410	08:00 am	493
09:00 am	378	09:00 am	367
10:00 am	339	10:00 am	388
11:00 am	364	11:00 am	389
12:00 pm	368	12:00 pm	370
01:00 pm	383	01:00 pm	391
02:00 pm	394	02:00 pm	397
03:00 pm	455	03:00 pm	424
04:00 pm	467	04:00 pm	484
05:00 pm	537	05:00 pm	581
06:00 pm	393	06:00 pm	416
07:00 pm	291	07:00 pm	279
08:00 pm	208	08:00 pm	203
09:00 pm	135	09:00 pm	132
10:00 pm	97	10:00 pm	66
11:00 pm	66	11:00 pm	61
7am-7pm	4941	7am-7pm	5135
6am-10pm	5776	6am-10pm	5964
6am-12am	5939	6am-12am	6091
12am-12am	6193	12am-12am	6305
am Peak	07:00 am	am Peak	08:00 am
Peak Volume	453	Peak Volume	493
pm Peak	05:00 pm	pm Peak	05:00 pm
Peak Volume	537	Peak Volume	581

Appendix B  
Traffic Data Reports

# Greater Traffic Company

File Name : 21  
 Site Code : 00000000  
 Start Date : 5/2/2018  
 Page No : 1

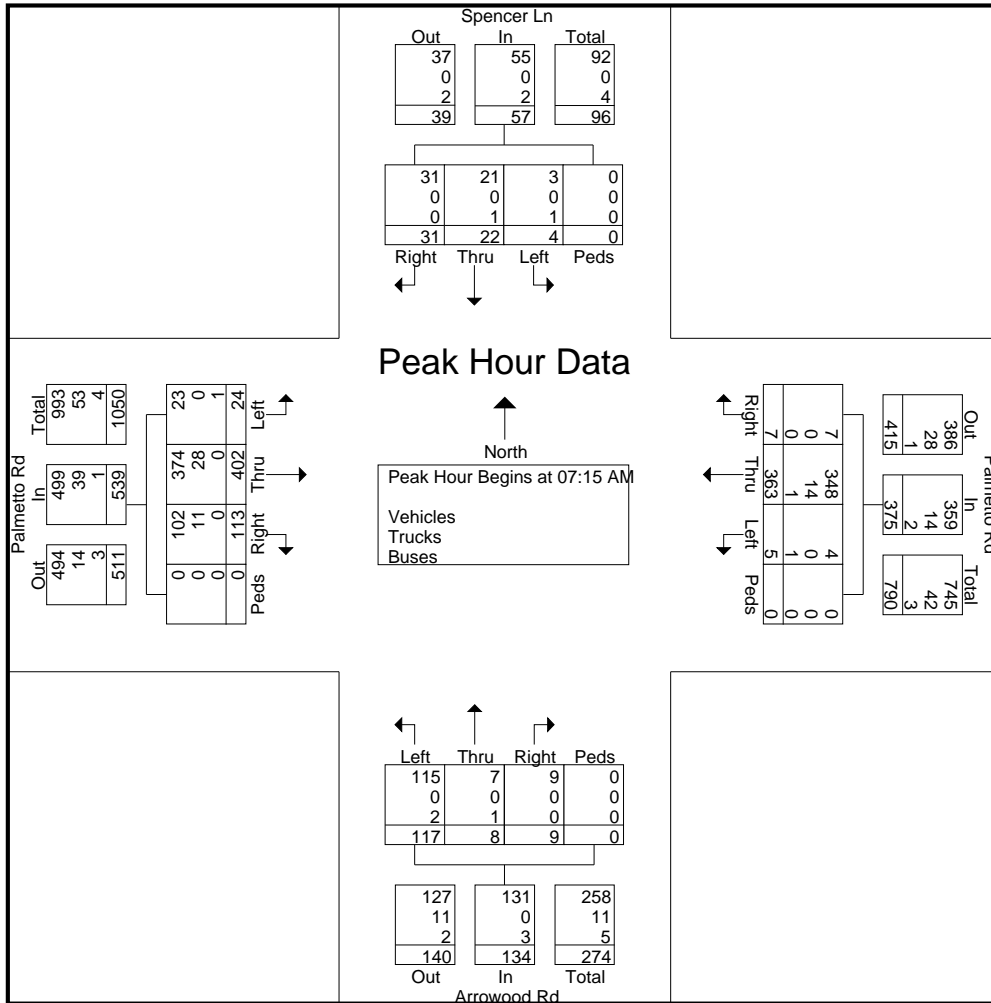
### Groups Printed- Vehicles - Trucks - Buses

Start Time	Arrowood Rd Northbound					Spencer Ln Southbound					Palmetto Rd Eastbound					Palmetto Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	24	1	2	0	27	1	0	9	0	10	2	76	17	0	95	0	76	0	0	76	208
07:15 AM	23	2	2	0	27	1	8	10	0	19	6	89	19	0	114	1	90	1	0	92	252
07:30 AM	38	1	3	0	42	0	4	10	0	14	3	112	19	0	134	0	107	3	0	110	300
07:45 AM	30	3	2	0	35	2	7	7	0	16	7	93	44	0	144	1	104	2	0	107	302
<b>Total</b>	115	7	9	0	131	4	19	36	0	59	18	370	99	0	487	2	377	6	0	385	1062
08:00 AM	26	2	2	0	30	1	3	4	0	8	8	108	31	0	147	3	62	1	0	66	251
08:15 AM	14	8	2	0	24	3	2	8	0	13	5	94	17	0	116	0	61	3	0	64	217
08:30 AM	18	5	1	0	24	7	4	7	0	18	7	90	18	0	115	1	46	0	0	47	204
08:45 AM	14	3	2	0	19	0	5	5	0	10	11	71	11	0	93	1	47	1	0	49	171
<b>Total</b>	72	18	7	0	97	11	14	24	0	49	31	363	77	0	471	5	216	5	0	226	843
*** BREAK ***																					
04:00 PM	16	9	1	0	26	3	12	10	0	25	9	67	19	0	95	3	77	2	0	82	228
04:15 PM	16	5	2	0	23	1	5	10	0	16	9	88	29	0	126	3	65	4	0	72	237
04:30 PM	27	4	1	0	32	3	6	11	0	20	15	64	18	0	97	2	95	1	0	98	247
04:45 PM	29	6	0	0	35	1	6	13	0	20	12	68	21	0	101	4	98	6	0	108	264
<b>Total</b>	88	24	4	0	116	8	29	44	0	81	45	287	87	0	419	12	335	13	0	360	976
05:00 PM	48	7	1	0	56	0	11	28	0	39	16	78	31	0	125	0	108	6	0	114	334
05:15 PM	20	11	0	0	31	2	12	23	0	37	12	76	22	0	110	4	121	4	0	129	307
05:30 PM	22	8	0	0	30	0	7	10	0	17	10	69	12	0	91	2	87	3	0	92	230
05:45 PM	15	5	2	0	22	3	7	13	0	23	10	78	36	0	124	3	70	1	0	74	243
<b>Total</b>	105	31	3	0	139	5	37	74	0	116	48	301	101	0	450	9	386	14	0	409	1114
<b>Grand Total</b>	380	80	23	0	483	28	99	178	0	305	142	1321	364	0	1827	28	1314	38	0	1380	3995
<b>Apprch %</b>	78.7	16.6	4.8	0	23	9.2	32.5	58.4	0	16	7.8	72.3	19.9	0	126	2	95.2	2.8	0	72	237
<b>Total %</b>	9.5	2	0.6	0	12.1	0.7	2.5	4.5	0	7.6	3.6	33.1	9.1	0	45.7	0.7	32.9	1	0	34.5	
<b>Vehicles</b>	367	79	23	0	469	26	97	178	0	301	141	1236	344	0	1721	27	1227	38	0	1292	3783
<b>% Vehicles</b>	96.6	98.8	100	0	97.1	92.9	98	100	0	98.7	99.3	93.6	94.5	0	94.2	96.4	93.4	100	0	93.6	94.7
<b>Trucks</b>	10	0	0	0	10	0	0	0	0	0	0	85	20	0	105	0	85	0	0	85	200
<b>% Trucks</b>	2.6	0	0	0	2.1	0	0	0	0	0	0	6.4	5.5	0	5.7	0	6.5	0	0	6.2	5
<b>Buses</b>	3	1	0	0	4	2	2	0	0	4	1	0	0	0	1	1	2	0	0	3	12
<b>% Buses</b>	0.8	1.2	0	0	0.8	7.1	2	0	0	1.3	0.7	0	0	0	0.1	3.6	0.2	0	0	0.2	0.3

# Greater Traffic Company

File Name : 21  
 Site Code : 00000000  
 Start Date : 5/2/2018  
 Page No : 2

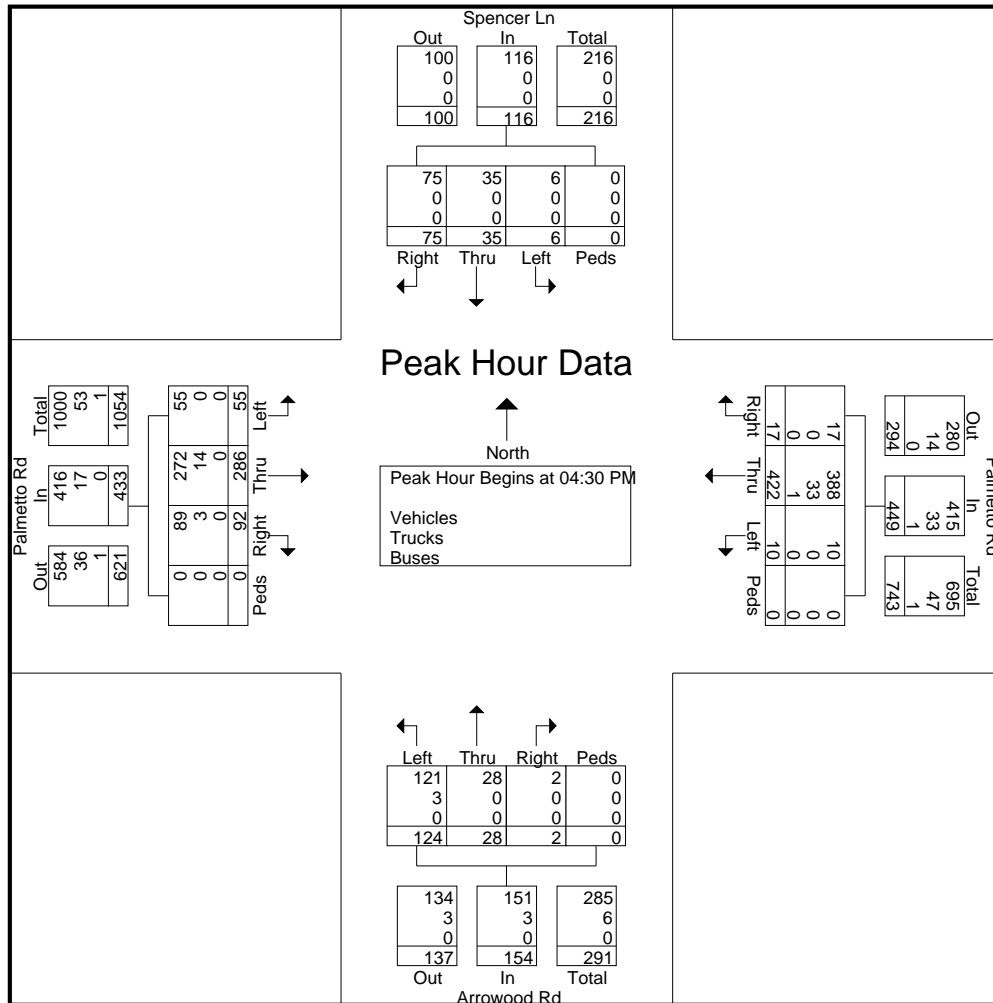
Start Time	Arrowood Rd Northbound					Spencer Ln Southbound					Palmetto Rd Eastbound					Palmetto Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	23	2	2	0	27	1	<b>8</b>	<b>10</b>	0	<b>19</b>	6	89	19	0	114	1	90	1	0	92	252
07:30 AM	<b>38</b>	1	<b>3</b>	0	<b>42</b>	0	4	10	0	14	3	<b>112</b>	19	0	134	0	<b>107</b>	<b>3</b>	0	<b>110</b>	300
07:45 AM	30	<b>3</b>	2	0	35	<b>2</b>	7	7	0	16	7	93	<b>44</b>	0	144	1	104	2	0	107	<b>302</b>
08:00 AM	26	2	2	0	30	1	3	4	0	8	<b>8</b>	108	31	0	<b>147</b>	<b>3</b>	62	1	0	66	251
Total Volume	117	8	9	0	134	4	22	31	0	57	24	402	113	0	539	5	363	7	0	375	1105
% App. Total	87.3	6	6.7	0		7	38.6	54.4	0		4.5	74.6	21	0		1.3	96.8	1.9	0		
PHF	.770	.667	.750	.000	.798	.500	.688	.775	.000	.750	.750	.897	.642	.000	.917	.417	.848	.583	.000	.852	.915
Vehicles	115	7	9	0	131	3	21	31	0	55	23	374	102	0	499	4	348	7	0	359	1044
% Vehicles																					
Trucks	0	0	0	0	0	0	0	0	0	0	0	28	11	0	39	0	14	0	0	14	53
% Trucks	0	0	0	0	0	0	0	0	0	0	0	7.0	9.7	0	7.2	0	3.9	0	0	3.7	4.8
Buses	2	1	0	0	3	1	1	0	0	2	1	0	0	0	1	1	1	0	0	2	8
% Buses	1.7	12.5	0	0	2.2	25.0	4.5	0	0	3.5	4.2	0	0	0	0.2	20.0	0.3	0	0	0.5	0.7



# Greater Traffic Company

File Name : 21  
 Site Code : 00000000  
 Start Date : 5/2/2018  
 Page No : 3

Start Time	Arrowood Rd Northbound					Spencer Ln Southbound					Palmetto Rd Eastbound					Palmetto Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	27	4	1	0	32	3	6	11	0	20	15	64	18	0	97	2	95	1	0	98	247
04:45 PM	29	6	0	0	35	1	6	13	0	20	12	68	21	0	101	4	98	6	0	108	264
05:00 PM	48	7	1	0	56	0	11	28	0	39	16	78	31	0	125	0	108	6	0	114	334
05:15 PM	20	11	0	0	31	2	12	23	0	37	12	76	22	0	110	4	121	4	0	129	307
Total Volume	124	28	2	0	154	6	35	75	0	116	55	286	92	0	433	10	422	17	0	449	1152
% App. Total	80.5	18.2	1.3	0		5.2	30.2	64.7	0		12.7	66.1	21.2	0		2.2	94	3.8	0		
PHF	.646	.636	.500	.000	.688	.500	.729	.670	.000	.744	.859	.917	.742	.000	.866	.625	.872	.708	.000	.870	.862
Vehicles	121	28	2	0	151	6	35	75	0	116	55	272	89	0	416	10	388	17	0	415	1098
% Vehicles																					
Trucks	3	0	0	0	3	0	0	0	0	0	0	14	3	0	17	0	33	0	0	33	53
% Trucks	2.4	0	0	0	1.9	0	0	0	0	0	0	4.9	3.3	0	3.9	0	7.8	0	0	7.3	4.6
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.2	0.1





## MetroCount Traffic Executive Daily Classes by Direction

### DayClassSplit-67 -- English (ENU)

#### Datasets:

**Site:** [] Tyrone Road  
**Attribute:** Tyrone Rd at Briarwood Rd  
**Direction:** 8 - East bound A>B, West bound B>A. **Lane:** 0  
**Survey Duration:** 8:24 Tuesday, May 08, 2018 => 13:53 Friday, May 11, 2018,  
**Zone:**  
**File:** Tyrone Rd at Briarwood 1.EC0 (Plus )  
**Identifier:** JG353AN2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:00 Tuesday, May 08, 2018 => 11:00 Friday, May 11, 2018 (2.83333)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 6 - 99 mph.  
**Direction:** North, East, South, West (bound), P = East  
**Separation:** Headway > 0 sec, Span 0 - 328.084 ft  
**Name:** Default Profile  
**Scheme:** Vehicle classification (Scheme F3)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 28248 / 29696 (95.12%)

## Daily Classes by Direction

**DayClassSplit-67**

**Site:** .0.1EW

**Description:** Tyrone Road

**Filter time:** 15:00 Tuesday, May 08, 2018 => 11:00 Friday, May 11, 2018

**Scheme:** Vehicle classification (Scheme F3)

**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13 ) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Monday, May 07, 2018

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
<b>Mon*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>AB</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>AB%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>BA</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BA%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Tue*</b>	19	3312	876	19	138	39	0	2	10	2	0	0	0	4417
(%)	0.4	75.0	19.8	0.4	3.1	0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0	
<b>AB</b>	10	1668	418	8	58	17	0	0	7	0	0	0	0	2186
<b>AB%</b>	52.6	50.4	47.7	42.1	42.0	43.6	0.0	0.0	70.0	0.0	0.0	0.0	0.0	49.5
<b>BA</b>	9	1644	458	11	80	22	0	2	3	2	0	0	0	2231
<b>BA%</b>	47.4	49.6	52.3	57.9	58.0	56.4	0.0	100.0	30.0	100.0	0.0	0.0	0.0	50.5
<b>Wed</b>	51	7508	2087	77	290	104	3	8	67	1	0	0	2	10198
(%)	0.5	73.6	20.5	0.8	2.8	1.0	0.0	0.1	0.7	0.0	0.0	0.0	0.0	
<b>AB</b>	29	3719	1014	35	144	49	2	2	24	1	0	0	2	5021
<b>AB%</b>	56.9	49.5	48.6	45.5	49.7	47.1	66.7	25.0	35.8	100.0	0.0	0.0	100.0	49.2
<b>BA</b>	22	3789	1073	42	146	55	1	6	43	0	0	0	0	5177
<b>BA%</b>	43.1	50.5	51.4	54.5	50.3	52.9	33.3	75.0	64.2	0.0	0.0	0.0	0.0	50.8
<b>Thu</b>	57	7517	2051	75	327	174	9	6	79	5	0	0	3	10303
(%)	0.6	73.0	19.9	0.7	3.2	1.7	0.1	0.1	0.8	0.0	0.0	0.0	0.0	
<b>AB</b>	30	3713	1014	32	151	87	9	3	32	2	0	0	1	5074
<b>AB%</b>	52.6	49.4	49.4	42.7	46.2	50.0	100.0	50.0	40.5	40.0	0.0	0.0	33.3	49.2
<b>BA</b>	27	3804	1037	43	176	87	0	3	47	3	0	0	2	5229
<b>BA%</b>	47.4	50.6	50.6	57.3	53.8	50.0	0.0	50.0	59.5	60.0	0.0	0.0	66.7	50.8
<b>Fri*</b>	14	2361	739	24	94	55	2	4	34	1	0	0	2	3330
(%)	0.4	70.9	22.2	0.7	2.8	1.7	0.1	0.1	1.0	0.0	0.0	0.0	0.1	
<b>AB</b>	8	1182	362	12	43	28	2	3	14	0	0	0	0	1654
<b>AB%</b>	57.1	50.1	49.0	50.0	45.7	50.9	100.0	75.0	41.2	0.0	0.0	0.0	0.0	49.7
<b>BA</b>	6	1179	377	12	51	27	0	1	20	1	0	0	2	1676
<b>BA%</b>	42.9	49.9	51.0	50.0	54.3	49.1	0.0	25.0	58.8	100.0	0.0	0.0	100.0	50.3
<b>Sat*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>AB</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>AB%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>BA</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BA%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Sun*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>AB</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>AB%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>BA</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BA%</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Average daily volume**

**Entire week**

	53	7512	2069	75	308	139	5	6	73	2	0	0	2	10250
(%)	0.5	73.3	20.2	0.7	3.0	1.4	0.0	0.1	0.7	0.0	0.0	0.0	0.0	
<b>AB</b>	29	3716	1014	33	147	68	5	2	28	1	0	0	1	5047
<b>AB%</b>	54.7	49.5	49.0	44.0	47.7	48.9	100.0	33.3	38.4	50.0	0.0	0.0	50.0	49.2
<b>BA</b>	24	3796	1055	42	161	71	0	4	45	1	0	0	1	5203
<b>BA%</b>	45.3	50.5	51.0	56.0	52.3	51.1	0.0	66.7	61.6	50.0	0.0	0.0	50.0	50.8

**Weekdays**

	53	7512	2069	75	308	139	5	6	73	2	0	0	2	10250
(%)	0.5	73.3	20.2	0.7	3.0	1.4	0.0	0.1	0.7	0.0	0.0	0.0	0.0	
<b>AB</b>	29	3716	1014	33	147	68	5	2	28	1	0	0	1	5047
<b>AB%</b>	54.7	49.5	49.0	44.0	47.7	48.9	100.0	33.3	38.4	50.0	0.0	0.0	50.0	49.2
<b>BA</b>	24	3796	1055	42	161	71	0	4	45	1	0	0	1	5203
<b>BA%</b>	45.3	50.5	51.0	56.0	52.3	51.1	0.0	66.7	61.6	50.0	0.0	0.0	50.0	50.8

**Weekend** No complete days.

\* - Incomplete

## MetroCount Traffic Executive Vehicle Counts

### VehicleCount-69 -- English (ENU)

#### Datasets:

**Site:** [] Tyrone Road  
**Attribute:** Tyrone Rd at Briarwood Rd  
**Direction:** 8 - East bound A>B, West bound B>A. **Lane:** 0  
**Survey Duration:** 8:24 Tuesday, May 08, 2018 => 13:53 Friday, May 11, 2018,  
**Zone:**  
**File:** Tyrone Rd at Briarwood 1.EC0 (Plus )  
**Identifier:** JG353AN2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:00 Tuesday, May 08, 2018 => 11:00 Friday, May 11, 2018 (2.83333)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 6 - 99 mph.  
**Direction:** East (bound), P = East  
**Separation:** Headway > 0 sec, Span 0 - 328.084 ft  
**Name:** Default Profile  
**Scheme:** Vehicle classification (Scheme F3)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 13935 / 29696 (46.93%)

**\* Tuesday, May 08, 2018 - Total=2186 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	347	429	581	371	191	126	79	35	27	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	95	134	131	54	37	22	11	7	10
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97	101	152	90	38	31	25	11	6	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84	98	151	82	56	34	22	7	5	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	135	144	68	43	24	10	6	9	2

**\* Wednesday, May 09, 2018 - Total=5021, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
18	6	6	7	29	57	210	416	451	320	231	237	265	283	289	330	419	546	416	190	109	82	63	41	
10	2	1	1	5	8	32	71	130	87	55	65	78	72	71	64	99	117	129	55	33	27	20	8	9
3	0	4	2	5	13	34	103	110	84	61	60	50	70	67	79	92	152	107	43	23	16	12	12	1
3	2	1	3	8	19	64	134	118	70	61	59	68	67	79	94	100	137	100	35	35	13	18	6	2
2	2	0	1	11	17	80	108	93	79	54	53	69	74	72	93	128	140	80	57	18	26	13	15	3

AM Peak 0730 - 0830 (482), AM PHF=0.90 PM Peak 1715 - 1815 (558), PM PHF=0.92

**\* Thursday, May 10, 2018 - Total=5074, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
15	13	7	10	23	73	188	442	467	290	258	258	252	252	284	379	382	532	420	205	146	98	42	38	
9	4	0	0	2	12	35	83	142	82	64	80	62	69	61	87	85	124	125	64	35	24	11	7	7
1	6	4	3	5	13	30	104	130	68	69	55	60	63	70	85	111	133	117	52	48	29	7	4	3
2	2	2	3	5	24	63	120	103	72	61	74	59	60	63	105	79	151	118	52	39	26	13	14	4
3	1	1	4	11	24	60	135	92	68	64	49	71	60	90	102	107	124	60	37	24	19	11	13	6

AM Peak 0730 - 0830 (527), AM PHF=0.93 PM Peak 1715 - 1815 (533), PM PHF=0.88

**\* Friday, May 11, 2018 - Total=1654 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
20	13	8	12	22	74	193	392	400	284	236	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	5	1	2	4	13	26	56	124	76	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	2	3	5	4	13	42	97	109	55	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	2	3	2	4	19	54	119	88	81	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	4	1	3	10	29	71	120	79	72	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#

## MetroCount Traffic Executive Vehicle Counts

### VehicleCount-70 -- English (ENU)

#### Datasets:

**Site:** [] Tyrone Road  
**Attribute:** Tyrone Rd at Briarwood Rd  
**Direction:** 8 - East bound A>B, West bound B>A. **Lane:** 0  
**Survey Duration:** 8:24 Tuesday, May 08, 2018 => 13:53 Friday, May 11, 2018,  
**Zone:**  
**File:** Tyrone Rd at Briarwood 1.EC0 (Plus )  
**Identifier:** JG353AN2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:00 Tuesday, May 08, 2018 => 11:00 Friday, May 11, 2018 (2.83333)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 6 - 99 mph.  
**Direction:** West (bound), P = East  
**Separation:** Headway > 0 sec, Span 0 - 328.084 ft  
**Name:** Default Profile  
**Scheme:** Vehicle classification (Scheme F3)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 14313 / 29696 (48.20%)

**\* Tuesday, May 08, 2018 - Total=2231 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	337	405	521	331	241	196	111	68	21	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	87	129	93	75	51	29	29	5	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76	89	148	78	68	41	25	21	8	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82	100	132	88	45	49	33	9	5	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89	129	112	72	53	55	24	9	3	3

**\* Wednesday, May 09, 2018 - Total=5177, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
19	8	8	10	21	69	257	590	375	221	222	228	289	270	317	341	416	550	330	223	192	128	65	28	
5	4	3	4	5	11	43	126	105	62	61	57	78	66	77	88	77	150	92	51	56	45	22	8	7
6	1	0	1	2	13	48	128	114	48	66	57	71	64	75	76	94	155	79	59	55	30	16	11	9
5	3	1	1	8	26	79	173	88	60	49	62	72	77	78	88	119	120	94	64	37	33	16	5	5
3	0	4	4	6	19	87	163	68	51	46	52	68	63	87	89	126	125	65	49	44	20	11	4	3

AM Peak 0700 - 0800 (590), AM PHF=0.85 PM Peak 1645 - 1745 (551), PM PHF=0.89

**\* Thursday, May 10, 2018 - Total=5229, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
24	12	10	11	31	75	256	587	392	250	211	250	263	297	294	343	408	531	333	228	214	113	68	28	
7	3	4	3	5	16	43	132	107	64	38	69	56	70	81	64	105	155	85	61	42	32	18	7	4
9	5	3	3	3	14	60	129	110	65	50	74	73	77	77	92	90	131	102	62	65	30	22	7	6
5	3	1	2	14	23	68	174	98	59	67	53	77	72	73	79	113	130	82	61	57	33	15	5	3
3	1	2	3	9	22	85	152	77	62	56	54	57	78	63	108	100	115	64	44	50	18	13	9	4

AM Peak 0700 - 0800 (587), AM PHF=0.84 PM Peak 1700 - 1800 (531), PM PHF=0.86

**\* Friday, May 11, 2018 - Total=1676 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
17	13	9	6	24	75	226	509	328	216	253	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	1	2	2	4	8	30	92	108	60	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1	2	0	5	16	52	119	103	47	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	1	1	9	33	60	159	69	56	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	8	4	3	6	18	84	139	48	53	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#

## MetroCount Traffic Executive Vehicle Counts

### VehicleCount-68 -- English (ENU)

#### Datasets:

**Site:** [] Tyrone Road  
**Attribute:** Tyrone Rd at Briarwood Rd  
**Direction:** 8 - East bound A>B, West bound B>A. **Lane:** 0  
**Survey Duration:** 8:24 Tuesday, May 08, 2018 => 13:53 Friday, May 11, 2018,  
**Zone:**  
**File:** Tyrone Rd at Briarwood 1.EC0 (Plus )  
**Identifier:** JG353AN2 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:00 Tuesday, May 08, 2018 => 11:00 Friday, May 11, 2018 (2.83333)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  
**Speed range:** 6 - 99 mph.  
**Direction:** North, East, South, West (bound), P = East  
**Separation:** Headway > 0 sec, Span 0 - 328.084 ft  
**Name:** Default Profile  
**Scheme:** Vehicle classification (Scheme F3)  
**Units:** Non metric (ft, mi, ft/s, mph, lb, ton)  
**In profile:** Vehicles = 28248 / 29696 (95.12%)

\* **Tuesday, May 08, 2018 - Total=4417 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	684	834	1102	702	432	322	190	103	48	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	161	182	263	224	129	88	51	40	12	15
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	173	190	300	168	106	72	50	32	14	9
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	166	198	283	170	101	83	55	16	10	8
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	184	264	256	140	96	79	34	15	12	5

\* **Wednesday, May 09, 2018 - Total=10198, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
37	14	14	17	50	126	467	1006	826	541	453	465	554	553	606	671	835	1096	746	413	301	210	128	69	
15	6	4	5	10	19	75	197	235	149	116	122	156	138	148	152	176	267	221	106	89	72	42	16	16
9	1	4	3	7	26	82	231	224	132	127	117	121	134	142	155	186	307	186	102	78	46	28	23	10
8	5	2	4	16	45	143	307	206	130	110	121	140	144	157	182	219	257	194	99	72	46	34	11	7
5	2	4	5	17	36	167	271	161	130	100	105	137	137	159	182	254	265	145	106	62	46	24	19	6

AM Peak 0715 - 0815 (1044), AM PHF=0.85 PM Peak 1700 - 1800 (1096), PM PHF=0.89

\* **Thursday, May 10, 2018 - Total=10303, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
39	25	17	21	54	148	444	1029	859	540	469	508	515	549	578	722	790	1063	753	433	360	211	110	66	
16	7	4	3	7	28	78	215	249	146	102	149	118	139	142	151	190	279	210	125	77	56	29	14	11
10	11	7	6	8	27	90	233	240	133	119	129	133	140	147	177	201	264	219	114	113	59	29	11	9
7	5	3	5	19	47	131	294	201	131	128	127	136	132	136	184	192	281	200	113	96	59	28	19	7
6	2	3	7	20	46	145	287	169	130	120	103	128	138	153	210	207	239	124	81	74	37	24	22	10

AM Peak 0730 - 0830 (1070), AM PHF=0.91 PM Peak 1700 - 1800 (1063), PM PHF=0.95

\* **Friday, May 11, 2018 - Total=3330 (Incomplete) , 15 minute drops**

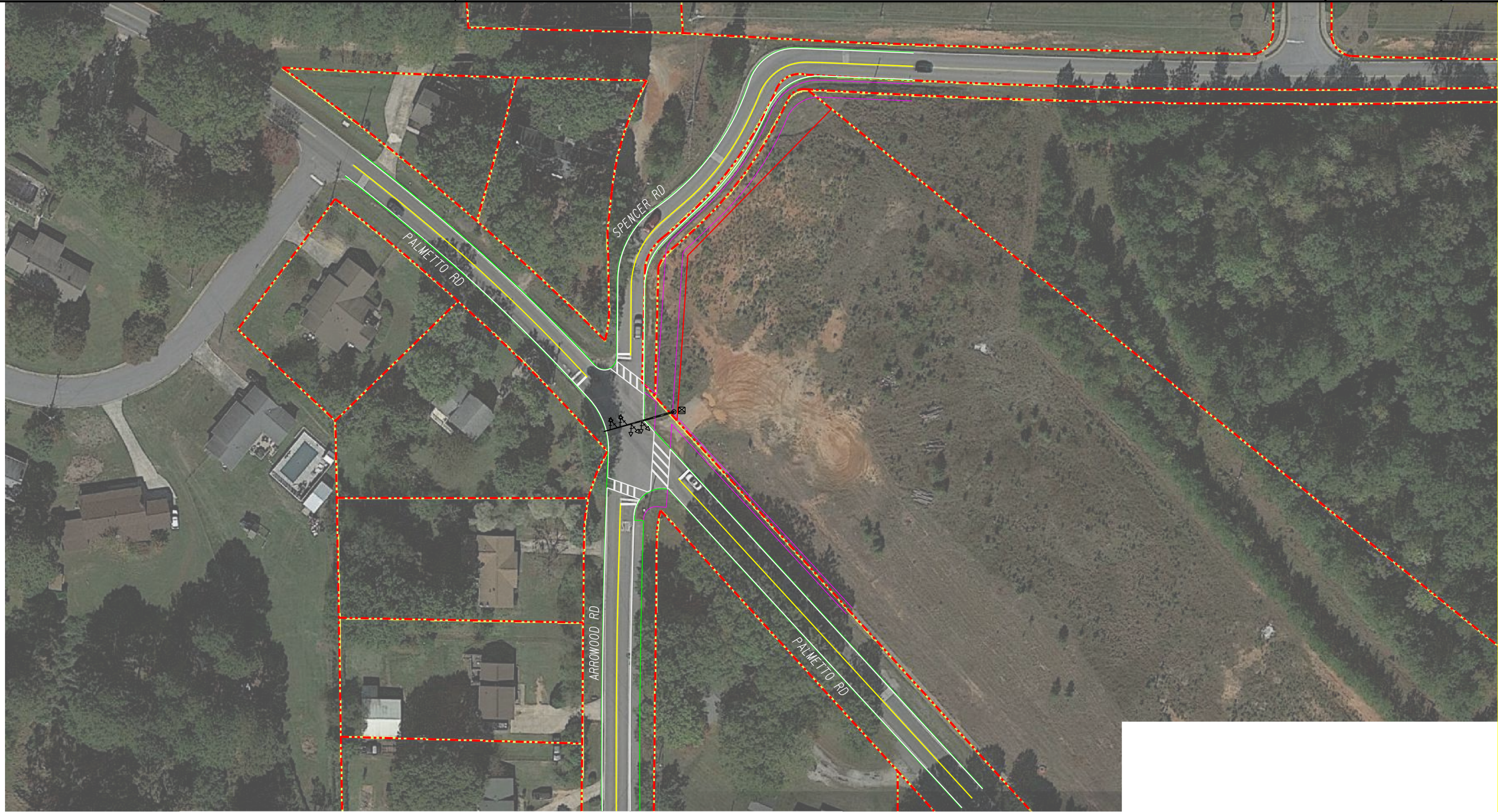
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37	26	17	18	46	149	419	901	728	500	489	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	6	3	4	8	21	56	148	232	136	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	3	5	5	9	29	94	216	212	102	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	5	4	3	13	52	114	278	157	137	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	12	5	6	16	47	155	259	127	125	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#



Appendix C  
Improvement Alternative Concepts



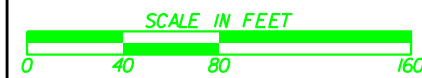
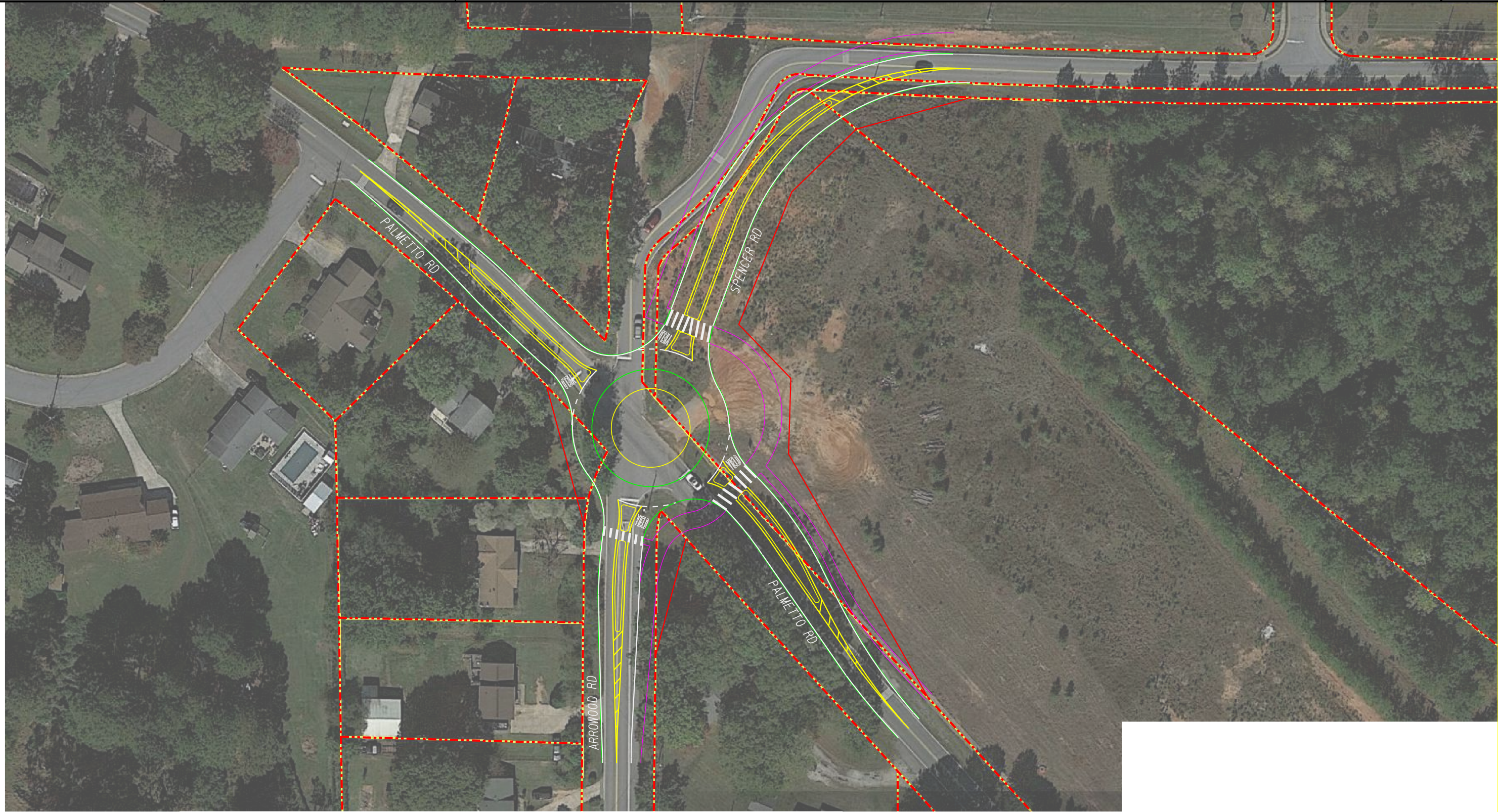


REVISION DATES	

**IMPROVEMENT CONCEPTS**  
TRAFFIC SIGNAL  
(GEOMETRY AS IS)

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	27-
CORRECTED:	DATE:	
VERIFIED:	DATE:	





REVISION DATES

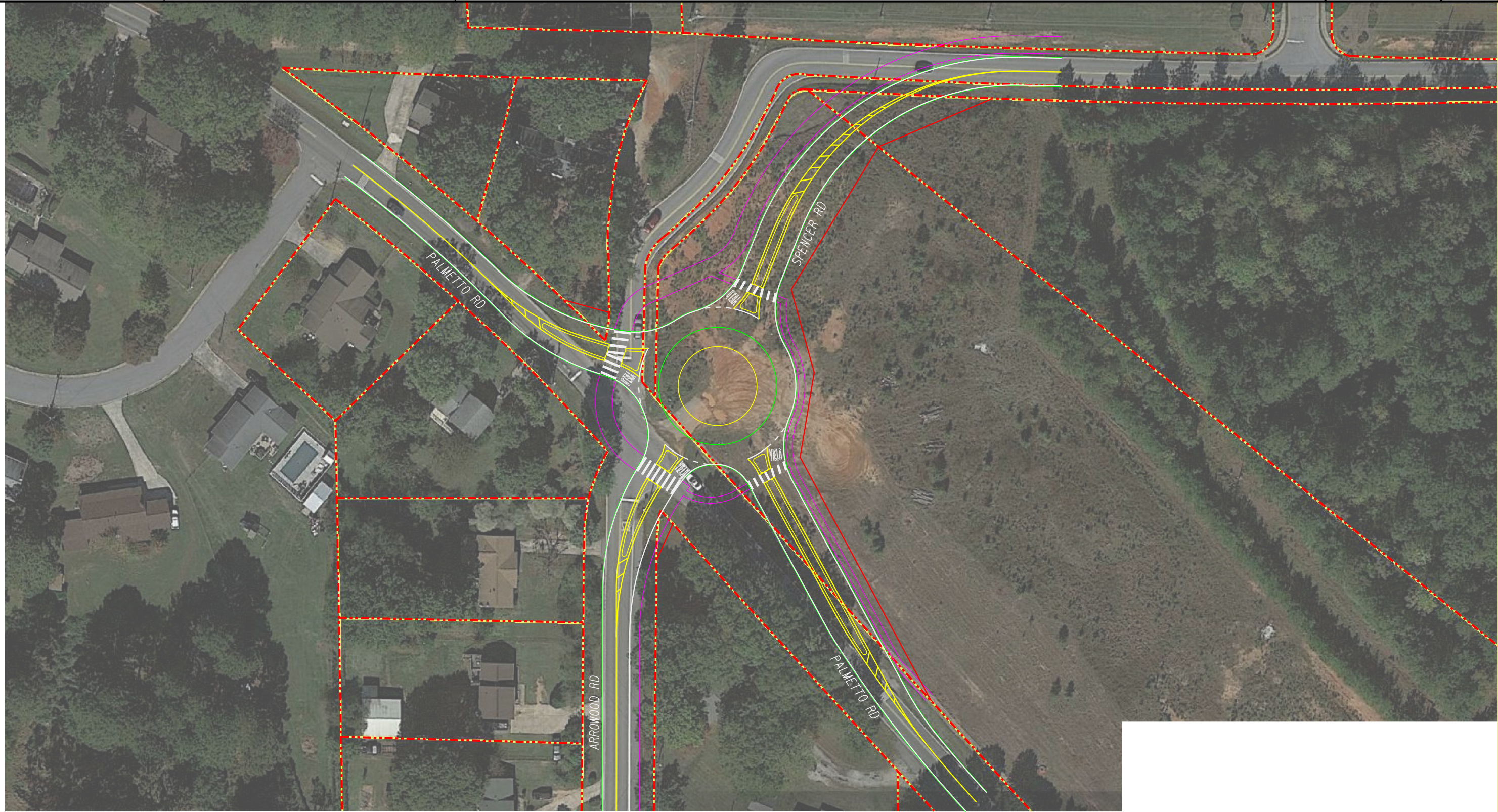
NO.	DATE	DESCRIPTION

IMPROVEMENT CONCEPTS

ROUNDABOUT

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	27-
CORRECTED:	DATE:	
VERIFIED:	DATE:	





REVISION DATES	

**IMPROVEMENT CONCEPTS**  
**ROUNDABOUT (SHIFTED NE)**

















CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	27-
CORRECTED:	DATE:	
VERIFIED:	DATE:	



Appendix D  
Capacity Analysis Reports

Lanes, Volumes, Timings  
1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2022)  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	418	118	5	378	7	122	8	9	4	23	32
Future Volume (vph)	25	418	118	5	378	7	122	8	9	4	23	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	135		0	135		0	135		0	135		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1779	0	0	1825	0	0	1701	0	0	1638	0
Flt Permitted		0.971			0.993			0.707			0.971	
Satd. Flow (perm)	0	1730	0	0	1814	0	0	1255	0	0	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			2			4			35	
Link Speed (mph)		35			35			35			30	
Link Distance (ft)		412			406			299			330	
Travel Time (s)		8.0			7.9			5.8			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	20%	0%	0%	2%	13%	0%	25%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	609	0	0	424	0	0	152	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		25.9			25.9			11.3			10.8	
Actuated g/C Ratio		0.58			0.58			0.26			0.24	
v/c Ratio		0.60			0.40			0.47			0.15	
Control Delay		11.8			9.3			21.1			10.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.8			9.3			21.1			10.2	
LOS		B			A			C			B	
Approach Delay		11.8			9.3			21.1			10.2	
Approach LOS		B			A			C			B	
Queue Length 50th (ft)		101			63			27			5	
Queue Length 95th (ft)		250			152			97			34	
Internal Link Dist (ft)		332			326			219			250	
Turn Bay Length (ft)												
Base Capacity (vph)		1674			1754			727			937	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

M&W

Synchro 10 Report

Lanes, Volumes, Timings  
 1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2022)  
 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.36			0.24			0.21			0.07	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	44.3
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	12.0
Intersection LOS:	B
Intersection Capacity Utilization	68.9%
ICU Level of Service	C
Analysis Period (min)	15

















Splits and Phases: 1: Arrowood Rd/Spencer Rd & Palmetto Rd



Lanes, Volumes, Timings  
1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2022)

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	298	96	10	439	18	129	29	2	6	36	78
Future Volume (vph)	57	298	96	10	439	18	129	29	2	6	36	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	135		0	135		0	135		0	135		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1705	0	0	1698	0	0	1735	0	0	1672	0
Flt Permitted		0.889			0.985			0.676			0.979	
Satd. Flow (perm)	0	1525	0	0	1674	0	0	1221	0	0	1640	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			4			1			91	
Link Speed (mph)		35			35			35			30	
Link Distance (ft)		412			406			299			330	
Travel Time (s)		8.0			7.9			5.8			7.5	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	5%	3%	0%	8%	0%	2%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	0	543	0	0	186	0	0	140	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effect Green (s)		21.9			21.9			13.0			13.0	
Actuated g/C Ratio		0.46			0.46			0.27			0.27	
v/c Ratio		0.74			0.71			0.56			0.27	
Control Delay		17.6			16.5			23.4			8.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.6			16.5			23.4			8.8	
LOS		B			B			C			A	
Approach Delay		17.6			16.5			23.4			8.8	
Approach LOS		B			B			C			A	
Queue Length 50th (ft)		94			100			37			9	
Queue Length 95th (ft)		228			232			118			49	
Internal Link Dist (ft)		332			326			219			250	
Turn Bay Length (ft)												
Base Capacity (vph)		1445			1585			709			990	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

M&W

Synchro 10 Report



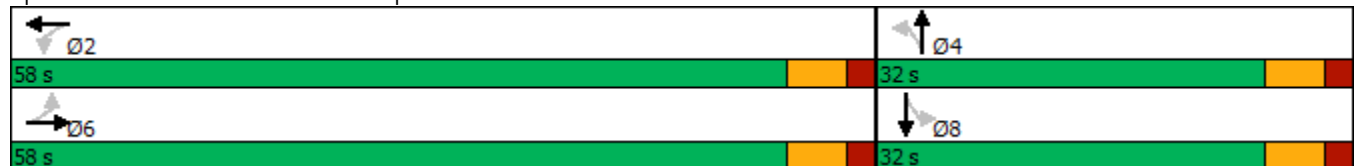
Lanes, Volumes, Timings  
 1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2022)  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.36			0.34			0.26			0.14	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	47.7
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	17.0
Intersection LOS:	B
Intersection Capacity Utilization	78.6%
ICU Level of Service	D
Analysis Period (min)	15

















Splits and Phases: 1: Arrowood Rd/Spencer Rd & Palmetto Rd



Lanes, Volumes, Timings  
1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2042)

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	510	143	6	461	9	149	10	11	5	28	39
Future Volume (vph)	30	510	143	6	461	9	149	10	11	5	28	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	135		0	135		0	135		0	135		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1779	0	0	1824	0	0	1701	0	0	1637	0
Flt Permitted		0.965			0.990			0.698			0.975	
Satd. Flow (perm)	0	1720	0	0	1808	0	0	1239	0	0	1601	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			2			4			42	
Link Speed (mph)		35			35			35			30	
Link Distance (ft)		412			406			299			330	
Travel Time (s)		8.0			7.9			5.8			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	20%	0%	0%	2%	13%	0%	25%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	742	0	0	518	0	0	185	0	0	77	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	63.0	63.0		63.0	63.0		27.0	27.0		27.0	27.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		30.7			30.7			13.3			13.3	
Actuated g/C Ratio		0.54			0.54			0.23			0.23	
v/c Ratio		0.79			0.53			0.63			0.19	
Control Delay		17.4			10.9			31.2			12.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.4			10.9			31.2			12.7	
LOS		B			B			C			B	
Approach Delay		17.4			10.9			31.2			12.7	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		158			92			46			8	
Queue Length 95th (ft)		373			210			146			46	
Internal Link Dist (ft)		332			326			219			250	
Turn Bay Length (ft)												
Base Capacity (vph)		1588			1667			486			651	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

M&W

Synchro 10 Report

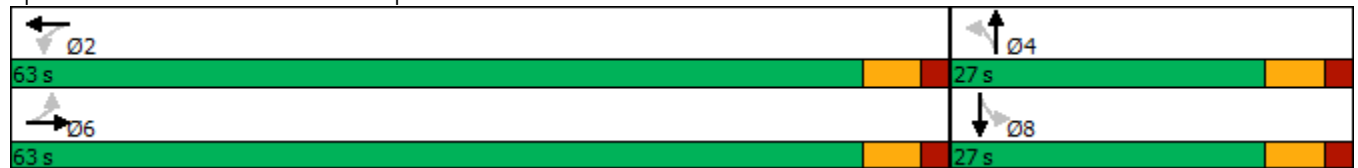
Lanes, Volumes, Timings  
 1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2042)  
 AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.47			0.31			0.38			0.12	

















Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	56.6
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	16.6
Intersection LOS:	B
Intersection Capacity Utilization	80.1%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 1: Arrowood Rd/Spencer Rd & Palmetto Rd



Lanes, Volumes, Timings  
1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2042)  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	363	117	13	536	22	157	36	3	8	88	95
Future Volume (vph)	70	363	117	13	536	22	157	36	3	8	88	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	135		0	135		0	135		0	135		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1705	0	0	1698	0	0	1734	0	0	1710	0
Flt Permitted		0.853			0.982			0.636			0.984	
Satd. Flow (perm)	0	1464	0	0	1669	0	0	1147	0	0	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			4			1			57	
Link Speed (mph)		35			35			35			30	
Link Distance (ft)		412			406			299			330	
Travel Time (s)		8.0			7.9			5.8			7.5	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	5%	3%	0%	8%	0%	2%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	639	0	0	664	0	0	228	0	0	221	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	57.0	57.0		57.0	57.0		33.0	33.0		33.0	33.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effect Green (s)		31.1			31.1			19.8			19.8	
Actuated g/C Ratio		0.48			0.48			0.31			0.31	
v/c Ratio		0.89			0.82			0.64			0.40	
Control Delay		30.1			23.6			31.9			17.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.1			23.6			31.9			17.6	
LOS		C			C			C			B	
Approach Delay		30.1			23.6			31.9			17.6	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)		197			200			75			48	
Queue Length 95th (ft)		364			352			184			127	
Internal Link Dist (ft)		332			326			219			250	
Turn Bay Length (ft)												
Base Capacity (vph)		1174			1333			537			820	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

M&W

Synchro 10 Report

Lanes, Volumes, Timings  
 1: Arrowood Rd/Spencer Rd & Palmetto Rd

Build, Signal, No Turn Lanes (2042)  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.54			0.50			0.42			0.27	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	64.2
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	26.3
Intersection LOS:	C
Intersection Capacity Utilization	100.8%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 1: Arrowood Rd/Spencer Rd & Palmetto Rd



# MOVEMENT SUMMARY

 Site: [Palmetto Rd Roundabout - AM (2022)]

Site Category: -  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Arrowood Road												
3	L2	133	2.0	0.205	7.2	LOS A	1.1	29.0	0.63	0.54	0.63	31.0
8	T1	9	13.0	0.205	7.9	LOS A	1.1	29.0	0.63	0.54	0.63	30.9
18	R2	10	0.0	0.205	7.0	LOS A	1.1	29.0	0.63	0.54	0.63	30.6
Approach		151	2.5	0.205	7.2	LOS A	1.1	29.0	0.63	0.54	0.63	31.0
East: Palmetto Road												
1	L2	5	20.0	0.425	9.2	LOS A	3.1	77.3	0.52	0.35	0.52	31.3
6	T1	411	0.0	0.425	8.4	LOS A	3.1	77.3	0.52	0.35	0.52	32.2
16	R2	8	0.0	0.425	8.4	LOS A	3.1	77.3	0.52	0.35	0.52	31.6
Approach		424	0.3	0.425	8.4	LOS A	3.1	77.3	0.52	0.35	0.52	32.1
North: Spencer Road												
7	L2	4	25.0	0.095	8.1	LOS A	0.5	13.1	0.64	0.52	0.64	32.0
4	T1	25	5.0	0.095	6.5	LOS A	0.5	13.1	0.64	0.52	0.64	32.9
14	R2	35	0.0	0.095	6.1	LOS A	0.5	13.1	0.64	0.52	0.64	32.4
Approach		64	3.6	0.095	6.4	LOS A	0.5	13.1	0.64	0.52	0.64	32.6
West: Palmetto Road												
5	L2	27	4.0	0.527	9.3	LOS A	5.0	125.2	0.30	0.12	0.30	31.5
2	T1	454	0.0	0.527	9.2	LOS A	5.0	125.2	0.30	0.12	0.30	31.8
12	R2	128	0.0	0.527	9.2	LOS A	5.0	125.2	0.30	0.12	0.30	31.2
Approach		610	0.2	0.527	9.2	LOS A	5.0	125.2	0.30	0.12	0.30	31.6
All Vehicles		1249	0.7	0.527	8.5	LOS A	5.0	125.2	0.43	0.27	0.43	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: MALDINO & WILBURN | Processed: Wednesday, November 4, 2020 2:13:07 PM

Project: P:\20-22 Tyrone, Palmetto at Arrowood & Spencer\Roundabout Analysis\Sidra.sip8

# MOVEMENT SUMMARY

 Site: [Palmetto Rd Roundabout -PM (2022)]

Site Category: -  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Arrowood Road												
3	L2	150	2.0	0.241	7.4	LOS A	1.4	34.8	0.62	0.52	0.62	31.1
8	T1	34	0.0	0.241	7.3	LOS A	1.4	34.8	0.62	0.52	0.62	31.3
18	R2	2	0.0	0.241	7.3	LOS A	1.4	34.8	0.62	0.52	0.62	30.7
Approach		186	1.6	0.241	7.4	LOS A	1.4	34.8	0.62	0.52	0.62	31.1
East: Palmetto Road												
1	L2	12	0.0	0.642	14.4	LOS B	8.2	216.1	0.76	0.74	1.01	29.3
6	T1	510	8.0	0.642	14.8	LOS B	8.2	216.1	0.76	0.74	1.01	29.3
16	R2	21	0.0	0.642	14.4	LOS B	8.2	216.1	0.76	0.74	1.01	28.9
Approach		543	7.5	0.642	14.8	LOS B	8.2	216.1	0.76	0.74	1.01	29.3
North: Spencer Road												
7	L2	7	0.0	0.245	9.6	LOS A	1.5	38.0	0.79	0.74	0.79	31.4
4	T1	42	0.0	0.245	9.6	LOS A	1.5	38.0	0.79	0.74	0.79	31.5
14	R2	91	0.0	0.245	9.6	LOS A	1.5	38.0	0.79	0.74	0.79	31.0
Approach		140	0.0	0.245	9.6	LOS A	1.5	38.0	0.79	0.74	0.79	31.2
West: Palmetto Road												
5	L2	66	0.0	0.486	8.7	LOS A	4.3	109.7	0.37	0.17	0.37	31.6
2	T1	347	5.0	0.486	8.9	LOS A	4.3	109.7	0.37	0.17	0.37	31.6
12	R2	112	3.0	0.486	8.8	LOS A	4.3	109.7	0.37	0.17	0.37	31.1
Approach		524	3.9	0.486	8.9	LOS A	4.3	109.7	0.37	0.17	0.37	31.5
All Vehicles		1393	4.6	0.642	11.0	LOS B	8.2	216.1	0.60	0.50	0.69	30.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: MALDINO & WILBURN | Processed: Wednesday, November 4, 2020 2:13:08 PM

Project: P:\20-22 Tyrone, Palmetto at Arrowood & Spencer\Roundabout Analysis\Sidra.sip8

# MOVEMENT SUMMARY

 Site: [Palmetto Rd Roundabout - AM (2042)]

Site Category: -  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Arrowood Road												
3	L2	162	2.0	0.283	9.1	LOS A	1.7	43.1	0.73	0.67	0.73	30.2
8	T1	11	13.0	0.283	10.0	LOS A	1.7	43.1	0.73	0.67	0.73	30.1
18	R2	12	0.0	0.283	8.9	LOS A	1.7	43.1	0.73	0.67	0.73	29.9
Approach		185	2.5	0.283	9.1	LOS A	1.7	43.1	0.73	0.67	0.73	30.2
East: Palmetto Road												
1	L2	7	20.0	0.542	11.8	LOS B	4.4	111.2	0.64	0.47	0.64	30.3
6	T1	501	0.0	0.542	10.8	LOS B	4.4	111.2	0.64	0.47	0.64	31.1
16	R2	10	0.0	0.542	10.8	LOS B	4.4	111.2	0.64	0.47	0.64	30.5
Approach		517	0.3	0.542	10.9	LOS B	4.4	111.2	0.64	0.47	0.64	31.0
North: Spencer Road												
7	L2	5	25.0	0.134	9.9	LOS A	0.8	19.6	0.72	0.64	0.72	31.4
4	T1	30	5.0	0.134	8.0	LOS A	0.8	19.6	0.72	0.64	0.72	32.2
14	R2	42	0.0	0.134	7.5	LOS A	0.8	19.6	0.72	0.64	0.72	31.7
Approach		78	3.7	0.134	7.9	LOS A	0.8	19.6	0.72	0.64	0.72	31.9
West: Palmetto Road												
5	L2	33	4.0	0.649	12.2	LOS B	7.8	195.4	0.42	0.18	0.42	30.3
2	T1	554	0.0	0.649	12.0	LOS B	7.8	195.4	0.42	0.18	0.42	30.5
12	R2	155	0.0	0.649	12.0	LOS B	7.8	195.4	0.42	0.18	0.42	30.0
Approach		742	0.2	0.649	12.0	LOS B	7.8	195.4	0.42	0.18	0.42	30.4
All Vehicles		1523	0.7	0.649	11.1	LOS B	7.8	195.4	0.55	0.36	0.55	30.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: MALDINO & WILBURN | Processed: Wednesday, November 4, 2020 2:13:08 PM

Project: P:\20-22 Tyrone, Palmetto at Arrowood & Spencer\Roundabout Analysis\Sidra.sip8



# MOVEMENT SUMMARY

 Site: [Palmetto Rd Roundabout -PM (2042)]

Site Category: -  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Arrowood Road												
3	L2	183	2.0	0.338	9.8	LOS A	2.1	54.4	0.75	0.68	0.75	30.1
8	T1	42	0.0	0.338	9.6	LOS A	2.1	54.4	0.75	0.68	0.75	30.3
18	R2	3	0.0	0.338	9.6	LOS A	2.1	54.4	0.75	0.68	0.75	29.7
Approach		228	1.6	0.338	9.8	LOS A	2.1	54.4	0.75	0.68	0.75	30.1
East: Palmetto Road												
1	L2	15	0.0	0.837	26.9	LOS C	20.7	548.5	1.00	1.33	1.97	25.2
6	T1	623	8.0	0.837	27.3	LOS C	20.7	548.5	1.00	1.33	1.97	25.2
16	R2	26	0.0	0.837	26.9	LOS C	20.7	548.5	1.00	1.33	1.97	24.9
Approach		664	7.5	0.837	27.3	LOS C	20.7	548.5	1.00	1.33	1.97	25.1
North: Spencer Road												
7	L2	9	0.0	0.515	19.5	LOS B	4.4	110.6	0.96	1.07	1.27	27.6
4	T1	102	0.0	0.515	19.5	LOS B	4.4	110.6	0.96	1.07	1.27	27.7
14	R2	110	0.0	0.515	19.5	LOS B	4.4	110.6	0.96	1.07	1.27	27.2
Approach		222	0.0	0.515	19.5	LOS B	4.4	110.6	0.96	1.07	1.27	27.5
West: Palmetto Road												
5	L2	81	0.0	0.645	13.1	LOS B	6.9	176.7	0.66	0.42	0.66	29.8
2	T1	422	5.0	0.645	13.3	LOS B	6.9	176.7	0.66	0.42	0.66	29.8
12	R2	136	3.0	0.645	13.2	LOS B	6.9	176.7	0.66	0.42	0.66	29.3
Approach		640	3.9	0.645	13.2	LOS B	6.9	176.7	0.66	0.42	0.66	29.7
All Vehicles		1753	4.5	0.837	18.9	LOS B	20.7	548.5	0.84	0.88	1.25	27.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: MALDINO & WILBURN | Processed: Wednesday, November 4, 2020 2:13:08 PM

Project: P:\20-22 Tyrone, Palmetto at Arrowood & Spencer\Roundabout Analysis\Sidra.sip8

Appendix E  
Simulation Reports

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1144
Vehs Exited	1141
Starting Vehs	11
Ending Vehs	14
Travel Distance (mi)	169
Travel Time (hr)	10.5
Total Delay (hr)	4.5
Total Stops	643
Fuel Used (gal)	8.2

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1144
Vehs Exited	1141
Starting Vehs	11
Ending Vehs	14
Travel Distance (mi)	169
Travel Time (hr)	10.5
Total Delay (hr)	4.5
Total Stops	643
Fuel Used (gal)	8.2

Summary of All Intervals

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1260
Vehs Exited	1252
Starting Vehs	11
Ending Vehs	19
Travel Distance (mi)	183
Travel Time (hr)	14.5
Total Delay (hr)	7.9
Total Stops	935
Fuel Used (gal)	10.2

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1260
Vehs Exited	1252
Starting Vehs	11
Ending Vehs	19
Travel Distance (mi)	183
Travel Time (hr)	14.5
Total Delay (hr)	7.9
Total Stops	935
Fuel Used (gal)	10.2

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1444
Vehs Exited	1447
Starting Vehs	15
Ending Vehs	12
Travel Distance (mi)	214
Travel Time (hr)	20.8
Total Delay (hr)	13.2
Total Stops	1065
Fuel Used (gal)	12.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1444
Vehs Exited	1447
Starting Vehs	15
Ending Vehs	12
Travel Distance (mi)	214
Travel Time (hr)	20.8
Total Delay (hr)	13.2
Total Stops	1065
Fuel Used (gal)	12.6

---

### Summary of All Intervals

---

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1516
Vehs Exited	1519
Starting Vehs	21
Ending Vehs	18
Travel Distance (mi)	220
Travel Time (hr)	25.6
Total Delay (hr)	17.7
Total Stops	1139
Fuel Used (gal)	14.3

---

### Interval #0 Information Seeding

---

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

---

### Interval #1 Information Recording

---

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1516
Vehs Exited	1519
Starting Vehs	21
Ending Vehs	18
Travel Distance (mi)	220
Travel Time (hr)	25.6
Total Delay (hr)	17.7
Total Stops	1139
Fuel Used (gal)	14.3

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1144
Vehs Exited	1144
Starting Vehs	9
Ending Vehs	9
Travel Distance (mi)	178
Travel Time (hr)	8.8
Total Delay (hr)	1.9
Total Stops	140
Fuel Used (gal)	8.3

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1144
Vehs Exited	1144
Starting Vehs	9
Ending Vehs	9
Travel Distance (mi)	178
Travel Time (hr)	8.8
Total Delay (hr)	1.9
Total Stops	140
Fuel Used (gal)	8.3

---

### Summary of All Intervals

---

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1260
Vehs Exited	1259
Starting Vehs	12
Ending Vehs	13
Travel Distance (mi)	193
Travel Time (hr)	9.8
Total Delay (hr)	2.2
Total Stops	243
Fuel Used (gal)	9.2

---

### Interval #0 Information Seeding

---

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

---

### Interval #1 Information Recording

---

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1260
Vehs Exited	1259
Starting Vehs	12
Ending Vehs	13
Travel Distance (mi)	193
Travel Time (hr)	9.8
Total Delay (hr)	2.2
Total Stops	243
Fuel Used (gal)	9.2



---

### Summary of All Intervals

---

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1444
Vehs Exited	1442
Starting Vehs	10
Ending Vehs	12
Travel Distance (mi)	224
Travel Time (hr)	11.5
Total Delay (hr)	2.8
Total Stops	283
Fuel Used (gal)	10.5

---

### Interval #0 Information Seeding

---

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

---

### Interval #1 Information Recording

---

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1444
Vehs Exited	1442
Starting Vehs	10
Ending Vehs	12
Travel Distance (mi)	224
Travel Time (hr)	11.5
Total Delay (hr)	2.8
Total Stops	283
Fuel Used (gal)	10.5

Summary of All Intervals

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	1516
Vehs Exited	1512
Starting Vehs	11
Ending Vehs	15
Travel Distance (mi)	232
Travel Time (hr)	12.8
Total Delay (hr)	3.7
Total Stops	460
Fuel Used (gal)	11.4

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	1516
Vehs Exited	1512
Starting Vehs	11
Ending Vehs	15
Travel Distance (mi)	232
Travel Time (hr)	12.8
Total Delay (hr)	3.7
Total Stops	460
Fuel Used (gal)	11.4

Appendix F  
Cost Estimate Sheets

**Traffic Signal,**

Item	Unit									Total units	Unit Price	Item Cost
Conc Sidewalk, 4 in	SY	32								32	30.71	982.72
Solid Traffic Stripe, White 8 in	LF	512								512	0.80	409.60
Traffic Signal Modification	SUM	1	New Signal Install, 2 Tandem Poles							1	115,000.00	115,000.00
Traffic Control	SUM	1								1	2,500.00	2,500.00
Lighting	SUM	1								1	60,000.00	60,000.00
Staging	SUM	1								1	5,000.00	5,000.00
Mobilization	SUM	1								1	5,000.00	5,000.00
SUBTOTAL												188,892.32
Concept Level Contingency (20%)												37,778.46
Engineering, Inspection, Unaccounted For												28,333.85
ROW Acquisition												10,000.00
TOTAL												<b>265,004.63</b>

Estimated Cost of New Multi-Use Trail (Within Construction Bounds of Intersection Improvement Project) *Not included in B-C Calculations	45,000.00*
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**Roundabout, Current Intersection Location**

Item	Unit										Total units	Unit Price	Item Cost
Concrete Median Install	SY	489									489	43.52	21,281.28
Rem Conc Sidewalk	SY	195									195		0.00
Conc Sidewalk, 4 in	SY	181									181	30.71	5,558.51
Gr Aggr Base Crs	TN	1035									1035	25.00	25,875.00
Recycled Asph Conc	TN	776									776	110.00	85,360.00
Asph Conc OGFC	TN	259									259	125.00	32,375.00
Pavement Removal	SY	1246									1246	68.54	85,400.84
Pavement Marking	EA	4									4	50.00	200.00
Solid Traffic Stripe, White 5 in	LF	2386									2386	0.15	357.90
Traffic Stripe, Yellow Hatch	SY	179									179	1.95	349.05
Solid Traffic Stripe, Yellow 5 in	LF	2151									2151	0.26	559.26
Solid Traffic Stripe, White 24 in	LF	620									620	6.25	3,875.00
Erosion Control	LS	1									1	70,000.00	70,000.00
Landscaping	LS	1									1	50,000.00	50,000.00
Lighting	LS	1									1	120,000.00	120,000.00
Grading	LS	1									1	120,000.00	120,000.00
Traffic Control	SUM	1									1	115,000.00	115,000.00
Staging	SUM	1									1	175,000.00	175,000.00
Mobilization	SUM	1									1	10,000.00	10,000.00
SUBTOTAL												921,191.84	
Concept Level Contingency (20%)												184,238.37	
Engineering, Inspection, Unaccounted For												138,178.78	
ROW Acquisition												45,000.00	
TOTAL												<u>1,288,608.98</u>	

Estimated Cost of New Multi-Use Trail (Within Construction Bounds of Intersection Improvement Project)	55,000.00*
*Not included in B-C Calculations	

**Roundabout, Shifted NE**

Item	Unit										Total units	Unit Price	Item Cost
Concrete Median Install	SY	320									320	43.52	13,926.40
Rem Conc Sidewalk	SY	190									190		0.00
Conc Sidewalk, 4 in	SY	230									230	30.71	7,063.30
Gr Aggr Base Crs	TN	1265									1265	25.00	31,625.00
Recycled Asph Conc	TN	949									949	110.00	104,390.00
Asph Conc OGFC	TN	316									316	125.00	39,500.00
Pavement Removal	SY	2397									2397	68.54	164,290.38
Pavement Marking	EA	4									4	50.00	200.00
Solid Traffic Stripe, White 5 in	LF	2878									2878	0.15	431.70
Traffic Stripe, Yellow Hatch	SY	144									144	1.95	280.80
Solid Traffic Stripe, Yellow 5 in	LF	2202									2202	0.26	572.52
Solid Traffic Stripe, White 24 in	LF	816									816	6.25	5,100.00
Erosion Control	LS	1									1	70,000.00	70,000.00
Landscaping	LS	1									1	50,000.00	50,000.00
Lighting	LS	1									1	120,000.00	120,000.00
Grading	LS	1									1	120,000.00	120,000.00
Traffic Control	SUM	1									1	115,000.00	115,000.00
Staging	SUM	1									1	150,000.00	150,000.00
Mobilization	SUM	1									1	10,000.00	10,000.00
SUBTOTAL												1,002,380.10	
Concept Level Contingency (20%)												200,476.02	
Engineering, Inspection, Unaccounted For												150,357.02	
ROW Acquisition												40,000.00	
TOTAL												<u>1,393,213.14</u>	

Estimated Cost of New Multi-Use Trail (Within Construction Bounds of Intersection Improvement Project)	55,000.00*
*Not included in B-C Calculations	

Appendix G  
Benefit Calculations

## Base Year Savings Analysis

Conditions	MOE	AM Peak Hour		PM Peak Hour		24-Hour Total	Weekday Savings Compared to No-Build	Base Year Savings Compared to No-Build	Total Base Year Savings
		Single Hour	Represented Hours (3)	Single Hour	Represented Hours (3)				
No-Build	Travel Time (hr)	10.9	32.7	14.7	44.1	76.8			
	Total Delay (hr)	4.9	14.7	8	24	38.7			
	Fuel Used (gal)	8.8	26.4	10.4	31.2	57.6			
Traffic Signal, No Turn Lanes	Travel Time (hr)	10.5	31.5	14.5	43.5	75	\$42.39	\$11,021.40	\$12,251.20
	Total Delay (hr)	4.5	13.5	7.9	23.7	37.2			
	Fuel Used (gal)	8.2	24.6	10.2	30.6	55.2	\$4.73	\$1,229.80	
Roundabout	Travel Time (hr)	8.8	26.4	9.8	29.4	55.8	\$494.55	\$128,583.00	\$131,196.00
	Total Delay (hr)	1.9	5.7	2.2	6.6	12.3			
	Fuel Used (gal)	8.3	24.9	9.2	27.6	52.5	\$10.05	\$2,613.00	
Roundabout, Shifted NE	Travel Time (hr)	8.8	26.4	9.8	29.4	55.8	\$494.55	\$128,583.00	\$131,196.00
	Total Delay (hr)	1.9	5.7	2.2	6.6	12.3			
	Fuel Used (gal)	8.3	24.9	9.2	27.6	52.5	\$10.05	\$2,613.00	



## Design Year Savings Analysis

Conditions	MOE	AM Peak Hour		PM Peak Hour		24-Hour Total	Weekday Savings Compared to No-Build	Design Year Savings Compared to No-Build	Total Design Year Savings
		Single Hour	Represented Hours (3)	Single Hour	Represented Hours (3)				
No-Build	Travel Time (hr)	25.7	77.1	101.1	303.3	380.4			
	Total Delay (hr)	18.2	54.6	93.8	281.4	336			
	Fuel Used (gal)	13.7	41.1	30.4	91.2	132.3			
Traffic Signal, No Turn Lanes	Travel Time (hr)	20.8	62.4	25.6	76.8	139.2	\$5,680.26	\$1,476,867.60	\$1,503,296.60
	Total Delay (hr)	13.2	39.6	17.7	53.1	92.7			
	Fuel Used (gal)	12.6	37.8	14.3	42.9	80.7	\$101.65	\$26,429.00	
Roundabout	Travel Time (hr)	11.5	34.5	12.8	38.4	72.9	\$7,241.63	\$1,882,823.80	\$1,916,935.80
	Total Delay (hr)	2.8	8.4	3.7	11.1	19.5			
	Fuel Used (gal)	10.5	31.5	11.4	34.2	65.7	\$131.20	\$34,112.00	
Roundabout, Shifted NE	Travel Time (hr)	11.5	34.5	12.8	38.4	72.9	\$7,241.63	\$1,882,823.80	\$1,916,935.80
	Total Delay (hr)	2.8	8.4	3.7	11.1	19.5			
	Fuel Used (gal)	10.5	31.5	11.4	34.2	65.7	\$131.20	\$34,112.00	

# Project Design Life Yearly Savings and Present Value Conversion

PRESENT (2022) VALUE of Annual Savings by Improvement Alternative						
Year	F to P Factor	Traffic Signal, No Turn Lanes	Roundabout	Roundabout Shifted NE		
2022	1	\$12,251.20	\$131,196.00	\$131,196.00		
2023	0.9802	\$85,084.65	\$216,117.13	\$216,117.13		
2024	0.9608	\$155,028.89	\$297,623.73	\$297,623.73		
2025	0.9418	\$222,169.80	\$375,817.70	\$375,817.70		
2026	0.9231	\$286,590.96	\$450,798.29	\$450,798.29		
2027	0.9048	\$348,373.76	\$522,662.10	\$522,662.10		
2028	0.8869	\$407,597.43	\$591,503.15	\$591,503.15		
2029	0.8694	\$464,339.09	\$657,412.98	\$657,412.98		
2030	0.8521	\$518,673.81	\$720,480.69	\$720,480.69		
2031	0.8353	\$570,674.68	\$780,792.98	\$780,792.98		
2032	0.8187	\$620,412.80	\$838,434.25	\$838,434.25		
2033	0.8025	\$667,957.40	\$893,486.62	\$893,486.62		
2034	0.7866	\$713,375.85	\$946,030.04	\$946,030.04		
2035	0.7711	\$756,733.71	\$996,142.26	\$996,142.26		
2036	0.7558	\$798,094.77	\$1,043,898.98	\$1,043,898.98		
2037	0.7408	\$837,521.11	\$1,089,373.82	\$1,089,373.82		
2038	0.7261	\$875,073.14	\$1,132,638.44	\$1,132,638.44		
2039	0.7118	\$910,809.63	\$1,173,762.52	\$1,173,762.52		
2040	0.6977	\$944,787.74	\$1,212,813.89	\$1,212,813.89		
2041	0.6839	\$977,063.11	\$1,249,858.49	\$1,249,858.49		
2042	0.6703	\$1,007,689.85	\$1,284,960.49	\$1,284,960.49		
		\$0.00	\$0.00	\$0.00		
		\$0.00	\$0.00	\$0.00		
		\$0.00	\$0.00	\$0.00		
		\$0.00	\$0.00	\$0.00		
		\$0.00	\$0.00	\$0.00		
Present Total Value of Annual Savings for 2025 to 2045		\$12,180,303.36	\$16,605,804.55	\$16,605,804.55		

2022 to 2042 Future Annual Savings by Improvement Alternative						
Year	Traffic Signal, No Turn Lanes	Roundabout	Roundabout Shifted NE			
2022	\$12,251.20	\$131,196.00	\$131,196.00			
2023	\$86,803.47	\$220,482.99	\$220,482.99			
2024	\$161,355.74	\$309,769.98	\$309,769.98			
2025	\$235,908.01	\$399,056.97	\$399,056.97			
2026	\$310,460.28	\$488,343.96	\$488,343.96			
2027	\$385,012.55	\$577,630.95	\$577,630.95			
2028	\$459,564.82	\$666,917.94	\$666,917.94			
2029	\$534,117.09	\$756,204.93	\$756,204.93			
2030	\$608,669.36	\$845,491.92	\$845,491.92			
2031	\$683,221.63	\$934,778.91	\$934,778.91			
2032	\$757,773.90	\$1,024,065.90	\$1,024,065.90			
2033	\$832,326.17	\$1,113,352.89	\$1,113,352.89			
2034	\$906,878.44	\$1,202,639.88	\$1,202,639.88			
2035	\$981,430.71	\$1,291,926.87	\$1,291,926.87			
2036	\$1,055,982.98	\$1,381,213.86	\$1,381,213.86			
2037	\$1,130,535.25	\$1,470,500.85	\$1,470,500.85			
2038	\$1,205,087.52	\$1,559,787.84	\$1,559,787.84			
2039	\$1,279,639.79	\$1,649,074.83	\$1,649,074.83			
2040	\$1,354,192.06	\$1,738,361.82	\$1,738,361.82			
2041	\$1,428,744.33	\$1,827,648.81	\$1,827,648.81			
2042	\$1,503,296.60	\$1,916,935.80	\$1,916,935.80			

**B-C Ratio Analysis**

	Present Total Benefit	Present Total Cost	B-C Ratio
Traffic Signal, No Turn Lanes	\$12,180,303.36	\$265,005.00	46
Roundabout	\$16,605,804.55	\$1,288,609.00	13
Roundabout, Shifted NE	\$16,605,804.55	\$1,393,213.00	12