Allen Park Development

Traffic Impact Analysis

Knightdale, North Carolina

January 2021

Prepared for:

Natelli Communities

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

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1 INTRODUCTION

This report presents the findings of the traffic impact analysis (TIA) for the proposed Allen Park Development. The development will be located off Old Milburnie Road and Forestville Road, in Knightdale, NC (see **Figure 1-1**).

The proposed development is planned for construction in 2027. Per Town of Knightdale standards / guidelines, analyses were completed for the 2020 Existing traffic volumes, 2028 Background traffic volumes, and 2028 Build traffic volumes (Background + site trips), 2038 Horizon Year traffic volumes (2028 Build + 10 years). The purpose of this assessment is as follows:

1. Verify that the existing geometry provided within the study area is sufficient to accommodate the projected traffic volumes;

2. Determine what, if any, improvements are necessary at the proposed site driveway connections; and

3. Provide an analysis of the future horizon year (2038).

The following steps were taken to determine the potential traffic impacts associated with this project:

1. Data Collection – AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected on December 17th, 2020 at the following intersections:

   - SR 2049 (Forestville Road) / SR 2228 (Old Crews Road);
   - SR 2049 (Forestville Road) / SR 2231 (Horton Road) / SR 2233 (Smithfield Road); and
   - SR 2217 (Old Milburnie Road) / US-64 Business (New Bern Avenue).

   AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected on September 18th, 2018 at the following intersections:

   - SR 2049 (Forestville Road) / SR 2215 (Buffalo Road).

   AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected on June 5th, 2018 at the following intersections:

   - SR 2049 (Forestville Road) / SR 2217 (Old Milburnie Road).

   48-hour tube counts were collected on December 16th and December 17th, 2020 along Old Milburnie Road south of Forestville Road.

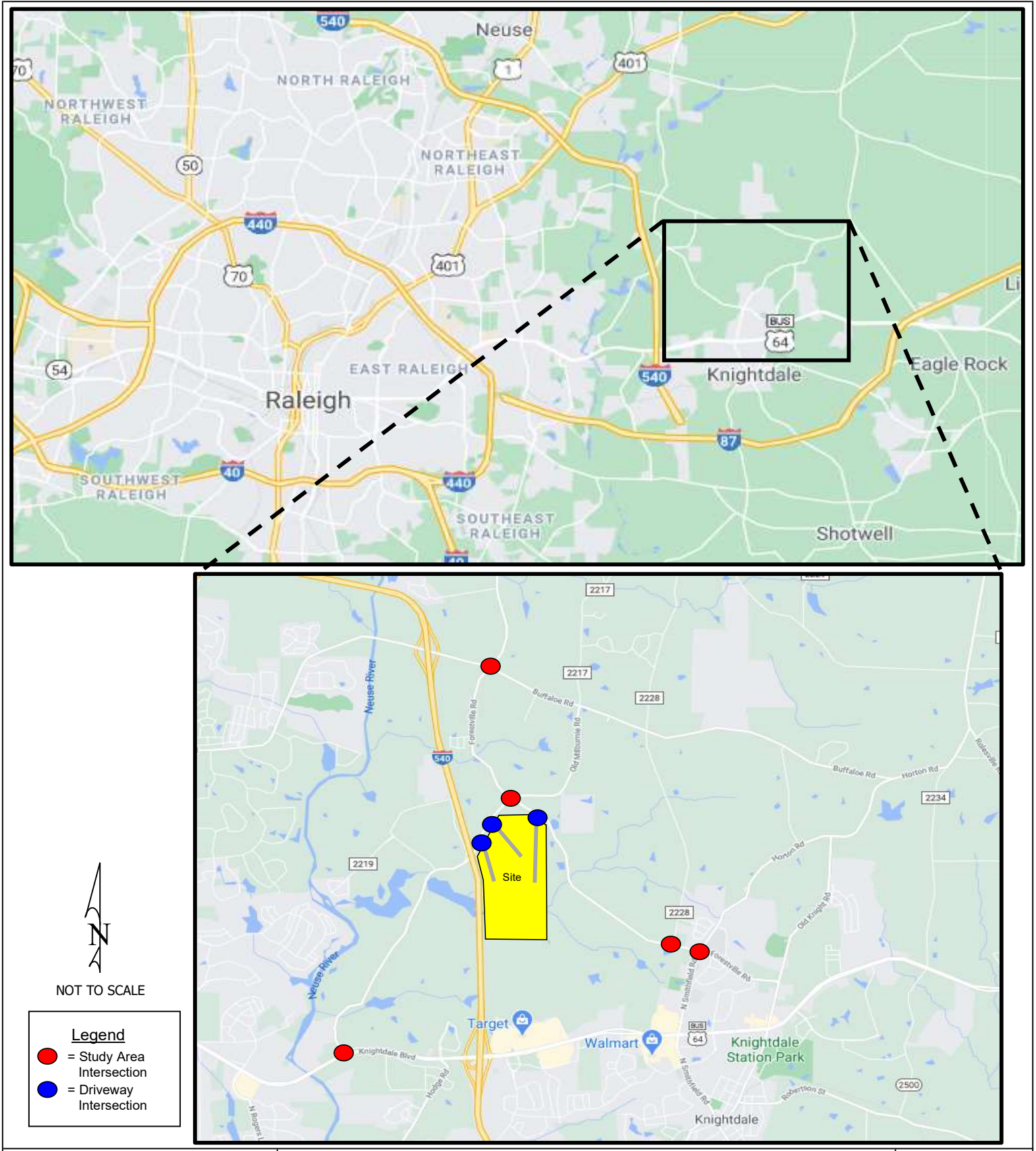
2. Trip Generation/Future Traffic – Traffic generated by the proposed development was estimated using the 10th Edition of the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*. Trip generation was calculated for the development following the NCDOT standards and practices for trip generation. Projected traffic volumes were calculated using a 3% ambient growth rate. Per the scoping document (see **Appendix A**), there are no approved developments in the project study area that will generate trips.

3. Trip Distribution and Projections – The distribution of site-generated trips was based on the distribution of existing area traffic and engineering judgement. It was assumed, for purposes of analysis, that projected trips would follow similar patterns as existing traffic.

4. Traffic Capacity Analysis – Level of service analyses were performed using SYNCHRO Version 10.3 for the following intersections:

    - SR 2049 (Forestville Road) / SR 2215 (Buffalo Road) - Signalized;
    - SR 2049 (Forestville Road) / SR 2217 (Old Milburnie Road) - Unsignalized;
    - SR 2049 (Forestville Road) / Site Driveway #3 – Unsignalized;
    - SR 2049 (Forestville Road) / SR 2228 (Old Crews Road) - Unsignalized;
    - SR 2049 (Forestville Road) / SR 2231 (Horton Road) / SR 2233 (Smithfield Road) – Signalized;
    - SR 2217 (Old Milburnie Road) / Site Driveway #1 – Unsignalized;
    - SR 2217 (Old Milburnie Road) / Site Driveway #2 – Unsignalized; and
    - SR 2217 (Old Milburnie Road) / US-64 Business (New Bern Avenue) - Signalized.

5. Review of Proposed Improvements – Roadway improvements proposed to accommodate projected site-generated traffic were evaluated.



NOT TO SCALE

Legend

- = Study Area Intersection
- = Driveway Intersection

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Allen Park
Traffic Impact Analysis
Site Location Map

Figure 1-1

2 EXISTING INFORMATION

The development will be located off Old Milburnie Road and Forestville Road, in Knightdale, NC (see **Figure 1-1**).

2.1 STUDY LIMITS

Access to the proposed site will be provided via three (3) full movement site driveway connections. Site Driveway #1 will be located off Old Milburnie Road, approximately 100' (C/L to C/L) north of the existing Wil-Mar Golf Club driveway. Site Driveway #2 will be located off Old Milburnie Road, approximately 800' (C/L to C/L) south of Site Driveway #1. Site Driveway #3 will be located off Forestville Road southeast of Old Milburnie Road.

The entrances are shown graphically on **Figure 1-1** and on the preliminary site layout for the residential development on **Figure 2-1** (all figures located at the end of their respective chapter).

The study limits include the following eight (8) intersections:

- Forestville Road / Buffalo Road;
- Forestville Road / Old Milburnie Road;
- Forestville Road / Site Driveway #3;
- Forestville Road / Old Crews Road;
- Forestville Road / Horton Road) / Smithfield Road;
- Old Milburnie Road / Site Driveway #1;
- Old Milburnie Road / Site Driveway #2; and
- Old Milburnie Road / US-64 Business.

All study area intersections and project assumptions were approved by the NCDOT / Town and are outlined in the scoping document (see **Appendix A**).

2.2 EXISTING ROADWAYS

SR 2049 (Forestville Road) is a two-lane undivided facility that runs approximately northwest-southeast in the project study area. The facility will provide access to the proposed development and has a posted 45-mph speed limit. Forestville Road connects Rogers Road in the northwest to Old Knight Road in the southeast. The facility primarily services residential and educational land uses. Per 2019 NCDOT Average Annual Daily Traffic (AADT) count maps, Forestville Road carries 3,800 Vehicles Per Day (VPD) south of Old Milburnie Road.

SR 2215 (Buffaloe Road) is a two-lane undivided facility that runs approximately east-west in the project study area. The facility is located north of the proposed development and has a posted 45-mph speed limit. Buffaloe Road connects Horton Road in the east to north Raleigh in the west. The facility primarily services residential and agricultural land uses in the project study area. Per 2019 NCDOT AADT count maps, Buffaloe Road carries 10,000 VPD east of Forestville Road.

SR 2217 (Old Milburnie Road) is a two-lane undivided facility that runs approximately northeast-southwest in the project study area. The facility will provide access to the proposed development and has a posted 45-mph speed limit. Old Milburnie Road connects Rolesville Road in the northeast to US 64 Business in the southwest. The facility primarily services residential and educational land uses in the project study area. Per 2019 NCDOT AADT count maps, Old Milburnie Road carries 4,500 VPD southwest of Forestville Road.

SR 2228 (Old Crews Road) is a two-lane undivided facility that runs approximately north-south in the project study area. The facility is located east of the proposed development and has a posted 45-mph speed limit. Old Crews Road connects Old Milburnie Road in the north to Forestville Road in the south. The facility primarily services residential land uses in the project study area. Per 2019 NCDOT AADT count maps, Old Crews Road carries 1,700 VPD north of Buffaloe Road.

SR 2231 (Horton Road) is a two-lane undivided facility that runs approximately north-south in the project study area. The facility is located east of the proposed development and has a posted 35-mph speed limit inside and outside of school hours. Horton Road connects Marks Creek Road in the north to Forestville Road in the south. The facility primarily services residential and educational land uses in the project study area. Per 2019 NCDOT AADT count maps, Horton Road carries 3,900 VPD north of Forestville Road.

SR 2233 (Smithfield Road) is a two-lane undivided facility that runs approximately north-south in the project study area. The facility is located east of the proposed development and has a posted 35-mph speed limit inside and outside of school hours. Smithfield Road connects Forestville Road in the north to Bissette Road in the south. The facility primarily services residential and commercial land uses in the project study area. Per 2019 NCDOT AADT count maps, Smithfield Road carries 12,500 VPD south of Forestville Road.

US 64 Business (New Bern Avenue) is a four-lane median divided facility that runs approximately east-west in the project study area. The facility is located south of the proposed development and has a posted 45-mph speed limit. US 64 Business connects Zebulon in the east to Raleigh in the west. The facility primarily services residential and commercial land uses. Per 2019 NCDOT AADT count maps, US 64 Business carries 29,500 VPD east of Old Milburnie Road.

2.3 EXISTING INTERSECTIONS

Using available aerial imagery and site visits, Timmons Group compiled the existing geometry for each of the study area intersections. The existing intersection geometry is shown on **Figure 2-2** and used throughout all analyses.

Forestville Road / Buffaloe Road is a four-phase signalized intersection with time of day phasing. All intersection approaches consist of an exclusive left-turn lane and a shared through / right-turn lane.

Forestville Road / Old Milburnie Road is an unsignalized four-way stop intersection. All intersection approaches include a shared left / through / right-turn lane.

Forestville Road / Old Crews Road is an unsignalized T-intersection with the southbound Old Crews Road approach encountering the stop condition. The southbound approach consists of a shared left / right-turn lane. The eastbound approach includes a shared through / left-turn lane. The westbound approach consists of an exclusive through lane and a right-turn lane.

Forestville Road / Horton Road / Smithfield Road is a three-phase signalized intersection with protected-permitted eastbound left-turns. The north, south, and eastbound intersection approaches consist of an exclusive left-turn lane and a shared through / right-turn lane. The westbound approach consists of an exclusive left-turn lane, a through lane, and an exclusive right-turn lane.

US 64 Business / Old Milburnie Road is a six-phase signalized intersection with alternate time of day phasing. The northbound intersection approach consists of an exclusive left-turn lane and a shared through / right-turn lane. The southbound approach consists of a shared through / left-turn lane and two exclusive right-turn lanes. The eastbound approach consists of an exclusive left-turn lane, a through lane,

and a shared through / right-turn lane. The westbound approach consists of an exclusive left-turn lane, two through lanes, and an exclusive right-turn lane.

2.4 TRAFFIC VOLUMES

Timmons Group calculated peak hour volumes for the following study area intersections using the AM (7:00 – 9:00) and PM (4:00 – 6:00) peak period turning movement counts^ undertaken on December 17th, 2020, September 18th, 2018, and June 5th, 2018. Traffic volumes collected in 2018 were grown to 2020 using a 3% annual growth rate for 2 years.

^ At the time of this study, various COVID-19 restrictions were in place which altered existing area traffic volumes (including the Wake County Public School System operating virtually). To account for these restrictions, all turning movement traffic counts were modified by a "COVID-19 Adjustment Factor". To calculate this adjustment factor, Timmons Group conducted a 48-hour tube count along Old Milburnie Road (southwest of Forestville Road) on December 16th and 17th, 2020. 2020 tube counts revealed that Old Milburnie Road experienced an average daily traffic volume of 2,650 VPD (see **Appendix B**). This daily traffic volume was then compared to the published 2019 AADT (4,500 VPD) previously collected in the same location. Utilizing the aforementioned 3% ambient growth rate, a 2020 AADT of 4,635 VPD was calculated. This AADT projection is approximately 75% greater than the 2020 collected traffic volume. However, the published 2015 AADT at the same location was 2,400 VPD. The 87.5% AADT increase from 2015 to 2019 (2,400 VPD to 4,500 VPD) was caused by the construction of East Wake Middle School located on Old Milburnie Road (northeast of Forestville Road). The AM (7:00 – 9:00) peak hour was counted during school peak hours, whereas the PM (4:00 - 6:00) peak hour was counted outside of school peak hours. To account for this discrepancy, it was discussed, and agreed to, with the NCDOT and Town of Knightdale (see **Appendix A**) that all turning movement traffic count volumes (see **Figure 2-3** and **Figure 2-4**) were grown by a 75% COVID-19 Adjustment Factor in the AM peak hour (with the exception of US 64 Business / Old Milburnie Road intersection) and a 5% COVID-19 Adjustment Factor in the PM peak hour. At the US 64 Business / Old Milburnie Road intersection, AM peak hour volumes to and from Old Milburnie Road were increased by 75% where all other volumes were increased by 5% in both peak hours. The adjusted 2020 traffic volumes are shown in **Figure 2-5**. Traffic count data is located in **Appendix B**.

2.5 CAPACITY ANALYSIS

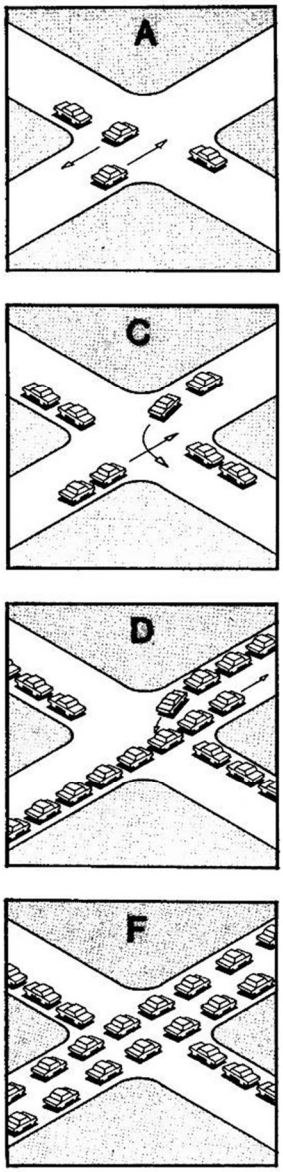
Using field observations, aerial photography, and traffic count data, traffic operations were analyzed during 2020 (existing), 2028 (without and with the proposed development site trips), and 2038 (with the proposed development site trips).

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. At signalized intersections, an overall intersection LOS E is generally considered unacceptable. At unsignalized intersections, a LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets typically function at a LOS F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic. **Table 2-1** shows in detail how each of these levels of service are interpreted.

Table 2-1: Level of Service Definitions

Level of Service	Roadway Segments or Controlled Access Highways	Intersections
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.
E	Actual capacity of the roadway invloves delay to all motorists due to congestion.	Very long queues may create lengthly delays, especially for left-turning vehicles.
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage ares during part or all of an hour.

SOURCE: *"A Policy on Design of Design of Urban Highways and Arterial Streets"* - AASHTO, 1973 based upon material published in *"Highway Capacity Manual"*, National Academy of Sciences, 1965.



For signalized and unsignalized intersections, level of service is defined in terms of **delay**, a measure of driver discomfort, frustration, fuel consumption and lost travel time. **Table 2-2** summarizes the delay associated with each LOS category:

Table 2-2: Signalized and Unsignalized Intersection Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Capacity analyses were performed to assess operational conditions. Study area intersections were analyzed using SYNCHRO Version 10.3 based on Highway Capacity Manual (HCM) methodologies with the following assumptions:

- Existing grades;
- 12-foot lane widths;
- No parking activity, bus stops, or pedestrians;
- PHFs of 0.90 were used for all analyses;
- A minimum of four (4) vehicles per analyzed intersection movement;
- Heavy vehicle percentages 2%; and
- Existing signal data / timing values found in the traffic signal plans (see **Appendix D**).

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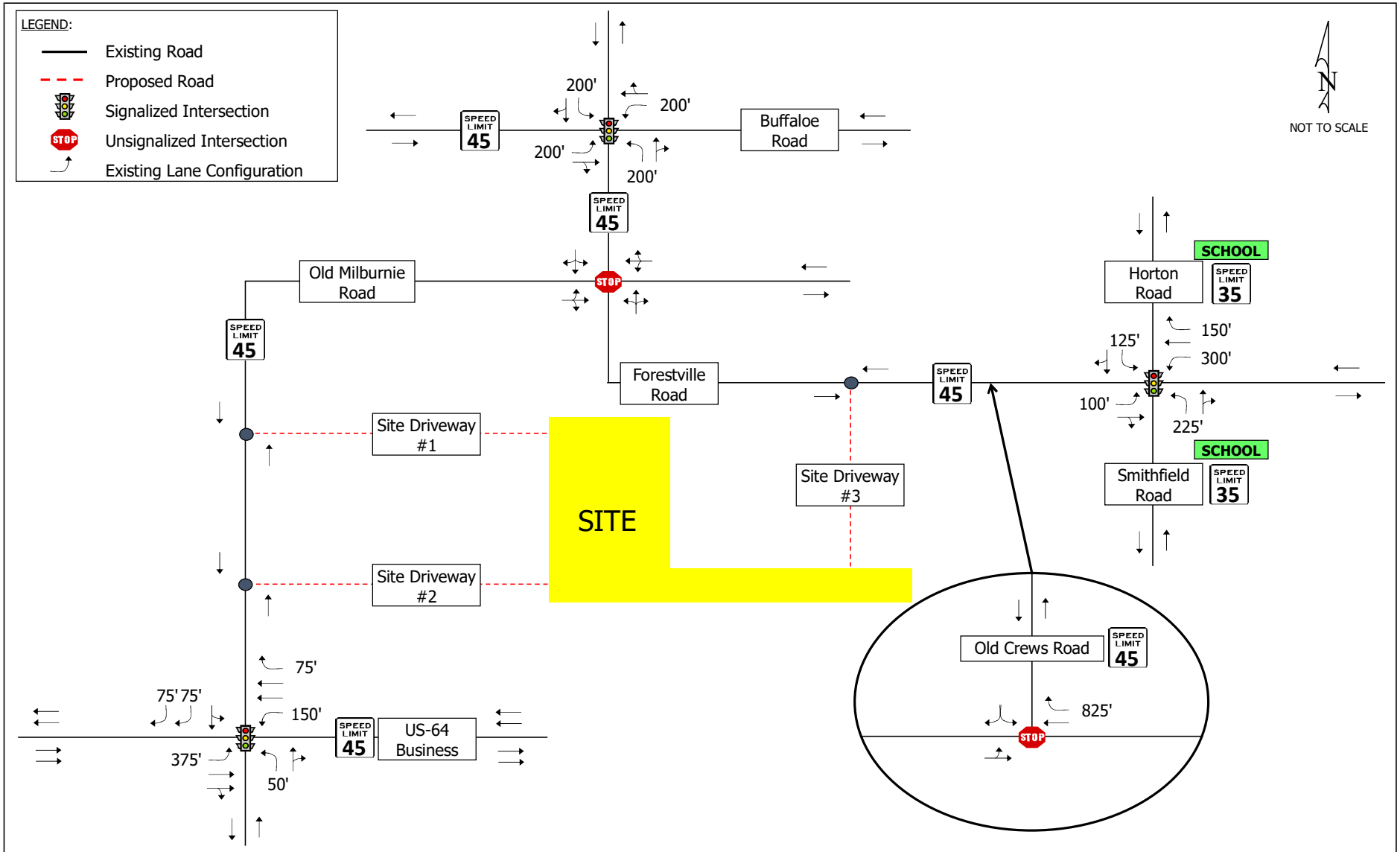
Allen Park
Traffic Impact Analysis
Site Plan

Figure 2-1



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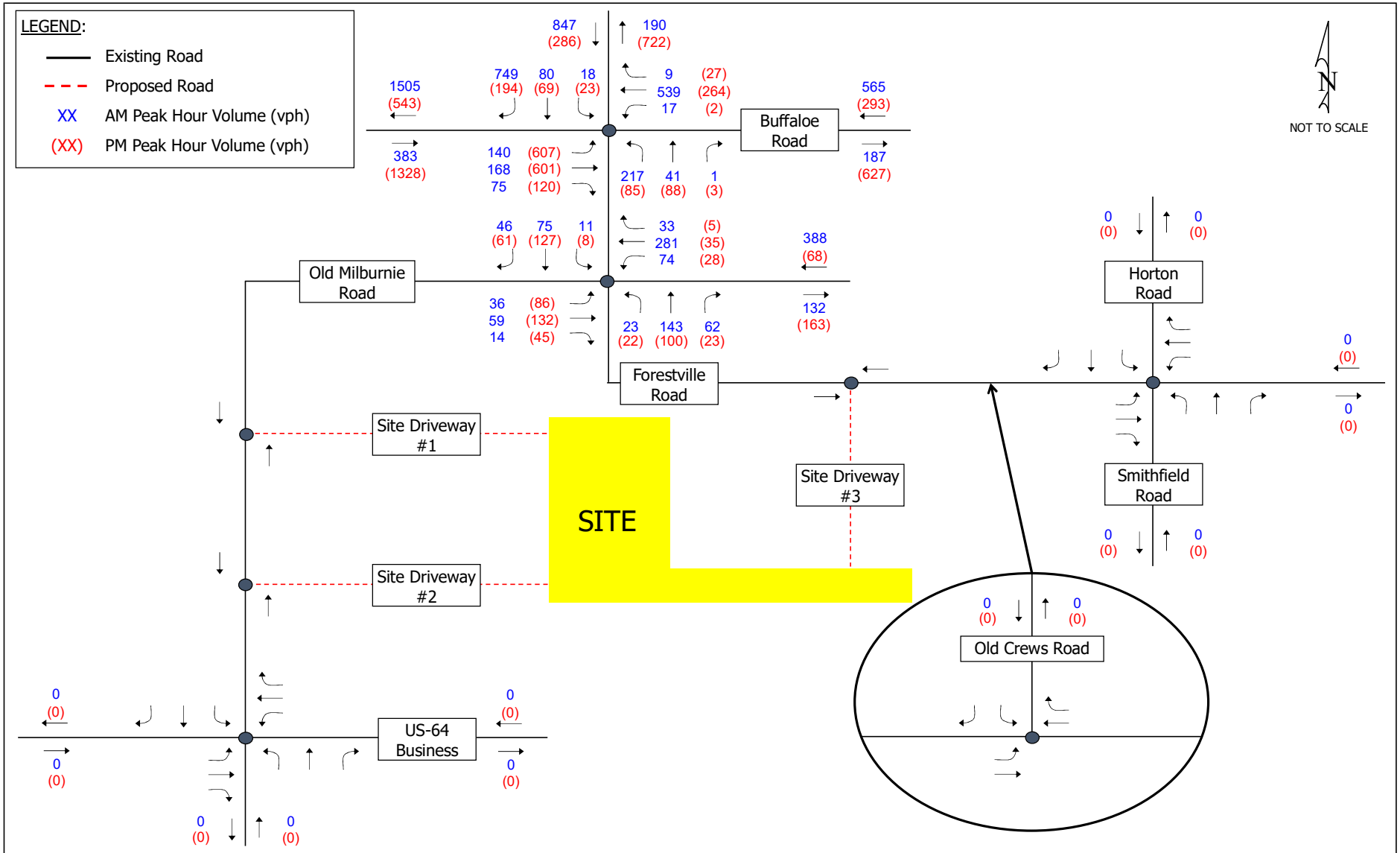
Allen Park
Traffic Impact Analysis
2020 Existing Lane Configuration

Figure 2-2



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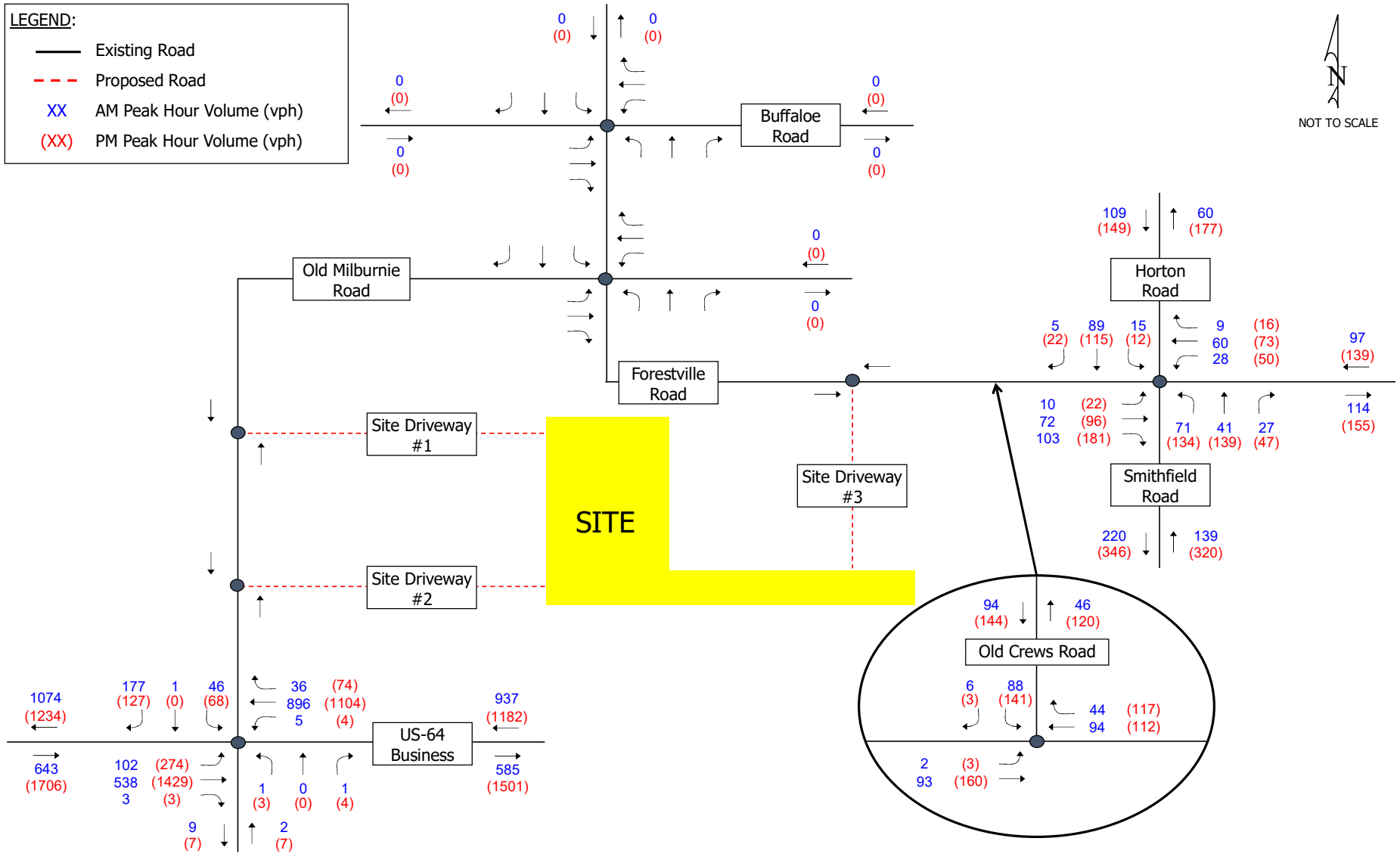
Allen Park
Traffic Impact Analysis
2018 Traffic Volumes

Figure 2-3



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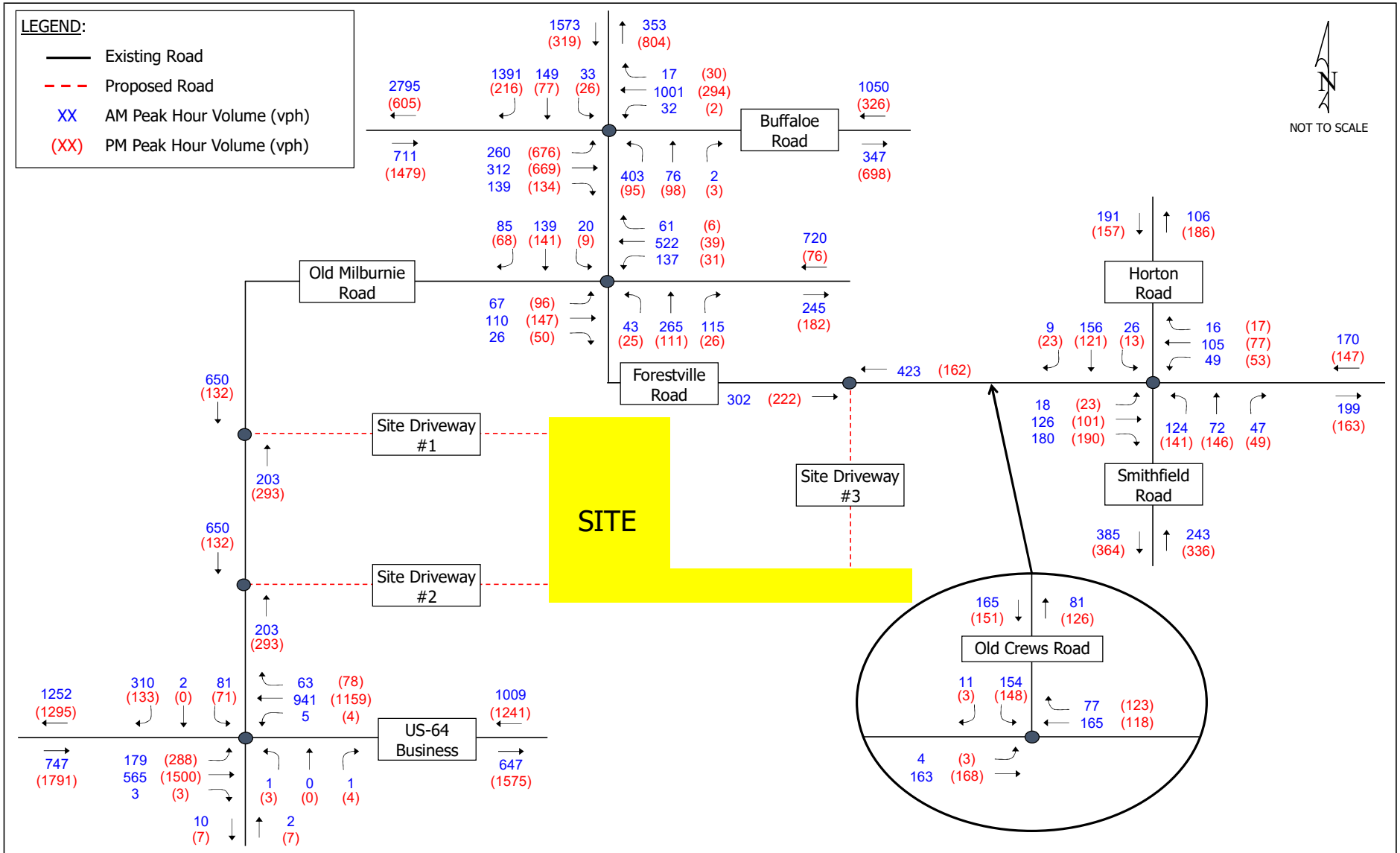
Allen Park
Traffic Impact Analysis
2020 Collected Traffic Volumes

Figure 2-4



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Allen Park
Traffic Impact Analysis
2020 Existing Traffic Volumes (with COVID-19 Factor)

Figure 2-5

3 EXISTING AND BACKGROUND CONDITIONS AND ANALYSIS

3.1 2020 EXISTING ANALYSES

Table 3-1 summarizes the 2020 Existing intersection LOS and delay based on the geometry shown on **Figure 2-2** and the 2020 traffic volumes shown on **Figure 2-5**. The corresponding SYNCHRO output is included in **Appendix C**.

All approaches at the unsignalized intersection of Forestville Road / Old Crews Road are currently operating at a LOS B or better during the 2020 Existing AM and PM peak hours.

The westbound and northbound approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are currently operating at a LOS F during the 2020 Existing AM peak hour. All other intersection approaches are currently operating at a LOS D or better during both peak hours.

The signalized intersection of Forestville Road / Buffaloe Road is currently operating at an overall LOS F during both 2020 Existing AM and PM peak hours. Multiple approaches are currently operating unacceptably during both peak hours.

The signalized intersection of Smithfield Road / Horton Road / Forestville Road is currently operating at an overall LOS B during both 2020 Existing AM and PM peak hours. All intersection approaches are operating at a LOS B.

The signalized intersection of Old Milburnie Road / US 64 Business is currently operating at an overall LOS C during both 2020 Existing AM and PM peak hours. The northbound approach is currently operating unacceptably during the PM peak hour. All other intersection approaches are operating at a LOS D or better during both peak hours.

Table 3-1: Intersection Level of Service and Delay Summary
2020 Existing Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
4: Forestville Road & Old Crews Road	EB Approach	0.2	A	0.2	A
	WB Approach	0.0	A	0.0	A
	SB Approach	12.9	B	12.2	B
2: Old Milburnie Road & Forestville Road	EB Approach	24.1	C	12.7	B
	WB Approach	***341.3***	***F***	9.5	A
	NB Approach	***69.7***	***F***	10.4	B
	SB Approach	27.6	D	10.9	B
1: Forestville Road & Buffaloe Road	EB Approach	***160.8***	***F***	***502.2***	***F***
	WB Approach	***108.2***	***F***	30.7	C
	NB Approach	***705.1***	***F***	48.3	D
	SB Approach	***2630.8***	***F***	***73.2***	***E***
	Total	***1233.5***	***F***	***338.2***	***F***
5: Smithfield Road/Horton Road & Forestville Road	EB Approach	15.9	B	15.5	B
	WB Approach	14.9	B	14.8	B
	NB Approach	11.4	B	11.7	B
	SB Approach	10.9	B	10.7	B
	Total	13.5	B	13.3	B
8: Old Milburnie Road & US 64 Business	EB Approach	15.6	B	18.2	B
	WB Approach	23.3	C	29.5	C
	NB Approach	45.5	D	***56.1***	***E***
	SB Approach	23.0	C	32.1	C
	Total	20.7	C	23.5	C

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

3.2 BACKGROUND TRAFFIC CONDITIONS

Per the scoping document (see **Appendix A**), there are no public improvement projects in the project study area that will be fully or partially built out by 2028. Additionally, there are no approved developments in the project study area that will be analyzed as part of the background analysis.

As part of an NCDOT safety project, there are current plans to construct a southbound right-turn lane at the intersection of Forestville Road and Buffaloe Road. For purposes of analysis, it was assumed that this turn lane will be constructed prior to all future analysis years.

As part of an area development, there are current plans to construct an exclusive eastbound right-turn lane and lengthen the westbound left-turn lane at the intersection of Old Milburnie Road and US 64 Business. For purposes of analysis, it was assumed that these turn lanes will be constructed prior to all future analysis years.

Figure 3-1 shows the 2028 background traffic volumes calculated using a 3% annual growth rate.

3.3 2028 BACKGROUND ANALYSIS

Table 3-2 summarizes the 2028 Background intersection LOS and delay based on the geometry shown in **Figure 2-2** (and improvements described) and the 2028 Background traffic volumes shown in **Figure 3-1**. The corresponding SYNCHRO output is included in **Appendix C**.

All approaches at the unsignalized intersection of Forestville Road / Old Crews Road are projected to operate at a LOS C or better during the 2028 Background AM and PM peak hours.

All approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are projected to operate unacceptably during the 2028 Background AM peak hour. All intersection approaches are projected to operate at a LOS C or better during the PM peak hour.

The signalized intersection of Forestville Road / Buffaloe Road is projected to operate at an overall LOS F during both 2028 Background AM and PM peak hours. Multiple approaches are projected to operate unacceptably during both peak hours.

The signalized intersection of Smithfield Road / Horton Road / Forestville Road is projected to operate at an overall LOS B during both 2028 Background AM and PM peak hours. All intersection approaches are projected to operate at a LOS B.

The signalized intersection of Old Milburnie Road / US 64 Business is projected to operate at an overall LOS C and D during the 2028 Background AM and PM peak hours, respectively. The northbound approach is projected to operate unacceptably during both peak hours. All other intersection approaches are projected to operate at a LOS D or better during both peak hours.

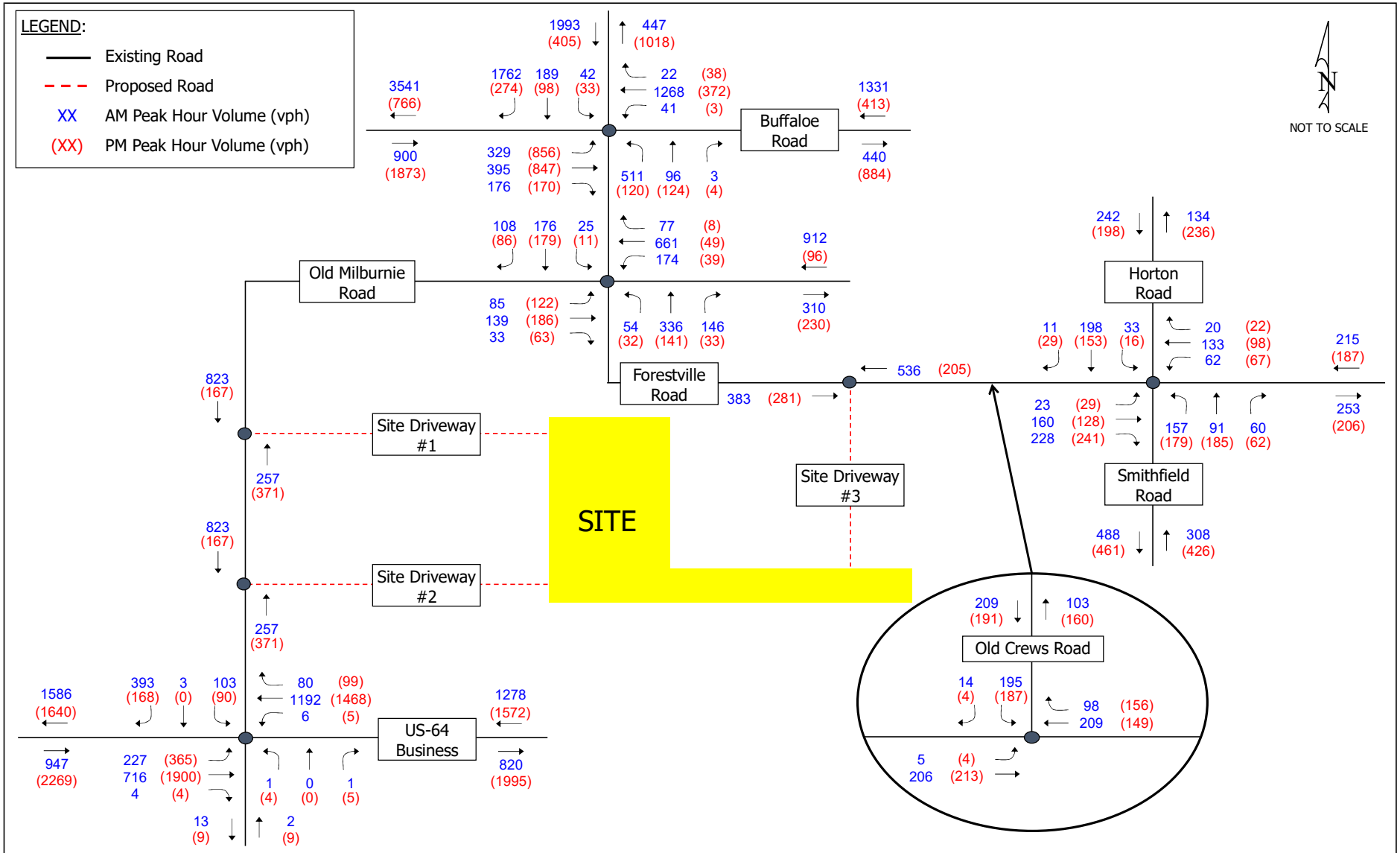
Table 3-2: Intersection Level of Service and Delay Summary
2028 Background Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
4: Forestville Road & Old Crews Road	EB Approach	0.2	A	0.1	A
	WB Approach	0.0	A	0.0	A
	SB Approach	15.9	C	14.3	B
2: Old Milburnie Road & Forestville Road	EB Approach	***48.1***	***E***	18.7	C
	WB Approach	***655.5***	***F***	11.0	B
	NB Approach	***223.7***	***F***	12.8	B
	SB Approach	***60.8***	***F***	14.2	B
1: Forestville Road & Buffaloe Road	EB Approach	***226.5***	***F***	***732.1***	***F***
	WB Approach	***215.8***	***F***	22.9	C
	NB Approach	***948.8***	***F***	***55.8***	***E***
	SB Approach	***1519.7***	***F***	***58.0***	***E***
	Total	***847.8***	***F***	***482.5***	***F***
5: Smithfield Road/Horton Road & Forestville Road	EB Approach	17.5	B	17.0	B
	WB Approach	14.6	B	14.5	B
	NB Approach	13.7	B	14.2	B
	SB Approach	12.7	B	12.4	B
	Total	15.0	B	14.9	B
8: Old Milburnie Road & US 64 Business	EB Approach	17.8	B	39.1	D
	WB Approach	29.6	C	31.4	C
	NB Approach	***58.6***	***E***	***78.2***	***E***
	SB Approach	31.5	C	49.5	D
	Total	25.9	C	37.0	D

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.



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Allen Park
Traffic Impact Analysis
2028 Background Traffic Volumes

Figure 3-1

4 SITE TRIP GENERATION AND DISTRIBUTION

Site trips for the Allen Park Development were estimated based on the proposed land use supplied by the developer and subsequently distributed onto the surrounding roadway network.

4.1 TRIP GENERATION

The site-generated trips shown in **Table 4-1** are based on trip generation information provided in the 10th Edition of the ITE's *Trip Generation Manual* and the anticipated development of the residential land use. Trip generation was calculated using the provided equation, and the proposed number of residential units as the independent variable (per NCDOT standards).

Table 4-1: Trip Generation Summary

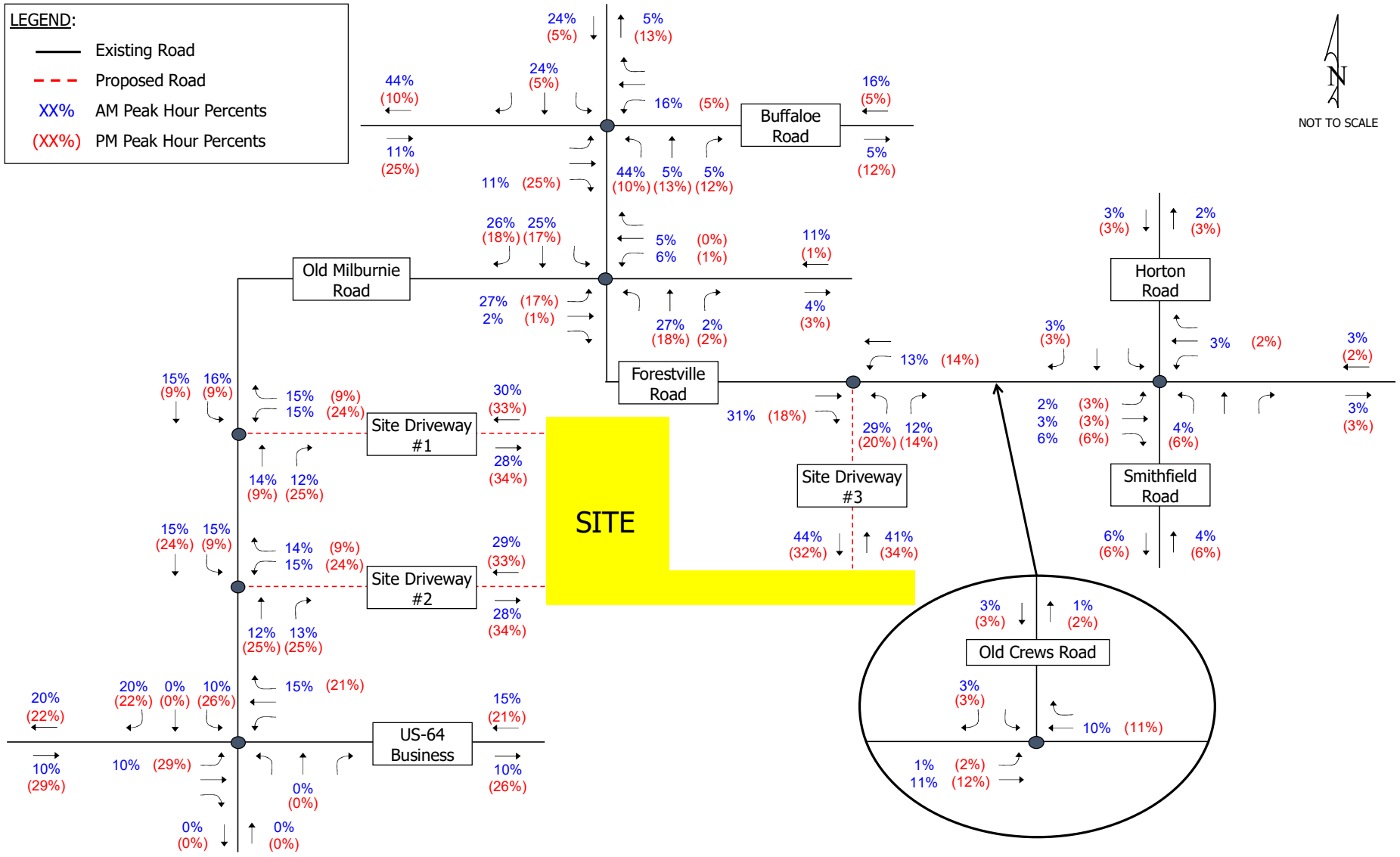
ITE Land Use Code	Independent Variable	Daily			AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
210 – Single Family Detached Housing	447 Units	2,062	2,062	4,124	81	242	322	270	158	428
220 – Multifamily Housing (Low-Rise)	173 Units	634	634	1,268	18	62	80	60	36	96
Total:		2,696	2,696	5,392	99	303	402	330	194	524

SOURCE: Institute of Transportation Engineers' *Trip Generation Manual* 10th Edition (2017)

AM peak hour trips generated totaled 99 incoming and 303 outgoing where PM peak hour trips totaled 330 incoming and 194 outgoing. Average daily traffic (ADT) volumes generated by the development totaled 5,392 vehicles per day. No reduction in trips was included due to internal capture and/or pass-by trips.

4.2 TRIP DISTRIBUTION

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing AM and PM peak hour traffic characteristics as well as engineering judgment. It was assumed, for purposes of this study, that all site traffic would enter and exit the study area in the same manner as the existing traffic. The percentages were routed, via shortest path, to and from the proposed development. This distribution was submitted to, reviewed, and approved by the NCDOT and Town of Knightdale prior to the submittal of this study. The distribution percentages were then applied to the generated trips to predict routes and project traffic volumes for the 2028 Build scenario. **Figure 4-1** shows the trip distribution percentages. **Figure 4-2** shows the trip distribution volumes. 2028 Build traffic volumes were determined by applying the combined site trip distribution volumes to the Background traffic volumes (see **Figure 3-1**).



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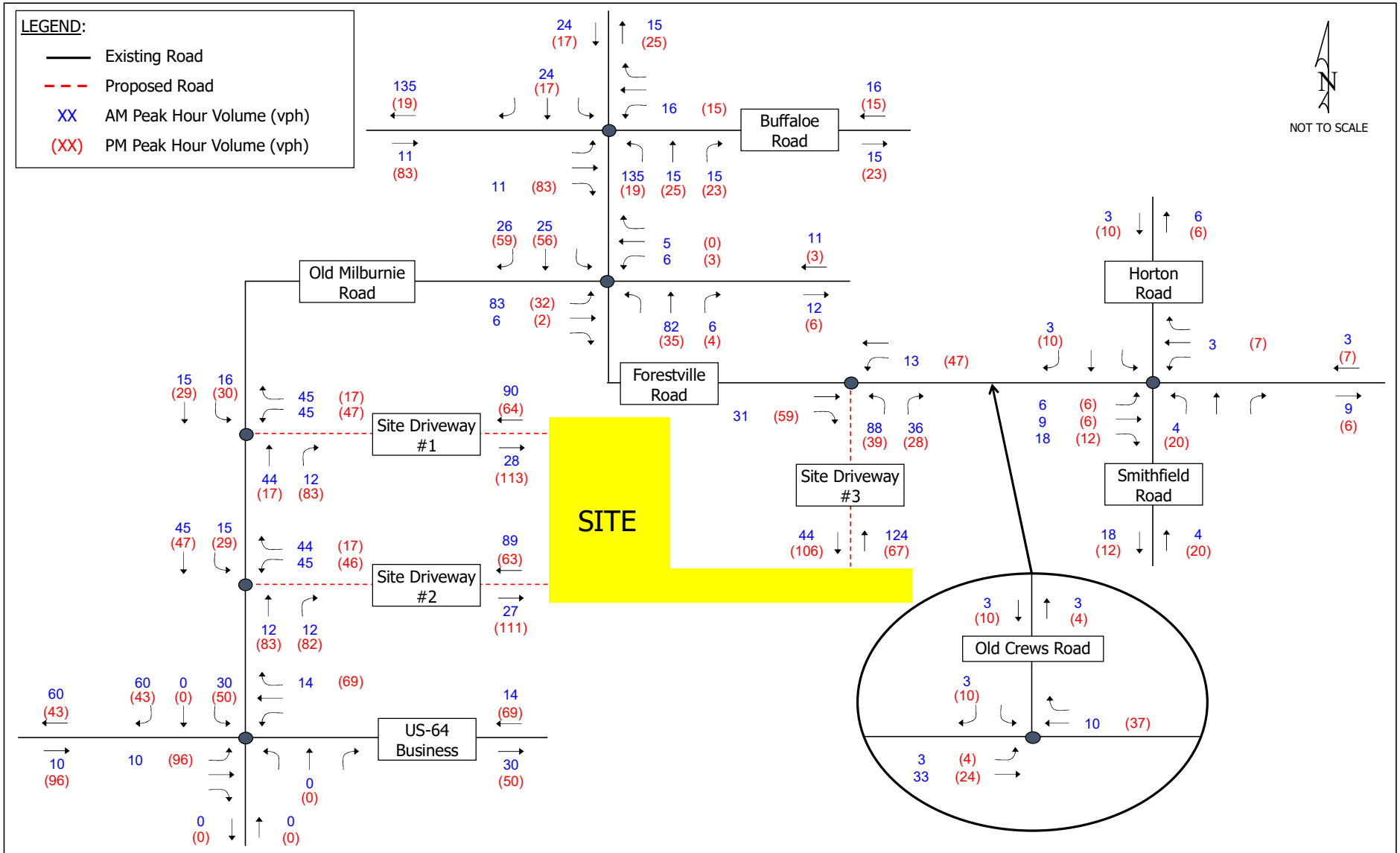
Allen Park
Traffic Impact Analysis
Trip Distribution Percentages

Figure 4-1



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Allen Park
Traffic Impact Analysis
Trip Distribution Volumes

Figure 4-2

5 BUILD CONDITION AND ANALYSIS

To complete the 2028 Build analyses (including the proposed development), the estimated site trips were added to the 2028 Background traffic volumes. The projected total volumes, along with the existing intersection geometry, were used to complete the capacity and turn lane warrant analyses.

5.1 BUILD TRAFFIC VOLUMES

The Background traffic volumes were added to the projected site trips from the Allen Park Development to generate the Build traffic volumes (background + site).

The 2028 Build traffic volumes shown on **Figure 5-1** contain the following:

- Existing 2020 turning movement traffic count volumes grown exponentially for 8 years at a 3% ambient growth rate (**Figure 3-1**); and
- Total site trips generated by the subject development (**Figure 4-2**).

5.2 2028 BUILD ANALYSIS

Table 5-1 summarizes the intersection LOS and delay based on the geometry shown in **Figure 2-2** and the 2028 Build traffic volumes shown in **Figure 5-1**. The corresponding SYNCHRO output is included in **Appendix C**.

All approaches at the unsignalized intersection of Site Driveway #3 / Forestville Road are projected to operate at a LOS D or better during the 2028 Build AM and PM peak hours. Per the NCDOT Policy on Street and Driveway Access to North Carolina Highways Manual:

"Generally left and right turn lanes and tapers shall be considered when:

- *In accordance with G.S. 136-18(29), the average daily traffic meets or exceeds 4,000 vehicles per day on any secondary route (the average daily traffic should include both the existing traffic plus traffic generated by the proposed development)"*

Per the NCDOT AADT maps, Forestville Road will exceed 4,000 VPD in 2028. Because of this, turn lanes were considered at Site Driveway #3. Per the NCDOT Nomograph (see **Appendix E**) and projected 2028 peak hour volumes, a 50-foot eastbound right-turn lane (with appropriate taper) and a 50-foot westbound left-turn lane (with appropriate taper) are recommended. Per **Table 5-2**, following this improvement, all approaches are projected to continue to operate acceptably.

All approaches at the unsignalized intersection of Forestville Road / Old Crews Road are projected to operate at a LOS C or better during the 2028 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the subject development.

All approaches at the unsignalized intersection of Old Milburnie Road / Site Driveway #1 are projected to operate at a LOS D or better during the 2028 Build AM and PM peak hours. It is projected that the AADT along Old Milburnie Road will exceed 4,000 VPD in 2028. Because of this, turn lanes were considered at Site Driveway #1. Per the NCDOT Nomograph (see **Appendix E**) and projected 2028 peak hour volumes, the construction a 100-foot northbound right-turn lane (with appropriate taper) and a 50-foot southbound left-turn lane (with appropriate taper) are recommended. Per **Table 5-2**, following this improvement, all approaches are projected to continue to operate acceptably.

All approaches at the unsignalized intersection of Old Milburnie Road / Site Driveway #2 are projected to operate at a LOS C or better during the 2028 Build AM and PM peak hours. As previously stated, Old Milburnie Road will exceed 4,000 VPD in 2028. Because of this, turn lanes were considered at Site Driveway #2. A northbound right-turn lane was considered but was deemed infeasible due to its proximity to the I-540 bridge and NCDOT control of access. Per the NCDOT Nomograph (see **Appendix E**) and projected 2028 peak hour volumes, the construction a 100-foot northbound right-turn lane (with appropriate taper) and a 50-foot southbound left-turn lane (with appropriate taper) are recommended. Per **Table 5-2**, following this improvement, all approaches are projected to continue to operate acceptably.

All approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are projected to operate at an unacceptable LOS during the 2028 Build AM peak hour. All other intersection approaches are projected to operate at a LOS D or better during the PM peak hour. There are no geometric improvements that would cause the intersection to operate acceptably as an all-way stop intersection. Despite this, to help with overall intersection operations, it is recommended that 100-foot left-turn lanes (with appropriate taper lengths) be constructed on both Old Milburnie Road intersection approaches. These turn lanes will help provide additional storage for queued vehicles. It should be noted that this improvement is dependent upon the availability of right-of-way. It is currently unknown if adequate right-of-way is available at this intersection to accommodate these improvements. Although intersection signalization with the construction of turn lanes would allow for the intersection to operate acceptably, current traffic volumes (COVID-19 impacted) do not meet MUTCD peak hour signal warrants. This intersection should be monitored (by future area developments) for intersection signalization.

The signalized intersection of Forestville Road / Buffaloe Road is projected to operate at an overall LOS F during both 2028 Build AM and PM peak hours. Multiple approaches are projected to operate unacceptably during both peak hours. Although the intersection is projected to operate unacceptably, no improvements are recommended at this intersection due to the construction of the proposed development. The subject development increases delay by less than 14% on all approaches, except for the AM northbound approach (delay to be increased by 36%). The intersection delay is caused by high volume on all approaches. Although the subject development increases northbound left-turn delay during the AM peak hour, there is currently a northbound left-turn lane with significant storage. Without two receiving lanes along Buffaloe Road, the construction of dual northbound left-turn lane (to help movement delay) is infeasible. Because of this, no improvements are recommended at this intersection due to the construction of the subject development.

The signalized intersection of Smithfield Road / Horton Road / Forestville Road is projected to operate at an overall LOS B during both 2028 Build AM and PM peak hours. All intersection approaches are projected to operate at a LOS B. No improvements are recommended at this intersection due to the construction of the subject development.

The signalized intersection of Old Milburnie Road / US 64 Business is projected to operate at an overall LOS C and E during the 2028 Build AM and PM peak hours, respectively. The northbound approach is projected to operate at a LOS E during both peak hours. The eastbound approach is projected to operate at a LOS E during the PM peak hour. All other intersection approaches are projected to operate at a LOS D or better during both peak hours. Although the intersection is projected to operate unacceptably during the PM peak hour, no improvements are recommended at this intersection due to the construction of the proposed development. The subject development increases delay by less than 10% on all approaches, except for the PM eastbound approach. The intersection delay is caused by significant commuter volumes along US 64 Business. It should be noted that with right-turns on red allowed (currently shown as prohibited per NCDOT standards), the intersection is projected to operate acceptably during both peak hours. Because of this, no improvements are recommended at this intersection due to the construction of the subject development.

5.3 2028 BUILD WITH IMPROVEMENTS (UDO REQUIRED)

As discussed, all approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are projected to operate at an unacceptable LOS during the 2028 Build AM peak hour. Per the Town's UDO, the following improvement was identified (but not recommended of this development) to either maintain an acceptable LOS or the existing LOS (if existing LOS is E or worse) and delay (as close as possible) during the full build-out scenario for each traffic movement and approach:

- Construction of a roundabout; or
- Intersection signalization with the following:
    - Construction of an eastbound left-turn lane
    - Construction of a westbound left-turn lane
    - Optimized signal timings

The signalized intersection of Forestville Road / Buffaloe Road is projected to operate at a LOS F during both peak hours. Multiple approaches are projected to operate unacceptably during both peak hours. The following improvements were identified to either maintain an acceptable LOS or the existing LOS and delay for each traffic movement and approach:

- Construction of dual northbound left-turn lanes with an additional westbound receiving lane (along Buffaloe Road);
- Construction of an eastbound right-turn lane;
- Signal optimization; and
- Enabling right-turns on red

The signalized intersection of Old Milburnie Road / US 64 Business is projected to operate at a LOS C and E during the 2028 Build AM and PM peak hours, respectively. Multiple approaches are projected to operate unacceptably during both peak hours. The following improvements were identified to allow for all intersection movements to operate acceptably:

- Signal optimization; and
- Enabling right-turns on red

Following the construction of the improvements above, all intersections / intersection movements are projected to operate at an acceptable LOS or at the Existing LOS (see **Table 5-3)**. **Figure 6-1** shows the UDO required improvements. The corresponding SYNCHRO outputs are provided in **Appendix C**.

5.4 2038 HORIZON YEAR ANALYSIS

To complete the 2038 Horizon Year analyses (including the proposed development), the 2028 Background traffic volumes were grown at a 3% ambient growth rate for eighteen (18) years and added to the estimated site trips. The projected total volumes, along with the proposed intersection geometry (see **Figure 6-1**), were used to complete the capacity and turn lane warrant analyses.

The 2038 Horizon Year traffic volumes shown on **Figure 5-2** contain the following:

- Existing 2020 turning movement traffic count volumes grown exponentially for 18 years at a 3% ambient growth rate; and

- Total site trips generated by the subject development (**Figure 4-2**).

Table 5-4 summarizes the intersection LOS and Delay based on the 2038 Horizon Year traffic volumes (see **Figure 5-2**). The corresponding SYNCHRO outputs are included in **Appendix C**.

The northbound approach at the unsignalized intersection of Site Driveway #3 / Forestville Road is projected to operate at a LOS F during the 2038 Horizon Year AM peak hour. All other intersection approaches are projected to operate at a LOS C or better during both peak hours.

The southbound approach at the unsignalized intersection of Forestville Road / Old Crews Road is projected to operate at a LOS E during the 2038 Horizon Year AM peak hour. All other intersection approaches are projected to operate at a LOS D or better during both peak hours.

The westbound approach at the unsignalized intersection of Old Milburnie Road / Site Driveway #1 is projected to operate at a LOS F during the 2038 Horizon Year AM peak hour. All other intersection approaches are projected to operate at a LOS C or better during both peak hours.

The westbound approach at the unsignalized intersection of Old Milburnie Road / Site Driveway #2 is projected to operate at a LOS F during the 2038 Horizon Year AM peak hour. All other intersection approaches are projected to operate at a LOS C or better during both peak hours.

Multiple approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are projected to operate at an unacceptable LOS during both 2038 Horizon Year peak hours.

The signalized intersection of Forestville Road / Buffaloe Road is projected to operate at an overall LOS F during both 2038 Horizon Year AM and PM peak hours. Multiple approaches are projected to operate unacceptably during both peak hours.

The signalized intersection of Smithfield Road / Horton Road / Forestville Road is projected to operate at an overall LOS C during both 2038 Horizon Year AM and PM peak hours. All intersection approaches are projected to operate at a LOS C or better during both peak hours.

The signalized intersection of Old Milburnie Road / US 64 Business is projected to operate at an overall LOS D and F during the 2038 Horizon Year AM and PM peak hours, respectively. Multiple approaches are projected to operate unacceptably during both peak hours.

Table 5-1: Intersection Level of Service and Delay Summary
2028 Build Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
3: Site Driveway #3 & Forestville Road	EB Approach	0.0	A	0.0	A
	WB Approach	0.2	A	1.5	A
	NB Approach	27.7	D	13.8	B
4: Forestville Road & Old Crews Road	EB Approach	0.3	A	0.3	A
	WB Approach	0.0	A	0.0	A
	SB Approach	17.4	C	16.0	C
6: Old Milburnie Road & Site Driveway #1	WB Approach	25.4	D	15.9	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.2	A	1.1	A
7: Old Milburnie Road & Site Driveway #2	WB Approach	24.7	C	17.6	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.4	A	1.0	A
2: Old Milburnie Road & Forestville Road	EB Approach	***121.6***	***F***	31.7	D
	WB Approach	***817.5***	***F***	12.9	B
	NB Approach	***420.9***	***F***	17.2	C
	SB Approach	***124.0***	***F***	26.7	D
1: Forestville Road & Buffaloe Road	EB Approach	***228.0***	***F***	***799.2***	***F***
	WB Approach	***219.9***	***F***	23.6	C
	NB Approach	***1297.2***	***F***	***63.5***	***E***
	SB Approach	***1451.3***	***F***	***64.3***	***E***
	Total	***877.7***	***F***	***519.3***	***F***
5: Smithfield Road/Horton Road & Forestville Road	EB Approach	17.2	B	16.3	B
	WB Approach	17.3	B	17.2	B
	NB Approach	15.2	B	16.1	B
	SB Approach	14.0	B	13.8	B
	Total	16.1	B	15.9	B
8: Old Milburnie Road & US 64 Business	EB Approach	19.6	B	***78.1***	***E***
	WB Approach	31.1	C	32.9	C
	NB Approach	***59.9***	***E***	***79.3***	***E***
	SB Approach	33.1	C	52.5	D
	Total	27.8	C	***59.1***	***E***

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

Table 5-2: Intersection Level of Service and Delay Summary
2028 Build + Improvements Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
3: Site Driveway #3 & Forestville Road	EB Approach	0.0	A	0.0	A
	WB Approach	0.2	A	1.5	A
	NB Approach	26.5	D	13.3	B
6: Old Milburnie Road & Site Driveway #1	WB Approach	24.7	C	15.1	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.2	A	1.1	A
7: Old Milburnie Road & Site Driveway #2	WB Approach	24.5	C	16.6	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.1	A	1.0	A
2: Old Milburnie Road & Forestville Road	EB Approach	28.9	D	16.0	C
	WB Approach	***428.5***	***F***	11.8	B
	NB Approach	***353.9***	***F***	15.8	C
	SB Approach	***83.6***	***F***	23.7	C

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

Table 5-3: Intersection Level of Service and Delay Summary
2028 Build + UDO Required Improvements Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
1: Forestville Road & Buffaloe Road	EB Approach	19.9	B	***97.8***	***F***
	WB Approach	***571.6***	***F***	***60.6***	***E***
	NB Approach	***468.4***	***F***	***60.8***	***E***
	SB Approach	***697.5***	***F***	38.8	D
	Total	***506.1***	***F***	***81.0***	***F***
2: Forestville Road & Old Milburnie Road	EB Approach	21.5	C	15.4	B
	WB Approach	***323.6***	***F***	13.3	B
	NB Approach	52.0	D	13.3	B
	SB Approach	16.5	B	18.0	B
	Total	***153.1***	***F***	15.7	B
8: Old Milburnie Road & US 64 Business	EB Approach	18.3	B	33.5	C
	WB Approach	29.4	C	51.9	D
	NB Approach	50.2	D	52.9	D
	SB Approach	24.7	C	52.8	D
	Total	24.8	C	42.0	D

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.

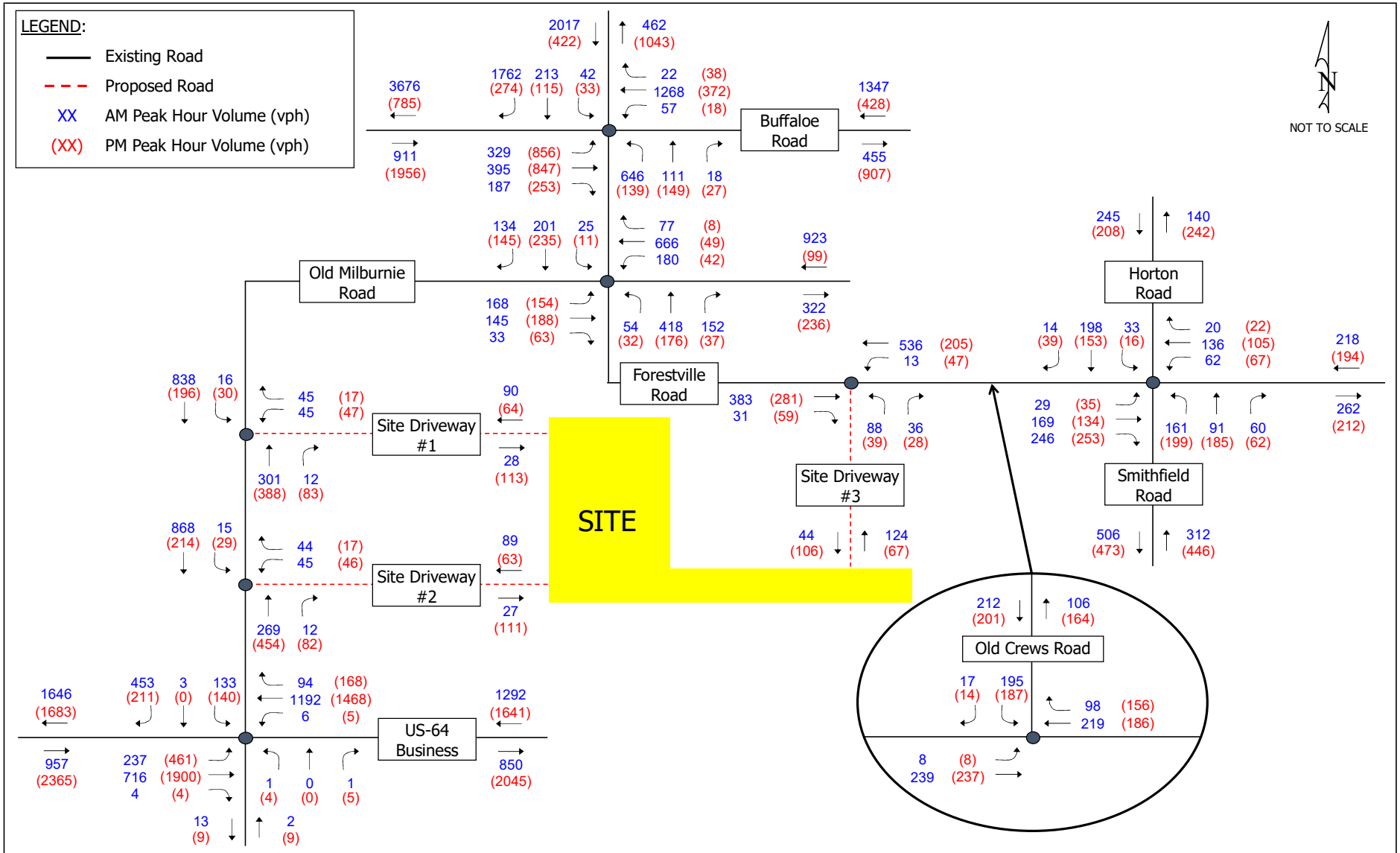
Table 5-4: Intersection Level of Service and Delay Summary
2038 Horizon Year Traffic Volumes

Intersection and Type of Control	Movement and Approach	AM PEAK HOUR		PM PEAK HOUR	
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]
3: Site Driveway #3 & Forestville Road	EB Approach	0.0	A	0.0	A
	WB Approach	0.2	A	1.2	A
	NB Approach	***60.7***	***F***	15.8	C
4: Forestville Road & Old Crews Road	EB Approach	0.3	A	0.2	A
	WB Approach	0.0	A	0.0	A
	SB Approach	***35.0***	***E***	26.8	D
6: Old Milburnie Road & Site Driveway #1	WB Approach	***57.0***	***F***	19.1	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.1	A	1.0	A
7: Old Milburnie Road & Site Driveway #2	WB Approach	***52.6***	***F***	22.6	C
	NB Approach	0.0	A	0.0	A
	SB Approach	0.1	A	0.9	A
2: Old Milburnie Road & Forestville Road	EB Approach	***245.1***	***F***	***149.7***	***F***
	WB Approach	***1243.4***	***F***	18.9	C
	NB Approach	***673.2***	***F***	***36.1***	***E***
	SB Approach	***265.6***	***F***	***101.7***	***F***
1: Forestville Road & Buffaloe Road	EB Approach	***361.2***	***F***	***1248.3***	***F***
	WB Approach	***435.3***	***F***	29.7	C
	NB Approach	***1768.4***	***F***	***86.3***	***F***
	SB Approach	***2003.1***	***F***	***81.9***	***F***
	Total	***1247.5***	***F***	***809.4***	***F***
5: Smithfield Road/Horton Road & Forestville Road	EB Approach	19.9	B	18.8	B
	WB Approach	18.9	B	19.2	B
	NB Approach	28.2	C	29.5	C
	SB Approach	18.7	B	17.6	B
	Total	21.6	C	22.4	C
8: Old Milburnie Road & US 64 Business	EB Approach	51.1	D	***202.8***	***F***
	WB Approach	35.5	D	44.7	D
	NB Approach	***85.6***	***F***	***89.3***	***F***
	SB Approach	***63.7***	***E***	***89.1***	***F***
	Total	46.6	D	***134.1***	***F***

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

**Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO.



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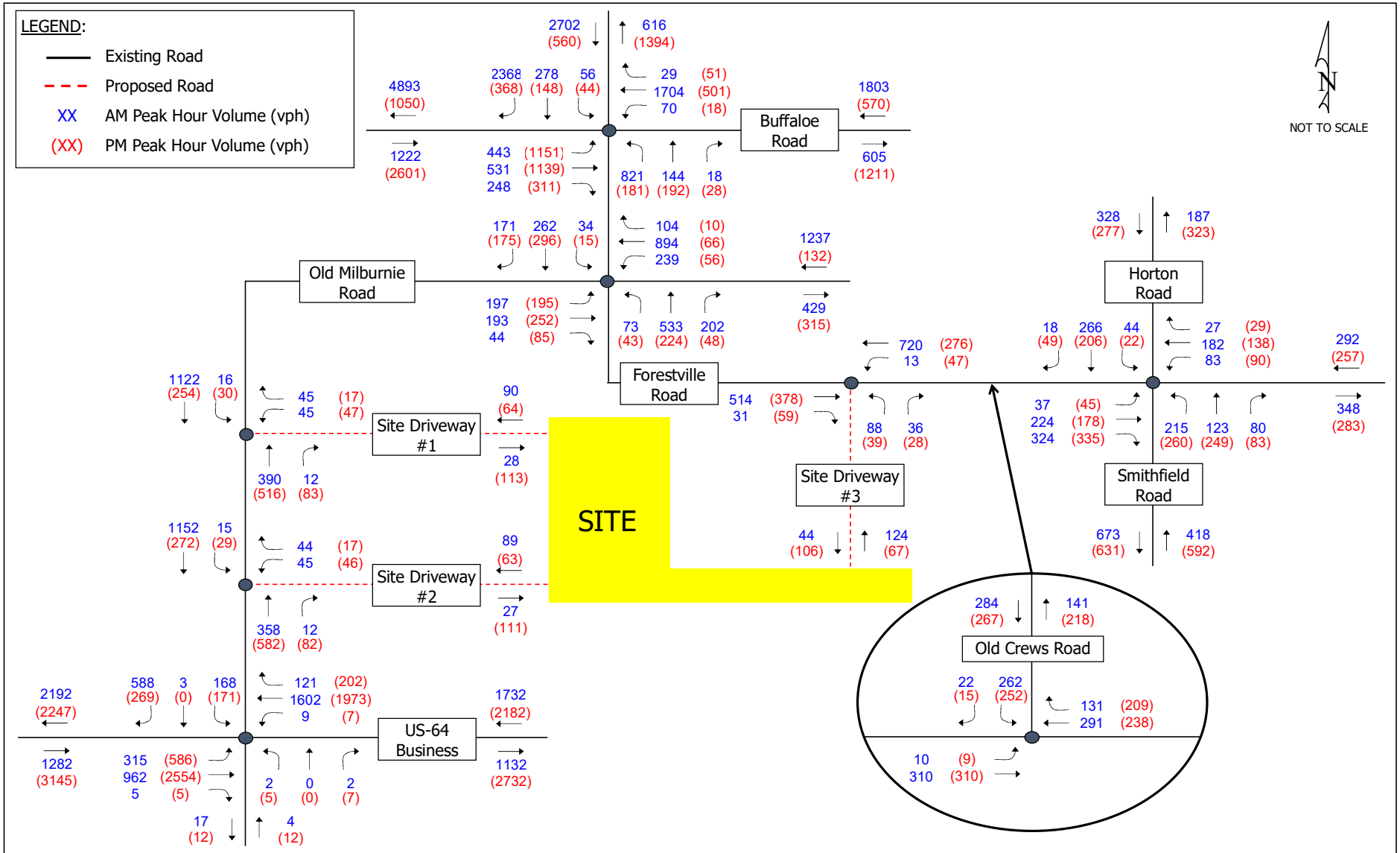
Allen Park
Traffic Impact Analysis
2028 Build Traffic Volumes

Figure 5-1



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Allen Park
Traffic Impact Analysis
2038 Horizon Year Traffic Volumes

Figure 5-2

6 CONCLUSIONS AND RECOMMENDATIONS

Capacity analyses were performed for 2020 Existing, 2028 Background, 2028 Build (Background + site trips) traffic volumes, 2028 Build + Improvements, 2028 Build + UDO Improvements, and 2038 Horizon Year (2038 background + site trips) traffic volumes. **Figure 6-1** shows the recommended improvements discussed below.

- All approaches at the unsignalized intersection of Site Driveway #3 / Forestville Road are projected to operate at a LOS D or better during the 2028 Build AM and PM peak hours. Per NCDOT requirements, the following intersection improvements are recommended:
    - Construction of a 50' eastbound right-turn lane (with appropriate taper)
    - Construction of a 50' westbound left-turn lane (with appropriate taper)

- All approaches at the unsignalized intersection of Forestville Road / Old Crews Road are projected to operate at a LOS C or better during the 2028 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the subject development.

- All approaches at the unsignalized intersection of Old Milburnie Road / Site Driveway #1 are projected to operate at a LOS D or better during the 2028 Build AM and PM peak hours. Per NCDOT requirements, the following intersection improvements are recommended:
    - Construction of a 100' northbound right-turn lane (with appropriate taper)
    - Construction of a 50' southbound left-turn lane (with appropriate taper)

- All approaches at the unsignalized intersection of Old Milburnie Road / Site Driveway #2 are projected to operate at a LOS D or better during the 2028 Build AM and PM peak hours. Per NCDOT requirements, the following intersection improvements are recommended:
    - Construction of a 100' northbound right-turn lane (with appropriate taper)
    - Construction of a 50' southbound left-turn lane (with appropriate taper)

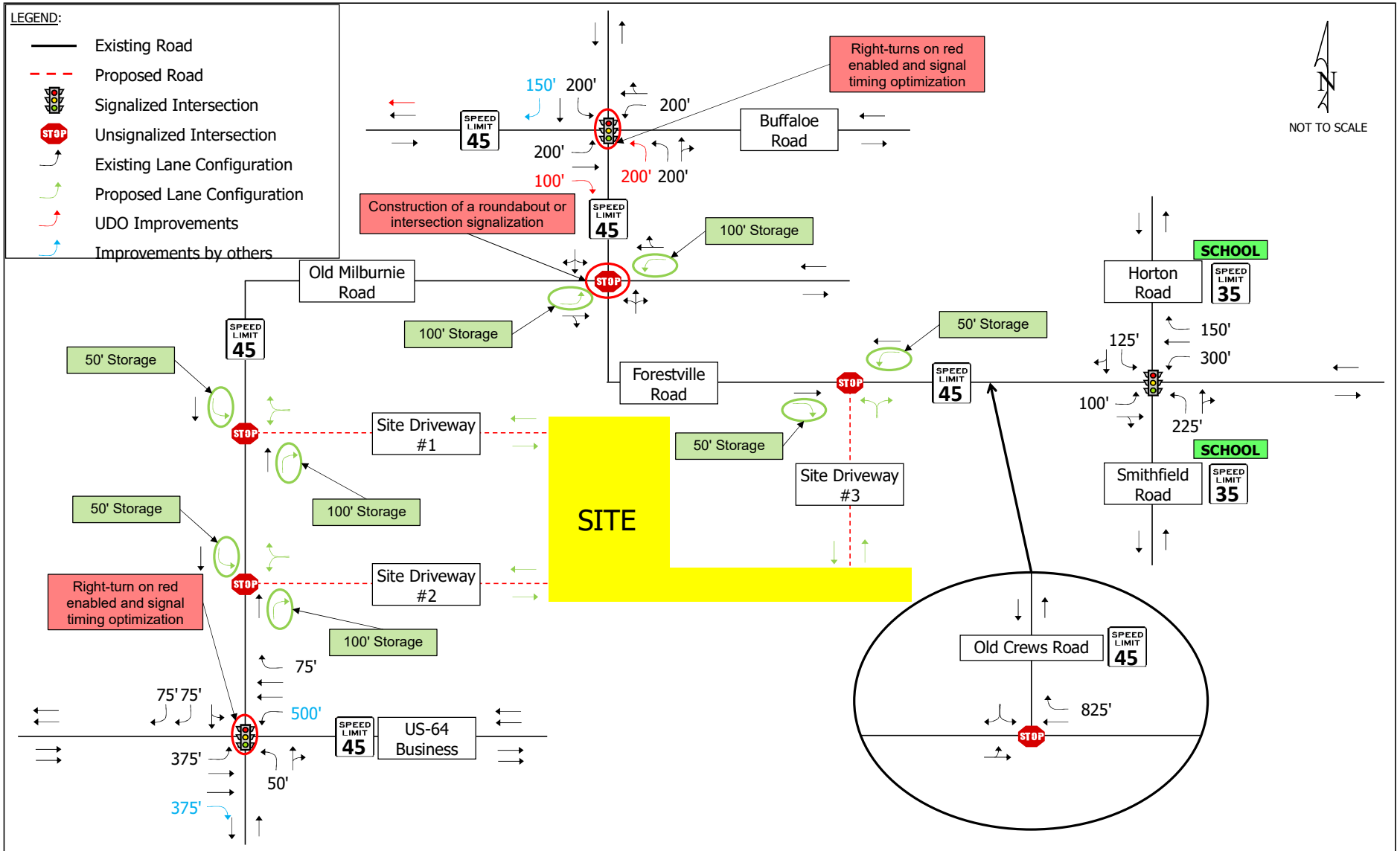
- All approaches at the unsignalized intersection of Old Milburnie Road / Forestville Road are projected to operate at an unacceptable LOS during the 2028 Build AM peak hour. All other intersection approaches are projected to operate at a LOS D or better during the PM peak hour. To help improve intersection operations, the following improvements are recommended:
    - Construction of a 100-foot eastbound left-turn lane (with appropriate taper)
    - Construction of a 100-foot westbound left-turn lane (with appropriate taper)

- The signalized intersection of Forestville Road / Buffaloe Road is projected to operate at an overall LOS F during both 2028 Build AM and PM peak hours. Multiple approaches are projected to operate unacceptably during both peak hours. Northbound dual left-turn lanes are necessary to make the northbound approach operate acceptably; however, dual left-turn lanes are not feasible at this location as only one receiving lane exists along Buffaloe Road. No improvements are recommended at this intersection due to the construction of the subject development.

- The signalized intersection of Smithfield Road / Horton Road / Forestville Road is projected to operate at an overall LOS B during both 2028 Build AM and PM peak hours. All intersection approaches are projected to operate at a LOS B. No improvements are recommended at this intersection due to the construction of the subject development.

- The signalized intersection of Old Milburnie Road / US 64 Business is projected to operate at an overall LOS C and E during the 2028 Build AM and PM peak hours, respectively. Per the UDO analysis, enabling right-turns on red along with optimized signal timings will result in an acceptable overall intersection LOS, as well as an acceptable LOS for all approaches during both peak hours.

Because of this, no improvements are recommended at this intersection due to the construction of the subject development.



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Allen Park
Traffic Impact Analysis
2028 Proposed Lane Configuration

Figure 6-1

Appendix A – Scoping Documents

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Allen Park Development Meeting Minutes (12/10/20)

Attendees:

Sean Brennan	NCDOT (District)	spbrennan@ncdot.gov
Clarence Bunting	NCDOT (Cong. Man.)	cbunting@ncdot.gov
Kevin Lewis	Town of Knightdale	kevin.lewis@knightdalenc.gov
Brian Massengill	Natelli Communities	brian@natelli.com
Beth Blackmon	Timmons Group	beth.blackmon@timmons.com
Cliff Lawson	Timmons Group	cliff.lawson@timmons.com
Jeff Hochanadel	Timmons Group	jeff.hochanadel@timmons.com

Items Discussed:

- A scoping meeting was held to discuss the Allen Park TIA
- The proposed development will consist of 620 residential units
- The proposed development will be constructed by 2027
- There are two proposed site driveways connections to Old Milburnie Road
- There is one proposed site driveway connection to Forestville Road
- Timmons Group will analyze the following conditions:
    - 2020 Existing
    - 2027 Background
    - 2027 Build
    - 2027 Build + Improvements (as needed)
- 3% ambient growth rate
- Timmons Group will analyze the following study area intersections:
    - Site Driveway 1 / Old Milburnie Road
    - Site Driveway 2 / Old Milburnie Road
    - Site Driveway 3 / Forestville Road
    - Buffaloe Road / Forestville Road
    - Old Milburnie Road / Forestville Road
    - Old Milburnie Road / US-64 Business
    - Forestville Road / Smithfield Road / Horton Road*

* Intersection added by Town of Knightdale

- No approved area developments:
- No high crash locations
- No STIP / Town funded roadway improvement projects
- Timmons Group will attempt to locate existing area turning movement traffic counts
- Town will provide a 2018 draft TIA for a parcel north of Old Lewis Farm Road which includes area count data
- Timmons Group will supplement available count data with collected turning movement traffic counts
- A COVID-19 factor will be applied to any newly conducted turning movement traffic counts
- Timmons Group will provide TIA scoping meeting minutes which will serve as the project scope
- Three (3) TIA hard copies will be submitted to the Town of Knightdale (per the UDO)
- Electronic TIA copies will be submitted to the NCDOT

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www.timmons.com
Site Development | Residential | Infrastructure | Technology

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Per a 12/15/20 email from the Town:

- Per Town standards, the following updated conditions will be analyzed:
  - 2020 Existing
  - 2028 Background
  - 2028 Build (2027 Build + 1 Year)
  - 2028 Build + Improvements (as needed)
  - 2038 Future (2028 + 10 Years)
- The TIA will offer capacity mitigation recommendations where LOS values fall below LOS D
- Timmons Group will provide trip distribution percentages to the Town (for review) prior to submitting the TIA
- The following study area intersection was added to the project scope:
  - Forestville Road / Old Crews Road

Jake Glas

From: Bunting, Clarence B <cbunting@ncdot.gov>
Sent: Tuesday, December 22, 2020 3:29 PM
To: Jeff Hochanadel
Cc: Brennan, Sean P; Kevin Lewis; Jake Glas; Cliff Lawson
Subject: RE: [External] Allen Park TIA

Jeff,

I'm comfortable with this if the Town and District are.

Thanks,
Clarence

From: Jeff Hochanadel <Jeff.Hochanadel@timmons.com>
Sent: Tuesday, December 22, 2020 2:40 PM
To: Bunting, Clarence B <cbunting@ncdot.gov>
Cc: Brennan, Sean P <spbrennan@ncdot.gov>; Kevin Lewis <kevin.lewis@knightdalenc.gov>; Jake Glas <Jake.Glas@timmons.com>; Cliff Lawson <cliff.lawson@timmons.com>
Subject: [External] Allen Park TIA

Clarence,

Timmons Group is currently working on the Allen Park TIA in Knightdale, NC. Per the approved scope, the following intersections are included in the project study area:

- Buffaloe Road / Forestville Road
- Old Milburnie Road / Forestville Road
- Old Milburnie Road / US-64 Business*
- Forestville Road / Old Crews Road*
- Forestville Road / Smithfield Road / Horton Road*

Timmons Group collected turning movement traffic counts at the starred* intersections above and will utilize existing turning movement counts found for the unstarred locations.

Along with the turning movement counts, we collected a 48-hour tube count along Old Milburnie Road south / west of Forestville Road. Our intention is to compare the 2020 ADT (calculated using the tube count data) to the NCDOT AADT count (grown to 2020) conducted at the same location to determine a Covid-19 adjustment factor. Based on the 2020 48-hour tube count, Timmons Group calculated a 2020 ADT of approximately 2,650 VPD. As shown below, the published 2015 AADT at this location was 2,400 VPD and the 2019 AADT in this location was 4,500 VPD. I believe the increase between 2015 and 2019 was due to the construction / modification to a school off Old Milburnie Road, just east of the count location.

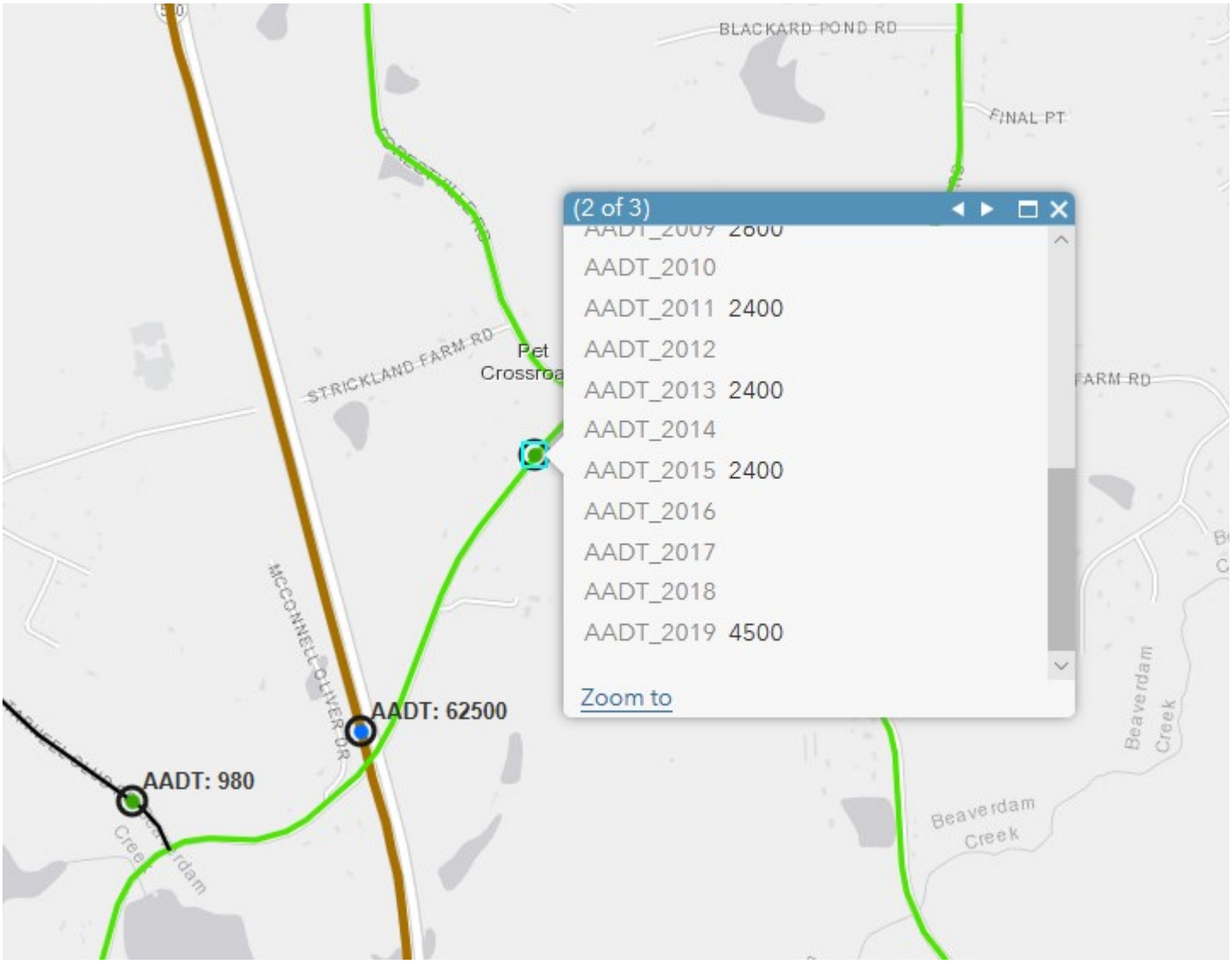
When we compare our 2020 ADT estimate to the projected 2020 AADT (using the 2019 AADT), we calculate a Covid-19 factor of 175%. When we compare our 2020 ADT estimate to the projected 2020 AADT (using the 2015 AADT), we calculate a Covid-19 factor of 105%.

I believe it makes sense to modify the AM peak hour volumes at the intersections of Old Milburnie Road / Old Crews Road and Old Milburnie Road / Forestville Road by 175% to account for Covid-19 as well as the current lack of school traffic. However, I do not agree with modifying the PM peak hour volumes by 175% (as the collected PM peak hour does not coincide with the school peak hour). I propose that the PM peak hour volumes be modified by 105%. The same holds true for the Old Milburnie Road / US-64 Bus intersection volumes. I feel that modifying AM peak hour turning volumes to/from Old Milburnie Road by 175% is appropriate, but I do not feel it would be appropriate to modify PM peak hour turning movement volumes or volumes along US-64 Bus (during either peak) by 175%. For the Old Milburnie Road / US-64 Bus intersection, I propose that we modify the AM peak hour volumes turning to / from Old Milburnie Road by 175% and modify all other volumes at this intersection by 105%.

When the aforementioned factors described above are applied to 2020 peak hour turning movement traffic count volumes, the volumes balance fairly well with the (grown) counts at Forestville Road / Old Milburnie Road (conducted in late 2018).

I want to make sure everyone agrees with the methodology discussed prior to proceeding forward with the study. Thoughts?

Thank You!
Jeff



Jeff Hochanadel, PE, PTOE
North Carolina Transportation Group Leader
TIMMONS GROUP | www.timmons.com
5410 Trinity Rd, Suite 102 | Raleigh, NC 27607
Office: 919.866.4511 | Fax: 919.859.5663
Cell: 919.426.8405
jeff.hochanadel@timmons.com
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Jake Glas

From: Kevin Lewis <kevin.lewis@knightdalenc.gov>
Sent: Sunday, January 10, 2021 7:36 PM
To: Jeff Hochanadel; Bunting, Clarence B
Cc: Brennan, Sean P; Jake Glas; Cliff Lawson
Subject: RE: Allen Park TIA

Jeff,

No comments form us, thanks.

Kevin Lewis, AICP, CZO
Senior Planner – Current

KNIGHTDALE
start something

Town of Knightdale | KnightdaleNC.gov
950 Steeple Square Ct. | Knightdale, NC 27545 | 919-217-2243

The Town of Knightdale has declared a State of Emergency and closed Town facilities to the public until further notice. Police and Fire operations continue uninterrupted. For more information, please visit our website or call 919-217-2200. We appreciate your patience as response times from Town employees working remotely may be longer than usual.

From: Jeff Hochanadel <Jeff.Hochanadel@timmons.com>
Sent: Thursday, January 7, 2021 10:42 AM
To: Kevin Lewis <kevin.lewis@knightdalenc.gov>; Bunting, Clarence B <cbunting@ncdot.gov>
Cc: Brennan, Sean P <spbrennan@ncdot.gov>; Jake Glas <Jake.Glas@timmons.com>; Cliff Lawson <Cliff.Lawson@timmons.com>
Subject: RE: Allen Park TIA

Were there any comments on the attached distribution?

Thanks!
Jeff

From: Jeff Hochanadel
Sent: Monday, January 04, 2021 1:50 PM
To: Kevin Lewis <kevin.lewis@knightdalenc.gov>; Bunting, Clarence B <cbunting@ncdot.gov>
Cc: Brennan, Sean P <spbrennan@ncdot.gov>; Jake Glas <Jake.Glas@timmons.com>; Cliff Lawson

<Cliff.Lawson@timmons.com>
Subject: RE: Allen Park TIA

Kevin,

Please see the attached trip distribution percentages and volumes. The percentages are based on the existing area traffic volumes. Because this land use is similar to adjacent residential land uses, there was no reason to believe the projected traffic would behave differently.

Although I really believe the volume to/from Old Crews Road will be negligible, we did show a small percentage accessing the facility.

Please review and let me know if you have any questions / comments. Please let me know if you need any additional information from Timmons Group.

Thank You!
Jeff

Jeff Hochanadel, PE, PTOE
North Carolina Transportation Group Leader
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jeff.hochanadel@timmons.com
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From: Kevin Lewis <kevin.lewis@knightdalenc.gov>
Sent: Tuesday, December 29, 2020 3:31 PM
To: Jeff Hochanadel <Jeff.Hochanadel@timmons.com>; Bunting, Clarence B <cbunting@ncdot.gov>
Cc: Brennan, Sean P <spbrennan@ncdot.gov>; Jake Glas <Jake.Glas@timmons.com>; Cliff Lawson <Cliff.Lawson@timmons.com>
Subject: RE: Allen Park TIA

Jeff,

Thanks for the analysis and summary. We do not have any issues with these modifications and are comfortable with moving forward.

Have you been able to determine the trip distribution based on this information as well?

Thanks,

Kevin Lewis, AICP, CZO
Senior Planner – Current

Town of Knightdale | KnightdaleNC.gov
950 Steeple Square Ct. | Knightdale, NC 27545 | 919-217-2243

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Subject: Allen Park TIA

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- Buffaloe Road / Forestville Road
- Old Milburnie Road / Forestville Road
- Old Milburnie Road / US-64 Business*
- Forestville Road / Old Crews Road*
- Forestville Road / Smithfield Road / Horton Road*

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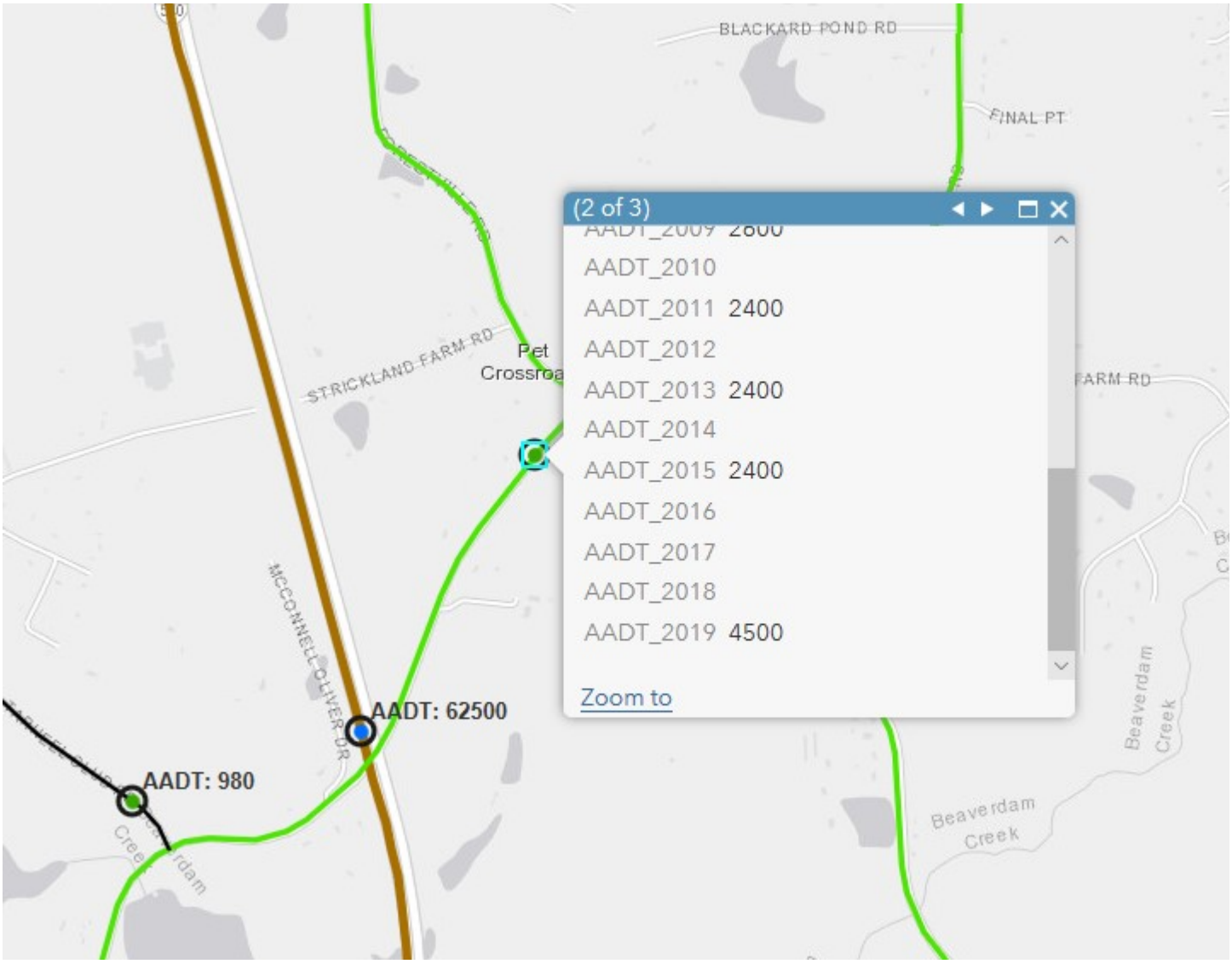

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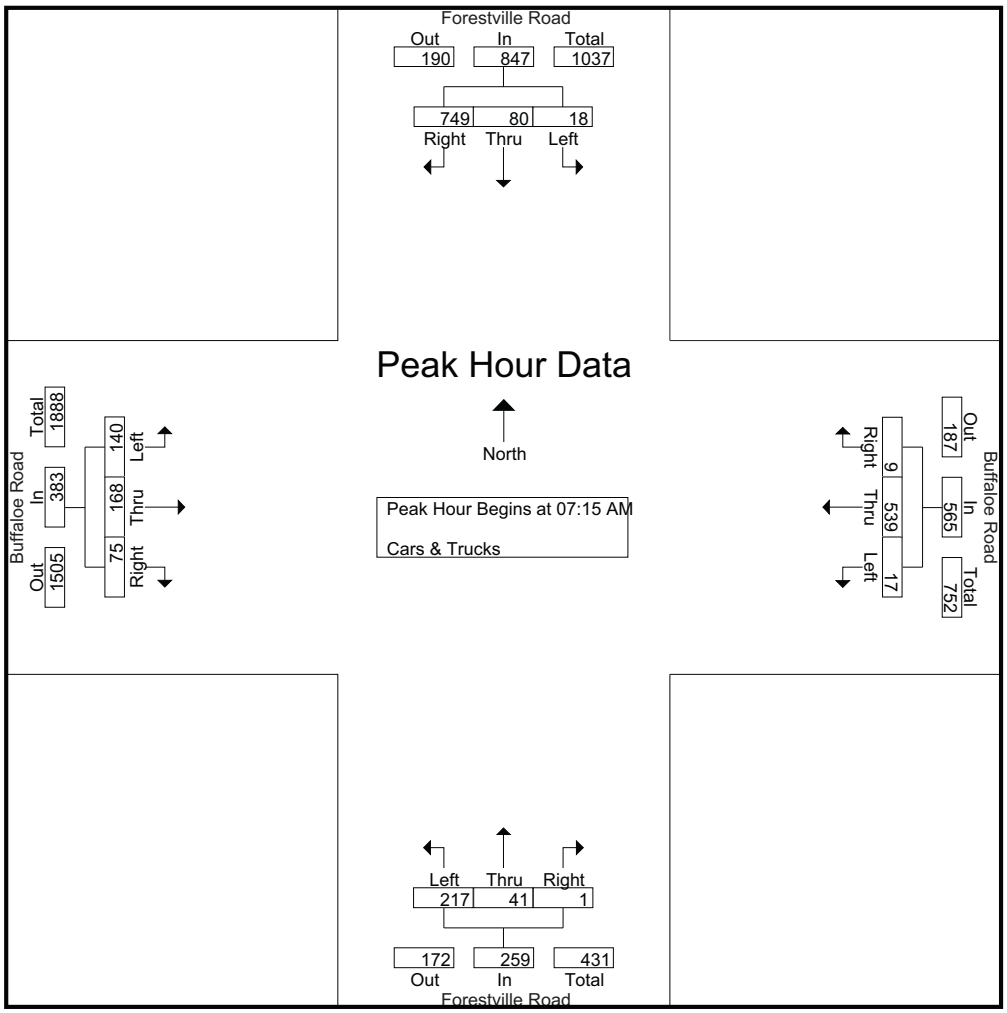
Appendix B – Traffic Counts

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : Buffaloe Road and Forestville Road
Site Code : 00091818
Start Date : 9/18/2018
Page No : 2

	Forestville Road From North				Buffaloe Road From East				Forestville Road From South				Buffaloe Road From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	198	19	**6**	223	**3**	135	0	138	0	9	**64**	73	20	**49**	35	**104**	**538**
07:30 AM	171	9	4	184	1	**148**	0	**149**	0	**15**	63	**78**	15	45	37	97	508
07:45 AM	**215**	11	3	**229**	2	130	0	132	0	11	38	49	**22**	29	**40**	91	501
08:00 AM	165	**41**	5	211	3	126	**17**	146	**1**	6	52	59	18	45	28	91	507
Total Volume	749	80	18	847	9	539	17	565	1	41	217	259	75	168	140	383	2054
% App. Total	88.4	9.4	2.1		1.6	95.4	3		0.4	15.8	83.8		19.6	43.9	36.6		
PHF	.871	.488	.750	.925	.750	.910	.250	.948	.250	.683	.848	.830	.852	.857	.875	.921	.954

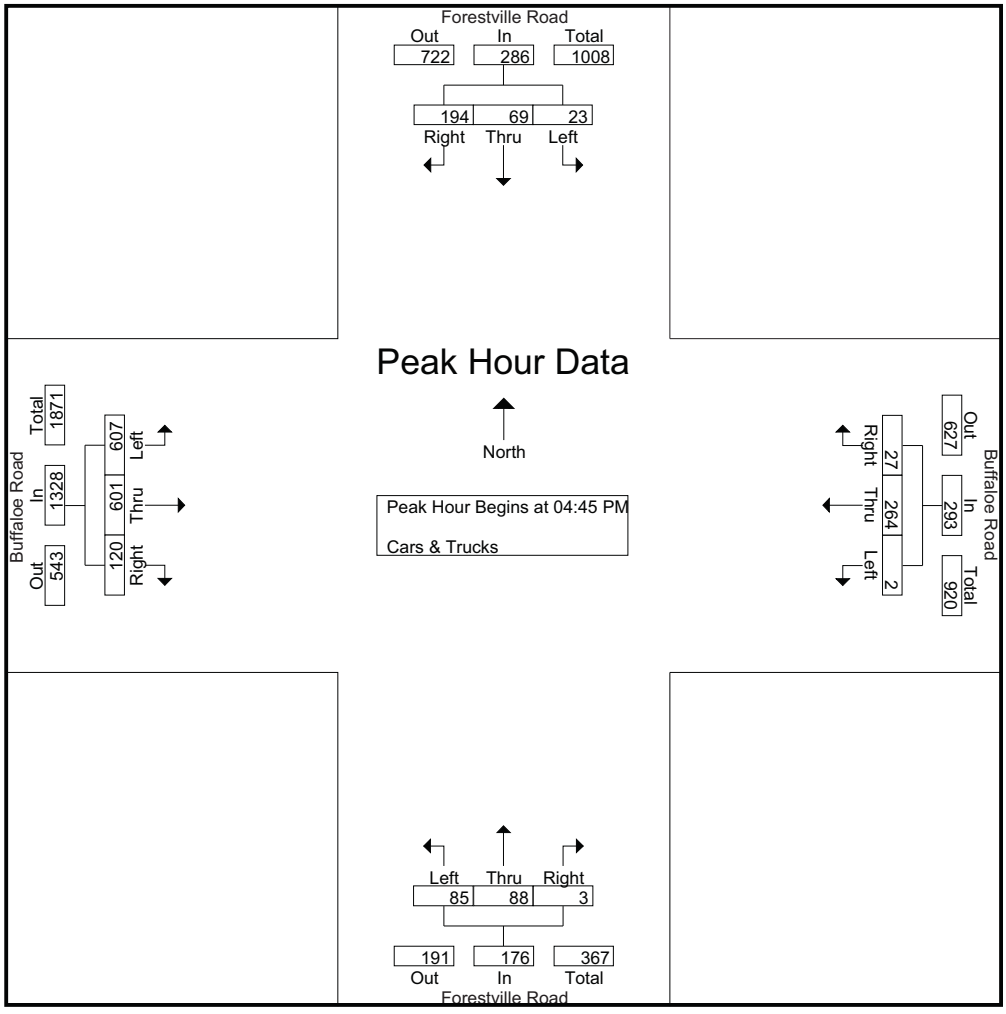


RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : Buffaloe Road and Forestville Road
Site Code : 00091818
Start Date : 9/18/2018
Page No : 3

	Forestville Road From North				Buffaloe Road From East				Forestville Road From South				Buffaloe Road From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	45	20	**7**	72	6	49	**2**	57	**1**	20	**32**	**53**	32	152	127	311	493
05:00 PM	45	15	6	66	**8**	71	0	79	0	22	18	40	**34**	143	155	332	517
05:15 PM	**59**	**21**	5	**85**	5	**76**	0	**81**	1	**25**	20	46	27	148	156	331	**543**
05:30 PM	45	13	5	63	8	68	0	76	1	21	15	37	27	**158**	**169**	**354**	530
Total Volume	194	69	23	286	27	264	2	293	3	88	85	176	120	601	607	1328	2083
% App. Total	67.8	24.1	8		9.2	90.1	0.7		1.7	50	48.3		9	45.3	45.7		
PHF	.822	.821	.821	.841	.844	.868	.250	.904	.750	.880	.664	.830	.882	.951	.898	.938	.959



AM COVID-19 Factor

Horton Road west of Old Knight Road	
Collected 2020	2650.5
Historical AADT 2019	4500
Grown Historical 2020	4635
Covid Adjustment Factor	74.87%
Growth Rate	3%

PM COVID-19 Factor

Horton Road west of Old Knight Road	
Collected 2020	2650.5
Historical AADT 2015	2400
Grown Historical 2020	2782.2578
Covid Adjustment Factor	4.97%
Growth Rate	3%

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : Forestville Road and Old Milburnie Road
Site Code : 00000003
Start Date : 6/5/2018
Page No : 1

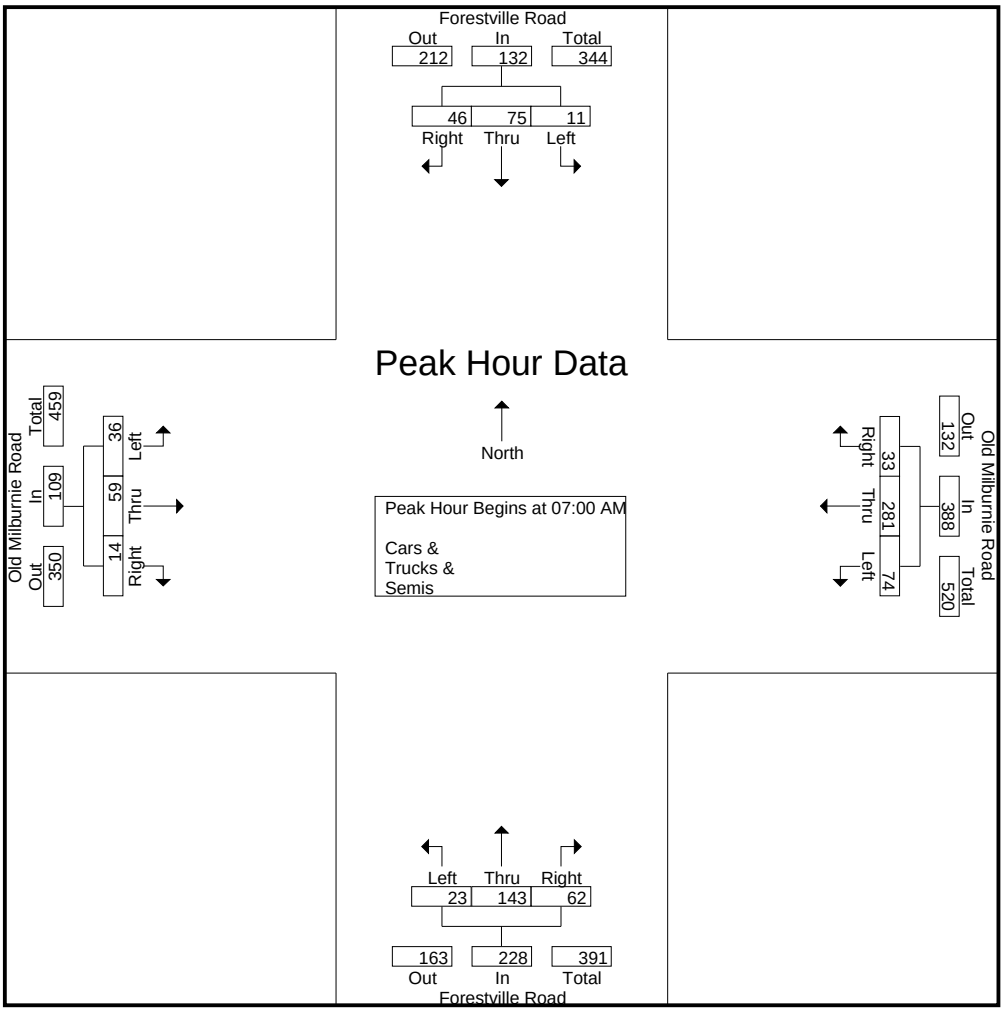
Groups Printed- Cars & - Trucks & - Semis

	Forestville Road From North				Old Milburnie Road From East				Forestville Road From South				Old Milburnie Road From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	17	22	6	45	13	47	24	84	38	41	6	85	4	30	7	41	255
07:15 AM	9	15	1	25	10	98	35	143	18	41	4	63	3	19	9	31	262
07:30 AM	8	18	4	30	4	64	6	74	4	37	9	50	4	3	7	14	168
07:45 AM	12	20	0	32	6	72	9	87	2	24	4	30	3	7	13	23	172
Total	46	75	11	132	33	281	74	388	62	143	23	228	14	59	36	109	857
08:00 AM	14	26	1	41	5	51	3	59	4	30	9	43	1	8	9	18	161
08:15 AM	13	17	1	31	3	43	6	52	2	24	5	31	4	10	3	17	131
08:30 AM	30	23	0	53	1	30	4	35	6	21	8	35	2	4	3	9	132
08:45 AM	33	28	2	63	0	24	6	30	6	16	12	34	9	13	31	53	180
Total	90	94	4	188	9	148	19	176	18	91	34	143	16	35	46	97	604
*** BREAK ***																	
04:00 PM	23	30	2	55	3	9	3	15	9	29	0	38	11	21	19	51	159
04:15 PM	15	30	1	46	0	9	2	11	0	19	3	22	7	24	21	52	131
04:30 PM	11	35	1	47	0	11	1	12	3	21	3	27	9	31	27	67	153
04:45 PM	7	31	3	41	3	9	4	16	8	29	4	41	13	31	24	68	166
Total	56	126	7	189	6	38	10	54	20	98	10	128	40	107	91	238	609
05:00 PM	15	41	3	59	1	10	8	19	5	24	5	34	10	35	13	58	170
05:15 PM	22	26	2	50	1	8	9	18	5	23	6	34	9	33	24	66	168
05:30 PM	17	29	0	46	0	8	7	15	5	24	7	36	13	33	25	71	168
05:45 PM	12	32	1	45	0	8	3	11	3	23	3	29	7	30	16	53	138
Total	66	128	6	200	2	34	27	63	18	94	21	133	39	131	78	248	644
Grand Total	258	423	28	709	50	501	130	681	118	426	88	632	109	332	251	692	2714
Apprch %	36.4	59.7	3.9		7.3	73.6	19.1		18.7	67.4	13.9		15.8	48	36.3		
Total %	9.5	15.6	1	26.1	1.8	18.5	4.8	25.1	4.3	15.7	3.2	23.3	4	12.2	9.2	25.5	
Cars &	241	405	22	668	46	489	119	654	109	407	85	601	102	323	237	662	2585
% Cars &	93.4	95.7	78.6	94.2	92	97.6	91.5	96	92.4	95.5	96.6	95.1	93.6	97.3	94.4	95.7	95.2
Trucks &	17	18	6	41	4	12	11	27	9	19	3	31	7	9	14	30	129
% Trucks &	6.6	4.3	21.4	5.8	8	2.4	8.5	4	7.6	4.5	3.4	4.9	6.4	2.7	5.6	4.3	4.8
Semis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Semis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : Forestville Road and Old Milburnie Road
Site Code : 00000003
Start Date : 6/5/2018
Page No : 2

	Forestville Road From North				Old Milburnie Road From East				Forestville Road From South				Old Milburnie Road From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	17	22	6	45	13	47	24	84	38	41	6	85	4	30	7	41	255
07:15 AM	9	15	1	25	10	98	35	143	18	41	4	63	3	19	9	31	262
07:30 AM	8	18	4	30	4	64	6	74	4	37	9	50	4	3	7	14	168
07:45 AM	12	20	0	32	6	72	9	87	2	24	4	30	3	7	13	23	172
Total Volume	46	75	11	132	33	281	74	388	62	143	23	228	14	59	36	109	857
% App. Total	34.8	56.8	8.3		8.5	72.4	19.1		27.2	62.7	10.1		12.8	54.1	33		
PHF	.676	.852	.458	.733	.635	.717	.529	.678	.408	.872	.639	.671	.875	.492	.692	.665	.818



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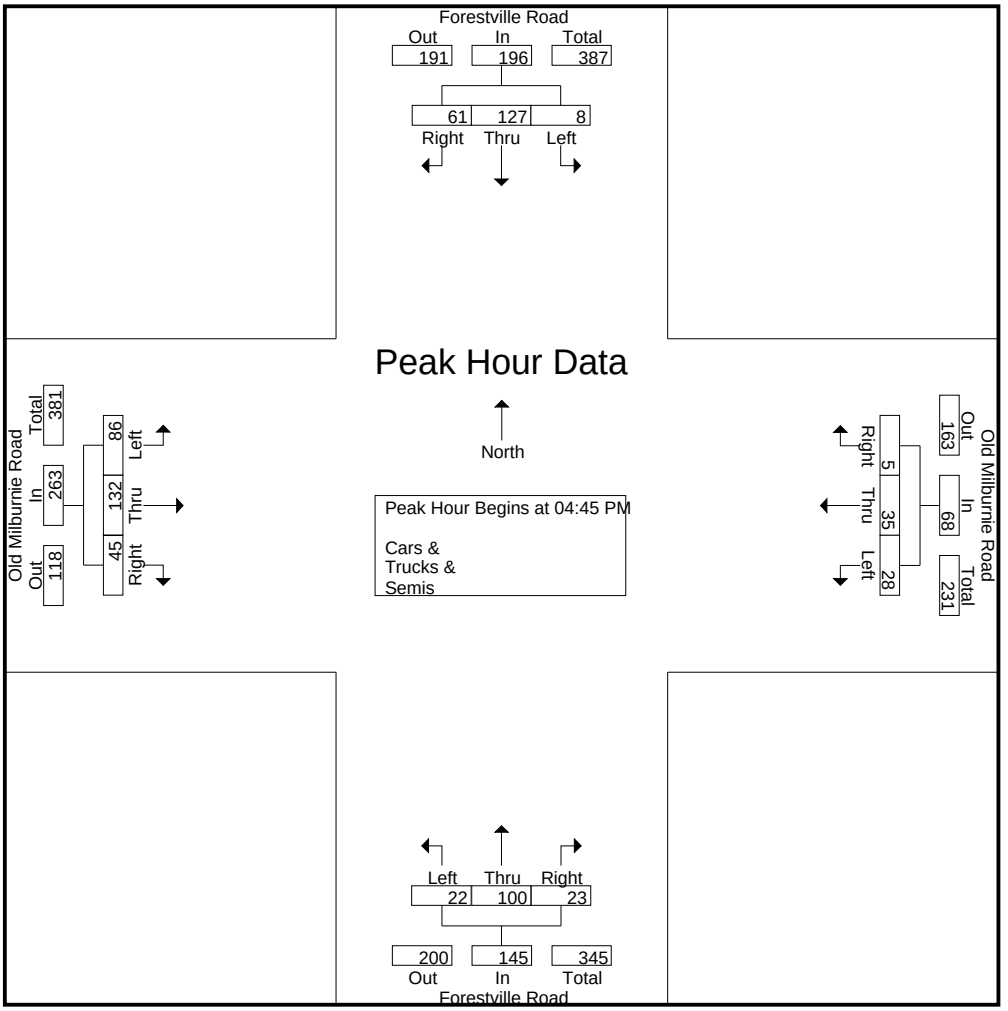
05:00 PM	15	41	3	59	1	10	8	19	5	24	5	34	10	35	13	58	170
05:15 PM	22	26	2	50	1	8	9	18	5	23	6	34	9	33	24	66	168
05:30 PM	17	29	0	46	0	8	7	15	5	24	7	36	13	33	25	71	168
Total Volume	61	127	8	196	5	35	28	68	23	100	22	145	45	132	86	263	672
% App. Total	31.1	64.8	4.1		7.4	51.5	41.2		15.9	69	15.2		17.1	50.2	32.7		
PHF	.693	.774	.667	.831	.417	.875	.778	.895	.719	.862	.786	.884	.865	.943	.860	.926	.988



TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Old Crews)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

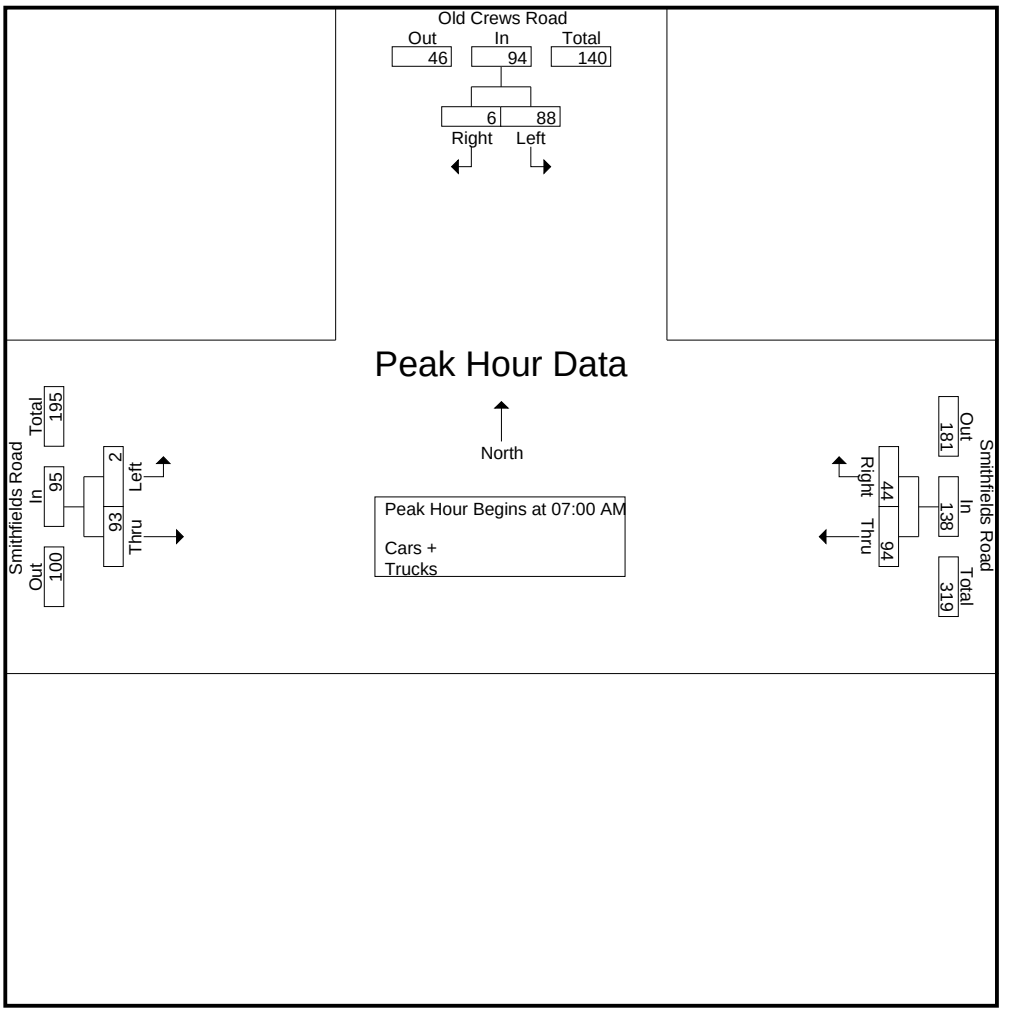
Groups Printed- Cars + - Trucks

	Old Crews Road Southbound			Smithfields Road Westbound			Smithfields Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
07:00 AM	2	15	17	13	27	40	22	0	22	79
07:15 AM	0	22	22	4	27	31	31	1	32	85
07:30 AM	2	25	27	5	18	23	21	1	22	72
07:45 AM	2	26	28	22	22	44	19	0	19	91
Total	6	88	94	44	94	138	93	2	95	327
08:00 AM	2	12	14	14	23	37	14	1	15	66
08:15 AM	1	20	21	7	13	20	26	1	27	68
08:30 AM	0	21	21	13	22	35	24	0	24	80
08:45 AM	0	23	23	13	11	24	25	2	27	74
Total	3	76	79	47	69	116	89	4	93	288
Grand Total	9	164	173	91	163	254	182	6	188	615
Apprch %	5.2	94.8		35.8	64.2		96.8	3.2		
Total %	1.5	26.7	28.1	14.8	26.5	41.3	29.6	1	30.6	
Cars +	9	164	173	89	161	250	180	5	185	608
% Cars +	100	100	100	97.8	98.8	98.4	98.9	83.3	98.4	98.9
Trucks	0	0	0	2	2	4	2	1	3	7
% Trucks	0	0	0	2.2	1.2	1.6	1.1	16.7	1.6	1.1

TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Old Crews)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Old Crews Road Southbound			Smithfields Road Westbound			Smithfields Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**2**	15	17	13	**27**	40	22	0	22	79
07:15 AM	0	22	22	4	27	31	**31**	**1**	**32**	85
07:30 AM	2	25	27	5	18	23	21	1	22	72
07:45 AM	2	**26**	**28**	**22**	22	**44**	19	0	19	**91**
Total Volume	6	88	94	44	94	138	93	2	95	327
% App. Total	6.4	93.6		31.9	68.1		97.9	2.1		
PHF	.750	.846	.839	.500	.870	.784	.750	.500	.742	.898



TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Old Crews)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

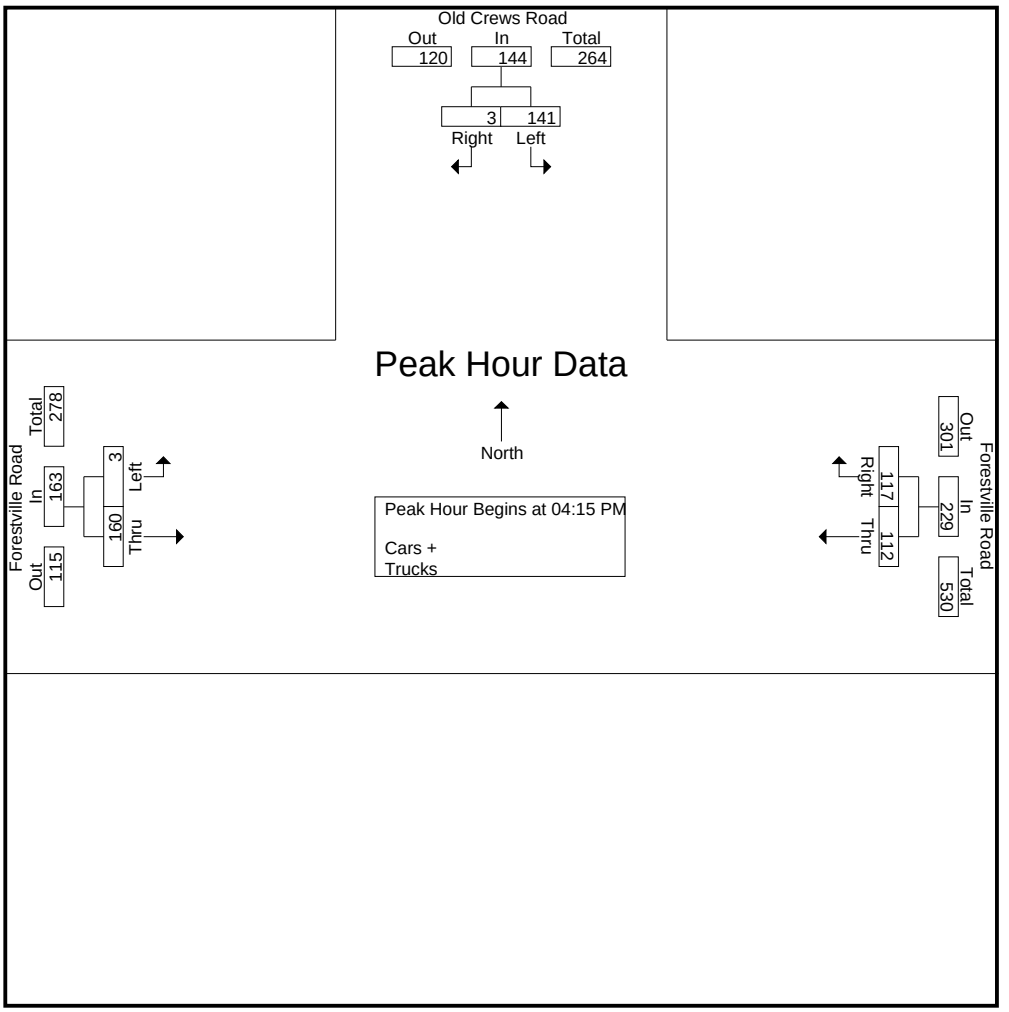
Groups Printed- Cars + - Trucks

	Old Crews Road Southbound			Forestville Road Westbound			Forestville Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
04:00 PM	2	22	24	33	38	71	27	0	27	122
04:15 PM	0	34	34	28	23	51	47	0	47	132
04:30 PM	1	35	36	21	34	55	43	1	44	135
04:45 PM	1	38	39	33	27	60	34	1	35	134
Total	4	129	133	115	122	237	151	2	153	523
05:00 PM	1	34	35	35	28	63	36	1	37	135
05:15 PM	1	35	36	27	26	53	39	2	41	130
05:30 PM	0	24	24	37	30	67	30	3	33	124
05:45 PM	0	24	24	29	24	53	33	1	34	111
Total	2	117	119	128	108	236	138	7	145	500
Grand Total	6	246	252	243	230	473	289	9	298	1023
Apprch %	2.4	97.6		51.4	48.6		97	3		
Total %	0.6	24	24.6	23.8	22.5	46.2	28.3	0.9	29.1	
Cars +	6	246	252	243	228	471	289	9	298	1021
% Cars +	100	100	100	100	99.1	99.6	100	100	100	99.8
Trucks	0	0	0	0	2	2	0	0	0	2
% Trucks	0	0	0	0	0.9	0.4	0	0	0	0.2

TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Old Crews)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Old Crews Road Southbound			Forestville Road Westbound			Forestville Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	34	34	28	23	51	**47**	0	**47**	132
04:30 PM	**1**	35	36	21	**34**	55	43	**1**	44	**135**
04:45 PM	1	**38**	**39**	33	27	60	34	1	35	134
05:00 PM	1	34	35	**35**	28	**63**	36	1	37	135
Total Volume	3	141	144	117	112	229	160	3	163	536
% App. Total	2.1	97.9		51.1	48.9		98.2	1.8		
PHF	.750	.928	.923	.836	.824	.909	.851	.750	.867	.993



TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Smithfield)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

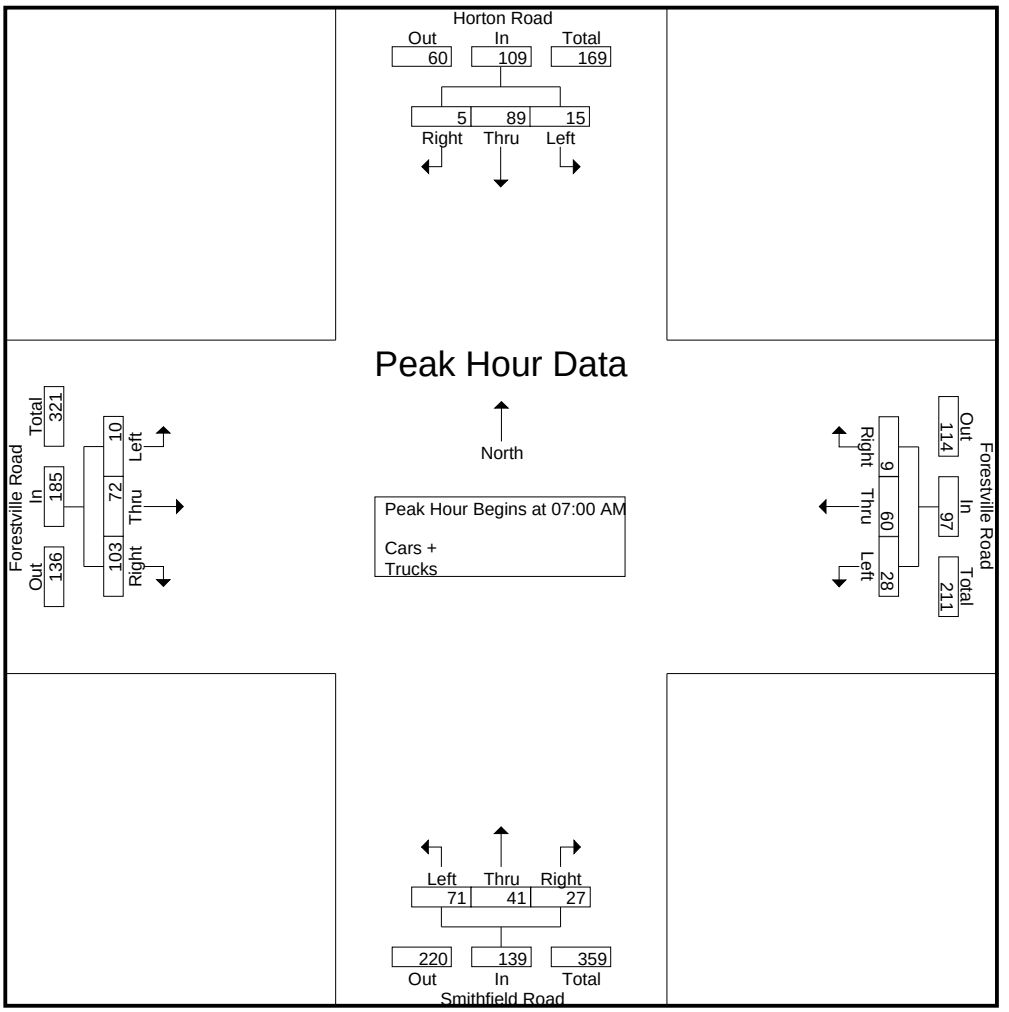
Groups Printed- Cars + - Trucks

	Horton Road Southbound				Forestville Road Westbound				Smithfield Road Northbound				Forestville Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	4	20	4	28	0	15	4	19	5	8	21	34	17	22	3	42	123
07:15 AM	0	24	4	28	3	15	13	31	6	10	16	32	25	24	3	52	143
07:30 AM	1	24	4	29	4	15	6	25	5	12	6	23	30	15	3	48	125
07:45 AM	0	21	3	24	2	15	5	22	11	11	28	50	31	11	1	43	139
Total	5	89	15	109	9	60	28	97	27	41	71	139	103	72	10	185	530
08:00 AM	3	17	4	24	1	17	3	21	15	10	18	43	22	6	0	28	116
08:15 AM	1	24	1	26	1	11	3	15	6	19	8	33	25	18	3	46	120
08:30 AM	2	19	2	23	0	16	5	21	7	17	18	42	29	12	4	45	131
08:45 AM	1	23	2	26	3	8	11	22	8	15	16	39	23	20	5	48	135
Total	7	83	9	99	5	52	22	79	36	61	60	157	99	56	12	167	502
Grand Total	12	172	24	208	14	112	50	176	63	102	131	296	202	128	22	352	1032
Apprch %	5.8	82.7	11.5		8	63.6	28.4		21.3	34.5	44.3		57.4	36.4	6.2		
Total %	1.2	16.7	2.3	20.2	1.4	10.9	4.8	17.1	6.1	9.9	12.7	28.7	19.6	12.4	2.1	34.1	
Cars +	12	172	22	206	10	108	50	168	63	102	131	296	200	128	22	350	1020
% Cars +	100	100	91.7	99	71.4	96.4	100	95.5	100	100	100	100	99	100	100	99.4	98.8
Trucks	0	0	2	2	4	4	0	8	0	0	0	0	2	0	0	2	12
% Trucks	0	0	8.3	1	28.6	3.6	0	4.5	0	0	0	0	1	0	0	0.6	1.2

TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Smithfield)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Horton Road Southbound				Forestville Road Westbound				Smithfield Road Northbound				Forestville Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**4**	20	**4**	28	0	**15**	4	19	5	8	21	34	17	22	**3**	42	123
07:15 AM	0	**24**	4	28	3	15	**13**	**31**	6	10	16	32	25	**24**	3	**52**	**143**
07:30 AM	1	24	4	**29**	**4**	15	6	25	5	**12**	6	23	30	15	3	48	125
07:45 AM	0	21	3	24	2	15	5	22	**11**	11	**28**	**50**	**31**	11	1	43	139
Total Volume	5	89	15	109	9	60	28	97	27	41	71	139	103	72	10	185	530
% App. Total	4.6	81.7	13.8		9.3	61.9	28.9		19.4	29.5	51.1		55.7	38.9	5.4		
PHF	.313	.927	.938	.940	.563	1.00	.538	.782	.614	.854	.634	.695	.831	.750	.833	.889	.927



TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Smithfield)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

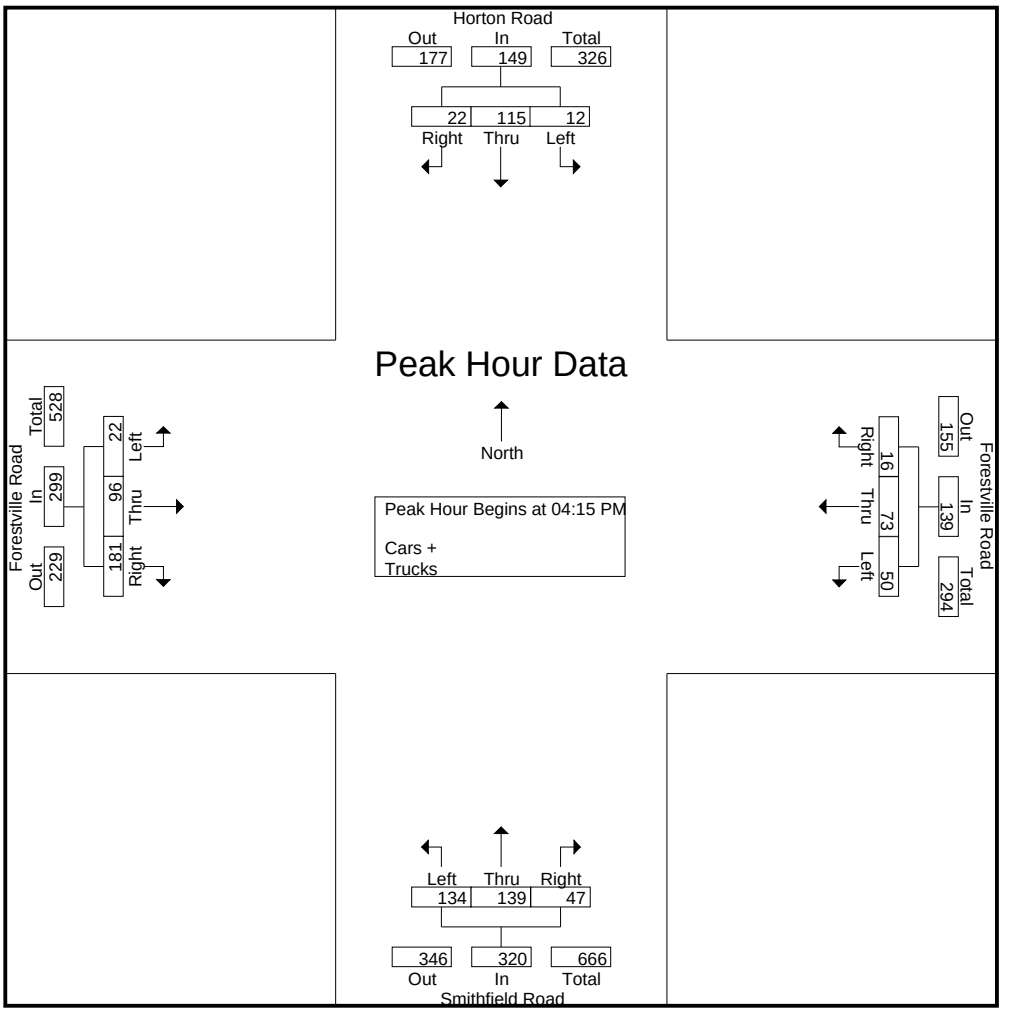
Groups Printed- Cars + - Trucks

	Horton Road Southbound				Forestville Road Westbound				Smithfield Road Northbound				Forestville Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
04:00 PM	6	28	1	35	7	16	10	33	9	31	48	88	27	21	2	50	206
04:15 PM	3	26	2	31	1	17	16	34	13	43	31	87	51	24	2	77	229
04:30 PM	7	25	4	36	2	19	17	38	14	21	30	65	45	22	10	77	216
04:45 PM	8	34	3	45	5	17	7	29	10	33	36	79	41	26	5	72	225
Total	24	113	10	147	15	69	50	134	46	128	145	319	164	93	19	276	876
05:00 PM	4	30	3	37	8	20	10	38	10	42	37	89	44	24	5	73	237
05:15 PM	5	31	6	42	6	15	3	24	8	30	30	68	45	21	5	71	205
05:30 PM	6	38	5	49	2	18	5	25	12	31	45	88	32	20	4	56	218
05:45 PM	2	25	3	30	2	11	5	18	6	33	36	75	40	12	3	55	178
Total	17	124	17	158	18	64	23	105	36	136	148	320	161	77	17	255	838
Grand Total	41	237	27	305	33	133	73	239	82	264	293	639	325	170	36	531	1714
Apprch %	13.4	77.7	8.9		13.8	55.6	30.5		12.8	41.3	45.9		61.2	32	6.8		
Total %	2.4	13.8	1.6	17.8	1.9	7.8	4.3	13.9	4.8	15.4	17.1	37.3	19	9.9	2.1	31	
Cars +	41	236	27	304	33	132	73	238	82	264	293	639	325	169	36	530	1711
% Cars +	100	99.6	100	99.7	100	99.2	100	99.6	100	100	100	100	100	99.4	100	99.8	99.8
Trucks	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
% Trucks	0	0.4	0	0.3	0	0.8	0	0.4	0	0	0	0	0	0.6	0	0.2	0.2

TRAFFIC DATA COLLECTION

File Name : Knightdale(Forestville and Smithfield)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Horton Road Southbound				Forestville Road Westbound				Smithfield Road Northbound				Forestville Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	3	26	2	31	1	17	16	34	13	**43**	31	87	**51**	24	2	**77**	229
04:30 PM	7	25	**4**	36	2	19	**17**	**38**	**14**	21	30	65	45	22	**10**	77	216
04:45 PM	**8**	**34**	3	**45**	5	17	7	29	10	33	36	79	41	**26**	5	72	225
05:00 PM	4	30	3	37	**8**	**20**	10	38	10	42	**37**	**89**	44	24	5	73	**237**
Total Volume	22	115	12	149	16	73	50	139	47	139	134	320	181	96	22	299	907
% App. Total	14.8	77.2	8.1		11.5	52.5	36		14.7	43.4	41.9		60.5	32.1	7.4		
PHF	.688	.846	.750	.828	.500	.913	.735	.914	.839	.808	.905	.899	.887	.923	.550	.971	.957



TRAFFIC DATA COLLECTION

File Name : Knightdale(US 64 and Old Milburnie)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

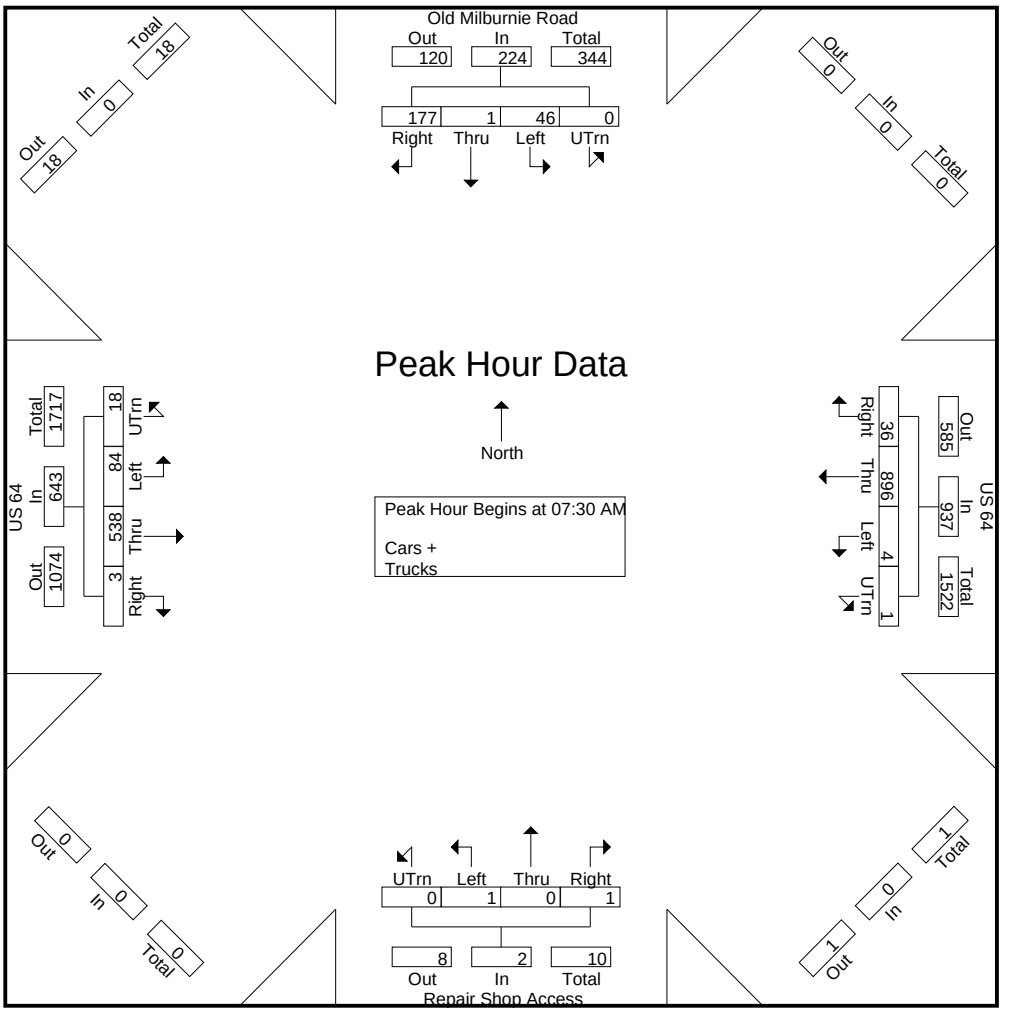
Groups Printed- Cars + - Trucks

	Old Milburnie Road Southbound					US 64 Westbound					Repair Shop Access Northbound					US 64 Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
07:00 AM	38	0	9	0	47	10	172	1	0	183	0	0	0	0	0	0	105	18	1	124	354
07:15 AM	37	0	17	0	54	5	190	0	0	195	0	0	0	0	0	0	135	17	1	153	402
07:30 AM	33	1	9	0	43	7	269	0	0	276	1	0	0	0	1	1	164	15	4	184	504
07:45 AM	56	0	18	0	74	12	221	0	1	234	0	0	0	0	0	0	117	24	3	144	452
Total	164	1	53	0	218	34	852	1	1	888	1	0	0	0	1	1	521	74	9	605	1712
08:00 AM	48	0	11	0	59	7	206	0	0	213	0	0	0	0	0	2	130	23	6	161	433
08:15 AM	40	0	8	0	48	10	200	4	0	214	0	0	1	0	1	0	127	22	5	154	417
08:30 AM	39	0	7	0	46	9	195	3	1	208	2	0	0	0	2	2	115	36	4	157	413
08:45 AM	49	1	16	0	66	8	198	2	0	208	0	0	1	0	1	1	153	25	5	184	459
Total	176	1	42	0	219	34	799	9	1	843	2	0	2	0	4	5	525	106	20	656	1722
Grand Total	340	2	95	0	437	68	1651	10	2	1731	3	0	2	0	5	6	1046	180	29	1261	3434
Apprch %	77.8	0.5	21.7	0		3.9	95.4	0.6	0.1		60	0	40	0		0.5	83	14.3	2.3		
Total %	9.9	0.1	2.8	0	12.7	2	48.1	0.3	0.1	50.4	0.1	0	0.1	0	0.1	0.2	30.5	5.2	0.8	36.7	
Cars +	336	2	92	0	430	66	1587	10	2	1665	3	0	2	0	5	6	982	174	28	1190	3290
% Cars +	98.8	100	96.8	0	98.4	97.1	96.1	100	100	96.2	100	0	100	0	100	100	93.9	96.7	96.6	94.4	95.8
Trucks	4	0	3	0	7	2	64	0	0	66	0	0	0	0	0	0	64	6	1	71	144
% Trucks	1.2	0	3.2	0	1.6	2.9	3.9	0	0	3.8	0	0	0	0	0	0	6.1	3.3	3.4	5.6	4.2

TRAFFIC DATA COLLECTION

File Name : Knightdale(US 64 and Old Milburnie)AM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Old Milburnie Road Southbound					US 64 Westbound					Repair Shop Access Northbound					US 64 Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	33	**1**	9	0	43	7	**269**	0	0	**276**	**1**	0	0	0	**1**	1	**164**	15	4	**184**	**504**
07:45 AM	**56**	0	**18**	0	**74**	**12**	221	0	**1**	234	0	0	0	0	0	0	117	**24**	3	144	452
08:00 AM	48	0	11	0	59	7	206	0	0	213	0	0	0	0	0	**2**	130	23	**6**	161	433
08:15 AM	40	0	8	0	48	10	200	**4**	0	214	0	0	**1**	0	1	0	127	22	5	154	417
Total Volume	177	1	46	0	224	36	896	4	1	937	1	0	1	0	2	3	538	84	18	643	1806
% App. Total	79	0.4	20.5	0		3.8	95.6	0.4	0.1		50	0	50	0		0.5	83.7	13.1	2.8		
PHF	.790	.250	.639	.000	.757	.750	.833	.250	.250	.849	.250	.000	.250	.000	.500	.375	.820	.875	.750	.874	.896



TRAFFIC DATA COLLECTION

File Name : Knightdale(US 64 and Old Milburnie)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 1

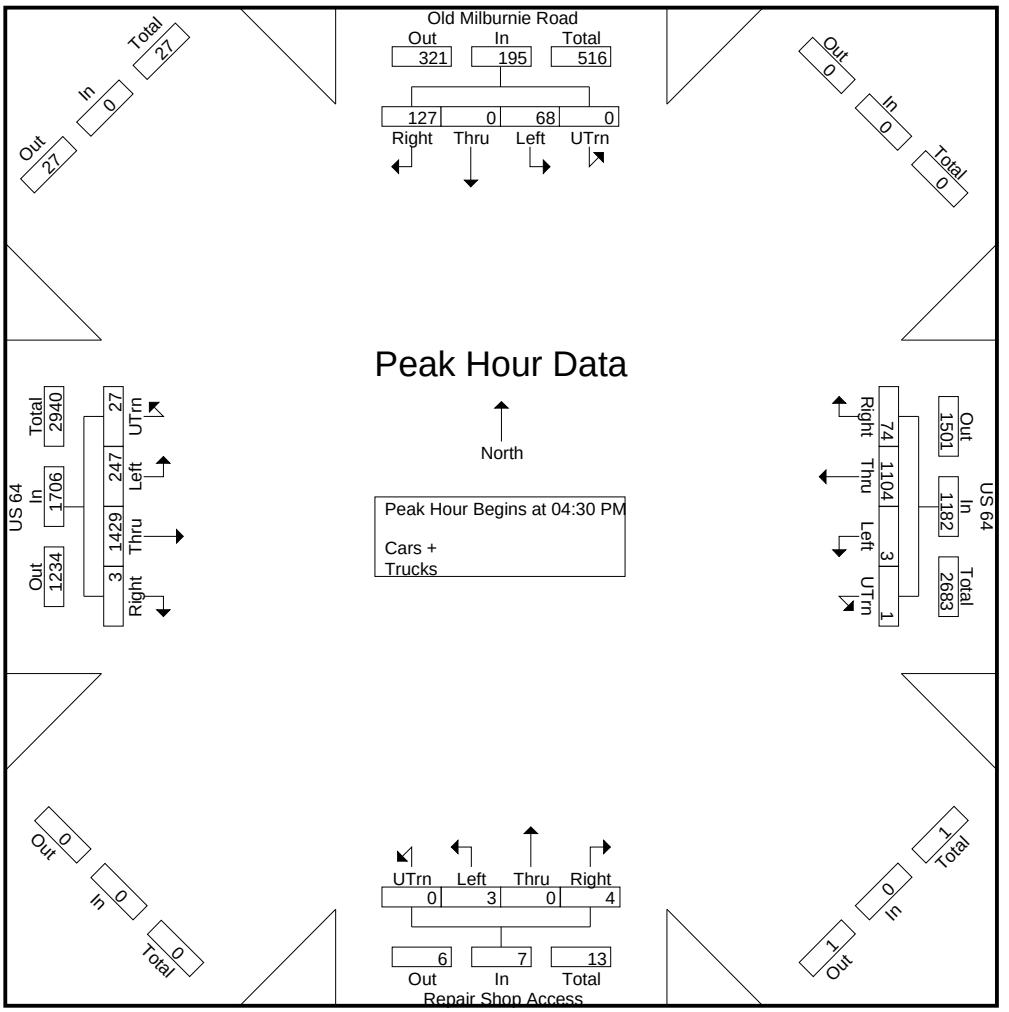
Groups Printed- Cars + - Trucks

	Old Milburnie Road Southbound					US 64 Westbound					Repair Shop Access Northbound					US 64 Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
04:00 PM	35	0	30	0	65	15	237	2	1	255	1	0	0	0	1	1	285	51	7	344	665
04:15 PM	41	0	28	0	69	11	245	0	0	256	0	1	1	0	2	0	328	55	6	389	716
04:30 PM	32	0	25	0	57	27	300	1	0	328	1	0	0	0	1	1	334	45	6	386	772
04:45 PM	34	0	14	0	48	15	265	1	0	281	2	0	0	0	2	1	323	59	8	391	722
Total	142	0	97	0	239	68	1047	4	1	1120	4	1	1	0	6	3	1270	210	27	1510	2875
05:00 PM	33	0	19	0	52	14	277	1	0	292	1	0	2	0	3	0	371	66	6	443	790
05:15 PM	28	0	10	0	38	18	262	0	1	281	0	0	1	0	1	1	401	77	7	486	806
05:30 PM	23	0	17	0	40	19	279	0	1	299	2	0	2	0	4	2	350	63	8	423	766
05:45 PM	45	0	16	0	61	18	297	0	1	316	0	0	0	0	0	1	291	41	9	342	719
Total	129	0	62	0	191	69	1115	1	3	1188	3	0	5	0	8	4	1413	247	30	1694	3081
Grand Total	271	0	159	0	430	137	2162	5	4	2308	7	1	6	0	14	7	2683	457	57	3204	5956
Apprch %	63	0	37	0		5.9	93.7	0.2	0.2		50	7.1	42.9	0		0.2	83.7	14.3	1.8		
Total %	4.6	0	2.7	0	7.2	2.3	36.3	0.1	0.1	38.8	0.1	0	0.1	0	0.2	0.1	45	7.7	1	53.8	
Cars +	260	0	156	0	416	136	2127	5	4	2272	7	1	6	0	14	7	2641	452	57	3157	5859
% Cars +	95.9	0	98.1	0	96.7	99.3	98.4	100	100	98.4	100	100	100	0	100	100	98.4	98.9	100	98.5	98.4
Trucks	11	0	3	0	14	1	35	0	0	36	0	0	0	0	0	0	42	5	0	47	97
% Trucks	4.1	0	1.9	0	3.3	0.7	1.6	0	0	1.6	0	0	0	0	0	0	1.6	1.1	0	1.5	1.6

TRAFFIC DATA COLLECTION

File Name : Knightdale(US 64 and Old Milburnie)PM Peak
Site Code :
Start Date : 12/17/2020
Page No : 2

	Old Milburnie Road Southbound					US 64 Westbound					Repair Shop Access Northbound					US 64 Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. 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	32	0	**25**	0	**57**	**27**	**300**	**1**	0	**328**	1	0	0	0	1	**1**	334	45	6	386	772
04:45 PM	**34**	0	14	0	48	15	265	1	0	281	**2**	0	0	0	2	1	323	59	**8**	391	722
05:00 PM	33	0	19	0	52	14	277	1	0	292	1	0	**2**	0	**3**	0	371	66	6	443	790
05:15 PM	28	0	10	0	38	18	262	0	**1**	281	0	0	1	0	1	1	**401**	**77**	7	**486**	**806**
Total Volume	127	0	68	0	195	74	1104	3	1	1182	4	0	3	0	7	3	1429	247	27	1706	3090
% App. Total	65.1	0	34.9	0		6.3	93.4	0.3	0.1		57.1	0	42.9	0		0.2	83.8	14.5	1.6		
PHF	.934	.000	.680	.000	.855	.685	.920	.750	.250	.901	.500	.000	.375	.000	.583	.750	.891	.802	.844	.878	.958



Daily Vehicle Volume Report

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	Northbound Volume	Southbound Volume	Total Volume
00:00 - 00:59	5	5	**10**
01:00 - 01:59	4	1	**5**
02:00 - 02:59	2	2	**4**
03:00 - 03:59	0	1	**1**
04:00 - 04:59	4	9	**13**
05:00 - 05:59	2	24	**26**
06:00 - 06:59	29	64	**93**
07:00 - 07:59	59	155	**214**
08:00 - 08:59	42	123	**165**
09:00 - 09:59	54	64	**118**
10:00 - 10:59	46	53	**99**
11:00 - 11:59	50	58	**108**
12:00 - 12:59	65	71	**136**
13:00 - 13:59	51	60	**111**
14:00 - 14:59	80	75	**155**
15:00 - 15:59	93	80	**173**
16:00 - 16:59	159	70	**229**
17:00 - 17:59	167	72	**239**
18:00 - 18:59	77	76	**153**
19:00 - 19:59	51	43	**94**
20:00 - 20:59	41	28	**69**
21:00 - 21:59	29	23	**52**
22:00 - 22:59	12	13	**25**
23:00 - 23:59	10	8	**18**
Totals	**1132**	**1178**	**2310**
AM Peak Time	**08:45 - 09:44**	**07:29 - 08:28**	**07:29 - 08:28**
AM Peak Volume	**60**	**179**	**227**
PM Peak Time	**16:23 - 17:22**	**14:45 - 15:44**	**16:23 - 17:22**
PM Peak Volume	**189**	**92**	**264**

Daily Vehicle Volume Report

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	Northbound Volume	Southbound Volume	Total Volume
00:00 - 00:59	4	5	**9**
01:00 - 01:59	3	2	**5**
02:00 - 02:59	3	1	**4**
03:00 - 03:59	1	0	**1**
04:00 - 04:59	7	7	**14**
05:00 - 05:59	3	26	**29**
06:00 - 06:59	60	70	**130**
07:00 - 07:59	80	156	**236**
08:00 - 08:59	81	181	**262**
09:00 - 09:59	78	89	**167**
10:00 - 10:59	61	82	**143**
11:00 - 11:59	64	83	**147**
12:00 - 12:59	94	88	**182**
13:00 - 13:59	68	79	**147**
14:00 - 14:59	103	104	**207**
15:00 - 15:59	123	141	**264**
16:00 - 16:59	190	103	**293**
17:00 - 17:59	183	115	**298**
18:00 - 18:59	91	74	**165**
19:00 - 19:59	61	55	**116**
20:00 - 20:59	31	34	**65**
21:00 - 21:59	26	22	**48**
22:00 - 22:59	21	17	**38**
23:00 - 23:59	11	10	**21**
Totals	**1447**	**1544**	**2991**
AM Peak Time	**08:31 - 09:30**	**07:42 - 08:41**	**08:06 - 09:05**
AM Peak Volume	**96**	**188**	**266**
PM Peak Time	**16:28 - 17:27**	**14:49 - 15:48**	**16:45 - 17:44**
PM Peak Volume	**223**	**142**	**322**

Daily Northbound Classes Report

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	4	1	0	0	0	0	0	0	0	0	0	0	0	**5**
01:00 - 01:59	0	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
02:00 - 02:59	0	1	0	0	1	0	0	0	0	0	0	0	0	0	**2**
03:00 - 03:59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
04:00 - 04:59	0	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
05:00 - 05:59	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
06:00 - 06:59	0	19	4	2	1	2	0	0	1	0	0	0	0	0	**29**
07:00 - 07:59	0	43	11	0	5	0	0	0	0	0	0	0	0	0	**59**
08:00 - 08:59	0	32	9	1	0	0	0	0	0	0	0	0	0	0	**42**
09:00 - 09:59	0	40	10	1	2	0	0	0	0	0	0	0	0	1	**54**
10:00 - 10:59	0	30	10	1	5	0	0	0	0	0	0	0	0	0	**46**
11:00 - 11:59	0	34	13	0	3	0	0	0	0	0	0	0	0	0	**50**
12:00 - 12:59	0	41	18	0	6	0	0	0	0	0	0	0	0	0	**65**
13:00 - 13:59	0	36	12	0	2	0	0	0	0	0	0	0	0	1	**51**
14:00 - 14:59	0	60	13	0	7	0	0	0	0	0	0	0	0	0	**80**
15:00 - 15:59	1	76	13	0	3	0	0	0	0	0	0	0	0	0	**93**
16:00 - 16:59	0	134	18	0	7	0	0	0	0	0	0	0	0	0	**159**
17:00 - 17:59	0	146	19	0	2	0	0	0	0	0	0	0	0	0	**167**
18:00 - 18:59	0	63	8	0	4	0	0	0	0	0	0	0	0	2	**77**
19:00 - 19:59	0	44	6	0	1	0	0	0	0	0	0	0	0	0	**51**
20:00 - 20:59	0	34	7	0	0	0	0	0	0	0	0	0	0	0	**41**
21:00 - 21:59	0	26	2	0	1	0	0	0	0	0	0	0	0	0	**29**
22:00 - 22:59	0	10	0	0	2	0	0	0	0	0	0	0	0	0	**12**
23:00 - 23:59	0	9	0	0	1	0	0	0	0	0	0	0	0	0	**10**
Totals	**1**	**892**	**174**	**5**	**53**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**4**	**1132**
Percent of Total	**0.1**	**78.8**	**15.4**	**0.4**	**4.7**	**0.2**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.4**	**100**
Percent of AM	**0.0**	**71.7**	**19.5**	**1.7**	**5.7**	**0.7**	**0.0**	**0.0**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**100**
Percent of PM	**0.1**	**81.3**	**13.9**	**0.0**	**4.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.4**	**100**

Truck Summary:

Total Trucks: 65 % Trucks: 5.7 AM % Trucks: 8.8 PM % Trucks: 4.7

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Northbound Classes Report

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	3	1	0	0	0	0	0	0	0	0	0	0	0	**4**
01:00 - 01:59	0	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
02:00 - 02:59	0	2	0	0	0	0	0	0	1	0	0	0	0	0	**3**
03:00 - 03:59	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	6	0	0	1	0	0	0	0	0	0	0	0	0	**7**
05:00 - 05:59	0	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
06:00 - 06:59	0	42	8	4	3	2	1	0	0	0	0	0	0	0	**60**
07:00 - 07:59	0	50	17	2	11	0	0	0	0	0	0	0	0	0	**80**
08:00 - 08:59	0	57	15	7	1	0	0	1	0	0	0	0	0	0	**81**
09:00 - 09:59	0	55	15	4	3	0	0	0	0	0	0	0	0	1	**78**
10:00 - 10:59	0	41	12	0	8	0	0	0	0	0	0	0	0	0	**61**
11:00 - 11:59	0	51	10	0	2	0	0	0	1	0	0	0	0	0	**64**
12:00 - 12:59	0	76	9	2	6	1	0	0	0	0	0	0	0	0	**94**
13:00 - 13:59	0	58	5	0	4	0	0	1	0	0	0	0	0	0	**68**
14:00 - 14:59	0	85	11	0	6	0	0	0	0	0	0	0	0	1	**103**
15:00 - 15:59	0	92	23	3	3	1	0	0	0	0	0	0	0	1	**123**
16:00 - 16:59	0	159	22	3	6	0	0	0	0	0	0	0	0	0	**190**
17:00 - 17:59	0	142	31	0	8	0	0	0	0	0	0	0	0	2	**183**
18:00 - 18:59	0	78	11	0	1	0	0	0	0	0	0	0	0	1	**91**
19:00 - 19:59	0	45	13	0	2	0	0	0	0	0	0	0	0	1	**61**
20:00 - 20:59	0	28	3	0	0	0	0	0	0	0	0	0	0	0	**31**
21:00 - 21:59	0	25	1	0	0	0	0	0	0	0	0	0	0	0	**26**
22:00 - 22:59	0	19	1	0	1	0	0	0	0	0	0	0	0	0	**21**
23:00 - 23:59	0	10	1	0	0	0	0	0	0	0	0	0	0	0	**11**
Totals	**0**	**1131**	**209**	**25**	**66**	**4**	**1**	**2**	**2**	**0**	**0**	**0**	**0**	**7**	**1447**
Percent of Total	**0.0**	**78.2**	**14.4**	**1.7**	**4.6**	**0.3**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**100**
Percent of AM	**0.0**	**70.6**	**17.5**	**3.8**	**6.5**	**0.4**	**0.2**	**0.2**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**100**
Percent of PM	**0.0**	**81.5**	**13.1**	**0.8**	**3.7**	**0.2**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.6**	**100**

Truck Summary:

Total Trucks: 107 % Trucks: 7.4 AM % Trucks: 11.9 PM % Trucks: 5.4

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Southbound Classes Report

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	5	0	0	0	0	0	0	0	0	0	0	0	0	**5**
01:00 - 01:59	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
02:00 - 02:59	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
03:00 - 03:59	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	5	3	0	1	0	0	0	0	0	0	0	0	0	**9**
05:00 - 05:59	0	16	5	0	3	0	0	0	0	0	0	0	0	0	**24**
06:00 - 06:59	1	47	6	1	8	0	0	0	0	0	0	0	0	1	**64**
07:00 - 07:59	0	116	19	0	20	0	0	0	0	0	0	0	0	0	**155**
08:00 - 08:59	1	84	20	1	16	0	0	0	1	0	0	0	0	0	**123**
09:00 - 09:59	0	38	15	0	11	0	0	0	0	0	0	0	0	0	**64**
10:00 - 10:59	0	29	10	1	11	0	0	2	0	0	0	0	0	0	**53**
11:00 - 11:59	0	37	5	0	14	1	0	1	0	0	0	0	0	0	**58**
12:00 - 12:59	0	46	11	0	14	0	0	0	0	0	0	0	0	0	**71**
13:00 - 13:59	0	38	9	0	11	1	0	0	0	0	0	0	0	1	**60**
14:00 - 14:59	0	56	9	0	10	0	0	0	0	0	0	0	0	0	**75**
15:00 - 15:59	0	58	14	0	8	0	0	0	0	0	0	0	0	0	**80**
16:00 - 16:59	0	55	4	0	11	0	0	0	0	0	0	0	0	0	**70**
17:00 - 17:59	0	52	12	0	8	0	0	0	0	0	0	0	0	0	**72**
18:00 - 18:59	0	63	8	0	5	0	0	0	0	0	0	0	0	0	**76**
19:00 - 19:59	0	35	6	0	2	0	0	0	0	0	0	0	0	0	**43**
20:00 - 20:59	0	25	2	0	1	0	0	0	0	0	0	0	0	0	**28**
21:00 - 21:59	0	15	3	0	5	0	0	0	0	0	0	0	0	0	**23**
22:00 - 22:59	0	10	1	0	2	0	0	0	0	0	0	0	0	0	**13**
23:00 - 23:59	0	7	1	0	0	0	0	0	0	0	0	0	0	0	**8**
Totals	**2**	**840**	**163**	**3**	**162**	**2**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**2**	**1178**
Percent of Total	**0.2**	**71.3**	**13.8**	**0.3**	**13.8**	**0.2**	**0.0**	**0.3**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**100**
Percent of AM	**0.4**	**68.0**	**14.8**	**0.5**	**15.2**	**0.2**	**0.0**	**0.5**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**100**
Percent of PM	**0.0**	**74.3**	**12.9**	**0.0**	**12.4**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**100**

Truck Summary:

Total Trucks: 173 % Trucks: 14.7 AM % Trucks: 16.8 PM % Trucks: 12.8

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Southbound Classes Report

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	5	0	0	0	0	0	0	0	0	0	0	0	0	**5**
01:00 - 01:59	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
02:00 - 02:59	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
03:00 - 03:59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
04:00 - 04:59	0	4	2	0	1	0	0	0	0	0	0	0	0	0	**7**
05:00 - 05:59	0	12	9	0	5	0	0	0	0	0	0	0	0	0	**26**
06:00 - 06:59	0	54	6	1	8	0	0	1	0	0	0	0	0	0	**70**
07:00 - 07:59	0	114	26	1	13	0	0	1	0	0	0	0	0	1	**156**
08:00 - 08:59	0	137	24	4	16	0	0	0	0	0	0	0	0	0	**181**
09:00 - 09:59	0	63	13	1	12	0	0	0	0	0	0	0	0	0	**89**
10:00 - 10:59	0	54	9	2	14	0	0	1	0	1	0	0	0	1	**82**
11:00 - 11:59	0	59	11	1	10	1	0	0	0	0	0	0	0	1	**83**
12:00 - 12:59	0	62	12	0	12	0	0	1	0	0	0	0	0	1	**88**
13:00 - 13:59	0	61	5	0	13	0	0	0	0	0	0	0	0	0	**79**
14:00 - 14:59	0	68	20	3	10	2	0	0	0	0	0	0	0	1	**104**
15:00 - 15:59	0	101	16	9	15	0	0	0	0	0	0	0	0	0	**141**
16:00 - 16:59	1	73	14	2	13	0	0	0	0	0	0	0	0	0	**103**
17:00 - 17:59	1	86	13	0	15	0	0	0	0	0	0	0	0	0	**115**
18:00 - 18:59	0	50	11	0	10	0	0	0	0	0	0	0	0	3	**74**
19:00 - 19:59	1	38	6	0	10	0	0	0	0	0	0	0	0	0	**55**
20:00 - 20:59	0	26	5	0	3	0	0	0	0	0	0	0	0	0	**34**
21:00 - 21:59	0	20	1	0	1	0	0	0	0	0	0	0	0	0	**22**
22:00 - 22:59	0	12	5	0	0	0	0	0	0	0	0	0	0	0	**17**
23:00 - 23:59	0	8	2	0	0	0	0	0	0	0	0	0	0	0	**10**
Totals	**3**	**1109**	**210**	**24**	**182**	**3**	**0**	**4**	**0**	**1**	**0**	**0**	**0**	**8**	**1544**
Percent of Total	**0.2**	**71.8**	**13.6**	**1.6**	**11.8**	**0.2**	**0.0**	**0.3**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.5**	**100**
Percent of AM	**0.0**	**71.8**	**14.2**	**1.4**	**11.4**	**0.1**	**0.0**	**0.4**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.4**	**100**
Percent of PM	**0.4**	**71.9**	**13.1**	**1.7**	**12.1**	**0.2**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.6**	**100**

Truck Summary:

Total Trucks: 222 % Trucks: 14.4 AM % Trucks: 14.0 PM % Trucks: 14.7

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Total Classes Report

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	9	1	0	0	0	0	0	0	0	0	0	0	0	**10**
01:00 - 01:59	0	4	0	0	1	0	0	0	0	0	0	0	0	0	**5**
02:00 - 02:59	0	3	0	0	1	0	0	0	0	0	0	0	0	0	**4**
03:00 - 03:59	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	9	3	0	1	0	0	0	0	0	0	0	0	0	**13**
05:00 - 05:59	0	18	5	0	3	0	0	0	0	0	0	0	0	0	**26**
06:00 - 06:59	1	66	10	3	9	2	0	0	1	0	0	0	0	1	**93**
07:00 - 07:59	0	159	30	0	25	0	0	0	0	0	0	0	0	0	**214**
08:00 - 08:59	1	116	29	2	16	0	0	0	1	0	0	0	0	0	**165**
09:00 - 09:59	0	78	25	1	13	0	0	0	0	0	0	0	0	1	**118**
10:00 - 10:59	0	59	20	2	16	0	0	2	0	0	0	0	0	0	**99**
11:00 - 11:59	0	71	18	0	17	1	0	1	0	0	0	0	0	0	**108**
12:00 - 12:59	0	87	29	0	20	0	0	0	0	0	0	0	0	0	**136**
13:00 - 13:59	0	74	21	0	13	1	0	0	0	0	0	0	0	2	**111**
14:00 - 14:59	0	116	22	0	17	0	0	0	0	0	0	0	0	0	**155**
15:00 - 15:59	1	134	27	0	11	0	0	0	0	0	0	0	0	0	**173**
16:00 - 16:59	0	189	22	0	18	0	0	0	0	0	0	0	0	0	**229**
17:00 - 17:59	0	198	31	0	10	0	0	0	0	0	0	0	0	0	**239**
18:00 - 18:59	0	126	16	0	9	0	0	0	0	0	0	0	0	2	**153**
19:00 - 19:59	0	79	12	0	3	0	0	0	0	0	0	0	0	0	**94**
20:00 - 20:59	0	59	9	0	1	0	0	0	0	0	0	0	0	0	**69**
21:00 - 21:59	0	41	5	0	6	0	0	0	0	0	0	0	0	0	**52**
22:00 - 22:59	0	20	1	0	4	0	0	0	0	0	0	0	0	0	**25**
23:00 - 23:59	0	16	1	0	1	0	0	0	0	0	0	0	0	0	**18**
Totals	**3**	**1732**	**337**	**8**	**215**	**4**	**0**	**3**	**2**	**0**	**0**	**0**	**0**	**6**	**2310**
Percent of Total	**0.1**	**75.0**	**14.6**	**0.3**	**9.3**	**0.2**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**100**
Percent of AM	**0.2**	**69.3**	**16.5**	**0.9**	**11.9**	**0.4**	**0.0**	**0.4**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**100**
Percent of PM	**0.1**	**78.3**	**13.5**	**0.0**	**7.8**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**100**

Truck Summary:

Total Trucks: 238 % Trucks: 10.3 AM % Trucks: 14.0 PM % Trucks: 8.1

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Total Classes Report

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Total
00:00 - 00:59	0	8	1	0	0	0	0	0	0	0	0	0	0	0	**9**
01:00 - 01:59	0	5	0	0	0	0	0	0	0	0	0	0	0	0	**5**
02:00 - 02:59	0	2	0	0	1	0	0	0	1	0	0	0	0	0	**4**
03:00 - 03:59	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	10	2	0	2	0	0	0	0	0	0	0	0	0	**14**
05:00 - 05:59	0	15	9	0	5	0	0	0	0	0	0	0	0	0	**29**
06:00 - 06:59	0	96	14	5	11	2	1	1	0	0	0	0	0	0	**130**
07:00 - 07:59	0	164	43	3	24	0	0	1	0	0	0	0	0	1	**236**
08:00 - 08:59	0	194	39	11	17	0	0	1	0	0	0	0	0	0	**262**
09:00 - 09:59	0	118	28	5	15	0	0	0	0	0	0	0	0	1	**167**
10:00 - 10:59	0	95	21	2	22	0	0	1	0	1	0	0	0	1	**143**
11:00 - 11:59	0	110	21	1	12	1	0	0	1	0	0	0	0	1	**147**
12:00 - 12:59	0	138	21	2	18	1	0	1	0	0	0	0	0	1	**182**
13:00 - 13:59	0	119	10	0	17	0	0	1	0	0	0	0	0	0	**147**
14:00 - 14:59	0	153	31	3	16	2	0	0	0	0	0	0	0	2	**207**
15:00 - 15:59	0	193	39	12	18	1	0	0	0	0	0	0	0	1	**264**
16:00 - 16:59	1	232	36	5	19	0	0	0	0	0	0	0	0	0	**293**
17:00 - 17:59	1	228	44	0	23	0	0	0	0	0	0	0	0	2	**298**
18:00 - 18:59	0	128	22	0	11	0	0	0	0	0	0	0	0	4	**165**
19:00 - 19:59	1	83	19	0	12	0	0	0	0	0	0	0	0	1	**116**
20:00 - 20:59	0	54	8	0	3	0	0	0	0	0	0	0	0	0	**65**
21:00 - 21:59	0	45	2	0	1	0	0	0	0	0	0	0	0	0	**48**
22:00 - 22:59	0	31	6	0	1	0	0	0	0	0	0	0	0	0	**38**
23:00 - 23:59	0	18	3	0	0	0	0	0	0	0	0	0	0	0	**21**
Totals	**3**	**2240**	**419**	**49**	**248**	**7**	**1**	**6**	**2**	**1**	**0**	**0**	**0**	**15**	**2991**
Percent of Total	**0.1**	**74.9**	**14.0**	**1.6**	**8.3**	**0.2**	**0.0**	**0.2**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**100**
Percent of AM	**0.0**	**71.3**	**15.5**	**2.4**	**9.5**	**0.3**	**0.1**	**0.3**	**0.2**	**0.1**	**0.0**	**0.0**	**0.0**	**0.3**	**100**
Percent of PM	**0.2**	**77.1**	**13.1**	**1.2**	**7.5**	**0.2**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.6**	**100**

Truck Summary:

Total Trucks: 329 % Trucks: 11.0 AM % Trucks: 13.2 PM % Trucks: 9.7

Classification Scheme: FHWA (ID: 2275065203)

#1 Motorcycles - 2 Axles
#2 Passenger Cars - 2 Axles
#3 Pickup Trucks, Vans - 2 Axles
#4 Buses
#5 Single Unit - 2 Axles, 6 Tires
#6 Single Unit Truck - 3 Axles
#7 Single Unit - 4 Axles
#8 Single Unit - 4 Axles or Less
#9 Double Unit - 5 Axles
#10 Double Unit - 6 Axles or More
#11 Multi-Unit - 5 Axles or Less
#12 Multi-Unit - 6 Axles
#13 Multi-Unit - 7 Axles or More
#14 Unlassified Vehicle

Daily Northbound Speeds (MPH)

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	1	0	2	2	0	0	0	0	0	**5**
01:00 - 01:59	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	**4**
02:00 - 02:59	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	**2**
03:00 - 03:59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
04:00 - 04:59	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	**4**
05:00 - 05:59	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	**2**
06:00 - 06:59	0	0	0	0	0	3	2	9	9	4	1	1	0	0	0	**29**
07:00 - 07:59	0	0	0	0	0	2	10	20	22	4	1	0	0	0	0	**59**
08:00 - 08:59	0	0	0	0	0	1	6	10	18	6	1	0	0	0	0	**42**
09:00 - 09:59	0	0	0	0	0	3	7	20	22	1	1	0	0	0	0	**54**
10:00 - 10:59	0	0	0	0	0	5	11	18	9	3	0	0	0	0	0	**46**
11:00 - 11:59	0	0	0	0	0	1	9	18	16	5	1	0	0	0	0	**50**
12:00 - 12:59	0	0	0	0	0	2	14	21	21	6	1	0	0	0	0	**65**
13:00 - 13:59	0	0	0	0	0	0	3	25	15	8	0	0	0	0	0	**51**
14:00 - 14:59	0	0	0	0	0	0	10	32	28	8	1	1	0	0	0	**80**
15:00 - 15:59	0	0	0	0	0	3	11	39	29	9	2	0	0	0	0	**93**
16:00 - 16:59	0	0	0	0	0	1	28	47	69	11	3	0	0	0	0	**159**
17:00 - 17:59	0	0	0	1	1	6	26	68	49	13	2	1	0	0	0	**167**
18:00 - 18:59	0	0	0	0	0	2	16	29	24	6	0	0	0	0	0	**77**
19:00 - 19:59	0	0	0	0	0	2	10	15	17	6	1	0	0	0	0	**51**
20:00 - 20:59	0	0	0	0	0	1	4	14	18	4	0	0	0	0	0	**41**
21:00 - 21:59	0	0	0	0	1	0	2	14	10	0	2	0	0	0	0	**29**
22:00 - 22:59	0	0	0	0	0	0	1	3	4	4	0	0	0	0	0	**12**
23:00 - 23:59	0	0	0	0	0	0	0	2	5	1	2	0	0	0	0	**10**
Totals	**0**	**0**	**0**	**1**	**2**	**32**	**172**	**406**	**393**	**104**	**19**	**3**	**0**	**0**	**0**	**1132**
Percent of Total	**0.0**	**0.0**	**0.0**	**0.1**	**0.2**	**2.8**	**15.2**	**35.9**	**34.7**	**9.2**	**1.7**	**0.3**	**0.0**	**0.0**	**0.0**	**100**
Percent of AM	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.1**	**15.8**	**32.7**	**35.0**	**9.4**	**1.7**	**0.3**	**0.0**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.0**	**0.0**	**0.1**	**0.2**	**2.0**	**15.0**	**37.0**	**34.6**	**9.1**	**1.7**	**0.2**	**0.0**	**0.0**	**0.0**	**100**

Standard Deviation: 5.4 MPH
Mean Speed: 44.4 MPH
Median Speed: 44.4 MPH
Modal Speed: 42.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 70.6%

85th Percentile: 49.4 MPH
15th Percentile: 38.9 MPH
90th Percentile: 50.6 MPH
95th Percentile: 53.3 MPH

Daily Northbound Speeds (MPH)

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	**4**
01:00 - 01:59	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	**3**
02:00 - 02:59	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	**3**
03:00 - 03:59	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	0	0	0	0	0	2	1	1	2	1	0	0	0	0	**7**
05:00 - 05:59	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	**3**
06:00 - 06:59	0	0	0	0	0	5	7	17	16	11	2	1	1	0	0	**60**
07:00 - 07:59	0	0	0	0	0	1	5	36	21	13	3	1	0	0	0	**80**
08:00 - 08:59	0	0	0	0	0	0	2	35	34	8	2	0	0	0	0	**81**
09:00 - 09:59	0	0	0	0	0	1	7	29	27	12	1	1	0	0	0	**78**
10:00 - 10:59	0	0	0	0	1	3	8	16	22	7	4	0	0	0	0	**61**
11:00 - 11:59	0	0	0	0	0	0	4	21	26	12	1	0	0	0	0	**64**
12:00 - 12:59	0	0	0	0	0	2	7	30	33	21	1	0	0	0	0	**94**
13:00 - 13:59	0	0	0	0	0	2	6	24	23	11	2	0	0	0	0	**68**
14:00 - 14:59	0	0	1	1	0	2	9	30	34	21	4	0	0	0	1	**103**
15:00 - 15:59	0	0	0	0	0	2	14	40	49	16	2	0	0	0	0	**123**
16:00 - 16:59	0	0	0	0	0	9	26	59	60	30	4	2	0	0	0	**190**
17:00 - 17:59	0	0	0	0	3	13	39	56	60	11	0	0	0	0	1	**183**
18:00 - 18:59	0	0	0	0	0	0	8	44	30	8	1	0	0	0	0	**91**
19:00 - 19:59	0	0	0	0	0	0	11	21	25	4	0	0	0	0	0	**61**
20:00 - 20:59	0	0	0	0	0	1	5	10	9	3	2	0	1	0	0	**31**
21:00 - 21:59	0	0	0	0	0	1	2	9	12	1	1	0	0	0	0	**26**
22:00 - 22:59	0	0	0	0	0	0	1	5	10	2	3	0	0	0	0	**21**
23:00 - 23:59	0	0	0	0	0	0	0	4	3	3	1	0	0	0	0	**11**
Totals	**0**	**0**	**1**	**1**	**4**	**42**	**164**	**491**	**501**	**198**	**36**	**5**	**2**	**0**	**2**	**1447**
Percent of Total	**0.0**	**0.0**	**0.1**	**0.1**	**0.3**	**2.9**	**11.3**	**33.9**	**34.6**	**13.7**	**2.5**	**0.3**	**0.1**	**0.0**	**0.1**	**100**
Percent of AM	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**2.2**	**8.1**	**35.7**	**34.4**	**15.1**	**3.4**	**0.7**	**0.2**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.0**	**0.1**	**0.1**	**0.3**	**3.2**	**12.8**	**33.1**	**34.7**	**13.1**	**2.1**	**0.2**	**0.1**	**0.0**	**0.2**	**100**

Standard Deviation: 6.1 MPH
Mean Speed: 45.2 MPH
Median Speed: 45.2 MPH
Modal Speed: 47.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 68.6%

85th Percentile: 50.6 MPH
15th Percentile: 40.0 MPH
90th Percentile: 52.5 MPH
95th Percentile: 54.3 MPH

Daily Southbound Speeds (MPH)

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	0	0	2	2	0	1	0	0	0	**5**
01:00 - 01:59	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
02:00 - 02:59	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	**2**
03:00 - 03:59	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
04:00 - 04:59	0	0	0	0	0	0	0	3	5	0	1	0	0	0	0	**9**
05:00 - 05:59	0	0	0	0	0	1	2	1	5	1	11	3	0	0	0	**24**
06:00 - 06:59	0	1	0	0	0	1	6	12	27	14	3	0	0	0	0	**64**
07:00 - 07:59	0	0	0	0	0	0	15	37	59	31	12	0	1	0	0	**155**
08:00 - 08:59	0	0	0	0	1	2	11	38	49	14	3	4	1	0	0	**123**
09:00 - 09:59	0	0	0	0	1	2	7	27	18	7	2	0	0	0	0	**64**
10:00 - 10:59	0	0	1	0	1	4	11	15	15	6	0	0	0	0	0	**53**
11:00 - 11:59	0	0	0	0	1	4	13	18	13	8	1	0	0	0	0	**58**
12:00 - 12:59	0	0	0	0	0	0	10	31	20	8	2	0	0	0	0	**71**
13:00 - 13:59	0	0	0	0	1	4	11	20	13	8	3	0	0	0	0	**60**
14:00 - 14:59	0	0	0	2	0	1	10	21	25	12	3	1	0	0	0	**75**
15:00 - 15:59	0	0	0	1	0	2	11	22	27	15	1	1	0	0	0	**80**
16:00 - 16:59	0	0	0	0	0	0	4	32	23	8	0	1	1	0	1	**70**
17:00 - 17:59	0	0	0	0	0	1	15	19	30	5	2	0	0	0	0	**72**
18:00 - 18:59	0	0	0	0	1	4	11	29	22	7	2	0	0	0	0	**76**
19:00 - 19:59	0	0	0	0	0	3	6	14	14	6	0	0	0	0	0	**43**
20:00 - 20:59	0	0	0	0	0	0	3	12	4	5	3	0	0	1	0	**28**
21:00 - 21:59	0	0	0	0	0	0	3	7	8	3	2	0	0	0	0	**23**
22:00 - 22:59	0	0	0	0	0	0	1	4	5	1	1	0	1	0	0	**13**
23:00 - 23:59	0	0	0	0	0	0	1	3	2	2	0	0	0	0	0	**8**
Totals	**0**	**1**	**1**	**3**	**6**	**29**	**151**	**365**	**389**	**164**	**52**	**11**	**4**	**1**	**1**	**1178**
Percent of Total	**0.0**	**0.1**	**0.1**	**0.3**	**0.5**	**2.5**	**12.8**	**31.0**	**33.0**	**13.9**	**4.4**	**0.9**	**0.3**	**0.1**	**0.1**	**100**
Percent of AM	**0.0**	**0.2**	**0.2**	**0.0**	**0.7**	**2.5**	**11.6**	**27.0**	**35.1**	**15.0**	**5.9**	**1.4**	**0.4**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.0**	**0.0**	**0.5**	**0.3**	**2.4**	**13.9**	**34.6**	**31.2**	**12.9**	**3.1**	**0.5**	**0.3**	**0.2**	**0.2**	**100**

Standard Deviation: 6.6 MPH
Mean Speed: 45.5 MPH
Median Speed: 45.4 MPH
Modal Speed: 47.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 64.0%

85th Percentile: 51.7 MPH
15th Percentile: 39.5 MPH
90th Percentile: 53.5 MPH
95th Percentile: 55.9 MPH

Daily Southbound Speeds (MPH)

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	**5**
01:00 - 01:59	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	**2**
02:00 - 02:59	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
03:00 - 03:59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
04:00 - 04:59	0	0	0	0	0	0	0	1	5	1	0	0	0	0	0	**7**
05:00 - 05:59	0	0	0	0	0	0	5	4	1	6	5	4	1	0	0	**26**
06:00 - 06:59	0	0	0	0	0	1	9	18	21	15	6	0	0	0	0	**70**
07:00 - 07:59	0	0	0	0	0	1	15	41	65	31	2	1	0	0	0	**156**
08:00 - 08:59	0	0	0	0	0	3	15	67	60	32	3	0	1	0	0	**181**
09:00 - 09:59	0	0	0	0	0	3	12	29	27	13	4	1	0	0	0	**89**
10:00 - 10:59	0	0	0	0	1	4	13	21	25	14	4	0	0	0	0	**82**
11:00 - 11:59	0	0	0	1	1	1	9	22	31	15	3	0	0	0	0	**83**
12:00 - 12:59	0	0	0	0	0	1	11	24	30	18	2	1	1	0	0	**88**
13:00 - 13:59	0	0	0	0	0	1	9	27	27	11	2	2	0	0	0	**79**
14:00 - 14:59	0	1	0	1	1	3	11	22	37	18	7	2	0	0	1	**104**
15:00 - 15:59	0	0	0	0	0	1	16	45	50	22	5	2	0	0	0	**141**
16:00 - 16:59	0	0	0	0	0	4	19	28	36	14	1	1	0	0	0	**103**
17:00 - 17:59	0	0	0	0	0	5	15	43	41	7	3	1	0	0	0	**115**
18:00 - 18:59	0	1	0	0	0	2	10	24	25	10	1	0	1	0	0	**74**
19:00 - 19:59	0	0	0	0	1	0	9	14	20	10	1	0	0	0	0	**55**
20:00 - 20:59	0	0	0	0	0	0	3	8	10	11	2	0	0	0	0	**34**
21:00 - 21:59	0	0	0	0	0	0	1	8	9	3	0	0	0	1	0	**22**
22:00 - 22:59	0	0	0	0	0	0	1	4	8	1	2	1	0	0	0	**17**
23:00 - 23:59	0	0	0	0	0	0	1	2	3	1	2	0	1	0	0	**10**
Totals	**0**	**2**	**0**	**2**	**4**	**30**	**184**	**453**	**535**	**254**	**57**	**16**	**5**	**1**	**1**	**1544**
Percent of Total	**0.0**	**0.1**	**0.0**	**0.1**	**0.3**	**1.9**	**11.9**	**29.3**	**34.7**	**16.5**	**3.7**	**1.0**	**0.3**	**0.1**	**0.1**	**100**
Percent of AM	**0.0**	**0.0**	**0.0**	**0.1**	**0.3**	**1.9**	**11.1**	**29.1**	**34.0**	**18.2**	**4.1**	**0.9**	**0.3**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.2**	**0.0**	**0.1**	**0.2**	**2.0**	**12.6**	**29.6**	**35.2**	**15.0**	**3.3**	**1.2**	**0.4**	**0.1**	**0.1**	**100**

Standard Deviation: 6.3 MPH
Mean Speed: 45.9 MPH
Median Speed: 45.9 MPH
Modal Speed: 47.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 64.0%

85th Percentile: 52.0 MPH
15th Percentile: 40.1 MPH
90th Percentile: 53.5 MPH
95th Percentile: 55.2 MPH

Daily Total Speeds (MPH)

Study Date: Wednesday, 12/16/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	1	0	4	4	0	1	0	0	0	**10**
01:00 - 01:59	0	0	0	0	0	0	1	0	4	0	0	0	0	0	0	**5**
02:00 - 02:59	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	**4**
03:00 - 03:59	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
04:00 - 04:59	0	0	0	0	0	0	0	4	7	1	1	0	0	0	0	**13**
05:00 - 05:59	0	0	0	0	0	1	2	2	5	2	11	3	0	0	0	**26**
06:00 - 06:59	0	1	0	0	0	4	8	21	36	18	4	1	0	0	0	**93**
07:00 - 07:59	0	0	0	0	0	2	25	57	81	35	13	0	1	0	0	**214**
08:00 - 08:59	0	0	0	0	1	3	17	48	67	20	4	4	1	0	0	**165**
09:00 - 09:59	0	0	0	0	1	5	14	47	40	8	3	0	0	0	0	**118**
10:00 - 10:59	0	0	1	0	1	9	22	33	24	9	0	0	0	0	0	**99**
11:00 - 11:59	0	0	0	0	1	5	22	36	29	13	2	0	0	0	0	**108**
12:00 - 12:59	0	0	0	0	0	2	24	52	41	14	3	0	0	0	0	**136**
13:00 - 13:59	0	0	0	0	1	4	14	45	28	16	3	0	0	0	0	**111**
14:00 - 14:59	0	0	0	2	0	1	20	53	53	20	4	2	0	0	0	**155**
15:00 - 15:59	0	0	0	1	0	5	22	61	56	24	3	1	0	0	0	**173**
16:00 - 16:59	0	0	0	0	0	1	32	79	92	19	3	1	1	0	1	**229**
17:00 - 17:59	0	0	0	1	1	7	41	87	79	18	4	1	0	0	0	**239**
18:00 - 18:59	0	0	0	0	1	6	27	58	46	13	2	0	0	0	0	**153**
19:00 - 19:59	0	0	0	0	0	5	16	29	31	12	1	0	0	0	0	**94**
20:00 - 20:59	0	0	0	0	0	1	7	26	22	9	3	0	0	1	0	**69**
21:00 - 21:59	0	0	0	0	1	0	5	21	18	3	4	0	0	0	0	**52**
22:00 - 22:59	0	0	0	0	0	0	2	7	9	5	1	0	1	0	0	**25**
23:00 - 23:59	0	0	0	0	0	0	1	5	7	3	2	0	0	0	0	**18**
Totals	**0**	**1**	**1**	**4**	**8**	**61**	**323**	**771**	**782**	**268**	**71**	**14**	**4**	**1**	**1**	**2310**
Percent of Total	**0.0**	**0.0**	**0.0**	**0.2**	**0.3**	**2.6**	**14.0**	**33.4**	**33.9**	**11.6**	**3.1**	**0.6**	**0.2**	**0.0**	**0.0**	**100**
Percent of AM	**0.0**	**0.1**	**0.1**	**0.0**	**0.5**	**3.4**	**13.1**	**29.0**	**35.0**	**13.1**	**4.4**	**1.1**	**0.2**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.0**	**0.0**	**0.3**	**0.3**	**2.2**	**14.5**	**36.0**	**33.1**	**10.7**	**2.3**	**0.3**	**0.1**	**0.1**	**0.1**	**100**

Standard Deviation: 6.1 MPH
Mean Speed: 44.9 MPH
Median Speed: 44.9 MPH
Modal Speed: 47.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 67.2%

85th Percentile: 50.2 MPH
15th Percentile: 39.2 MPH
90th Percentile: 52.4 MPH
95th Percentile: 54.5 MPH

Daily Total Speeds (MPH)

Study Date: Thursday, 12/17/2020
Unit ID: Old Milburnie Rd S of Forestvill
Location: Ols Milburnie Rd S of Forestville Rd
Posted Speed: 45

	0-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-125	Total
00:00 - 00:59	0	0	0	0	0	0	0	2	5	1	1	0	0	0	0	**9**
01:00 - 01:59	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	**5**
02:00 - 02:59	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	**4**
03:00 - 03:59	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
04:00 - 04:59	0	0	0	0	0	0	2	2	6	3	1	0	0	0	0	**14**
05:00 - 05:59	0	0	0	0	0	0	5	5	2	7	5	4	1	0	0	**29**
06:00 - 06:59	0	0	0	0	0	6	16	35	37	26	8	1	1	0	0	**130**
07:00 - 07:59	0	0	0	0	0	2	20	77	86	44	5	2	0	0	0	**236**
08:00 - 08:59	0	0	0	0	0	3	17	102	94	40	5	0	1	0	0	**262**
09:00 - 09:59	0	0	0	0	0	4	19	58	54	25	5	2	0	0	0	**167**
10:00 - 10:59	0	0	0	0	2	7	21	37	47	21	8	0	0	0	0	**143**
11:00 - 11:59	0	0	0	1	1	1	13	43	57	27	4	0	0	0	0	**147**
12:00 - 12:59	0	0	0	0	0	3	18	54	63	39	3	1	1	0	0	**182**
13:00 - 13:59	0	0	0	0	0	3	15	51	50	22	4	2	0	0	0	**147**
14:00 - 14:59	0	1	1	2	1	5	20	52	71	39	11	2	0	0	2	**207**
15:00 - 15:59	0	0	0	0	0	3	30	85	99	38	7	2	0	0	0	**264**
16:00 - 16:59	0	0	0	0	0	13	45	87	96	44	5	3	0	0	0	**293**
17:00 - 17:59	0	0	0	0	3	18	54	99	101	18	3	1	0	0	1	**298**
18:00 - 18:59	0	1	0	0	0	2	18	68	55	18	2	0	1	0	0	**165**
19:00 - 19:59	0	0	0	0	1	0	20	35	45	14	1	0	0	0	0	**116**
20:00 - 20:59	0	0	0	0	0	1	8	18	19	14	4	0	1	0	0	**65**
21:00 - 21:59	0	0	0	0	0	1	3	17	21	4	1	0	0	1	0	**48**
22:00 - 22:59	0	0	0	0	0	0	2	9	18	3	5	1	0	0	0	**38**
23:00 - 23:59	0	0	0	0	0	0	1	6	6	4	3	0	1	0	0	**21**
Totals	**0**	**2**	**1**	**3**	**8**	**72**	**348**	**944**	**1036**	**452**	**93**	**21**	**7**	**1**	**3**	**2991**
Percent of Total	**0.0**	**0.1**	**0.0**	**0.1**	**0.3**	**2.4**	**11.6**	**31.6**	**34.6**	**15.1**	**3.1**	**0.7**	**0.2**	**0.0**	**0.1**	**100**
Percent of AM	**0.0**	**0.0**	**0.0**	**0.1**	**0.3**	**2.0**	**9.9**	**31.6**	**34.2**	**17.0**	**3.8**	**0.8**	**0.3**	**0.0**	**0.0**	**100**
Percent of PM	**0.0**	**0.1**	**0.1**	**0.1**	**0.3**	**2.7**	**12.7**	**31.5**	**34.9**	**13.9**	**2.7**	**0.7**	**0.2**	**0.1**	**0.2**	**100**

Standard Deviation: 6.2 MPH
Mean Speed: 45.6 MPH
Median Speed: 45.6 MPH
Modal Speed: 47.5 MPH

Ten Mile Pace: 40 to 49 MPH
Percent in Ten Mile Pace: 66.2%

85th Percentile: 51.4 MPH
15th Percentile: 40.1 MPH
90th Percentile: 53.1 MPH
95th Percentile: 54.7 MPH

Weekly Volumes

Unit ID: Old Milburnie Rd S of Forestvill

Location: Ols Milburnie Rd S of Forestville Rd

Week of 12/16/2020

Start Time	12/16 Wednesday		12/17 Thursday		12/18 Friday		12/19 Saturday		12/20 Sunday		12/21 Monday		12/22 Tuesday		Daily Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
00:00	5	5	4	5	-	-	-	-	-	-	-	-	-	-	5	5
01:00	4	1	3	2	-	-	-	-	-	-	-	-	-	-	4	2
02:00	2	2	3	1	-	-	-	-	-	-	-	-	-	-	3	2
03:00	0	1	1	0	-	-	-	-	-	-	-	-	-	-	1	1
04:00	4	9	7	7	-	-	-	-	-	-	-	-	-	-	6	8
05:00	2	24	3	26	-	-	-	-	-	-	-	-	-	-	3	25
06:00	29	64	60	70	-	-	-	-	-	-	-	-	-	-	45	67
07:00	59	155	80	156	-	-	-	-	-	-	-	-	-	-	70	156
08:00	42	123	81	181	-	-	-	-	-	-	-	-	-	-	62	152
09:00	54	64	78	89	-	-	-	-	-	-	-	-	-	-	66	77
10:00	46	53	61	82	-	-	-	-	-	-	-	-	-	-	54	68
11:00	50	58	64	83	-	-	-	-	-	-	-	-	-	-	57	71
12:00	65	71	94	88	-	-	-	-	-	-	-	-	-	-	80	80
13:00	51	60	68	79	-	-	-	-	-	-	-	-	-	-	60	70
14:00	80	75	103	104	-	-	-	-	-	-	-	-	-	-	92	90
15:00	93	80	123	141	-	-	-	-	-	-	-	-	-	-	108	111
16:00	159	70	190	103	-	-	-	-	-	-	-	-	-	-	175	87
17:00	167	72	183	115	-	-	-	-	-	-	-	-	-	-	175	94
18:00	77	76	91	74	-	-	-	-	-	-	-	-	-	-	84	75
19:00	51	43	61	55	-	-	-	-	-	-	-	-	-	-	56	49
20:00	41	28	31	34	-	-	-	-	-	-	-	-	-	-	36	31
21:00	29	23	26	22	-	-	-	-	-	-	-	-	-	-	28	23
22:00	12	13	21	17	-	-	-	-	-	-	-	-	-	-	17	15
23:00	10	8	11	10	-	-	-	-	-	-	-	-	-	-	11	9
Lane Total	1132	1178	1447	1544	-	-	-	-	-	-	-	-	-	-	1298	1368
Day Total		2310		2991		-		-		-		-		-		2666
AM Peak	08:45	07:29	08:31	07:42	-	-	-	-	-	-	-	-	-	-	07:00	07:00
AM Count	60	179	95	188	-	-	-	-	-	-	-	-	-	-	70	156
PM Peak	16:23	14:45	16:28	14:49	-	-	-	-	-	-	-	-	-	-	16:00	15:00
PM Count	189	92	222	142	-	-	-	-	-	-	-	-	-	-	175	111

Appendix C – Synchro

2020 Existing Traffic Volumes

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	163	165	77	154	11
Future Vol, veh/h	4	163	165	77	154	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	181	183	86	171	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	269	0	-	0	372	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	189	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1295	-	-	-	629	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1295	-	-	-	627	859
Mov Cap-2 Maneuver	-	-	-	-	627	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	843	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.9
HCM LOS			B

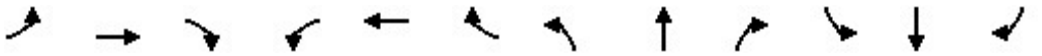
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1295	-	-	-	638
HCM Lane V/C Ratio	0.003	-	-	-	0.287
HCM Control Delay (s)	7.8	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.2

Intersection	
Intersection Delay, s/veh	180.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	67	110	26	137	522	61	43	265	115	20	139	85
Future Vol, veh/h	67	110	26	137	522	61	43	265	115	20	139	85
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	74	122	29	152	580	68	48	294	128	22	154	94
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	24.1	341.3	69.7	27.6
HCM LOS	C	F	F	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	33%	19%	8%
Vol Thru, %	63%	54%	72%	57%
Vol Right, %	27%	13%	8%	35%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	423	203	720	244
LT Vol	43	67	137	20
Through Vol	265	110	522	139
RT Vol	115	26	61	85
Lane Flow Rate	470	226	800	271
Geometry Grp	1	1	1	1
Degree of Util (X)	0.973	0.531	1.695	0.61
Departure Headway (Hd)	9.154	10.162	7.627	10.068
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	399	359	480	361
Service Time	7.154	8.162	5.726	8.068
HCM Lane V/C Ratio	1.178	0.63	1.667	0.751
HCM Control Delay	69.7	24.1	341.3	27.6
HCM Lane LOS	F	C	F	D
HCM 95th-tile Q	11.3	3	46.8	3.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	312	139	32	1001	17	403	76	4	33	149	1391
Future Volume (vph)	260	312	139	32	1001	17	403	76	4	33	149	1391
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.954			0.997			0.993			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1742	0	1778	1866	0	1734	1813	0	1743	1587	0
Flt Permitted	0.950			0.480			0.950			0.700		
Satd. Flow (perm)	1734	1742	0	899	1866	0	1734	1813	0	1284	1587	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	289	347	154	36	1112	19	448	84	4	37	166	1546
Shared Lane Traffic (%)												
Lane Group Flow (vph)	289	501	0	36	1131	0	448	88	0	37	1712	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases				6						4		
Detector Phase	5	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	15.0	105.0		85.0	85.0		15.0	45.0		25.0	25.0	
Actuated g/C Ratio	0.09	0.66		0.53	0.53		0.09	0.28		0.16	0.16	
v/c Ratio	1.78	0.44		0.08	1.14		2.77	0.17		0.18	6.93	
Control Delay	414.0	14.7		19.0	111.0		834.8	44.6		61.5	2686.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	414.0	14.7		19.0	111.0		834.8	44.6		61.5	2686.3	
LOS	F	B		B	F		F	D		E	F	
Approach Delay		160.8			108.2			705.1			2630.8	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~450	240		18	~1377		~795	70		34	~3442	
Queue Length 95th (ft)	#648	318		39	#1644		#1020	119		72	#3702	
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		
Base Capacity (vph)	162	1143		477	991		162	509		200	247	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.78	0.44		0.08	1.14		2.77	0.17		0.18	6.93	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 6.93			
Intersection Signal Delay: 1233.5		Intersection LOS: F	
Intersection Capacity Utilization 200.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

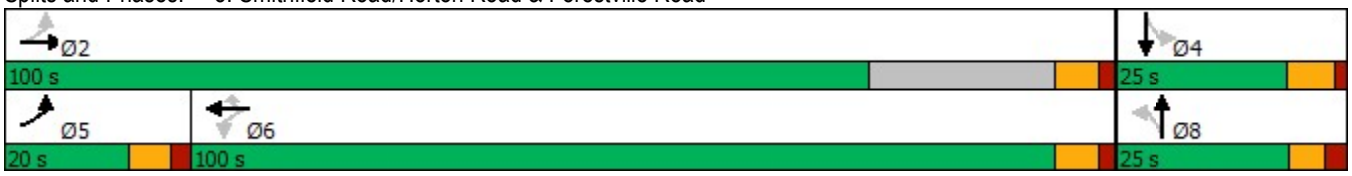
Splits and Phases: 1: Forestville Road & Buffaloe Road

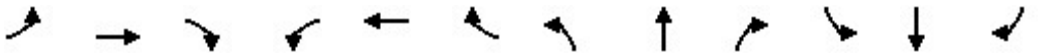
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	126	180	49	105	16	124	72	47	26	156	9
Future Volume (vph)	18	126	180	49	105	16	124	72	47	26	156	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.912				0.850		0.941			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1665	0	1761	1853	1575	1770	1753	0	1725	1802	0
Flt Permitted	0.506			0.556			0.642			0.673		
Satd. Flow (perm)	924	1665	0	1031	1853	1575	1196	1753	0	1222	1802	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	20	140	200	54	117	18	138	80	52	29	173	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	340	0	54	117	18	138	132	0	29	183	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	16.7	16.7		14.5	14.5	14.5	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.36	0.36		0.31	0.31	0.31	0.43	0.43		0.43	0.43	
v/c Ratio	0.04	0.58		0.17	0.21	0.04	0.27	0.18		0.06	0.24	
Control Delay	9.2	16.3		15.5	14.8	14.0	12.1	10.6		10.4	11.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.2	16.3		15.5	14.8	14.0	12.1	10.6		10.4	11.0	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		15.9			14.9			11.4			10.9	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	3	71		10	21	3	20	18		4	26	
Queue Length 95th (ft)	12	127		41	70	18	73	65		21	86	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	602	1665		1031	1853	1575	514	753		525	774	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.03	0.20		0.05	0.06	0.01	0.27	0.18		0.06	0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 47			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road



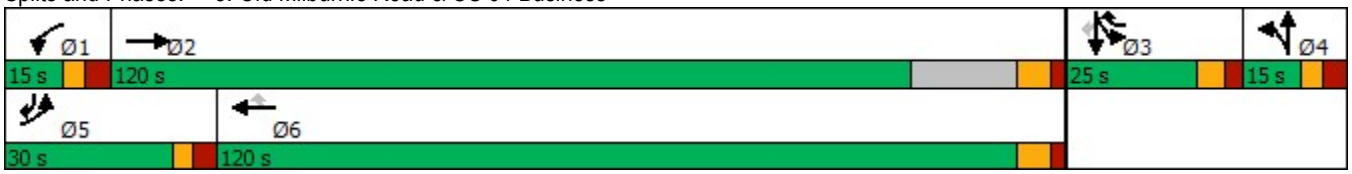


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	565	4	5	941	63	4	4	4	81	4	310
Future Volume (vph)	179	565	4	5	941	63	4	4	4	81	4	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		0	150		75	50		0	0		75
Storage Lanes	1		0	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.999				0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3483	0	1778	3557	1591	1761	1714	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3483	0	1778	3557	1591	1761	1714	0	0	1742	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	199	628	4	6	1046	70	4	4	4	90	4	344
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	632	0	6	1046	70	4	8	0	0	94	344
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	3	4	4		3	3	5
Permitted Phases						6						3
Detector Phase	5	2		1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8		13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0		15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%		7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2		8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6		3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2		3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8		-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0		1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0		0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	17.2	56.4		9.4	35.8	52.1	9.5	9.5			11.0	32.0
Actuated g/C Ratio	0.20	0.67		0.11	0.42	0.62	0.11	0.11			0.13	0.38
v/c Ratio	0.56	0.27		0.03	0.69	0.07	0.02	0.04			0.42	0.33
Control Delay	40.3	7.8		45.6	24.1	8.8	45.8	45.4			45.7	16.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	40.3	7.8		45.6	24.1	8.8	45.8	45.4			45.7	16.8
LOS	D	A		D	C	A	D	D			D	B
Approach Delay		15.6			23.3			45.5			23.0	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	80	38		2	190	10	2	3			40	56
Queue Length 95th (ft)	214	170		18	414	42	14	22			121	115
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375			150		75	50					75
Base Capacity (vph)	551	3483		225	3545	1179	222	216			441	1343
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.36	0.18		0.03	0.30	0.06	0.02	0.04			0.21	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 190			
Actuated Cycle Length: 84.3			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 8: Old Milburnie Road & US 64 Business



Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	168	118	123	148	4
Future Vol, veh/h	4	168	118	123	148	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	187	131	137	164	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	268	0	-	0	326	131
Stage 1	-	-	-	-	131	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1296	-	-	-	668	919
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1296	-	-	-	666	919
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.2
HCM LOS			B

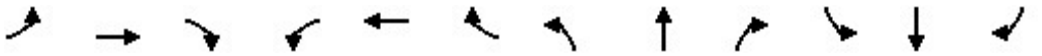
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1296	-	-	-	671
HCM Lane V/C Ratio	0.003	-	-	-	0.252
HCM Control Delay (s)	7.8	0	-	-	12.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	147	50	31	39	6	25	111	26	9	141	68
Future Vol, veh/h	96	147	50	31	39	6	25	111	26	9	141	68
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	107	163	56	34	43	7	28	123	29	10	157	76
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.7	9.5	10.4	10.9
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	33%	41%	4%
Vol Thru, %	69%	50%	51%	65%
Vol Right, %	16%	17%	8%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	162	293	76	218
LT Vol	25	96	31	9
Through Vol	111	147	39	141
RT Vol	26	50	6	68
Lane Flow Rate	180	326	84	242
Geometry Grp	1	1	1	1
Degree of Util (X)	0.268	0.467	0.132	0.347
Departure Headway (Hd)	5.365	5.168	5.627	5.161
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	670	697	637	698
Service Time	3.4	3.195	3.666	3.194
HCM Lane V/C Ratio	0.269	0.468	0.132	0.347
HCM Control Delay	10.4	12.7	9.5	10.9
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.1	2.5	0.5	1.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	676	669	134	4	294	30	95	98	4	26	77	216
Future Volume (vph)	676	669	134	4	294	30	95	98	4	26	77	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.975			0.986			0.995			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1780	0	1778	1846	0	1734	1816	0	1743	1633	0
Flt Permitted	0.950			0.127			0.950			0.684		
Satd. Flow (perm)	1734	1780	0	238	1846	0	1734	1816	0	1255	1633	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	751	743	149	4	327	33	106	109	4	29	86	240
Shared Lane Traffic (%)												
Lane Group Flow (vph)	751	892	0	4	360	0	106	113	0	29	326	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases				6						4		
Detector Phase	5	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	15.4	63.2		42.6	42.6		11.9	42.8		25.7	25.7	
Actuated g/C Ratio	0.13	0.54		0.37	0.37		0.10	0.37		0.22	0.22	
v/c Ratio	3.28	0.92		0.05	0.53		0.60	0.17		0.10	0.90	
Control Delay	1051.6	39.6		23.0	30.8		68.1	29.6		45.0	75.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	1051.6	39.6		23.0	30.8		68.1	29.6		45.0	75.7	
LOS	F	D		C	C		E	C		D	E	
Approach Delay		502.2			30.7			48.3			73.2	
Approach LOS		F			C			D			E	
Queue Length 50th (ft)	~1015	584		2	208		78	58		18	246	
Queue Length 95th (ft)	#1491	827		10	299		159	125		54	#535	
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		
Base Capacity (vph)	229	1580		178	1387		229	722		277	361	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	3.28	0.56		0.02	0.26		0.46	0.16		0.10	0.90	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 116.3			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 3.28			
Intersection Signal Delay: 338.2		Intersection LOS: F	
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

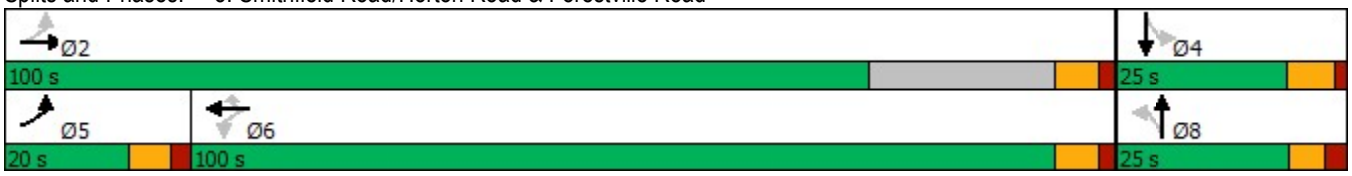
Splits and Phases: 1: Forestville Road & Buffaloe Road

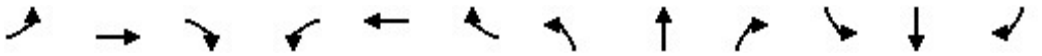
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	101	190	53	77	17	141	146	49	13	121	23
Future Volume (vph)	23	101	190	53	77	17	141	146	49	13	121	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.902				0.850		0.962			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1647	0	1761	1853	1575	1770	1792	0	1725	1773	0
Flt Permitted	0.520			0.565			0.656			0.623		
Satd. Flow (perm)	949	1647	0	1047	1853	1575	1222	1792	0	1131	1773	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	112	211	59	86	19	157	162	54	14	134	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	323	0	59	86	19	157	216	0	14	160	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	16.6	16.6		14.3	14.3	14.3	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.35	0.35		0.30	0.30	0.30	0.43	0.43		0.43	0.43	
v/c Ratio	0.05	0.56		0.18	0.15	0.04	0.30	0.28		0.03	0.21	
Control Delay	9.4	15.9		15.7	14.4	14.1	12.3	11.2		10.3	10.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.4	15.9		15.7	14.4	14.1	12.3	11.2		10.3	10.7	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		15.5			14.8			11.7			10.7	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	4	67		10	15	3	23	31		2	22	
Queue Length 95th (ft)	15	120		44	54	19	82	100		13	77	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	604	1647		1047	1853	1575	527	773		488	764	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.20		0.06	0.05	0.01	0.30	0.28		0.03	0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 46.9			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 60.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





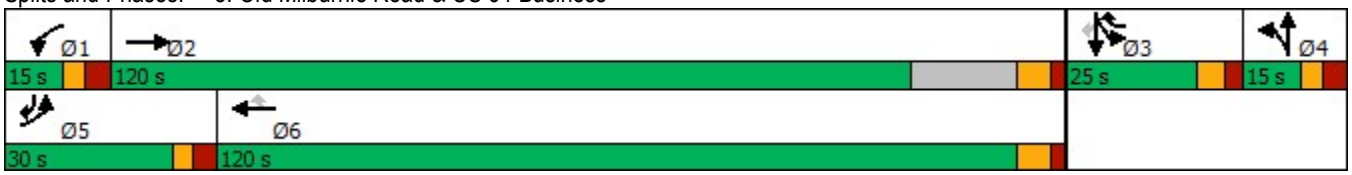
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	288	1500	4	4	1159	78	4	4	4	71	4	133
Future Volume (vph)	288	1500	4	4	1159	78	4	4	4	71	4	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		0	150		75	50		0	0		75
Storage Lanes	1		0	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt						0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.955	
Satd. Flow (prot)	1743	3486	0	1778	3557	1591	1761	1714	0	0	1743	2731
Flt Permitted	0.950			0.950			0.950				0.955	
Satd. Flow (perm)	1743	3486	0	1778	3557	1591	1761	1714	0	0	1743	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	320	1667	4	4	1288	87	4	4	4	79	4	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	320	1671	0	4	1288	87	4	8	0	0	83	148
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	3	4	4		3	3	5
Permitted Phases						6						3
Detector Phase	5	2		1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8		13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0		15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%		7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2		8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6		3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2		3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8		-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0		1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0		0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	26.2	75.2		9.2	45.8	62.7	9.3	9.3			11.7	41.5
Actuated g/C Ratio	0.25	0.72		0.09	0.44	0.60	0.09	0.09			0.11	0.40
v/c Ratio	0.73	0.66		0.03	0.82	0.09	0.03	0.05			0.43	0.14
Control Delay	50.6	11.9		56.2	30.8	9.1	56.2	56.0			55.1	19.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	50.6	11.9		56.2	30.8	9.1	56.2	56.0			55.1	19.2
LOS	D	B		E	C	A	E	E			E	B
Approach Delay		18.2			29.5			56.1			32.1	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	162	164		2	324	19	2	4			45	27
Queue Length 95th (ft)	#505	686		17	575	49	17	26			126	69
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375			150		75	50					75
Base Capacity (vph)	439	3435		179	3386	1103	177	173			352	1092
Starvation Cap Reductn	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn	0	0		0	0	0	0	0			0	0
Storage Cap Reductn	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio	0.73	0.49		0.02	0.38	0.08	0.02	0.05			0.24	0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 190			
Actuated Cycle Length: 103.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 23.5		Intersection LOS: C	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



2028 Background Traffic Volumes

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	206	209	98	195	14
Future Vol, veh/h	5	206	209	98	195	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	229	232	109	217	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	341	0	-	0	473	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	241	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1218	-	-	-	550	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	799	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1218	-	-	-	547	807
Mov Cap-2 Maneuver	-	-	-	-	547	-
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	15.9
HCM LOS			C

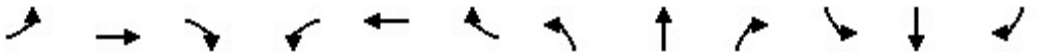
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1218	-	-	-	559
HCM Lane V/C Ratio	0.005	-	-	-	0.415
HCM Control Delay (s)	8	0	-	-	15.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	2

Intersection	
Intersection Delay, s/veh	371.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	85	139	33	174	661	77	54	336	146	25	176	108
Future Vol, veh/h	85	139	33	174	661	77	54	336	146	25	176	108
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	94	154	37	193	734	86	60	373	162	28	196	120
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	48.1	655.5	223.7	60.8
HCM LOS	E	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	33%	19%	8%
Vol Thru, %	63%	54%	72%	57%
Vol Right, %	27%	13%	8%	35%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	536	257	912	309
LT Vol	54	85	174	25
Through Vol	336	139	661	176
RT Vol	146	33	77	108
Lane Flow Rate	596	286	1013	343
Geometry Grp	1	1	1	1
Degree of Util (X)	1.385	0.727	2.393	0.832
Departure Headway (Hd)	11.908	14.418	9.582	13.985
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	310	254	395	261
Service Time	9.908	12.418	7.582	11.985
HCM Lane V/C Ratio	1.923	1.126	2.565	1.314
HCM Control Delay	223.7	48.1	655.5	60.8
HCM Lane LOS	F	E	F	F
HCM 95th-tile Q	21.8	5	70.2	6.7

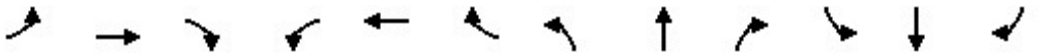


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	395	176	41	1268	22	511	96	4	42	189	1762
Future Volume (vph)	329	395	176	41	1268	22	511	96	4	42	189	1762
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.954			0.997			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1742	0	1778	1866	0	1734	1816	0	1743	1835	1560
Flt Permitted	0.950			0.409			0.950			0.685		
Satd. Flow (perm)	1734	1742	0	766	1866	0	1734	1816	0	1257	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	366	439	196	46	1409	24	568	107	4	47	210	1958
Shared Lane Traffic (%)												
Lane Group Flow (vph)	366	635	0	46	1433	0	568	111	0	47	210	1958
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.0	105.0		85.0	85.0		15.0	41.4		21.3	21.3	41.4
Actuated g/C Ratio	0.10	0.67		0.54	0.54		0.10	0.26		0.14	0.14	0.26
v/c Ratio	2.20	0.54		0.11	1.41		3.42	0.23		0.27	0.84	4.75
Control Delay	591.9	15.9		19.2	222.1		1125.2	46.2		64.5	93.2	1707.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	591.9	15.9		19.2	222.1		1125.2	46.2		64.5	93.2	1707.7
LOS	F	B		B	F		F	D		E	F	F
Approach Delay		226.5			215.8			948.8			1519.7	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~606	326		23	~1990		~1038	89		44	212	~3733
Queue Length 95th (ft)	#830	447		48	#2296		#1295	146		87	#320	#4018
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	166	1170		416	1014		166	522		201	293	412
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	2.20	0.54		0.11	1.41		3.42	0.21		0.23	0.72	4.75

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 156.4			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 4.75			
Intersection Signal Delay: 847.8		Intersection LOS: F	
Intersection Capacity Utilization 218.0%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Forestville Road & Buffaloe Road

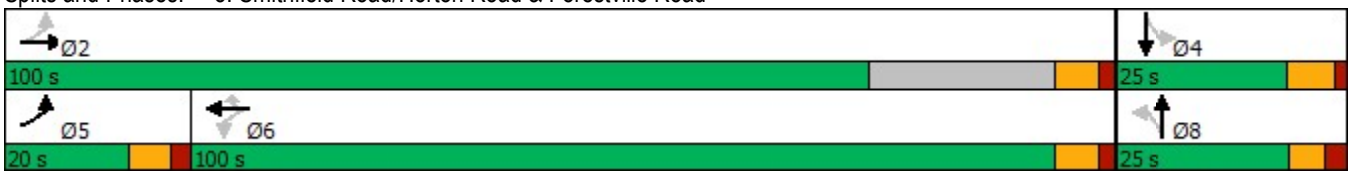


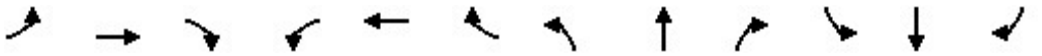
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	160	228	62	133	20	157	91	60	33	198	11
Future Volume (vph)	23	160	228	62	133	20	157	91	60	33	198	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.912				0.850		0.940			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1665	0	1761	1853	1575	1770	1751	0	1725	1802	0
Flt Permitted	0.510			0.512			0.610			0.651		
Satd. Flow (perm)	931	1665	0	949	1853	1575	1136	1751	0	1182	1802	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	178	253	69	148	22	174	101	67	37	220	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	431	0	69	148	22	174	168	0	37	232	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	19.1	19.1		16.8	16.8	16.8	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.39	0.39		0.34	0.34	0.34	0.41	0.41		0.41	0.41	
v/c Ratio	0.05	0.67		0.21	0.24	0.04	0.38	0.23		0.08	0.32	
Control Delay	8.8	18.0		15.6	14.4	13.4	15.0	12.3		11.6	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.8	18.0		15.6	14.4	13.4	15.0	12.3		11.6	12.9	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		17.5			14.6			13.7			12.7	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	4	97		12	27	4	32	29		6	42	
Queue Length 95th (ft)	15	169		50	85	21	96	82		25	110	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	611	1665		949	1853	1575	464	716		483	736	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.26		0.07	0.08	0.01	0.38	0.23		0.08	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 49.4			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 15.0		Intersection LOS: B	
Intersection Capacity Utilization 68.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





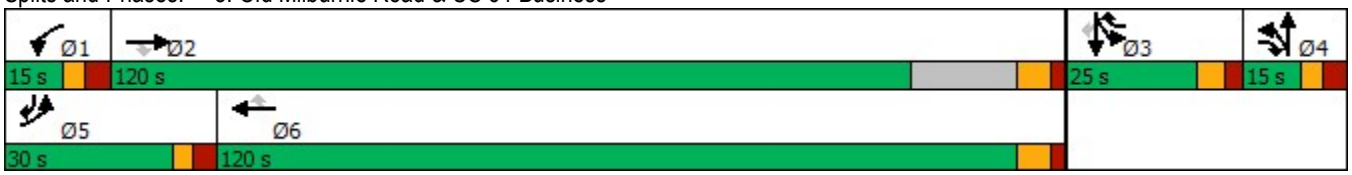
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	716	4	6	1192	80	4	4	4	103	4	393
Future Volume (vph)	227	716	4	6	1192	80	4	4	4	103	4	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	252	796	4	7	1324	89	4	4	4	114	4	437
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	796	4	7	1324	89	4	8	0	0	118	437
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	26.0	79.5	83.2	9.2	50.3	68.8	9.3	9.3			13.3	42.9
Actuated g/C Ratio	0.24	0.72	0.76	0.08	0.46	0.63	0.08	0.08			0.12	0.39
v/c Ratio	0.61	0.32	0.00	0.05	0.81	0.09	0.03	0.06			0.56	0.41
Control Delay	49.7	7.7	3.5	58.7	30.8	8.7	58.5	58.7			60.6	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	49.7	7.7	3.5	58.7	30.8	8.7	58.5	58.7			60.6	23.6
LOS	D	A	A	E	C	A	E	E			E	C
Approach Delay		17.8			29.6			58.6			31.5	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	153	65	1	4	364	19	3	5			76	116
Queue Length 95th (ft)	#364	236	3	23	612	49	17	26			168	194
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	413	3432	1175	168	3346	1106	166	162			330	1066
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.61	0.23	0.00	0.04	0.40	0.08	0.02	0.05			0.36	0.41

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 109.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 25.9 Intersection LOS: C
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	213	149	156	187	4
Future Vol, veh/h	4	213	149	156	187	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	237	166	173	208	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	339	0	-	0	411	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	245	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1220	-	-	-	597	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	796	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1220	-	-	-	595	878
Mov Cap-2 Maneuver	-	-	-	-	595	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.3
HCM LOS			B

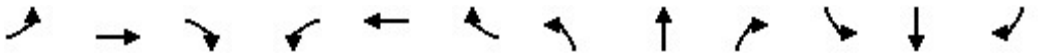
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1220	-	-	-	599
HCM Lane V/C Ratio	0.004	-	-	-	0.354
HCM Control Delay (s)	8	0	-	-	14.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.6

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	122	186	63	39	49	8	32	141	33	11	179	86
Future Vol, veh/h	122	186	63	39	49	8	32	141	33	11	179	86
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	136	207	70	43	54	9	36	157	37	12	199	96
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.7	11	12.8	14.2
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	33%	41%	4%
Vol Thru, %	68%	50%	51%	65%
Vol Right, %	16%	17%	8%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	206	371	96	276
LT Vol	32	122	39	11
Through Vol	141	186	49	179
RT Vol	33	63	8	86
Lane Flow Rate	229	412	107	307
Geometry Grp	1	1	1	1
Degree of Util (X)	0.386	0.647	0.191	0.487
Departure Headway (Hd)	6.067	5.654	6.434	5.818
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	597	635	560	623
Service Time	4.067	3.745	4.45	3.818
HCM Lane V/C Ratio	0.384	0.649	0.191	0.493
HCM Control Delay	12.8	18.7	11	14.2
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	1.8	4.7	0.7	2.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	856	847	170	4	372	38	120	124	4	33	98	274
Future Volume (vph)	856	847	170	4	372	38	120	124	4	33	98	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.975			0.986			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1780	0	1778	1846	0	1734	1818	0	1743	1835	1560
Flt Permitted	0.950			0.076			0.950			0.666		
Satd. Flow (perm)	1734	1780	0	142	1846	0	1734	1818	0	1222	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	951	941	189	4	413	42	133	138	4	37	109	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	951	1130	0	4	455	0	133	142	0	37	109	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.2	81.0		60.7	60.7		13.6	30.7		12.1	12.1	32.3
Actuated g/C Ratio	0.12	0.67		0.50	0.50		0.11	0.25		0.10	0.10	0.27
v/c Ratio	4.40	0.96		0.06	0.49		0.69	0.31		0.31	0.60	0.74
Control Delay	1557.0	37.8		19.8	22.9		72.9	39.9		59.9	68.3	54.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	1557.0	37.8		19.8	22.9		72.9	39.9		59.9	68.3	54.0
LOS	F	D		B	C		E	D		E	E	D
Approach Delay		732.1			22.9			55.8			58.0	
Approach LOS		F			C			E			E	
Queue Length 50th (ft)	~1453	780		2	236		106	95		29	88	233
Queue Length 95th (ft)	#1769	#1250		9	352		#196	155		65	150	343
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	216	1525		100	1303		216	679		253	381	413
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	4.40	0.74		0.04	0.35		0.62	0.21		0.15	0.29	0.74

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 121.8			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 4.40			
Intersection Signal Delay: 482.5		Intersection LOS: F	
Intersection Capacity Utilization 98.6%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

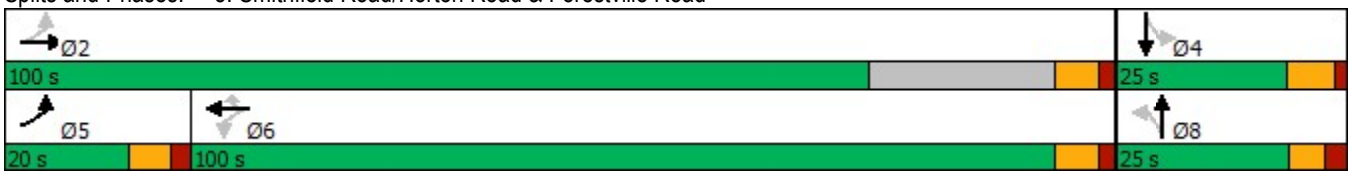
Splits and Phases: 1: Forestville Road & Buffaloe Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	128	241	67	98	22	179	185	62	16	153	29
Future Volume (vph)	29	128	241	67	98	22	179	185	62	16	153	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.902				0.850		0.962			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1647	0	1761	1853	1575	1770	1792	0	1725	1773	0
Flt Permitted	0.526			0.522			0.631			0.556		
Satd. Flow (perm)	960	1647	0	967	1853	1575	1175	1792	0	1010	1773	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	32	142	268	74	109	24	199	206	69	18	170	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	410	0	74	109	24	199	275	0	18	202	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	18.8	18.8		16.5	16.5	16.5	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.38	0.38		0.34	0.34	0.34	0.41	0.41		0.41	0.41	
v/c Ratio	0.06	0.65		0.23	0.18	0.05	0.41	0.37		0.04	0.28	
Control Delay	9.0	17.6		15.8	13.9	13.5	15.3	13.4		11.6	12.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.0	17.6		15.8	13.9	13.5	15.3	13.4		11.6	12.5	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		17.0			14.5			14.2			12.4	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	5	91		13	19	4	37	50		3	35	
Queue Length 95th (ft)	17	159		53	65	22	109	132		16	97	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	611	1647		967	1853	1575	484	738		416	730	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.25		0.08	0.06	0.02	0.41	0.37		0.04	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 49.1			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 14.9		Intersection LOS: B	
Intersection Capacity Utilization 67.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road



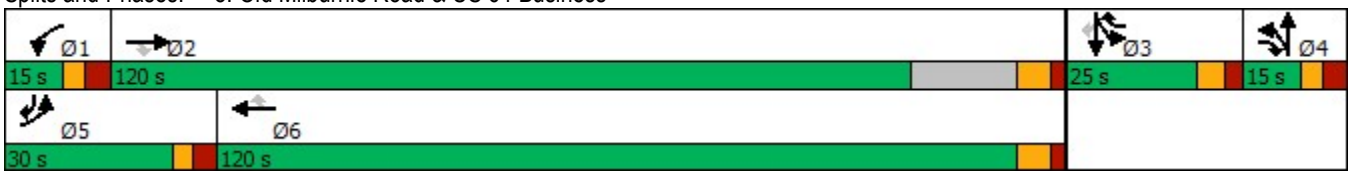
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	365	1900	4	5	1468	99	4	4	5	90	4	168
Future Volume (vph)	365	1900	4	5	1468	99	4	4	5	90	4	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.910				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	406	2111	4	6	1631	110	4	4	6	100	4	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	406	2111	4	6	1631	110	4	10	0	0	104	187
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	26.8	102.6	109.1	9.4	72.5	91.8	9.6	9.6			14.0	43.5
Actuated g/C Ratio	0.20	0.75	0.80	0.07	0.53	0.67	0.07	0.07			0.10	0.32
v/c Ratio	1.19	0.81	0.00	0.05	0.86	0.10	0.03	0.08			0.58	0.21
Control Delay	157.5	16.4	2.8	78.4	32.8	8.0	77.8	78.3			79.5	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	157.5	16.4	2.8	78.4	32.8	8.0	77.8	78.3			79.5	32.8
LOS	F	B	A	E	C	A	E	E			E	C
Approach Delay		39.1			31.4			78.2			49.5	
Approach LOS		D			C			E			D	
Queue Length 50th (ft)	~477	626	1	5	682	35	4	9			93	60
Queue Length 95th (ft)	#979	1134	3	27	842	56	20	37			199	132
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	341	3105	1231	139	2963	1156	138	132			273	870
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	1.19	0.68	0.00	0.04	0.55	0.10	0.03	0.08			0.38	0.21

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 136.5
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 85.2% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



2028 Build Traffic Volumes

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	383	31	13	536	88	36
Future Vol, veh/h	383	31	13	536	88	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	426	34	14	596	98	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	460	0	1067	443
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	624	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1101	-	246	615
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	534	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1101	-	241	615
Mov Cap-2 Maneuver	-	-	-	-	241	-
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	524	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	27.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	293	-	-	1101	-
HCM Lane V/C Ratio	0.47	-	-	0.013	-
HCM Control Delay (s)	27.7	-	-	8.3	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	239	219	98	195	17
Future Vol, veh/h	8	239	219	98	195	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	266	243	109	217	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	352	0	-	0	527	243
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	284	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1207	-	-	-	512	796
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1207	-	-	-	507	796
Mov Cap-2 Maneuver	-	-	-	-	507	-
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	764	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1207	-	-	-	522
HCM Lane V/C Ratio	0.007	-	-	-	0.451
HCM Control Delay (s)	8	0	-	-	17.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	2.3

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	45	301	12	16	838
Future Vol, veh/h	45	45	301	12	16	838
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	50	334	13	18	931

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1308	341	0	0	347	0
Stage 1	341	-	-	-	-	-
Stage 2	967	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	176	701	-	-	1212	-
Stage 1	720	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	171	701	-	-	1212	-
Mov Cap-2 Maneuver	171	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	358	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.4	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	275	1212	-
HCM Lane V/C Ratio	-	-	0.364	0.015	-
HCM Control Delay (s)	-	-	25.4	8	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	44	269	12	15	868
Future Vol, veh/h	45	44	269	12	15	868
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	49	299	13	17	964

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1304	306	0	0	312	0
Stage 1	306	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	177	734	-	-	1248	-
Stage 1	747	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	172	734	-	-	1248	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	347	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25	0	0.1
HCM LOS	D		

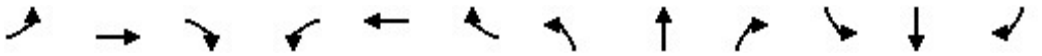
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	277	1248	-
HCM Lane V/C Ratio	-	-	0.357	0.013	-
HCM Control Delay (s)	-	-	25	7.9	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0	-

Intersection	
Intersection Delay, s/veh	490
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	168	145	33	180	666	77	54	418	152	25	201	134
Future Vol, veh/h	168	145	33	180	666	77	54	418	152	25	201	134
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	187	161	37	200	740	86	60	464	169	28	223	149
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	121.6	817.5	420.9	124
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	49%	20%	7%
Vol Thru, %	67%	42%	72%	56%
Vol Right, %	24%	10%	8%	37%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	624	346	923	360
LT Vol	54	168	180	25
Through Vol	418	145	666	201
RT Vol	152	33	77	134
Lane Flow Rate	693	384	1026	400
Geometry Grp	1	1	1	1
Degree of Util (X)	1.83	1.026	2.741	1.039
Departure Headway (Hd)	14.605	18.983	12.238	18.601
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	257	196	308	200
Service Time	12.605	16.983	10.238	16.601
HCM Lane V/C Ratio	2.696	1.959	3.331	2
HCM Control Delay	420.9	121.6	817.5	124
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	31	8.9	68.4	9.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	395	187	57	1268	22	646	111	18	42	213	1762
Future Volume (vph)	329	395	187	57	1268	22	646	111	18	42	213	1762
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.952			0.997			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1738	0	1778	1866	0	1734	1787	0	1743	1835	1560
Flt Permitted	0.950			0.396			0.950			0.666		
Satd. Flow (perm)	1734	1738	0	741	1866	0	1734	1787	0	1222	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	366	439	208	63	1409	24	718	123	20	47	237	1958
Shared Lane Traffic (%)												
Lane Group Flow (vph)	366	647	0	63	1433	0	718	143	0	47	237	1958
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

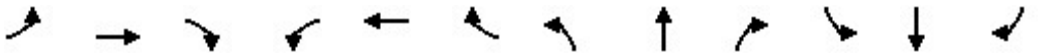
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.0	105.0		85.0	85.0		15.0	43.0		23.0	23.0	43.0
Actuated g/C Ratio	0.09	0.66		0.54	0.54		0.09	0.27		0.15	0.15	0.27
v/c Ratio	2.23	0.56		0.16	1.43		4.38	0.29		0.27	0.89	4.62
Control Delay	601.5	16.8		20.4	228.7		1546.1	47.3		64.0	98.8	1648.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	601.5	16.8		20.4	228.7		1546.1	47.3		64.0	98.8	1648.3
LOS	F	B		C	F		F	D		E	F	F
Approach Delay		228.0			219.9			1297.2			1451.3	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~617	351		33	~2032		~1380	118		44	244	~3768
Queue Length 95th (ft)	#830	461		64	#2296		#1631	182		87	#385	#4018
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	164	1155		398	1004		164	509		193	290	424
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	2.23	0.56		0.16	1.43		4.38	0.28		0.24	0.82	4.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 158			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 4.62			
Intersection Signal Delay: 878.6		Intersection LOS: F	
Intersection Capacity Utilization 225.5%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Forestville Road & Buffaloe Road

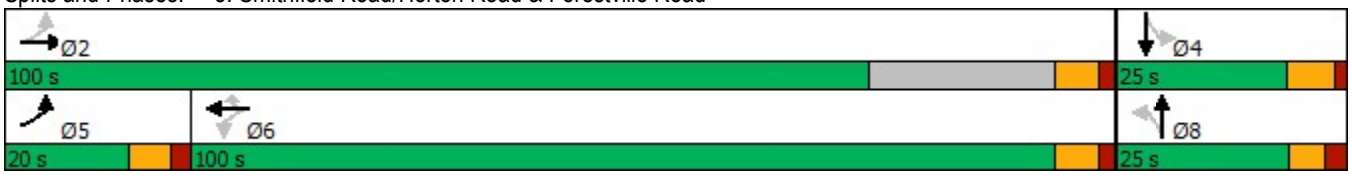


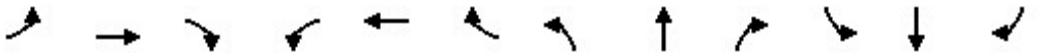
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	169	246	62	136	20	161	91	60	33	198	14
Future Volume (vph)	29	169	246	62	136	20	161	91	60	33	198	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.911				0.850		0.940			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1663	0	1761	1853	1575	1770	1751	0	1725	1798	0
Flt Permitted	0.504			0.498			0.602			0.651		
Satd. Flow (perm)	920	1663	0	923	1853	1575	1121	1751	0	1182	1798	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	32	188	273	69	151	22	179	101	67	37	220	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	461	0	69	151	22	179	168	0	37	236	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	20.8	20.8		16.0	16.0	16.0	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.41	0.41		0.31	0.31	0.31	0.39	0.39		0.39	0.39	
v/c Ratio	0.06	0.68		0.24	0.26	0.04	0.40	0.24		0.08	0.33	
Control Delay	8.6	17.8		18.5	16.9	15.9	16.7	13.5		12.7	14.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.6	17.8		18.5	16.9	15.9	16.7	13.5		12.7	14.2	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		17.2			17.3			15.2			14.0	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	5	106		12	27	4	35	31		6	45	
Queue Length 95th (ft)	17	184		50	86	21	100	82		26	113	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	620	1663		923	1853	1575	443	692		467	710	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.28		0.07	0.08	0.01	0.40	0.24		0.08	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 51.2			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





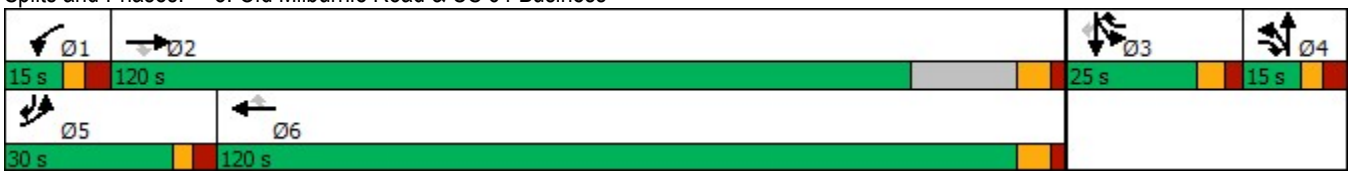
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	716	4	6	1192	94	4	4	4	133	4	453
Future Volume (vph)	237	716	4	6	1192	94	4	4	4	133	4	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	263	796	4	7	1324	104	4	4	4	148	4	503
Shared Lane Traffic (%)												
Lane Group Flow (vph)	263	796	4	7	1324	104	4	8	0	0	152	503
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	25.9	80.2	84.0	9.1	51.4	72.7	9.2	9.2			16.2	45.6
Actuated g/C Ratio	0.23	0.71	0.74	0.08	0.45	0.64	0.08	0.08			0.14	0.40
v/c Ratio	0.66	0.32	0.00	0.05	0.82	0.10	0.03	0.06			0.61	0.46
Control Delay	53.5	8.5	4.0	60.0	32.7	8.5	59.8	60.0			60.8	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	53.5	8.5	4.0	60.0	32.7	8.5	59.8	60.0			60.8	24.7
LOS	D	A	A	E	C	A	E	E			E	C
Approach Delay		19.6			31.1			59.9			33.1	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	173	80	1	5	395	22	3	5			102	141
Queue Length 95th (ft)	#390	238	3	23	616	57	17	25			211	226
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	397	3410	1147	161	3324	1082	160	156			318	1097
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.66	0.23	0.00	0.04	0.40	0.10	0.03	0.05			0.48	0.46

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 113.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 27.8 Intersection LOS: C
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	281	59	47	205	39	28
Future Vol, veh/h	281	59	47	205	39	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	312	66	52	228	43	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	378	0	677	345
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	332	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1180	-	418	698
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	727	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1180	-	397	698
Mov Cap-2 Maneuver	-	-	-	-	397	-
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	691	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	484	-	-	1180	-
HCM Lane V/C Ratio	0.154	-	-	0.044	-
HCM Control Delay (s)	13.8	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	237	186	156	187	14
Future Vol, veh/h	8	237	186	156	187	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	263	207	173	208	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	380	0	-	0	488	207
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1178	-	-	-	539	833
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1178	-	-	-	534	833
Mov Cap-2 Maneuver	-	-	-	-	534	-
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	767	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1178	-	-	-	548
HCM Lane V/C Ratio	0.008	-	-	-	0.408
HCM Control Delay (s)	8.1	0	-	-	16
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	2

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	17	388	83	30	196
Future Vol, veh/h	47	17	388	83	30	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	19	431	92	33	218

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	761	477	0	0	523	0
Stage 1	477	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	373	588	-	-	1043	-
Stage 1	624	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	360	588	-	-	1043	-
Mov Cap-2 Maneuver	360	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	736	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.9	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	401	1043	-
HCM Lane V/C Ratio	-	-	0.177	0.032	-
HCM Control Delay (s)	-	-	15.9	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	17	454	82	29	214
Future Vol, veh/h	46	17	454	82	29	214
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	19	504	91	32	238

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	852	550	0	0	595	0
Stage 1	550	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	330	535	-	-	981	-
Stage 1	578	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	317	535	-	-	981	-
Mov Cap-2 Maneuver	317	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.6	0	1
HCM LOS	C		

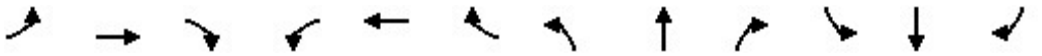
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	356	981	-
HCM Lane V/C Ratio	-	-	0.197	0.033	-
HCM Control Delay (s)	-	-	17.6	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Intersection Delay, s/veh	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	154	188	63	42	49	8	32	176	37	11	235	145
Future Vol, veh/h	154	188	63	42	49	8	32	176	37	11	235	145
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	171	209	70	47	54	9	36	196	41	12	261	161
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	31.7	12.9	17.2	26.7
HCM LOS	D	B	C	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	38%	42%	3%
Vol Thru, %	72%	46%	49%	60%
Vol Right, %	15%	16%	8%	37%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	405	99	391
LT Vol	32	154	42	11
Through Vol	176	188	49	235
RT Vol	37	63	8	145
Lane Flow Rate	272	450	110	434
Geometry Grp	1	1	1	1
Degree of Util (X)	0.521	0.809	0.233	0.759
Departure Headway (Hd)	6.895	6.469	7.624	6.291
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	525	554	473	569
Service Time	4.895	4.565	5.64	4.39
HCM Lane V/C Ratio	0.518	0.812	0.233	0.763
HCM Control Delay	17.2	31.7	12.9	26.7
HCM Lane LOS	C	D	B	D
HCM 95th-tile Q	3	7.9	0.9	6.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	856	847	253	18	372	38	139	149	27	33	115	274
Future Volume (vph)	856	847	253	18	372	38	139	149	27	33	115	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.966			0.986			0.977				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1763	0	1778	1846	0	1734	1784	0	1743	1835	1560
Flt Permitted	0.950			0.058			0.950			0.634		
Satd. Flow (perm)	1734	1763	0	109	1846	0	1734	1784	0	1163	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	951	941	281	20	413	42	154	166	30	37	128	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	951	1222	0	20	455	0	154	196	0	37	128	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.1	89.1		68.9	68.9		14.9	33.9		13.9	13.9	34.1
Actuated g/C Ratio	0.11	0.67		0.52	0.52		0.11	0.25		0.10	0.10	0.26
v/c Ratio	4.83	1.04		0.36	0.48		0.79	0.43		0.31	0.67	0.76
Control Delay	1750.6	58.8		41.4	22.8		86.3	45.5		63.1	75.2	59.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	1750.6	58.8		41.4	22.8		86.3	45.5		63.1	75.2	59.9
LOS	F	E		D	C		F	D		E	E	E
Approach Delay		799.2			23.6			63.5			64.3	
Approach LOS		F			C			E			E	
Queue Length 50th (ft)	~1471	~1107		10	242		126	136		29	104	233
Queue Length 95th (ft)	#2099	#1599		42	366		#304	247		74	196	405
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	197	1402		70	1188		197	608		220	347	399
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	4.83	0.87		0.29	0.38		0.78	0.32		0.17	0.37	0.76

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 133			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 4.83			
Intersection Signal Delay: 519.3		Intersection LOS: F	
Intersection Capacity Utilization 101.9%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

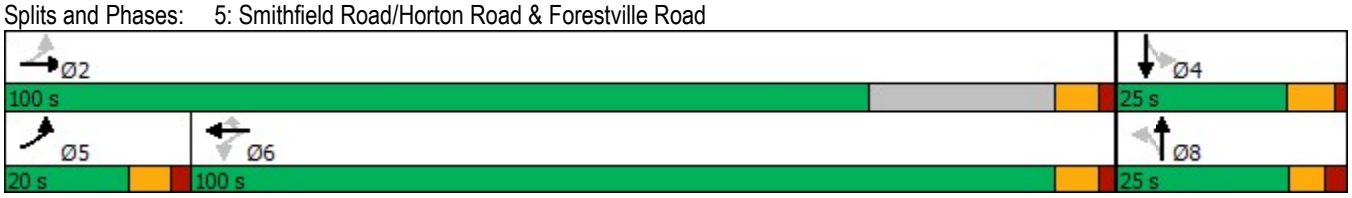
Splits and Phases: 1: Forestville Road & Buffaloe Road

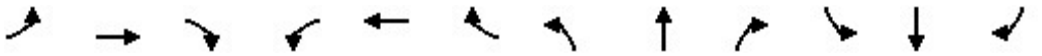
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	134	253	67	105	22	199	185	62	16	153	39
Future Volume (vph)	35	134	253	67	105	22	199	185	62	16	153	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.902				0.850		0.962			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1647	0	1761	1853	1575	1770	1792	0	1725	1762	0
Flt Permitted	0.516			0.512			0.625			0.553		
Satd. Flow (perm)	942	1647	0	949	1853	1575	1164	1792	0	1004	1762	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	149	281	74	117	24	221	206	69	18	170	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	430	0	74	117	24	221	275	0	18	213	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	20.4	20.4		15.6	15.6	15.6	20.3	20.3		20.3	20.3	
Actuated g/C Ratio	0.40	0.40		0.31	0.31	0.31	0.40	0.40		0.40	0.40	
v/c Ratio	0.08	0.65		0.25	0.21	0.05	0.48	0.39		0.04	0.30	
Control Delay	8.7	17.0		18.7	16.5	15.9	17.8	14.7		12.7	13.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.7	17.0		18.7	16.5	15.9	17.8	14.7		12.7	13.9	
LOS	A	B		B	B	B	B	B		B	B	
Approach Delay		16.3			17.2			16.1			13.8	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	7	97		13	21	4	43	51		3	38	
Queue Length 95th (ft)	19	169		53	69	22	124	132		16	103	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	620	1647		949	1853	1575	464	714		400	702	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.06	0.26		0.08	0.06	0.02	0.48	0.39		0.04	0.30	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 50.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 15.9		Intersection LOS: B	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





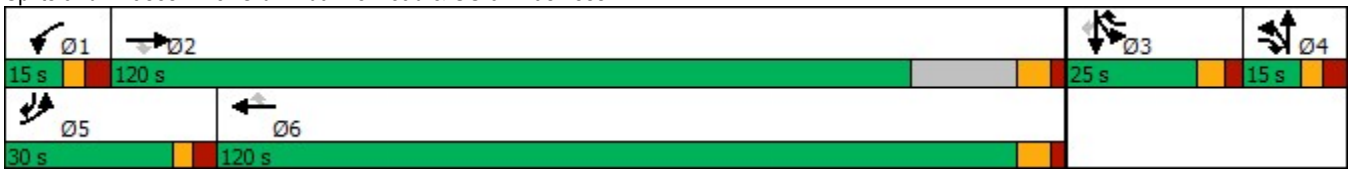
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	461	1900	4	5	1468	168	4	4	5	140	4	211
Future Volume (vph)	461	1900	4	5	1468	168	4	4	5	140	4	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.910				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	512	2111	4	6	1631	187	4	4	6	156	4	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	512	2111	4	6	1631	187	4	10	0	0	160	234
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	26.3	104.6	111.2	9.2	75.1	99.2	9.4	9.4			18.8	47.7
Actuated g/C Ratio	0.18	0.73	0.78	0.06	0.52	0.69	0.07	0.07			0.13	0.33
v/c Ratio	1.61	0.83	0.00	0.05	0.87	0.17	0.03	0.09			0.70	0.26
Control Delay	322.8	18.9	3.2	79.8	35.6	8.1	79.0	79.4			80.7	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	322.8	18.9	3.2	79.8	35.6	8.1	79.0	79.4			80.7	33.3
LOS	F	B	A	E	D	A	E	E			F	C
Approach Delay		78.1			32.9			79.3			52.5	
Approach LOS		E			C			E			D	
Queue Length 50th (ft)	~743	742	1	6	747	63	4	10			152	80
Queue Length 95th (ft)	#1268	1134	3	27	842	93	20	37			#346	164
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	319	3052	1195	130	2912	1125	128	123			255	908
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	1.61	0.69	0.00	0.05	0.56	0.17	0.03	0.08			0.63	0.26

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 143.3
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.61
Intersection Signal Delay: 59.1 Intersection LOS: E
Intersection Capacity Utilization 93.3% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



2028 Build + Improvements Traffic Volumes

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	383	31	13	536	88	36
Future Vol, veh/h	383	31	13	536	88	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	426	34	14	596	98	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	460	0	1050	426
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	624	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1101	-	252	628
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	534	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1101	-	249	628
Mov Cap-2 Maneuver	-	-	-	-	249	-
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	527	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	302	-	-	1101	-
HCM Lane V/C Ratio	0.456	-	-	0.013	-
HCM Control Delay (s)	26.5	-	-	8.3	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	2.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	45	301	12	16	838
Future Vol, veh/h	45	45	301	12	16	838
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	50	334	13	18	931

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1301	334	0	0	347	0
Stage 1	334	-	-	-	-	-
Stage 2	967	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	178	708	-	-	1212	-
Stage 1	725	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	175	708	-	-	1212	-
Mov Cap-2 Maneuver	175	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	363	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.7	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	281	1212	-
HCM Lane V/C Ratio	-	-	0.356	0.015	-
HCM Control Delay (s)	-	-	24.7	8	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1.6	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	44	269	12	15	868
Future Vol, veh/h	45	44	269	12	15	868
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	49	299	13	17	964

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1297	299	0	0	312	0
Stage 1	299	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	179	741	-	-	1248	-
Stage 1	752	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	176	741	-	-	1248	-
Mov Cap-2 Maneuver	176	-	-	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	352	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.5	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	282	1248	-
HCM Lane V/C Ratio	-	-	0.351	0.013	-
HCM Control Delay (s)	-	-	24.5	7.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1.5	0	-

Intersection	
Intersection Delay, s/veh	291.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	168	145	33	180	666	77	54	418	152	25	201	134
Future Vol, veh/h	168	145	33	180	666	77	54	418	152	25	201	134
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	187	161	37	200	740	86	60	464	169	28	223	149
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	28.9	428.5	353.9	83.6
HCM LOS	D	F	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	9%	100%	0%	100%	0%	7%
Vol Thru, %	67%	0%	81%	0%	90%	56%
Vol Right, %	24%	0%	19%	0%	10%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	624	168	178	180	743	360
LT Vol	54	168	0	180	0	25
Through Vol	418	0	145	0	666	201
RT Vol	152	0	33	0	77	134
Lane Flow Rate	693	187	198	200	826	400
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	1.705	0.524	0.521	0.539	2.095	0.974
Departure Headway (Hd)	10.34	13.287	12.609	11.349	10.74	12.427
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	361	274	289	320	347	296
Service Time	8.34	10.987	10.309	9.049	8.44	10.427
HCM Lane V/C Ratio	1.92	0.682	0.685	0.625	2.38	1.351
HCM Control Delay	353.9	29.7	28.2	26.6	525.9	83.6
HCM Lane LOS	F	D	D	D	F	F
HCM 95th-tile Q	36.7	2.8	2.8	3	51	9.8

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	281	59	47	205	39	28
Future Vol, veh/h	281	59	47	205	39	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	312	66	52	228	43	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	378	0	644	312
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	332	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1180	-	437	728
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	727	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1180	-	418	728
Mov Cap-2 Maneuver	-	-	-	-	418	-
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	508	-	-	1180	-
HCM Lane V/C Ratio	0.147	-	-	0.044	-
HCM Control Delay (s)	13.3	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	17	388	83	30	196
Future Vol, veh/h	47	17	388	83	30	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	19	431	92	33	218

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	715	431	0	0	523	0
Stage 1	431	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	397	624	-	-	1043	-
Stage 1	655	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	384	624	-	-	1043	-
Mov Cap-2 Maneuver	384	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	428	1043	-
HCM Lane V/C Ratio	-	-	0.166	0.032	-
HCM Control Delay (s)	-	-	15.1	8.6	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	17	454	82	29	214
Future Vol, veh/h	46	17	454	82	29	214
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	19	504	91	32	238

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	806	504	0	0	595	0
Stage 1	504	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	351	568	-	-	981	-
Stage 1	607	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	339	568	-	-	981	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	725	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.6	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	380	981	-
HCM Lane V/C Ratio	-	-	0.184	0.033	-
HCM Control Delay (s)	-	-	16.6	8.8	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

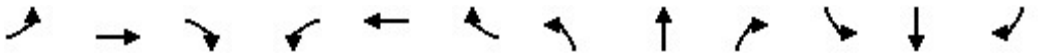
Intersection	
Intersection Delay, s/veh	18.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	154	188	63	42	49	8	32	176	37	11	235	145
Future Vol, veh/h	154	188	63	42	49	8	32	176	37	11	235	145
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	171	209	70	47	54	9	36	196	41	12	261	161
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	16	11.8	15.8	23.7
HCM LOS	C	B	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	100%	0%	100%	0%	3%
Vol Thru, %	72%	0%	75%	0%	86%	60%
Vol Right, %	15%	0%	25%	0%	14%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	154	251	42	57	391
LT Vol	32	154	0	42	0	11
Through Vol	176	0	188	0	49	235
RT Vol	37	0	63	0	8	145
Lane Flow Rate	272	171	279	47	63	434
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.493	0.357	0.529	0.107	0.134	0.729
Departure Headway (Hd)	6.521	7.52	6.826	8.263	7.644	6.04
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	553	479	527	433	468	600
Service Time	4.567	5.267	4.574	6.026	5.407	4.078
HCM Lane V/C Ratio	0.492	0.357	0.529	0.109	0.135	0.723
HCM Control Delay	15.8	14.4	17	12	11.6	23.7
HCM Lane LOS	C	B	C	B	B	C
HCM 95th-tile Q	2.7	1.6	3.1	0.4	0.5	6.2

2028 Build + UDO Traffic Volumes



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	395	187	57	1268	22	646	111	18	42	213	1762
Future Volume (vph)	329	395	187	57	1268	22	646	111	18	42	213	1762
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		100	200		0	200		0	200		150
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.997			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1825	1552	1778	1866	0	3364	1787	0	1743	1835	1560
Flt Permitted	0.950			0.508			0.950			0.666		
Satd. Flow (perm)	1734	1825	1552	951	1866	0	3364	1787	0	1222	1835	1560
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			201		1			5				63
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	366	439	208	63	1409	24	718	123	20	47	237	1958
Shared Lane Traffic (%)												
Lane Group Flow (vph)	366	439	208	63	1433	0	718	143	0	47	237	1958
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases			2	6				8		4		4
Detector Phase	5	2	2	6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	12.0	12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5	18.5	18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	58.0	114.0	114.0	56.0	56.0		20.0	36.0		16.0	16.0	58.0
Total Split (%)	38.7%	76.0%	76.0%	37.3%	37.3%		13.3%	24.0%		10.7%	10.7%	38.7%
Maximum Green (s)	51.9	107.5	107.5	49.5	49.5		14.9	30.7		10.7	10.7	51.9
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9	1.9	1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5	0.0	-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0	6.5	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0	6.0	6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0	3.0	3.0	3.0		2.0	2.0		2.0	2.0	2.0

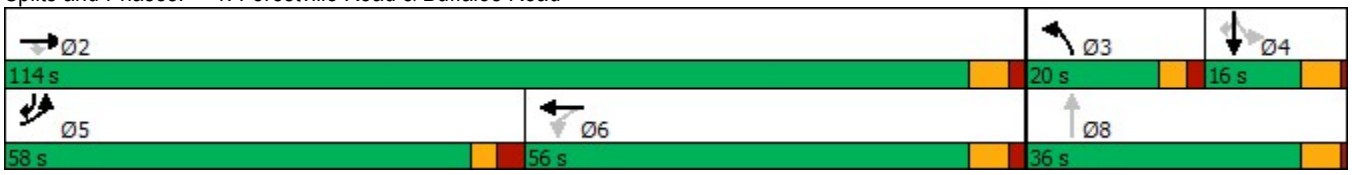
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	15.0	15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0	30.0	30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	Min	Min	Min		None	None		None	None	None
Act Effct Green (s)	53.0	109.0	107.5	51.0	51.0		15.0	31.0		11.0	11.0	69.0
Actuated g/C Ratio	0.35	0.73	0.72	0.34	0.34		0.10	0.21		0.07	0.07	0.46
v/c Ratio	0.60	0.33	0.18	0.20	2.26		2.14	0.38		0.53	1.77	2.61
Control Delay	44.7	8.2	1.2	37.1	595.1		551.2	52.9		88.6	411.4	746.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.7	8.2	1.2	37.1	595.1		551.2	52.9		88.6	411.4	746.7
LOS	D	A	A	D	F		F	D		F	F	F
Approach Delay		19.9			571.6			468.4			697.5	
Approach LOS		B			F			F			F	
Queue Length 50th (ft)	293	140	2	44	~2284		~574	117		45	~344	~3207
Queue Length 95th (ft)	405	190	25	84	#2553		#703	187		#96	#523	#3466
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200		100	200			200			200		150
Base Capacity (vph)	612	1326	1169	323	635		336	373		89	134	751
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.60	0.33	0.18	0.20	2.26		2.14	0.38		0.53	1.77	2.61

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 2.61			
Intersection Signal Delay: 506.5		Intersection LOS: F	
Intersection Capacity Utilization 208.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Forestville Road & Buffaloe Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	145	33	180	666	77	54	418	152	25	201	134
Future Volume (vph)	168	145	33	180	666	77	54	418	152	25	201	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.972			0.984			0.967			0.950	
Flt Protected	0.950			0.950				0.996			0.997	
Satd. Flow (prot)	1770	1811	0	1770	1833	0	0	1794	0	0	1764	0
Flt Permitted	0.296			0.607				0.941			0.945	
Satd. Flow (perm)	551	1811	0	1131	1833	0	0	1695	0	0	1672	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1764			419			2490			1684	
Travel Time (s)		26.7			6.3			37.7			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	187	161	37	200	740	86	60	464	169	28	223	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	198	0	200	826	0	0	693	0	0	400	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	9.5	18.0		9.5	18.0		27.0	27.0		27.0	27.0	
Total Split (%)	17.4%	33.0%		17.4%	33.0%		49.5%	49.5%		49.5%	49.5%	
Maximum Green (s)	5.0	13.5		5.0	13.5		22.5	22.5		22.5	22.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		Min	Min	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	

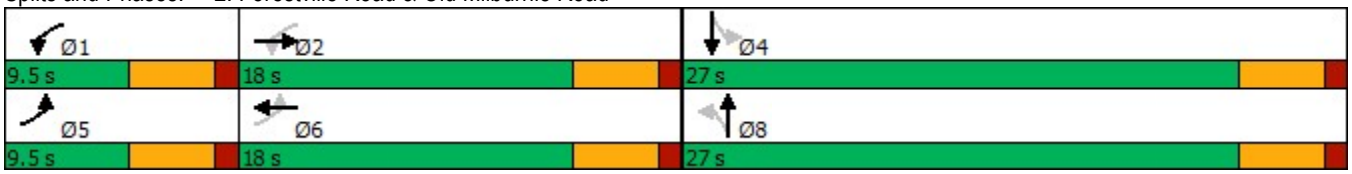
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	18.5	13.5		18.5	13.5			22.5			22.5	
Actuated g/C Ratio	0.34	0.25		0.34	0.25			0.41			0.41	
v/c Ratio	0.63	0.44		0.45	1.82			0.99			0.58	
Control Delay	22.6	21.1		14.8	398.4			52.0			16.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	22.6	21.1		14.8	398.4			52.0			16.5	
LOS	C	C		B	F			D			B	
Approach Delay		21.8			323.6			52.0			16.5	
Approach LOS		C			F			D			B	
Queue Length 50th (ft)	37	54		40	~421			212			95	
Queue Length 95th (ft)	#78	104		77	#605			#415			169	
Internal Link Dist (ft)		1684			339			2410			1604	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	298	448		442	454			699			690	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.63	0.44		0.45	1.82			0.99			0.58	

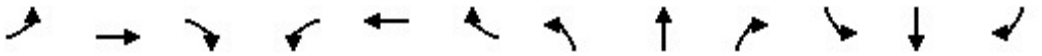
Intersection Summary			
Area Type:	Other		
Cycle Length: 54.5			
Actuated Cycle Length: 54.5			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.82			
Intersection Signal Delay: 153.0		Intersection LOS: F	
Intersection Capacity Utilization 107.5%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Forestville Road & Old Milburnie Road





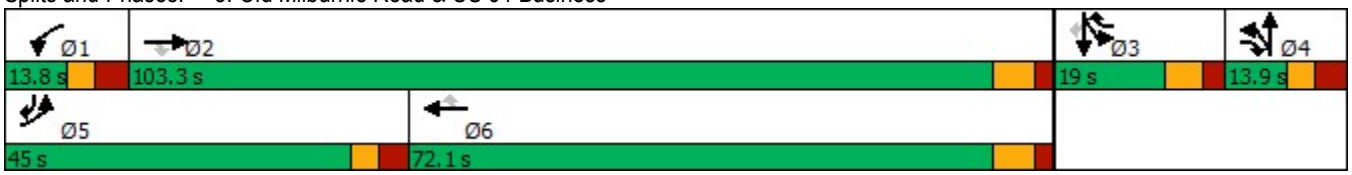
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	716	4	6	1192	94	4	4	4	133	4	453
Future Volume (vph)	237	716	4	6	1192	94	4	4	4	133	4	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1742	2731
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76			124		4				201
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	263	796	4	7	1324	104	4	4	4	148	4	503
Shared Lane Traffic (%)												
Lane Group Flow (vph)	263	796	4	7	1324	104	4	8	0	0	152	503
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	45.0	103.3	13.9	13.8	72.1	19.0	13.9	13.9		19.0	19.0	45.0
Total Split (%)	30.0%	68.9%	9.3%	9.2%	48.1%	12.7%	9.3%	9.3%		12.7%	12.7%	30.0%
Maximum Green (s)	38.7	96.5	7.0	7.0	65.3	12.4	7.0	7.0		12.4	12.4	38.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

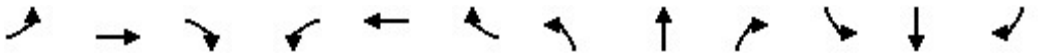
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	22.5	73.1	76.6	9.5	47.2	67.1	9.6	9.6			14.5	40.9
Actuated g/C Ratio	0.22	0.70	0.73	0.09	0.45	0.64	0.09	0.09			0.14	0.39
v/c Ratio	0.70	0.33	0.00	0.04	0.82	0.10	0.02	0.05			0.63	0.42
Control Delay	51.7	7.4	0.0	58.8	31.4	1.5	59.0	45.9			61.3	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	51.7	7.4	0.0	58.8	31.4	1.5	59.0	45.9			61.3	13.6
LOS	D	A	A	E	C	A	E	D			E	B
Approach Delay		18.3			29.4			50.2			24.7	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	140	68	0	4	341	0	2	2			84	61
Queue Length 95th (ft)	323	210	0	24	649	17	16	22			#282	145
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	716	3088	1162	160	2451	1072	161	160			250	1684
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.37	0.26	0.00	0.04	0.54	0.10	0.02	0.05			0.61	0.30

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 104.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 24.8 Intersection LOS: C
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business





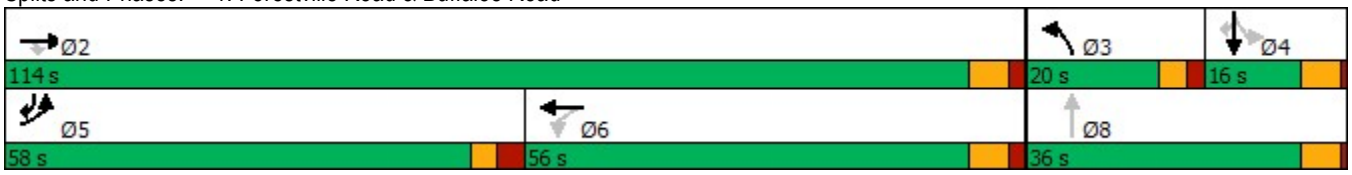
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	856	847	253	18	372	38	139	149	27	33	115	274
Future Volume (vph)	856	847	253	18	372	38	139	149	27	33	115	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		100	200		0	200		0	200		150
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.986			0.977				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1825	1552	1778	1846	0	3364	1784	0	1743	1835	1560
Flt Permitted	0.950			0.318			0.950			0.634		
Satd. Flow (perm)	1734	1825	1552	595	1846	0	3364	1784	0	1163	1835	1560
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			126		4			5				204
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	951	941	281	20	413	42	154	166	30	37	128	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	951	941	281	20	455	0	154	196	0	37	128	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases			2	6				8		4		4
Detector Phase	5	2	2	6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	12.0	12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5	18.5	18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	58.0	114.0	114.0	56.0	56.0		20.0	36.0		16.0	16.0	58.0
Total Split (%)	38.7%	76.0%	76.0%	37.3%	37.3%		13.3%	24.0%		10.7%	10.7%	38.7%
Maximum Green (s)	51.9	107.5	107.5	49.5	49.5		14.9	30.7		10.7	10.7	51.9
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9	1.9	1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5	0.0	-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0	6.5	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0	6.0	6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0	3.0	3.0	3.0		2.0	2.0		2.0	2.0	2.0

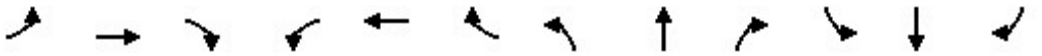
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	15.0	15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0	30.0	30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	Min	Min	Min		None	None		None	None	None
Act Effct Green (s)	53.4	96.3	94.8	37.9	37.9		10.6	26.8		11.1	11.1	69.5
Actuated g/C Ratio	0.40	0.72	0.71	0.28	0.28		0.08	0.20		0.08	0.08	0.52
v/c Ratio	1.37	0.71	0.25	0.12	0.86		0.57	0.54		0.39	0.84	0.33
Control Delay	207.9	14.4	4.1	36.5	61.6		69.2	54.1		74.2	101.6	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	207.9	14.4	4.1	36.5	61.6		69.2	54.1		74.2	101.6	8.1
LOS	F	B	A	D	E		E	D		E	F	A
Approach Delay		97.8			60.6			60.8			38.8	
Approach LOS		F			E			E			D	
Queue Length 50th (ft)	~1081	413	38	13	368		67	149		31	111	43
Queue Length 95th (ft)	#1565	622	75	35	519		113	254		76	#262	126
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200		100	200			200			200		150
Base Capacity (vph)	695	1505	1286	229	714		382	422		96	152	912
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.37	0.63	0.22	0.09	0.64		0.40	0.46		0.39	0.84	0.33

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 133.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.37
Intersection Signal Delay: 81.0 Intersection LOS: F
Intersection Capacity Utilization 101.3% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Forestville Road & Buffaloe Road





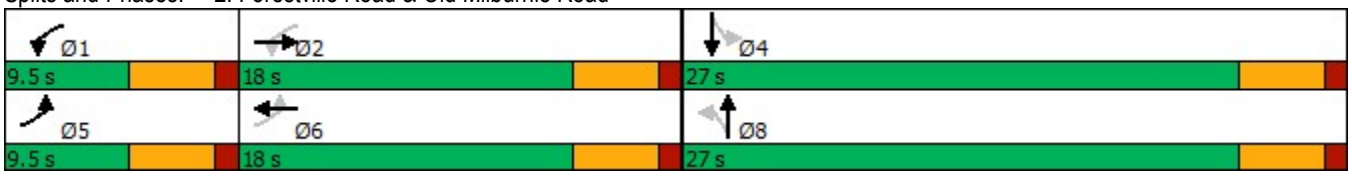
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	188	63	42	49	8	32	176	37	11	235	145
Future Volume (vph)	154	188	63	42	49	8	32	176	37	11	235	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.962			0.979			0.980			0.950	
Flt Protected	0.950			0.950				0.993			0.999	
Satd. Flow (prot)	1770	1792	0	1770	1824	0	0	1813	0	0	1768	0
Flt Permitted	0.716			0.542				0.925			0.988	
Satd. Flow (perm)	1334	1792	0	1010	1824	0	0	1689	0	0	1748	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1764			419			2490			1684	
Travel Time (s)		26.7			6.3			37.7			25.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	171	209	70	47	54	9	36	196	41	12	261	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	279	0	47	63	0	0	273	0	0	434	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	9.5	18.0		9.5	18.0		27.0	27.0		27.0	27.0	
Total Split (%)	17.4%	33.0%		17.4%	33.0%		49.5%	49.5%		49.5%	49.5%	
Maximum Green (s)	5.0	13.5		5.0	13.5		22.5	22.5		22.5	22.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		Min	Min	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	

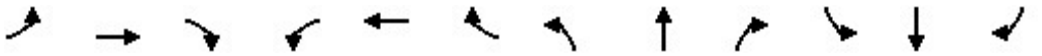
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	13.1	13.5		15.0	9.4			15.2			15.2	
Actuated g/C Ratio	0.32	0.33		0.36	0.23			0.37			0.37	
v/c Ratio	0.36	0.48		0.10	0.15			0.44			0.68	
Control Delay	11.9	17.6		9.3	16.3			13.3			18.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.9	17.6		9.3	16.3			13.3			18.0	
LOS	B	B		A	B			B			B	
Approach Delay		15.4			13.3			13.3			18.0	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	23	41		6	12			44			77	
Queue Length 95th (ft)	67	#151		24	40			109			183	
Internal Link Dist (ft)		1684			339			2410			1604	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	477	680		465	646			998			1033	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.36	0.41		0.10	0.10			0.27			0.42	

Intersection Summary

Area Type: Other
Cycle Length: 54.5
Actuated Cycle Length: 41.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 56.5% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Forestville Road & Old Milburnie Road





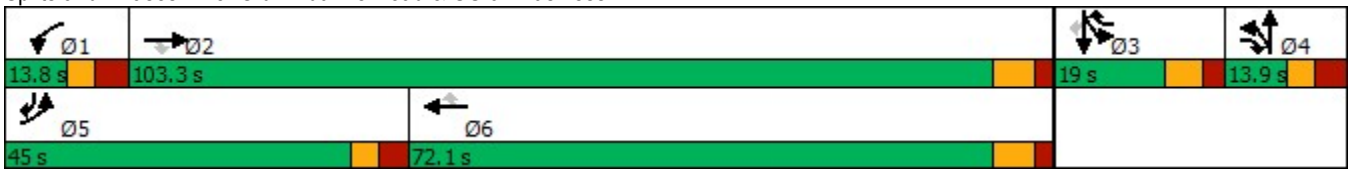
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	461	1900	4	5	1468	168	4	4	5	140	4	211
Future Volume (vph)	461	1900	4	5	1468	168	4	4	5	140	4	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.910				0.850
Flt Protected	0.950			0.950			0.950				0.954	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Flt Permitted	0.950			0.950			0.950				0.954	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1687	0	0	1742	2731
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76			124		6				182
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	512	2111	4	6	1631	187	4	4	6	156	4	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	512	2111	4	6	1631	187	4	10	0	0	160	234
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	45.0	103.3	13.9	13.8	72.1	19.0	13.9	13.9		19.0	19.0	45.0
Total Split (%)	30.0%	68.9%	9.3%	9.2%	48.1%	12.7%	9.3%	9.3%		12.7%	12.7%	30.0%
Maximum Green (s)	38.7	96.5	7.0	7.0	65.3	12.4	7.0	7.0		12.4	12.4	38.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	40.1	109.7	116.7	8.8	67.2	86.3	8.9	8.9			14.0	56.2
Actuated g/C Ratio	0.28	0.76	0.81	0.06	0.47	0.60	0.06	0.06			0.10	0.39
v/c Ratio	1.06	0.80	0.00	0.06	0.98	0.19	0.04	0.09			0.95	0.20
Control Delay	107.0	15.8	0.0	68.0	57.1	5.6	67.5	47.1			121.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	107.0	15.8	0.0	68.0	57.1	5.6	67.5	47.1			121.1	6.1
LOS	F	B	A	E	E	A	E	D			F	A
Approach Delay		33.5			51.9			52.9			52.8	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	~567	624	0	6	~892	26	4	4			159	14
Queue Length 95th (ft)	#796	1038	0	22	#1029	63	17	25			#314	40
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	483	2647	1275	108	1656	1000	108	109			169	1174
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	1.06	0.80	0.00	0.06	0.98	0.19	0.04	0.09			0.95	0.20

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 144.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 42.0 Intersection LOS: D
Intersection Capacity Utilization 93.3% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



2038 Horizon Year Traffic Volumes

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	514	31	13	720	88	36
Future Vol, veh/h	514	31	13	720	88	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	571	34	14	800	98	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	605	0	1399	571
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	828	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	973	-	155	520
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	429	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	973	-	153	520
Mov Cap-2 Maneuver	-	-	-	-	153	-
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	423	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	60.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	192	-	-	973	-
HCM Lane V/C Ratio	0.718	-	-	0.015	-
HCM Control Delay (s)	60.7	-	-	8.8	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	4.6	-	-	0	-

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	310	291	131	262	22
Future Vol, veh/h	10	310	291	131	262	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	344	323	146	291	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	469	0	-	0	689	323
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	366	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1093	-	-	-	412	718
Stage 1	-	-	-	-	734	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1093	-	-	-	407	718
Mov Cap-2 Maneuver	-	-	-	-	407	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	702	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	35
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1093	-	-	-	421
HCM Lane V/C Ratio	0.01	-	-	-	0.75
HCM Control Delay (s)	8.3	0	-	-	35
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	6.1

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	45	390	12	16	1122
Future Vol, veh/h	45	45	390	12	16	1122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	50	433	13	18	1247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1716	433	0	0	446	0
Stage 1	433	-	-	-	-	-
Stage 2	1283	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	99	623	-	-	1114	-
Stage 1	654	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	97	623	-	-	1114	-
Mov Cap-2 Maneuver	97	-	-	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	256	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	53.8	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	168	1114	-
HCM Lane V/C Ratio	-	-	0.595	0.016	-
HCM Control Delay (s)	-	-	53.8	8.3	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	3.2	0	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	44	358	12	15	1152
Future Vol, veh/h	45	44	358	12	15	1152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	49	398	13	17	1280

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1712	398	0	0	411	0
Stage 1	398	-	-	-	-	-
Stage 2	1314	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	100	652	-	-	1148	-
Stage 1	678	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	99	652	-	-	1148	-
Mov Cap-2 Maneuver	99	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	247	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	52.1	0	0.1
HCM LOS	F		

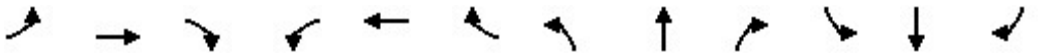
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	170	1148	-
HCM Lane V/C Ratio	-	-	0.582	0.015	-
HCM Control Delay (s)	-	-	52.1	8.2	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	3.1	0	-

Intersection	
Intersection Delay, s/veh	513.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	197	193	44	239	894	104	73	533	202	34	262	171
Future Vol, veh/h	197	193	44	239	894	104	73	533	202	34	262	171
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	219	214	49	266	993	116	81	592	224	38	291	190
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	44.3	727	616.7	205.9
HCM LOS	E	F	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	9%	100%	0%	100%	0%	7%
Vol Thru, %	66%	0%	81%	0%	90%	56%
Vol Right, %	25%	0%	19%	0%	10%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	808	197	237	239	998	467
LT Vol	73	197	0	239	0	34
Through Vol	533	0	193	0	894	262
RT Vol	202	0	44	0	104	171
Lane Flow Rate	898	219	263	266	1109	519
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	2.293	0.622	0.702	0.737	2.901	1.315
Departure Headway (Hd)	11.732	15.716	15.032	13.424	12.807	14.764
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	323	232	242	271	299	249
Service Time	9.732	13.416	12.732	11.124	10.507	12.764
HCM Lane V/C Ratio	2.78	0.944	1.087	0.982	3.709	2.084
HCM Control Delay	616.7	41.2	46.8	46.1	890.1	205.9
HCM Lane LOS	F	E	E	E	F	F
HCM 95th-tile Q	54.4	3.7	4.6	5.3	71.1	16.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	443	531	248	70	1704	29	821	144	18	56	278	2368
Future Volume (vph)	443	531	248	70	1704	29	821	144	18	56	278	2368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.952			0.998			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1738	0	1778	1868	0	1734	1794	0	1743	1835	1560
Flt Permitted	0.950			0.237			0.950			0.644		
Satd. Flow (perm)	1734	1738	0	444	1868	0	1734	1794	0	1182	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	492	590	276	78	1893	32	912	160	20	62	309	2631
Shared Lane Traffic (%)												
Lane Group Flow (vph)	492	866	0	78	1925	0	912	180	0	62	309	2631
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

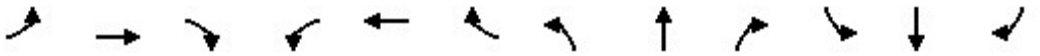
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.0	105.0		85.0	85.0		15.0	45.0		25.0	25.0	45.0
Actuated g/C Ratio	0.09	0.66		0.53	0.53		0.09	0.28		0.16	0.16	0.28
v/c Ratio	3.04	0.76		0.33	1.94		5.63	0.36		0.34	1.08	6.01
Control Delay	954.0	24.4		26.3	451.9		2107.8	48.4		66.0	137.2	2267.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	954.0	24.4		26.3	451.9		2107.8	48.4		66.0	137.2	2267.9
LOS	F	C		C	F		F	D		E	F	F
Approach Delay		361.2			435.3			1768.4			2003.1	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~890	588		45	~3097		~1800	151		59	~359	~5227
Queue Length 95th (ft)	#1122	776		90	#3346		#2063	227		110	#558	#5437
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	162	1140		235	992		162	504		184	286	438
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	3.04	0.76		0.33	1.94		5.63	0.36		0.34	1.08	6.01

Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 160	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 6.01	
Intersection Signal Delay: 1248.4	Intersection LOS: F
Intersection Capacity Utilization 296.1%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Forestville Road & Buffaloe Road

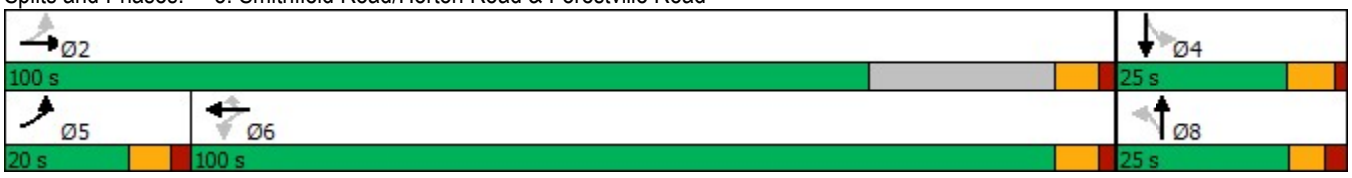


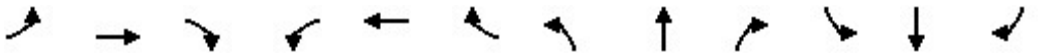
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	224	324	83	182	27	215	123	80	44	266	18
Future Volume (vph)	37	224	324	83	182	27	215	123	80	44	266	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.911				0.850		0.941			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1663	0	1761	1853	1575	1770	1753	0	1725	1800	0
Flt Permitted	0.494			0.434			0.473			0.597		
Satd. Flow (perm)	902	1663	0	804	1853	1575	881	1753	0	1084	1800	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	249	360	92	202	30	239	137	89	49	296	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	609	0	92	202	30	239	226	0	49	316	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	26.6	26.6		18.9	18.9	18.9	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.47	0.47		0.33	0.33	0.33	0.36	0.36		0.36	0.36	
v/c Ratio	0.07	0.78		0.35	0.33	0.06	0.77	0.36		0.13	0.50	
Control Delay	8.0	20.7		21.5	18.1	16.1	38.6	17.3		15.7	19.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.0	20.7		21.5	18.1	16.1	38.6	17.3		15.7	19.1	
LOS	A	C		C	B	B	D	B		B	B	
Approach Delay		19.9			18.9			28.2			18.7	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	7	161		27	59	8	72	57		11	84	
Queue Length 95th (ft)	19	270		65	108	24	#211	126		37	177	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	643	1663		804	1853	1575	312	621		384	638	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.06	0.37		0.11	0.11	0.02	0.77	0.36		0.13	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 56.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





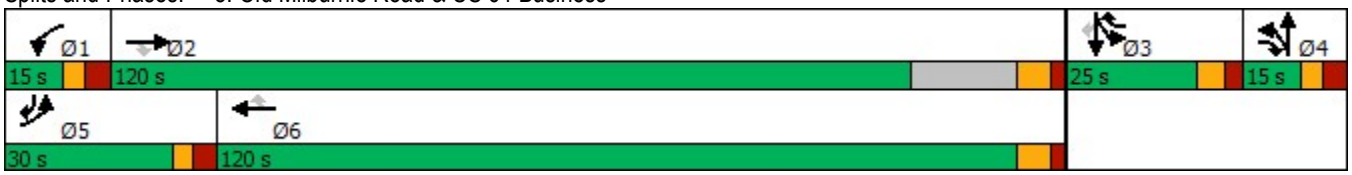
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	315	962	5	9	1602	121	4	4	4	168	4	588
Future Volume (vph)	315	962	5	9	1602	121	4	4	4	168	4	588
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.925				0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1740	2731
Flt Permitted	0.950			0.950			0.950				0.953	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1714	0	0	1740	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	350	1069	6	10	1780	134	4	4	4	187	4	653
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	1069	6	10	1780	134	4	8	0	0	191	653
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	26.0	114.0	119.7	9.1	87.4	113.4	9.3	9.3			20.8	49.3
Actuated g/C Ratio	0.17	0.73	0.76	0.06	0.56	0.72	0.06	0.06			0.13	0.31
v/c Ratio	1.22	0.42	0.01	0.10	0.90	0.12	0.04	0.08			0.83	0.76
Control Delay	177.2	10.1	3.2	85.8	37.4	7.1	85.0	85.9			96.6	54.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	177.2	10.1	3.2	85.8	37.4	7.1	85.0	85.9			96.6	54.1
LOS	F	B	A	F	D	A	F	F			F	D
Approach Delay		51.1			35.5			85.6			63.7	
Approach LOS		D			D			F			E	
Queue Length 50th (ft)	~473	214	1	10	884	44	4	8			203	311
Queue Length 95th (ft)	#824	335	4	37	985	66	20	31			#434	#587
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	287	2922	1184	117	2704	1148	116	113			230	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	1.22	0.37	0.01	0.09	0.66	0.12	0.03	0.07			0.83	0.76

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 157.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 46.6 Intersection LOS: D
Intersection Capacity Utilization 90.4% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business



Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	378	59	47	276	39	28
Future Vol, veh/h	378	59	47	276	39	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	420	66	52	307	43	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	486	0	831	420
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	411	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1077	-	340	633
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1077	-	324	633
Mov Cap-2 Maneuver	-	-	-	-	324	-
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	637	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	407	-	-	1077	-
HCM Lane V/C Ratio	0.183	-	-	0.048	-
HCM Control Delay (s)	15.8	-	-	8.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	310	238	209	252	15
Future Vol, veh/h	9	310	238	209	252	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	825	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	344	264	232	280	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	496	0	-	0	628	264
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1068	-	-	-	447	775
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1068	-	-	-	442	775
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	26.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1068	-	-	-	453
HCM Lane V/C Ratio	0.009	-	-	-	0.655
HCM Control Delay (s)	8.4	0	-	-	26.8
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	4.6

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	17	516	83	30	254
Future Vol, veh/h	47	17	516	83	30	254
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	19	573	92	33	282

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	921	573	0	0	665	0
Stage 1	573	-	-	-	-	-
Stage 2	348	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	300	519	-	-	924	-
Stage 1	564	-	-	-	-	-
Stage 2	715	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	289	519	-	-	924	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	564	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	328	924	-
HCM Lane V/C Ratio	-	-	0.217	0.036	-
HCM Control Delay (s)	-	-	19	9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	17	582	82	29	272
Future Vol, veh/h	46	17	582	82	29	272
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	19	647	91	32	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1013	647	0	0	738	0
Stage 1	647	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	265	471	-	-	868	-
Stage 1	521	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	471	-	-	868	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	676	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.2	0	0.9
HCM LOS	C		

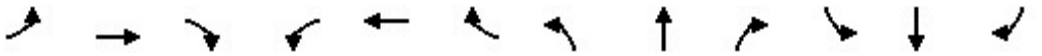
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	291	868	-
HCM Lane V/C Ratio	-	-	0.241	0.037	-
HCM Control Delay (s)	-	-	21.2	9.3	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

Intersection	
Intersection Delay, s/veh	47.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	195	252	85	56	66	10	43	224	48	15	296	175
Future Vol, veh/h	195	252	85	56	66	10	43	224	48	15	296	175
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	217	280	94	62	73	11	48	249	53	17	329	194
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	30.2	14.4	30	86.7
HCM LOS	D	B	D	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	14%	100%	0%	100%	0%	3%
Vol Thru, %	71%	0%	75%	0%	87%	61%
Vol Right, %	15%	0%	25%	0%	13%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	195	337	56	76	486
LT Vol	43	195	0	56	0	15
Through Vol	224	0	252	0	66	296
RT Vol	48	0	85	0	10	175
Lane Flow Rate	350	217	374	62	84	540
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.739	0.506	0.801	0.163	0.207	1.07
Departure Headway (Hd)	7.862	8.771	8.067	9.926	9.304	7.132
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	462	414	453	363	388	513
Service Time	5.862	6.471	5.767	7.626	7.004	5.151
HCM Lane V/C Ratio	0.758	0.524	0.826	0.171	0.216	1.053
HCM Control Delay	30	20.1	36.1	14.5	14.4	86.7
HCM Lane LOS	D	C	E	B	B	F
HCM 95th-tile Q	6	2.8	7.3	0.6	0.8	16.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1151	1139	311	18	501	51	181	192	28	44	148	368
Future Volume (vph)	1151	1139	311	18	501	51	181	192	28	44	148	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			4%			3%	
Storage Length (ft)	200		0	200		0	200		0	200		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.968			0.986			0.981				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1767	0	1778	1846	0	1734	1791	0	1743	1835	1560
Flt Permitted	0.950			0.058			0.950			0.607		
Satd. Flow (perm)	1734	1767	0	109	1846	0	1734	1791	0	1114	1835	1560
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		680			563			3419			455	
Travel Time (s)		10.3			8.5			51.8			6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1279	1266	346	20	557	57	201	213	31	49	164	409
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1279	1612	0	20	614	0	201	244	0	49	164	409
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	0.99	0.99	0.99	1.03	1.03	1.03	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	pm+ov
Protected Phases	5	2			6		3				4	5
Permitted Phases				6				8		4		4
Detector Phase	5	2		6	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.1	18.5		18.5	18.5		12.1	12.3		12.3	12.3	13.1
Total Split (s)	20.0	90.0		90.0	90.0		20.0	30.0		30.0	30.0	20.0
Total Split (%)	12.5%	56.3%		56.3%	56.3%		12.5%	18.8%		18.8%	18.8%	12.5%
Maximum Green (s)	13.9	83.5		83.5	83.5		14.9	24.7		24.7	24.7	13.9
Yellow Time (s)	3.0	4.6		4.6	4.6		3.0	4.3		4.3	4.3	3.0
All-Red Time (s)	3.1	1.9		1.9	1.9		2.1	1.0		1.0	1.0	3.1
Lost Time Adjust (s)	-1.1	-1.5		-1.5	-1.5		-0.1	-0.3		-0.3	-0.3	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

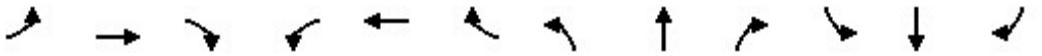
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effct Green (s)	15.1	89.0		68.9	68.9		15.1	36.8		16.6	16.6	36.8
Actuated g/C Ratio	0.11	0.65		0.51	0.51		0.11	0.27		0.12	0.12	0.27
v/c Ratio	6.66	1.39		0.37	0.66		1.05	0.50		0.36	0.73	0.97
Control Delay	2561.4	206.4		44.3	29.2		134.5	46.5		63.5	77.3	85.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	2561.4	206.4		44.3	29.2		134.5	46.5		63.5	77.3	85.9
LOS	F	F		D	C		F	D		E	E	F
Approach Delay		1248.3			29.7			86.3			81.9	
Approach LOS		F			C			F			F	
Queue Length 50th (ft)	~2087	~1840		10	386		~177	175		39	136	343
Queue Length 95th (ft)	#2862	#2499		44	574		#433	305		92	245	#630
Internal Link Dist (ft)		600			483			3339			375	
Turn Bay Length (ft)	200			200			200			200		150
Base Capacity (vph)	192	1375		68	1163		192	597		206	339	422
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	6.66	1.17		0.29	0.53		1.05	0.41		0.24	0.48	0.97

Intersection Summary	
Area Type:	Other
Cycle Length: 160	
Actuated Cycle Length: 135.9	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 6.66	
Intersection Signal Delay: 809.4	Intersection LOS: F
Intersection Capacity Utilization 127.7%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Forestville Road & Buffaloe Road

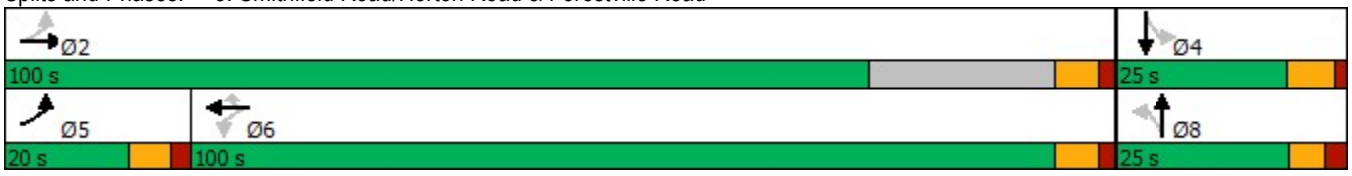


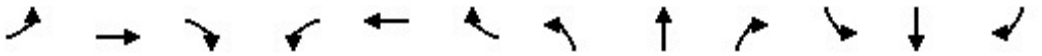
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	178	335	90	138	29	260	249	83	22	206	49
Future Volume (vph)	45	178	335	90	138	29	260	249	83	22	206	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			1%			0%			5%	
Storage Length (ft)	100		0	300		150	225		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.902				0.850		0.963			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1734	1647	0	1761	1853	1575	1770	1794	0	1725	1764	0
Flt Permitted	0.515			0.450			0.523			0.410		
Satd. Flow (perm)	940	1647	0	834	1853	1575	974	1794	0	745	1764	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1116			648			771			460	
Travel Time (s)		16.9			9.8			15.0			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	198	372	100	153	32	289	277	92	24	229	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	570	0	100	153	32	289	369	0	24	283	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.03	1.03	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	18.7		18.7	18.7	18.7	13.5	13.5		13.6	13.6	
Total Split (s)	20.0	100.0		100.0	100.0	100.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.8%	69.0%		69.0%	69.0%	69.0%	17.2%	17.2%		17.2%	17.2%	
Maximum Green (s)	13.3	93.3		93.3	93.3	93.3	18.5	18.5		18.4	18.4	
Yellow Time (s)	4.7	4.7		4.7	4.7	4.7	4.0	4.0		5.1	5.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.5	2.5		1.5	1.5	
Lost Time Adjust (s)	-1.7	-1.7		-1.7	-1.7	-1.7	-1.5	-1.5		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	1.0	6.0		6.0	6.0	6.0	1.0	1.0		1.0	1.0	
Minimum Gap (s)	1.0	3.0		3.0	3.0	3.0	1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0		15.0	15.0	15.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	35.0		35.0	35.0	35.0	0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min	Min	None	None		None	None	
Act Effct Green (s)	25.5	25.5		17.8	17.8	17.8	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.46	0.46		0.32	0.32	0.32	0.36	0.36		0.36	0.36	
v/c Ratio	0.09	0.76		0.38	0.26	0.06	0.82	0.57		0.09	0.44	
Control Delay	8.2	19.7		22.4	17.7	16.4	41.7	20.0		15.3	17.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.2	19.7		22.4	17.7	16.4	41.7	20.0		15.3	17.8	
LOS	A	B		C	B	B	D	C		B	B	
Approach Delay		18.8			19.2			29.5			17.6	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	9	146		30	44	9	90	101		5	74	
Queue Length 95th (ft)	22	247		70	85	26	#243	202		22	152	
Internal Link Dist (ft)		1036			568			691			380	
Turn Bay Length (ft)	100			300		150	225			125		
Base Capacity (vph)	645	1647		834	1853	1575	352	648		269	637	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.35		0.12	0.08	0.02	0.82	0.57		0.09	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 55.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 22.4		Intersection LOS: C	
Intersection Capacity Utilization 84.8%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Smithfield Road/Horton Road & Forestville Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	586	2554	5	7	1973	202	5	4	7	171	4	269
Future Volume (vph)	586	2554	5	7	1973	202	5	4	7	171	4	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			1%			4%	
Storage Length (ft)	375		375	500		75	50		0	0		75
Storage Lanes	1		1	1		1	1		0	0		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850			0.850		0.900				0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	1743	3486	1560	1778	3557	1591	1761	1668	0	0	1740	2731
Flt Permitted	0.950			0.950			0.950				0.953	
Satd. Flow (perm)	1743	3486	1560	1778	3557	1591	1761	1668	0	0	1740	2731
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			45	
Link Distance (ft)		728			760			210			2143	
Travel Time (s)		11.0			11.5			5.7			32.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	651	2838	6	8	2192	224	6	4	8	190	4	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	651	2838	6	8	2192	224	6	12	0	0	194	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2	4	1	6	3	4	4		3	3	5
Permitted Phases			2			6						3
Detector Phase	5	2	4	1	6	3	4	4		3	3	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.3	22.8	13.9	13.8	18.8	13.6	13.9	13.9		13.6	13.6	13.3
Total Split (s)	30.0	120.0	15.0	15.0	120.0	25.0	15.0	15.0		25.0	25.0	30.0
Total Split (%)	15.8%	63.2%	7.9%	7.9%	63.2%	13.2%	7.9%	7.9%		13.2%	13.2%	15.8%
Maximum Green (s)	23.7	113.2	8.1	8.2	113.2	18.4	8.1	8.1		18.4	18.4	23.7
Yellow Time (s)	3.0	4.6	3.1	3.0	4.6	4.2	3.1	3.1		4.2	4.2	3.0
All-Red Time (s)	3.3	2.2	3.8	3.8	2.2	2.4	3.8	3.8		2.4	2.4	3.3
Lost Time Adjust (s)	-1.3	-1.8	-1.9	-1.8	-1.8	-1.6	-1.9	-1.9			-1.6	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0	2.0	1.0	6.0	1.0	2.0	2.0		1.0	1.0	1.0
Minimum Gap (s)	1.0	3.0	2.0	1.0	3.0	1.0	2.0	2.0		1.0	1.0	1.0

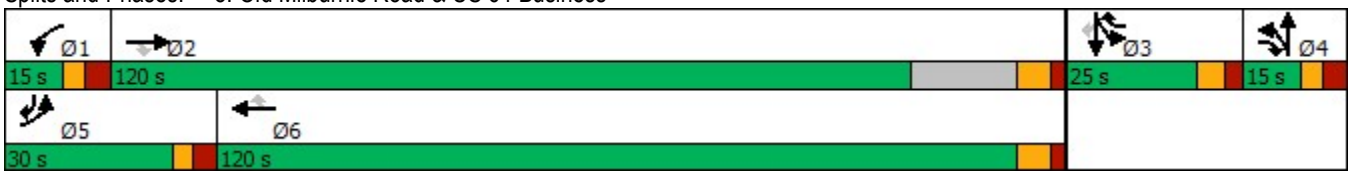
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None		None	None	None
Walk Time (s)		7.0										
Flash Dont Walk (s)		9.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)	25.0	139.8	146.2	8.8	115.2	140.2	9.1	9.1			20.0	47.2
Actuated g/C Ratio	0.14	0.76	0.80	0.05	0.63	0.76	0.05	0.05			0.11	0.26
v/c Ratio	2.75	1.07	0.00	0.09	0.98	0.18	0.07	0.15			1.03	0.43
Control Delay	820.2	61.6	3.2	89.0	48.4	6.9	87.8	90.1			148.2	50.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	820.2	61.6	3.2	89.0	48.4	6.9	87.8	90.1			148.2	50.7
LOS	F	E	A	F	D	A	F	F			F	D
Approach Delay		202.8			44.7			89.3			89.1	
Approach LOS		F			D			F			F	
Queue Length 50th (ft)	~1376	~2027	1	10	~1499	78	7	15			~262	157
Queue Length 95th (ft)	#1642	#2300	4	31	#1625	111	27	41			#447	207
Internal Link Dist (ft)		648			680			130			2063	
Turn Bay Length (ft)	375		375	500		75	50					75
Base Capacity (vph)	237	2656	1238	97	2232	1215	96	91			189	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	2.75	1.07	0.00	0.08	0.98	0.18	0.06	0.13			1.03	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 190			
Actuated Cycle Length: 183.5			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 2.75			
Intersection Signal Delay: 134.1		Intersection LOS: F	
Intersection Capacity Utilization 115.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

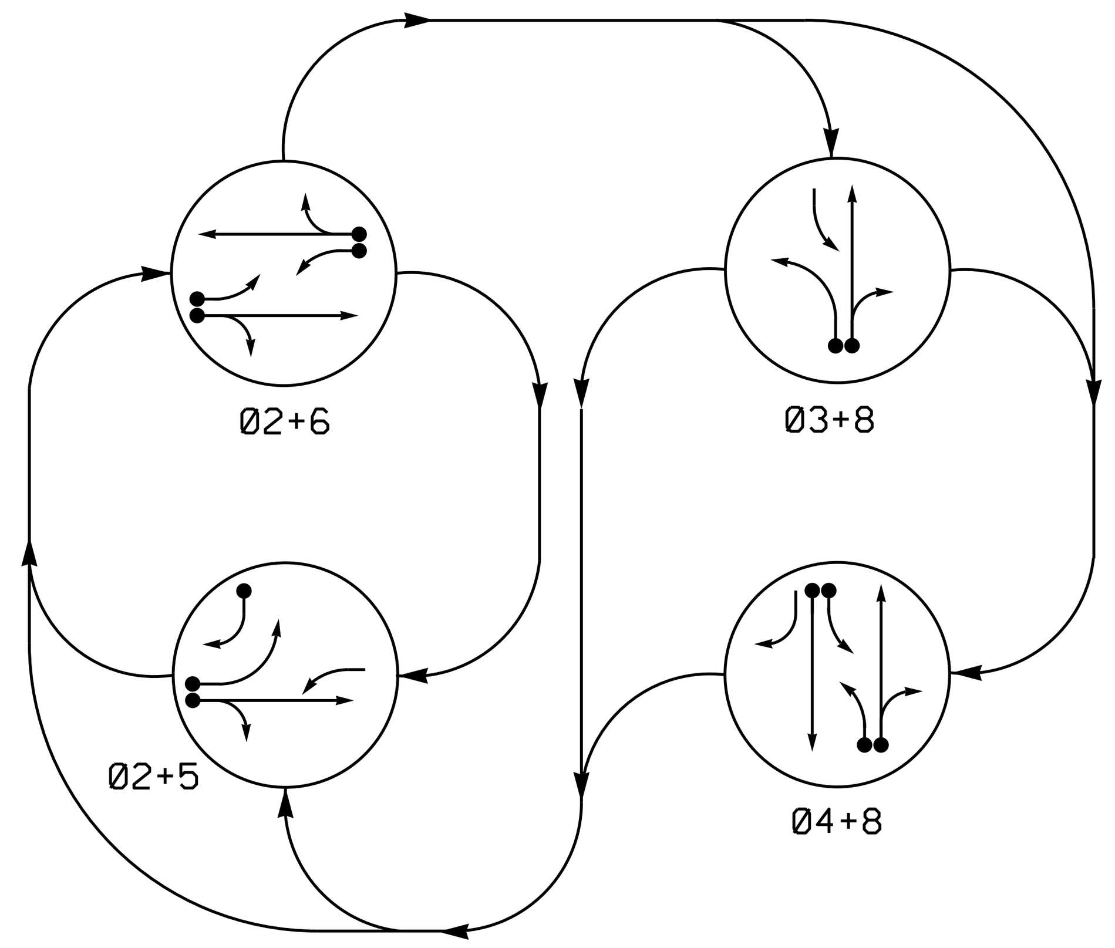
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Old Milburnie Road & US 64 Business

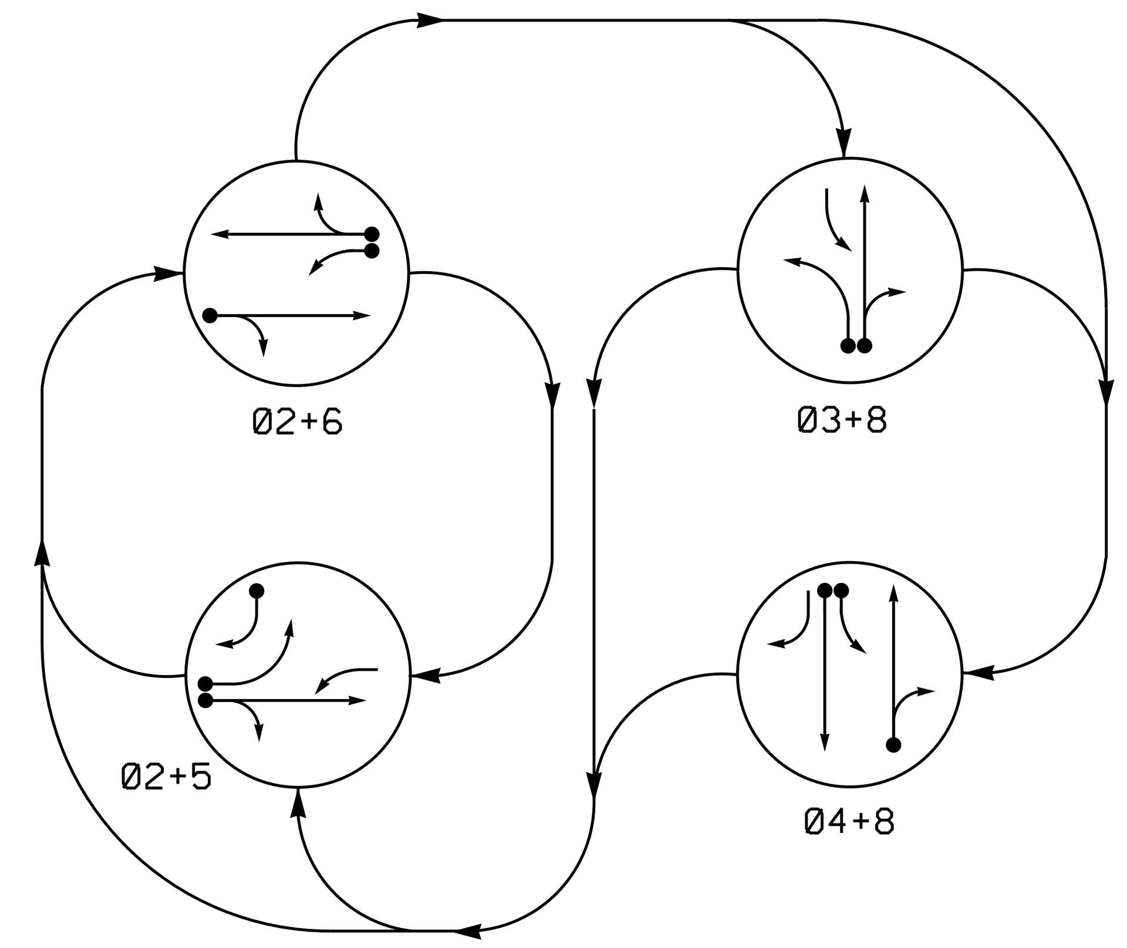


Appendix D – Signal Plans

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM

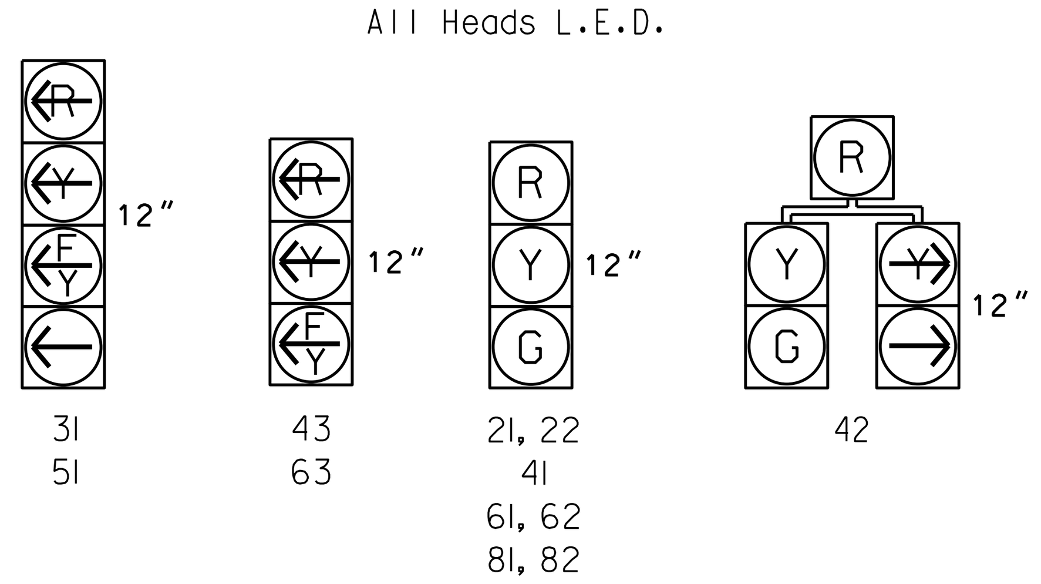


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	TIMING: DELAY	TIMING: EXTEND (STRETCH)	OPERATION MODE 0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	STATUS: NEW	STATUS: EXISTING
2A	6X6	5	300	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	-	X	3	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4B	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	-	X	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	5	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X40	2-4-2	0	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6C #	6X40	2-4-2	+5	-	X	#	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	-	X	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8B	6X6	4	+5	-	X	8	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X

See Note 9

4 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal head 41.
4. Phase 5 may be lagged.
5. Phase 3 may be lagged.
6. Set all detector units to presence mode.
7. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Blankout sign B shall only illuminate during phase 6 and after 5 seconds of steady activation on loop 6C. The sign shall extinguish when there is no longer detection on loop 6C or phase 6 green termination.

DEFAULT PHASING TABLE OF OPERATION

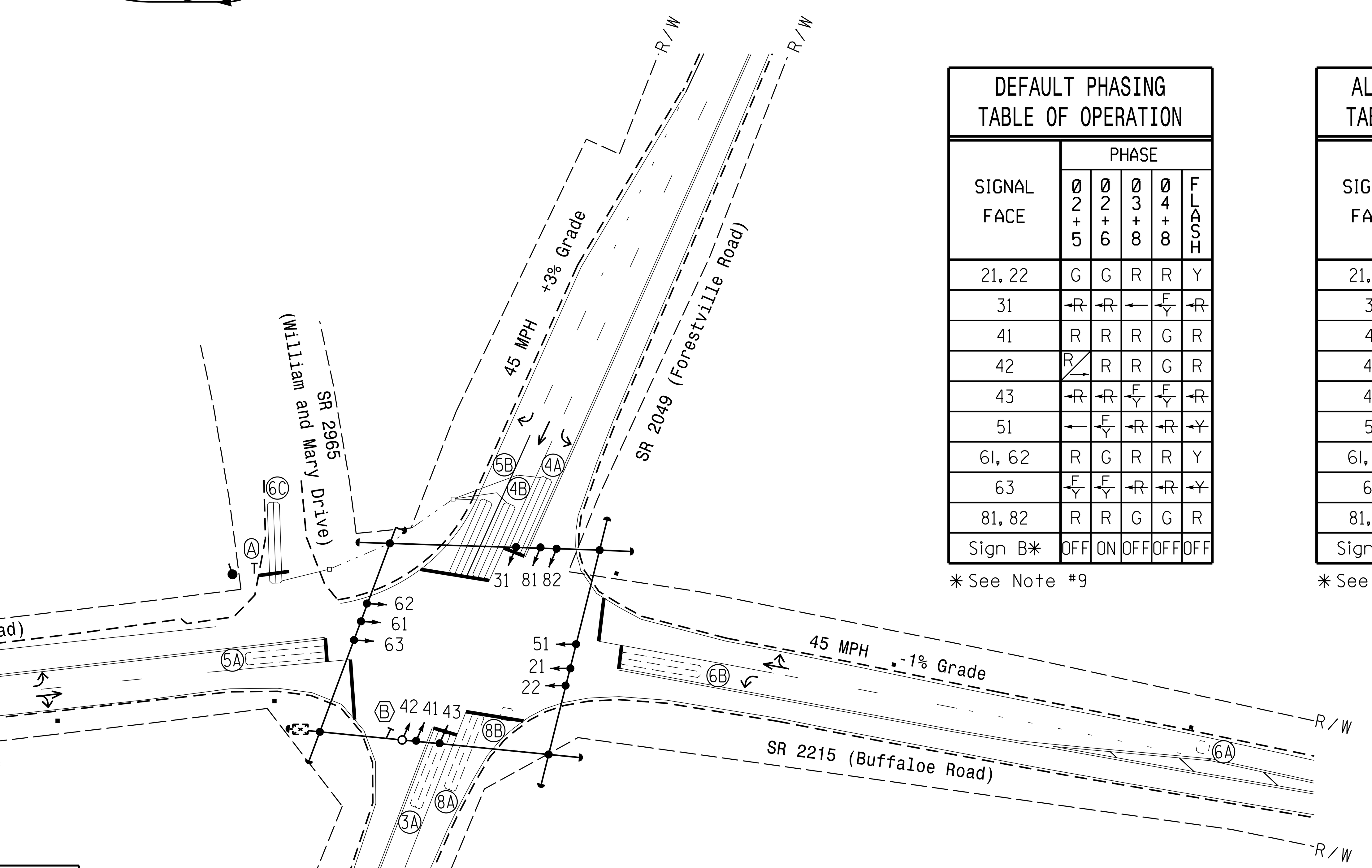
SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
21, 22	G	G	R	R	Y
31	←R	←R	←	←FY	←R
41	R	R	R	G	R
42	R/→	R	R	G	R
43	←R	←R	←FY	←FY	←R
51	←	←FY	←R	←R	←Y
61, 62	R	G	R	R	Y
63	←FY	←FY	←R	←R	←Y
81, 82	R	R	G	G	R
Sign B*	OFF	ON	OFF	OFF	OFF

* See Note #9

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
21, 22	G	G	R	R	Y
31	←R	←R	←	←R	←R
41	R	R	R	G	R
42	R/→	R	R	G	R
43	←R	←R	←FY	←FY	←R
51	←	←R	←R	←R	←Y
61, 62	R	G	R	R	Y
63	←FY	←FY	←R	←R	←Y
81, 82	R	R	G	G	R
Sign B*	OFF	ON	OFF	OFF	OFF

* See Note #9



LEGEND

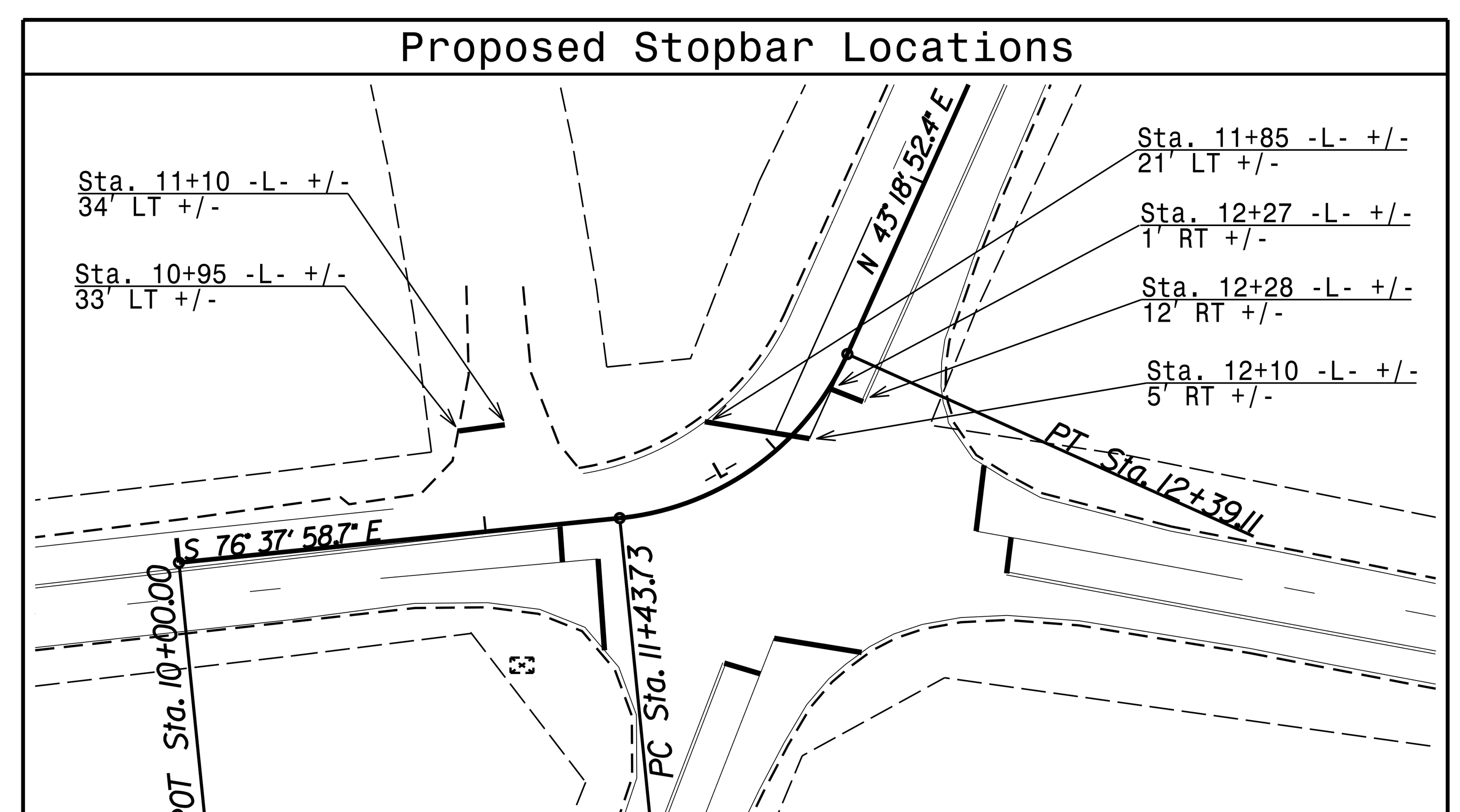
PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	"STOP" Sign (R1-1)	(A)
(B)	"NO RIGHT TURN" LED Blankout Sign	(B)

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	3	4	5	6	8
Min Green *	12	7	7	7	12	7
Passage Gap *	6.0	2.0	2.0	2.0	6.0	2.0
Maximum Green *	90	20	30	20	90	30
Yellow Change	4.6	3.0	4.3	3.0	4.6	4.3
Red Clear	1.9	2.1	1.0	3.1	1.9	1.0
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	2.5	-	-	-	2.5	-
Maximum Initial *	34	-	-	-	34	-
Time Before Reduction *	15	-	-	-	15	-
Time To Reduce *	30	-	-	-	30	-
Minimum Gap	3.0	-	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Proposed Stopbar Locations



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade - Final Design

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

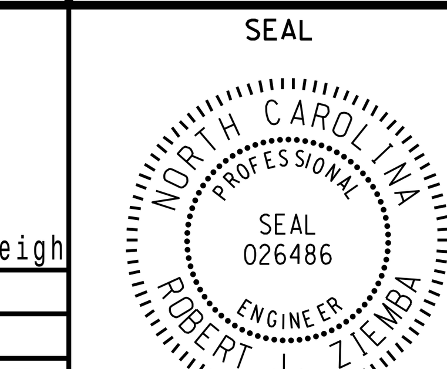
SR 2215 (Buffaloe Road)
at
SR 2049 (Forestville Road)

Division 5	Wake County	Raleigh
PLAN DATE: August 2018	REVIEWED BY:	
PREPARED BY: I. O. Umozurike	REVIEWED BY:	

SCALE 0 50 — 1" = 50'

REVISIONS	INIT.	DATE

SEAL

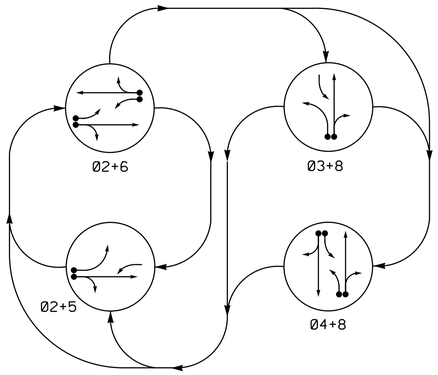


DocuSigned by: 9/24/2018
SIGNATURE DATE

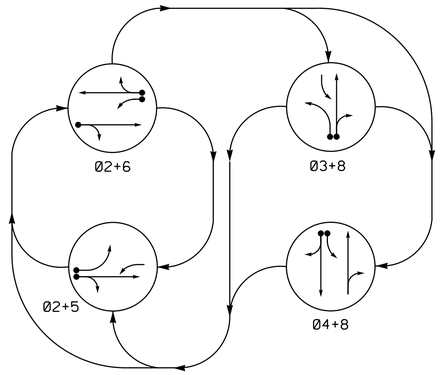
SIG. INVENTORY NO. 05-1097

PROJECT REFERENCE NO.	SHEET NO.
W-5705E	Sig. 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING																
							TIMING		OPERATION MODE											STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT/PROT/PER THROUGH	6 AND	7	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
3A	6X40	2-4-2	0	-	X	3	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4B	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	-	X	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X40	2-4-2	0	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	-	X	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X6	4	+5	-	X	8	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

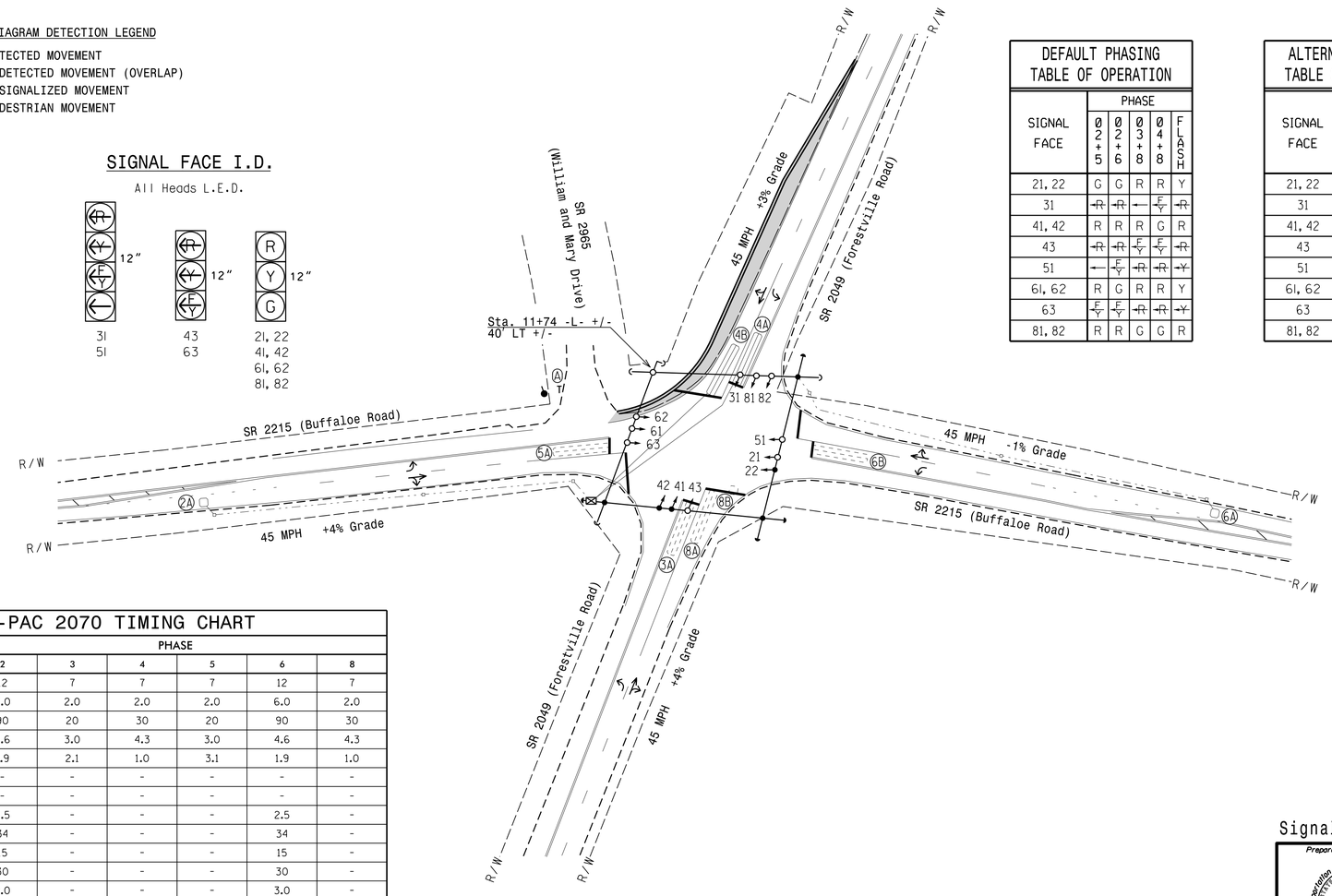
SIGNAL FACE I.D.

All Heads L.E.D.

31
51

43
63

21, 22
41, 42
61, 62
81, 82



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
21, 22	G	G	R	R	Y
31	~~R~~	~~R~~	←	~~R~~	~~R~~
41, 42	R	R	R	G	R
43	~~R~~	~~R~~	~~Y~~	~~Y~~	~~R~~
51	←	~~Y~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	R	Y
63	~~Y~~	~~Y~~	~~R~~	~~R~~	~~Y~~
81, 82	R	R	G	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
21, 22	G	G	R	R	Y
31	~~R~~	~~R~~	←	~~R~~	~~R~~
41, 42	R	R	R	G	R
43	~~R~~	~~R~~	~~Y~~	~~Y~~	~~R~~
51	←	~~R~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	R	Y
63	~~Y~~	~~Y~~	~~R~~	~~R~~	~~Y~~
81, 82	R	R	G	G	R

SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	2	3	4	5	6	8
Min Green *	12	7	7	7	12	7
Passage Gap *	6.0	2.0	2.0	2.0	6.0	2.0
Maximum Green *	90	20	30	20	90	30
Yellow Change	4.6	3.0	4.3	3.0	4.6	4.3
Red Clear	1.9	2.1	1.0	3.1	1.9	1.0
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	2.5	-	-	-	2.5	-
Maximum Initial *	34	-	-	-	34	-
Time Before Reduction *	15	-	-	-	15	-
Time To Reduce *	30	-	-	-	30	-
Minimum Gap	3.0	-	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

4 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads 22, 81, and 82.
4. Phase 5 may be lagged.
5. Phase 3 may be lagged.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	┈┈
⊠	Controller & Cabinet	⊡
□	Junction Box	■
┈┈┈	2-in Underground Conduit	┈·┈
N/A	Right of Way	———
→	Directional Arrow	→
▒	Construction Zone	▒
Ⓐ	"STOP" Sign (R1-1)	Ⓐ

Signal Upgrade - Temporary Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2215 (Buffaloe Road)
at
SR 2049 (Forestville Road)

Division 5 Wake County Raleigh

PLAN DATE: August 2018 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

SCALE 0 50 1" = 50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by: Robert J. Ziemba 9/24/2018
SIGNATURE DATE

SIG. INVENTORY NO. 05-1097T

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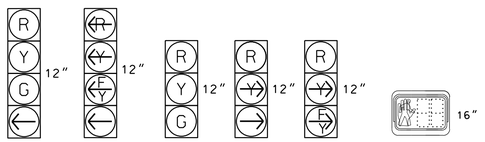
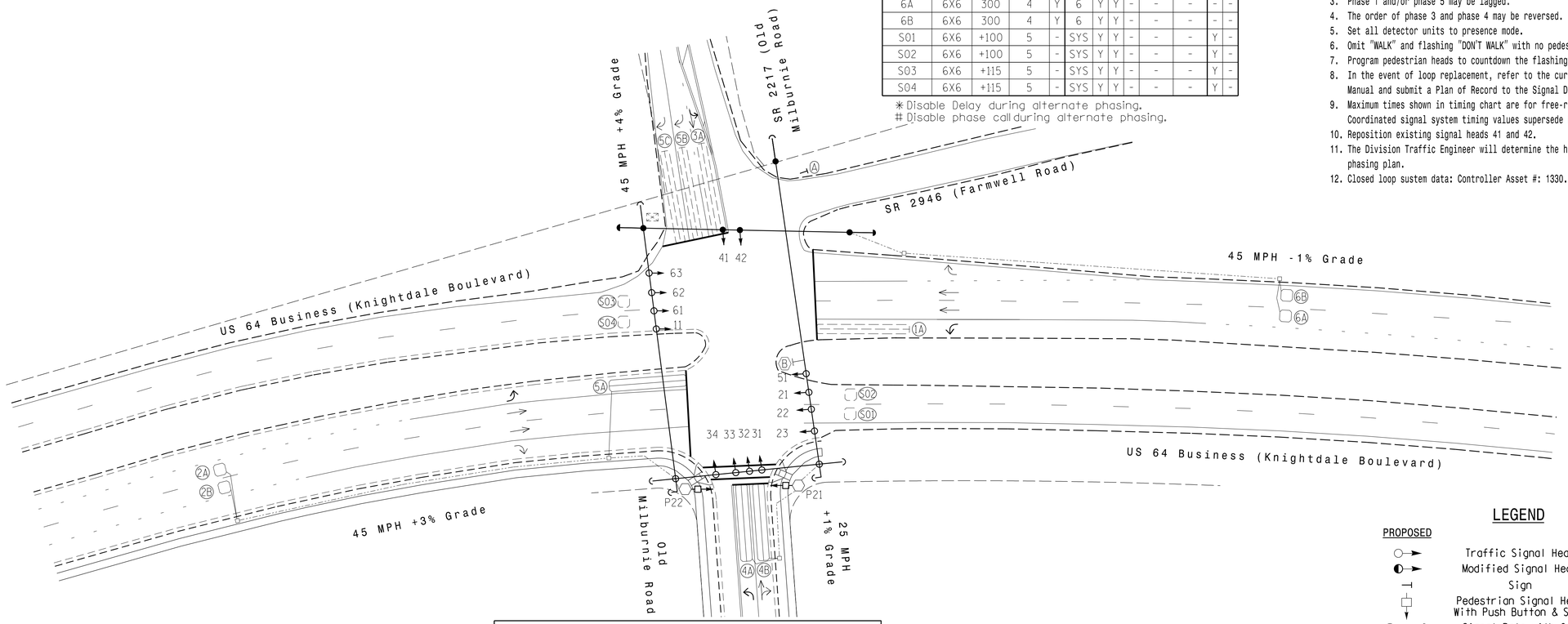
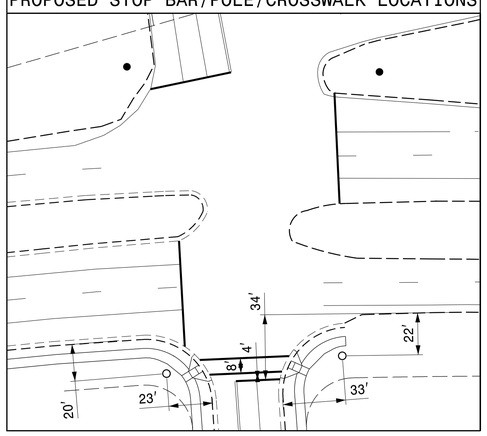
rziemba







PROJECT REFERENCE NO.	SHEET NO.
36249.4170	Sig-1.0

SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15✳	-	-
					6 #	Y	Y	Y	-	3	-	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	4	Y	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	3	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15✳	-	-
					2 #	Y	Y	Y	-	3	-	-
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
5C	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	300	4	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	4	Y	6	Y	Y	-	-	-	-	-
S01	6X6	+100	5	-	SYS	Y	Y	-	-	-	Y	-
S02	6X6	+100	5	-	SYS	Y	Y	-	-	-	Y	-
S03	6X6	+115	5	-	SYS	Y	Y	-	-	-	Y	-
S04	6X6	+115	5	-	SYS	Y	Y	-	-	-	Y	-

✳ Disable Delay during alternate phasing.
Disable phase call during alternate phasing.

6 Phase
Fully Actuated
US 64 Bus. (Knightdale) CLS
Signal System #: D05-28_Knightdale

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Reposition existing signal heads 41 and 42.
11. The Division Traffic Engineer will determine the hours of use for each phasing plan.
12. Closed loop sustem data: Controller Asset #: 1330.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
○—)	Signal Pole with Guy	●—◗
○—⌣	Signal Pole with Sidewalk Guy	●—◡
▭	Inductive Loop Detector	⌷
☒	Controller & Cabinet	⊠
□	Junction Box	■
- - - - -	2-in Underground Conduit	—·—·—
N/A	Right of Way	— — —
→	Directional Arrow	→
⬡	Type II Signal Pedestal	⬢
Ⓐ	"STOP" Sign (R1-1)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ

OASIS 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	1.0	6.0	1.0	2.0	1.0	6.0
Max Green 1 *	15	120	25	15	30	120
Yellow Clearance	3.0	4.6	4.2	3.1	3.0	4.6
Red Clearance	3.8	2.2	2.4	3.8	3.3	2.2
Walk 1 *	-	7	-	-	-	-
Don't Walk 1	-	9	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PROPOSED STOP BAR/POLE/CROSSWALK LOCATIONS

NC Dept of Transportation
Division of Highways
Final Drawing Date: 12/2/2020
DocuSigned by:
1B9B4B66274A494...
ITS & Signals Unit

RAMEY KEMP ASSOCIATES
5808 Faringdon Place Raleigh, North Carolina 27609
Phone: 919-872-5115 | www.rameykemp.com | NC License No. C-0910

Signal Upgrade - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

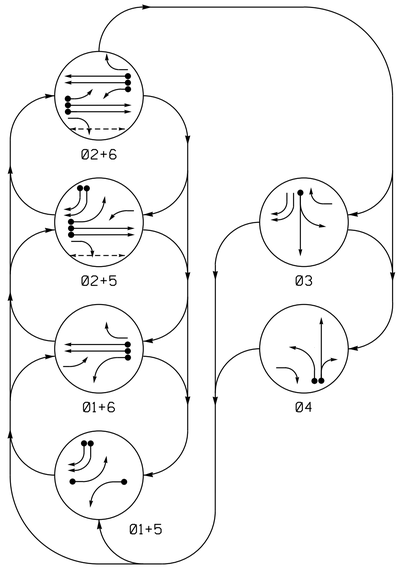
SCALE
0 40
1"=40'

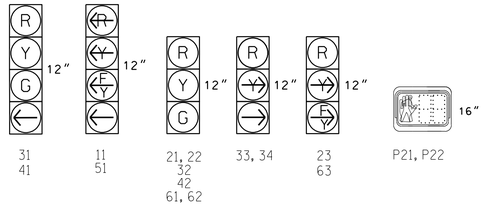
US 64 Business
(Knightdale Boulevard)
at
SR 2217 (Old Milburnie Road)
Division 5 Wake County Knightdale

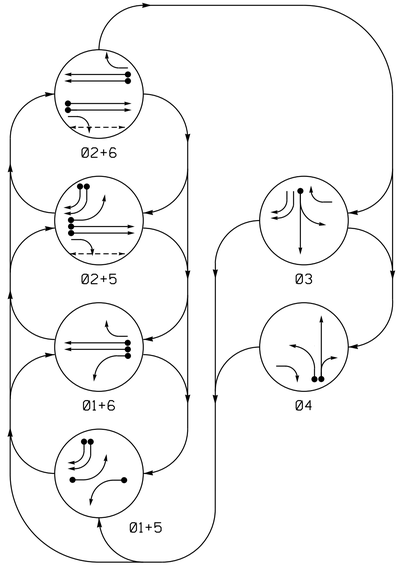
PLAN DATE:	November 2020	REVIEWED BY:	WJ Hamilton
PREPARED BY:	JA Wendt	RKA PROJ. NO.:	20228 (040)

REVISIONS	INIT.	DATE

SEAL
SEAL 32396
WILLIAM J. HAMILTON
DocuSigned by:
William J. Hamilton
A0560D704648484...
SIGNATURE
11/27/2020
DATE
SIG. INVENTORY NO. 05-1330







PROJECT REFERENCE NO.	SHEET NO.
36249.4170	Sig-1.1

DEFAULT PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

←●	DETECTED MOVEMENT
←	UNDETECTED MOVEMENT (OVERLAP)
← − −	UNSIGNALIZED MOVEMENT
← − − →	PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←F/Y	←F/Y	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
23	R	R	F/Y→	F/Y→	R	F/Y→	Y→
31	R	R	R	R	G←	R	R
32	R	R	R	R	G	R	R
33, 34	→	R→	→	R→	→	R→	R→
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←R	←Y
61, 62	R	G	R	G	R	R	Y
63	R	F/Y→	R	F/Y→	F/Y→	R	Y→
P21, P22	DW	DW	W	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

31 41	11 51	21, 22 32 42 61, 62	33, 34	23 63	P21, P22

6 Phase
Fully Actuated
US 64 Bus. (Knightdale) CLS
Signal System #: D05-28_Knightdale

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Reposition existing signal heads 41 and 42.
11. The Division Traffic Engineer will determine the hours of use for each phasing plan.
12. Closed loop sustem data: Controller Asset #: 1330.

ALTERNATE PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

←●	DETECTED MOVEMENT
←	UNDETECTED MOVEMENT (OVERLAP)
← − −	UNSIGNALIZED MOVEMENT
← − − →	PEDESTRIAN MOVEMENT

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
23	R	R	F/Y→	F/Y→	R	F/Y→	Y→
31	R	R	R	R	G←	R	R
32	R	R	R	R	G	R	R
33, 34	→	R→	→	R→	→	R→	R→
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R	←Y
61, 62	R	G	R	G	R	R	Y
63	R	F/Y→	R	F/Y→	F/Y→	R	Y→
P21, P22	DW	DW	W	W	DW	DW	DRK

NC Dept of Transportation
Division of Highways
Final Drawing Date: 12/2/2020
DocuSigned by:
1B9B4B66274A494...
ITS & Signals Unit

RAMEY KEMP ASSOCIATES
5808 Faringdon Place Raleigh, North Carolina 27609
Phone: 919-872-5115 | www.rameykemp.com | NC LIcense No. C-0910

Signal Upgrade - Sheet 2 of 2

Prepared for:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

US 64 Business
(Knightdale Boulevard)
at
SR 2217 (Old Milburnie Road)

Division 5 Wake County Knightdale

PLAN DATE:	November 2020	REVIEWED BY:	WJ Hamilton
PREPARED BY:	JA Wendt	RKA PROJ. NO.:	20228 (040)

SCALE
0 40
1″=40′

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

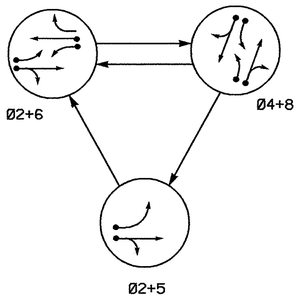
SEAL
SEAL 32396
WILLIAM J. HAMILTON

DocuSigned by:
William J. Hamilton
A0560D704648484...
SIGNATURE 11/27/2020 DATE

SIG. INVENTORY NO. 05-1330

PROJECT REFERENCE NO.	SHEET NO.
9.8051209	SIG. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

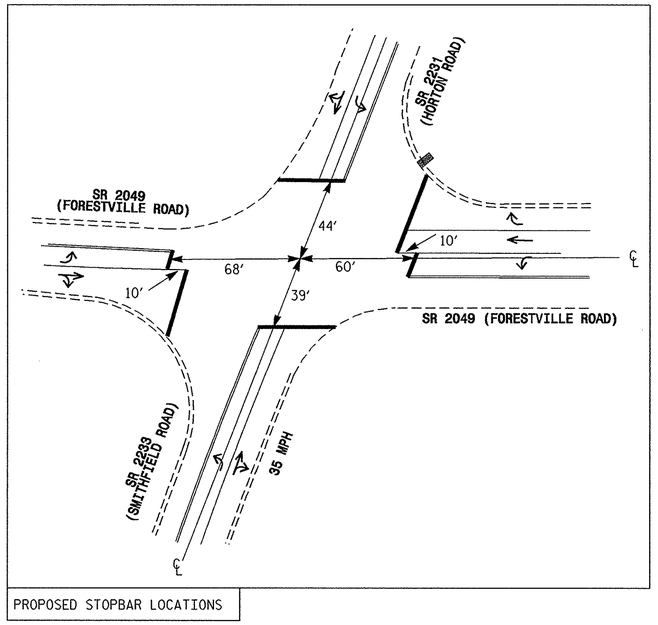
SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4+8	FLASH
21	G	G	R	Y
22	G	G	R	Y
41, 42	R	R	G	R
61, 62	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

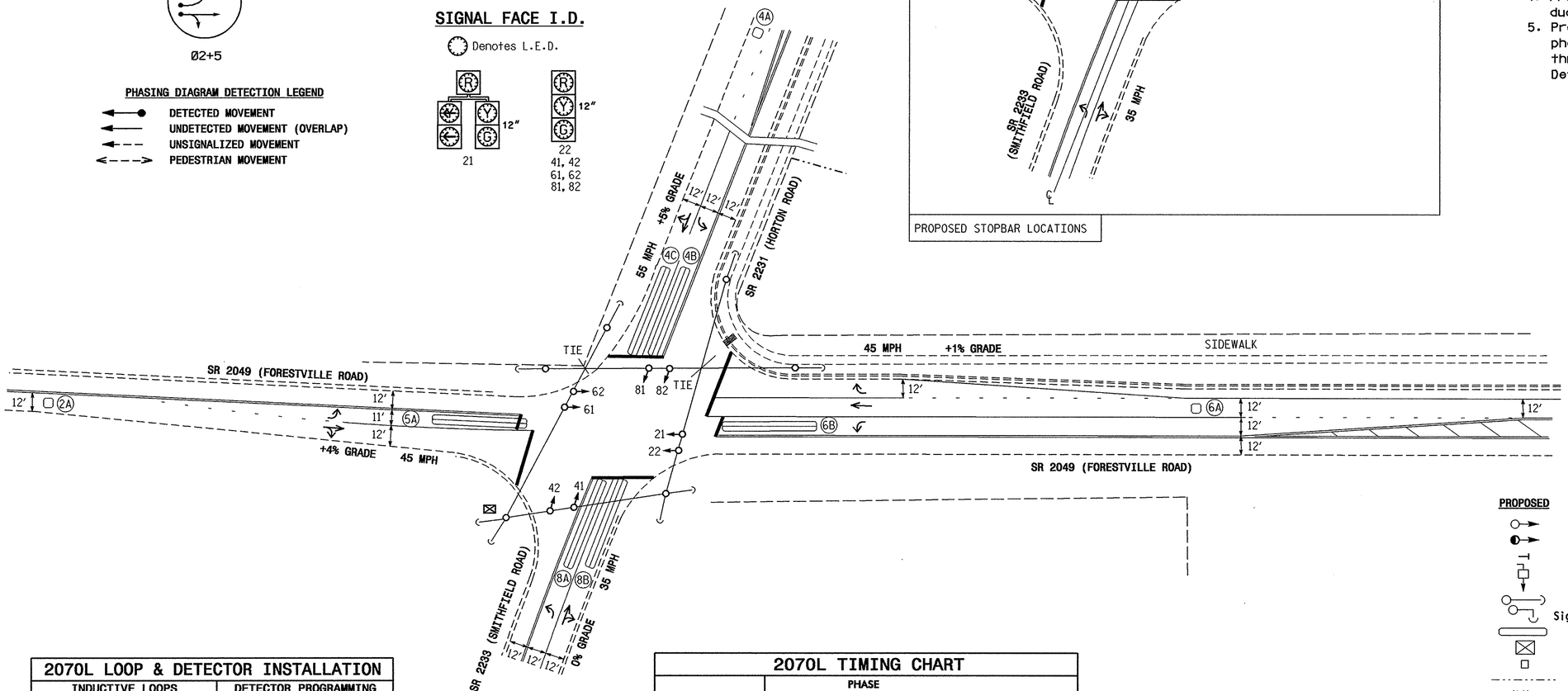
Denotes L.E.D.

21

22
41, 42
61, 62
81, 82



PROPOSED STOPBAR LOCATIONS



3-PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Omit phase 5 during phase 6 on.
3. Set all detector units to presence mode.
4. Program phase 4 and phase 8 for dual entry.
5. Program controller to clear from phase 2+6 to phase 5 by progressing through phase 4+8 (see Electrical Details).

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
2A	6X6	5	300′	X	2	Y	Y					Y
4A	6X6	5	420′	X	4		Y			4		Y
4B	6X60	2-4-2	0	X	4	Y	Y				3	Y
4C	6X60	2-4-2	0	X	4	Y	Y				10	Y
5A	6X60	2-4-2	+5	X	5	Y	Y				15	Y
					2	Y	Y	Y			3	Y
6A	6X6	5	300′	X	6	Y	Y					Y
6B	6X60	2-4-2	0	X	6	Y	Y	Y			3	Y
8A	6X60	2-4-2	0	X	8	Y	Y				3	Y
8B	6X60	2-4-2	0	X	8	Y	Y				10	Y

2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green 1 *	12	7	7	12	7
Extension 1 *	6	1	1	6	1
Max Green 1 *	100	25	20	100	25
Yellow Clearance	4.7	5.1	4.7	4.7	4.0
Red Clearance	2	1.5	2	2	2.5
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	2.0	-	-	2.0	-
Max Variable Initial *	34	-	-	34	-
Time Before Reduction *	15	-	-	15	-
Time To Reduction *	35	-	-	35	-
Minimum Gap	3	-	-	3	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	

NEW INSTALLATION

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SR 2049 (FORESTVILLE ROAD) AT SR 2233 (SMITHFIELD ROAD)/ SR 2231 (HORTON ROAD)

DIVISION 05 WAKE COUNTY KNIGHTDALE

PLAN DATE: MARCH, 2003 REVIEWED BY:

PREPARED BY: Monif Bazzarie REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 25475 ENGINEER BONIFACE MADUABUCHUKWU

SIGNATURE DATE 3/3/03

SIG. INVENTORY NO. 05-2175

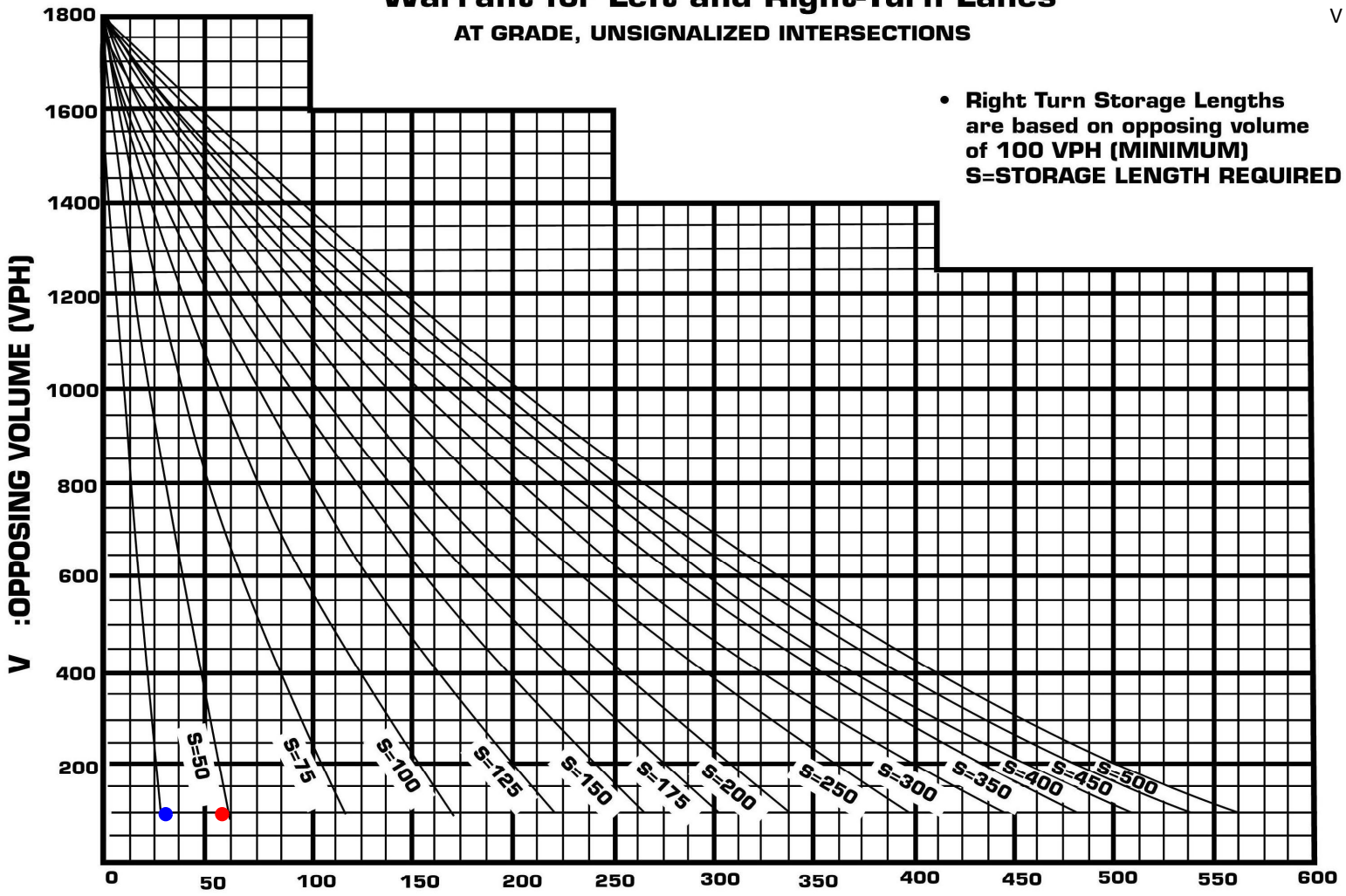
04-MAR-2003 10:57
W:\People\Unit\Workgroups\Mod1\Monif\052175_2002xxx.sig
mbazzarie

Appendix E – NCDOT Nomographs

AM Peak Hour
VL = 31
V = 100
PM Peak Hour
VL = 59
V = 10

Warrant for Left and Right-Turn Lanes

AT GRADE, UNSIGNALIZED INTERSECTIONS



- **Right Turn Storage Lengths are based on opposing volume of 100 VPH (MINIMUM)**
- **S=STORAGE LENGTH REQUIRED**

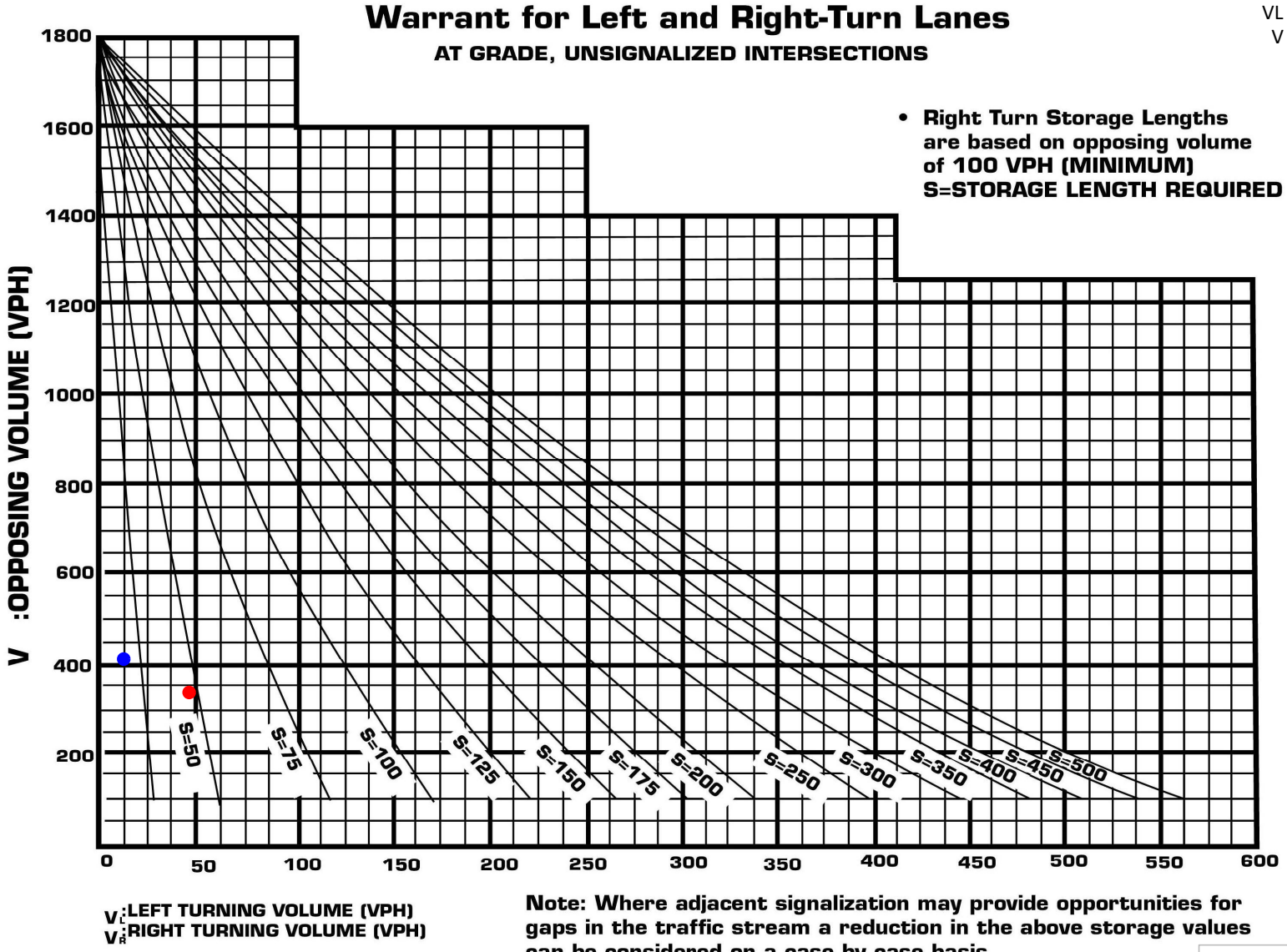
V_L: LEFT TURNING VOLUME (VPH)
V_R: RIGHT TURNING VOLUME (VPH)

Note: Where adjacent signalization may provide opportunities for gaps in the traffic stream a reduction in the above storage values can be considered on a case by case basis.

LEGEND
● = AM Peak
● = PM Peak

Site Driveway #3 / Forestville Road
Eastbound Right-Turn
2028 AM and PM Peak Hours

AM Peak Hour
VL = 13
V = 414
PM Peak Hour
VL = 47
V = 340

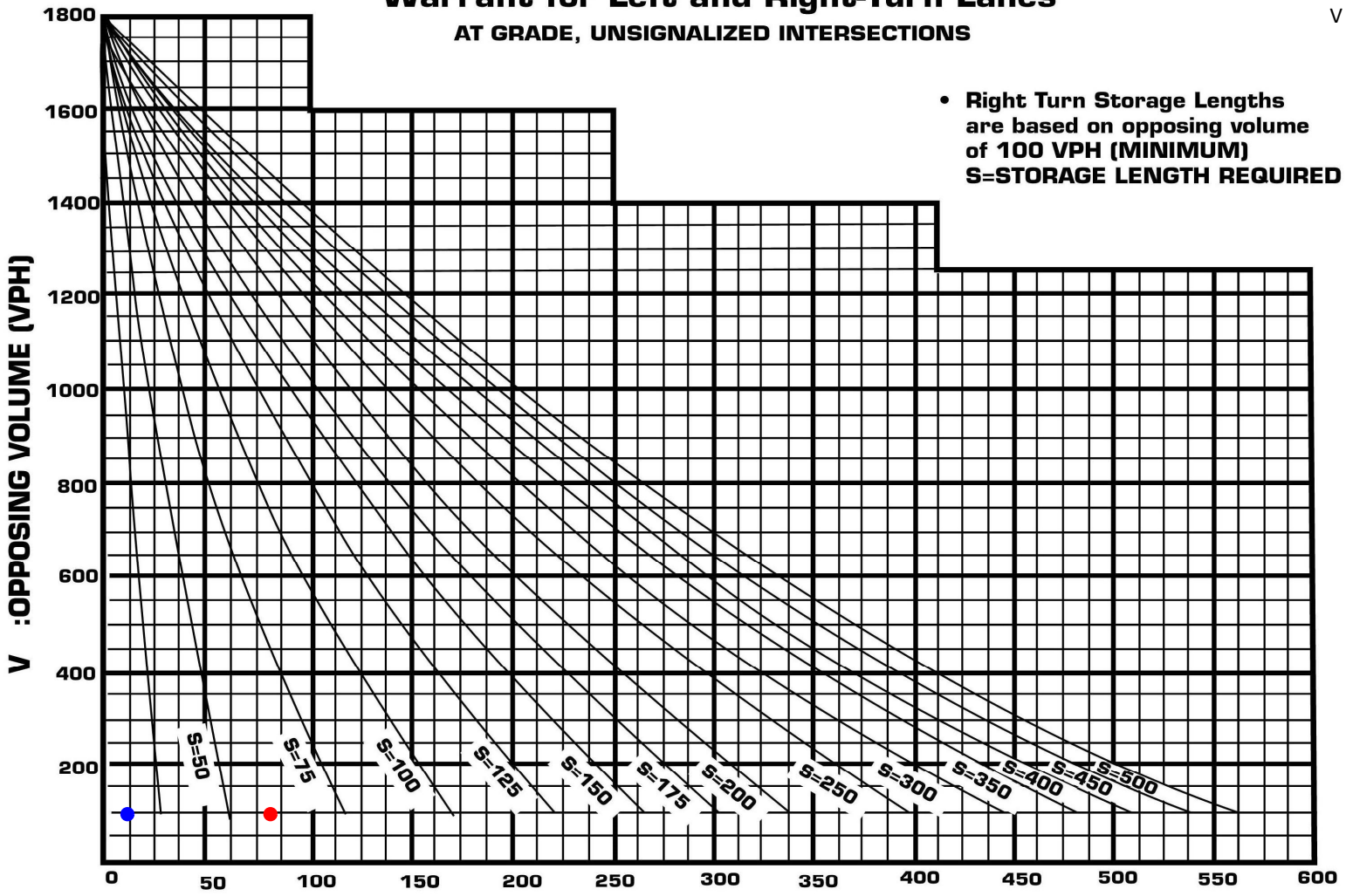


Site Driveway #3 / Forestville Road
Westbound Left-Turn
2028 AM and PM Peak Hours

AM Peak Hour
VL = 12
V = 100
PM Peak Hour
VL = 83
V = 100

Warrant for Left and Right-Turn Lanes

AT GRADE, UNSIGNALIZED INTERSECTIONS



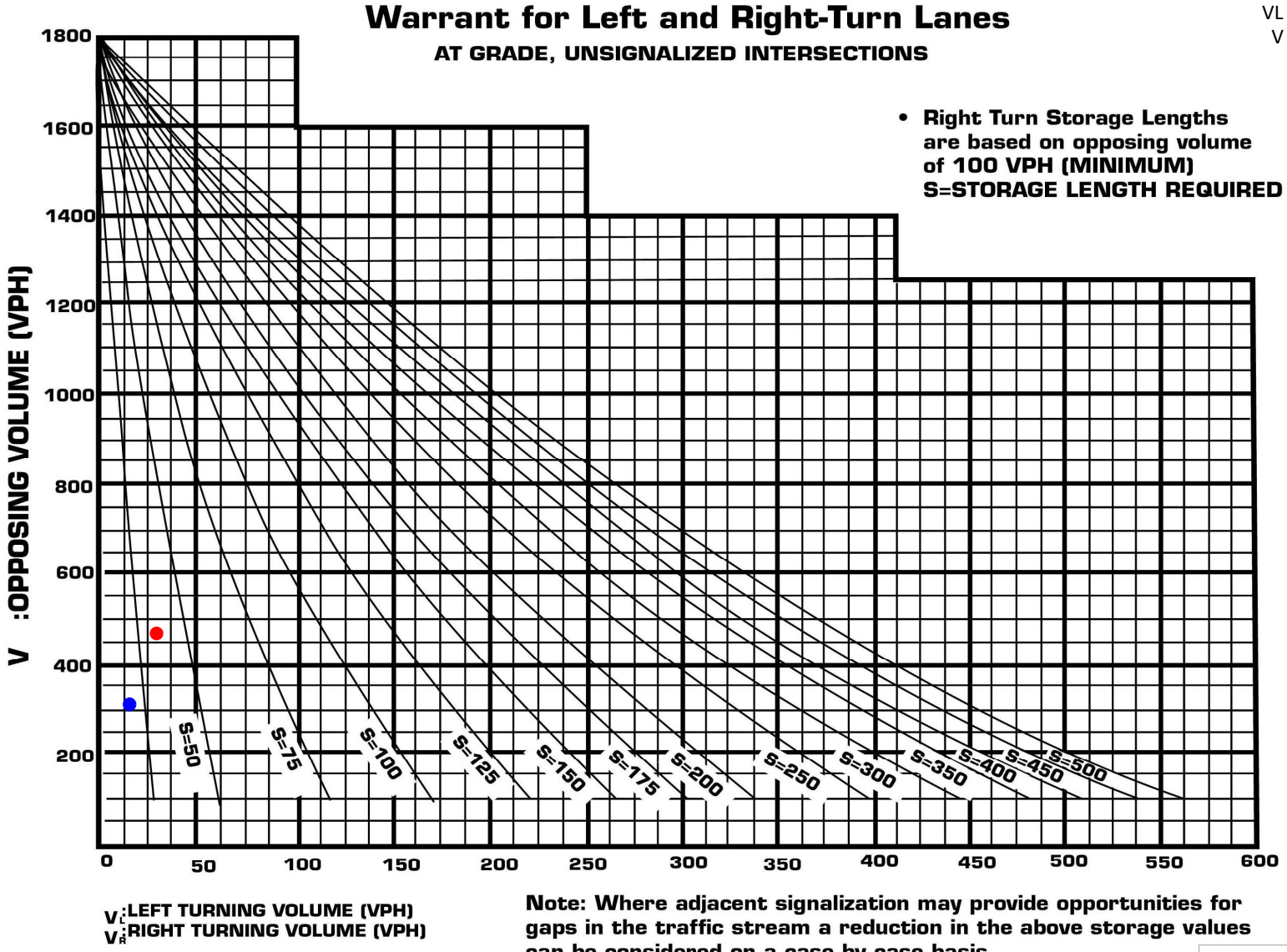
V_L: LEFT TURNING VOLUME (VPH)
V_R: RIGHT TURNING VOLUME (VPH)

Note: Where adjacent signalization may provide opportunities for gaps in the traffic stream a reduction in the above storage values can be considered on a case by case basis.

LEGEND
● = AM Peak
● = PM Peak

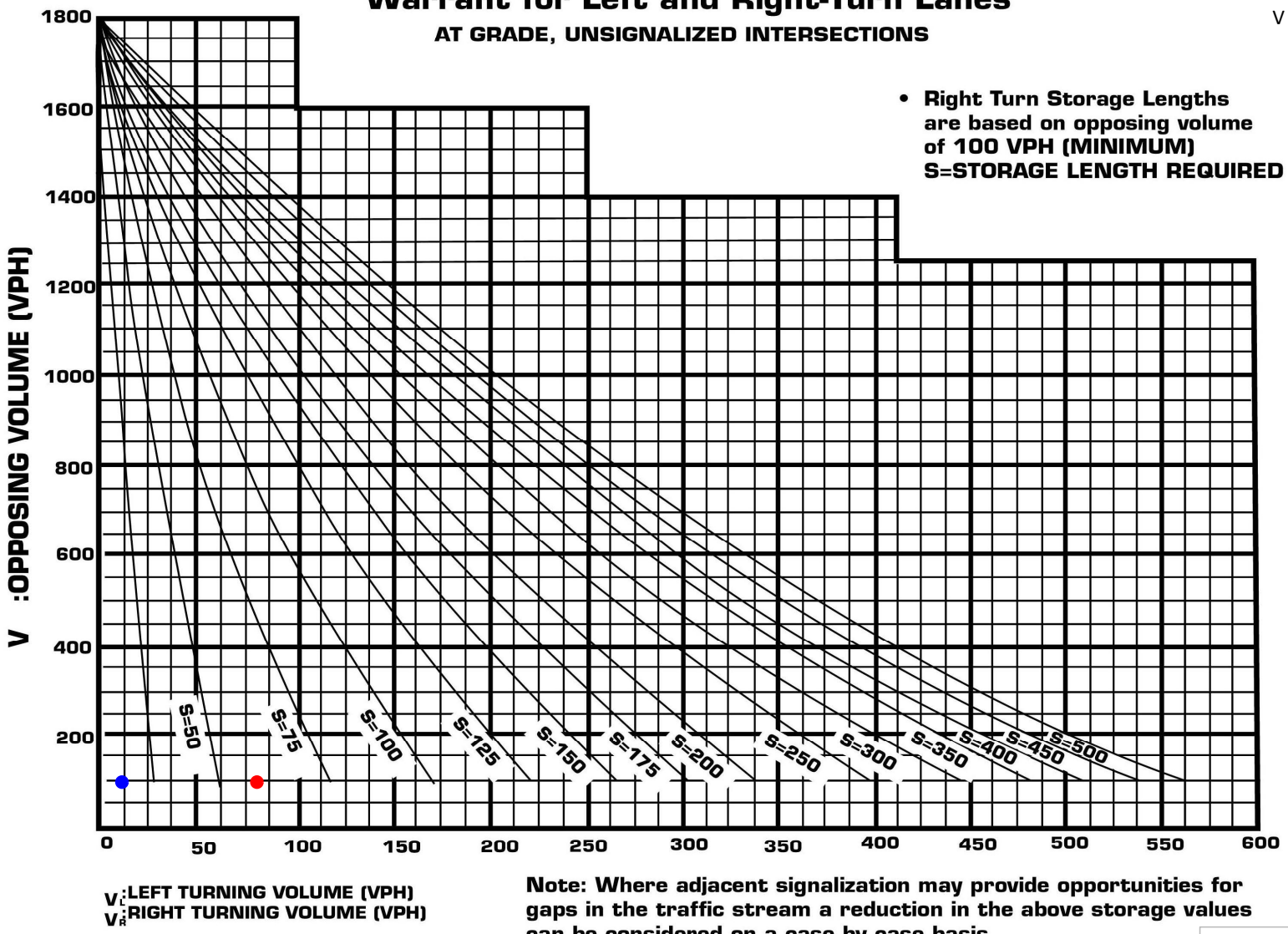
Old Milburnie Road / Site Driveway #1
Northbound Right-Turn
2028 AM and PM Peak Hours

AM Peak Hour
VL = 16
V = 313
PM Peak Hour
VL = 30
V = 471



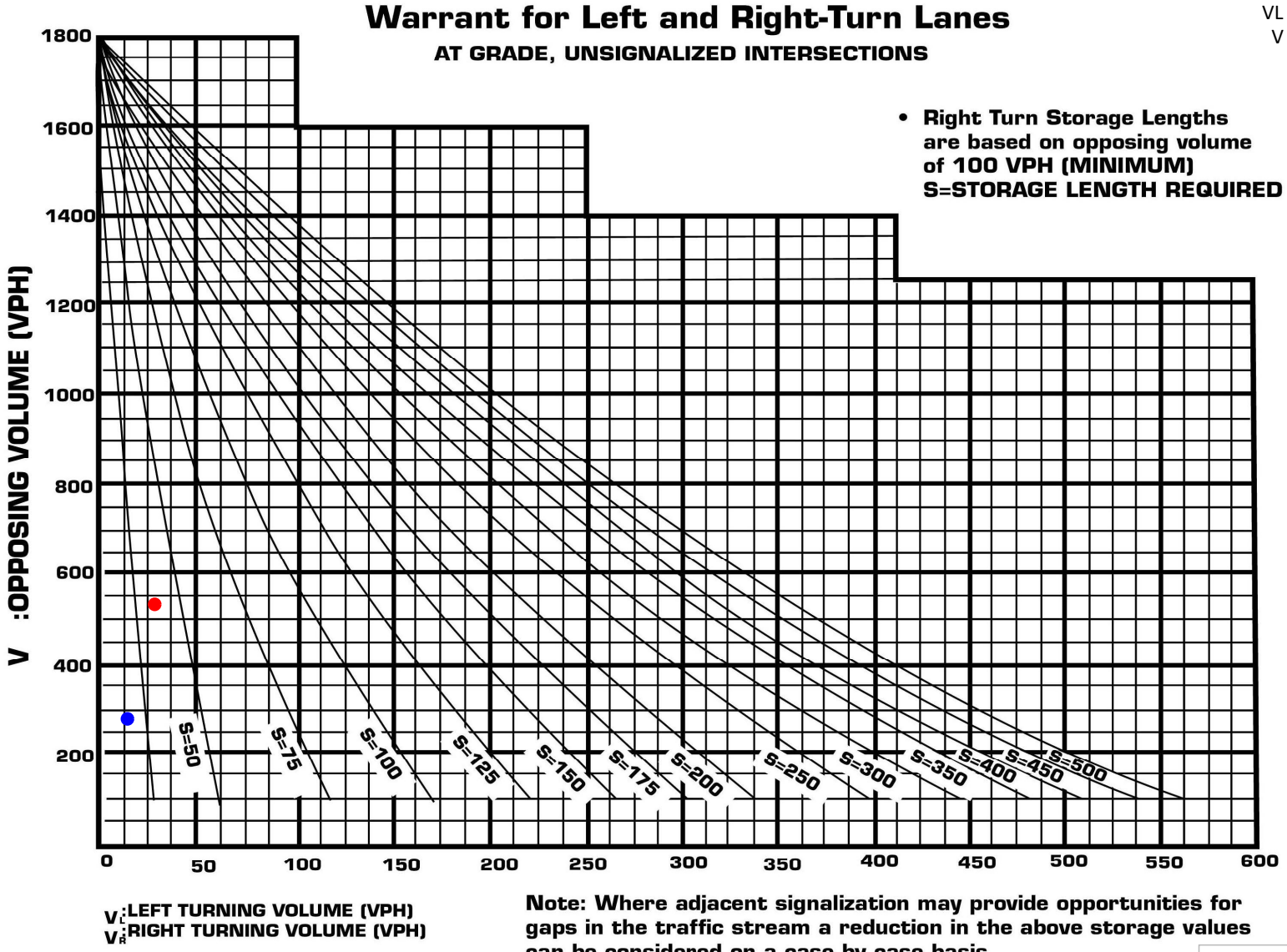
Old Milburnie Road / Site Driveway #1
Southbound Left-Turn
2028 AM and PM Peak Hours

AM Peak Hour
VL = 12
V = 100
PM Peak Hour
VL = 82
V = 100



Old Milburnie Road / Site Driveway #2
Northbound Right-Turn
2028 AM and PM Peak Hours

AM Peak Hour
VL = 15
V = 281
PM Peak Hour
VL = 29
V = 536



Old Milburnie Road / Site Driveway #2
Southbound Left-Turn
2028 AM and PM Peak Hours