APPENDIX A

Framework Document

Framework Document

US 29 Arterial Preservation Plan

1. Stakeholder Acceptance

The undersigned parties from VDOT Central Office, Lynchburg District, Campbell County, Pittsylvania County, City of Danville, and City of Lynchburg concur with the methods and assumptions for the US 29 Arterial Preservation Plan.

VDOT (Lynchburg District):

_____
Signature

_____
Printed Name

_____
Title

_____
Date

VDOT (Central Office):

_____
Signature

_____
Printed Name

_____
Title

_____
Date

Campbell County:

_____
Signature

_____
Printed Name

_____
Title

_____
Date

Pittsylvania County:

_____
Signature

_____
Printed Name

_____
Title

_____
Date

City of Danville:

_____
Signature

_____
Printed Name

_____
Title

_____
Date

City of Lynchburg:

_____
Signature

_____
Printed Name

_____
Title

_____
Date

1. *Participation on the Study Team and/or signing of this document does not constitute approval of the US 29 Arterial Preservation Plan.*
2. All members will use this document as a guide and reference as the study progresses through the various stages of project development. If there are any agreed upon changes to the assumptions in this document, a revised document will be prepared and signed by the parties who originally signed it.

2. Introduction and Project Description

The Virginia Department of Transportation (VDOT) initiated the development of the Arterial Preservation Program (APP) in the spring of 2017. The purpose of the APP is to preserve and enhance capacity and safety along the Arterial Preservation Network, while ensuring that:

- Mainline through traffic is served with priority
- Future land use and economic development is supported
- Access points and traffic control do not degrade travel speed and safety
- Safety is improved

A toolbox of preservation and enhancement strategies will be deployed on APP corridors to improve the existing conditions in the corridor and progress future planning efforts. As an alternative to traditional widening to increase capacity, preservation and enhancement strategies promote innovative transportation solutions to minimize delays for through traffic and improve safety while considering local economic development goals.

Arterial Preservation Plans are developed for Arterial Preservation Network (APN) corridors to implement the following preservation and enhancement strategies:

- Integrate program priorities with local economic development goals
- Improve access management
- Educate community on the benefits of improved mobility
- Inspire comprehensive, transportation and zoning planning efforts
- Eliminate unwarranted traffic signals
- Implement innovative intersection configurations

The APN includes segments of selected facilities that are part of the VDOT Corridors of Statewide Significance (CoSS) system or are functionally classified as Principal or Other Principal Arterials. These highway facilities are needed for statewide connectivity, which is critical for economic development. The *proposed* APN is pending adoption into VTrans2040 by the Commonwealth Transportation Board (CTB).

The roadway segments selected for the APN are categorized into two types, Mobility Preservation Segments (MPS) and Mobility Enhancement Segments (MES). MPSs are segments of arterial roadways outside urban areas that serve a critical mobility function without parallel interstate facilities. MESs are segments of arterial roadways within urban areas with a proliferation of commercial entrances and traffic signals where there are potential opportunities to improve traffic flow without roadway widening. US 29, south of the City of Lynchburg, is classified as a MPS where the focus is to preserve the mobility by minimizing the delays of through traffic when changes are proposed. US 29 serves as a pilot plan within the APP.

3. Purpose and Need

US 29 is designated as a CoSS that connects North Carolina to Washington, D.C. through Virginia as a mostly rural corridor through mountainous terrain. Given the operational significance of the corridor, the purpose of this plan is to perform a high-level review of US 29 and identify improvements to preserve and enhance capacity and safety along the corridor.

4. Study Team

The Study Team will consist of representatives from the following entities:

- VDOT Central Office
- VDOT Lynchburg District
- VDOT Halifax Residency
- Campbell County
- Pittsylvania County
- City of Danville
- City of Lynchburg
- Liberty University
- Region 2000 Local Government Council
- West Piedmont Planning District Commission
- Kimley-Horn

Expected Roles and Responsibilities

Study Team

The responsibilities of the Study Team include the following:

- Study Team members are anticipated to participate in the study meetings, either in person or remotely, throughout the development of the US 29 APP process.
- Kimley-Horn, VDOT Central Office, and VDOT District staff will conduct in-person meetings with the Study Team throughout the study process.
- All relevant data (e.g., historical or current traffic volumes, land use plans and maps, traffic impact analyses, site plans, comprehensive plans, etc.) pertaining to the study area and not previously collected as part of the data collection effort outlined in **Section 5.0** should be provided to Kimley-Horn.
- Study Team members will be involved in the development and review of study elements (e.g., segmentation, growth rate development, land use assumptions, etc.) throughout the study process.
- The Study Team will develop alternatives and recommendations based on project traffic volumes and land use along the corridor. Study Team members are anticipated to review and provide comments on the alternatives and recommendations.
- At the conclusion of the study, the Study Team is anticipated to review and comment on the draft report.

5. Project Study Area

The US 29 APP study area consists of US 29 from Route 719 (Lawless Creek Road/E Witt Road) to US 460 (approximately 46 miles). Given the length of the US 29 corridor, corridor segmentation and identification of emerging intersection methodologies were applied to identify the level of review and areas of focus along US 29.

6. Corridor Segmentation and Emerging Intersections

The first step of the corridor segmentation and emerging intersection methodology consists of data collection. The data collection effort included compilation and synthetization of the following VDOT data sources along the corridor:

Traffic Monitoring System (TMS)

- Average daily traffic (ADT)

Crash Data from the VDOT Roadway Network System (RNS)

- 2012 – 2016 crash data (fatal or severe injury crashes)

Statewide Planning System (SPS)

- Jurisdiction
- Area type
- Posted speed limit
- Terrain
- Heavy vehicle percentage
- Number of through lanes
- Median width
- Right shoulder width
- Left shoulder width

Access Point and Intersection Inventory System

- Access direction
- Access control (interchange, signalized, unsignalized, roundabout, midblock median access, right-in/right-out, right-in only, right-out only, RCUT, partial RCUT, left-in/right-in/right-out)
- Turn lane presence
- Cross streets
- Number of approaches
- Land use and level of activity (residential, commercial retail, industrial, government/school/ institutional)

2016 Strategically Targeted Affordable Roadway Solutions (STARS) MapPack

- Potential for safety improvement (intersections and segments)
- Travel time index
- Duration of congestion
- Volume-to-capacity ratio

LandTrack and Land Use Permitting System (LUPS)

- Site plans
- Traffic impact analysis (TIAs)
- Project narratives

Online Web Searches

- Jurisdiction comprehensive plans
- Jurisdiction zoning plans
- Jurisdiction land use plans
- Relevant traffic studies or plans

Corridor Segmentation Methodology

Based on the data collection effort, the US 29 corridor was divided into three segment types based on the following characteristics.

- *Developed:* Segments that have an existing concentration of residential, commercial, manufacturing, and industrial land development. These segments have a higher density of existing access points and often include a series of signalized intersections. The planning goal in these segments is to improve the efficiency and safety of the segment through retrofit strategies by eliminating unwarranted traffic signals, improving access management spacing, modifying the design of existing median openings, and exploring innovative intersection configurations.

- *Emerging:* Segments that have active development or high potential for increased development within the next 5 to 10 years. These segments are often adjacent to developed segments or are adjacent to segments where limited-access designations terminate. The planning goal in these segments is to develop a corridor management strategy to maintain and protect the efficiency of the segment while promoting and facilitating local economic development goals.

- *Stable:* Segments that may experience sporadic development but the land use is expected to remain consistent over the long term. These segments often traverse between developed and emerging segments. The planning goal in these segments is to

preserve the efficiency of the segment by promoting improved access management spacing and identifying spot intersection improvements.

Following input from the Study Team on the preliminary corridor segmentation, the corridor segmentation was finalized and is shown in **Table 1**.

Emerging Intersections Methodology

Emerging intersections are existing or future intersections with safety, operational, or congestion issues, or are expected to see an increase in traffic demand due to planned or active development on the intersecting route. In addition to the corridor segmentation, emerging intersections were identified using the following data:

- Signalized intersection
- PSI intersection
- Junction of two primary routes
- Minor street ADT ≥ 10% of major street ADT
- Fatal and severe injury crashes
- Intersections that may experience heavy increases in traffic due to future development
- Park & Ride investment strategy intersections
- VDOT Central Office and District input

The preliminary list of emerging intersections was further narrowed based on the following criteria:

- Signalized intersection
- PSI intersection rank ≤ 100
- Previous study recommendations
- Adjacent to future development

Following input from the Study Team on the preliminary emerging intersections and further analysis, the emerging intersection list was finalized and is shown in **Table 2**.

Table 1: US 29 Corridor Segmentation

Segment Number	Segment Limits	Segment Category
1	500' south of Route 719 (Lawless Creek Road/E Witt Road) to 500' north of Deerwood Drive	Emerging
2	500' north of Deerwood Drive to 500' south of Route 718 (Dry Fork Road/Snakepath Road)	Stable
3	500' south of Route 718 (Dry Fork Road/Snakepath Road) to US 29/US 29 BUS Junction south of Chatham	Emerging
4	US 29/US 29 BUS Junction north of Chatham to Railroad crossing north of Dual Tracks Road	Emerging
5	Railroad crossing north of Dual Tracks Road to US 29/US 29 BUS Junction south of Gretna	Stable
6	US 29/US 29 BUS Junction north of Gretna to US 29/US 29 BUS Junction south of Hurt	Stable
7	US 29/US 29 BUS Junction north of Altavista to Phillips Lane	Stable
8	Phillips Lane to 500' south of Route 738 (English Tavern Road)	Emerging
9	500' south of Route 738 (English Tavern Road) to US 29/US 460 Interchange	Developed

Table 2: US 29 Emerging Intersections

Intersection Number	Emerging Intersection	Traffic Control	PSI Rank ≤ 100
1	US 29 BUS at Route 719 (Lawless Creek Road/E Witt Road)	Signalized	-
2	US 29 BUS at Route 726 (Malmaison Road)	Signalized	-
3	US 29 at Route 703 (Fairview Road/Tight Squeeze Road)	Signalized	-
4	US 29 at Route 699 (Gladys Road)	Unsignalized	54
5	US 29 at Route 24 (Colonial Highway)	Signalized	-
6	US 29 at Route 685 (Calohan Road)	Signalized	24
7	US 29 at Route 738 (English Tavern Road - North Drive)	Signalized	-

7. Emerging Intersection Analysis

Data Collection and Field Observations

Turning movement count data will be used from the data collection effort conducted during the segmentation and emerging intersection process if the data was collected within the past three years. It is assumed that traffic volume data will be collected from 6:00 AM to 6:00 PM at the following locations:

1. Route 719 (Lawless Creek Road/E Witt Road)
2. Route 699 (Gladys Road)
3. Route 726 (Malmaison Road)
4. Route 703 (Fairview Road/Tight Squeeze Road)
5. Route 24 (Colonial Highway)
6. Route 685 (Calohan Road)
7. Route 738 (English Tavern Road - North Drive)

Kimley-Horn will conduct field observations, requiring two people, during one AM and one PM peak period to observe and identify existing traffic operational and safety deficiencies at the emerging intersections listed in

Table 2.

Existing Conditions Analysis

Kimley-Horn will evaluate and document existing traffic operations, geometric, and safety conditions at the US 29 emerging intersections listed in **Table 2**. These results will be used as a basis of comparison against future year scenarios. The base year for analysis will be 2017. The peak periods for analysis consist of a morning (AM) and evening (PM) peak hour.

The traffic operations analysis will be accomplished using the Synchro analytical software tool. All inputs and analysis methodologies will be consistent with VDOT *Traffic Operations and Safety Analysis Manual* (TOSAM), Version 1.0. Delay and 95th percentile queue length from Synchro Professional (Version 9) for stop-controlled and signalized intersections will be the measures of effectiveness (MOEs). If necessary, delay and 95th percentile queue length will be obtained from SIDRA for roundabout evaluations.

A crash summary table will be created for each emerging intersection that examines the crash type and severity by year.

Travel Forecast

Kimley-Horn will use traffic growth rates provided by VDOT TMPD based on the Statewide Planning System (SPS) to develop forecasts for the horizon year of 2040. Kimley-Horn will create traffic volume figures depicting emerging intersection no-build forecasts, illustrating average daily traffic, AM and PM peak hour volumes, and truck percentages. Traffic forecasts will be submitted to VDOT for review prior to any analysis being performed.

No-Build Conditions Analysis

Kimley-Horn will evaluate the future 2040 no-build volumes with the traffic analysis tools and MOEs identified in the existing conditions analysis section. The peak periods for analysis consist of a morning (AM) and evening (PM) peak hour.

Development of Potential Alternatives

Kimley-Horn, in collaboration with the Study Team, will identify traffic operations, geometric, maintenance, and safety deficiencies based on observations during the field review and the existing and no-build conditions traffic operations analyses. Kimley-Horn will develop a list of up to two potential improvements at each emerging intersection. These improvements will fall under one of two categories:

- Intersection capacity improvements
- Innovative intersection improvements – Kimley-Horn will use VJuST and Synchro 9 to determine if innovative intersections should be considered at existing emerging intersections

Alternative Screening and Build Conditions Analysis

Kimley-Horn and the Study Team will evaluate the list of potential improvements to determine which improvements should be evaluated using Synchro 9 during the screening process. Kimley-Horn will consider a maximum of two intersection improvements at each emerging intersection, one of which may be innovative intersection improvements.

Kimley-Horn will use the no-build AM and PM peak hour Synchro models as the basis for the development of the 2040 build Synchro models. The preferred improvements identified and agreed upon by the Study Team will be included in the future build conditions analysis. Kimley-Horn will perform peak hour build traffic operations analyses using Synchro 9 and will summarize the AM and PM peak hour traffic operations results in tabular and depictive formats.

Improvement Summary Sheets

Concept drawings and cost estimates will be developed for improvements analyzed in the future build conditions analysis. Concept drawings will be illustrated on aerial imagery. Engineering, permitting, and utility relocation will be approximated based on GIS and available survey information. Cost estimates will be completed using unit costs and PCES.

Kimley-Horn will create project summary sheets for up to 7 improvement scenarios. The project summary sheets will consist of a brief description of the proposed improvement, a planning level cost estimate, and a planning level schedule estimate. For geometric improvements, the project summary sheets will also consist of a graphic showing the proposed improvements.

8. Access Management and Safety Review

Access Management Spacing Review

Kimley-Horn will review the existing access management spacing to identify access management improvements such as full or partial closures to median openings throughout the study corridor relying only on spacing standards. Improvements to access management spacing will be noted as needing additional analysis. If innovative intersection solutions are proposed, a

geometric review will be conducted to identify the feasibility of U-turns at adjacent intersections prior to conducting safety and traffic operations analysis on the proposed recommendations.

Corridor-wide Safety Review

A review of existing rumble strips, pavement markings, signing, and guard rail will be conducted to identify potential systemic safety improvements along the study corridor.

9. Implementation Plan

An implementation plan will be developed for the study corridor based on the review of all the data collected as part of the US 29 Arterial Preservation Plan. The purpose of this plan is to ensure capacity and safety along US 29 is preserved and enhanced by guiding current and future land planning and development decisions made by VDOT, localities, and developers.

The improvements will be classified into the following implementation categories:

- Improvements recommended for advancement
- Ability to apply for funding
- Segments and intersections recommended for further study
- Proceed to a Strategically Targeted and Affordable Roadway Solutions (STARS) study
- Proceed to conceptual design and cost estimation
- May require additional data and analysis
- Jurisdiction planning efforts
- Adoption of US 29 Arterial Preservation Plan by jurisdictions
- Update jurisdiction comprehensive plans
- Policy updates
- Public outreach efforts
- Identify additional public outreach needs

10. Public Outreach

VDOT and the jurisdictions will be responsible for planning and implementing public outreach meetings. Kimley-Horn will assist in the development of the public outreach materials consisting of presentation, graphics, and pamphlets/brochures deemed necessary to conduct the meeting.

11. Guiding Documents

The information contained in this Framework Document is not to preclude the policies that are contained in the documents listed below:

VDOT Traffic Operations and Safety Analysis Manual (TOSAM), Version 1.0
http://www.virginiadot.org/business/resources/TOSAM.pdf

VDOT I&IM TMPD-2.0 – Process for Conducting Planning Studies on the Arterial Preservation Network – dated July 13, 2017
http://www.virginiadot.org/Corridor_Planning_Studies-_Arterial_Management_Plans.pdf

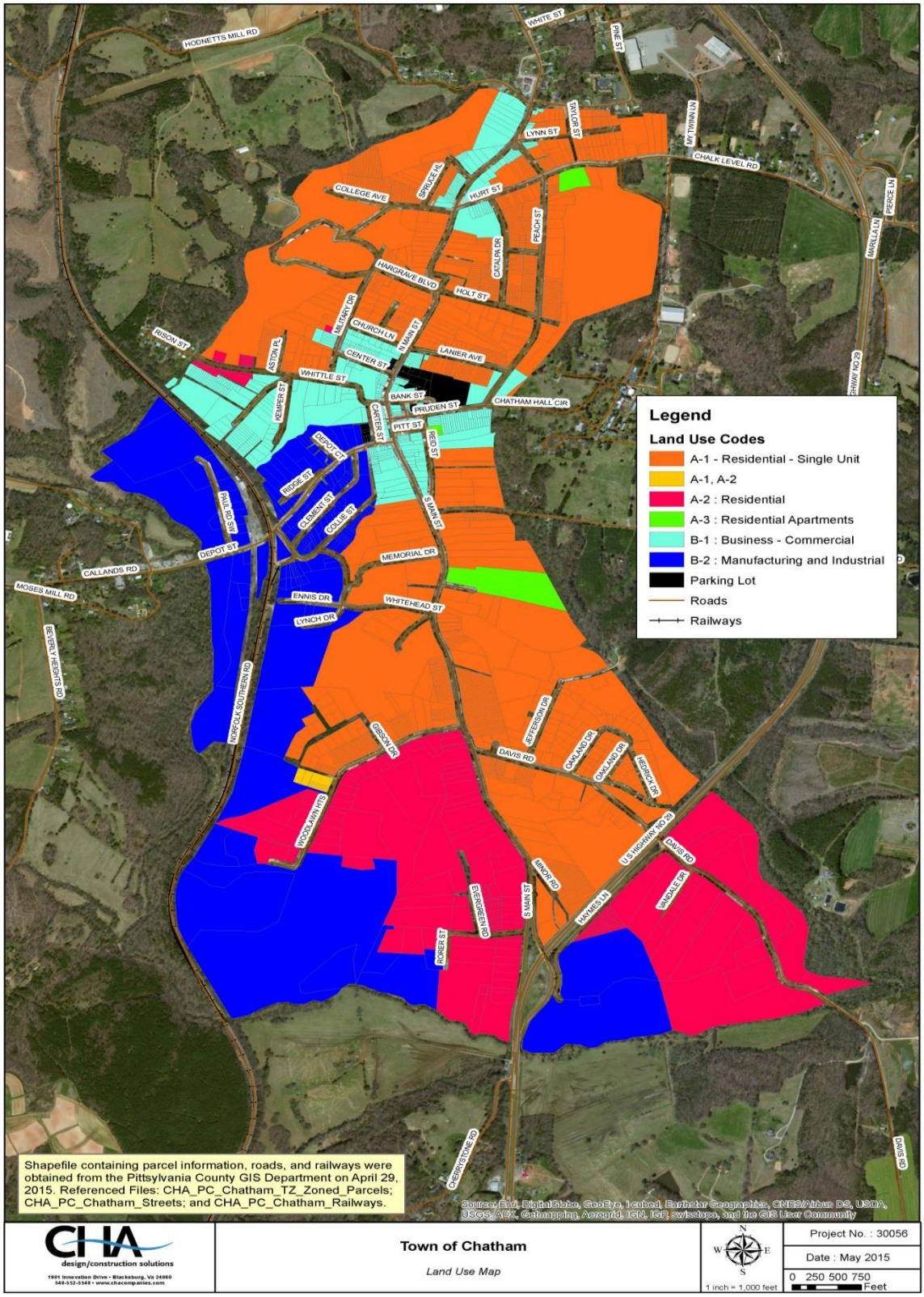
VDOT Road Design Manual – dated July 2017

http://www.extranet.vdot.state.va.us/locdes/Electronic_Pubs/2005%20RDM/roaddesigncovervol.pdf

APPENDIX B

Existing and Future Land Use

Appendix I: Zoning Map



Land Use Map
2014 - 2029
Adopted 12/2/2014

Legend

Facility Site Points

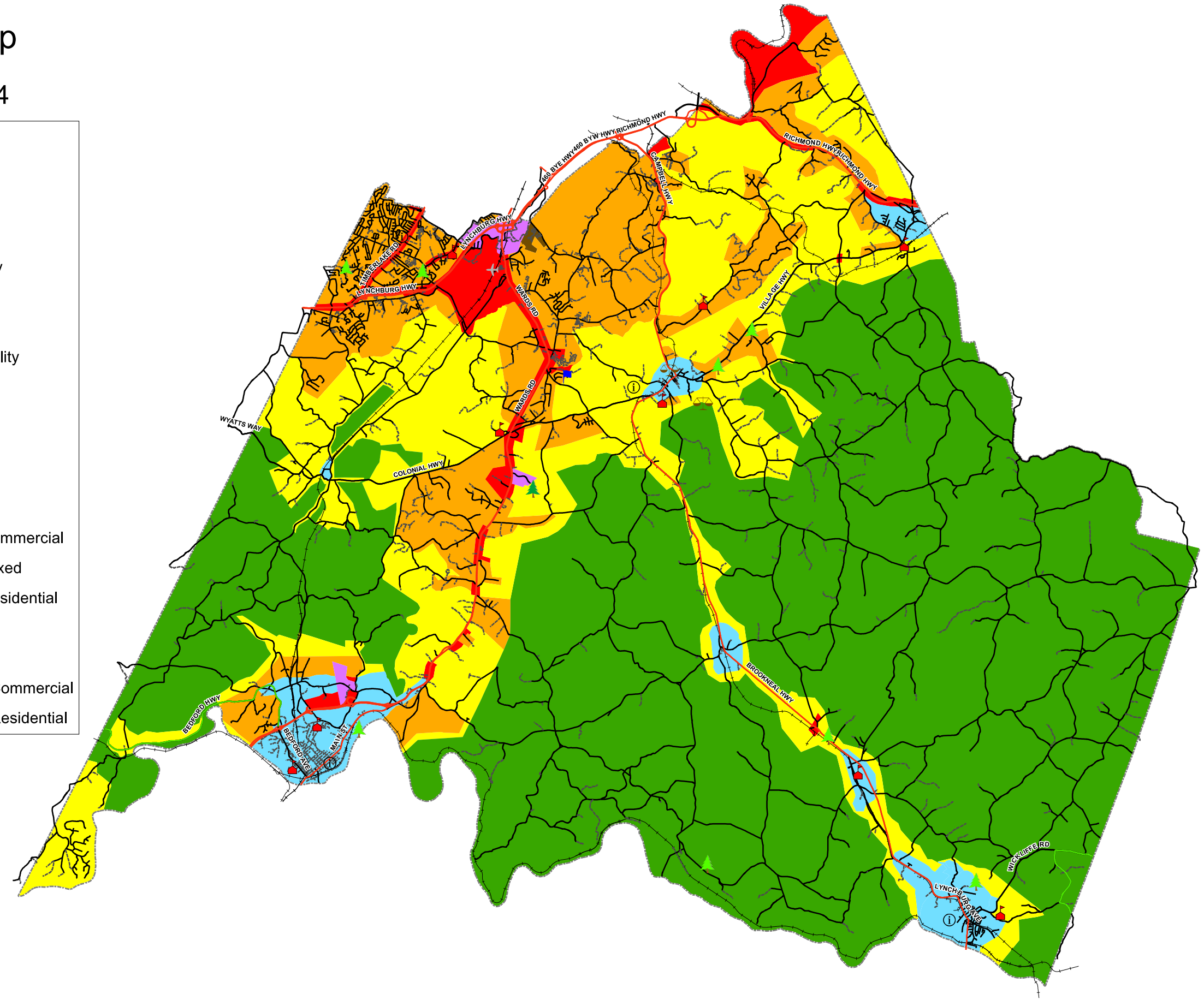
Landmarks

- Airport Terminal
- County Government Facility
- Landfill
- Library
- Municipal Government Facility
- Park
- Elementary School
- Middle/High School

LandUse

Land Use Description

- Medium to High Density Commercial
- Medium to High Density Mixed
- Medium to High Density Residential
- Rural
- Transitional
- Urban Development Area Commercial
- Urban Development Area Residential



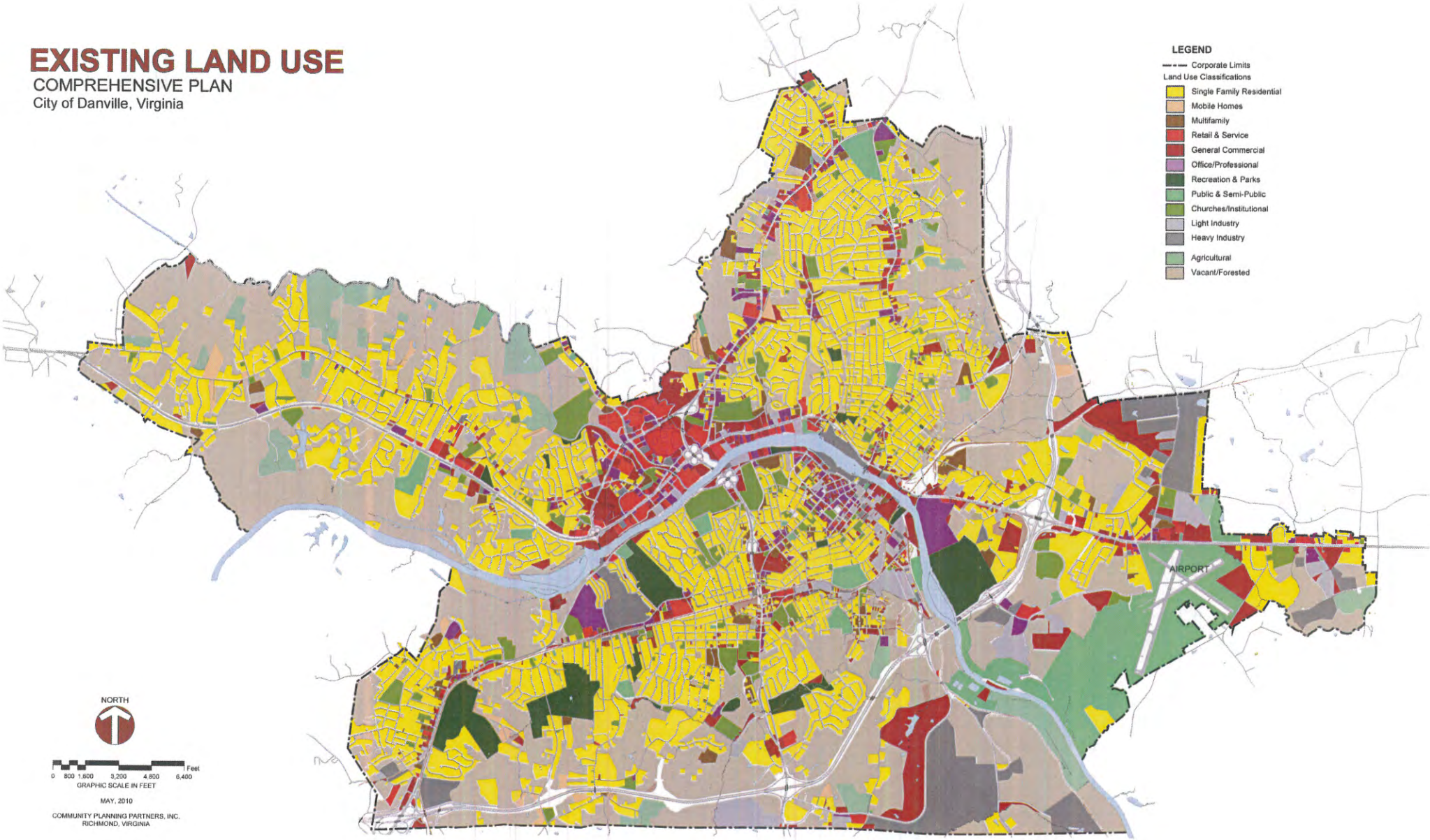
N

0 2.5 5 10 15 20 Miles

EXISTING LAND USE

COMPREHENSIVE PLAN

City of Danville, Virginia



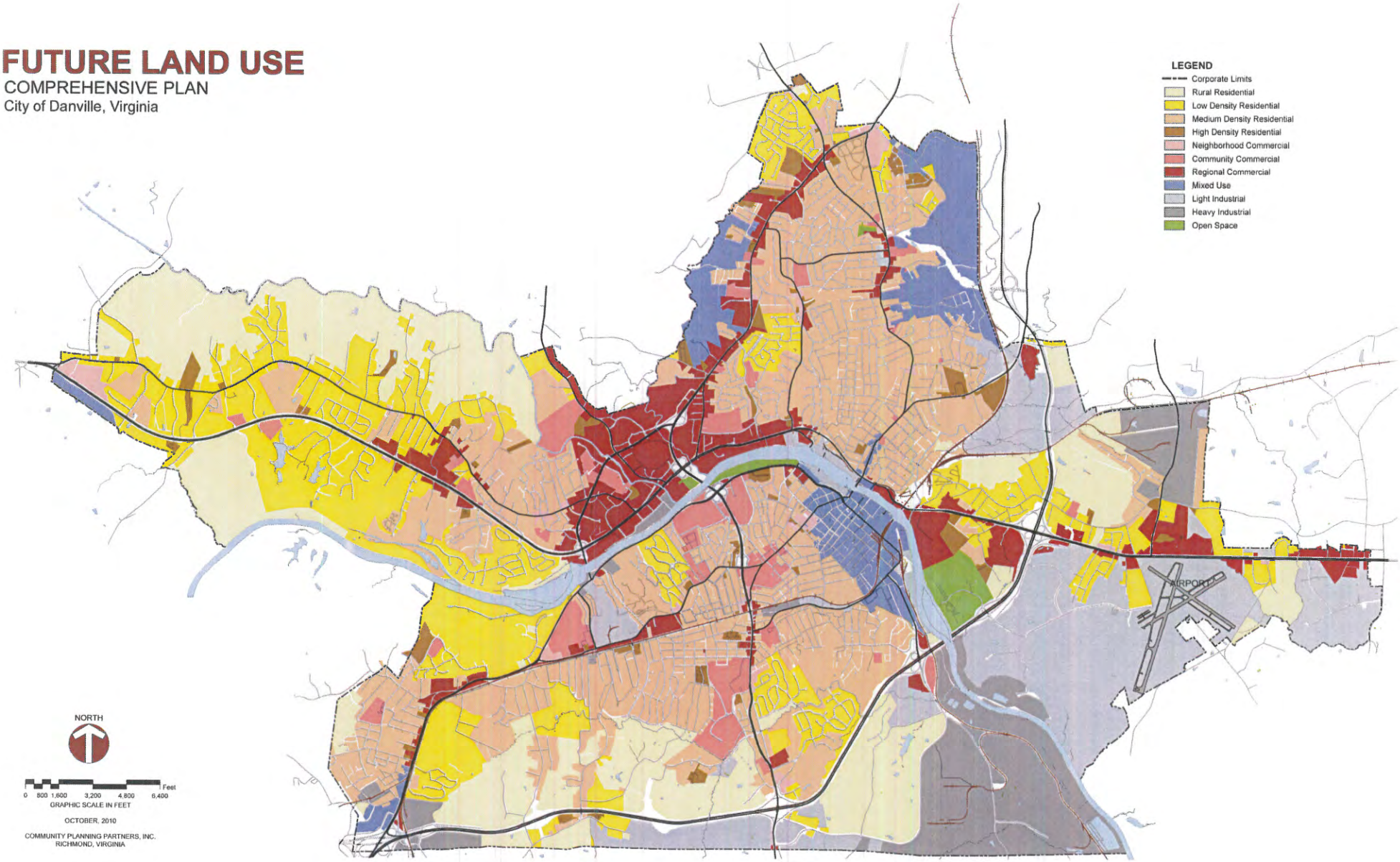
MAY, 2010

COMMUNITY PLANNING PARTNERS, INC.
RICHMOND, VIRGINIA

FUTURE LAND USE

COMPREHENSIVE PLAN

City of Danville, Virginia

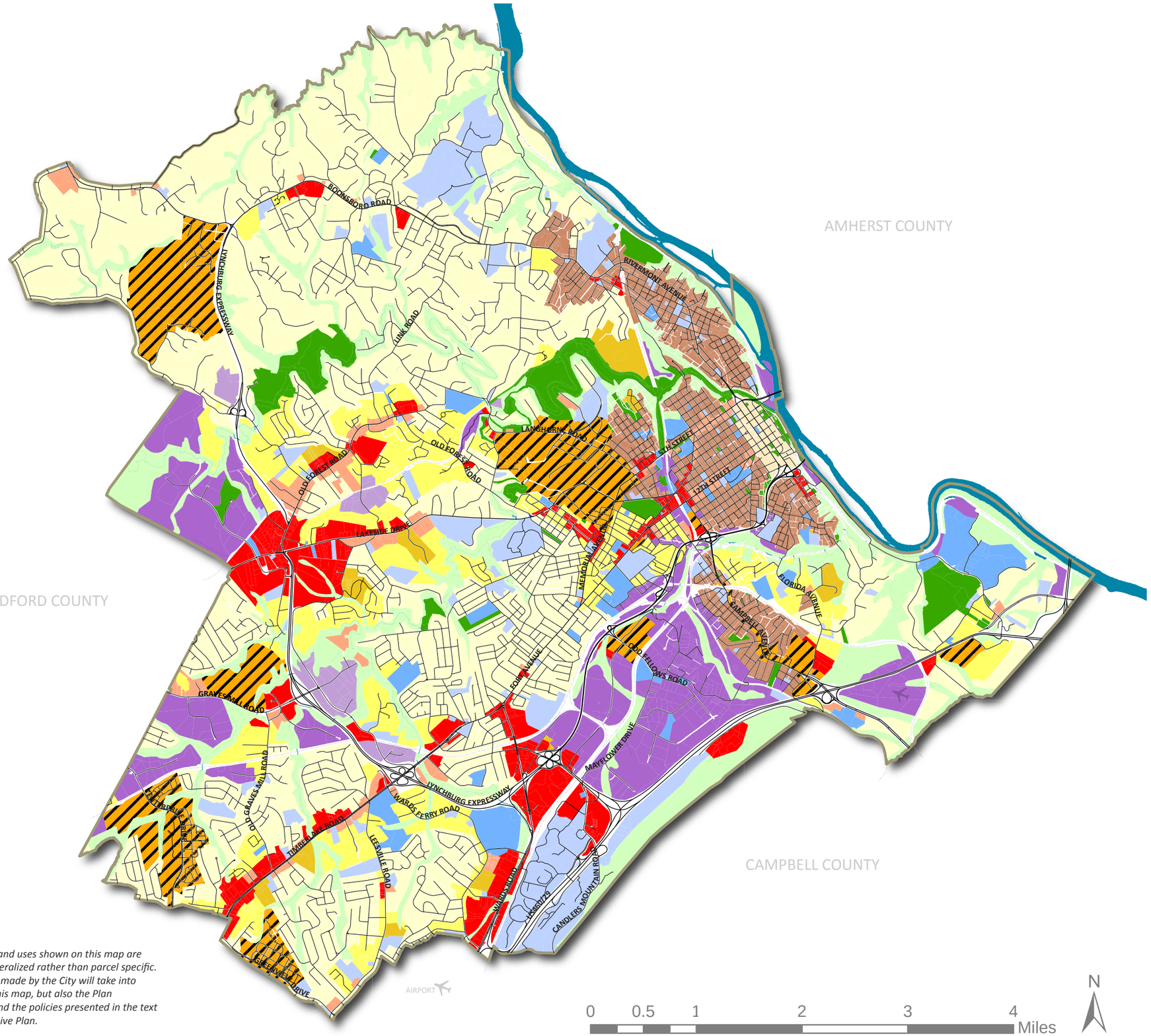


OCTOBER, 2010

COMMUNITY PLANNING PARTNERS, INC.
RICHMOND, VIRGINIA

Exhibit 6-3
Future Land Use Map (FLUM)

October 2013



Public Parks
Resource Conservation
Public Use
Institution
Downtown
Employment 1
Employment 2
Neighborhood Commercial
Community Commercial
Low Density Residential
Medium Density Residential
High Density Residential
Traditional Residential
Mixed Use
Corporate Limit

0 0.5 1 2 3 4 Miles

N

DISCLAIMER: The land uses shown on this map are intended to be generalized rather than parcel specific. Land use decisions made by the City will take into account not only this map, but also the Plan Framework Map and the policies presented in the text of the Comprehensive Plan.

Prepared by:
Department of Community Development
Planning Works

City of Lynchburg
COMPREHENSIVE PLAN
Planning for the Future 2013-2030

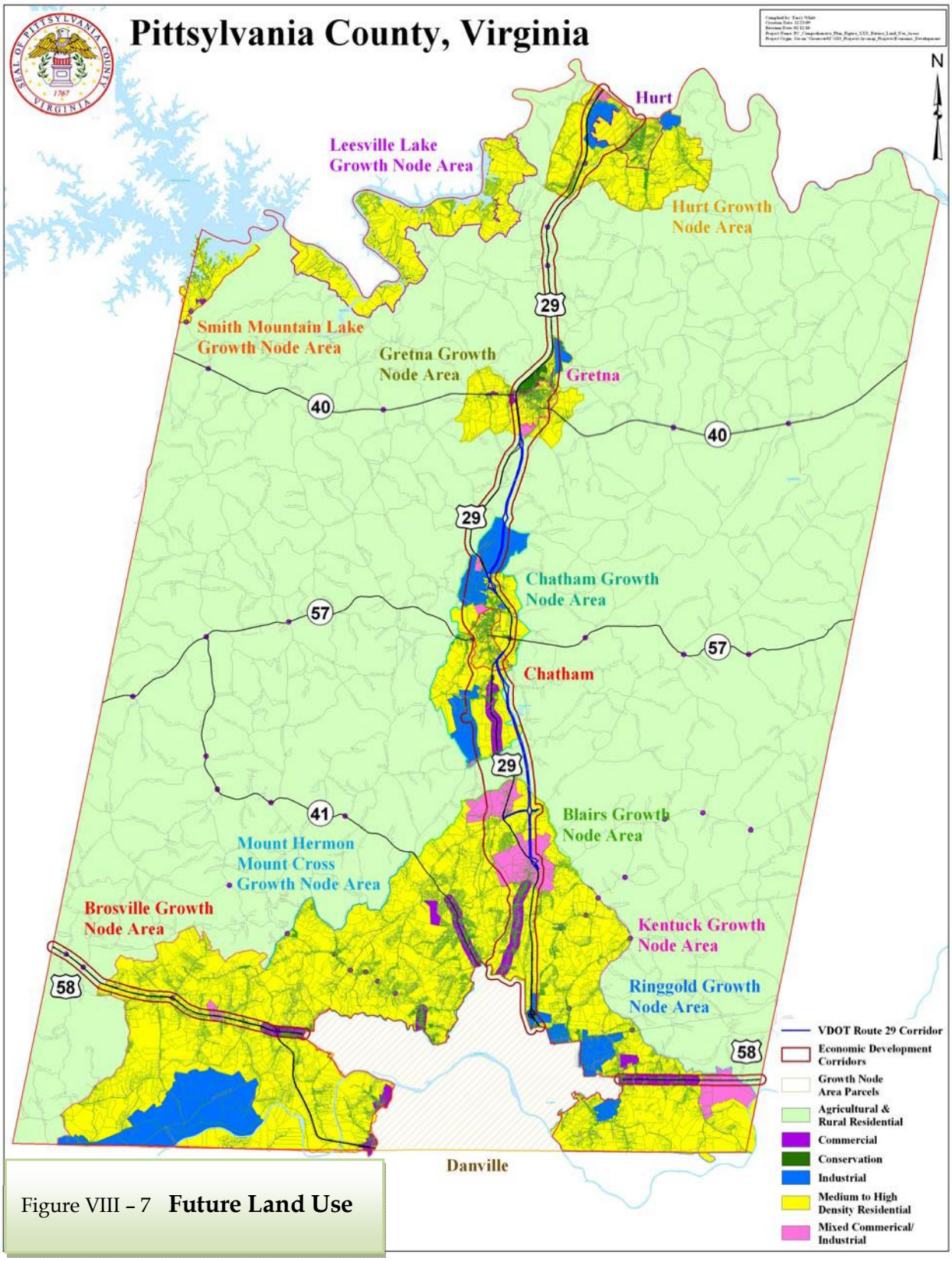


Figure VIII – 7 **Future Land Use**

APPENDIX C

Traffic Data

APPENDIX C-1

Turning Movement Counts

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	2	0	1	0	3	0	0	3	0	3	0	41	1	0	42	1	33	2	1	37	85
06:15 AM	1	0	3	0	4	2	0	10	0	12	0	41	0	0	41	1	34	0	0	35	92
06:30 AM	1	0	0	0	1	3	0	6	0	9	1	64	0	0	65	3	47	2	0	52	127
06:45 AM	1	2	3	0	6	1	0	6	0	7	0	45	3	0	48	3	59	1	0	63	124
Total	5	2	7	0	14	6	0	25	0	31	1	191	4	0	196	8	173	5	1	187	428
07:00 AM	7	0	2	0	9	2	1	5	0	8	4	40	3	1	48	0	73	6	1	80	145
07:15 AM	5	0	2	0	7	3	0	1	0	4	5	55	0	0	60	4	89	14	1	108	179
07:30 AM	4	0	5	0	9	3	5	7	0	15	15	65	2	1	83	2	115	23	1	141	248
07:45 AM	41	10	37	0	88	6	13	7	0	26	16	55	2	0	73	1	79	44	0	124	311
Total	57	10	46	0	113	14	19	20	0	53	40	215	7	2	264	7	356	87	3	453	883
08:00 AM	22	5	25	0	52	3	5	4	0	12	10	40	0	0	50	3	132	19	1	155	269
08:15 AM	3	1	6	0	10	2	2	5	0	9	4	45	2	0	51	9	115	7	1	132	202
08:30 AM	5	0	1	0	6	4	1	1	0	6	1	54	3	0	58	1	94	0	1	96	166
08:45 AM	3	1	3	0	7	5	1	8	0	14	3	56	2	0	61	2	91	0	0	93	175
Total	33	7	35	0	75	14	9	18	0	41	18	195	7	0	220	15	432	26	3	476	812
09:00 AM	2	1	2	0	5	2	0	1	0	3	2	42	2	0	46	3	71	3	1	78	132
09:15 AM	2	1	1	0	4	4	1	2	0	7	1	53	3	1	58	2	77	2	2	83	152
09:30 AM	2	1	0	0	3	5	1	3	0	9	2	52	2	1	57	5	104	0	0	109	178
09:45 AM	0	0	2	0	2	4	0	2	0	6	1	48	1	1	51	5	67	0	1	73	132
Total	6	3	5	0	14	15	2	8	0	25	6	195	8	3	212	15	319	5	4	343	594
10:00 AM	1	1	0	0	2	2	1	3	0	6	0	67	1	0	68	5	66	2	2	75	151
10:15 AM	3	0	3	0	6	0	1	4	0	5	3	64	2	1	70	4	84	5	0	93	174
10:30 AM	0	0	2	0	2	1	0	3	0	4	0	59	3	1	63	5	67	1	0	73	142
10:45 AM	2	1	2	0	5	2	0	3	0	5	2	74	2	1	79	1	62	6	1	70	159
Total	6	2	7	0	15	5	2	13	0	20	5	264	8	3	280	15	279	14	3	311	626
11:00 AM	2	0	2	0	4	4	1	8	0	13	1	60	2	1	64	3	78	5	1	87	168
11:15 AM	2	2	1	0	5	6	0	7	0	13	0	65	1	0	66	3	72	4	1	80	164
11:30 AM	1	1	0	0	2	3	0	2	0	5	3	64	2	1	70	2	84	2	0	88	165
11:45 AM	3	0	3	0	6	4	0	4	0	8	2	76	4	1	83	1	77	3	1	82	179
Total	8	3	6	0	17	17	1	21	0	39	6	265	9	3	283	9	311	14	3	337	676
12:00 PM	2	0	1	0	3	0	0	2	0	2	3	63	0	0	66	5	64	0	2	71	142
12:15 PM	4	1	1	0	6	1	0	4	0	5	0	68	2	0	70	2	64	3	0	69	150
12:30 PM	5	0	4	0	9	2	0	1	0	3	2	78	4	2	86	3	86	3	1	93	191
12:45 PM	3	0	0	0	3	3	0	4	0	7	2	77	2	1	82	9	81	6	0	96	188
Total	14	1	6	0	21	6	0	11	0	17	7	286	8	3	304	19	295	12	3	329	671
01:00 PM	8	0	2	0	10	5	1	2	0	8	0	90	2	0	92	5	77	7	1	90	200
01:15 PM	5	0	3	0	8	4	0	2	0	6	2	84	2	0	88	3	53	7	1	64	166
01:30 PM	5	0	3	0	8	2	0	4	0	6	2	80	1	1	84	5	80	1	0	86	184
01:45 PM	4	0	4	0	8	7	1	2	0	10	4	113	5	1	123	4	77	6	0	87	228
Total	22	0	12	0	34	18	2	10	0	30	8	367	10	2	387	17	287	21	2	327	778
02:00 PM	7	0	1	0	8	4	1	7	0	12	1	94	1	1	97	3	55	8	0	66	183
02:15 PM	8	2	3	0	13	2	1	2	0	5	5	87	2	1	95	7	83	10	1	101	214
02:30 PM	5	0	5	0	10	6	4	2	0	12	9	92	0	0	101	3	101	9	3	116	239
02:45 PM	14	5	6	0	25	4	0	5	0	9	13	96	4	1	114	4	91	16	2	113	261
Total	34	7	15	0	56	16	6	16	0	38	28	369	7	3	407	17	330	43	6	396	897
03:00 PM	33	8	22	0	63	3	1	5	0	9	7	93	3	2	105	6	92	14	1	113	290
03:15 PM	8	1	9	0	18	3	1	4	0	8	6	96	2	0	104	7	91	9	1	108	238
03:30 PM	5	1	5	0	11	3	4	6	0	13	4	123	6	1	134	5	139	10	1	155	313
03:45 PM	4	3	13	0	20	3	2	5	0	10	3	109	7	0	119	11	124	7	2	144	293
Total	50	13	49	0	112	12	8	20	0	40	20	421	18	3	462	29	446	40	5	520	1134
04:00 PM	15	2	9	0	26	8	0	4	0	12	5	86	6	2	99	5	106	2	1	114	251
04:15 PM	4	3	1	0	8	6	3	8	0	17	3	133	5	0	141	7	93	3	3	106	272
04:30 PM	5	3	4	0	12	5	1	4	0	10	3	103	7	1	114	3	86	1	2	92	228
04:45 PM	3	1	3	0	7	4	2	4	0	10	5	101	6	0	112	10	73	12	1	96	225
Total	27	9	17	0	53	23	6	20	0	49	16	423	24	3	466	25	358	18	7	408	976
05:00 PM	2	1	4	0	7	3	1	3	0	7	5	127	6	0	138	6	67	9	1	83	235
05:15 PM	4	3	5	0	12	3	2	8	0	13	3	153	4	0	160	9	89	6	1	105	290
05:30 PM	5	2	4	0	11	4	2	8	0	14	2	118	8	3	131	6	100	5	0	111	267
05:45 PM	4	0	1	0	5	8	3	4	0	15	6	124	3	0	133	5	78	8	2	93	246
Total	15	6	14	0	35	18	8	23	0	49	16	522	21	3	562	26	334	28	4	392	1038
06:00 PM	6	0	5	0	11	3	1	7	0	11	2	99	6	0	107	3	69	3	2	77	206
06:15 PM	3	0	5	0	8	2	1	13	0	16	4	84	4	1	93	10	79	9	3	101	218

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	10	1	9	0	20	4	3	9	0	16	3	88	0	3	94	7	53	6	0	66	196
06:45 PM	2	0	1	0	3	1	0	1	0	2	3	78	3	0	84	4	51	3	1	59	148
Total	21	1	20	0	42	10	5	30	0	45	12	349	13	4	378	24	252	21	6	303	768
Grand Total	298	64	239	0	601	174	68	235	0	477	183	4062	144	32	4421	226	4172	334	50	4782	10281
Apprch %	49.6	10.6	39.8	0		36.5	14.3	49.3	0		4.1	91.9	3.3	0.7		4.7	87.2	7	1		
Total %	2.9	0.6	2.3	0	5.8	1.7	0.7	2.3	0	4.6	1.8	39.5	1.4	0.3	43	2.2	40.6	3.2	0.5	46.5	

	E. Witt Rd Eastbound				Lawless Creek Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	0	5	9	3	5	**7**	15	15	**65**	**2**	**82**	2	115	23	140	246
07:45 AM	**41**	**10**	**37**	**88**	**6**	**13**	7	**26**	**16**	55	2	73	1	79	**44**	124	**311**
08:00 AM	22	5	25	52	3	5	4	12	10	40	0	50	3	**132**	19	**154**	268
08:15 AM	3	1	6	10	2	2	5	9	4	45	2	51	**9**	115	7	131	201
Total Volume	70	16	73	159	14	25	23	62	45	205	6	256	15	441	93	549	1026
% App. Total	44	10.1	45.9		22.6	40.3	37.1		17.6	80.1	2.3		2.7	80.3	16.9		
PHF	.427	.400	.493	.452	.583	.481	.821	.596	.703	.788	.750	.780	.417	.835	.528	.891	.825
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**33**	**8**	**22**	**63**	**3**	1	5	9	**7**	93	3	103	6	92	**14**	112	287
03:15 PM	8	1	9	18	3	1	4	8	6	96	2	104	7	91	9	107	237
03:30 PM	5	1	5	11	3	**4**	**6**	**13**	4	**123**	6	**133**	5	**139**	10	**154**	**311**
03:45 PM	4	3	13	20	3	2	5	10	3	109	**7**	119	**11**	124	7	142	291
Total Volume	50	13	49	112	12	8	20	40	20	421	18	459	29	446	40	515	1126
% App. Total	44.6	11.6	43.8		30	20	50		4.4	91.7	3.9		5.6	86.6	7.8		
PHF	.379	.406	.557	.444	1.00	.500	.833	.769	.714	.856	.643	.863	.659	.802	.714	.836	.905

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	4
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	2
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
06:45 AM	1	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	6
Total	1	0	2	0	3	0	0	0	0	0	0	5	0	0	5	0	3	2	1	6	14
07:00 AM	0	0	1	0	1	0	0	1	0	1	0	2	0	0	2	1	0	0	0	1	5
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	1	3	1	0	5	9
07:30 AM	0	1	0	0	1	0	0	1	0	1	2	3	0	0	5	0	1	6	0	7	14
07:45 AM	4	0	1	0	5	0	1	0	0	1	1	3	0	0	4	0	3	4	0	7	17
Total	4	1	2	0	7	0	1	2	0	3	4	11	0	0	15	2	7	11	0	20	45
08:00 AM	3	1	0	0	4	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	8
08:15 AM	1	0	0	0	1	0	0	0	0	0	0	2	0	0	2	0	2	1	0	3	6
08:30 AM	1	0	1	0	2	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	7
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	5
Total	5	1	1	0	7	0	0	0	0	0	0	11	0	0	11	0	7	1	0	8	26
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	5
09:30 AM	0	0	1	0	1	0	0	0	0	0	0	4	0	0	4	1	2	1	0	4	9
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	4	0	0	4	6
Total	0	0	1	0	1	0	0	0	0	0	0	12	0	0	12	1	9	1	0	11	24
10:00 AM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	2	0	4	0	0	4	7
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	4
10:30 AM	1	0	0	0	1	0	0	0	0	0	0	3	0	0	3	0	4	0	0	4	8
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	1	2	0	0	3	6
Total	1	0	0	0	1	0	0	1	0	1	0	11	0	0	11	1	11	0	0	12	25
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	5	0	0	6	8
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	2	0	0	2	5
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	4
11:45 AM	0	0	0	0	0	0	0	1	0	1	0	4	0	0	4	0	2	0	0	2	7
Total	0	0	0	0	0	0	0	1	0	1	0	10	0	0	10	1	12	0	0	13	24
12:00 PM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	2	2	2	0	0	4	7
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	3	0	0	3	9
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	4
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	2	0	0	2	5
Total	0	0	0	0	0	0	0	1	0	1	0	12	0	0	12	2	10	0	0	12	25
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	1	1	0	0	2	4
01:15 PM	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	2	1	0	4	6
01:30 PM	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	4
01:45 PM	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	0	2	0	0	2	5
Total	1	0	0	0	1	1	0	1	0	2	0	5	1	0	6	2	7	1	0	10	19
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	2	0	3	6
02:15 PM	1	0	0	0	1	0	0	0	0	0	0	4	0	0	4	0	6	2	0	8	13
02:30 PM	0	0	0	0	0	0	1	1	0	2	1	3	0	0	4	0	3	4	0	7	13
02:45 PM	9	1	3	0	13	0	0	0	0	0	2	1	0	0	3	0	1	1	0	2	18
Total	10	1	3	0	14	0	1	1	0	2	3	11	0	0	14	0	11	9	0	20	50
03:00 PM	1	0	2	0	3	0	1	0	0	1	1	1	1	0	3	0	1	0	0	1	8
03:15 PM	0	0	1	0	1	0	0	0	0	0	0	2	1	0	3	2	3	0	0	5	9
03:30 PM	1	0	0	0	1	2	0	1	0	3	0	4	1	0	5	1	3	1	0	5	14
03:45 PM	0	0	0	0	0	0	0	1	0	1	0	2	1	0	3	0	2	1	0	3	7
Total	2	0	3	0	5	2	1	2	0	5	1	9	4	0	14	3	9	2	0	14	38
04:00 PM	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	2	4	0	0	6	9
04:15 PM	1	0	0	0	1	0	0	0	0	0	0	4	0	0	4	1	1	0	0	2	7
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	5	0	0	5	7
Total	1	0	0	0	1	0	1	0	0	1	1	10	0	0	11	3	11	0	0	14	27
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	3	6
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	4	0	0	4	6
Total	0	0	1	0	1	0	0	0	0	0	0	8	0	0	8	0	9	0	0	9	18
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	3

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	3	6
Grand Total	25	3	13	0	41	3	4	9	0	16	9	118	5	0	132	15	109	27	1	152	341
Apprch %	61	7.3	31.7	0		18.8	25	56.2	0		6.8	89.4	3.8	0		9.9	71.7	17.8	0.7		
Total %	7.3	0.9	3.8	0	12	0.9	1.2	2.6	0	4.7	2.6	34.6	1.5	0	38.7	4.4	32	7.9	0.3	44.6	

	E. Witt Rd Eastbound				Lawless Creek Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	0	0	1	**3**	0	4	**1**	**3**	1	5	9
07:30 AM	0	**1**	0	1	0	0	**1**	**1**	**2**	3	0	**5**	0	1	**6**	**7**	14
07:45 AM	**4**	0	**1**	**5**	0	**1**	0	1	1	3	0	4	0	3	4	7	**17**
08:00 AM	3	1	0	4	0	0	0	0	0	2	0	2	0	2	0	2	8
Total Volume	7	2	1	10	0	1	1	2	4	11	0	15	1	9	11	21	48
% App. Total	70	20	10		0	50	50		26.7	73.3	0		4.8	42.9	52.4		
PHF	.438	.500	.250	.500	.000	.250	.250	.500	.500	.917	.000	.750	.250	.750	.458	.750	.706
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:15 PM																	
02:15 PM	1	0	0	1	0	0	0	0	0	**4**	0	**4**	0	**6**	2	**8**	13
02:30 PM	0	0	0	0	0	**1**	**1**	**2**	1	3	0	4	0	3	**4**	7	13
02:45 PM	**9**	**1**	**3**	**13**	0	0	0	0	**2**	1	0	3	0	1	1	2	**18**
03:00 PM	1	0	2	3	0	1	0	1	1	1	**1**	3	0	1	0	1	8
Total Volume	11	1	5	17	0	2	1	3	4	9	1	14	0	11	7	18	52
% App. Total	64.7	5.9	29.4		0	66.7	33.3		28.6	64.3	7.1		0	61.1	38.9		
PHF	.306	.250	.417	.327	.000	.500	.250	.375	.500	.563	.250	.875	.000	.458	.438	.563	.722

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Apprch %	0	0	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	

	E. Witt Rd Eastbound				Lawless Creek Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 AM																	
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.250

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	2	0	1	0	3	0	0	3	0	3	0	44	1	0	45	1	34	2	1	38	89
06:15 AM	1	0	3	0	4	2	0	10	0	12	0	42	0	0	42	1	34	0	1	36	94
06:30 AM	1	0	0	0	1	3	0	6	0	9	1	65	0	0	66	3	47	3	0	53	129
06:45 AM	2	2	5	0	9	1	0	6	0	7	0	45	3	0	48	3	61	2	0	66	130
Total	6	2	9	0	17	6	0	25	0	31	1	196	4	0	201	8	176	7	2	193	442
07:00 AM	7	0	3	0	10	2	1	6	0	9	4	42	3	1	50	1	73	6	1	81	150
07:15 AM	5	0	2	0	7	3	0	1	0	4	6	58	0	0	64	5	92	15	1	113	188
07:30 AM	4	1	5	0	10	3	5	8	0	16	17	68	2	1	88	2	116	29	1	148	262
07:45 AM	45	10	38	0	93	6	14	7	0	27	17	58	2	0	77	1	82	48	0	131	328
Total	61	11	48	0	120	14	20	22	0	56	44	226	7	2	279	9	363	98	3	473	928
08:00 AM	25	6	25	0	56	3	5	4	0	12	10	42	0	0	52	3	134	19	1	157	277
08:15 AM	4	1	6	0	11	2	2	5	0	9	4	47	2	0	53	9	117	8	1	135	208
08:30 AM	6	0	2	0	8	4	1	1	0	6	1	59	3	0	63	1	94	0	1	96	173
08:45 AM	3	1	3	0	7	5	1	8	0	14	3	58	2	0	63	2	94	0	0	96	180
Total	38	8	36	0	82	14	9	18	0	41	18	206	7	0	231	15	439	27	3	484	838
09:00 AM	2	1	2	0	5	2	0	1	0	3	2	46	2	0	50	3	71	3	1	78	136
09:15 AM	2	1	1	0	4	4	1	2	0	7	1	55	3	1	60	2	80	2	2	86	157
09:30 AM	2	1	1	0	4	5	1	3	0	9	2	56	2	1	61	6	106	1	0	113	187
09:45 AM	0	0	2	0	2	4	0	2	0	6	1	50	1	1	53	5	71	0	1	77	138
Total	6	3	6	0	15	15	2	8	0	25	6	207	8	3	224	16	328	6	4	354	618
10:00 AM	1	1	0	0	2	2	1	4	0	7	0	69	1	0	70	5	70	2	2	79	158
10:15 AM	3	0	3	0	6	0	1	4	0	5	3	67	2	1	73	4	85	5	0	94	178
10:30 AM	1	0	2	0	3	1	0	3	0	4	0	62	3	1	66	5	71	1	0	77	150
10:45 AM	2	1	2	0	5	2	0	3	0	5	2	77	2	1	82	2	64	6	1	73	165
Total	7	2	7	0	16	5	2	14	0	21	5	275	8	3	291	16	290	14	3	323	651
11:00 AM	2	0	2	0	4	4	1	8	0	13	1	62	2	1	66	4	83	5	1	93	176
11:15 AM	2	2	1	0	5	6	0	7	0	13	0	68	1	0	69	3	74	4	1	82	169
11:30 AM	1	1	0	0	2	3	0	2	0	5	3	65	2	1	71	2	87	2	0	91	169
11:45 AM	3	0	3	0	6	4	0	5	0	9	2	80	4	1	87	1	79	3	1	84	186
Total	8	3	6	0	17	17	1	22	0	40	6	275	9	3	293	10	323	14	3	350	700
12:00 PM	2	0	1	0	3	0	0	3	0	3	3	65	0	0	68	7	66	0	2	75	149
12:15 PM	4	1	1	0	6	1	0	4	0	5	0	74	2	0	76	2	67	3	0	72	159
12:30 PM	5	0	4	0	9	2	0	1	0	3	2	79	4	2	87	3	89	3	1	96	195
12:45 PM	3	0	0	0	3	3	0	4	0	7	2	80	2	1	85	9	83	6	0	98	193
Total	14	1	6	0	21	6	0	12	0	18	7	298	8	3	316	21	305	12	3	341	696
01:00 PM	8	0	2	0	10	5	1	2	0	8	0	92	3	0	95	6	78	7	1	92	205
01:15 PM	5	0	3	0	8	4	0	3	0	7	2	85	2	0	89	4	55	8	1	68	172
01:30 PM	6	0	3	0	9	2	0	4	0	6	2	81	1	1	85	5	82	1	0	88	188
01:45 PM	4	0	4	0	8	8	1	2	0	11	4	115	5	1	125	4	79	6	0	89	233
Total	23	0	12	0	35	19	2	11	0	32	8	373	11	2	394	19	294	22	2	337	798
02:00 PM	7	0	1	0	8	4	1	7	0	12	1	97	1	1	100	3	56	10	0	69	189
02:15 PM	9	2	3	0	14	2	1	2	0	5	5	91	2	1	99	7	89	12	1	109	227
02:30 PM	5	0	5	0	10	6	5	3	0	14	10	95	0	0	105	3	104	13	3	123	252
02:45 PM	23	6	9	0	38	4	0	5	0	9	15	97	4	1	117	4	92	17	2	115	279
Total	44	8	18	0	70	16	7	17	0	40	31	380	7	3	421	17	341	52	6	416	947
03:00 PM	34	8	24	0	66	3	2	5	0	10	8	94	4	2	108	6	93	14	1	114	298
03:15 PM	8	1	10	0	19	3	1	4	0	8	6	98	3	0	107	9	94	9	1	113	247
03:30 PM	6	1	5	0	12	5	4	7	0	16	4	127	7	1	139	6	142	11	1	160	327
03:45 PM	4	3	13	0	20	3	2	6	0	11	3	111	8	0	122	11	126	8	2	147	300
Total	52	13	52	0	117	14	9	22	0	45	21	430	22	3	476	32	455	42	5	534	1172
04:00 PM	15	2	9	0	26	8	1	4	0	13	5	88	6	2	101	7	110	2	1	120	260
04:15 PM	5	3	1	0	9	6	3	8	0	17	3	137	5	0	145	8	94	3	3	108	279
04:30 PM	5	3	4	0	12	5	1	4	0	10	3	106	7	1	117	3	87	1	2	93	232
04:45 PM	3	1	3	0	7	4	2	4	0	10	6	102	6	0	114	10	78	12	1	101	232
Total	28	9	17	0	54	23	7	20	0	50	17	433	24	3	477	28	369	18	7	422	1003
05:00 PM	2	1	5	0	8	3	1	3	0	7	5	128	6	0	139	6	68	9	1	84	238
05:15 PM	4	3	5	0	12	3	2	8	0	13	3	155	4	0	162	9	90	6	1	106	293
05:30 PM	5	2	4	0	11	4	2	8	0	14	2	121	8	3	134	6	103	5	0	114	273
05:45 PM	4	0	1	0	5	8	3	4	0	15	6	126	3	0	135	5	82	8	2	97	252
Total	15	6	15	0	36	18	8	23	0	49	16	530	21	3	570	26	343	28	4	401	1056
06:00 PM	6	0	5	0	11	3	1	7	0	11	2	99	6	0	107	3	71	3	2	79	208
06:15 PM	3	0	5	0	8	2	1	13	0	16	4	86	4	1	95	10	80	9	3	102	221

Peggy Malone & Associates
(800) 247-8602

File Name : 1-US 29 and E Witt Rd_Lawless Creek Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	E. Witt Rd Eastbound					Lawless Creek Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	10	1	9	0	20	4	3	9	0	16	3	88	0	3	94	7	53	6	0	66	196
06:45 PM	2	0	1	0	3	1	0	1	0	2	3	79	3	0	85	4	51	3	1	59	149
Total	21	1	20	0	42	10	5	30	0	45	12	352	13	4	381	24	255	21	6	306	774
Grand Total	323	67	252	0	642	177	72	244	0	493	192	4181	149	32	4554	241	4281	361	51	4934	10623
Apprch %	50.3	10.4	39.3	0		35.9	14.6	49.5	0		4.2	91.8	3.3	0.7		4.9	86.8	7.3	1		
Total %	3	0.6	2.4	0	6	1.7	0.7	2.3	0	4.6	1.8	39.4	1.4	0.3	42.9	2.3	40.3	3.4	0.5	46.4	

	E. Witt Rd Eastbound				Lawless Creek Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	1	5	10	3	5	**8**	16	**17**	**68**	**2**	**87**	2	116	29	147	260
07:45 AM	**45**	**10**	**38**	**93**	**6**	**14**	7	**27**	17	58	2	77	1	82	**48**	131	**328**
08:00 AM	25	6	25	56	3	5	4	12	10	42	0	52	3	**134**	19	**156**	276
08:15 AM	4	1	6	11	2	2	5	9	4	47	2	53	**9**	117	8	134	207
Total Volume	78	18	74	170	14	26	24	64	48	215	6	269	15	449	104	568	1071
% App. Total	45.9	10.6	43.5		21.9	40.6	37.5		17.8	79.9	2.2		2.6	79	18.3		
PHF	.433	.450	.487	.457	.583	.464	.750	.593	.706	.790	.750	.773	.417	.838	.542	.910	.816
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**34**	**8**	**24**	**66**	3	2	5	10	**8**	94	4	106	6	93	**14**	113	295
03:15 PM	8	1	10	19	3	1	4	8	6	98	3	107	9	94	9	112	246
03:30 PM	6	1	5	12	**5**	**4**	**7**	**16**	4	**127**	7	**138**	6	**142**	11	**159**	**325**
03:45 PM	4	3	13	20	3	2	6	11	3	111	**8**	122	**11**	126	8	145	298
Total Volume	52	13	52	117	14	9	22	45	21	430	22	473	32	455	42	529	1164
% App. Total	44.4	11.1	44.4		31.1	20	48.9		4.4	90.9	4.7		6	86	7.9		
PHF	.382	.406	.542	.443	.700	.563	.786	.703	.656	.846	.688	.857	.727	.801	.750	.832	.895

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	13	0	19	0	32	0	47	3	0	50	1	29	1	0	31	113
06:15 AM	0	0	0	0	0	16	0	9	0	25	0	40	9	0	49	2	31	0	0	33	107
06:30 AM	0	0	0	0	0	16	0	15	0	31	0	60	9	0	69	3	44	1	0	48	148
06:45 AM	0	0	0	0	0	16	1	12	0	29	1	42	11	0	54	2	50	1	0	53	136
Total	0	0	0	0	0	61	1	55	0	117	1	189	32	0	222	8	154	3	0	165	504
07:00 AM	0	0	1	0	1	18	1	13	0	32	0	42	20	0	62	8	68	0	0	76	171
07:15 AM	0	0	0	0	0	40	1	21	0	62	0	51	15	0	66	16	73	0	0	89	217
07:30 AM	0	0	0	0	0	47	0	24	0	71	0	53	28	0	81	13	98	2	0	113	265
07:45 AM	0	0	0	0	0	53	0	23	0	76	0	66	39	0	105	7	79	0	0	86	267
Total	0	0	1	0	1	158	2	81	0	241	0	212	102	0	314	44	318	2	0	364	920
08:00 AM	0	0	0	0	0	50	1	19	0	70	0	46	15	0	61	9	114	0	0	123	254
08:15 AM	0	0	1	0	1	31	1	20	0	52	0	46	10	0	56	9	89	0	0	98	207
08:30 AM	0	0	1	0	1	26	0	9	0	35	2	43	16	0	61	5	64	1	0	70	167
08:45 AM	0	0	0	0	0	17	0	9	0	26	0	50	16	0	66	4	73	0	0	77	169
Total	0	0	2	0	2	124	2	57	0	183	2	185	57	0	244	27	340	1	0	368	797
09:00 AM	0	0	1	0	1	17	0	5	0	22	1	31	15	0	47	6	50	0	0	56	126
09:15 AM	0	1	0	0	1	15	0	13	0	28	1	34	19	0	54	8	66	0	0	74	157
09:30 AM	0	0	0	0	0	29	0	12	0	41	0	50	10	0	60	3	78	0	1	82	183
09:45 AM	0	0	0	0	0	16	0	4	0	20	0	33	19	1	53	4	51	0	0	55	128
Total	0	1	1	0	2	77	0	34	0	111	2	148	63	1	214	21	245	0	1	267	594
10:00 AM	0	0	0	0	0	21	0	8	0	29	0	48	17	0	65	6	64	0	0	70	164
10:15 AM	0	0	0	0	0	21	0	2	0	23	0	49	22	1	72	4	70	0	0	74	169
10:30 AM	0	0	0	0	0	14	0	6	0	20	0	46	19	0	65	8	53	0	0	61	146
10:45 AM	0	0	0	0	0	21	0	9	0	30	0	51	22	0	73	4	49	0	0	53	156
Total	0	0	0	0	0	77	0	25	0	102	0	194	80	1	275	22	236	0	0	258	635
11:00 AM	0	0	0	0	0	17	0	5	0	22	0	50	16	0	66	4	64	1	0	69	157
11:15 AM	0	0	1	0	1	18	0	7	0	25	0	60	13	0	73	9	60	0	0	69	168
11:30 AM	1	0	0	0	1	14	0	6	0	20	0	57	16	0	73	6	69	1	1	77	171
11:45 AM	0	0	0	0	0	19	0	8	0	27	0	55	23	0	78	7	63	0	0	70	175
Total	1	0	1	0	2	68	0	26	0	94	0	222	68	0	290	26	256	2	1	285	671
12:00 PM	2	0	1	0	3	20	0	4	0	24	0	49	19	0	68	6	52	1	0	59	154
12:15 PM	1	0	0	0	1	20	0	7	0	27	0	56	19	0	75	10	45	0	0	55	158
12:30 PM	0	1	1	0	2	20	0	4	0	24	0	60	19	0	79	6	75	0	0	81	186
12:45 PM	0	0	1	0	1	26	0	12	0	38	1	63	22	0	86	7	62	0	0	69	194
Total	3	1	3	0	7	86	0	27	0	113	1	228	79	0	308	29	234	1	0	264	692
01:00 PM	0	0	1	0	1	18	2	5	0	25	1	65	22	0	88	3	62	0	0	65	179
01:15 PM	0	1	0	0	1	18	1	11	0	30	0	71	26	0	97	5	51	0	0	56	184
01:30 PM	0	0	1	0	1	20	1	12	0	33	0	73	29	0	102	8	69	0	0	77	213
01:45 PM	1	0	0	0	1	18	0	9	0	27	0	87	22	0	109	6	65	0	0	71	208
Total	1	1	2	0	4	74	4	37	0	115	1	296	99	0	396	22	247	0	0	269	784
02:00 PM	0	0	1	0	1	16	0	11	0	27	1	81	27	0	109	9	51	1	0	61	198
02:15 PM	0	0	1	0	1	26	0	11	0	37	0	71	28	0	99	16	69	0	0	85	222
02:30 PM	0	1	1	0	2	28	0	9	0	37	2	66	25	0	93	14	98	0	0	112	244
02:45 PM	1	0	1	0	2	31	0	9	0	40	1	83	39	0	123	18	74	1	0	93	258
Total	1	1	4	0	6	101	0	40	0	141	4	301	119	0	424	57	292	2	0	351	922
03:00 PM	1	0	0	0	1	21	0	12	0	33	0	85	36	0	121	15	88	1	0	104	259
03:15 PM	0	0	0	0	0	27	0	16	0	43	0	76	34	0	110	13	87	0	1	101	254
03:30 PM	0	1	1	0	2	28	0	20	0	48	0	108	28	0	136	23	135	0	0	158	344
03:45 PM	0	2	0	0	2	39	0	14	0	53	0	84	40	0	124	17	103	0	0	120	299
Total	1	3	1	0	5	115	0	62	0	177	0	353	138	0	491	68	413	1	1	483	1156
04:00 PM	1	0	1	0	2	15	0	13	0	28	1	81	32	0	114	20	91	0	1	112	256
04:15 PM	1	0	0	0	1	21	0	10	0	31	0	103	38	0	141	21	80	0	1	102	275
04:30 PM	0	0	0	0	0	24	0	7	0	31	0	82	37	0	119	10	76	0	0	86	236
04:45 PM	0	0	0	0	0	24	0	11	0	35	0	83	31	0	114	12	67	1	1	81	230
Total	2	0	1	0	3	84	0	41	0	125	1	349	138	0	488	63	314	1	3	381	997
05:00 PM	0	1	1	0	2	27	0	16	0	43	0	101	30	0	131	20	69	0	1	90	266
05:15 PM	0	1	1	0	2	28	3	10	0	41	2	109	67	0	178	24	78	1	0	103	324
05:30 PM	0	0	1	0	1	29	0	10	0	39	0	92	45	0	137	6	69	1	0	76	253
05:45 PM	1	0	2	0	3	34	0	7	0	41	0	85	56	0	141	14	47	0	0	61	246
Total	1	2	5	0	8	118	3	43	0	164	2	387	198	0	587	64	263	2	1	330	1089
06:00 PM	0	0	1	0	1	8	0	11	0	19	0	74	35	0	109	17	61	1	0	79	208
06:15 PM	1	0	1	0	2	27	0	8	0	35	0	66	31	0	97	16	67	0	0	83	217

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	28	0	14	0	42	0	66	35	0	101	8	38	0	1	47	190
06:45 PM	0	0	0	0	0	16	0	12	0	28	0	63	31	0	94	7	39	0	0	46	168
Total	1	0	2	0	3	79	0	45	0	124	0	269	132	0	401	48	205	1	1	255	783
Grand Total	11	9	23	0	43	1222	12	573	0	1807	14	3333	1305	2	4654	499	3517	16	8	4040	10544
Apprch %	25.6	20.9	53.5	0		67.6	0.7	31.7	0		0.3	71.6	28	0		12.4	87.1	0.4	0.2		
Total %	0.1	0.1	0.2	0	0.4	11.6	0.1	5.4	0	17.1	0.1	31.6	12.4	0	44.1	4.7	33.4	0.2	0.1	38.3	

	Malmaison Rd Eastbound				Malmaison Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	40	**1**	21	62	0	51	15	66	**16**	73	0	89	217
07:30 AM	0	0	0	0	47	0	**24**	71	0	53	28	81	13	98	**2**	113	265
07:45 AM	0	0	0	0	**53**	0	23	**76**	0	**66**	**39**	**105**	7	79	0	86	**267**
08:00 AM	0	0	0	0	50	1	19	70	0	46	15	61	9	**114**	0	**123**	254
Total Volume	0	0	0	0	190	2	87	279	0	216	97	313	45	364	2	411	1003
% App. Total	0	0	0		68.1	0.7	31.2		0	69	31		10.9	88.6	0.5		
PHF	.000	.000	.000	.000	.896	.500	.906	.918	.000	.818	.622	.745	.703	.798	.250	.835	.939
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	0	1	**1**	**2**	28	0	**20**	48	0	**108**	28	136	**23**	**135**	0	**158**	**344**
03:45 PM	0	**2**	0	2	**39**	0	14	**53**	0	84	**40**	124	17	103	0	120	299
04:00 PM	**1**	0	1	2	15	0	13	28	**1**	81	32	114	20	91	0	111	255
04:15 PM	1	0	0	1	21	0	10	31	0	103	38	**141**	21	80	0	101	274
Total Volume	2	3	2	7	103	0	57	160	1	376	138	515	81	409	0	490	1172
% App. Total	28.6	42.9	28.6		64.4	0	35.6		0.2	73	26.8		16.5	83.5	0		
PHF	.500	.375	.500	.875	.660	.000	.713	.755	.250	.870	.863	.913	.880	.757	.000	.775	.852

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	1	0	1	0	0	0	0	0	1	2	1	0	4	0	1	1	0	2	7
06:15 AM	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	2
06:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	2
06:45 AM	2	0	0	0	2	1	0	1	0	2	0	2	3	0	5	1	2	0	0	3	12
Total	2	0	1	0	3	2	0	2	0	4	1	5	5	0	11	1	3	1	0	5	23
07:00 AM	1	0	1	0	2	0	0	0	0	0	1	1	4	0	6	2	0	0	0	2	10
07:15 AM	1	0	0	0	1	2	0	1	0	3	0	1	1	0	2	0	2	0	0	2	8
07:30 AM	0	0	0	0	0	4	0	1	0	5	1	2	1	0	4	1	5	0	0	6	15
07:45 AM	1	0	0	0	1	3	0	2	0	5	0	3	4	0	7	1	4	0	0	5	18
Total	3	0	1	0	4	9	0	4	0	13	2	7	10	0	19	4	11	0	0	15	51
08:00 AM	0	0	0	0	0	0	0	2	0	2	0	4	1	0	5	0	1	0	0	1	8
08:15 AM	0	0	1	0	1	0	0	1	0	1	0	3	1	0	4	1	2	0	0	3	9
08:30 AM	0	0	0	0	0	1	0	0	0	1	0	5	1	0	6	0	0	0	0	0	7
08:45 AM	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	0	2	0	0	2	6
Total	0	0	1	0	1	1	1	3	0	5	0	15	3	0	18	1	5	0	0	6	30
09:00 AM	0	0	0	0	0	1	0	0	0	1	0	2	1	0	3	1	0	0	0	1	5
09:15 AM	0	1	0	0	1	0	0	1	0	1	1	0	0	0	1	3	2	0	0	5	8
09:30 AM	0	0	1	0	1	2	0	1	0	3	0	4	2	0	6	2	2	0	0	4	14
09:45 AM	1	0	0	0	1	3	0	0	0	3	0	2	0	0	2	1	3	0	0	4	10
Total	1	1	1	0	3	6	0	2	0	8	1	8	3	0	12	7	7	0	0	14	37
10:00 AM	0	0	0	0	0	2	0	0	0	2	0	4	1	0	5	3	2	1	0	6	13
10:15 AM	0	0	0	0	0	0	0	2	0	2	0	3	1	0	4	0	0	0	0	0	6
10:30 AM	0	0	0	0	0	1	0	0	0	1	0	1	1	0	2	0	3	0	0	3	6
10:45 AM	0	0	0	0	0	1	0	0	0	1	0	2	2	0	4	0	4	0	0	4	9
Total	0	0	0	0	0	4	0	2	0	6	0	10	5	0	15	3	9	1	0	13	34
11:00 AM	0	0	0	0	0	1	1	1	0	3	0	1	0	0	1	1	4	0	0	5	9
11:15 AM	2	0	0	0	2	0	0	3	0	3	0	2	2	0	4	2	2	1	0	5	14
11:30 AM	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	2	2	0	0	4	7
11:45 AM	1	0	0	0	1	2	0	0	0	2	1	3	0	0	4	3	2	0	0	5	12
Total	3	0	0	0	3	4	1	4	0	9	1	8	2	0	11	8	10	1	0	19	42
12:00 PM	0	0	0	0	0	0	0	1	0	1	0	3	0	0	3	0	3	0	0	3	7
12:15 PM	0	2	0	0	2	1	0	1	0	2	0	6	0	0	6	2	1	0	0	3	13
12:30 PM	0	0	0	0	0	2	0	0	0	2	0	1	1	0	2	3	1	0	0	4	8
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	4
Total	0	2	0	0	2	3	0	2	0	5	0	13	2	0	15	5	5	0	0	10	32
01:00 PM	0	0	0	0	0	0	0	3	0	3	0	1	3	0	4	1	2	0	0	3	10
01:15 PM	0	0	1	0	1	2	0	0	0	2	1	2	0	0	3	3	2	1	0	6	12
01:30 PM	0	0	1	0	1	0	0	2	0	2	0	2	0	0	2	0	1	0	0	1	6
01:45 PM	0	0	0	0	0	0	0	3	0	3	0	1	3	0	4	0	2	0	0	2	9
Total	0	0	2	0	2	2	0	8	0	10	1	6	6	0	13	4	7	1	0	12	37
02:00 PM	0	0	0	0	0	2	0	1	0	3	0	1	1	0	2	2	2	0	0	4	9
02:15 PM	0	1	0	0	1	4	0	2	0	6	0	4	2	0	6	3	6	0	0	9	22
02:30 PM	0	0	0	0	0	5	0	0	0	5	0	4	0	0	4	2	3	0	0	5	14
02:45 PM	2	0	0	0	2	0	0	1	0	1	0	4	7	0	11	2	1	1	0	4	18
Total	2	1	0	0	3	11	0	4	0	15	0	13	10	0	23	9	12	1	0	22	63
03:00 PM	0	1	0	0	1	0	0	1	0	1	0	1	1	0	2	2	2	0	0	4	8
03:15 PM	0	0	0	0	0	2	0	0	0	2	1	1	0	0	2	2	3	0	0	5	9
03:30 PM	1	0	1	0	2	0	0	1	0	1	0	2	2	0	4	0	3	1	0	4	11
03:45 PM	1	1	0	0	2	0	2	0	0	2	0	2	0	0	2	1	2	0	0	3	9
Total	2	2	1	0	5	2	2	2	0	6	1	6	3	0	10	5	10	1	0	16	37
04:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	3	0	0	4	6
04:15 PM	0	1	0	0	1	1	0	0	0	1	0	7	0	0	7	1	2	1	0	4	13
04:30 PM	0	0	1	0	1	0	0	3	0	3	1	3	1	0	5	0	2	1	0	3	12
04:45 PM	0	0	0	0	0	3	0	1	0	4	0	1	3	0	4	0	5	0	0	5	13
Total	0	1	1	0	2	4	1	4	0	9	1	11	5	0	17	2	12	2	0	16	44
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	0	0	1	3
05:15 PM	0	1	0	0	1	1	0	0	0	1	0	3	0	0	3	0	1	0	0	1	6
05:30 PM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	2	1	3	0	0	4	7
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	3	0	0	3	0	4	0	0	4	8
Total	0	1	0	0	1	2	0	1	0	3	0	9	1	0	10	1	9	0	0	10	24
06:00 PM	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	1	2	0	0	3	6
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	4

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	3	0	3	0	3	0	0	3	1	4	0	0	5	11
Grand Total	13	8	8	0	29	50	5	41	0	96	8	114	55	0	177	51	104	8	0	163	465
Apprch %	44.8	27.6	27.6	0		52.1	5.2	42.7	0		4.5	64.4	31.1	0		31.3	63.8	4.9	0		
Total %	2.8	1.7	1.7	0	6.2	10.8	1.1	8.8	0	20.6	1.7	24.5	11.8	0	38.1	11	22.4	1.7	0	35.1	

	Malmaison Rd Eastbound				Malmaison Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	0	**1**	**2**	0	0	0	0	**1**	1	**4**	6	**2**	0	0	2	10
07:15 AM	1	0	0	1	2	0	1	3	0	1	1	2	0	2	0	2	8
07:30 AM	0	0	0	0	**4**	0	1	**5**	1	2	1	4	1	**5**	0	**6**	15
07:45 AM	1	0	0	1	3	0	**2**	5	0	**3**	4	**7**	1	4	0	5	**18**
Total Volume	3	0	1	4	9	0	4	13	2	7	10	19	4	11	0	15	51
% App. Total	75	0	25		69.2	0	30.8		10.5	36.8	52.6		26.7	73.3	0		
PHF	.750	.000	.250	.500	.563	.000	.500	.650	.500	.583	.625	.679	.500	.550	.000	.625	.708
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	2	0	1	3	0	1	1	2	2	2	0	4	9
02:15 PM	0	**1**	0	1	4	0	**2**	**6**	0	**4**	2	6	**3**	**6**	0	**9**	**22**
02:30 PM	0	0	0	0	**5**	0	0	5	0	4	0	4	2	3	0	5	14
02:45 PM	**2**	0	0	**2**	0	0	1	1	0	4	**7**	**11**	2	1	**1**	4	18
Total Volume	2	1	0	3	11	0	4	15	0	13	10	23	9	12	1	22	63
% App. Total	66.7	33.3	0		73.3	0	26.7		0	56.5	43.5		40.9	54.5	4.5		
PHF	.250	.250	.000	.375	.550	.000	.500	.625	.000	.813	.357	.523	.750	.500	.250	.611	.716

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	Malmaison Rd Eastbound				Malmaison Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 AM																	
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	1	0	1	13	0	19	0	32	1	49	4	0	54	1	30	2	0	33	120
06:15 AM	0	0	0	0	0	16	0	10	0	26	0	41	9	0	50	2	31	0	0	33	109
06:30 AM	0	0	0	0	0	17	0	15	0	32	0	60	10	0	70	3	44	1	0	48	150
06:45 AM	2	0	0	0	2	17	1	13	0	31	1	44	14	0	59	3	52	1	0	56	148
Total	2	0	1	0	3	63	1	57	0	121	2	194	37	0	233	9	157	4	0	170	527
07:00 AM	1	0	2	0	3	18	1	13	0	32	1	43	24	0	68	10	68	0	0	78	181
07:15 AM	1	0	0	0	1	42	1	22	0	65	0	52	16	0	68	16	75	0	0	91	225
07:30 AM	0	0	0	0	0	51	0	25	0	76	1	55	29	0	85	14	103	2	0	119	280
07:45 AM	1	0	0	0	1	56	0	25	0	81	0	69	43	0	112	8	83	0	0	91	285
Total	3	0	2	0	5	167	2	85	0	254	2	219	112	0	333	48	329	2	0	379	971
08:00 AM	0	0	0	0	0	50	1	21	0	72	0	50	16	0	66	9	115	0	0	124	262
08:15 AM	0	0	2	0	2	31	1	21	0	53	0	49	11	0	60	10	91	0	0	101	216
08:30 AM	0	0	1	0	1	27	0	9	0	36	2	48	17	0	67	5	64	1	0	70	174
08:45 AM	0	0	0	0	0	17	1	9	0	27	0	53	16	0	69	4	75	0	0	79	175
Total	0	0	3	0	3	125	3	60	0	188	2	200	60	0	262	28	345	1	0	374	827
09:00 AM	0	0	1	0	1	18	0	5	0	23	1	33	16	0	50	7	50	0	0	57	131
09:15 AM	0	2	0	0	2	15	0	14	0	29	2	34	19	0	55	11	68	0	0	79	165
09:30 AM	0	0	1	0	1	31	0	13	0	44	0	54	12	0	66	5	80	0	1	86	197
09:45 AM	1	0	0	0	1	19	0	4	0	23	0	35	19	1	55	5	54	0	0	59	138
Total	1	2	2	0	5	83	0	36	0	119	3	156	66	1	226	28	252	0	1	281	631
10:00 AM	0	0	0	0	0	23	0	8	0	31	0	52	18	0	70	9	66	1	0	76	177
10:15 AM	0	0	0	0	0	21	0	4	0	25	0	52	23	1	76	4	70	0	0	74	175
10:30 AM	0	0	0	0	0	15	0	6	0	21	0	47	20	0	67	8	56	0	0	64	152
10:45 AM	0	0	0	0	0	22	0	9	0	31	0	53	24	0	77	4	53	0	0	57	165
Total	0	0	0	0	0	81	0	27	0	108	0	204	85	1	290	25	245	1	0	271	669
11:00 AM	0	0	0	0	0	18	1	6	0	25	0	51	16	0	67	5	68	1	0	74	166
11:15 AM	2	0	1	0	3	18	0	10	0	28	0	62	15	0	77	11	62	1	0	74	182
11:30 AM	1	0	0	0	1	15	0	6	0	21	0	59	16	0	75	8	71	1	1	81	178
11:45 AM	1	0	0	0	1	21	0	8	0	29	1	58	23	0	82	10	65	0	0	75	187
Total	4	0	1	0	5	72	1	30	0	103	1	230	70	0	301	34	266	3	1	304	713
12:00 PM	2	0	1	0	3	20	0	5	0	25	0	52	19	0	71	6	55	1	0	62	161
12:15 PM	1	2	0	0	3	21	0	8	0	29	0	62	19	0	81	12	46	0	0	58	171
12:30 PM	0	1	1	0	2	22	0	4	0	26	0	61	20	0	81	9	76	0	0	85	194
12:45 PM	0	0	1	0	1	26	0	12	0	38	1	66	23	0	90	7	62	0	0	69	198
Total	3	3	3	0	9	89	0	29	0	118	1	241	81	0	323	34	239	1	0	274	724
01:00 PM	0	0	1	0	1	18	2	8	0	28	1	66	25	0	92	4	64	0	0	68	189
01:15 PM	0	1	1	0	2	20	1	11	0	32	1	73	26	0	100	8	53	1	0	62	196
01:30 PM	0	0	2	0	2	20	1	14	0	35	0	75	29	0	104	8	70	0	0	78	219
01:45 PM	1	0	0	0	1	18	0	12	0	30	0	88	25	0	113	6	67	0	0	73	217
Total	1	1	4	0	6	76	4	45	0	125	2	302	105	0	409	26	254	1	0	281	821
02:00 PM	0	0	1	0	1	18	0	12	0	30	1	82	28	0	111	11	53	1	0	65	207
02:15 PM	0	1	1	0	2	30	0	13	0	43	0	75	30	0	105	19	75	0	0	94	244
02:30 PM	0	1	1	0	2	33	0	9	0	42	2	70	25	0	97	16	101	0	0	117	258
02:45 PM	3	0	1	0	4	31	0	10	0	41	1	87	46	0	134	20	75	2	0	97	276
Total	3	2	4	0	9	112	0	44	0	156	4	314	129	0	447	66	304	3	0	373	985
03:00 PM	1	1	0	0	2	21	0	13	0	34	0	86	37	0	123	17	90	1	0	108	267
03:15 PM	0	0	0	0	0	29	0	16	0	45	1	77	34	0	112	15	90	0	1	106	263
03:30 PM	1	1	2	0	4	28	0	21	0	49	0	110	30	0	140	23	138	1	0	162	355
03:45 PM	1	3	0	0	4	39	2	14	0	55	0	86	40	0	126	18	105	0	0	123	308
Total	3	5	2	0	10	117	2	64	0	183	1	359	141	0	501	73	423	2	1	499	1193
04:00 PM	1	0	1	0	2	15	1	13	0	29	1	81	33	0	115	21	94	0	1	116	262
04:15 PM	1	1	0	0	2	22	0	10	0	32	0	110	38	0	148	22	82	1	1	106	288
04:30 PM	0	0	1	0	1	24	0	10	0	34	1	85	38	0	124	10	78	1	0	89	248
04:45 PM	0	0	0	0	0	27	0	12	0	39	0	84	34	0	118	12	72	1	1	86	243
Total	2	1	2	0	5	88	1	45	0	134	2	360	143	0	505	65	326	3	3	397	1041
05:00 PM	0	1	1	0	2	27	0	16	0	43	0	102	31	0	133	20	70	0	1	91	269
05:15 PM	0	2	1	0	3	29	3	10	0	42	2	112	67	0	181	24	79	1	0	104	330
05:30 PM	0	0	1	0	1	29	0	11	0	40	0	94	45	0	139	7	72	1	0	80	260
05:45 PM	1	0	2	0	3	35	0	7	0	42	0	88	56	0	144	14	51	0	0	65	254
Total	1	3	5	0	9	120	3	44	0	167	2	396	199	0	597	65	272	2	1	340	1113
06:00 PM	0	0	1	0	1	8	0	14	0	22	0	74	35	0	109	18	63	1	0	82	214
06:15 PM	1	0	1	0	2	27	0	8	0	35	0	68	31	0	99	16	69	0	0	85	221

Peggy Malone & Associates
(800) 247-8602

File Name : 2-US 29 and Malmalson Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	Malmaison Rd Eastbound					Malmaison Rd Westbound					BUS US 29 Northbound					BUS US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	28	0	14	0	42	0	66	35	0	101	8	38	0	1	47	190
06:45 PM	0	0	0	0	0	16	0	12	0	28	0	64	31	0	95	7	39	0	0	46	169
Total	1	0	2	0	3	79	0	48	0	127	0	272	132	0	404	49	209	1	1	260	794
Grand Total	24	17	31	0	72	1272	17	614	0	1903	22	3447	1360	2	4831	550	3621	24	8	4203	11009
Apprch %	33.3	23.6	43.1	0		66.8	0.9	32.3	0		0.5	71.4	28.2	0		13.1	86.2	0.6	0.2		
Total %	0.2	0.2	0.3	0	0.7	11.6	0.2	5.6	0	17.3	0.2	31.3	12.4	0	43.9	5	32.9	0.2	0.1	38.2	

	Malmaison Rd Eastbound				Malmaison Rd Westbound				BUS US 29 Northbound				BUS US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**1**	0	0	**1**	42	**1**	22	65	0	52	16	68	**16**	75	0	91	225
07:30 AM	0	0	0	0	51	0	**25**	76	**1**	55	29	85	14	103	**2**	119	280
07:45 AM	1	0	0	1	**56**	0	25	**81**	0	**69**	**43**	**112**	8	83	0	91	**285**
08:00 AM	0	0	0	0	50	1	21	72	0	50	16	66	9	**115**	0	**124**	262
Total Volume	2	0	0	2	199	2	93	294	1	226	104	331	47	376	2	425	1052
% App. Total	100	0	0		67.7	0.7	31.6		0.3	68.3	31.4		11.1	88.5	0.5		
PHF	.500	.000	.000	.500	.888	.500	.930	.907	.250	.819	.605	.739	.734	.817	.250	.857	.923
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	**1**	1	**2**	**4**	28	0	**21**	49	0	**110**	30	140	**23**	**138**	**1**	**162**	**355**
03:45 PM	1	**3**	0	4	**39**	**2**	14	**55**	0	86	**40**	126	18	105	0	123	308
04:00 PM	1	0	1	2	15	1	13	29	**1**	81	33	115	21	94	0	115	261
04:15 PM	1	1	0	2	22	0	10	32	0	110	38	**148**	22	82	1	105	287
Total Volume	4	5	3	12	104	3	58	165	1	387	141	529	84	419	2	505	1211
% App. Total	33.3	41.7	25		63	1.8	35.2		0.2	73.2	26.7		16.6	83	0.4		
PHF	1.00	.417	.375	.750	.667	.375	.690	.750	.250	.880	.881	.894	.913	.759	.500	.779	.853

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	12	1	2	0	15	6	1	0	0	7	5	37	2	0	44	0	58	9	0	67	133
06:15 AM	15	1	5	0	21	2	1	2	0	5	10	67	0	0	77	2	69	6	7	84	187
06:30 AM	7	1	5	0	13	1	0	0	0	1	6	81	1	1	89	0	73	9	10	92	195
06:45 AM	10	3	3	0	16	4	2	0	0	6	8	80	3	0	91	2	67	13	10	92	205
Total	44	6	15	0	65	13	4	2	0	19	29	265	6	1	301	4	267	37	27	335	720
07:00 AM	19	2	5	0	26	5	1	1	0	7	10	58	0	0	68	3	85	15	4	107	208
07:15 AM	31	5	5	0	41	5	2	1	0	8	17	93	1	0	111	0	117	14	5	136	296
07:30 AM	29	3	8	0	40	7	4	3	0	14	16	107	3	0	126	1	126	23	7	157	337
07:45 AM	32	4	12	0	48	6	8	7	0	21	51	138	3	1	193	4	121	33	8	166	428
Total	111	14	30	0	155	23	15	12	0	50	94	396	7	1	498	8	449	85	24	566	1269
08:00 AM	35	3	13	0	51	4	6	2	0	12	50	134	9	0	193	5	130	48	8	191	447
08:15 AM	27	4	11	0	42	5	3	2	0	10	15	122	5	1	143	2	115	14	8	139	334
08:30 AM	22	7	9	0	38	2	3	5	0	10	11	109	3	1	124	3	106	9	5	123	295
08:45 AM	19	7	6	0	32	3	4	2	0	9	13	90	2	1	106	7	84	16	8	115	262
Total	103	21	39	0	163	14	16	11	0	41	89	455	19	3	566	17	435	87	29	568	1338
09:00 AM	28	2	9	0	39	2	7	3	0	12	12	72	1	2	87	3	97	10	5	115	253
09:15 AM	18	6	8	0	32	5	7	5	0	17	13	65	2	0	80	3	102	10	3	118	247
09:30 AM	19	7	13	0	39	4	5	4	0	13	14	78	1	1	94	2	71	12	9	94	240
09:45 AM	24	6	11	0	41	6	2	6	0	14	8	80	0	0	88	1	75	17	12	105	248
Total	89	21	41	0	151	17	21	18	0	56	47	295	4	3	349	9	345	49	29	432	988
10:00 AM	27	3	11	0	41	2	1	4	0	7	8	73	2	1	84	5	97	12	4	118	250
10:15 AM	22	2	7	0	31	2	4	6	0	12	9	94	5	1	109	2	70	6	4	82	234
10:30 AM	19	3	4	0	26	3	4	2	0	9	9	72	1	2	84	5	88	15	8	116	235
10:45 AM	18	4	9	0	31	6	4	5	0	15	9	69	2	3	83	12	102	8	9	131	260
Total	86	12	31	0	129	13	13	17	0	43	35	308	10	7	360	24	357	41	25	447	979
11:00 AM	35	4	9	0	48	2	4	10	0	16	7	86	3	2	98	4	93	20	9	126	288
11:15 AM	25	8	7	0	40	4	4	4	0	12	7	84	2	1	94	5	83	10	5	103	249
11:30 AM	26	8	7	0	41	6	1	4	0	11	15	73	4	5	97	6	99	7	8	120	269
11:45 AM	30	4	9	0	43	4	3	7	0	14	16	90	1	0	107	7	84	12	6	109	273
Total	116	24	32	0	172	16	12	25	0	53	45	333	10	8	396	22	359	49	28	458	1079
12:00 PM	29	1	11	0	41	2	5	13	0	20	11	74	3	0	88	10	97	16	6	129	278
12:15 PM	29	4	7	0	40	6	7	9	0	22	12	88	4	4	108	6	75	14	10	105	275
12:30 PM	29	3	10	0	42	2	4	10	0	16	18	95	1	3	117	8	100	20	5	133	308
12:45 PM	29	4	15	0	48	2	2	9	0	13	19	92	4	2	117	9	77	22	21	129	307
Total	116	12	43	0	171	12	18	41	0	71	60	349	12	9	430	33	349	72	42	496	1168
01:00 PM	36	5	10	0	51	3	0	6	0	9	19	83	2	1	105	5	88	11	12	116	281
01:15 PM	29	1	6	0	36	2	5	4	0	11	17	84	3	1	105	3	91	20	7	121	273
01:30 PM	32	4	16	0	52	4	1	4	0	9	12	113	5	1	131	5	95	10	17	127	319
01:45 PM	30	6	6	0	42	2	4	8	0	14	23	112	0	3	138	3	71	19	2	95	289
Total	127	16	38	0	181	11	10	22	0	43	71	392	10	6	479	16	345	60	38	459	1162
02:00 PM	29	3	17	0	49	7	5	10	0	22	20	114	6	0	140	5	75	10	9	99	310
02:15 PM	28	8	9	0	45	5	4	9	0	18	14	107	8	0	129	3	114	15	8	140	332
02:30 PM	27	6	12	0	45	9	8	7	0	24	16	116	3	2	137	8	79	16	11	114	320
02:45 PM	35	3	12	0	50	4	7	4	0	15	23	109	5	2	139	7	89	18	9	123	327
Total	119	20	50	0	189	25	24	30	0	79	73	446	22	4	545	23	357	59	37	476	1289
03:00 PM	42	11	9	0	62	6	6	9	0	21	32	106	6	0	144	8	113	21	8	150	377
03:15 PM	59	9	12	0	80	7	8	7	0	22	28	140	5	1	174	5	133	31	9	178	454
03:30 PM	34	6	9	0	49	6	4	3	0	13	26	138	1	4	169	6	147	14	15	182	413
03:45 PM	39	8	17	0	64	5	3	8	0	16	33	115	2	0	150	11	122	14	16	163	393
Total	174	34	47	0	255	24	21	27	0	72	119	499	14	5	637	30	515	80	48	673	1637
04:00 PM	50	7	13	0	70	3	5	3	0	11	22	110	5	1	138	12	161	32	7	212	431
04:15 PM	37	10	19	0	66	6	12	5	0	23	20	117	3	2	142	7	125	15	10	157	388
04:30 PM	33	4	9	0	46	3	9	7	0	19	18	116	4	1	139	7	122	15	12	156	360
04:45 PM	30	9	7	0	46	1	6	11	0	18	13	133	8	3	157	16	124	16	9	165	386
Total	150	30	48	0	228	13	32	26	0	71	73	476	20	7	576	42	532	78	38	690	1565
05:00 PM	43	3	14	0	60	6	6	9	0	21	20	107	9	3	139	10	162	28	7	207	427
05:15 PM	47	10	12	0	69	5	9	7	0	21	18	138	8	2	166	14	129	19	9	171	427
05:30 PM	26	9	18	0	53	3	5	10	0	18	24	124	4	2	154	8	108	21	7	144	369
05:45 PM	30	11	11	0	52	5	5	10	0	20	13	94	6	0	113	2	93	18	7	120	305
Total	146	33	55	0	234	19	25	36	0	80	75	463	27	7	572	34	492	86	30	642	1528
06:00 PM	39	6	6	0	51	6	1	10	0	17	19	100	3	4	126	6	119	21	8	154	348
06:15 PM	48	8	7	0	63	9	6	6	0	21	8	93	3	2	106	2	86	11	6	105	295

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	34	6	7	0	47	7	4	8	0	19	10	74	2	4	90	3	96	3	2	104	260
06:45 PM	29	5	9	0	43	4	4	7	0	15	13	83	3	0	99	7	74	11	6	98	255
Total	150	25	29	0	204	26	15	31	0	72	50	350	11	10	421	18	375	46	22	461	1158
Grand Total	1531	268	498	0	2297	226	226	298	0	750	860	5027	172	71	6130	280	5177	829	417	6703	15880
Apprch %	66.7	11.7	21.7	0		30.1	30.1	39.7	0		14	82	2.8	1.2		4.2	77.2	12.4	6.2		
Total %	9.6	1.7	3.1	0	14.5	1.4	1.4	1.9	0	4.7	5.4	31.7	1.1	0.4	38.6	1.8	32.6	5.2	2.6	42.2	

	Tight Squeeze Rd Eastbound				Fairview Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	29	3	8	40	**7**	4	3	14	16	107	3	126	1	126	23	150	330
07:45 AM	32	**4**	12	48	6	**8**	**7**	**21**	**51**	**138**	3	192	4	121	33	158	419
08:00 AM	**35**	3	**13**	**51**	4	6	2	12	50	134	**9**	**193**	**5**	**130**	**48**	**183**	**439**
08:15 AM	27	4	11	42	5	3	2	10	15	122	5	142	2	115	14	131	325
Total Volume	123	14	44	181	22	21	14	57	132	501	20	653	12	492	118	622	1513
% App. Total	68	7.7	24.3		38.6	36.8	24.6		20.2	76.7	3.1		1.9	79.1	19		
PHF	.879	.875	.846	.887	.786	.656	.500	.679	.647	.908	.556	.846	.600	.946	.615	.850	.862
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	29	3	**17**	49	7	5	**10**	22	20	114	6	**140**	5	75	10	90	301
02:15 PM	28	**8**	9	45	5	4	9	18	14	107	**8**	129	3	**114**	15	**132**	**324**
02:30 PM	27	6	12	45	**9**	**8**	7	**24**	16	**116**	3	135	**8**	79	16	103	307
02:45 PM	**35**	3	12	**50**	4	7	4	15	**23**	109	5	137	7	89	**18**	114	316
Total Volume	119	20	50	189	25	24	30	79	73	446	22	541	23	357	59	439	1248
% App. Total	63	10.6	26.5		31.6	30.4	38		13.5	82.4	4.1		5.2	81.3	13.4		
PHF	.850	.625	.735	.945	.694	.750	.750	.823	.793	.961	.688	.966	.719	.783	.819	.831	.963

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	2	0	0	0	2	0	0	0	0	0	1	12	0	0	13	0	6	0	0	6	21
06:15 AM	1	0	0	0	1	0	0	0	0	0	0	13	0	0	13	0	13	0	0	13	27
06:30 AM	2	0	0	0	2	0	0	0	0	0	1	9	0	0	10	0	15	0	0	15	27
06:45 AM	1	0	0	0	1	0	1	0	0	1	1	14	0	0	15	0	12	0	0	12	29
Total	6	0	0	0	6	0	1	0	0	1	3	48	0	0	51	0	46	0	0	46	104
07:00 AM	0	0	0	0	0	0	0	0	0	0	3	18	0	0	21	0	14	1	0	15	36
07:15 AM	1	0	1	0	2	1	0	1	0	2	0	11	0	0	11	1	9	1	0	11	26
07:30 AM	1	0	3	0	4	0	0	1	0	1	1	11	0	0	12	0	19	1	0	20	37
07:45 AM	2	0	0	0	2	0	0	0	0	0	9	16	0	0	25	0	15	7	0	22	49
Total	4	0	4	0	8	1	0	2	0	3	13	56	0	0	69	1	57	10	0	68	148
08:00 AM	0	0	1	0	1	0	1	0	0	1	15	18	1	0	34	0	8	0	0	8	44
08:15 AM	1	0	1	0	2	0	0	0	0	0	1	18	0	0	19	2	16	2	0	20	41
08:30 AM	2	1	1	0	4	1	3	1	0	5	2	13	2	0	17	0	15	2	0	17	43
08:45 AM	3	0	2	0	5	1	0	0	0	1	2	17	1	0	20	0	19	0	0	19	45
Total	6	1	5	0	12	2	4	1	0	7	20	66	4	0	90	2	58	4	0	64	173
09:00 AM	1	0	2	0	3	0	0	0	0	0	4	22	1	0	27	0	22	1	0	23	53
09:15 AM	1	0	1	0	2	0	0	0	0	0	3	23	0	0	26	0	25	0	1	26	54
09:30 AM	1	0	0	0	1	1	0	0	0	1	0	15	0	0	15	0	19	1	0	20	37
09:45 AM	2	0	0	0	2	0	0	0	0	0	2	19	0	0	21	0	15	1	0	16	39
Total	5	0	3	0	8	1	0	0	0	1	9	79	1	0	89	0	81	3	1	85	183
10:00 AM	2	0	0	0	2	0	1	0	0	1	0	12	1	0	13	0	13	0	0	13	29
10:15 AM	0	0	0	0	0	1	1	0	0	2	0	20	0	0	20	0	16	1	0	17	39
10:30 AM	1	0	1	0	2	0	0	0	0	0	1	20	0	0	21	0	26	1	0	27	50
10:45 AM	0	1	2	0	3	0	0	2	0	2	1	16	0	0	17	0	11	1	0	12	34
Total	3	1	3	0	7	1	2	2	0	5	2	68	1	0	71	0	66	3	0	69	152
11:00 AM	0	0	0	0	0	0	0	1	0	1	1	22	0	0	23	0	25	2	0	27	51
11:15 AM	2	0	2	0	4	1	0	0	0	1	0	22	0	0	22	0	11	0	0	11	38
11:30 AM	3	0	1	0	4	0	1	0	0	1	1	19	0	0	20	0	16	0	1	17	42
11:45 AM	1	0	1	0	2	0	0	1	0	1	0	19	1	0	20	0	17	1	0	18	41
Total	6	0	4	0	10	1	1	2	0	4	2	82	1	0	85	0	69	3	1	73	172
12:00 PM	2	0	1	0	3	0	0	0	0	0	5	24	0	0	29	0	20	3	1	24	56
12:15 PM	0	0	1	0	1	0	0	0	0	0	1	23	0	0	24	0	12	1	0	13	38
12:30 PM	2	0	0	0	2	0	0	0	0	0	3	14	0	0	17	0	22	0	0	22	41
12:45 PM	1	0	2	0	3	0	0	0	0	0	1	18	0	0	19	0	10	0	0	10	32
Total	5	0	4	0	9	0	0	0	0	0	10	79	0	0	89	0	64	4	1	69	167
01:00 PM	1	0	0	0	1	0	0	0	0	0	2	22	0	0	24	2	11	0	0	13	38
01:15 PM	0	0	1	0	1	0	1	0	0	1	2	13	0	0	15	0	17	4	0	21	38
01:30 PM	1	0	4	0	5	0	0	1	0	1	2	24	0	0	26	1	17	0	0	18	50
01:45 PM	0	0	2	0	2	0	1	0	0	1	3	17	0	0	20	2	20	0	0	22	45
Total	2	0	7	0	9	0	2	1	0	3	9	76	0	0	85	5	65	4	0	74	171
02:00 PM	2	0	1	0	3	1	0	2	0	3	0	24	2	0	26	0	16	2	0	18	50
02:15 PM	5	0	3	0	8	2	2	1	0	5	1	15	3	0	19	0	20	1	0	21	53
02:30 PM	3	1	1	0	5	2	0	0	0	2	1	15	0	0	16	1	19	4	0	24	47
02:45 PM	1	0	1	0	2	0	1	0	0	1	0	13	0	0	13	1	17	0	0	18	34
Total	11	1	6	0	18	5	3	3	0	11	2	67	5	0	74	2	72	7	0	81	184
03:00 PM	1	0	2	0	3	1	0	0	0	1	3	16	1	0	20	1	21	1	0	23	47
03:15 PM	5	1	1	0	7	0	0	0	0	0	11	29	1	4	45	0	19	2	0	21	73
03:30 PM	2	0	3	0	5	0	0	0	0	0	0	16	0	0	16	0	15	1	1	17	38
03:45 PM	1	0	1	0	2	2	0	0	0	2	2	19	0	0	21	0	5	2	0	7	32
Total	9	1	7	0	17	3	0	0	0	3	16	80	2	4	102	1	60	6	1	68	190
04:00 PM	4	0	0	0	4	0	0	0	0	0	2	21	0	0	23	0	12	2	0	14	41
04:15 PM	0	0	1	0	1	0	0	0	0	0	1	17	0	0	18	0	16	2	0	18	37
04:30 PM	2	0	0	0	2	0	0	0	0	0	0	17	0	0	17	0	19	1	0	20	39
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	13	1	0	15	0	12	1	0	13	28
Total	6	0	1	0	7	0	0	0	0	0	4	68	1	0	73	0	59	6	0	65	145
05:00 PM	2	0	0	0	2	0	0	0	0	0	2	9	0	0	11	0	11	1	0	12	25
05:15 PM	1	0	0	0	1	1	0	0	0	1	0	6	0	0	6	0	7	1	0	8	16
05:30 PM	1	0	1	0	2	0	0	0	0	0	3	15	0	0	18	0	12	1	0	13	33
05:45 PM	1	0	0	0	1	0	0	0	0	0	0	10	0	0	10	0	17	0	0	17	28
Total	5	0	1	0	6	1	0	0	0	1	5	40	0	0	45	0	47	3	0	50	102
06:00 PM	2	0	1	0	3	0	0	0	0	0	1	9	0	0	10	0	10	0	0	10	23
06:15 PM	1	0	0	0	1	0	0	0	0	0	1	5	1	0	7	0	6	1	0	7	15

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	1	0	1	0	0	0	0	0	0	4	0	0	4	0	13	1	0	14	19
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	4	0	0	4	14
Total	3	0	2	0	5	0	0	0	0	0	2	28	1	0	31	0	33	2	0	35	71
Grand Total	71	4	47	0	122	15	13	11	0	39	97	837	16	4	954	11	777	55	4	847	1962
Apprch %	58.2	3.3	38.5	0		38.5	33.3	28.2	0		10.2	87.7	1.7	0.4		1.3	91.7	6.5	0.5		
Total %	3.6	0.2	2.4	0	6.2	0.8	0.7	0.6	0	2	4.9	42.7	0.8	0.2	48.6	0.6	39.6	2.8	0.2	43.2	

	Tight Squeeze Rd Eastbound				Fairview Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:30 AM																	
08:30 AM	2	**1**	1	4	**1**	**3**	**1**	**5**	2	13	**2**	17	0	15	**2**	17	43
08:45 AM	**3**	0	**2**	**5**	1	0	0	1	2	17	1	20	0	19	0	19	45
09:00 AM	1	0	2	3	0	0	0	0	**4**	22	1	**27**	0	22	1	23	**53**
09:15 AM	1	0	1	2	0	0	0	0	3	**23**	0	26	0	**25**	0	**25**	53
Total Volume	7	1	6	14	2	3	1	6	11	75	4	90	0	81	3	84	194
% App. Total	50	7.1	42.9		33.3	50	16.7		12.2	83.3	4.4		0	96.4	3.6		
PHF	.583	.250	.750	.700	.500	.250	.250	.300	.688	.815	.500	.833	.000	.810	.375	.840	.915
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	1	0	**4**	5	0	0	1	1	2	**24**	0	**26**	1	17	0	18	50
01:45 PM	0	0	2	2	0	1	0	1	**3**	17	0	20	**2**	**20**	0	**22**	45
02:00 PM	2	0	1	3	1	0	**2**	3	0	24	2	26	0	16	**2**	18	50
02:15 PM	**5**	0	3	**8**	**2**	**2**	1	**5**	1	15	**3**	19	0	20	1	21	**53**
Total Volume	8	0	10	18	3	3	4	10	6	80	5	91	3	73	3	79	198
% App. Total	44.4	0	55.6		30	30	40		6.6	87.9	5.5		3.8	92.4	3.8		
PHF	.400	.000	.625	.563	.375	.375	.500	.500	.500	.833	.417	.875	.375	.913	.375	.898	.934

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
10:00 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	3
10:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	5
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	3	0	1	0	4	0	0	0	0	0	0	1	1	0	2	1	1	1	0	3	9
Apprch %	75	0	25	0		0	0	0	0		0	50	50	0		33.3	33.3	33.3	0		
Total %	33.3	0	11.1	0	44.4	0	0	0	0	0	0	11.1	11.1	0	22.2	11.1	11.1	11.1	0	33.3	

	Tight Squeeze Rd Eastbound				Fairview Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:00 AM																	
10:00 AM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	1	0	0	1	0	0	0	0	0	0	**1**	**1**	**1**	0	0	**1**	**3**
10:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	3	0	0	3	0	0	0	0	0	0	1	1	1	0	0	1	5
% App. Total	100	0	0		0	0	0		0	0	100		100	0	0		
PHF	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.250	.250	.250	.000	.000	.250	.417
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	14	1	2	0	17	6	1	0	0	7	6	49	2	0	57	0	64	9	0	73	154
06:15 AM	16	1	5	0	22	2	1	2	0	5	10	80	0	0	90	2	82	6	7	97	214
06:30 AM	9	1	6	0	16	1	0	0	0	1	7	90	1	1	99	0	88	10	10	108	224
06:45 AM	11	3	3	0	17	4	3	0	0	7	9	94	3	0	106	2	79	13	10	104	234
Total	50	6	16	0	72	13	5	2	0	20	32	313	6	1	352	4	313	38	27	382	826
07:00 AM	19	2	5	0	26	5	1	1	0	7	13	76	0	0	89	3	99	16	4	122	244
07:15 AM	32	5	6	0	43	6	2	2	0	10	17	104	1	0	122	1	126	15	5	147	322
07:30 AM	30	3	11	0	44	7	4	4	0	15	17	118	3	0	138	1	145	24	7	177	374
07:45 AM	34	4	12	0	50	6	8	7	0	21	60	154	3	1	218	4	136	40	8	188	477
Total	115	14	34	0	163	24	15	14	0	53	107	452	7	1	567	9	506	95	24	634	1417
08:00 AM	35	3	14	0	52	4	7	2	0	13	65	152	10	0	227	5	138	48	8	199	491
08:15 AM	28	4	12	0	44	5	3	2	0	10	16	140	5	1	162	4	131	16	8	159	375
08:30 AM	24	8	10	0	42	3	6	6	0	15	13	122	5	1	141	3	121	11	5	140	338
08:45 AM	22	7	8	0	37	4	4	2	0	10	15	107	3	1	126	7	103	16	8	134	307
Total	109	22	44	0	175	16	20	12	0	48	109	521	23	3	656	19	493	91	29	632	1511
09:00 AM	29	2	11	0	42	2	7	3	0	12	16	94	2	2	114	3	120	11	5	139	307
09:15 AM	19	6	9	0	34	5	7	5	0	17	16	88	2	0	106	3	127	10	4	144	301
09:30 AM	20	7	13	0	40	5	5	4	0	14	14	93	1	1	109	2	90	13	9	114	277
09:45 AM	26	6	11	0	43	6	2	6	0	14	10	99	0	0	109	1	90	18	12	121	287
Total	94	21	44	0	159	18	21	18	0	57	56	374	5	3	438	9	427	52	30	518	1172
10:00 AM	30	3	11	0	44	2	2	4	0	8	8	85	3	1	97	5	110	12	4	131	280
10:15 AM	22	2	7	0	31	3	5	6	0	14	9	114	5	1	129	2	86	7	4	99	273
10:30 AM	21	3	5	0	29	3	4	2	0	9	10	92	2	2	106	6	114	16	8	144	288
10:45 AM	19	5	11	0	35	6	4	7	0	17	10	85	2	3	100	12	113	9	9	143	295
Total	92	13	34	0	139	14	15	19	0	48	37	376	12	7	432	25	423	44	25	517	1136
11:00 AM	35	4	9	0	48	2	4	11	0	17	8	108	3	2	121	4	118	22	9	153	339
11:15 AM	27	8	9	0	44	5	4	4	0	13	7	106	2	1	116	5	94	10	5	114	287
11:30 AM	29	8	8	0	45	6	2	4	0	12	16	92	4	5	117	6	115	7	9	137	311
11:45 AM	31	4	10	0	45	4	3	8	0	15	16	109	2	0	127	7	101	13	6	127	314
Total	122	24	36	0	182	17	13	27	0	57	47	415	11	8	481	22	428	52	29	531	1251
12:00 PM	31	1	12	0	44	2	5	13	0	20	16	98	3	0	117	10	117	19	7	153	334
12:15 PM	29	4	8	0	41	6	7	9	0	22	13	111	4	4	132	6	87	15	10	118	313
12:30 PM	31	3	10	0	44	2	4	10	0	16	21	109	1	3	134	8	122	20	5	155	349
12:45 PM	30	4	17	0	51	2	2	9	0	13	20	110	4	2	136	9	87	22	21	139	339
Total	121	12	47	0	180	12	18	41	0	71	70	428	12	9	519	33	413	76	43	565	1335
01:00 PM	37	5	10	0	52	3	0	6	0	9	21	105	2	1	129	7	99	11	12	129	319
01:15 PM	29	1	7	0	37	2	6	4	0	12	19	97	3	1	120	3	108	24	7	142	311
01:30 PM	33	4	20	0	57	4	1	5	0	10	14	137	5	1	157	6	112	10	17	145	369
01:45 PM	30	6	8	0	44	2	5	8	0	15	26	129	0	3	158	5	91	19	2	117	334
Total	129	16	45	0	190	11	12	23	0	46	80	468	10	6	564	21	410	64	38	533	1333
02:00 PM	31	3	18	0	52	8	5	12	0	25	20	138	8	0	166	5	91	12	9	117	360
02:15 PM	33	8	12	0	53	7	6	10	0	23	15	122	11	0	148	3	134	16	8	161	385
02:30 PM	30	7	13	0	50	11	8	7	0	26	17	131	3	2	153	9	98	20	11	138	367
02:45 PM	36	3	13	0	52	4	8	4	0	16	23	122	5	2	152	8	106	18	9	141	361
Total	130	21	56	0	207	30	27	33	0	90	75	513	27	4	619	25	429	66	37	557	1473
03:00 PM	43	11	11	0	65	7	6	9	0	22	35	122	7	0	164	9	134	22	8	173	424
03:15 PM	64	10	13	0	87	7	8	7	0	22	39	169	6	5	219	5	152	33	9	199	527
03:30 PM	36	6	12	0	54	6	4	3	0	13	26	154	1	4	185	6	162	15	16	199	451
03:45 PM	40	8	18	0	66	7	3	8	0	18	35	134	2	0	171	11	127	16	16	170	425
Total	183	35	54	0	272	27	21	27	0	75	135	579	16	9	739	31	575	86	49	741	1827
04:00 PM	54	7	13	0	74	3	5	3	0	11	24	131	5	1	161	12	173	34	7	226	472
04:15 PM	37	10	20	0	67	6	12	5	0	23	21	134	3	2	160	7	141	17	10	175	425
04:30 PM	35	4	9	0	48	3	9	7	0	19	18	133	4	1	156	7	141	16	12	176	399
04:45 PM	30	9	7	0	46	1	6	11	0	18	14	146	9	3	172	16	136	17	9	178	414
Total	156	30	49	0	235	13	32	26	0	71	77	544	21	7	649	42	591	84	38	755	1710
05:00 PM	45	3	14	0	62	6	6	9	0	21	22	116	9	3	150	10	173	29	7	219	452
05:15 PM	48	10	12	0	70	6	9	7	0	22	18	145	8	2	173	14	136	20	9	179	444
05:30 PM	27	9	19	0	55	3	5	10	0	18	27	139	4	2	172	8	120	22	7	157	402
05:45 PM	31	11	11	0	53	5	5	10	0	20	13	104	6	0	123	2	110	18	7	137	333
Total	151	33	56	0	240	20	25	36	0	81	80	504	27	7	618	34	539	89	30	692	1631
06:00 PM	41	6	7	0	54	6	1	10	0	17	20	109	3	4	136	6	129	21	8	164	371
06:15 PM	49	8	7	0	64	9	6	6	0	21	9	98	4	2	113	2	92	12	6	112	310

Peggy Malone & Associates
(800) 247-8602

File Name : 3-US 29 and Tight Squeeze Rd_Fairview Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	Tight Squeeze Rd Eastbound					Fairview Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	34	6	8	0	48	7	4	8	0	19	10	78	2	4	94	3	109	4	2	118	279
06:45 PM	29	5	9	0	43	4	4	7	0	15	13	93	3	0	109	7	78	11	6	102	269
Total	153	25	31	0	209	26	15	31	0	72	52	378	12	10	452	18	408	48	22	496	1229
Grand Total	1605	272	546	0	2423	241	239	309	0	789	957	5865	189	75	7086	292	5955	885	421	7553	17851
Apprch %	66.2	11.2	22.5	0		30.5	30.3	39.2	0		13.5	82.8	2.7	1.1		3.9	78.8	11.7	5.6		
Total %	9	1.5	3.1	0	13.6	1.4	1.3	1.7	0	4.4	5.4	32.9	1.1	0.4	39.7	1.6	33.4	5	2.4	42.3	

	Tight Squeeze Rd Eastbound				Fairview Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	30	3	11	44	**7**	4	4	15	17	118	3	138	1	**145**	24	170	367
07:45 AM	34	**4**	12	50	6	**8**	**7**	**21**	60	**154**	3	217	4	136	40	180	468
08:00 AM	**35**	3	**14**	**52**	4	7	2	13	**65**	152	**10**	**227**	**5**	138	**48**	**191**	**483**
08:15 AM	28	4	12	44	5	3	2	10	16	140	5	161	4	131	16	151	366
Total Volume	127	14	49	190	22	22	15	59	158	564	21	743	14	550	128	692	1684
% App. Total	66.8	7.4	25.8		37.3	37.3	25.4		21.3	75.9	2.8		2	79.5	18.5		
PHF	.907	.875	.875	.913	.786	.688	.536	.702	.608	.916	.525	.818	.700	.948	.667	.906	.872
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	31	3	**18**	52	8	5	**12**	25	20	**138**	8	**166**	5	91	12	108	351
02:15 PM	33	**8**	12	**53**	7	6	10	23	15	122	**11**	148	3	**134**	16	**153**	**377**
02:30 PM	30	7	13	50	**11**	**8**	7	**26**	17	131	3	151	**9**	98	**20**	127	354
02:45 PM	**36**	3	13	52	4	8	4	16	**23**	122	5	150	8	106	18	132	350
Total Volume	130	21	56	207	30	27	33	90	75	513	27	615	25	429	66	520	1432
% App. Total	62.8	10.1	27.1		33.3	30	36.7		12.2	83.4	4.4		4.8	82.5	12.7		
PHF	.903	.656	.778	.976	.682	.844	.688	.865	.815	.929	.614	.926	.694	.800	.825	.850	.950

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	16	2	2	0	20	8	1	1	0	10	0	136	7	0	143	0	36	2	0	38	211
06:15 AM	27	4	2	0	33	7	2	0	0	9	0	167	12	0	179	1	66	3	0	70	291
06:30 AM	21	2	5	0	28	15	2	1	0	18	0	170	10	0	180	1	67	1	0	69	295
06:45 AM	25	5	4	0	34	20	1	0	0	21	3	155	14	0	172	1	80	7	0	88	315
Total	89	13	13	0	115	50	6	2	0	58	3	628	43	0	674	3	249	13	0	265	1112
07:00 AM	25	9	2	0	36	21	2	0	0	23	2	161	18	0	181	1	84	7	0	92	332
07:15 AM	25	10	5	0	40	12	1	2	0	15	1	236	21	1	259	3	137	10	1	151	465
07:30 AM	19	11	7	0	37	18	4	2	0	24	1	211	34	0	246	3	139	10	0	152	459
07:45 AM	23	16	10	0	49	19	4	2	0	25	1	188	21	0	210	6	110	10	0	126	410
Total	92	46	24	0	162	70	11	6	0	87	5	796	94	1	896	13	470	37	1	521	1666
08:00 AM	18	14	13	0	45	19	5	2	0	26	0	129	20	0	149	16	103	3	0	122	342
08:15 AM	14	5	7	0	26	22	7	17	0	46	0	160	32	0	192	11	113	5	0	129	393
08:30 AM	13	4	8	0	25	30	16	36	0	82	4	142	17	1	164	2	104	5	0	111	382
08:45 AM	16	5	1	0	22	12	4	3	0	19	3	128	10	0	141	0	69	4	0	73	255
Total	61	28	29	0	118	83	32	58	0	173	7	559	79	1	646	29	389	17	0	435	1372
09:00 AM	10	1	2	0	13	15	8	0	0	23	1	109	11	0	121	0	70	4	0	74	231
09:15 AM	12	5	3	0	20	12	2	5	0	19	2	128	13	1	144	1	91	7	0	99	282
09:30 AM	12	3	4	0	19	19	2	4	0	25	3	118	9	1	131	0	93	6	0	99	274
09:45 AM	13	2	1	0	16	14	3	0	0	17	4	114	11	0	129	1	87	10	0	98	260
Total	47	11	10	0	68	60	15	9	0	84	10	469	44	2	525	2	341	27	0	370	1047
10:00 AM	4	3	4	0	11	11	3	0	0	14	2	108	12	0	122	1	95	11	0	107	254
10:15 AM	12	2	5	0	19	13	3	1	0	17	0	111	14	0	125	4	76	6	1	87	248
10:30 AM	9	5	6	0	20	10	0	4	0	14	5	112	12	0	129	3	97	13	1	114	277
10:45 AM	13	5	1	0	19	13	4	3	0	20	3	107	18	0	128	0	89	6	0	95	262
Total	38	15	16	0	69	47	10	8	0	65	10	438	56	0	504	8	357	36	2	403	1041
11:00 AM	8	3	4	0	15	10	5	1	0	16	2	85	7	0	94	2	97	7	1	107	232
11:15 AM	5	1	1	0	7	16	3	2	0	21	5	108	15	0	128	0	90	7	0	97	253
11:30 AM	10	3	3	0	16	17	5	8	0	30	4	107	11	0	122	0	85	13	0	98	266
11:45 AM	13	1	3	0	17	18	0	3	0	21	2	111	13	0	126	2	92	12	1	107	271
Total	36	8	11	0	55	61	13	14	0	88	13	411	46	0	470	4	364	39	2	409	1022
12:00 PM	13	7	3	0	23	23	5	14	0	42	5	110	14	1	130	2	115	11	1	129	324
12:15 PM	12	6	2	0	20	23	4	3	0	30	2	126	18	0	146	4	122	10	0	136	332
12:30 PM	16	1	3	0	20	16	4	4	0	24	1	91	16	0	108	1	126	13	0	140	292
12:45 PM	6	4	3	0	13	23	7	6	0	36	1	119	16	0	136	0	106	10	1	117	302
Total	47	18	11	0	76	85	20	27	0	132	9	446	64	1	520	7	469	44	2	522	1250
01:00 PM	11	6	1	0	18	9	2	2	0	13	6	97	15	0	118	3	106	13	2	124	273
01:15 PM	9	1	3	0	13	9	6	2	0	17	3	126	18	0	147	2	114	8	0	124	301
01:30 PM	5	7	3	0	15	13	0	2	0	15	2	120	9	1	132	3	107	9	0	119	281
01:45 PM	11	1	1	0	13	14	8	1	0	23	0	75	15	1	91	0	126	11	1	138	265
Total	36	15	8	0	59	45	16	7	0	68	11	418	57	2	488	8	453	41	3	505	1120
02:00 PM	12	8	4	0	24	16	1	2	0	19	4	107	15	0	126	1	100	16	0	117	286
02:15 PM	17	3	2	0	22	17	1	1	0	19	5	123	20	0	148	1	130	9	0	140	329
02:30 PM	8	6	2	0	16	13	3	2	0	18	3	131	13	0	147	1	161	11	0	173	354
02:45 PM	13	7	7	0	27	16	5	6	0	27	3	110	19	0	132	4	153	12	1	170	356
Total	50	24	15	0	89	62	10	11	0	83	15	471	67	0	553	7	544	48	1	600	1325
03:00 PM	11	4	5	0	20	17	10	8	0	35	3	86	14	0	103	2	157	16	0	175	333
03:15 PM	9	5	6	0	20	29	6	12	0	47	3	111	19	0	133	1	165	8	0	174	374
03:30 PM	9	7	7	0	23	29	10	18	0	57	2	138	22	0	162	3	178	14	0	195	437
03:45 PM	18	2	4	0	24	32	14	7	0	53	8	112	19	0	139	2	193	24	0	219	435
Total	47	18	22	0	87	107	40	45	0	192	16	447	74	0	537	8	693	62	0	763	1579
04:00 PM	10	2	2	0	14	19	9	2	0	30	5	107	29	0	141	3	188	23	0	214	399
04:15 PM	6	4	2	0	12	20	13	3	0	36	5	150	27	0	182	0	152	17	0	169	399
04:30 PM	17	5	1	0	23	28	13	3	0	44	3	151	25	0	179	2	182	17	0	201	447
04:45 PM	10	8	7	0	25	23	8	4	0	35	5	144	31	0	180	2	217	15	0	234	474
Total	43	19	12	0	74	90	43	12	0	145	18	552	112	0	682	7	739	72	0	818	1719
05:00 PM	11	4	1	0	16	37	9	2	0	48	9	143	14	1	167	0	164	23	0	187	418
05:15 PM	10	7	1	0	18	20	9	2	0	31	2	129	22	0	153	2	223	25	0	250	452
05:30 PM	22	12	2	0	36	26	16	3	0	45	4	125	20	0	149	3	189	24	0	216	446
05:45 PM	16	9	4	0	29	13	11	2	0	26	4	119	19	0	142	0	198	25	0	223	420
Total	59	32	8	0	99	96	45	9	0	150	19	516	75	1	611	5	774	97	0	876	1736
06:00 PM	13	3	5	0	21	24	14	0	0	38	4	120	19	1	144	2	146	27	1	176	379
06:15 PM	15	2	5	0	22	20	9	0	0	29	2	93	13	0	108	2	137	11	0	150	309

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	13	1	2	0	16	11	8	1	0	20	0	93	13	0	106	0	132	17	0	149	291
06:45 PM	5	3	0	0	8	9	3	0	0	12	1	66	11	0	78	0	99	11	0	110	208
Total	46	9	12	0	67	64	34	1	0	99	7	372	56	1	436	4	514	66	1	585	1187
Grand Total	691	256	191	0	1138	920	295	209	0	1424	143	6523	867	9	7542	105	6356	599	12	7072	17176
Apprch %	60.7	22.5	16.8	0		64.6	20.7	14.7	0		1.9	86.5	11.5	0.1		1.5	89.9	8.5	0.2		
Total %	4	1.5	1.1	0	6.6	5.4	1.7	1.2	0	8.3	0.8	38	5	0.1	43.9	0.6	37	3.5	0.1	41.2	

	Colonial Hwy Eastbound				Colonial Hwy Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**25**	10	5	40	12	1	**2**	15	**1**	**236**	21	**258**	3	137	**10**	150	**463**
07:30 AM	19	11	7	37	18	4	2	24	1	211	**34**	246	3	**139**	10	**152**	459
07:45 AM	23	**16**	10	**49**	**19**	4	2	25	1	188	21	210	6	110	10	126	410
08:00 AM	18	14	**13**	45	19	**5**	2	**26**	0	129	20	149	**16**	103	3	122	342
Total Volume	85	51	35	171	68	14	8	90	3	764	96	863	28	489	33	550	1674
% App. Total	49.7	29.8	20.5		75.6	15.6	8.9		0.3	88.5	11.1		5.1	88.9	6		
PHF	.850	.797	.673	.872	.895	.700	1.00	.865	.750	.809	.706	.836	.438	.879	.825	.905	.904
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**17**	5	1	23	28	**13**	3	44	3	**151**	25	179	**2**	182	17	201	447
04:45 PM	10	**8**	**7**	**25**	23	8	**4**	35	5	144	**31**	**180**	2	217	15	234	**474**
05:00 PM	11	4	1	16	**37**	9	2	**48**	**9**	143	14	166	0	164	23	187	417
05:15 PM	10	7	1	18	20	9	2	31	2	129	22	153	2	**223**	**25**	**250**	452
Total Volume	48	24	10	82	108	39	11	158	19	567	92	678	6	786	80	872	1790
% App. Total	58.5	29.3	12.2		68.4	24.7	7		2.8	83.6	13.6		0.7	90.1	9.2		
PHF	.706	.750	.357	.820	.730	.750	.688	.823	.528	.939	.742	.942	.750	.881	.800	.872	.944

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	1	1	0	0	2	0	6	1	0	7	0	14	0	0	14	23
06:15 AM	0	0	0	0	0	3	0	0	0	3	0	11	0	0	11	0	10	0	0	10	24
06:30 AM	0	0	0	0	0	2	1	1	0	4	0	14	0	0	14	1	15	1	0	17	35
06:45 AM	0	0	1	0	1	1	1	1	0	3	0	15	2	0	17	2	8	2	0	12	33
Total	0	0	1	0	1	7	3	2	0	12	0	46	3	0	49	3	47	3	0	53	115
07:00 AM	2	0	1	0	3	0	0	1	0	1	0	26	0	0	26	0	10	0	0	10	40
07:15 AM	1	1	0	0	2	1	1	1	0	3	0	11	3	1	15	0	12	0	0	12	32
07:30 AM	0	0	0	0	0	1	0	0	0	1	0	14	1	0	15	0	13	0	0	13	29
07:45 AM	0	1	0	0	1	1	1	0	0	2	2	24	1	0	27	0	8	0	0	8	38
Total	3	2	1	0	6	3	2	2	0	7	2	75	5	1	83	0	43	0	0	43	139
08:00 AM	0	1	0	0	1	3	1	1	0	5	0	14	3	0	17	1	15	1	0	17	40
08:15 AM	1	2	0	0	3	2	0	3	0	5	0	19	4	0	23	4	27	0	0	31	62
08:30 AM	0	1	0	0	1	5	0	4	0	9	0	15	1	0	16	1	22	1	0	24	50
08:45 AM	0	0	1	0	1	0	0	2	0	2	1	20	2	1	24	1	23	0	0	24	51
Total	1	4	1	0	6	10	1	10	0	21	1	68	10	1	80	7	87	2	0	96	203
09:00 AM	3	1	0	0	4	2	0	0	0	2	0	12	5	0	17	0	16	0	0	16	39
09:15 AM	0	0	0	0	0	0	0	0	0	0	1	8	3	0	12	0	15	0	0	15	27
09:30 AM	0	2	1	0	3	2	0	1	0	3	1	28	2	0	31	0	11	1	1	13	50
09:45 AM	0	0	0	0	0	5	0	0	0	5	0	18	1	0	19	1	23	0	0	24	48
Total	3	3	1	0	7	9	0	1	0	10	2	66	11	0	79	1	65	1	1	68	164
10:00 AM	1	0	2	0	3	3	0	0	0	3	2	17	4	0	23	0	22	0	0	22	51
10:15 AM	0	0	0	0	0	5	0	4	0	9	0	18	2	0	20	0	14	1	0	15	44
10:30 AM	0	0	1	0	1	1	0	0	0	1	0	14	4	0	18	0	21	0	0	21	41
10:45 AM	0	0	0	0	0	3	1	0	0	4	0	18	2	0	20	1	13	0	0	14	38
Total	1	0	3	0	4	12	1	4	0	17	2	67	12	0	81	1	70	1	0	72	174
11:00 AM	1	0	0	0	1	0	0	0	0	0	0	21	2	0	23	0	14	0	0	14	38
11:15 AM	1	0	0	0	1	5	0	0	0	5	0	16	2	0	18	0	13	0	0	13	37
11:30 AM	1	0	0	0	1	0	1	2	0	3	1	15	2	0	18	1	19	0	0	20	42
11:45 AM	0	0	0	0	0	0	0	1	0	1	0	22	0	0	22	0	13	0	0	13	36
Total	3	0	0	0	3	5	1	3	0	9	1	74	6	0	81	1	59	0	0	60	153
12:00 PM	0	0	0	0	0	0	1	1	0	2	1	17	1	0	19	1	13	0	0	14	35
12:15 PM	0	0	1	0	1	2	0	0	0	2	0	16	4	0	20	1	16	0	0	17	40
12:30 PM	0	0	2	0	2	6	1	3	0	10	0	17	3	0	20	1	22	0	0	23	55
12:45 PM	0	0	0	0	0	3	0	4	0	7	1	24	4	0	29	2	22	0	0	24	60
Total	0	0	3	0	3	11	2	8	0	21	2	74	12	0	88	5	73	0	0	78	190
01:00 PM	0	0	0	0	0	1	0	2	0	3	0	17	5	0	22	1	16	0	0	17	42
01:15 PM	0	0	0	0	0	1	0	0	0	1	0	15	3	0	18	0	17	0	0	17	36
01:30 PM	0	0	0	0	0	2	0	1	0	3	0	22	2	0	24	0	18	0	0	18	45
01:45 PM	0	0	0	0	0	1	1	2	0	4	0	15	2	0	17	1	23	0	0	24	45
Total	0	0	0	0	0	5	1	5	0	11	0	69	12	0	81	2	74	0	0	76	168
02:00 PM	0	0	1	0	1	1	0	1	0	2	0	18	1	0	19	0	25	0	0	25	47
02:15 PM	0	0	0	0	0	2	1	2	0	5	0	20	3	0	23	1	14	0	0	15	43
02:30 PM	0	0	0	0	0	0	0	1	0	1	0	12	1	0	13	0	18	1	0	19	33
02:45 PM	1	0	1	0	2	1	0	4	0	5	0	25	1	0	26	0	15	0	0	15	48
Total	1	0	2	0	3	4	1	8	0	13	0	75	6	0	81	1	72	1	0	74	171
03:00 PM	0	0	1	0	1	1	2	0	0	3	0	20	0	0	20	0	11	0	0	11	35
03:15 PM	0	0	0	0	0	3	1	1	0	5	0	13	3	0	16	3	19	1	0	23	44
03:30 PM	0	0	0	0	0	1	1	2	0	4	3	15	1	0	19	5	23	1	0	29	52
03:45 PM	0	2	0	0	2	2	1	3	0	6	0	25	1	0	26	0	19	1	0	20	54
Total	0	2	1	0	3	7	5	6	0	18	3	73	5	0	81	8	72	3	0	83	185
04:00 PM	0	3	0	0	3	2	0	1	0	3	0	20	0	0	20	1	21	2	0	24	50
04:15 PM	0	0	0	0	0	2	1	1	0	4	0	18	3	0	21	0	17	0	0	17	42
04:30 PM	0	0	1	0	1	3	0	1	0	4	0	16	0	0	16	2	15	3	0	20	41
04:45 PM	0	0	0	0	0	3	0	1	0	4	0	16	0	0	16	0	11	1	0	12	32
Total	0	3	1	0	4	10	1	4	0	15	0	70	3	0	73	3	64	6	0	73	165
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	17	2	0	19	0	13	0	0	13	32
05:15 PM	0	0	0	0	0	1	0	0	0	1	0	18	1	0	19	0	10	0	0	10	30
05:30 PM	0	0	0	0	0	6	2	0	0	8	1	8	1	0	10	1	9	0	0	10	28
05:45 PM	0	0	0	0	0	2	0	1	0	3	0	8	1	0	9	0	12	0	0	12	24
Total	0	0	0	0	0	9	2	1	0	12	1	51	5	0	57	1	44	0	0	45	114
06:00 PM	0	0	0	0	0	1	1	0	0	2	0	17	1	0	18	0	12	0	0	12	32
06:15 PM	1	0	0	0	1	0	0	0	0	0	0	12	0	0	12	0	15	0	0	15	28

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	1	0	0	1	1	0	0	0	1	0	7	0	0	7	0	6	0	0	6	15
06:45 PM	0	0	0	0	0	1	0	0	0	1	1	5	0	0	6	0	9	0	0	9	16
Total	1	1	0	0	2	3	1	0	0	4	1	41	1	0	43	0	42	0	0	42	91
Grand Total	13	15	14	0	42	95	21	54	0	170	15	849	91	2	957	33	812	17	1	863	2032
Apprch %	31	35.7	33.3	0		55.9	12.4	31.8	0		1.6	88.7	9.5	0.2		3.8	94.1	2	0.1		
Total %	0.6	0.7	0.7	0	2.1	4.7	1	2.7	0	8.4	0.7	41.8	4.5	0.1	47.1	1.6	40	0.8	0	42.5	

	Colonial Hwy Eastbound				Colonial Hwy Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	1	0	1	3	**1**	1	5	0	14	3	17	1	15	**1**	17	40
08:15 AM	**1**	**2**	0	**3**	2	0	3	5	0	19	**4**	**23**	**4**	**27**	0	**31**	**62**
08:30 AM	0	1	0	1	**5**	0	**4**	**9**	0	15	1	16	1	22	1	24	50
08:45 AM	0	0	**1**	1	0	0	2	2	**1**	**20**	2	23	1	23	0	24	50
Total Volume	1	4	1	6	10	1	10	21	1	68	10	79	7	87	2	96	202
% App. Total	16.7	66.7	16.7		47.6	4.8	47.6		1.3	86.1	12.7		7.3	90.6	2.1		
PHF	.250	.500	.250	.500	.500	.250	.625	.583	.250	.850	.625	.859	.438	.806	.500	.774	.815
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	0	0	0	0	**3**	**1**	1	5	0	13	**3**	16	3	19	1	23	44
03:30 PM	0	0	0	0	1	1	2	4	**3**	15	1	19	**5**	**23**	1	**29**	52
03:45 PM	0	2	0	2	2	1	**3**	**6**	0	**25**	1	**26**	0	19	1	20	**54**
04:00 PM	0	**3**	0	**3**	2	0	1	3	0	20	0	20	1	21	**2**	24	50
Total Volume	0	5	0	5	8	3	7	18	3	73	5	81	9	82	5	96	200
% App. Total	0	100	0		44.4	16.7	38.9		3.7	90.1	6.2		9.4	85.4	5.2		
PHF	.000	.417	.000	.417	.667	.750	.583	.750	.250	.730	.417	.779	.450	.891	.625	.828	.926

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	4	0	0	4	5
Apprch %	0	0	0	0		100	0	0	0		0	0	0	0		0	100	0	0		
Total %	0	0	0	0	0	20	0	0	0	20	0	0	0	0	0	0	80	0	0	80	

	Colonial Hwy Eastbound				Colonial Hwy Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	**1**
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**	**2**
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	16	2	2	0	20	9	2	1	0	12	0	142	8	0	150	0	50	2	0	52	234
06:15 AM	27	4	2	0	33	10	2	0	0	12	0	178	12	0	190	1	76	3	0	80	315
06:30 AM	21	2	5	0	28	17	3	2	0	22	0	184	10	0	194	2	82	2	0	86	330
06:45 AM	25	5	5	0	35	21	2	1	0	24	3	170	16	0	189	3	88	9	0	100	348
Total	89	13	14	0	116	57	9	4	0	70	3	674	46	0	723	6	296	16	0	318	1227
07:00 AM	27	9	3	0	39	21	2	1	0	24	2	187	18	0	207	1	94	7	0	102	372
07:15 AM	26	11	5	0	42	13	2	3	0	18	1	247	24	2	274	3	149	10	1	163	497
07:30 AM	19	11	7	0	37	19	4	2	0	25	1	225	35	0	261	3	152	10	0	165	488
07:45 AM	23	17	10	0	50	20	5	2	0	27	3	212	22	0	237	6	118	10	0	134	448
Total	95	48	25	0	168	73	13	8	0	94	7	871	99	2	979	13	513	37	1	564	1805
08:00 AM	18	15	13	0	46	22	6	3	0	31	0	143	23	0	166	17	119	4	0	140	383
08:15 AM	15	7	7	0	29	24	7	20	0	51	0	179	36	0	215	15	140	5	0	160	455
08:30 AM	13	5	8	0	26	35	16	40	0	91	4	157	18	1	180	3	126	6	0	135	432
08:45 AM	16	5	2	0	23	12	4	5	0	21	4	148	12	1	165	1	92	4	0	97	306
Total	62	32	30	0	124	93	33	68	0	194	8	627	89	2	726	36	477	19	0	532	1576
09:00 AM	13	2	2	0	17	17	8	0	0	25	1	121	16	0	138	0	86	4	0	90	270
09:15 AM	12	5	3	0	20	12	2	5	0	19	3	136	16	1	156	1	106	7	0	114	309
09:30 AM	12	5	5	0	22	21	2	5	0	28	4	146	11	1	162	0	105	7	1	113	325
09:45 AM	13	2	1	0	16	19	3	0	0	22	4	132	12	0	148	2	110	10	0	122	308
Total	50	14	11	0	75	69	15	10	0	94	12	535	55	2	604	3	407	28	1	439	1212
10:00 AM	5	3	6	0	14	14	3	0	0	17	4	125	16	0	145	1	117	11	0	129	305
10:15 AM	12	2	5	0	19	18	3	5	0	26	0	129	16	0	145	4	90	7	1	102	292
10:30 AM	9	5	7	0	21	11	0	4	0	15	5	126	16	0	147	3	118	13	1	135	318
10:45 AM	13	5	1	0	19	16	5	3	0	24	3	125	20	0	148	1	102	6	0	109	300
Total	39	15	19	0	73	59	11	12	0	82	12	505	68	0	585	9	427	37	2	475	1215
11:00 AM	9	3	4	0	16	11	5	1	0	17	2	106	9	0	117	2	111	7	1	121	271
11:15 AM	6	1	1	0	8	21	3	2	0	26	5	124	17	0	146	0	103	7	0	110	290
11:30 AM	11	3	3	0	17	17	6	10	0	33	5	122	13	0	140	1	104	13	0	118	308
11:45 AM	13	1	3	0	17	18	0	4	0	22	2	133	13	0	148	2	105	12	1	120	307
Total	39	8	11	0	58	67	14	17	0	98	14	485	52	0	551	5	423	39	2	469	1176
12:00 PM	13	7	3	0	23	23	6	15	0	44	6	127	15	1	149	3	128	11	1	143	359
12:15 PM	12	6	3	0	21	25	4	3	0	32	2	142	22	0	166	5	138	10	0	153	372
12:30 PM	16	1	5	0	22	22	5	7	0	34	1	108	19	0	128	2	148	13	0	163	347
12:45 PM	6	4	3	0	13	26	7	10	0	43	2	143	20	0	165	2	128	10	1	141	362
Total	47	18	14	0	79	96	22	35	0	153	11	520	76	1	608	12	542	44	2	600	1440
01:00 PM	11	6	1	0	18	10	2	4	0	16	6	114	20	0	140	4	122	13	2	141	315
01:15 PM	9	1	3	0	13	10	6	2	0	18	3	141	21	0	165	2	131	8	0	141	337
01:30 PM	5	7	3	0	15	15	0	3	0	18	2	142	11	1	156	3	125	9	0	137	326
01:45 PM	11	1	1	0	13	15	9	3	0	27	0	90	17	1	108	1	149	11	1	162	310
Total	36	15	8	0	59	50	17	12	0	79	11	487	69	2	569	10	527	41	3	581	1288
02:00 PM	12	8	5	0	25	17	1	3	0	21	4	125	16	0	145	1	125	16	0	142	333
02:15 PM	17	3	2	0	22	19	2	3	0	24	5	143	23	0	171	2	144	9	0	155	372
02:30 PM	8	6	2	0	16	13	3	3	0	19	3	143	14	0	160	1	179	12	0	192	387
02:45 PM	14	7	8	0	29	17	5	10	0	32	3	135	20	0	158	4	168	12	1	185	404
Total	51	24	17	0	92	66	11	19	0	96	15	546	73	0	634	8	616	49	1	674	1496
03:00 PM	11	4	6	0	21	18	12	8	0	38	3	106	14	0	123	2	168	16	0	186	368
03:15 PM	9	5	6	0	20	32	7	13	0	52	3	124	22	0	149	4	184	9	0	197	418
03:30 PM	9	7	7	0	23	30	11	20	0	61	5	153	23	0	181	8	201	15	0	224	489
03:45 PM	18	4	4	0	26	34	15	10	0	59	8	137	20	0	165	2	212	25	0	239	489
Total	47	20	23	0	90	114	45	51	0	210	19	520	79	0	618	16	765	65	0	846	1764
04:00 PM	10	5	2	0	17	21	9	3	0	33	5	127	29	0	161	4	209	25	0	238	449
04:15 PM	6	4	2	0	12	22	14	4	0	40	5	168	30	0	203	0	169	17	0	186	441
04:30 PM	17	5	2	0	24	31	13	4	0	48	3	167	25	0	195	4	197	20	0	221	488
04:45 PM	10	8	7	0	25	26	8	5	0	39	5	160	31	0	196	2	228	16	0	246	506
Total	43	22	13	0	78	100	44	16	0	160	18	622	115	0	755	10	803	78	0	891	1884
05:00 PM	11	4	1	0	16	37	9	2	0	48	9	160	16	1	186	0	177	23	0	200	450
05:15 PM	10	7	1	0	18	21	9	2	0	32	2	147	23	0	172	2	233	25	0	260	482
05:30 PM	22	12	2	0	36	32	18	3	0	53	5	133	21	0	159	4	198	24	0	226	474
05:45 PM	16	9	4	0	29	15	11	3	0	29	4	127	20	0	151	0	212	25	0	237	446
Total	59	32	8	0	99	105	47	10	0	162	20	567	80	1	668	6	820	97	0	923	1852
06:00 PM	13	3	5	0	21	25	15	0	0	40	4	137	20	1	162	2	158	27	1	188	411
06:15 PM	16	2	5	0	23	20	9	0	0	29	2	105	13	0	120	2	152	11	0	165	337

Peggy Malone & Associates
(800) 247-8602

File Name : 4-US 29 and Colonial Hwy Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	Colonial Hwy Eastbound					Colonial Hwy Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	13	2	2	0	17	12	8	1	0	21	0	100	13	0	113	0	138	17	0	155	306
06:45 PM	5	3	0	0	8	10	3	0	0	13	2	71	11	0	84	0	108	11	0	119	224
Total	47	10	12	0	69	67	35	1	0	103	8	413	57	1	479	4	556	66	1	627	1278
Grand Total	704	271	205	0	1180	1016	316	263	0	1595	158	7372	958	11	8499	138	7172	616	13	7939	19213
Apprch %	59.7	23	17.4	0		63.7	19.8	16.5	0		1.9	86.7	11.3	0.1		1.7	90.3	7.8	0.2		
Total %	3.7	1.4	1.1	0	6.1	5.3	1.6	1.4	0	8.3	0.8	38.4	5	0.1	44.2	0.7	37.3	3.2	0.1	41.3	

	Colonial Hwy Eastbound				Colonial Hwy Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**26**	11	5	42	13	2	**3**	18	1	**247**	24	**272**	3	149	**10**	162	**494**
07:30 AM	19	11	7	37	19	4	2	25	1	225	**35**	261	3	**152**	10	**165**	488
07:45 AM	23	**17**	10	**50**	20	5	2	27	**3**	212	22	237	6	118	10	134	448
08:00 AM	18	15	**13**	46	**22**	**6**	3	**31**	0	143	23	166	**17**	119	4	140	383
Total Volume	86	54	35	175	74	17	10	101	5	827	104	936	29	538	34	601	1813
% App. Total	49.1	30.9	20		73.3	16.8	9.9		0.5	88.4	11.1		4.8	89.5	5.7		
PHF	.827	.794	.673	.875	.841	.708	.833	.815	.417	.837	.743	.860	.426	.885	.850	.911	.918
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**17**	5	2	24	31	**13**	4	**48**	3	**167**	25	195	**4**	197	20	221	488
04:45 PM	10	**8**	**7**	**25**	26	8	**5**	39	5	160	**31**	**196**	2	228	16	246	**506**
05:00 PM	11	4	1	16	**37**	9	2	48	**9**	160	16	185	0	177	23	200	449
05:15 PM	10	7	1	18	21	9	2	32	2	147	23	172	2	**233**	**25**	**260**	482
Total Volume	48	24	11	83	115	39	13	167	19	634	95	748	8	835	84	927	1925
% App. Total	57.8	28.9	13.3		68.9	23.4	7.8		2.5	84.8	12.7		0.9	90.1	9.1		
PHF	.706	.750	.393	.830	.777	.750	.650	.870	.528	.949	.766	.954	.500	.896	.840	.891	.951

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	4	1	52	0	57	1	124	14	0	139	27	38	2	0	67	263
06:15 AM	0	0	0	0	0	8	0	65	0	73	0	170	15	0	185	27	63	0	0	90	348
06:30 AM	0	0	0	0	0	9	0	84	0	93	0	208	13	1	222	25	74	2	0	101	416
06:45 AM	0	0	0	0	0	6	0	65	0	71	0	164	12	0	176	48	87	1	0	136	383
Total	0	0	0	0	0	27	1	266	0	294	1	666	54	1	722	127	262	5	0	394	1410
07:00 AM	0	0	0	0	0	10	1	57	0	68	1	159	14	0	174	53	107	0	0	160	402
07:15 AM	0	0	0	0	0	11	0	98	0	109	2	228	31	0	261	47	151	0	1	199	569
07:30 AM	0	0	0	0	0	9	2	116	0	127	0	233	22	1	256	65	117	3	0	185	568
07:45 AM	0	0	0	0	0	19	3	86	0	108	1	193	16	3	213	67	121	2	1	191	512
Total	0	0	0	0	0	49	6	357	0	412	4	813	83	4	904	232	496	5	2	735	2051
08:00 AM	0	0	1	0	1	23	2	68	0	93	3	172	24	0	199	46	123	1	0	170	463
08:15 AM	1	0	0	0	1	18	0	63	0	81	1	172	17	0	190	56	112	1	0	169	441
08:30 AM	0	0	1	0	1	17	0	88	0	105	0	205	20	0	225	55	89	0	0	144	475
08:45 AM	1	0	0	0	1	11	1	80	0	92	0	152	19	0	171	47	75	1	1	124	388
Total	2	0	2	0	4	69	3	299	0	371	4	701	80	0	785	204	399	3	1	607	1767
09:00 AM	0	0	0	0	0	6	1	57	0	64	0	118	11	1	130	46	77	0	1	124	318
09:15 AM	0	0	1	0	1	15	0	59	0	74	1	132	10	0	143	38	104	2	1	145	363
09:30 AM	0	0	0	0	0	12	0	67	0	79	0	125	11	0	136	52	101	0	0	153	368
09:45 AM	1	0	1	0	2	11	1	46	0	58	1	121	17	2	141	49	80	0	0	129	330
Total	1	0	2	0	3	44	2	229	0	275	2	496	49	3	550	185	362	2	2	551	1379
10:00 AM	0	0	1	0	1	16	0	55	0	71	1	93	19	1	114	59	109	0	0	168	354
10:15 AM	0	0	0	0	0	14	0	62	0	76	1	114	16	0	131	45	86	1	1	133	340
10:30 AM	1	0	1	0	2	14	0	31	0	45	0	116	14	1	131	42	102	0	0	144	322
10:45 AM	0	0	0	0	0	9	0	45	0	54	1	113	16	1	131	39	95	2	0	136	321
Total	1	0	2	0	3	53	0	193	0	246	3	436	65	3	507	185	392	3	1	581	1337
11:00 AM	1	0	0	0	1	14	0	76	0	90	1	90	12	2	105	58	101	0	1	160	356
11:15 AM	0	0	2	0	2	10	0	55	0	65	1	123	12	1	137	57	98	1	1	157	361
11:30 AM	0	0	0	0	0	15	0	60	0	75	0	114	11	5	130	52	96	2	2	152	357
11:45 AM	0	0	1	0	1	10	0	68	0	78	0	125	21	0	146	77	95	0	0	172	397
Total	1	0	3	0	4	49	0	259	0	308	2	452	56	8	518	244	390	3	4	641	1471
12:00 PM	0	0	0	0	0	20	0	60	0	80	0	106	24	0	130	109	119	1	0	229	439
12:15 PM	0	0	2	0	2	20	0	44	0	64	1	150	19	2	172	72	122	1	0	195	433
12:30 PM	0	0	0	0	0	25	0	57	0	82	1	102	14	0	117	70	129	0	0	199	398
12:45 PM	0	0	2	0	2	20	0	59	0	79	1	112	17	1	131	64	113	0	2	179	391
Total	0	0	4	0	4	85	0	220	0	305	3	470	74	3	550	315	483	2	2	802	1661
01:00 PM	0	0	0	0	0	19	1	37	0	57	2	111	9	1	123	60	110	1	0	171	351
01:15 PM	0	0	0	0	0	13	1	65	0	79	0	122	9	3	134	78	110	0	0	188	401
01:30 PM	0	0	2	0	2	15	0	55	0	70	2	124	9	0	135	64	119	3	1	187	394
01:45 PM	0	0	1	0	1	20	0	63	0	83	0	102	11	0	113	69	128	0	0	197	394
Total	0	0	3	0	3	67	2	220	0	289	4	459	38	4	505	271	467	4	1	743	1540
02:00 PM	0	0	1	0	1	15	0	53	0	68	2	98	9	2	111	62	118	0	0	180	360
02:15 PM	0	0	1	0	1	10	0	53	0	63	2	161	20	1	184	64	145	0	0	209	457
02:30 PM	0	0	1	0	1	22	0	54	0	76	0	108	15	2	125	65	165	0	1	231	433
02:45 PM	0	0	0	0	0	8	0	33	0	41	0	130	14	0	144	76	169	0	0	245	430
Total	0	0	3	0	3	55	0	193	0	248	4	497	58	5	564	267	597	0	1	865	1680
03:00 PM	0	0	0	0	0	16	0	71	0	87	0	125	5	0	130	65	158	3	0	226	443
03:15 PM	0	0	1	0	1	11	0	82	0	93	0	109	11	1	121	74	193	1	0	268	483
03:30 PM	0	0	2	0	2	6	0	54	0	60	1	131	18	3	153	104	183	0	0	287	502
03:45 PM	1	0	4	0	5	13	0	72	0	85	3	153	10	1	167	100	233	1	1	335	592
Total	1	0	7	0	8	46	0	279	0	325	4	518	44	5	571	343	767	5	1	1116	2020
04:00 PM	0	0	0	0	0	8	0	63	0	71	0	107	8	1	116	92	202	0	0	294	481
04:15 PM	0	0	2	0	2	11	0	66	0	77	1	142	13	1	157	81	171	1	0	253	489
04:30 PM	0	0	1	0	1	8	0	71	0	79	0	152	10	1	163	114	212	0	0	326	569
04:45 PM	2	0	2	0	4	11	1	75	0	87	4	154	16	1	175	99	217	0	0	316	582
Total	2	0	5	0	7	38	1	275	0	314	5	555	47	4	611	386	802	1	0	1189	2121
05:00 PM	0	0	1	0	1	10	0	74	0	84	0	167	20	1	188	105	216	0	3	324	597
05:15 PM	1	0	0	0	1	20	0	67	0	87	0	142	17	1	160	121	239	0	0	360	608
05:30 PM	0	0	0	0	0	14	0	74	0	88	2	149	15	1	167	89	233	0	1	323	578
05:45 PM	1	0	0	0	1	14	0	61	0	75	0	118	11	2	131	123	190	0	0	313	520
Total	2	0	1	0	3	58	0	276	0	334	2	576	63	5	646	438	878	0	4	1320	2303
06:00 PM	0	0	0	0	0	10	0	73	0	83	0	142	12	1	155	90	178	0	0	268	506
06:15 PM	0	0	0	0	0	27	0	76	0	103	1	116	7	0	124	88	135	0	0	223	450

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	10	0	78	0	88	0	104	4	0	108	98	142	0	1	241	437
06:45 PM	0	0	3	0	3	12	0	47	0	59	0	86	8	0	94	61	125	0	0	186	342
Total	0	0	3	0	3	59	0	274	0	333	1	448	31	1	481	337	580	0	1	918	1735
Grand Total	10	0	35	0	45	699	15	3340	0	4054	39	7087	742	46	7914	3534	6875	33	20	10462	22475
Apprch %	22.2	0	77.8	0		17.2	0.4	82.4	0		0.5	89.6	9.4	0.6		33.8	65.7	0.3	0.2		
Total %	0	0	0.2	0	0.2	3.1	0.1	14.9	0	18	0.2	31.5	3.3	0.2	35.2	15.7	30.6	0.1	0.1	46.5	

	Bus Drvwy Eastbound				Calohan Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	11	0	98	109	2	228	**31**	**261**	47	**151**	0	**198**	**568**
07:30 AM	0	0	0	0	9	2	**116**	**127**	0	**233**	22	255	65	117	**3**	185	567
07:45 AM	0	0	0	0	19	**3**	86	108	1	193	16	210	**67**	121	2	190	508
08:00 AM	0	0	**1**	**1**	**23**	2	68	93	**3**	172	24	199	46	123	1	170	463
Total Volume	0	0	1	1	62	7	368	437	6	826	93	925	225	512	6	743	2106
% App. Total	0	0	100		14.2	1.6	84.2		0.6	89.3	10.1		30.3	68.9	0.8		
PHF	.000	.000	.250	.250	.674	.583	.793	.860	.500	.886	.750	.886	.840	.848	.500	.938	.927
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**2**	0	**2**	**4**	11	**1**	**75**	87	**4**	154	16	174	99	217	0	316	581
05:00 PM	0	0	1	1	10	0	74	84	0	**167**	**20**	**187**	105	216	0	321	593
05:15 PM	1	0	0	1	**20**	0	67	87	0	142	17	159	**121**	**239**	0	**360**	**607**
05:30 PM	0	0	0	0	14	0	74	**88**	2	149	15	166	89	233	0	322	576
Total Volume	3	0	3	6	55	1	290	346	6	612	68	686	414	905	0	1319	2357
% App. Total	50	0	50		15.9	0.3	83.8		0.9	89.2	9.9		31.4	68.6	0		
PHF	.375	.000	.375	.375	.688	.250	.967	.983	.375	.916	.850	.917	.855	.947	.000	.916	.971

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	4	0	4	0	7	0	0	7	4	14	0	0	18	29
06:15 AM	0	0	0	0	0	0	0	3	0	3	0	9	0	0	9	4	12	0	0	16	28
06:30 AM	0	0	0	0	0	1	0	4	0	5	0	17	0	0	17	4	13	0	0	17	39
06:45 AM	0	0	0	0	0	0	0	4	0	4	0	15	0	0	15	5	12	0	0	17	36
Total	0	0	0	0	0	1	0	15	0	16	0	48	0	0	48	17	51	0	0	68	132
07:00 AM	0	0	0	0	0	2	0	3	0	5	0	22	1	0	23	7	10	0	0	17	45
07:15 AM	0	0	0	0	0	0	0	6	0	6	0	12	1	0	13	9	14	0	0	23	42
07:30 AM	0	0	0	0	0	2	0	7	0	9	0	14	0	0	14	6	10	0	0	16	39
07:45 AM	0	0	0	0	0	0	0	7	0	7	0	21	0	0	21	5	12	0	0	17	45
Total	0	0	0	0	0	4	0	23	0	27	0	69	2	0	71	27	46	0	0	73	171
08:00 AM	0	0	0	0	0	4	0	7	0	11	0	12	2	0	14	6	20	0	0	26	51
08:15 AM	0	0	0	0	0	1	0	11	0	12	0	16	2	0	18	7	31	1	0	39	69
08:30 AM	0	0	0	0	0	1	0	6	0	7	0	16	1	0	17	7	18	0	0	25	49
08:45 AM	0	0	0	0	0	2	0	8	0	10	0	24	1	0	25	3	29	0	0	32	67
Total	0	0	0	0	0	8	0	32	0	40	0	68	6	0	74	23	98	1	0	122	236
09:00 AM	0	0	0	0	0	0	0	7	0	7	0	12	2	0	14	2	12	0	0	14	35
09:15 AM	0	0	0	0	0	1	0	5	0	6	0	9	2	0	11	9	18	0	0	27	44
09:30 AM	0	0	0	0	0	1	0	6	0	7	0	26	1	0	27	11	15	0	0	26	60
09:45 AM	0	0	0	0	0	4	0	3	0	7	0	19	0	0	19	8	21	0	0	29	55
Total	0	0	0	0	0	6	0	21	0	27	0	66	5	0	71	30	66	0	0	96	194
10:00 AM	0	0	0	0	0	3	0	4	0	7	0	18	0	0	18	7	20	0	0	27	52
10:15 AM	0	0	0	0	0	2	0	8	0	10	0	19	0	0	19	5	9	0	0	14	43
10:30 AM	0	0	0	0	0	1	0	4	0	5	0	17	0	0	17	6	21	0	0	27	49
10:45 AM	0	0	0	0	0	1	0	5	0	6	0	15	1	0	16	10	16	0	0	26	48
Total	0	0	0	0	0	7	0	21	0	28	0	69	1	0	70	28	66	0	0	94	192
11:00 AM	0	0	0	0	0	0	0	3	0	3	0	19	2	0	21	8	13	0	0	21	45
11:15 AM	0	0	0	0	0	1	0	8	0	9	0	16	0	0	16	4	17	0	0	21	46
11:30 AM	0	0	0	0	0	1	0	8	0	9	0	14	1	0	15	9	17	0	0	26	50
11:45 AM	0	0	0	0	0	2	0	4	0	6	0	20	1	0	21	4	16	0	0	20	47
Total	0	0	0	0	0	4	0	23	0	27	0	69	4	0	73	25	63	0	0	88	188
12:00 PM	0	0	0	0	0	0	0	5	0	5	0	19	0	0	19	6	14	0	1	21	45
12:15 PM	0	0	0	0	0	1	0	6	0	7	0	19	0	0	19	8	18	0	0	26	52
12:30 PM	0	0	0	0	0	0	0	5	0	5	0	11	1	0	12	14	22	1	0	37	54
12:45 PM	0	0	2	0	2	2	0	12	0	14	0	29	0	0	29	5	23	0	0	28	73
Total	0	0	2	0	2	3	0	28	0	31	0	78	1	0	79	33	77	1	1	112	224
01:00 PM	0	0	0	0	0	4	0	9	0	13	0	23	1	0	24	4	14	0	0	18	55
01:15 PM	0	0	0	0	0	1	0	8	0	9	0	12	0	0	12	7	16	0	0	23	44
01:30 PM	0	0	0	0	0	2	0	6	0	8	0	20	1	0	21	7	25	0	0	32	61
01:45 PM	0	0	0	0	0	2	0	16	0	18	0	21	0	0	21	7	21	0	1	29	68
Total	0	0	0	0	0	9	0	39	0	48	0	76	2	0	78	25	76	0	1	102	228
02:00 PM	0	0	0	0	0	3	0	2	0	5	0	12	0	0	12	5	20	0	0	25	42
02:15 PM	0	0	0	0	0	2	0	5	0	7	0	26	0	0	26	7	15	0	0	22	55
02:30 PM	0	0	0	0	0	2	0	5	0	7	0	14	1	0	15	3	25	1	0	29	51
02:45 PM	0	0	0	0	0	0	0	9	0	9	0	27	1	0	28	7	14	0	0	21	58
Total	0	0	0	0	0	7	0	21	0	28	0	79	2	0	81	22	74	1	0	97	206
03:00 PM	0	0	0	0	0	0	0	9	0	9	0	20	0	0	20	7	17	0	0	24	53
03:15 PM	0	0	0	0	0	1	0	5	0	6	0	15	0	1	16	1	28	0	0	29	51
03:30 PM	0	0	0	0	0	3	0	7	0	10	0	13	1	0	14	4	21	0	0	25	49
03:45 PM	0	0	0	0	0	1	0	10	0	11	0	27	0	0	27	5	23	0	0	28	66
Total	0	0	0	0	0	5	0	31	0	36	0	75	1	1	77	17	89	0	0	106	219
04:00 PM	0	0	0	0	0	1	0	7	0	8	0	20	0	0	20	3	21	0	0	24	52
04:15 PM	0	0	0	0	0	0	0	3	0	3	0	24	1	0	25	2	22	0	0	24	52
04:30 PM	0	0	0	0	0	0	0	3	0	3	0	17	0	0	17	3	20	0	0	23	43
04:45 PM	0	0	0	0	0	1	0	2	0	3	0	12	1	0	13	1	13	0	0	14	30
Total	0	0	0	0	0	2	0	15	0	17	0	73	2	0	75	9	76	0	0	85	177
05:00 PM	0	0	0	0	0	2	0	1	0	3	0	23	0	0	23	2	12	0	0	14	40
05:15 PM	0	0	0	0	0	2	0	3	0	5	0	18	0	0	18	2	10	0	0	12	35
05:30 PM	0	0	0	0	0	0	0	5	0	5	0	10	0	0	10	1	13	0	0	14	29
05:45 PM	0	0	0	0	0	0	0	1	0	1	0	5	0	0	5	5	16	0	0	21	27
Total	0	0	0	0	0	4	0	10	0	14	0	56	0	0	56	10	51	0	0	61	131
06:00 PM	0	0	0	0	0	1	0	2	0	3	0	16	0	0	16	0	9	0	0	9	28
06:15 PM	0	0	0	0	0	1	0	3	0	4	0	15	0	0	15	1	14	0	0	15	34

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	1	0	1	0	8	0	0	8	1	5	0	0	6	15
06:45 PM	0	0	0	0	0	0	0	1	0	1	0	6	0	0	6	3	12	0	0	15	22
Total	0	0	0	0	0	2	0	7	0	9	0	45	0	0	45	5	40	0	0	45	99
Grand Total	0	0	2	0	2	62	0	286	0	348	0	871	26	1	898	271	873	3	2	1149	2397
Apprch %	0	0	100	0		17.8	0	82.2	0		0	97	2.9	0.1		23.6	76	0.3	0.2		
Total %	0	0	0.1	0	0.1	2.6	0	11.9	0	14.5	0	36.3	1.1	0	37.5	11.3	36.4	0.1	0.1	47.9	

	Bus Drvwy Eastbound				Calohan Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	**4**	0	7	11	0	12	**2**	14	6	20	0	26	51
08:15 AM	0	0	0	0	1	0	**11**	**12**	0	16	2	18	**7**	**31**	**1**	**39**	**69**
08:30 AM	0	0	0	0	1	0	6	7	0	16	1	17	7	18	0	25	49
08:45 AM	0	0	0	0	2	0	8	10	0	**24**	1	**25**	3	29	0	32	67
Total Volume	0	0	0	0	8	0	32	40	0	68	6	74	23	98	1	122	236
% App. Total	0	0	0		20	0	80		0	91.9	8.1		18.9	80.3	0.8		
PHF	.000	.000	.000	.000	.500	.000	.727	.833	.000	.708	.750	.740	.821	.790	.250	.782	.855
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	0	0	0	0	1	0	6	7	0	19	0	19	8	18	0	26	52
12:30 PM	0	0	0	0	0	0	5	5	0	11	**1**	12	**14**	22	**1**	**37**	54
12:45 PM	0	0	**2**	**2**	2	0	**12**	**14**	0	**29**	0	**29**	5	**23**	0	28	**73**
01:00 PM	0	0	0	0	**4**	0	9	13	0	23	1	24	4	14	0	18	55
Total Volume	0	0	2	2	7	0	32	39	0	82	2	84	31	77	1	109	234
% App. Total	0	0	100		17.9	0	82.1		0	97.6	2.4		28.4	70.6	0.9		
PHF	.000	.000	.250	.250	.438	.000	.667	.696	.000	.707	.500	.724	.554	.837	.250	.736	.801

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	2
Apprch %	0	0	0	0		0	0	100	0		0	100	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	50	0	50	0	50	0	0	50	0	0	0	0	0	

	Bus Drvwy Eastbound				Calohan Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 AM																	
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	0	100		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	4	1	56	0	61	1	131	14	0	146	31	52	2	0	85	292
06:15 AM	0	0	0	0	0	8	0	68	0	76	0	179	15	0	194	31	75	0	0	106	376
06:30 AM	0	0	0	0	0	10	0	88	0	98	0	225	13	1	239	29	87	2	0	118	455
06:45 AM	0	0	0	0	0	6	0	69	0	75	0	179	12	0	191	53	99	1	0	153	419
Total	0	0	0	0	0	28	1	281	0	310	1	714	54	1	770	144	313	5	0	462	1542
07:00 AM	0	0	0	0	0	12	1	60	0	73	1	181	15	0	197	60	117	0	0	177	447
07:15 AM	0	0	0	0	0	11	0	104	0	115	2	240	32	0	274	56	165	0	1	222	611
07:30 AM	0	0	0	0	0	11	2	123	0	136	0	247	22	1	270	71	127	3	0	201	607
07:45 AM	0	0	0	0	0	19	3	93	0	115	1	214	16	3	234	72	133	2	1	208	557
Total	0	0	0	0	0	53	6	380	0	439	4	882	85	4	975	259	542	5	2	808	2222
08:00 AM	0	0	1	0	1	27	2	75	0	104	3	184	26	0	213	52	143	1	0	196	514
08:15 AM	1	0	0	0	1	19	0	74	0	93	1	188	19	0	208	63	143	2	0	208	510
08:30 AM	0	0	1	0	1	18	0	94	0	112	0	221	21	0	242	62	107	0	0	169	524
08:45 AM	1	0	0	0	1	13	1	88	0	102	0	176	20	0	196	50	104	1	1	156	455
Total	2	0	2	0	4	77	3	331	0	411	4	769	86	0	859	227	497	4	1	729	2003
09:00 AM	0	0	0	0	0	6	1	64	0	71	0	130	13	1	144	48	89	0	1	138	353
09:15 AM	0	0	1	0	1	16	0	64	0	80	1	141	12	0	154	47	122	2	1	172	407
09:30 AM	0	0	0	0	0	13	0	73	0	86	0	151	12	0	163	63	116	0	0	179	428
09:45 AM	1	0	1	0	2	15	1	49	0	65	1	140	17	2	160	57	101	0	0	158	385
Total	1	0	2	0	3	50	2	250	0	302	2	562	54	3	621	215	428	2	2	647	1573
10:00 AM	0	0	1	0	1	19	0	59	0	78	1	111	19	1	132	66	129	0	0	195	406
10:15 AM	0	0	0	0	0	16	0	70	0	86	1	133	16	0	150	50	95	1	1	147	383
10:30 AM	1	0	1	0	2	15	0	35	0	50	0	133	14	1	148	48	123	0	0	171	371
10:45 AM	0	0	0	0	0	10	0	50	0	60	1	128	17	1	147	49	111	2	0	162	369
Total	1	0	2	0	3	60	0	214	0	274	3	505	66	3	577	213	458	3	1	675	1529
11:00 AM	1	0	0	0	1	14	0	79	0	93	1	109	14	2	126	66	114	0	1	181	401
11:15 AM	0	0	2	0	2	11	0	63	0	74	1	139	12	1	153	61	115	1	1	178	407
11:30 AM	0	0	0	0	0	16	0	68	0	84	0	128	12	5	145	61	113	2	2	178	407
11:45 AM	0	0	1	0	1	12	0	72	0	84	0	145	22	0	167	81	111	0	0	192	444
Total	1	0	3	0	4	53	0	282	0	335	2	521	60	8	591	269	453	3	4	729	1659
12:00 PM	0	0	0	0	0	20	0	65	0	85	0	125	24	0	149	115	133	1	1	250	484
12:15 PM	0	0	2	0	2	21	0	51	0	72	1	169	19	2	191	80	140	1	0	221	486
12:30 PM	0	0	0	0	0	25	0	62	0	87	1	113	15	0	129	84	151	1	0	236	452
12:45 PM	0	0	4	0	4	22	0	71	0	93	1	141	17	1	160	69	136	0	2	207	464
Total	0	0	6	0	6	88	0	249	0	337	3	548	75	3	629	348	560	3	3	914	1886
01:00 PM	0	0	0	0	0	23	1	46	0	70	2	134	10	1	147	64	124	1	0	189	406
01:15 PM	0	0	0	0	0	14	1	73	0	88	0	134	9	3	146	85	126	0	0	211	445
01:30 PM	0	0	2	0	2	17	0	61	0	78	2	144	10	0	156	71	144	3	1	219	455
01:45 PM	0	0	1	0	1	22	0	79	0	101	0	123	11	0	134	76	149	0	1	226	462
Total	0	0	3	0	3	76	2	259	0	337	4	535	40	4	583	296	543	4	2	845	1768
02:00 PM	0	0	1	0	1	18	0	55	0	73	2	111	9	2	124	67	138	0	0	205	403
02:15 PM	0	0	1	0	1	12	0	58	0	70	2	187	20	1	210	71	160	0	0	231	512
02:30 PM	0	0	1	0	1	24	0	59	0	83	0	122	16	2	140	68	190	1	1	260	484
02:45 PM	0	0	0	0	0	8	0	42	0	50	0	157	15	0	172	83	183	0	0	266	488
Total	0	0	3	0	3	62	0	214	0	276	4	577	60	5	646	289	671	1	1	962	1887
03:00 PM	0	0	0	0	0	16	0	80	0	96	0	145	5	0	150	72	175	3	0	250	496
03:15 PM	0	0	1	0	1	12	0	87	0	99	0	124	11	2	137	75	221	1	0	297	534
03:30 PM	0	0	2	0	2	9	0	61	0	70	1	144	19	3	167	108	204	0	0	312	551
03:45 PM	1	0	4	0	5	14	0	82	0	96	3	180	10	1	194	105	256	1	1	363	658
Total	1	0	7	0	8	51	0	310	0	361	4	593	45	6	648	360	856	5	1	1222	2239
04:00 PM	0	0	0	0	0	9	0	70	0	79	0	127	8	1	136	95	223	0	0	318	533
04:15 PM	0	0	2	0	2	11	0	69	0	80	1	166	14	1	182	83	193	1	0	277	541
04:30 PM	0	0	1	0	1	8	0	74	0	82	0	169	10	1	180	117	232	0	0	349	612
04:45 PM	2	0	2	0	4	12	1	77	0	90	4	166	17	1	188	100	230	0	0	330	612
Total	2	0	5	0	7	40	1	290	0	331	5	628	49	4	686	395	878	1	0	1274	2298
05:00 PM	0	0	1	0	1	12	0	75	0	87	0	190	20	1	211	107	228	0	3	338	637
05:15 PM	1	0	0	0	1	22	0	70	0	92	0	160	17	1	178	123	249	0	0	372	643
05:30 PM	0	0	0	0	0	14	0	79	0	93	2	159	15	1	177	90	246	0	1	337	607
05:45 PM	1	0	0	0	1	14	0	62	0	76	0	123	11	2	136	128	206	0	0	334	547
Total	2	0	1	0	3	62	0	286	0	348	2	632	63	5	702	448	929	0	4	1381	2434
06:00 PM	0	0	0	0	0	11	0	75	0	86	0	158	12	1	171	90	187	0	0	277	534
06:15 PM	0	0	0	0	0	28	0	79	0	107	1	131	7	0	139	89	149	0	0	238	484

Peggy Malone & Associates
(800) 247-8602

File Name : 5-US 29 and Calohan Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	Bus Drvwy Eastbound					Calohan Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	10	0	79	0	89	0	112	4	0	116	99	147	0	1	247	452
06:45 PM	0	0	3	0	3	12	0	48	0	60	0	92	8	0	100	64	137	0	0	201	364
Total	0	0	3	0	3	61	0	281	0	342	1	493	31	1	526	342	620	0	1	963	1834
Grand Total	10	0	37	0	47	761	15	3627	0	4403	39	7959	768	47	8813	3805	7748	36	22	11611	24874
Apprch %	21.3	0	78.7	0		17.3	0.3	82.4	0		0.4	90.3	8.7	0.5		32.8	66.7	0.3	0.2		
Total %	0	0	0.1	0	0.2	3.1	0.1	14.6	0	17.7	0.2	32	3.1	0.2	35.4	15.3	31.1	0.1	0.1	46.7	

	Bus Drvwy Eastbound				Calohan Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	11	0	104	115	2	240	**32**	**274**	56	**165**	0	**221**	**610**
07:30 AM	0	0	0	0	11	2	**123**	**136**	0	**247**	22	269	71	127	**3**	201	606
07:45 AM	0	0	0	0	19	**3**	93	115	1	214	16	231	**72**	133	2	207	553
08:00 AM	0	0	**1**	**1**	**27**	2	75	104	**3**	184	26	213	52	143	1	196	514
Total Volume	0	0	1	1	68	7	395	470	6	885	96	987	251	568	6	825	2283
% App. Total	0	0	100		14.5	1.5	84		0.6	89.7	9.7		30.4	68.8	0.7		
PHF	.000	.000	.250	.250	.630	.583	.803	.864	.500	.896	.750	.901	.872	.861	.500	.933	.936
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	1	1	8	0	74	82	0	169	10	179	117	232	0	349	611
04:45 PM	**2**	0	**2**	**4**	12	**1**	**77**	90	**4**	166	17	187	100	230	0	330	611
05:00 PM	0	0	1	1	12	0	75	87	0	**190**	**20**	**210**	107	228	0	335	633
05:15 PM	1	0	0	1	**22**	0	70	**92**	0	160	17	177	**123**	**249**	0	**372**	**642**
Total Volume	3	0	4	7	54	1	296	351	4	685	64	753	447	939	0	1386	2497
% App. Total	42.9	0	57.1		15.4	0.3	84.3		0.5	91	8.5		32.3	67.7	0		
PHF	.375	.000	.500	.438	.614	.250	.961	.954	.250	.901	.800	.896	.909	.943	.000	.931	.972

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 1

Groups Printed- Car

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	95	2	0	97	17	0	19	0	36	9	121	1	0	131	0	0	0	0	0	264
07:15 AM	0	128	3	0	131	28	0	21	0	49	7	141	0	0	148	0	0	0	0	0	328
07:30 AM	0	153	4	0	157	23	0	19	0	42	6	131	0	0	137	1	0	0	0	1	337
07:45 AM	0	124	1	0	125	17	0	18	0	35	8	153	0	0	161	0	0	0	0	0	321
Total	0	500	10	0	510	85	0	77	0	162	30	546	1	0	577	1	0	0	0	1	1250
08:00 AM	1	82	4	0	87	17	0	12	0	29	7	153	0	0	160	1	0	0	0	1	277
08:15 AM	0	105	4	0	109	8	1	8	0	17	8	153	1	0	162	0	0	1	0	1	289
08:30 AM	0	114	4	0	118	13	0	15	0	28	6	101	0	0	107	0	0	0	0	0	253
08:45 AM	0	89	4	0	93	4	0	9	0	13	5	102	0	0	107	0	0	0	0	0	213
Total	1	390	16	0	407	42	1	44	0	87	26	509	1	0	536	1	0	1	0	2	1032
09:00 AM	0	90	4	0	94	7	0	7	0	14	4	116	0	0	120	0	0	0	0	0	228
09:15 AM	0	95	6	0	101	17	0	8	0	25	10	113	0	0	123	0	0	0	0	0	249
09:30 AM	0	109	2	0	111	13	0	10	0	23	8	107	0	0	115	0	0	0	0	0	249
09:45 AM	1	102	3	0	106	7	0	9	0	16	3	121	0	0	124	1	0	0	0	1	247
Total	1	396	15	0	412	44	0	34	0	78	25	457	0	0	482	1	0	0	0	1	973
10:00 AM	0	85	3	0	88	8	0	12	0	20	7	117	0	0	124	0	0	0	0	0	232
10:15 AM	0	90	5	0	95	14	1	9	0	24	5	99	0	0	104	1	0	0	0	1	224
10:30 AM	0	85	5	0	90	10	0	15	0	25	10	113	0	0	123	0	0	0	0	0	238
10:45 AM	0	114	10	0	124	4	0	5	0	9	10	98	0	0	108	0	0	0	0	0	241
Total	0	374	23	0	397	36	1	41	0	78	32	427	0	0	459	1	0	0	0	1	935
11:00 AM	0	115	7	0	122	4	0	11	0	15	8	108	1	0	117	0	0	0	0	0	254
11:15 AM	0	109	8	0	117	9	0	12	0	21	8	115	1	0	124	0	0	0	0	0	262
11:30 AM	0	123	2	0	125	8	0	15	0	23	5	111	2	0	118	2	0	2	0	4	270
11:45 AM	1	137	11	0	149	6	0	7	0	13	5	112	0	0	117	0	0	0	0	0	279
Total	1	484	28	0	513	27	0	45	0	72	26	446	4	0	476	2	0	2	0	4	1065
12:00 PM	0	118	14	0	132	6	2	9	0	17	13	115	1	0	129	2	0	0	0	2	280
12:15 PM	0	134	4	0	138	5	0	13	0	18	8	142	2	0	152	0	0	0	0	0	308
12:30 PM	0	137	2	0	139	11	0	11	0	22	16	131	0	0	147	0	0	0	0	0	308
12:45 PM	0	126	5	0	131	13	0	13	0	26	6	107	1	0	114	0	0	0	0	0	271
Total	0	515	25	0	540	35	2	46	0	83	43	495	4	0	542	2	0	0	0	2	1167
01:00 PM	0	113	6	0	119	7	0	10	0	17	14	137	0	0	151	0	0	0	0	0	287
01:15 PM	1	138	14	0	153	10	0	12	0	22	12	132	1	0	145	1	0	2	0	3	323
01:30 PM	0	149	8	0	157	9	0	10	0	19	11	119	0	0	130	0	0	0	0	0	306
01:45 PM	0	139	10	0	149	4	0	11	0	15	12	141	0	0	153	0	0	0	0	0	317
Total	1	539	38	0	578	30	0	43	0	73	49	529	1	0	579	1	0	2	0	3	1233
02:00 PM	0	135	8	0	143	13	0	6	0	19	12	155	0	0	167	1	0	0	0	1	330
02:15 PM	0	169	8	0	177	12	1	20	0	33	7	140	0	0	147	0	0	0	0	0	357
02:30 PM	0	148	5	0	153	7	0	11	0	18	7	117	1	0	125	0	0	1	0	1	297
02:45 PM	1	165	8	0	174	9	0	12	0	21	11	117	0	0	128	0	0	0	0	0	323
Total	1	617	29	0	647	41	1	49	0	91	37	529	1	0	567	1	0	1	0	2	1307
03:00 PM	1	170	12	0	183	3	0	7	0	10	15	131	2	0	148	2	0	0	0	2	343
03:15 PM	1	143	15	0	159	8	0	11	0	19	12	156	1	0	169	2	1	0	0	3	350
03:30 PM	0	205	20	0	225	6	0	10	0	16	24	161	3	0	188	0	0	0	0	0	429
03:45 PM	0	180	10	0	190	11	0	18	0	29	12	150	0	0	162	0	0	0	0	0	381
Total	2	698	57	0	757	28	0	46	0	74	63	598	6	0	667	4	1	0	0	5	1503
04:00 PM	0	189	16	0	205	9	1	7	0	17	11	159	0	0	170	0	0	0	0	0	392
04:15 PM	0	170	21	0	191	1	0	12	0	13	21	164	1	0	186	1	0	1	0	2	392
04:30 PM	2	179	12	0	193	7	0	10	0	17	18	163	1	0	182	1	0	0	0	1	393
04:45 PM	1	182	14	0	197	7	0	9	0	16	22	175	6	0	203	0	0	0	0	0	416
Total	3	720	63	0	786	24	1	38	0	63	72	661	8	0	741	2	0	1	0	3	1593
05:00 PM	2	201	22	0	225	15	0	14	0	29	16	155	2	0	173	0	0	0	0	0	427
05:15 PM	3	215	18	0	236	11	0	16	0	27	20	165	5	0	190	0	0	0	0	0	453

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 2

Groups Printed- Car

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:30 PM	3	187	24	0	214	4	1	10	0	15	22	146	2	0	170	1	1	0	0	2	401
05:45 PM	4	172	19	0	195	8	1	8	0	17	19	140	6	0	165	3	1	1	0	5	382
Total	12	775	83	0	870	38	2	48	0	88	77	606	15	0	698	4	2	1	0	7	1663
06:00 PM	0	159	11	0	170	9	1	12	0	22	13	128	1	0	142	3	0	0	0	3	337
06:15 PM	1	137	12	0	150	5	0	12	0	17	11	87	1	0	99	1	1	0	0	2	268
06:30 PM	4	140	8	0	152	4	0	9	0	13	15	91	3	0	109	6	0	0	0	6	280
06:45 PM	2	115	8	0	125	6	1	10	0	17	12	96	3	0	111	3	0	0	0	3	256
Total	7	551	39	0	597	24	2	43	0	69	51	402	8	0	461	13	1	0	0	14	1141
Grand Total	29	6559	426	0	7014	454	10	554	0	1018	531	6205	49	0	6785	33	4	8	0	45	14862
Apprch %	0.4	93.5	6.1	0		44.6	1	54.4	0		7.8	91.5	0.7	0		73.3	8.9	17.8	0		
Total %	0.2	44.1	2.9	0	47.2	3.1	0.1	3.7	0	6.8	3.6	41.8	0.3	0	45.7	0.2	0	0.1	0	0.3	

	Rt. 29 Southbound				Gladys Rd. Westbound				Rt. 29 Northbound				Driveway 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 01:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	128	3	131	**28**	0	**21**	**49**	7	141	0	148	0	0	0	0	328
07:30 AM	0	**153**	**4**	**157**	23	0	19	42	6	131	0	137	**1**	0	0	**1**	**337**
07:45 AM	0	124	1	125	17	0	18	35	**8**	**153**	0	**161**	0	0	0	0	321
08:00 AM	**1**	82	4	87	17	0	12	29	7	153	0	160	1	0	0	1	277
Total Volume	1	487	12	500	85	0	70	155	28	578	0	606	2	0	0	2	1263
% App. Total	0.2	97.4	2.4		54.8	0	45.2		4.6	95.4	0		100	0	0		
PHF	.250	.796	.750	.796	.759	.000	.833	.791	.875	.944	.000	.941	.500	.000	.000	.500	.937
Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	182	14	197	7	0	9	16	**22**	**175**	**6**	**203**	0	0	0	0	416
05:00 PM	2	201	22	225	**15**	0	14	**29**	16	155	2	173	0	0	0	0	427
05:15 PM	**3**	**215**	18	**236**	11	0	**16**	27	20	165	5	190	0	0	0	0	**453**
05:30 PM	3	187	**24**	214	4	**1**	10	15	22	146	2	170	**1**	**1**	0	**2**	401
Total Volume	9	785	78	872	37	1	49	87	80	641	15	736	1	1	0	2	1697
% App. Total	1	90	8.9		42.5	1.1	56.3		10.9	87.1	2		50	50	0		
PHF	.750	.913	.813	.924	.617	.250	.766	.750	.909	.916	.625	.906	.250	.250	.000	.250	.937

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 1

Groups Printed- Truck

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	16	1	0	17	0	0	1	0	1	0	14	0	0	14	0	0	0	0	0	32
07:15 AM	0	16	0	0	16	0	0	0	0	0	1	8	0	0	9	0	0	0	0	0	25
07:30 AM	0	15	0	0	15	2	0	2	0	4	2	9	0	0	11	0	0	0	0	0	30
07:45 AM	0	19	1	0	20	0	0	0	0	0	1	11	0	0	12	0	0	0	0	0	32
Total	0	66	2	0	68	2	0	3	0	5	4	42	0	0	46	0	0	0	0	0	119
08:00 AM	0	28	0	0	28	0	0	0	0	0	3	18	0	0	21	0	0	0	0	0	49
08:15 AM	0	17	0	0	17	0	0	0	0	0	1	14	0	0	15	0	0	0	0	0	32
08:30 AM	0	21	0	0	21	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	42
08:45 AM	0	21	0	0	21	2	0	1	0	3	0	20	0	0	20	0	0	0	0	0	44
Total	0	87	0	0	87	2	0	1	0	3	4	73	0	0	77	0	0	0	0	0	167
09:00 AM	0	22	0	0	22	1	0	1	0	2	2	15	0	0	17	0	0	0	0	0	41
09:15 AM	0	16	0	0	16	0	0	0	0	0	4	18	0	0	22	0	0	0	0	0	38
09:30 AM	0	32	2	0	34	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	49
09:45 AM	0	17	0	0	17	0	0	0	0	0	1	25	1	0	27	0	0	0	0	0	44
Total	0	87	2	0	89	1	0	1	0	2	7	73	1	0	81	0	0	0	0	0	172
10:00 AM	0	14	1	0	15	0	0	2	0	2	2	21	0	0	23	0	0	0	0	0	40
10:15 AM	0	23	0	0	23	0	0	1	0	1	2	13	0	0	15	1	0	0	0	1	40
10:30 AM	1	17	0	0	18	0	0	1	0	1	1	24	0	0	25	0	1	0	0	1	45
10:45 AM	0	25	0	0	25	0	0	2	0	2	1	17	0	0	18	0	0	0	0	0	45
Total	1	79	1	0	81	0	0	6	0	6	6	75	0	0	81	1	1	0	0	2	170
11:00 AM	0	11	1	0	12	0	0	2	0	2	1	16	0	0	17	0	0	0	0	0	31
11:15 AM	0	20	0	0	20	0	0	2	0	2	2	23	0	0	25	0	0	0	0	0	47
11:30 AM	0	16	1	0	17	0	0	1	0	1	0	18	0	0	18	0	0	0	0	0	36
11:45 AM	0	25	1	0	26	0	0	3	0	3	2	15	0	0	17	0	0	0	0	0	46
Total	0	72	3	0	75	0	0	8	0	8	5	72	0	0	77	0	0	0	0	0	160
12:00 PM	0	18	0	0	18	0	1	3	0	4	1	8	0	0	9	0	0	0	0	0	31
12:15 PM	0	16	0	0	16	0	0	0	0	0	3	24	0	0	27	0	0	0	0	0	43
12:30 PM	0	22	0	0	22	0	0	0	0	0	1	15	0	0	16	0	0	0	0	0	38
12:45 PM	0	18	1	0	19	0	0	1	0	1	1	24	0	0	25	1	0	0	0	1	46
Total	0	74	1	0	75	0	1	4	0	5	6	71	0	0	77	1	0	0	0	1	158
01:00 PM	0	20	0	0	20	0	0	1	0	1	3	18	0	0	21	0	0	0	0	0	42
01:15 PM	0	25	0	0	25	0	0	1	0	1	2	16	0	0	18	0	0	0	0	0	44
01:30 PM	0	28	0	0	28	0	0	0	0	0	1	14	0	0	15	0	0	0	0	0	43
01:45 PM	0	17	0	0	17	1	0	0	0	1	1	29	0	0	30	0	0	0	0	0	48
Total	0	90	0	0	90	1	0	2	0	3	7	77	0	0	84	0	0	0	0	0	177
02:00 PM	0	20	0	0	20	1	0	1	0	2	1	27	0	0	28	0	0	0	0	0	50
02:15 PM	0	20	0	0	20	1	0	1	0	2	0	23	0	0	23	0	0	0	0	0	45
02:30 PM	0	26	0	0	26	0	0	5	0	5	1	11	0	0	12	0	0	0	0	0	43
02:45 PM	0	12	0	0	12	0	0	3	0	3	0	15	0	0	15	0	0	0	0	0	30
Total	0	78	0	0	78	2	0	10	0	12	2	76	0	0	78	0	0	0	0	0	168
03:00 PM	0	17	2	0	19	1	0	0	0	1	2	19	0	0	21	0	0	0	0	0	41
03:15 PM	0	21	0	0	21	2	0	0	0	2	2	15	0	0	17	0	0	0	0	0	40
03:30 PM	0	15	1	0	16	1	0	1	0	2	3	20	0	0	23	0	0	0	0	0	41
03:45 PM	0	17	0	0	17	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	33
Total	0	70	3	0	73	4	0	1	0	5	7	70	0	0	77	0	0	0	0	0	155
04:00 PM	0	20	0	0	20	0	0	1	0	1	3	21	0	0	24	0	0	0	0	0	45
04:15 PM	0	12	0	0	12	0	0	2	0	2	1	19	0	0	20	0	0	0	0	0	34
04:30 PM	0	21	0	0	21	0	0	4	0	4	0	10	0	0	10	0	0	0	0	0	35
04:45 PM	0	10	0	0	10	1	0	3	0	4	1	13	0	0	14	0	0	0	0	0	28
Total	0	63	0	0	63	1	0	10	0	11	5	63	0	0	68	0	0	0	0	0	142
05:00 PM	0	10	2	0	12	0	0	0	0	0	2	6	0	0	8	0	0	0	0	0	20
05:15 PM	0	21	0	0	21	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	25

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 2

Groups Printed- Truck

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:30 PM	1	8	1	0	10	1	0	0	0	1	0	19	0	0	19	0	0	0	0	0	30
05:45 PM	0	15	0	0	15	0	0	3	0	3	1	12	0	0	13	0	0	1	0	1	32
Total	1	54	3	0	58	2	0	3	0	5	3	40	0	0	43	0	0	1	0	1	107
06:00 PM	0	8	0	0	8	0	0	1	0	1	2	15	0	0	17	0	0	0	0	0	26
06:15 PM	0	14	0	0	14	1	0	1	0	2	0	2	0	0	2	0	0	0	0	0	18
06:30 PM	0	10	0	0	10	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	17
06:45 PM	0	6	0	0	6	1	0	0	0	1	1	7	0	0	8	0	0	0	0	0	15
Total	0	38	0	0	38	2	0	2	0	4	3	31	0	0	34	0	0	0	0	0	76
Grand Total	2	858	15	0	875	17	1	51	0	69	59	763	1	0	823	2	1	1	0	4	1771
Apprch %	0.2	98.1	1.7	0		24.6	1.4	73.9	0		7.2	92.7	0.1	0		50	25	25	0		
Total %	0.1	48.4	0.8	0	49.4	1	0.1	2.9	0	3.9	3.3	43.1	0.1	0	46.5	0.1	0.1	0.1	0	0.2	

	Rt. 29 Southbound				Gladys Rd. Westbound				Rt. 29 Northbound				Driveway 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 01:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 09:30 AM																	
09:30 AM	0	**32**	**2**	**34**	0	0	0	0	0	15	0	15	0	0	0	0	**49**
09:45 AM	0	17	0	17	0	0	0	0	1	**25**	**1**	**27**	0	0	0	0	44
10:00 AM	0	14	1	15	0	0	**2**	**2**	**2**	21	0	23	0	0	0	0	40
10:15 AM	0	23	0	23	0	0	1	1	2	13	0	15	**1**	0	0	**1**	40
Total Volume	0	86	3	89	0	0	3	3	5	74	1	80	1	0	0	1	173
% App. Total	0	96.6	3.4		0	0	100		6.2	92.5	1.2		100	0	0		
PHF	.000	.672	.375	.654	.000	.000	.375	.375	.625	.740	.250	.741	.250	.000	.000	.250	.883
Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	**28**	0	**28**	0	0	0	0	**1**	14	0	15	0	0	0	0	43
01:45 PM	0	17	0	17	**1**	0	0	1	1	**29**	0	**30**	0	0	0	0	48
02:00 PM	0	20	0	20	1	0	**1**	**2**	1	27	0	28	0	0	0	0	**50**
02:15 PM	0	20	0	20	1	0	1	2	0	23	0	23	0	0	0	0	45
Total Volume	0	85	0	85	3	0	2	5	3	93	0	96	0	0	0	0	186
% App. Total	0	100	0		60	0	40		3.1	96.9	0		0	0	0		
PHF	.000	.759	.000	.759	.750	.000	.500	.625	.750	.802	.000	.800	.000	.000	.000	.000	.930

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 1

Groups Printed- Combined

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	111	3	0	114	17	0	20	0	37	9	135	1	0	145	0	0	0	0	0	296
07:15 AM	0	144	3	0	147	28	0	21	0	49	8	149	0	0	157	0	0	0	0	0	353
07:30 AM	0	168	4	0	172	25	0	21	0	46	8	140	0	0	148	1	0	0	0	1	367
07:45 AM	0	143	2	0	145	17	0	18	0	35	9	164	0	0	173	0	0	0	0	0	353
Total	0	566	12	0	578	87	0	80	0	167	34	588	1	0	623	1	0	0	0	1	1369
08:00 AM	1	110	4	0	115	17	0	12	0	29	10	171	0	0	181	1	0	0	0	1	326
08:15 AM	0	122	4	0	126	8	1	8	0	17	9	167	1	0	177	0	0	1	0	1	321
08:30 AM	0	135	4	0	139	13	0	15	0	28	6	122	0	0	128	0	0	0	0	0	295
08:45 AM	0	110	4	0	114	6	0	10	0	16	5	122	0	0	127	0	0	0	0	0	257
Total	1	477	16	0	494	44	1	45	0	90	30	582	1	0	613	1	0	1	0	2	1199
09:00 AM	0	112	4	0	116	8	0	8	0	16	6	131	0	0	137	0	0	0	0	0	269
09:15 AM	0	111	6	0	117	17	0	8	0	25	14	131	0	0	145	0	0	0	0	0	287
09:30 AM	0	141	4	0	145	13	0	10	0	23	8	122	0	0	130	0	0	0	0	0	298
09:45 AM	1	119	3	0	123	7	0	9	0	16	4	146	1	0	151	1	0	0	0	1	291
Total	1	483	17	0	501	45	0	35	0	80	32	530	1	0	563	1	0	0	0	1	1145
10:00 AM	0	99	4	0	103	8	0	14	0	22	9	138	0	0	147	0	0	0	0	0	272
10:15 AM	0	113	5	0	118	14	1	10	0	25	7	112	0	0	119	2	0	0	0	2	264
10:30 AM	1	102	5	0	108	10	0	16	0	26	11	137	0	0	148	0	1	0	0	1	283
10:45 AM	0	139	10	0	149	4	0	7	0	11	11	115	0	0	126	0	0	0	0	0	286
Total	1	453	24	0	478	36	1	47	0	84	38	502	0	0	540	2	1	0	0	3	1105
11:00 AM	0	126	8	0	134	4	0	13	0	17	9	124	1	0	134	0	0	0	0	0	285
11:15 AM	0	129	8	0	137	9	0	14	0	23	10	138	1	0	149	0	0	0	0	0	309
11:30 AM	0	139	3	0	142	8	0	16	0	24	5	129	2	0	136	2	0	2	0	4	306
11:45 AM	1	162	12	0	175	6	0	10	0	16	7	127	0	0	134	0	0	0	0	0	325
Total	1	556	31	0	588	27	0	53	0	80	31	518	4	0	553	2	0	2	0	4	1225
12:00 PM	0	136	14	0	150	6	3	12	0	21	14	123	1	0	138	2	0	0	0	2	311
12:15 PM	0	150	4	0	154	5	0	13	0	18	11	166	2	0	179	0	0	0	0	0	351
12:30 PM	0	159	2	0	161	11	0	11	0	22	17	146	0	0	163	0	0	0	0	0	346
12:45 PM	0	144	6	0	150	13	0	14	0	27	7	131	1	0	139	1	0	0	0	1	317
Total	0	589	26	0	615	35	3	50	0	88	49	566	4	0	619	3	0	0	0	3	1325
01:00 PM	0	133	6	0	139	7	0	11	0	18	17	155	0	0	172	0	0	0	0	0	329
01:15 PM	1	163	14	0	178	10	0	13	0	23	14	148	1	0	163	1	0	2	0	3	367
01:30 PM	0	177	8	0	185	9	0	10	0	19	12	133	0	0	145	0	0	0	0	0	349
01:45 PM	0	156	10	0	166	5	0	11	0	16	13	170	0	0	183	0	0	0	0	0	365
Total	1	629	38	0	668	31	0	45	0	76	56	606	1	0	663	1	0	2	0	3	1410
02:00 PM	0	155	8	0	163	14	0	7	0	21	13	182	0	0	195	1	0	0	0	1	380
02:15 PM	0	189	8	0	197	13	1	21	0	35	7	163	0	0	170	0	0	0	0	0	402
02:30 PM	0	174	5	0	179	7	0	16	0	23	8	128	1	0	137	0	0	1	0	1	340
02:45 PM	1	177	8	0	186	9	0	15	0	24	11	132	0	0	143	0	0	0	0	0	353
Total	1	695	29	0	725	43	1	59	0	103	39	605	1	0	645	1	0	1	0	2	1475
03:00 PM	1	187	14	0	202	4	0	7	0	11	17	150	2	0	169	2	0	0	0	2	384
03:15 PM	1	164	15	0	180	10	0	11	0	21	14	171	1	0	186	2	1	0	0	3	390
03:30 PM	0	220	21	0	241	7	0	11	0	18	27	181	3	0	211	0	0	0	0	0	470
03:45 PM	0	197	10	0	207	11	0	18	0	29	12	166	0	0	178	0	0	0	0	0	414
Total	2	768	60	0	830	32	0	47	0	79	70	668	6	0	744	4	1	0	0	5	1658
04:00 PM	0	209	16	0	225	9	1	8	0	18	14	180	0	0	194	0	0	0	0	0	437
04:15 PM	0	182	21	0	203	1	0	14	0	15	22	183	1	0	206	1	0	1	0	2	426
04:30 PM	2	200	12	0	214	7	0	14	0	21	18	173	1	0	192	1	0	0	0	1	428
04:45 PM	1	192	14	0	207	8	0	12	0	20	23	188	6	0	217	0	0	0	0	0	444
Total	3	783	63	0	849	25	1	48	0	74	77	724	8	0	809	2	0	1	0	3	1735
05:00 PM	2	211	24	0	237	15	0	14	0	29	18	161	2	0	181	0	0	0	0	0	447
05:15 PM	3	236	18	0	257	12	0	16	0	28	20	168	5	0	193	0	0	0	0	0	478

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 5-US29 Wards Rd. and Gladys Rd.
Site Code :
Start Date : 10/12/2017
Page No : 2

Groups Printed- Combined

	Rt. 29 Southbound					Gladys Rd. Westbound					Rt. 29 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:30 PM	4	195	25	0	224	5	1	10	0	16	22	165	2	0	189	1	1	0	0	2	431
05:45 PM	4	187	19	0	210	8	1	11	0	20	20	152	6	0	178	3	1	2	0	6	414
Total	13	829	86	0	928	40	2	51	0	93	80	646	15	0	741	4	2	2	0	8	1770
06:00 PM	0	167	11	0	178	9	1	13	0	23	15	143	1	0	159	3	0	0	0	3	363
06:15 PM	1	151	12	0	164	6	0	13	0	19	11	89	1	0	101	1	1	0	0	2	286
06:30 PM	4	150	8	0	162	4	0	9	0	13	15	98	3	0	116	6	0	0	0	6	297
06:45 PM	2	121	8	0	131	7	1	10	0	18	13	103	3	0	119	3	0	0	0	3	271
Total	7	589	39	0	635	26	2	45	0	73	54	433	8	0	495	13	1	0	0	14	1217
Grand Total	31	7417	441	0	7889	471	11	605	0	1087	590	6968	50	0	7608	35	5	9	0	49	16633
Apprch %	0.4	94	5.6	0		43.3	1	55.7	0		7.8	91.6	0.7	0		71.4	10.2	18.4	0		
Total %	0.2	44.6	2.7	0	47.4	2.8	0.1	3.6	0	6.5	3.5	41.9	0.3	0	45.7	0.2	0	0.1	0	0.3	

	Rt. 29 Southbound				Gladys Rd. Westbound				Rt. 29 Northbound				Driveway 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 01:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	144	3	147	**28**	0	**21**	**49**	8	149	0	157	0	0	0	0	353
07:30 AM	0	**168**	**4**	**172**	25	0	21	46	8	140	0	148	**1**	0	0	**1**	**367**
07:45 AM	0	143	2	145	17	0	18	35	9	164	0	173	0	0	0	0	353
08:00 AM	**1**	110	4	115	17	0	12	29	**10**	**171**	0	**181**	1	0	0	1	326
Total Volume	1	565	13	579	87	0	72	159	35	624	0	659	2	0	0	2	1399
% App. Total	0.2	97.6	2.2		54.7	0	45.3		5.3	94.7	0		100	0	0		
PHF	.250	.841	.813	.842	.777	.000	.857	.811	.875	.912	.000	.910	.500	.000	.000	.500	.953
Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	192	14	207	8	0	12	20	**23**	**188**	**6**	**217**	0	0	0	0	444
05:00 PM	2	211	24	237	**15**	0	14	**29**	18	161	2	181	0	0	0	0	447
05:15 PM	3	**236**	18	**257**	12	0	**16**	28	20	168	5	193	0	0	0	0	**478**
05:30 PM	**4**	195	**25**	224	5	**1**	10	16	22	165	2	189	**1**	**1**	0	**2**	431
Total Volume	10	834	81	925	40	1	52	93	83	682	15	780	1	1	0	2	1800
% App. Total	1.1	90.2	8.8		43	1.1	55.9		10.6	87.4	1.9		50	50	0		
PHF	.625	.883	.810	.900	.667	.250	.813	.802	.902	.907	.625	.899	.250	.250	.000	.250	.941

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Car

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	35	0	35	0	170	0	0	170	3	53	0	0	56	261
06:15 AM	0	0	0	0	0	2	0	38	0	40	0	202	0	0	202	6	85	1	0	92	334
06:30 AM	0	0	0	0	0	3	2	72	0	77	5	254	2	0	261	14	70	3	0	87	425
06:45 AM	0	0	0	0	0	4	4	61	0	69	5	232	2	0	239	12	120	8	0	140	448
Total	0	0	0	0	0	9	6	206	0	221	10	858	4	0	872	35	328	12	0	375	1468
07:00 AM	0	0	1	0	1	3	0	65	0	68	7	220	2	0	229	9	124	3	0	136	434
07:15 AM	0	0	0	0	0	2	0	87	0	89	3	280	2	0	285	19	168	0	0	187	561
07:30 AM	0	0	1	0	1	5	0	100	0	105	0	332	1	0	333	20	131	2	0	153	592
07:45 AM	1	0	0	0	1	5	0	84	0	89	1	254	3	0	258	26	138	3	0	167	515
Total	1	0	2	0	3	15	0	336	0	351	11	1086	8	0	1105	74	561	8	0	643	2102
08:00 AM	2	0	1	0	3	10	0	87	0	97	0	234	1	0	235	27	122	3	1	153	488
08:15 AM	1	0	0	0	1	6	0	56	0	62	1	198	1	1	201	21	122	1	0	144	408
08:30 AM	2	0	1	0	3	3	0	63	0	66	2	254	1	0	257	27	119	1	0	147	473
08:45 AM	1	0	0	0	1	5	0	52	0	57	0	205	4	1	210	19	93	0	1	113	381
Total	6	0	2	0	8	24	0	258	0	282	3	891	7	2	903	94	456	5	2	557	1750
09:00 AM	0	0	0	0	0	3	0	39	1	43	0	140	6	0	146	23	117	3	1	144	333
09:15 AM	4	0	0	0	4	3	0	31	0	34	1	145	6	0	152	24	137	4	0	165	355
09:30 AM	1	2	0	0	3	2	0	44	0	46	1	132	16	0	149	23	122	3	0	148	346
09:45 AM	1	0	0	0	1	7	0	33	0	40	2	95	6	0	103	22	114	2	1	139	283
Total	6	2	0	0	8	15	0	147	1	163	4	512	34	0	550	92	490	12	2	596	1317
10:00 AM	3	1	1	0	5	3	0	33	0	36	0	85	8	0	93	20	128	1	1	150	284
10:15 AM	0	0	0	0	0	7	0	33	0	40	1	108	4	0	113	22	126	0	0	148	301
10:30 AM	0	0	0	0	0	1	0	36	0	37	0	81	16	0	97	28	97	3	1	129	263
10:45 AM	2	0	0	0	2	1	0	31	0	32	0	114	5	0	119	35	139	1	0	175	328
Total	5	1	1	0	7	12	0	133	0	145	1	388	33	0	422	105	490	5	2	602	1176
11:00 AM	3	0	0	0	3	1	0	41	0	42	1	144	2	0	147	33	162	0	0	195	387
11:15 AM	1	0	0	0	1	1	0	25	0	26	2	172	0	0	174	42	140	1	1	184	385
11:30 AM	2	0	0	0	2	0	0	39	0	39	1	173	0	1	175	28	172	2	0	202	418
11:45 AM	3	0	1	0	4	2	0	25	0	27	0	166	2	0	168	44	167	2	0	213	412
Total	9	0	1	0	10	4	0	130	0	134	4	655	4	1	664	147	641	5	1	794	1602
12:00 PM	1	0	0	0	1	2	0	47	0	49	1	180	4	0	185	33	156	3	0	192	427
12:15 PM	0	0	1	0	1	1	0	33	0	34	0	156	6	0	162	43	182	0	0	225	422
12:30 PM	1	1	1	0	3	2	0	41	0	43	0	179	4	0	183	35	199	3	0	237	466
12:45 PM	0	0	1	0	1	1	0	31	0	32	2	165	2	0	169	49	179	4	0	232	434
Total	2	1	3	0	6	6	0	152	0	158	3	680	16	0	699	160	716	10	0	886	1749
01:00 PM	0	0	0	0	0	2	0	21	0	23	1	156	3	0	160	44	191	5	0	240	423
01:15 PM	0	1	0	0	1	2	1	16	0	19	5	157	4	2	168	53	166	2	0	221	409
01:30 PM	2	0	0	0	2	0	0	16	0	16	2	159	0	1	162	48	177	1	0	226	406
01:45 PM	0	1	0	0	1	2	0	53	0	55	1	157	5	0	163	38	187	0	0	225	444
Total	2	2	0	0	4	6	1	106	0	113	9	629	12	3	653	183	721	8	0	912	1682
02:00 PM	0	0	0	0	0	1	0	31	0	32	0	164	0	0	164	39	171	1	1	212	408
02:15 PM	2	0	0	0	2	4	0	34	0	38	0	187	0	0	187	47	178	5	0	230	457
02:30 PM	0	0	0	0	0	1	0	31	0	32	1	190	1	0	192	52	207	0	0	259	483
02:45 PM	2	0	0	0	2	5	0	35	0	40	0	158	1	0	159	50	230	6	0	286	487
Total	4	0	0	0	4	11	0	131	0	142	1	699	2	0	702	188	786	12	1	987	1835
03:00 PM	2	0	0	0	2	4	0	40	0	44	1	159	1	0	161	48	223	1	0	272	479
03:15 PM	1	0	0	0	1	2	0	38	0	40	0	158	1	0	159	64	269	2	1	336	536
03:30 PM	0	0	0	0	0	3	0	46	0	49	0	187	6	0	193	67	258	1	0	326	568
03:45 PM	0	0	0	0	0	3	0	48	0	51	0	201	2	0	203	62	262	0	0	324	578
Total	3	0	0	0	3	12	0	172	0	184	1	705	10	0	716	241	1012	4	1	1258	2161
04:00 PM	0	0	0	0	0	0	0	51	0	51	0	195	3	0	198	70	289	1	0	360	609
04:15 PM	0	0	0	0	0	1	0	45	0	46	0	228	3	0	231	64	261	0	0	325	602
04:30 PM	0	0	0	0	0	2	0	63	0	65	0	177	5	0	182	81	254	0	0	335	582
04:45 PM	5	0	0	0	5	5	0	57	0	62	0	170	5	0	175	77	297	1	0	375	617
Total	5	0	0	0	5	8	0	216	0	224	0	770	16	0	786	292	1101	2	0	1395	2410
05:00 PM	10	3	0	0	13	7	0	44	0	51	0	188	8	0	196	92	306	3	0	401	661
05:15 PM	3	0	0	0	3	1	0	64	0	65	0	195	6	0	201	90	310	0	0	400	669
05:30 PM	2	0	0	0	2	4	0	51	0	55	0	174	2	0	176	101	273	0	0	374	607
05:45 PM	0	0	0	0	0	0	0	51	0	51	0	152	3	0	155	87	256	0	0	343	549
Total	15	3	0	0	18	12	0	210	0	222	0	709	19	0	728	370	1145	3	0	1518	2486
06:00 PM	0	0	0	0	0	2	0	51	0	53	0	175	7	0	182	74	210	0	0	284	519
06:15 PM	0	0	0	0	0	4	0	51	0	55	0	148	4	0	152	59	212	0	0	271	478

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Car

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	3	0	53	0	56	0	128	2	0	130	69	187	2	0	258	444
06:45 PM	0	0	0	0	0	0	0	39	0	39	0	112	2	0	114	63	163	0	0	226	379
Total	0	0	0	0	0	9	0	194	0	203	0	563	15	0	578	265	772	2	0	1039	1820
Grand Total	58	9	9	0	76	143	7	2391	1	2542	47	9145	180	6	9378	2246	9219	88	9	11562	23558
Apprch %	76.3	11.8	11.8	0		5.6	0.3	94.1	0		0.5	97.5	1.9	0.1		19.4	79.7	0.8	0.1		
Total %	0.2	0	0	0	0.3	0.6	0	10.1	0	10.8	0.2	38.8	0.8	0	39.8	9.5	39.1	0.4	0	49.1	

	English Tavern Rd Eastbound				English Tavern Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	2	0	87	89	**3**	280	2	285	19	**168**	0	**187**	561
07:30 AM	0	0	**1**	1	5	0	**100**	**105**	0	**332**	1	**333**	20	131	2	153	**592**
07:45 AM	1	0	0	1	5	0	84	89	1	254	**3**	258	26	138	**3**	167	515
08:00 AM	**2**	0	1	**3**	**10**	0	87	97	0	234	1	235	**27**	122	3	152	487
Total Volume	3	0	2	5	22	0	358	380	4	1100	7	1111	92	559	8	659	2155
% App. Total	60	0	40		5.8	0	94.2		0.4	99	0.6		14	84.8	1.2		
PHF	.375	.000	.500	.417	.550	.000	.895	.905	.333	.828	.583	.834	.852	.832	.667	.881	.910

Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	2	0	87	89	**3**	280	2	285	19	**168**	0	**187**	561
07:30 AM	0	0	**1**	1	5	0	**100**	**105**	0	**332**	1	**333**	20	131	2	153	**592**
07:45 AM	1	0	0	1	5	0	84	89	1	254	**3**	258	26	138	**3**	167	515
08:00 AM	**2**	0	1	**3**	**10**	0	87	97	0	234	1	235	**27**	122	3	152	487
Total Volume	3	0	2	5	22	0	358	380	4	1100	7	1111	92	559	8	659	2155
% App. Total	60	0	40		5.8	0	94.2		0.4	99	0.6		14	84.8	1.2		
PHF	.375	.000	.500	.417	.550	.000	.895	.905	.333	.828	.583	.834	.852	.832	.667	.881	.910

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Truck

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	13	0	0	13	22
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	1	19	0	0	20	30
06:30 AM	0	0	0	0	0	1	0	0	0	1	0	22	0	0	22	0	14	0	0	14	37
06:45 AM	0	0	0	0	0	0	0	1	0	1	0	22	0	0	22	0	18	0	0	18	41
Total	0	0	0	0	0	1	0	1	0	2	0	63	0	0	63	1	64	0	0	65	130
07:00 AM	1	0	0	0	1	1	0	0	0	1	0	22	0	0	22	0	15	0	0	15	39
07:15 AM	1	0	0	0	1	0	0	0	0	0	0	15	0	0	15	0	20	1	0	21	37
07:30 AM	0	0	0	0	0	1	0	1	0	2	0	21	0	0	21	2	18	0	0	20	43
07:45 AM	0	0	0	0	0	1	0	1	0	2	2	26	1	0	29	0	15	0	0	15	46
Total	2	0	0	0	2	3	0	2	0	5	2	84	1	0	87	2	68	1	0	71	165
08:00 AM	2	0	0	0	2	1	0	0	0	1	1	15	0	0	16	2	24	0	0	26	45
08:15 AM	3	0	0	0	3	2	0	1	0	3	0	24	0	0	24	2	32	1	0	35	65
08:30 AM	1	0	1	0	2	0	0	2	0	2	1	27	1	0	29	2	31	4	0	37	70
08:45 AM	1	0	0	0	1	0	0	0	0	0	0	33	0	0	33	1	25	1	0	27	61
Total	7	0	1	0	8	3	0	3	0	6	2	99	1	0	102	7	112	6	0	125	241
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	19	0	0	19	1	19	0	0	20	39
09:15 AM	3	0	0	0	3	0	0	1	0	1	0	11	0	0	11	0	21	0	0	21	36
09:30 AM	0	0	0	0	0	1	0	3	0	4	0	13	1	0	14	2	24	1	0	27	45
09:45 AM	0	1	0	0	1	0	0	2	0	2	1	30	1	0	32	2	29	1	0	32	67
Total	3	1	0	0	4	1	0	6	0	7	1	73	2	0	76	5	93	2	0	100	187
10:00 AM	1	0	0	0	1	1	0	2	0	3	0	14	1	0	15	2	18	0	0	20	39
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	19	3	0	22	2	22	0	0	24	46
10:30 AM	0	0	0	0	0	1	0	1	0	2	0	21	0	0	21	1	25	0	0	26	49
10:45 AM	0	0	0	0	0	1	0	0	0	1	0	19	0	0	19	1	27	0	0	28	48
Total	1	0	0	0	1	3	0	3	0	6	0	73	4	0	77	6	92	0	0	98	182
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	17	0	0	17	1	13	0	0	14	31
11:15 AM	0	0	0	0	0	0	0	2	0	2	0	18	0	0	18	0	27	1	0	28	48
11:30 AM	0	0	0	0	0	0	0	1	0	1	0	28	0	0	28	3	22	0	0	25	54
11:45 AM	0	0	0	0	0	0	0	2	0	2	0	19	0	0	19	1	29	1	0	31	52
Total	0	0	0	0	0	0	0	5	0	5	0	82	0	0	82	5	91	2	0	98	185
12:00 PM	1	0	2	0	3	0	0	1	0	1	0	21	0	0	21	0	26	1	0	27	52
12:15 PM	0	0	0	0	0	0	0	1	0	1	0	27	0	0	27	0	14	0	0	14	42
12:30 PM	1	0	0	0	1	0	0	0	0	0	0	31	0	0	31	0	20	1	0	21	53
12:45 PM	0	0	1	0	1	0	0	0	0	0	0	19	0	0	19	0	20	0	0	20	40
Total	2	0	3	0	5	0	0	2	0	2	0	98	0	0	98	0	80	2	0	82	187
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	29	0	0	29	0	24	0	0	24	53
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	21	0	0	21	1	27	0	0	28	49
01:30 PM	0	0	0	0	0	1	0	0	0	1	0	26	1	0	27	0	25	0	0	25	53
01:45 PM	1	0	0	0	1	0	0	0	0	0	0	13	0	0	13	1	24	0	0	25	39
Total	1	0	0	0	1	1	0	0	0	1	0	89	1	0	90	2	100	0	0	102	194
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	2	20	0	0	22	45
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	19	0	0	19	0	23	0	0	23	42
02:30 PM	0	0	0	0	0	0	0	0	0	0	1	29	0	0	30	1	16	1	0	18	48
02:45 PM	0	0	1	0	1	0	0	0	0	0	0	22	0	0	22	0	14	0	0	14	37
Total	0	0	1	0	1	0	0	0	0	0	1	93	0	0	94	3	73	1	0	77	172
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	27	0	0	27	1	29	0	0	30	57
03:15 PM	1	0	0	0	1	1	0	0	0	1	0	15	0	0	15	0	25	1	0	26	43
03:30 PM	0	0	0	0	0	3	0	1	0	4	0	15	0	0	15	1	17	0	0	18	37
03:45 PM	0	0	0	0	0	1	0	1	0	2	2	16	0	0	18	2	22	1	0	25	45
Total	1	0	0	0	1	5	0	2	0	7	2	73	0	0	75	4	93	2	0	99	182
04:00 PM	0	0	0	0	0	0	0	1	0	1	0	17	0	0	17	0	15	0	0	15	33
04:15 PM	0	0	0	0	0	0	0	1	0	1	1	10	0	0	11	0	16	1	0	17	29
04:30 PM	0	0	0	0	0	1	0	1	0	2	0	16	0	0	16	0	15	0	0	15	33
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	16	0	0	16	0	14	0	0	14	30
Total	0	0	0	0	0	1	0	3	0	4	1	59	0	0	60	0	60	1	0	61	125
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12	0	14	0	0	14	26
05:15 PM	1	0	0	0	1	0	0	0	0	0	0	15	0	0	15	1	13	1	0	15	31
05:30 PM	0	0	0	0	0	1	0	1	0	2	0	11	0	0	11	1	13	0	0	14	27
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	17	0	0	17	0	10	0	0	10	27
Total	1	0	0	0	1	1	0	1	0	2	0	55	0	0	55	2	50	1	0	53	111
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	13	0	0	13	19
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	4	0	0	4	15

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Truck

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	13	0	0	13	23
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	6	0	0	6	17
Total	0	0	0	0	0	0	0	0	0	0	0	38	0	0	38	0	36	0	0	36	74
Grand Total	18	1	5	0	24	19	0	28	0	47	9	979	9	0	997	37	1012	18	0	1067	2135
Apprch %	75	4.2	20.8	0		40.4	0	59.6	0		0.9	98.2	0.9	0		3.5	94.8	1.7	0		
Total %	0.8	0	0.2	0	1.1	0.9	0	1.3	0	2.2	0.4	45.9	0.4	0	46.7	1.7	47.4	0.8	0	50	

	English Tavern Rd Eastbound				English Tavern Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	2	0	0	2	1	0	0	1	**1**	15	0	16	**2**	24	0	26	45
08:15 AM	**3**	0	0	**3**	**2**	0	1	**3**	0	24	0	24	2	**32**	1	35	65
08:30 AM	1	0	**1**	2	0	0	**2**	2	1	27	**1**	29	2	31	**4**	**37**	**70**
08:45 AM	1	0	0	1	0	0	0	0	0	**33**	0	**33**	1	25	1	27	61
Total Volume	7	0	1	8	3	0	3	6	2	99	1	102	7	112	6	125	241
% App. Total	87.5	0	12.5		50	0	50		2	97.1	1		5.6	89.6	4.8		
PHF	.583	.000	.250	.667	.375	.000	.375	.500	.500	.750	.250	.773	.875	.875	.375	.845	.861

Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	2	0	0	2	1	0	0	1	**1**	15	0	16	**2**	24	0	26	45
08:15 AM	**3**	0	0	**3**	**2**	0	1	**3**	0	24	0	24	2	**32**	1	35	65
08:30 AM	1	0	**1**	2	0	0	**2**	2	1	27	**1**	29	2	31	**4**	**37**	**70**
08:45 AM	1	0	0	1	0	0	0	0	0	**33**	0	**33**	1	25	1	27	61
Total Volume	7	0	1	8	3	0	3	6	2	99	1	102	7	112	6	125	241
% App. Total	87.5	0	12.5		50	0	50		2	97.1	1		5.6	89.6	4.8		
PHF	.583	.000	.250	.667	.375	.000	.375	.500	.500	.750	.250	.773	.875	.875	.375	.845	.861

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Bicycles on Road

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Bicycles on Road

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	2
Apprch %	0	0	0	0		0	0	100	0		0	100	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	50	0	50	0	50	0	0	50	0	0	0	0	0	

	English Tavern Rd Eastbound				English Tavern Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	0	100		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	0	100		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 1

Groups Printed- Combined

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	35	0	35	0	179	0	0	179	3	66	0	0	69	283
06:15 AM	0	0	0	0	0	2	0	38	0	40	0	212	0	0	212	7	104	1	0	112	364
06:30 AM	0	0	0	0	0	4	2	72	0	78	5	276	2	0	283	14	84	3	0	101	462
06:45 AM	0	0	0	0	0	4	4	62	0	70	5	254	2	0	261	12	138	8	0	158	489
Total	0	0	0	0	0	10	6	207	0	223	10	921	4	0	935	36	392	12	0	440	1598
07:00 AM	1	0	1	0	2	4	0	65	0	69	7	242	2	0	251	9	139	3	0	151	473
07:15 AM	1	0	0	0	1	2	0	87	0	89	3	295	2	0	300	19	188	1	0	208	598
07:30 AM	0	0	1	0	1	6	0	101	0	107	0	353	1	0	354	22	149	2	0	173	635
07:45 AM	1	0	0	0	1	6	0	86	0	92	3	280	4	0	287	26	153	3	0	182	562
Total	3	0	2	0	5	18	0	339	0	357	13	1170	9	0	1192	76	629	9	0	714	2268
08:00 AM	4	0	1	0	5	11	0	87	0	98	1	249	1	0	251	29	146	3	1	179	533
08:15 AM	4	0	0	0	4	8	0	57	0	65	1	222	1	1	225	23	154	2	0	179	473
08:30 AM	3	0	2	0	5	3	0	65	0	68	3	281	2	0	286	29	150	5	0	184	543
08:45 AM	2	0	0	0	2	5	0	52	0	57	0	238	4	1	243	20	118	1	1	140	442
Total	13	0	3	0	16	27	0	261	0	288	5	990	8	2	1005	101	568	11	2	682	1991
09:00 AM	0	0	0	0	0	3	0	39	1	43	0	159	6	0	165	24	136	3	1	164	372
09:15 AM	7	0	0	0	7	3	0	32	0	35	1	156	6	0	163	24	158	4	0	186	391
09:30 AM	1	2	0	0	3	3	0	47	0	50	1	145	17	0	163	25	146	4	0	175	391
09:45 AM	1	1	0	0	2	7	0	35	0	42	3	125	7	0	135	24	143	3	1	171	350
Total	9	3	0	0	12	16	0	153	1	170	5	585	36	0	626	97	583	14	2	696	1504
10:00 AM	4	1	1	0	6	4	0	35	0	39	0	99	9	0	108	22	146	1	1	170	323
10:15 AM	0	0	0	0	0	7	0	33	0	40	1	127	7	0	135	24	148	0	0	172	347
10:30 AM	0	0	0	0	0	2	0	37	0	39	0	102	16	0	118	29	122	3	1	155	312
10:45 AM	2	0	0	0	2	2	0	31	0	33	0	133	5	0	138	36	166	1	0	203	376
Total	6	1	1	0	8	15	0	136	0	151	1	461	37	0	499	111	582	5	2	700	1358
11:00 AM	3	0	0	0	3	1	0	41	0	42	1	161	2	0	164	34	175	0	0	209	418
11:15 AM	1	0	0	0	1	1	0	27	0	28	2	190	0	0	192	42	167	2	1	212	433
11:30 AM	2	0	0	0	2	0	0	40	0	40	1	201	0	1	203	31	194	2	0	227	472
11:45 AM	3	0	1	0	4	2	0	27	0	29	0	185	2	0	187	45	196	3	0	244	464
Total	9	0	1	0	10	4	0	135	0	139	4	737	4	1	746	152	732	7	1	892	1787
12:00 PM	2	0	2	0	4	2	0	48	0	50	1	201	4	0	206	33	182	4	0	219	479
12:15 PM	0	0	1	0	1	1	0	34	0	35	0	183	6	0	189	43	196	0	0	239	464
12:30 PM	2	1	1	0	4	2	0	41	0	43	0	210	4	0	214	35	219	4	0	258	519
12:45 PM	0	0	2	0	2	1	0	31	0	32	2	184	2	0	188	49	199	4	0	252	474
Total	4	1	6	0	11	6	0	154	0	160	3	778	16	0	797	160	796	12	0	968	1936
01:00 PM	0	0	0	0	0	2	0	21	0	23	1	185	3	0	189	44	215	5	0	264	476
01:15 PM	0	1	0	0	1	2	1	16	0	19	5	178	4	2	189	54	193	2	0	249	458
01:30 PM	2	0	0	0	2	1	0	16	0	17	2	185	1	1	189	48	202	1	0	251	459
01:45 PM	1	1	0	0	2	2	0	53	0	55	1	170	5	0	176	39	211	0	0	250	483
Total	3	2	0	0	5	7	1	106	0	114	9	718	13	3	743	185	821	8	0	1014	1876
02:00 PM	0	0	0	0	0	1	0	31	0	32	0	187	0	0	187	41	191	1	1	234	453
02:15 PM	2	0	0	0	2	4	0	34	0	38	0	206	0	0	206	47	201	5	0	253	499
02:30 PM	0	0	0	0	0	1	0	31	0	32	2	219	1	0	222	53	223	1	0	277	531
02:45 PM	2	0	1	0	3	5	0	35	0	40	0	180	1	0	181	50	244	6	0	300	524
Total	4	0	1	0	5	11	0	131	0	142	2	792	2	0	796	191	859	13	1	1064	2007
03:00 PM	2	0	0	0	2	4	0	40	0	44	1	186	1	0	188	49	252	1	0	302	536
03:15 PM	2	0	0	0	2	3	0	38	0	41	0	173	1	0	174	64	294	3	1	362	579
03:30 PM	0	0	0	0	0	6	0	47	0	53	0	202	6	0	208	68	275	1	0	344	605
03:45 PM	0	0	0	0	0	4	0	49	0	53	2	217	2	0	221	64	284	1	0	349	623
Total	4	0	0	0	4	17	0	174	0	191	3	778	10	0	791	245	1105	6	1	1357	2343
04:00 PM	0	0	0	0	0	0	0	52	0	52	0	212	3	0	215	70	304	1	0	375	642
04:15 PM	0	0	0	0	0	1	0	46	0	47	1	238	3	0	242	64	277	1	0	342	631
04:30 PM	0	0	0	0	0	3	0	64	0	67	0	193	5	0	198	81	269	0	0	350	615
04:45 PM	5	0	0	0	5	5	0	57	0	62	0	186	5	0	191	77	311	1	0	389	647
Total	5	0	0	0	5	9	0	219	0	228	1	829	16	0	846	292	1161	3	0	1456	2535
05:00 PM	10	3	0	0	13	7	0	44	0	51	0	200	8	0	208	92	320	3	0	415	687
05:15 PM	4	0	0	0	4	1	0	64	0	65	0	210	6	0	216	91	323	1	0	415	700
05:30 PM	2	0	0	0	2	5	0	52	0	57	0	185	2	0	187	102	286	0	0	388	634
05:45 PM	0	0	0	0	0	0	0	51	0	51	0	169	3	0	172	87	266	0	0	353	576
Total	16	3	0	0	19	13	0	211	0	224	0	764	19	0	783	372	1195	4	0	1571	2597
06:00 PM	0	0	0	0	0	2	0	51	0	53	0	181	7	0	188	74	223	0	0	297	538
06:15 PM	0	0	0	0	0	4	0	51	0	55	0	159	4	0	163	59	216	0	0	275	493

Peggy Malone & Associates
(800) 247-8602

File Name : 6-US 29 and English Tavern Rd Uturns
Site Code :
Start Date : 2/21/2018
Page No : 2

Groups Printed- Combined

	English Tavern Rd Eastbound					English Tavern Rd Westbound					US 29 Northbound					US 29 Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
06:30 PM	0	0	0	0	0	3	0	53	0	56	0	138	2	0	140	69	200	2	0	271	467
06:45 PM	0	0	0	0	0	0	0	39	0	39	0	124	2	0	126	63	169	0	0	232	397
Total	0	0	0	0	0	9	0	194	0	203	0	602	15	0	617	265	808	2	0	1075	1895
Grand Total	76	10	14	0	100	162	7	2420	1	2590	56	10125	189	6	10376	2283	10231	106	9	12629	25695
Apprch %	76	10	14	0		6.3	0.3	93.4	0		0.5	97.6	1.8	0.1		18.1	81	0.8	0.1		
Total %	0.3	0	0.1	0	0.4	0.6	0	9.4	0	10.1	0.2	39.4	0.7	0	40.4	8.9	39.8	0.4	0	49.1	

	English Tavern Rd Eastbound				English Tavern Rd Westbound				US 29 Northbound				US 29 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	0	0	1	2	0	87	89	**3**	295	2	300	19	**188**	1	**208**	598
07:30 AM	0	0	**1**	1	6	0	**101**	**107**	0	**353**	1	**354**	22	149	2	173	**635**
07:45 AM	1	0	0	1	6	0	86	92	3	280	**4**	287	26	153	**3**	182	562
08:00 AM	**4**	0	1	**5**	**11**	0	87	98	1	249	1	251	**29**	146	3	178	532
Total Volume	6	0	2	8	25	0	361	386	7	1177	8	1192	96	636	9	741	2327
% App. Total	75	0	25		6.5	0	93.5		0.6	98.7	0.7		13	85.8	1.2		
PHF	.375	.000	.500	.400	.568	.000	.894	.902	.583	.834	.500	.842	.828	.846	.750	.891	.916

Peak Hour Analysis From 06:00 AM to 11:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	0	0	1	2	0	87	89	**3**	295	2	300	19	**188**	1	**208**	598
07:30 AM	0	0	**1**	1	6	0	**101**	**107**	0	**353**	1	**354**	22	149	2	173	**635**
07:45 AM	1	0	0	1	6	0	86	92	3	280	**4**	287	26	153	**3**	182	562
08:00 AM	**4**	0	1	**5**	**11**	0	87	98	1	249	1	251	**29**	146	3	178	532
Total Volume	6	0	2	8	25	0	361	386	7	1177	8	1192	96	636	9	741	2327
% App. Total	75	0	25		6.5	0	93.5		0.6	98.7	0.7		13	85.8	1.2		
PHF	.375	.000	.500	.400	.568	.000	.894	.902	.583	.834	.500	.842	.828	.846	.750	.891	.916

APPENDIX C-2

Signal Timing

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 24
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**15**	10	10	8	15		
PASSAGE	**3.0**	**6.0**	4.0	4.0	3.0	6.0		
YELLOW	**3.9**	**4.9**	4.9	4.6	4.0	4.8		
RED	**2.8**	**1.0**	3.4	3.3	2.5	1.0		
MAX 1	**25**	**50**	20	20	25	50		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 685
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**20**	8	8	5	20		
PASSAGE	**4.0**	**5.0**	4.0	4.0	4.0	5.0		
YELLOW	**3.8**	**4.8**	4.0	4.1	3.9	4.6		
RED	**2.8**	**1.0**	1.5	3.4	2.5	1.0		
MAX 1	**45**	**60**	45	30	20	60		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 703
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**6**	**20**	10	6	6	20		
PASSAGE	**4.0**	**6.0**	6.0	5.0	4.0	6.0		
YELLOW	**4.0**	**4.0**	3.5	3.5	4.0	4.0		
RED	**2.0**	**2.0**	1.5	1.5	2.0	2.0		
MAX 1	**25**	**60**	30	20	15	60		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 719
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**20**	10	8	8	20		
PASSAGE	**3.0**	**6.0**	6.0	3.5	3.0	6.0		
YELLOW	**3.8**	**4.9**	4.4	5.6	4.0	4.6		
RED	**2.6**	**1.0**	2.7	2.8	1.7	1.0		
MAX 1	**30**	**45**	40	30	25	45		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 726
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**12**	10	10	8	12		
PASSAGE	**3.5**	**5.0**	4.0	5.0	3.5	5.0		
YELLOW	**3.5**	**4.8**	4.9	3.0	3.9	4.7		
RED	**2.9**	**1.0**	2.6	3.1	2.7	1.0		
MAX 1	**15**	**30**	25	20	10	30		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	29 & 738
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**10**	**12**	10	10	12	12		
PASSAGE	**1.0**	**1.0**	2.0	1.0	2.0	1.0		
YELLOW	**5.6**	**5.6**	4.1	3.6	5.6	5.6		
RED	**2.8**	**2.8**	2.9	2.8	2.8	2.8		
MAX 1	**25**	**45**	30	20	30	45		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	460 & 24
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**12**	8	8	8	12		
PASSAGE	**3.5**	**6.0**	3.5	4.5	3.5	6.0		
YELLOW	**4.7**	**4.7**	4.4	4.0	4.7	4.7		
RED	**2.4**	**2.4**	2.9	3.3	2.4	2.4		
MAX 1	**20**	**60**	30	30	20	60		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	460 & 623
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**5**	**20**	6	8	5	20		
PASSAGE	**2.0**	**6.0**	3.0	3.0	2.0	6.0		
YELLOW	**4.9**	**4.9**	4.0	3.8	4.9	4.9		
RED	**3.1**	**3.1**	2.7	2.6	3.1	3.1		
MAX 1	**15**	**45**	25	30	15	45		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	460 & 858 7 1512
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**5**	**12**	8	6	5	12		
PASSAGE	**3.0**	**7.0**	3.0	3.0	4.9	7.0		
YELLOW	**4.9**	**4.9**	3.2	3.0	4.9	4.9		
RED	**2.6**	**2.6**	2.6	2.5	2.6	2.6		
MAX 1	**25**	**60**	30	20	30	60		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

SIGNAL TIMING SHEET

DATE ISSUED		**INTERSECTION**	460 & SHOPPES APPOMATTOX
CONTROLLER TYPE		**LOCATION**	LYNCHBURG VA
CABINET TYPE	**NEMA TS-2**	**DISTRICT**	LYNCHBURG
SEQUENCE		**MAINTENANCE JURISDICTION**	

PHASE NUMBER	**1**	**2**	3	4	5	6	7	8
PHASE SETTING								
DETECTOR PHASES								
FUNCTION								
OVERLAP								
MINMUM GREEN	**8**	**10**	8	8	8	10		
PASSAGE	**2.0**	**6.0**	3.0	3.0	3.5	5.7		
YELLOW	**4.6**	**4.3**	3.0	3.0	3.5	5.7		
RED	**3.2**	**1.0**	4.4	3.5	2.7	1.0		
MAX 1	**25**	**50**	25	20	15	50		
MAX 2								
WALK								
PED CLEAR								
RECALL								
AWF TIME (S)								
DELAY DETECTION TIMING								
PRE-EMPTION TYPE								
SPLIT PLAN 1								
SPLIT PLAN 2								
SPLIT PLANE 3								
CYLCE LENGTH PLAN 1								
CYLCE LENGTH PLAN 2								
CYLCE LENGTH PLAN 3								

TIME OF DAY	**DAY OF WEEK**	**CYCLE LENGTH**	**OFFSET**

APPENDIX D

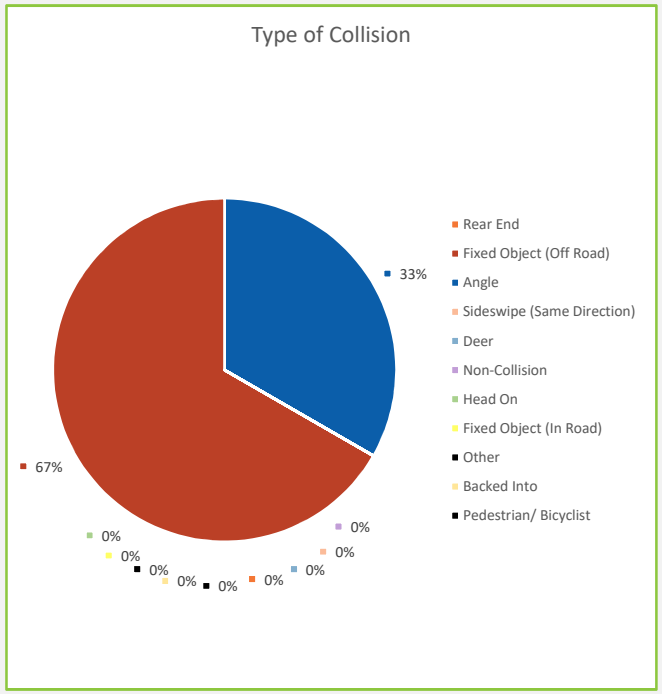
Safety Analysis

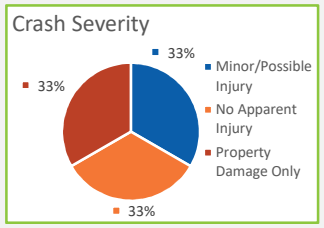
APPENDIX D-1

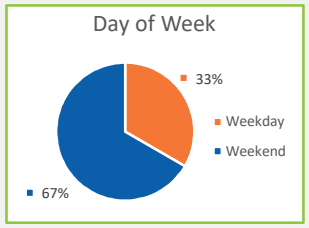
Intersection Crashes

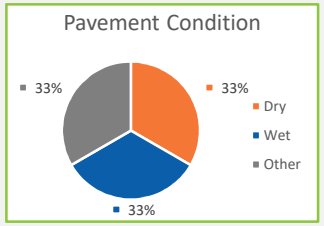
US 29 AND LAWLESS CREEK ROAD

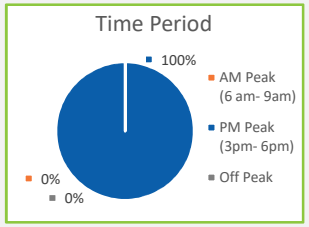
Summary of Crash Data: January 1, 2012 - December 31, 2016

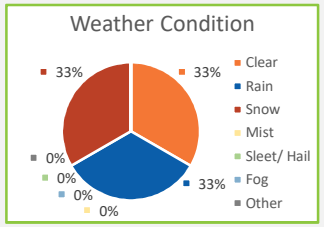


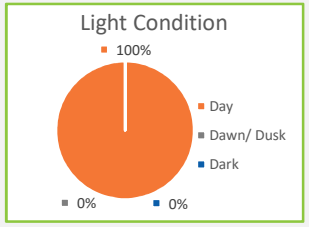












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	0	1	1	0	0	2	0	2	0	2	0	0	1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	2
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1
TOTAL	**0**	**0**	**1**	**1**	**1**	**1**	**2**	0	**3**	**0**	**3**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**

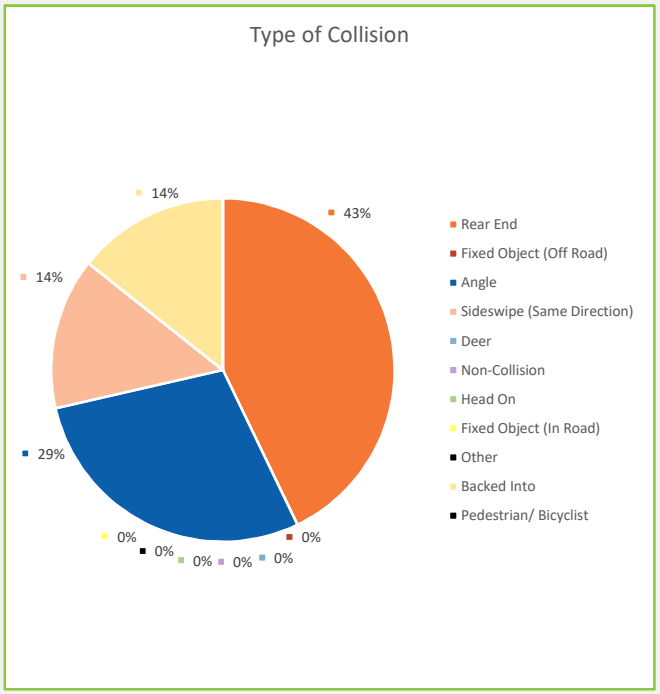
APP: US 29 CORRIDOR

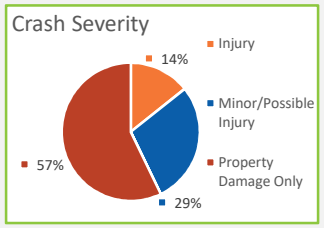
ARTERIAL PRESERVATION PROGRAM

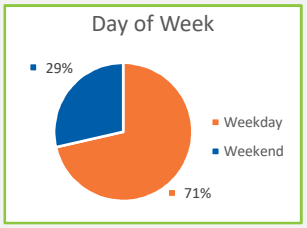
VDOT

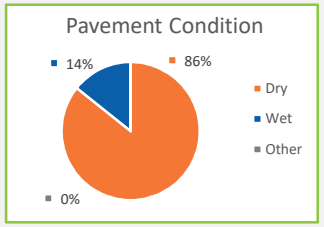
US 29 AND MALMAISON ROAD

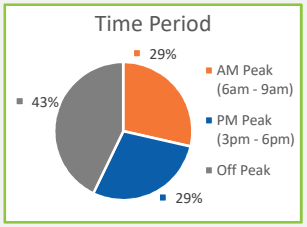
Summary of Crash Data: January 1, 2012 - December 31, 2016

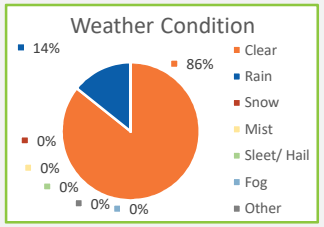


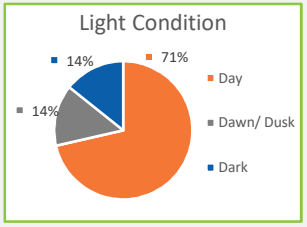










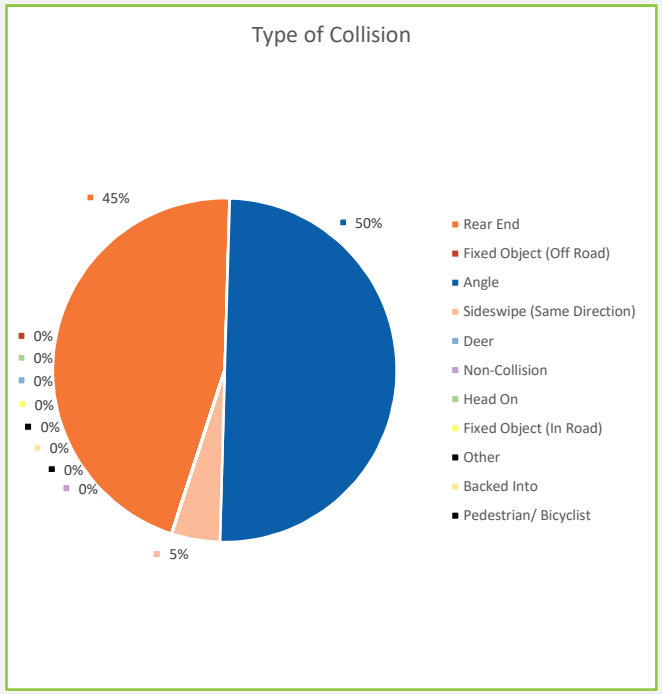


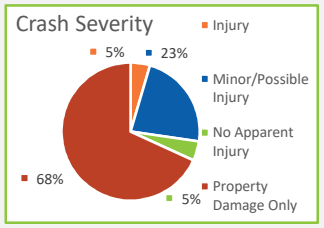
YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	1	0	0	2	2	1	1	1	1	2	0	1	2	1	0	0	0	0	0	2	1	0	2	0	1	0	0	0	0	0	0	0	0	3
2013	0	0	0	0	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2014	0	0	1	0	1	1	1	1	0	1	1	1	0	2	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	2
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1
TOTAL	**0**	**1**	**2**	**0**	**4**	**5**	**2**	2	**2**	**3**	**5**	**1**	**1**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**6**	**1**	**0**	**3**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**7**

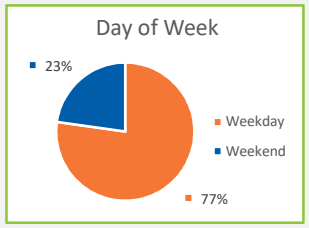
ARTERIAL PRESERVATION PROGRAM VDOT

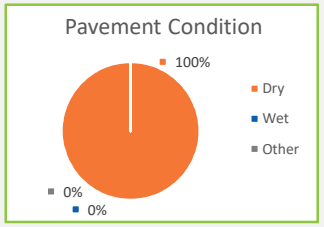
US 29 AND FAIRVIEW ROAD/TIGHTSQUEEZE ROAD

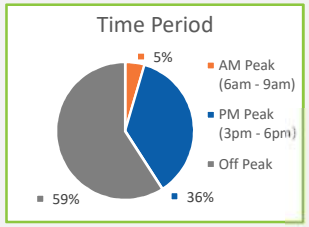
Summary of Crash Data: January 1, 2012 - December 31, 2016

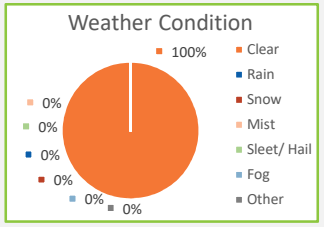


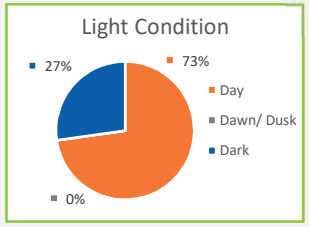












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	1	0	0	5	6	0	0	2	4	4	0	2	6	0	0	0	0	0	0	6	0	0	2	0	4	0	0	0	0	0	0	0	0	6
2013	0	0	1	0	3	3	1	1	2	1	4	0	0	4	0	0	0	0	0	0	4	0	0	2	0	2	0	0	0	0	0	0	0	0	4
2014	0	0	3	1	3	5	2	0	3	4	6	0	1	7	0	0	0	0	0	0	7	0	0	4	0	2	1	0	0	0	0	0	0	0	7
2015	0	0	0	0	2	1	1	0	0	2	1	0	1	2	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	2
2016	0	0	1	0	2	2	1	0	1	2	1	0	2	3	0	0	0	0	0	0	3	0	0	1	0	2	0	0	0	0	0	0	0	0	3
TOTAL	**0**	**1**	**5**	**1**	**15**	**17**	**5**	**1**	**8**	**13**	**16**	**0**	**6**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**0**	**10**	**0**	**11**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22**

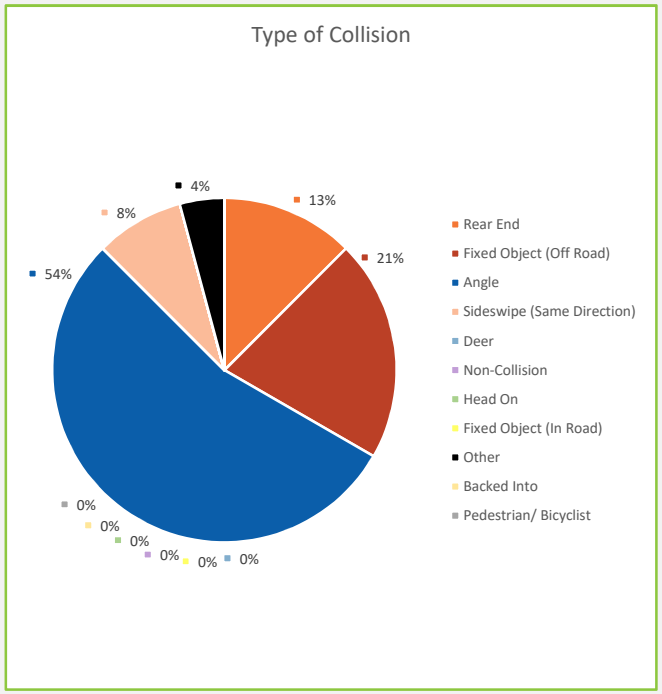
APP: US 29 CORRIDOR

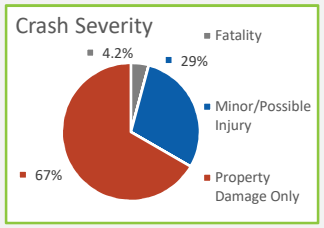
ARTERIAL PRESERVATION PROGRAM

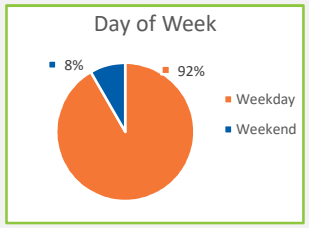
VDOT

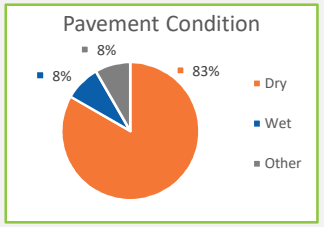
US 29 AND GLADYS ROAD

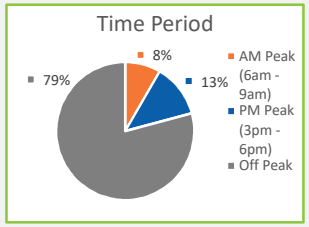
Summary of Crash Data: January 1, 2012 - December 31, 2016

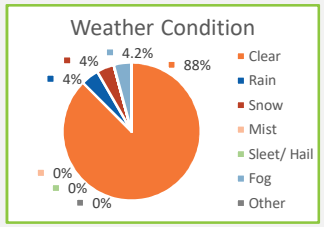


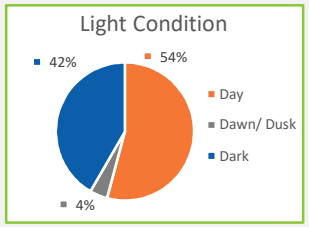












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	0	1	0	3	3	1	0	0	4	2	0	2	3	1	0	0	0	0	0	3	1	0	1	1	1	1	0	0	0	0	0	0	0	0	4
2013	0	0	2	0	2	4	0	1	1	2	3	0	1	3	0	1	0	0	0	0	2	0	2	0	2	1	1	0	0	0	0	0	0	0	0	4
2014	0	0	0	0	2	2	0	0	1	1	0	0	2	1	0	0	0	0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	2
2015	1	0	2	0	3	6	0	0	0	6	2	1	3	6	0	0	0	0	0	0	6	0	0	1	2	2	0	0	0	0	0	1	0	0	6
2016	0	0	2	0	6	7	1	1	1	6	6	0	2	8	0	0	0	0	0	0	8	0	0	0	0	8	0	0	0	0	0	0	0	0	8
TOTAL	**1**	**0**	**7**	**0**	**16**	**22**	**2**	**2**	**3**	**19**	**13**	**1**	**10**	**21**	**1**	**1**	**0**	**0**	**1**	**0**	**20**	**2**	**2**	**3**	**5**	**13**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**24**

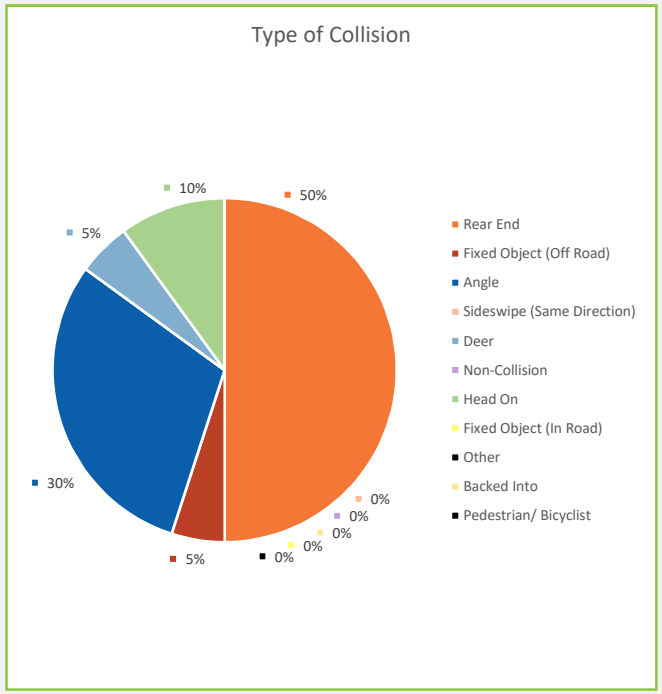
APP: US 29 CORRIDOR

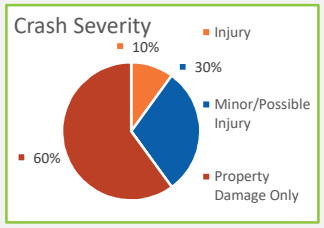
ARTERIAL PRESERVATION PROGRAM

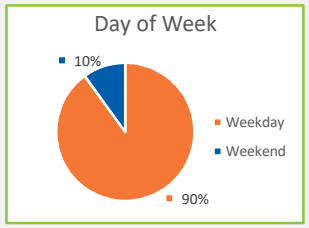
VDOT

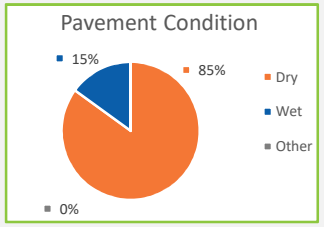
US 29 AND COLONIAL HIGHWAY

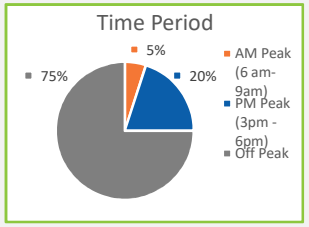
Summary of Crash Data: January 1, 2012 - December 31, 2016

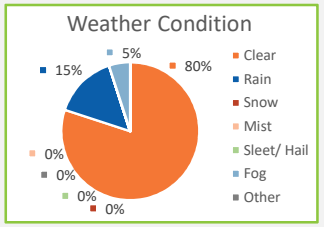


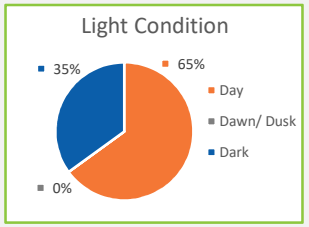












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2013	0	0	3	0	1	4	0	0	2	2	3	0	1	3	1	0	0	0	0	0	3	1	0	2	0	1	0	1	0	0	0	0	0	0	**4**
2014	0	1	0	0	2	3	0	0	2	1	3	0	0	2	1	0	0	0	0	0	2	1	0	2	0	1	0	0	0	0	0	0	0	0	**3**
2015	0	0	3	0	3	6	0	1	0	5	3	0	3	4	1	0	0	0	1	0	5	1	0	5	0	1	0	0	0	0	0	0	0	0	**6**
2016	0	1	0	0	6	5	2	0	0	7	4	0	3	7	0	0	0	0	0	0	7	0	0	1	1	3	0	0	0	2	0	0	0	0	**7**
TOTAL	**0**	**2**	**6**	**0**	**12**	**18**	**2**	**1**	**4**	**15**	**13**	**0**	**7**	**16**	**3**	**0**	**0**	**0**	**1**	**0**	**17**	**3**	**0**	**10**	**1**	**6**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**20**

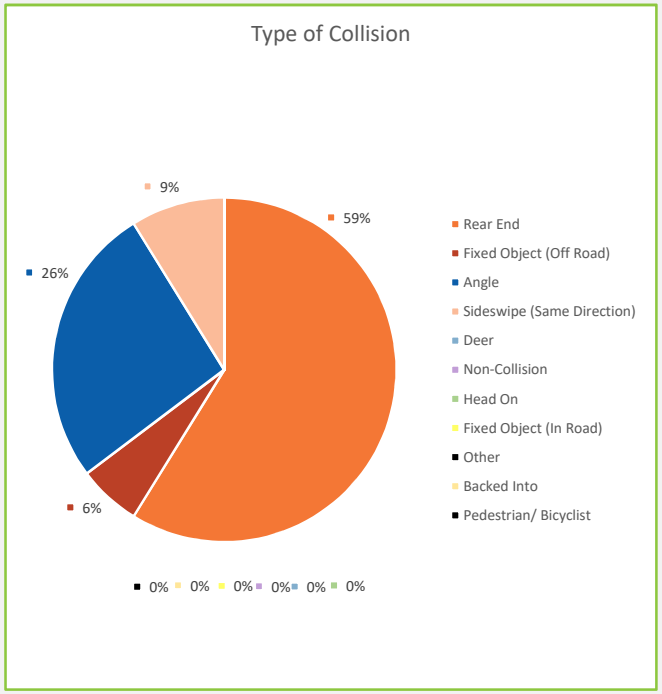
APP: US 29 CORRIDOR

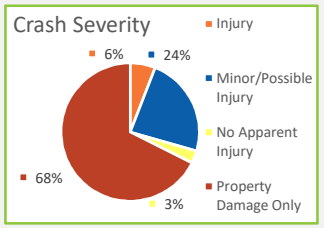
ARTERIAL PRESERVATION PROGRAM

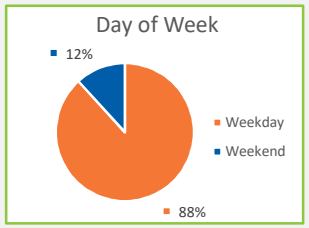
VDOT

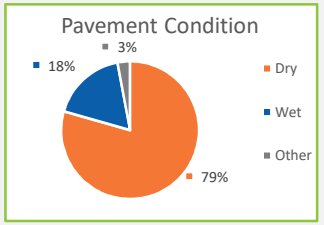
US 29 AND CALOHAN ROAD

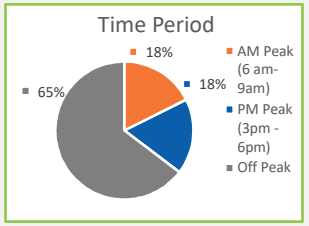
Summary of Crash Data: January 1, 2012 - December 31, 2016

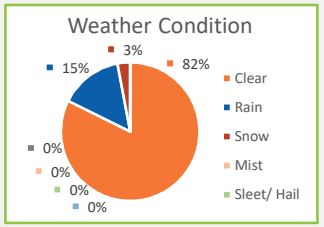


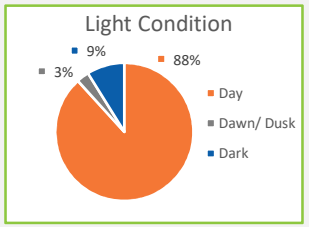












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	0	0	1	5	5	1	0	1	5	6	0	0	6	0	0	0	0	0	0	6	0	0	4	0	1	1	0	0	0	0	0	0	0	6
2013	0	2	4	0	4	9	1	3	0	7	10	0	0	7	3	0	0	0	0	0	7	3	0	6	2	2	0	0	0	0	0	0	0	0	10
2014	0	0	1	0	4	4	1	0	3	2	4	0	1	2	2	1	0	0	0	0	1	3	1	2	0	1	2	0	0	0	0	0	0	0	5
2015	0	0	1	0	3	3	1	1	0	3	3	0	1	4	0	0	0	0	0	0	4	0	0	2	0	2	0	0	0	0	0	0	0	0	4
2016	0	0	2	0	7	9	0	2	2	5	7	1	1	9	0	0	0	0	0	0	9	0	0	6	0	3	0	0	0	0	0	0	0	0	9
TOTAL	**0**	**2**	**8**	**1**	**23**	**30**	**4**	6	**6**	**22**	**30**	**1**	**3**	**28**	**5**	**1**	**0**	**0**	**0**	**0**	**27**	**6**	**1**	**20**	**2**	**9**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**34**

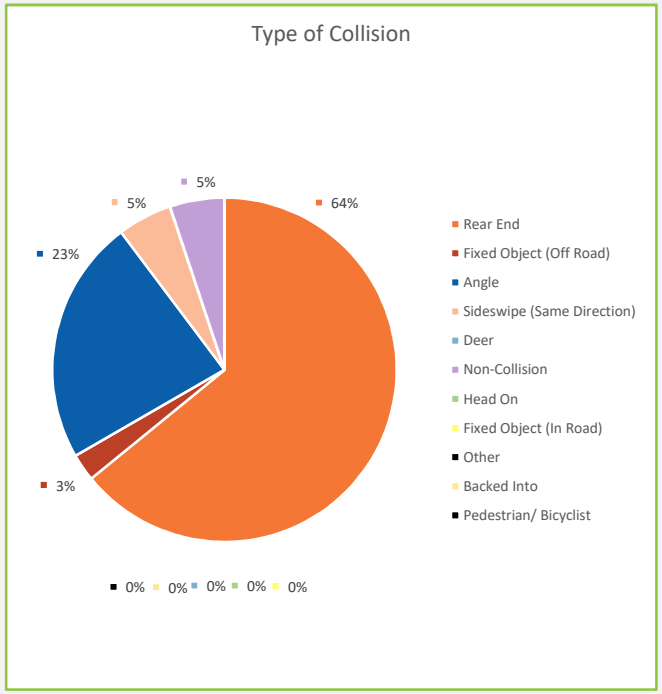
APP: US 29 CORRIDOR

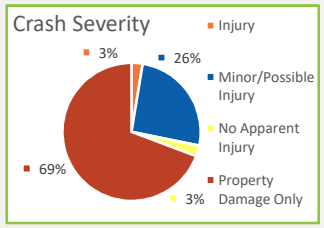
ARTERIAL PRESERVATION PROGRAM

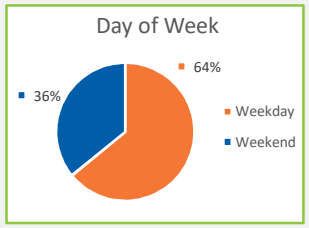
VDOT

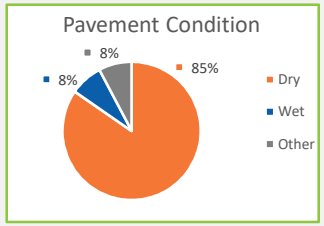
US 29 AND ENGLISH TAVERN ROAD (NORTH)

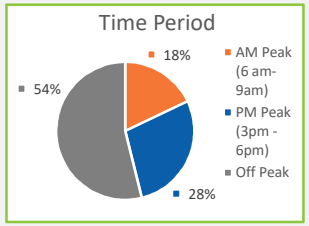
Summary of Crash Data: January 1, 2012 - December 31, 2016

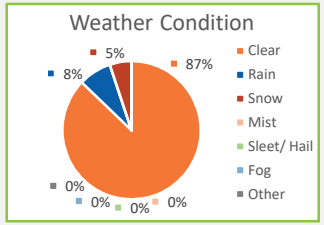


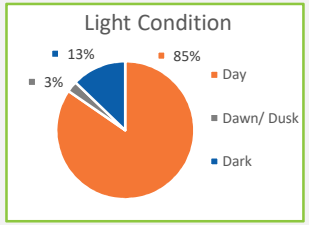












YEAR	SEVERITY					DAY OF WEEK		TIME PERIOD			LIGHT CONDITION			WEATHER CONDITION							PAVEMENT CONDITION			TYPE OF COLLISION											TOTAL
	Fatality	Serious Injury	Minor/ Possible Injury	No Apparent Injury	Property Damage Only	Weekday	Weekend	AM Peak (6am - 9am)	PM Peak (3pm - 6pm)	Off Peak	Day	Dawn/ Dusk	Dark	Clear	Rain	Snow	Mist	Sleet/ Hail	Fog	Other	Dry	Wet	Other	Rear End	Fixed Object (Off Road)	Angle	Sideswipe (Same Direction)	Deer	Non-Collision	Head On	Fixed Object (In Road)	Other	Backed Into	Pedestrian/ Bicyclist	
2012	0	1	1	0	3	4	1	1	2	2	5	0	0	4	0	1	0	0	0	0	4	0	1	5	0	0	0	0	0	0	0	0	0	0	5
2013	0	0	3	0	6	5	4	1	3	5	7	0	2	8	1	0	0	0	0	0	8	1	0	6	1	2	0	0	0	0	0	0	0	0	9
2014	0	0	2	0	9	4	7	3	4	4	9	0	2	10	1	0	0	0	0	0	10	1	0	6	0	3	2	0	0	0	0	0	0	0	11
2015	0	0	1	0	5	5	1	0	1	5	5	0	1	4	1	1	0	0	0	0	4	1	1	5	0	0	0	0	1	0	0	0	0	0	6
2016	0	0	3	1	4	7	1	2	1	5	7	1	0	8	0	0	0	0	0	0	7	0	1	3	0	4	0	0	1	0	0	0	0	0	8
TOTAL	**0**	**1**	**10**	**1**	**27**	**25**	**14**	**7**	**11**	**21**	**33**	**1**	**5**	**34**	**3**	**2**	**0**	**0**	**0**	**0**	**33**	**3**	**3**	**25**	**1**	**9**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**39**

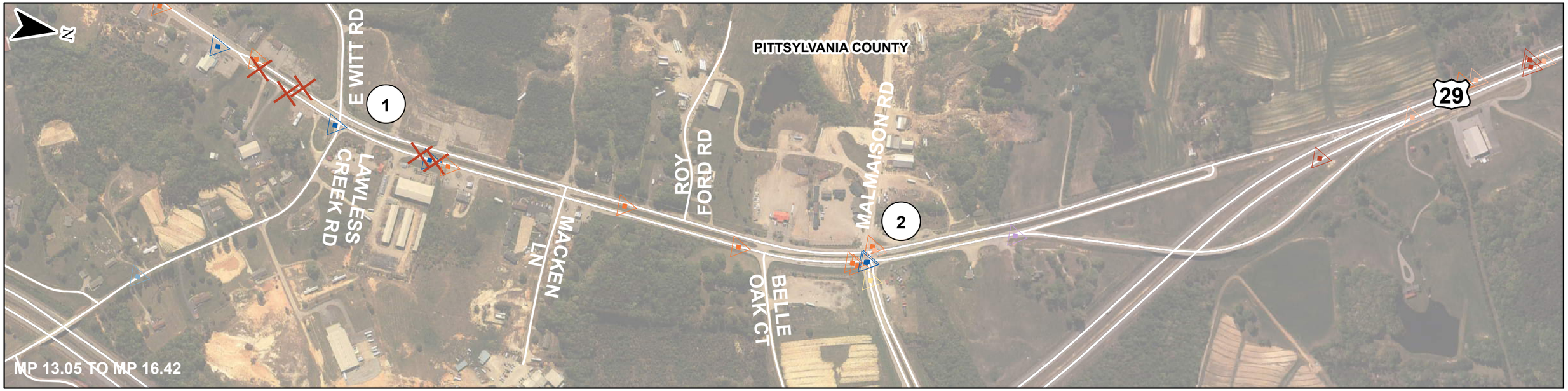
APP: US 29 CORRIDOR

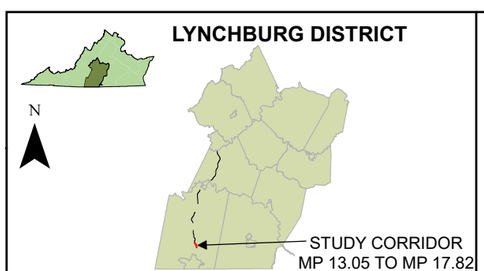
ARTERIAL PRESERVATION PROGRAM

VDOT

APPENDIX D-2

Roadway Departure Crashes





Legend

✚ Roadway Departure Crash

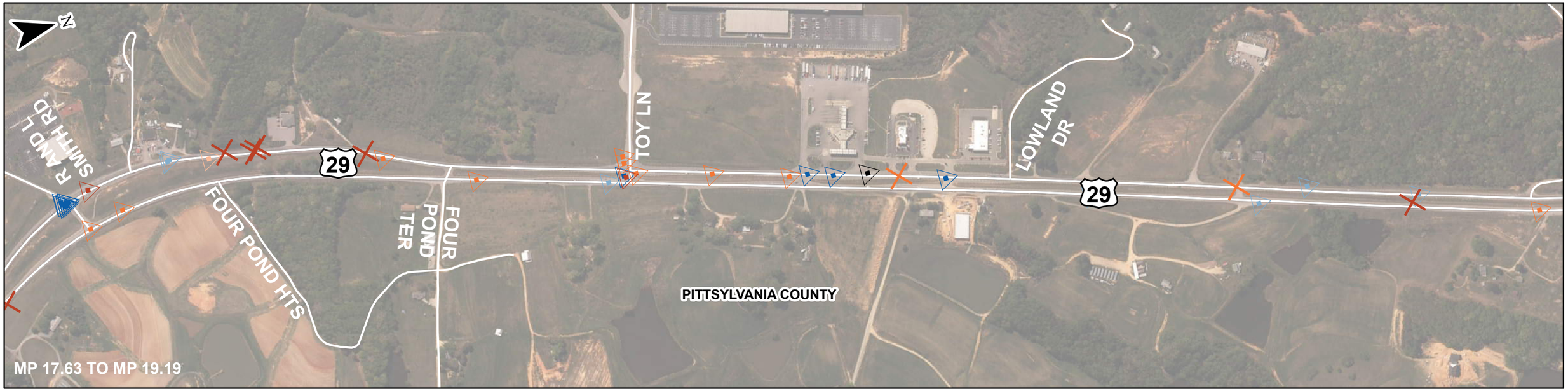
▲ Non-Roadway Departure Crash

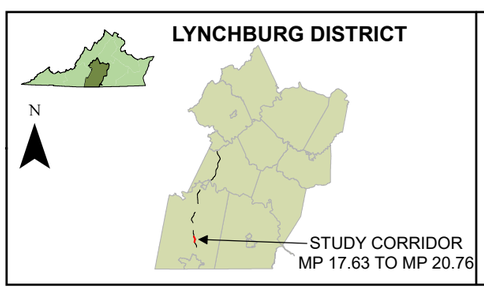
Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 719 (Lawless Creek Road) to Route 863 (R and L Smith Road)

VDOT ARTERIALO PRESERVATION PROGRAM





Legend

✚ Roadway Departure Crash

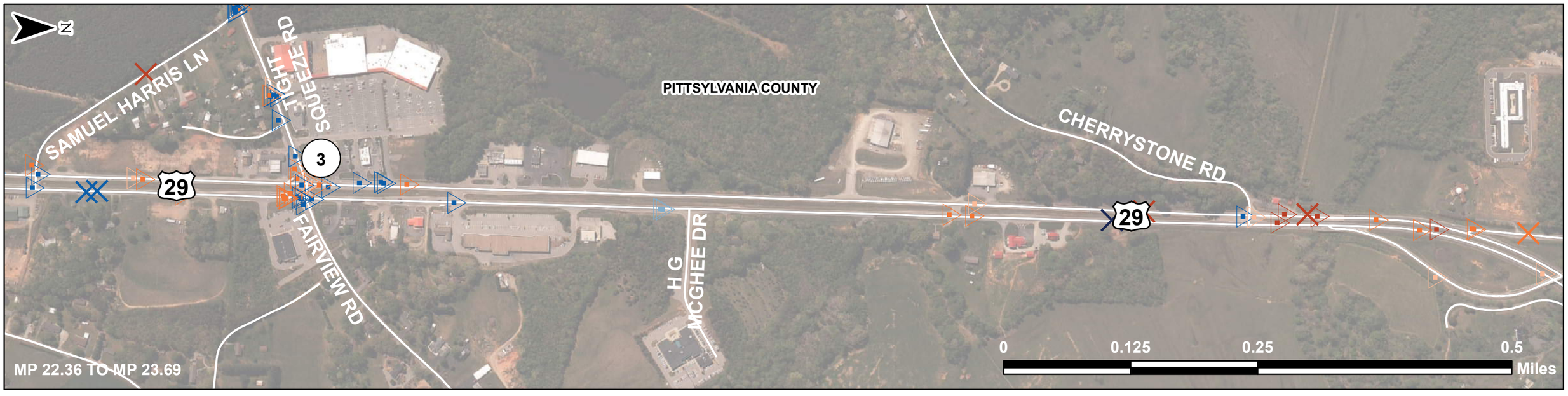
▲ Non-Roadway Departure Crash

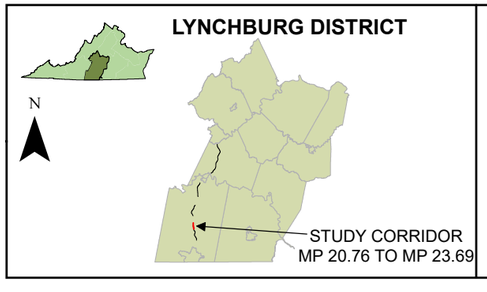
Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 863 (R and L Smith Road) to Chatham Middle School

VDOT ARTERIAL PRESERVATION PROGRAM





Legend

✚ Roadway Departure Crash

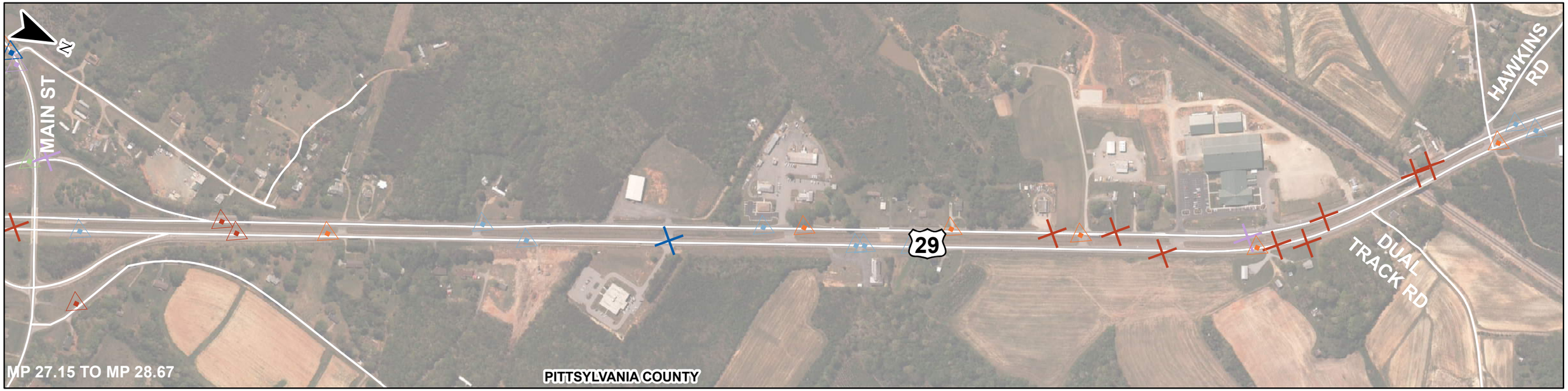
▲ Non-Roadway Departure Crash

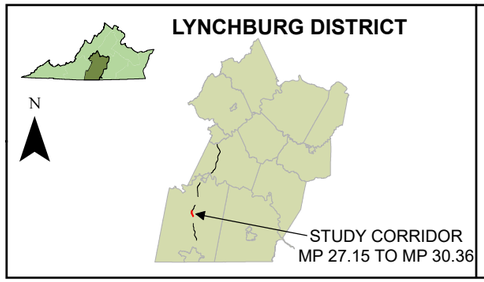
Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Chatham Middle School to Cherrystone Road

VDOT ARTERIALO PRESERVATION PROGRAM





Legend

✚ Roadway Departure Crash

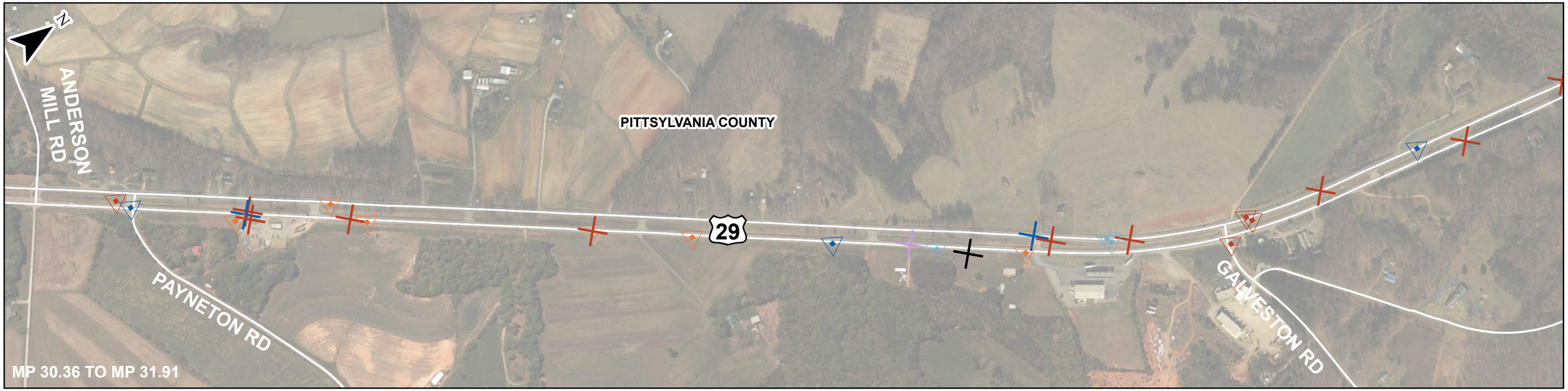
▲ Non-Roadway Departure Crash

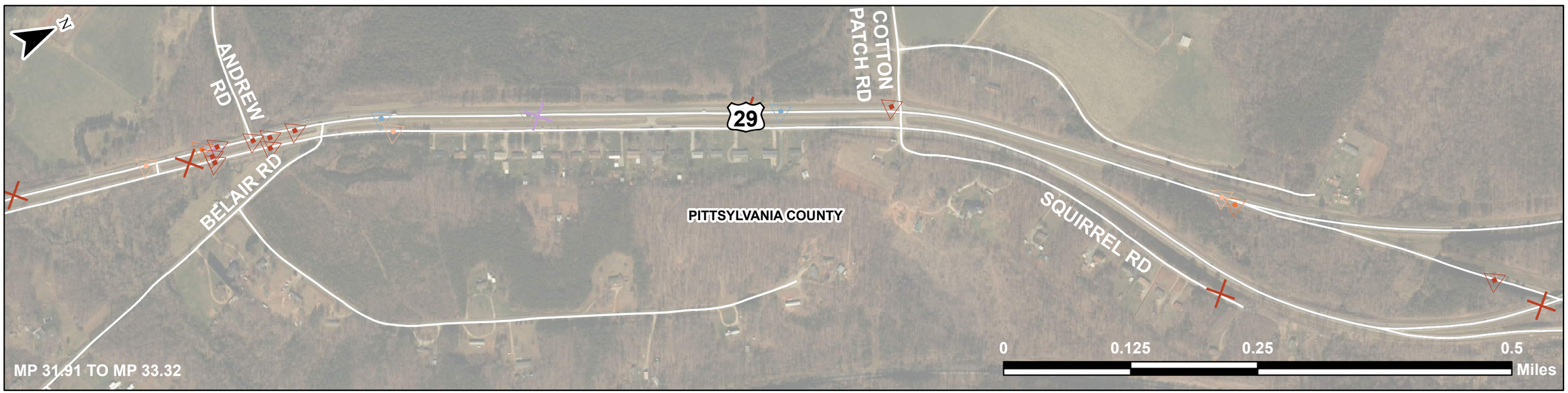
Crash Type:

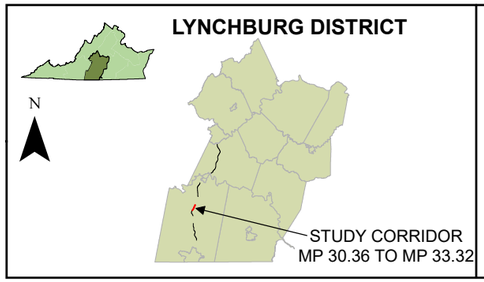
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From US 29 BUS (Main Street) to Route 794 (Old Mine Road)

VDOT ARTERIAL PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

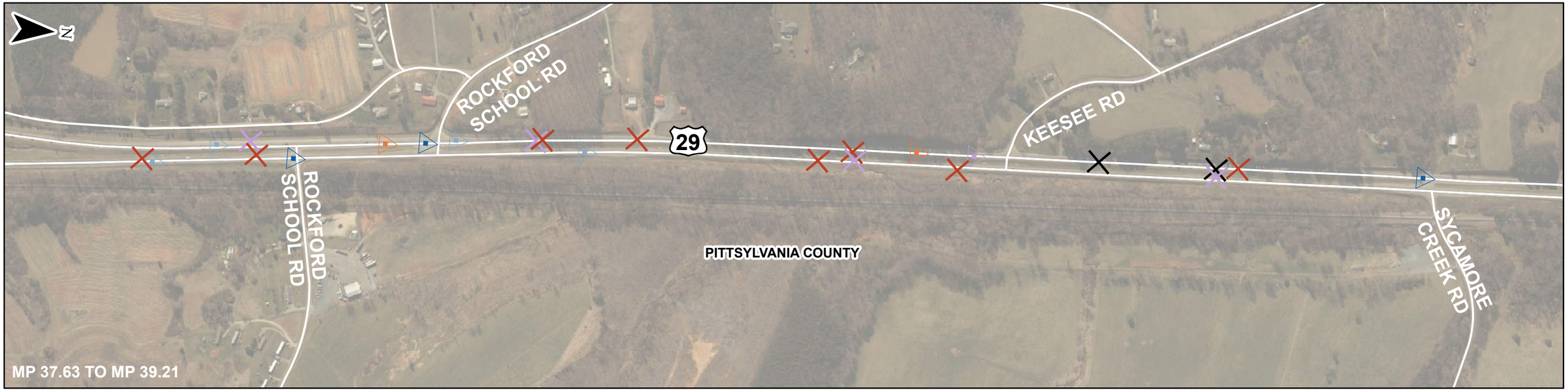
▲ Non-Roadway Departure Crash

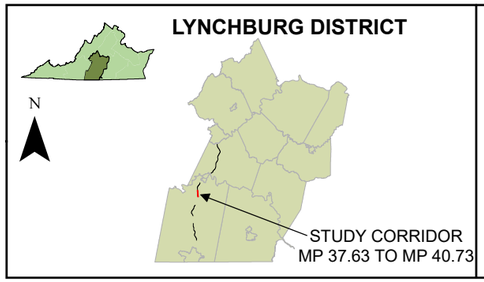
Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 649 (Anderson Mill Road) to Route 672 (Cotton Patch Road)

VDOT ARTERIALO PRESERVATION PROGRAM





Legend

✚ Roadway Departure Crash

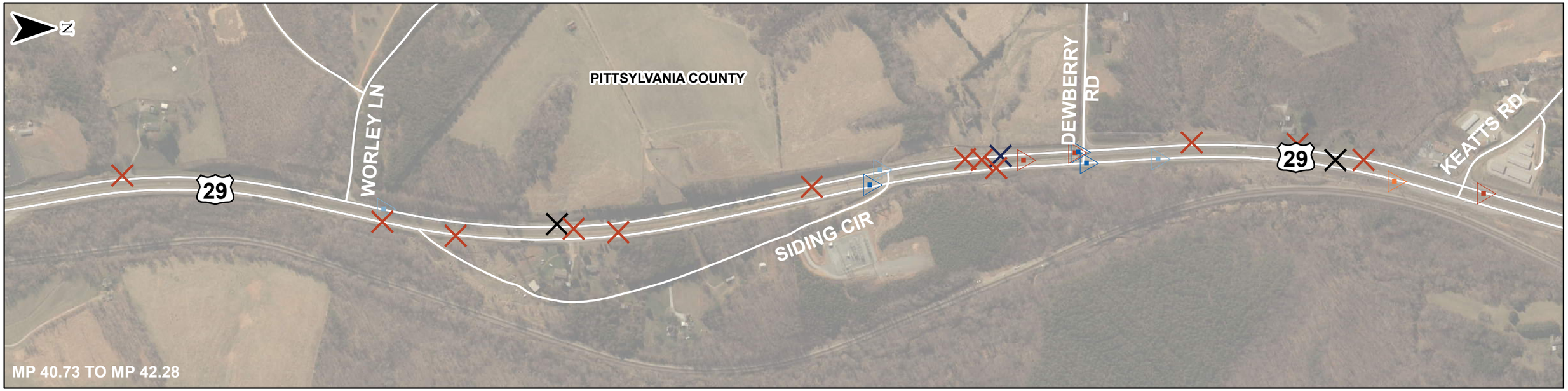
▲ Non-Roadway Departure Crash

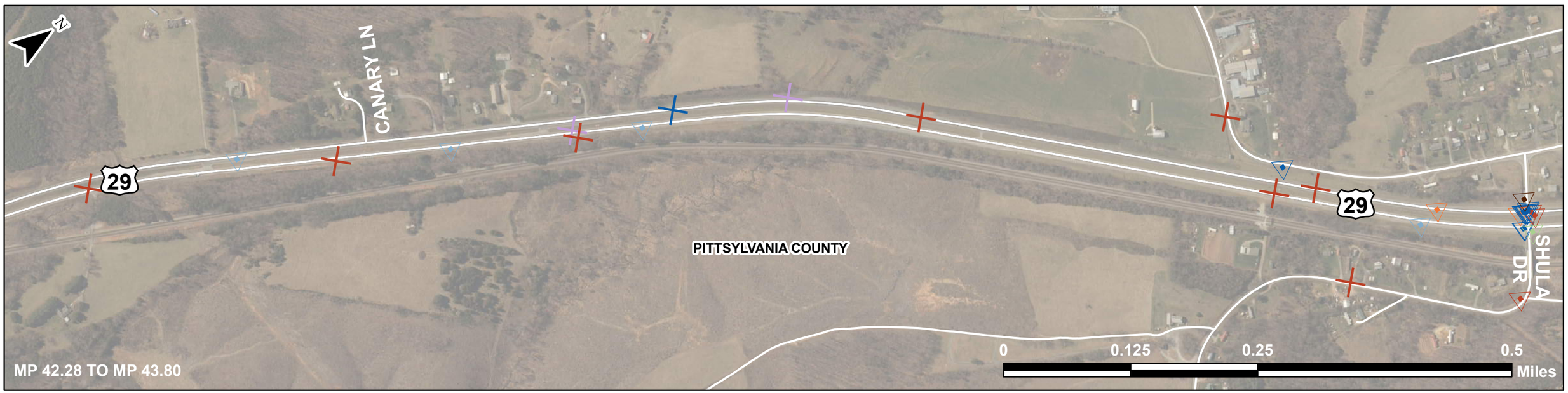
Crash Type:

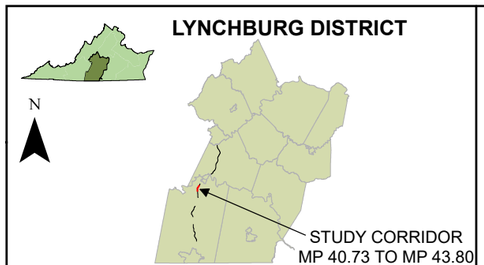
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 665 (Rockford School Road) to Route 643 (Derby Road)

VDOT ARTERIALO PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

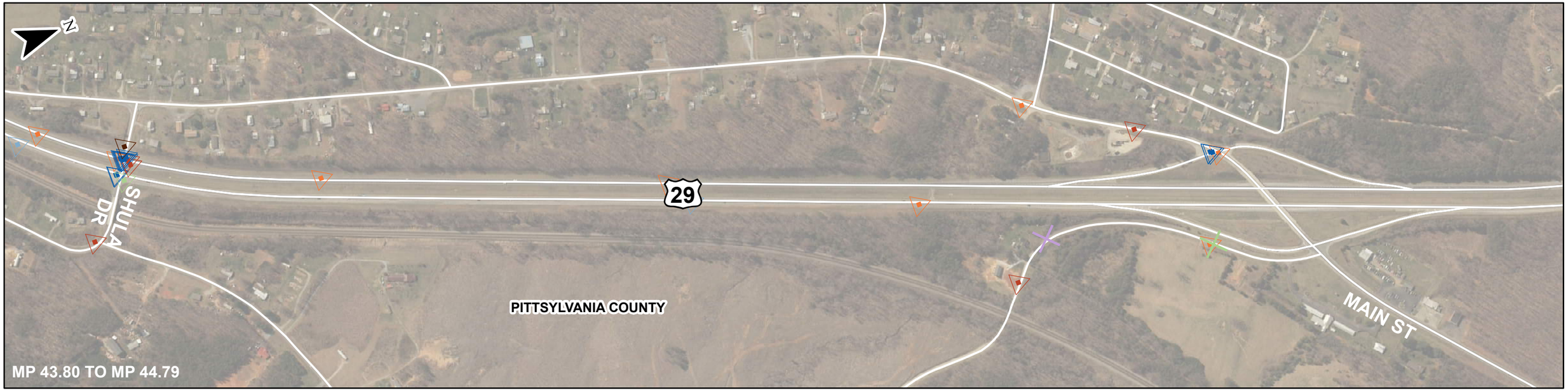
▲ Non-Roadway Departure Crash

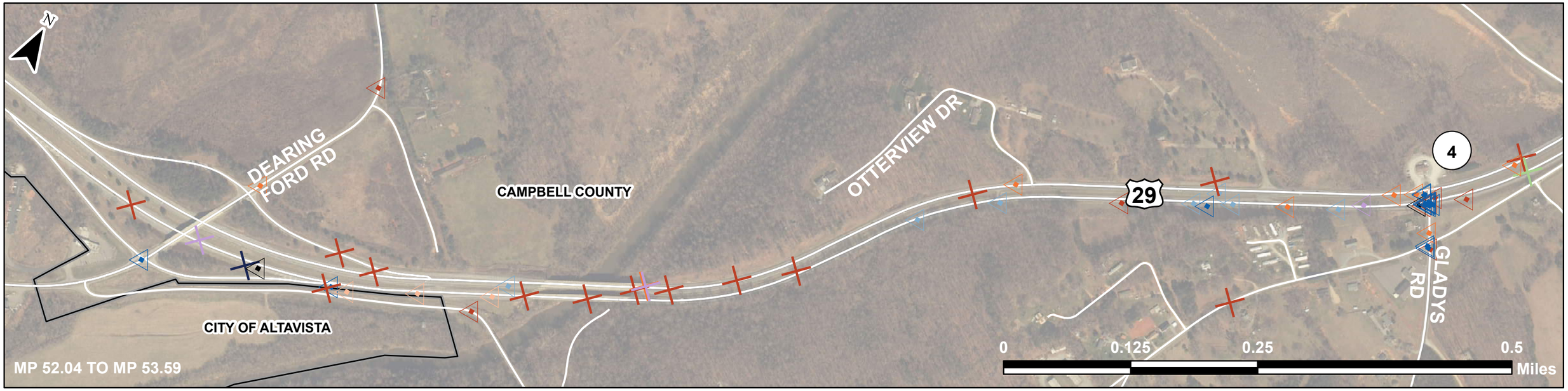
Crash Type:

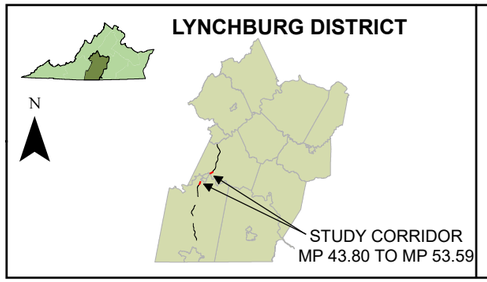
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 643 (Derby Road) to Route 642 (Shula Drive)

VDOT ARTERIAL PRESERVATION PROGRAM







Legend

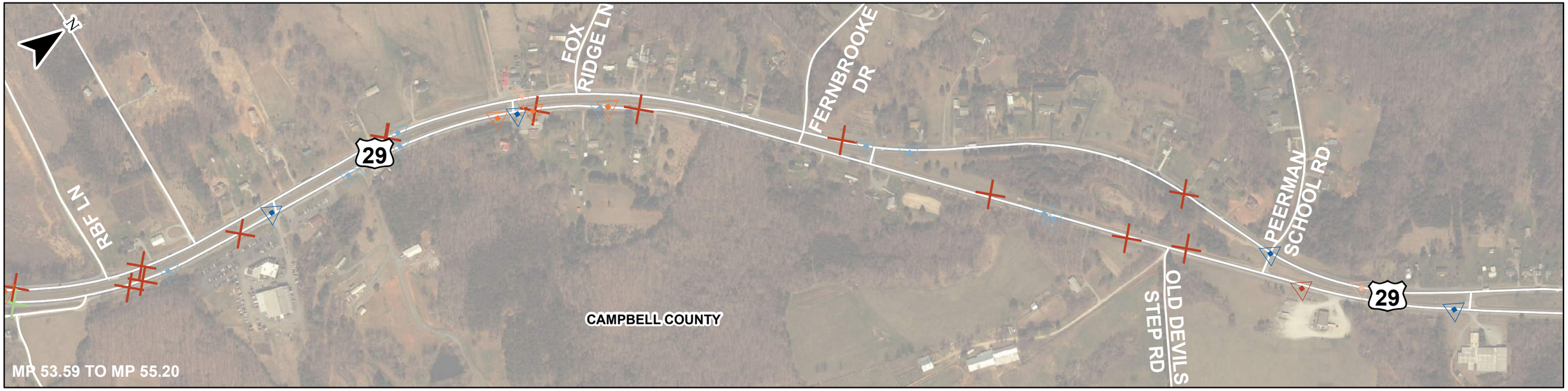
- ✚ Roadway Departure Crash
- ▲ Non-Roadway Departure Crash

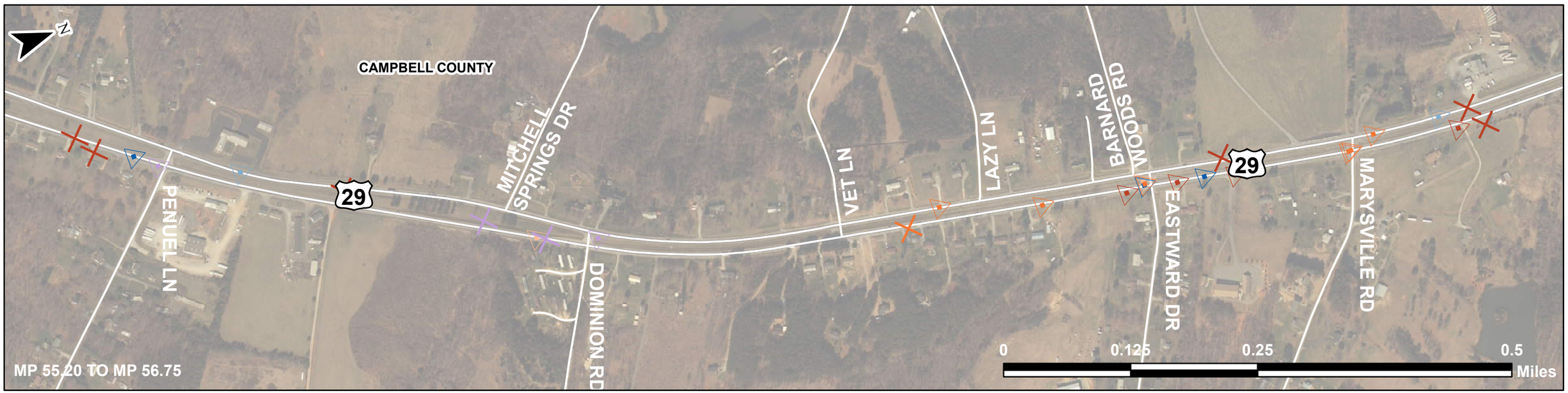
Crash Type:

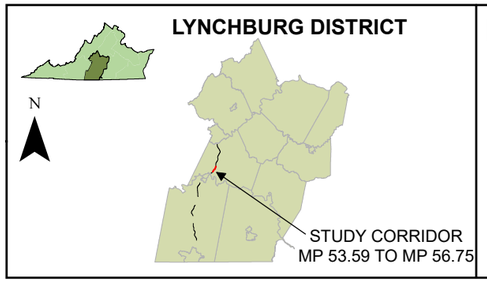
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 642 (Shula Drive) to Route 699 (Gladys Road)

VDOT ARTERIAL PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

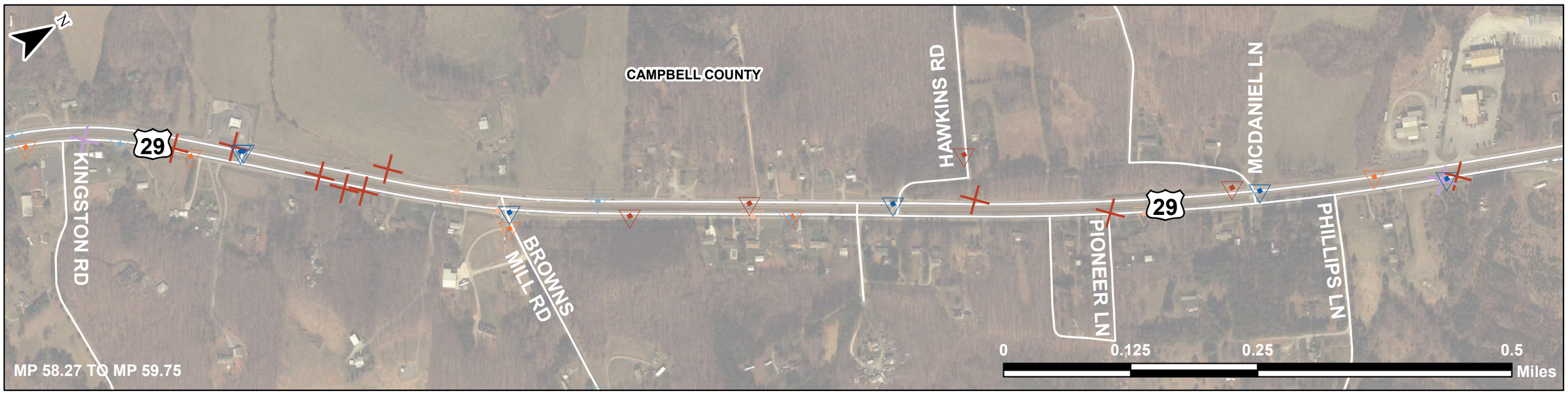
▲ Non-Roadway Departure Crash

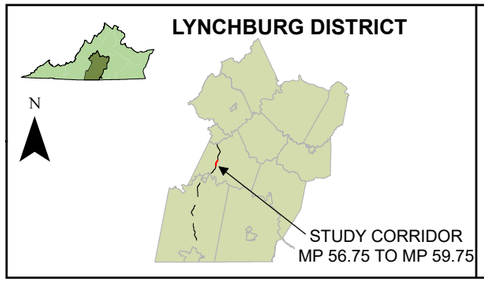
Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From RBF Lane to Route 696 (Marysville Road)

VDOT ARTERIAL PRESERVATION PROGRAM





Legend

✚ Roadway Departure Crash

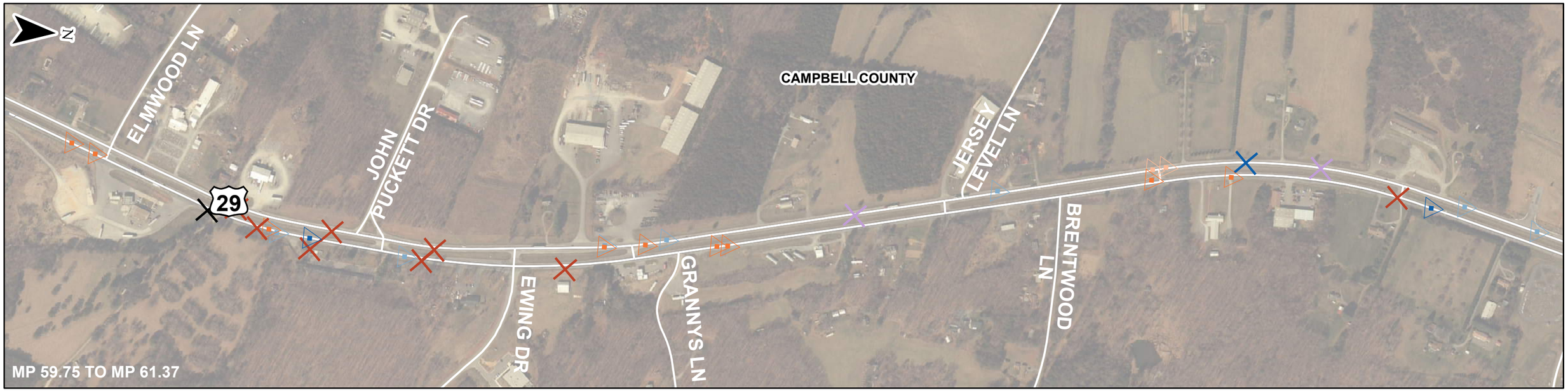
▲ Non-Roadway Departure Crash

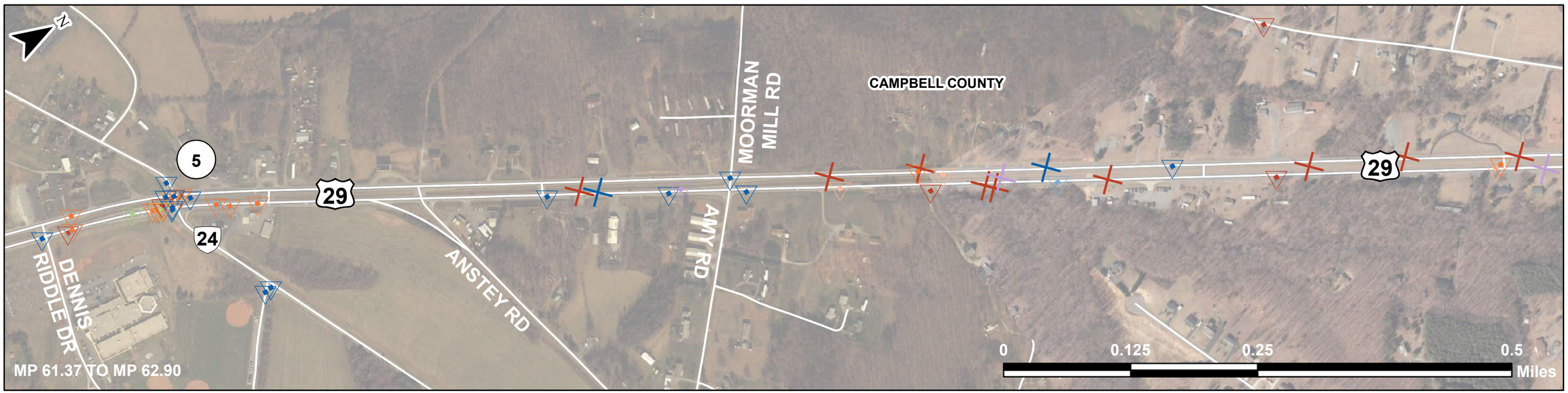
Crash Type:

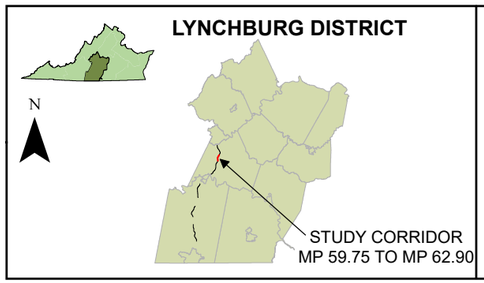
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 750 (Nickland Drive) to Phillips Lane

VDOT ARTERIAL PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

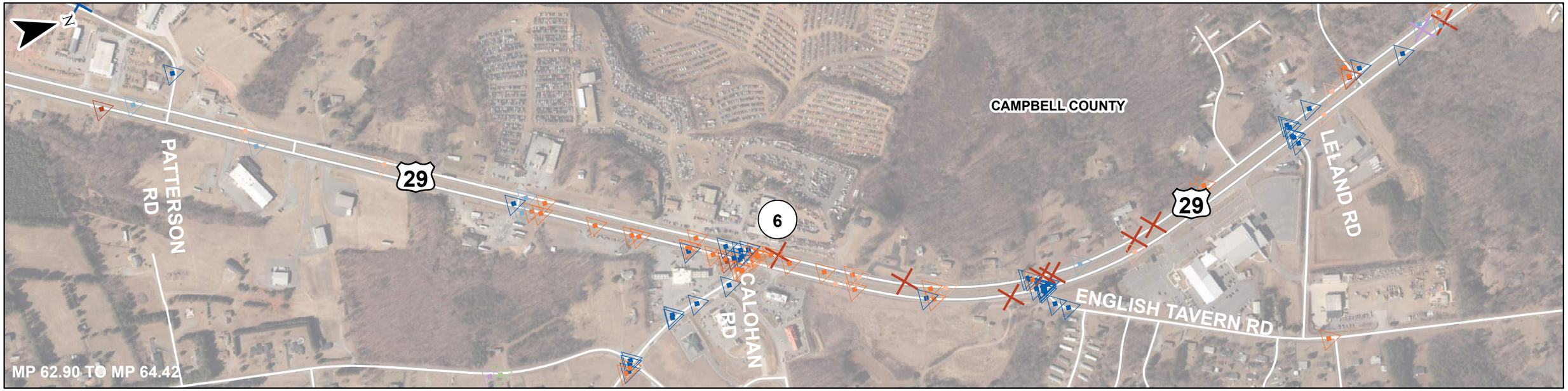
▲ Non-Roadway Departure Crash

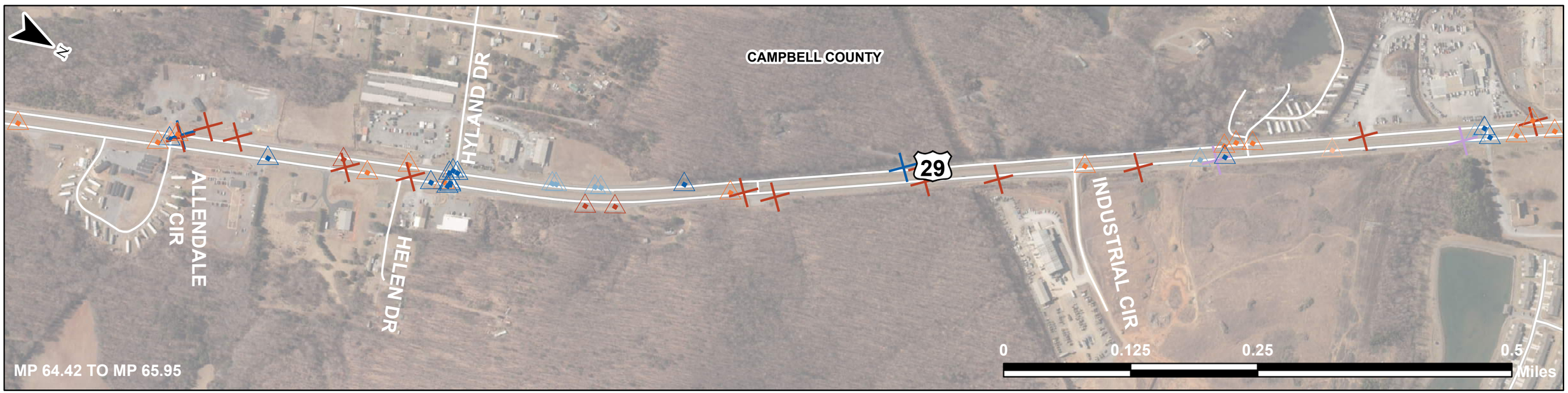
Crash Type:

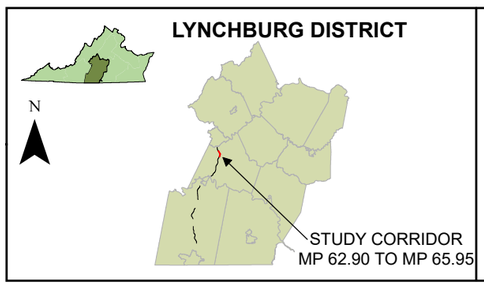
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 923 (Elmwood Lane) to Route 689 (Amy Road)

VDOT ARTERIALO PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

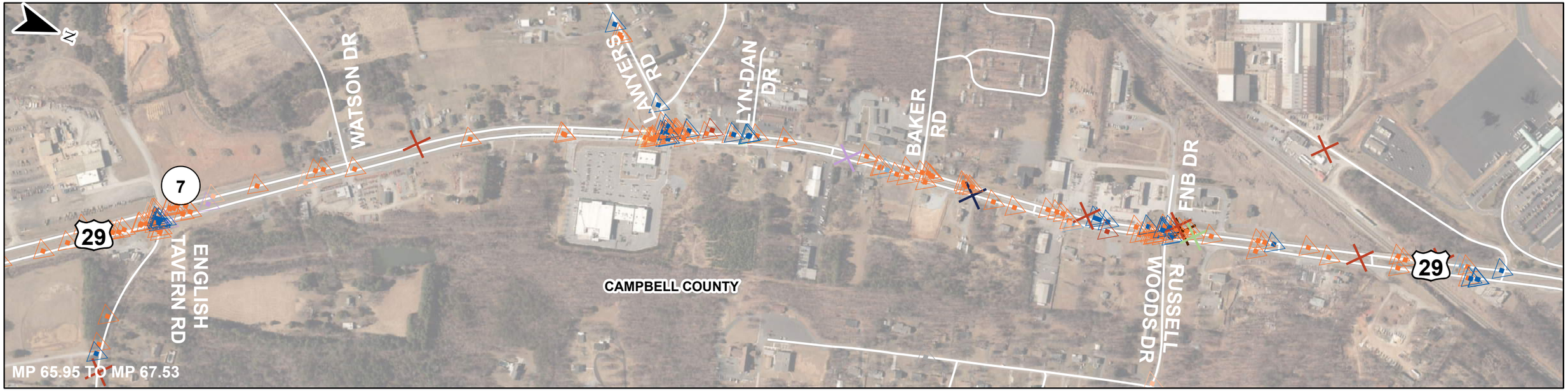
▲ Non-Roadway Departure Crash

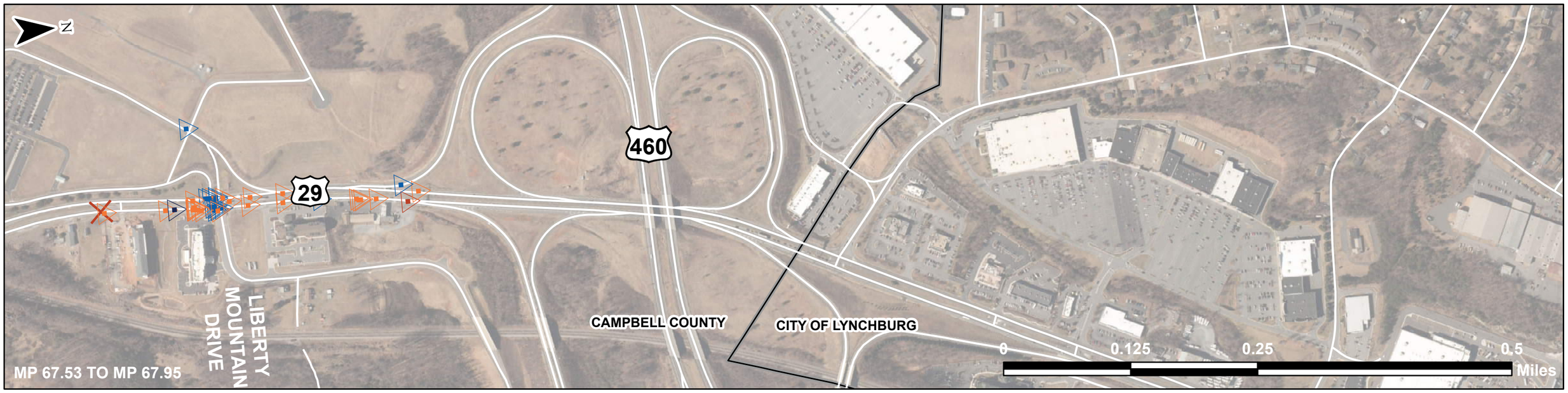
Crash Type:

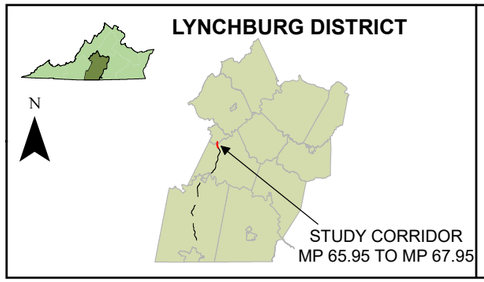
- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 688 (Patterson Road) to Industrial Circle

VDOT ARTERIALO PRESERVATION PROGRAM







Legend

✚ Roadway Departure Crash

▲ Non-Roadway Departure Crash

Crash Type:

- Rear End
- Angle
- Head On
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Fixed Object – In Road
- Fixed Object – Off Road
- Deer/Other Animal
- Pedestrian/Bicyclist
- Backed Into
- Other
- Non-Collision

US 29 Existing Conditions Map From Route 738 (English Tavern Road) to US 460 (Richmond Highway)

VDOT ARTERIALO PRESERVATION PROGRAM

APPENDIX E

Traffic Signal Warrants

Lawless Creek Road/E Witt Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Lawless Creek Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: Lawless Creek Road/E Witt Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
06:00 AM TO 07:00 AM	394	31							Y							
07:00 AM TO 08:00 AM	752	120	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
08:00 AM TO 09:00 AM	715	82	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
09:00 AM TO 10:00 AM	578	25	Y						Y			Y				
10:00 AM TO 11:00 AM	614	21	Y						Y			Y				
11:00 AM TO 12:00 PM	643	40	Y			Y			Y			Y				
12:00 PM TO 01:00 PM	657	21	Y			Y			Y			Y				
01:00 PM TO 02:00 PM	731	35	Y			Y			Y			Y				
02:00 PM TO 03:00 PM	837	70	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
03:00 PM TO 04:00 PM	1,010	117	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	899	54	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
05:00 PM TO 06:00 PM	971	49	Y			Y			Y			Y	Y	**Y**		
06:00 PM TO 07:00 PM	687	45	Y			Y			Y			Y	Y	**Y**		
	9,488	710			**2**			**5**			**2**			**7**	**2**	**1**
			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **NOT SATISFIED**						4 HRS NEEDED **NOT SATISFIED**	1 HR NEEDED **SATISFIED**

Malmaison Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Malmaison Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 1

MINOR STREET: Malmaison Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			350	105		525	53		280	84		420	42			
06:00 AM TO 07:00 AM	403	121	Y	Y	**Y**		Y		Y	Y	**Y**		Y			
07:00 AM TO 08:00 AM	712	254	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	636	188	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	507	119	Y	Y	**Y**		Y		Y	Y	**Y**	Y	Y	**Y**		
10:00 AM TO 11:00 AM	561	108	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
11:00 AM TO 12:00 PM	605	103	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
12:00 PM TO 01:00 PM	597	118	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
01:00 PM TO 02:00 PM	690	125	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
02:00 PM TO 03:00 PM	820	156	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	1,000	183	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	902	134	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	937	167	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	664	127	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
	9,034	1,903			**12**			**11**			**13**			**12**	**11**	**6**
			8 HOURS NEEDED **SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

Tight Squeeze Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Tight Squeeze Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: Tight Squeeze Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): Y

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
06:00 AM TO 07:00 AM	734	72	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
07:00 AM TO 08:00 AM	1,201	163	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	1,288	175	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	956	159	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
10:00 AM TO 11:00 AM	949	139	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
11:00 AM TO 12:00 PM	1,012	182	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
12:00 PM TO 01:00 PM	1,084	180	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
01:00 PM TO 02:00 PM	1,097	190	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
02:00 PM TO 03:00 PM	1,176	207	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	1,480	272	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	1,404	235	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	1,310	240	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	948	209	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
	14,639	2,423			**12**			**13**			**12**			**13**	**12**	**12**
			8 HOURS NEEDED **SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

Gladys Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Gladys Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: Gladys Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): Y

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
07:00 AM TO 08:00 AM	1,201	167	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	1,107	90	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	1,064	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
10:00 AM TO 11:00 AM	1,018	84	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
11:00 AM TO 12:00 PM	1,141	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
12:00 PM TO 01:00 PM	1,234	88	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
01:00 PM TO 02:00 PM	1,331	76	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	**Y**
02:00 PM TO 03:00 PM	1,370	103	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	1,574	79	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	1,658	74	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
05:00 PM TO 06:00 PM	1,669	91	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	1,130	73	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
	15,497	1,085			**1**			**12**			**6**			**12**	**12**	**7**
			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **NOT SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

Colonial Highway at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Colonial Highway at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: Colonial Highway — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): Y

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
06:00 AM TO 07:00 AM	1,041	116	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
07:00 AM TO 08:00 AM	1,543	168	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	1,258	194	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	1,043	94	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
10:00 AM TO 11:00 AM	1,060	82	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
11:00 AM TO 12:00 PM	1,020	98	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
12:00 PM TO 01:00 PM	1,208	153	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
01:00 PM TO 02:00 PM	1,150	79	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
02:00 PM TO 03:00 PM	1,308	96	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	1,464	210	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	1,646	160	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	1,591	162	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	1,106	103	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
	16,438	1,715			**7**			**13**			**11**			**13**	**13**	**9**
			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

Calohan Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Calohan Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: Calohan Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): Y

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
06:00 AM TO 07:00 AM	1,232	310	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
07:00 AM TO 08:00 AM	1,783	439	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	1,588	411	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	1,268	302	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
10:00 AM TO 11:00 AM	1,252	274	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
11:00 AM TO 12:00 PM	1,320	335	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
12:00 PM TO 01:00 PM	1,543	337	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
01:00 PM TO 02:00 PM	1,428	337	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
02:00 PM TO 03:00 PM	1,608	276	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	1,870	361	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	1,960	331	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	2,083	348	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	1,489	342	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
	20,424	4,403			**13**			**13**			**13**			**13**	**13**	**13**
			8 HOURS NEEDED **SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

English Tavern Rd at US 29

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: English Tavern Rd at US 29

COUNT DATE: 11/14/2017

INTERSECTION CONDITION: Existing Conditions

MAJOR STREET: US 29 — # OF APPROACH LANES: 2

MINOR STREET: English Tavern Rd — # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES →			420	105		630	53		336	84		504	42			
06:00 AM TO 07:00 AM	1,375	223	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
07:00 AM TO 08:00 AM	1,906	357	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	1,687	288	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	1,322	170	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
10:00 AM TO 11:00 AM	1,199	151	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
11:00 AM TO 12:00 PM	1,638	139	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
12:00 PM TO 01:00 PM	1,765	160	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
01:00 PM TO 02:00 PM	1,757	114	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
02:00 PM TO 03:00 PM	1,860	142	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
03:00 PM TO 04:00 PM	2,148	191	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	2,302	228	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	2,354	224	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	1,692	203	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
	23,005	2,590			**13**			**13**			**13**			**13**	**13**	**13**
			8 HOURS NEEDED **SATISFIED**			8 HOURS NEEDED **SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **SATISFIED**						4 HRS NEEDED **SATISFIED**	1 HR NEEDED **SATISFIED**

APPENDIX F

Existing Operation Analysis

APPENDIX F-1

Delay Summary Table

HCM - Intersection Delay and LOS
2018 Existing Conditions
US 29 Arterial Preservation Plan

	Intersection Number and Description	Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)			US 29				US 29				Lawless Creek Road				E Witt Road				Intersection	
		Signal	Left	40.7	D	41.2	D	46.5	D	38.1	D	34.4	C	32.6	C	40.7	D	36.7	D	Delay	Delay
			Through	17.3	B	16.0	B	23.4	C	15.5	B									25.5	19.2
			Right					19.9	B	13.1	B	30.2	C	29.4	C					LOS	LOS
			Approach	21.5	C	17.2	B	23.5	C	16.9	B	32.6	C	31.2	C	40.7	D	36.7	D	C	B
2	US 29 at Malmaison Road			US 29				US 29				Malmaison Road				Malmaison Road				Intersection	
		Signal	Left	33.7	C	37.7	D	32.7	C	51.5	D	36.6	D	39.7	D	25.2	C	38.1	D	Delay	Delay
			Through	19.7	B	18.8	B	16.0	B	11.9	B									19.8	20.6
			Right	16.5	B	13.6	B					0.0	A	35.3	D	20.1	C	30.0	C	LOS	LOS
			Approach	18.7	B	17.4	B	17.8	B	18.6	B	36.6	D	38.5	D	23.6	C	35.2	D	B	C
3	US 29 at Tight Squeeze Road/Fairview Road			US 29				US 29				Tight Squeeze Road				Fairview Road				Intersection	
		Signal	Left	44.1	D	41.5	D	47.6	D	44.7	D	54.1	D	128.5	F	44.7	D	43.4	D	Delay	Delay
			Through	18.9	B	22.1	C	27.6	C	27.4	C									29.0	42.3
			Right	14.8	B	16.8	B	12.9	B	12.0	B									LOS	LOS
			Approach	24.2	C	25.5	C	26.2	C	27.3	C	54.1	D	128.5	F	44.7	D	43.4	D	C	D
4	US 29 at Gladys Road			US 29				US 29				Gladys Road				Gladys Road				Intersection	
		Two-Way Stop	Left	0.0	A	9.8	A	9.1	A	9.7	A	10.1	B	19.2	C	17.9	C	23.9	C	Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right	†	†	†	†													LOS	LOS
			Approach	-	-	-	-	-	-	-	-	10.1	B	19.2	C	17.9	C	23.9	C	-	-
5	US 29 at Colonial Highway			US 29				US 29				Colonial Highway				Colonial Highway				Intersection	
		Signal	Left	60.6	E	46.7	D	47.8	D	57.4	E	51.4	D	40.8	D	44.2	D	42.2	D	Delay	Delay
			Through	24.5	C	19.3	B	18.6	B	22.9	C									26.1	23.8
			Right	17.2	B	15.2	B	15.1	B	16.2	B	37.4	D	36.5	D					LOS	LOS
			Approach	23.9	C	19.5	B	19.8	B	22.6	C	48.7	D	40.2	D	44.2	D	42.2	D	C	C
6	US 29 at Calohan Road			US 29				US 29				Calohan Road				Calohan Road				Intersection	
		Signal	Left	69.4	E	61.8	E	43.9	D	40.9	D	38.5	D	39.9	D	43.5	D	44.2	D	Delay	Delay
			Through	23.2	C	27.0	C	7.3	A	7.5	A									25.1	24.2
			Right	16.4	B	20.7	C									41.1	D	41.5	D	LOS	LOS
			Approach	23.0	C	26.8	C	18.5	B	18.3	B	38.5	D	39.9	D	41.4	D	41.9	D	C	C
7	US 29 at English Tavern Road			US 29				US 29				Access Driveway				English Tavern Road				Intersection	
		Signal	Left	9.9	A	0.0	A	14.5	B	23.0	C	45.9	D	44.5	D	37.6	D	35.9	D	Delay	Delay
			Through	27.3	C	36.2	D	13.4	B	11.7	B									24.7	22.9
			Right	14.4	B	23.0	C	10.5	B	7.1	A					38.2	D	36.2	D	LOS	LOS
			Approach	27.1	C	35.9	D	13.5	B	14.3	B	45.9	D	44.5	D	38.2	D	36.1	D	C	C

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

APPENDIX F-2

Synchro Delay Reports

AM Delay

HCM Signalized Intersection Capacity Analysis
1: US 29 & Lawless Creek Road

04/11/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	78	18	74	14	26	24	1	48	215	6	3	15
Future Volume (vph)	78	18	74	14	26	24	1	48	215	6	3	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95			1.00
Frt		1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected		0.96	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)		1657	1599		1731			1704	3429			1805
Flt Permitted		0.96	1.00		0.99			0.95	1.00			0.95
Satd. Flow (perm)		1657	1599		1731			1704	3429			1805
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	95	22	90	17	32	29	1	59	262	7	4	18
RTOR Reduction (vph)	0	0	74	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	117	16	0	62	0	0	60	268	0	0	22
Heavy Vehicles (%)	10%	11%	1%	0%	4%	4%	0%	6%	5%	0%	0%	0%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA		Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3									
Actuated Green, G (s)		15.7	15.7		7.4			7.1	35.3			2.7
Effective Green, g (s)		15.7	15.7		7.4			7.1	35.3			2.7
Actuated g/C Ratio		0.18	0.18		0.08			0.08	0.40			0.03
Clearance Time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Vehicle Extension (s)		6.0	6.0		3.5			3.0	6.0			3.0
Lane Grp Cap (vph)		295	285		145			137	1377			55
v/s Ratio Prot		c0.07			c0.04			c0.04	c0.08			0.01
v/s Ratio Perm			0.01									
v/c Ratio		0.40	0.06		0.43			0.44	0.19			0.40
Uniform Delay, d1		31.9	30.0		38.2			38.5	17.1			41.8
Progression Factor		1.00	1.00		1.00			1.00	1.00			1.00
Incremental Delay, d2		2.5	0.2		2.4			2.2	0.2			4.7
Delay (s)		34.4	30.2		40.7			40.7	17.3			46.5
Level of Service		C	C		D			D	B			D
Approach Delay (s)		32.6			40.7				21.5			
Approach LOS		C			D				C			

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	87.9	Sum of lost time (s)	27.8
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	449	104
Future Volume (vph)	449	104
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1455
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1455
Peak-hour factor, PHF	0.82	0.82
Adj. Flow (vph)	548	127
RTOR Reduction (vph)	0	84
Lane Group Flow (vph)	548	43
Heavy Vehicles (%)	2%	11%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	29.9	29.9
Effective Green, g (s)	29.9	29.9
Actuated g/C Ratio	0.34	0.34
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1203	494
v/s Ratio Prot	c0.15	
v/s Ratio Perm		0.03
v/c Ratio	0.46	0.09
Uniform Delay, d1	22.6	19.7
Progression Factor	1.00	1.00
Incremental Delay, d2	0.8	0.2
Delay (s)	23.4	19.9
Level of Service	C	B
Approach Delay (s)	23.5	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	199	2	93	1	226	104	47	376	2
Future Volume (vph)	2	0	0	199	2	93	1	226	104	47	376	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			7.5	7.5	6.4	5.7	5.7	6.6	5.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		902			1725	1524	902	1827	1509	1736	3503	
Flt Permitted		0.95			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		902			1725	1524	902	1827	1509	1736	3503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	0	216	2	101	1	246	113	51	409	2
RTOR Reduction (vph)	0	0	0	0	0	79	0	0	80	0	1	0
Lane Group Flow (vph)	0	2	0	0	218	22	1	246	33	51	410	0
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Prot	Prot	NA	
Protected Phases	4	4		3	3		1	6	6	5	2	
Permitted Phases			4			3						
Actuated Green, G (s)		1.3			14.0	14.0	1.0	19.0	19.0	4.1	22.2	
Effective Green, g (s)		1.3			14.0	14.0	1.0	19.0	19.0	4.1	22.2	
Actuated g/C Ratio		0.02			0.22	0.22	0.02	0.30	0.30	0.06	0.35	
Clearance Time (s)		6.1			7.5	7.5	6.4	5.7	5.7	6.6	5.8	
Vehicle Extension (s)		5.0			4.0	4.0	3.5	5.0	5.0	3.5	5.0	
Lane Grp Cap (vph)		18			375	331	14	539	445	110	1209	
v/s Ratio Prot		c0.00			c0.13		0.00	c0.13	0.02	c0.03	c0.12	
v/s Ratio Perm						0.01						
v/c Ratio		0.11			0.58	0.07	0.07	0.46	0.08	0.46	0.34	
Uniform Delay, d1		30.9			22.5	20.0	31.2	18.4	16.3	29.0	15.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.7			2.7	0.1	2.6	1.3	0.2	3.6	0.4	
Delay (s)		36.6			25.2	20.1	33.7	19.7	16.5	32.7	16.0	
Level of Service		D			C	C	C	B	B	C	B	
Approach Delay (s)		36.6			23.6			18.7			17.8	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	25.9
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	127	14	49	22	22	15	2	158	564	21	31	14
Future Volume (vph)	127	14	49	22	22	15	2	158	564	21	31	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Lane Util. Factor		1.00			1.00			1.00	0.95	1.00		1.00
Frt		0.97			0.97			1.00	1.00	0.85		1.00
Flt Protected		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1697			1738			1558	3252	1538		1730
Flt Permitted		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1697			1738			1558	3252	1538		1730
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	146	16	56	25	25	17	2	182	648	24	36	16
RTOR Reduction (vph)	0	8	0	0	10	0	0	0	0	13	0	0
Lane Group Flow (vph)	0	210	0	0	57	0	0	184	648	11	0	52
Heavy Vehicles (%)	3%	0%	10%	0%	5%	7%	0%	16%	11%	5%	0%	14%
Turn Type	Split	NA		Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	4	4		3	3		1	1	6		5	5
Permitted Phases										6		
Actuated Green, G (s)		15.6			9.3			17.2	44.0	44.0		6.5
Effective Green, g (s)		15.6			9.3			17.2	44.0	44.0		6.5
Actuated g/C Ratio		0.16			0.10			0.18	0.45	0.45		0.07
Clearance Time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)		5.0			6.0			4.0	6.0	6.0		4.0
Lane Grp Cap (vph)		271			165			275	1469	694		115
v/s Ratio Prot		c0.12			c0.03			c0.12	0.20			0.03
v/s Ratio Perm										0.01		
v/c Ratio		0.77			0.35			0.67	0.44	0.02		0.45
Uniform Delay, d1		39.2			41.2			37.4	18.3	14.7		43.7
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		14.8			3.5			6.6	0.6	0.0		3.8
Delay (s)		54.1			44.7			44.1	18.9	14.8		47.6
Level of Service		D			D			D	B	B		D
Approach Delay (s)		54.1			44.7				24.2			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	550	128
Future Volume (vph)	550	128
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	6.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3252	1495
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3252	1495
Peak-hour factor, PHF	0.87	0.87
Adj. Flow (vph)	632	147
RTOR Reduction (vph)	0	73
Lane Group Flow (vph)	632	74
Heavy Vehicles (%)	11%	8%
Turn Type	NA	pt+ov
Protected Phases	2	2 4
Permitted Phases		
Actuated Green, G (s)	33.3	48.9
Effective Green, g (s)	33.3	48.9
Actuated g/C Ratio	0.34	0.50
Clearance Time (s)	6.0	
Vehicle Extension (s)	6.0	
Lane Grp Cap (vph)	1111	750
v/s Ratio Prot	c0.19	0.05
v/s Ratio Perm		
v/c Ratio	0.57	0.10
Uniform Delay, d1	26.2	12.7
Progression Factor	1.00	1.00
Incremental Delay, d2	1.4	0.2
Delay (s)	27.6	12.9
Level of Service	C	B
Approach Delay (s)	26.2	
Approach LOS	C	

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	72	0	87	0	624	35	13	565	1
Future Vol, veh/h	0	0	2	72	0	87	0	624	35	13	565	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	105	120	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	3	0	2	0	7	20	8	14	0
Mvmt Flow	0	0	2	76	0	92	0	657	37	14	595	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	951	1280	298	982	1280	328	596	0	0	657	0	0
Stage 1	623	623	-	657	657	-	-	-	-	-	-	-
Stage 2	328	657	-	325	623	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.56	6.5	6.94	4.1	-	-	4.26	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.53	4	3.32	2.2	-	-	2.28	-	-
Pot Cap-1 Maneuver	217	167	704	202	167	668	990	-	-	887	-	-
Stage 1	445	481	-	418	465	-	-	-	-	-	-	-
Stage 2	664	465	-	659	481	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	185	164	704	199	164	668	990	-	-	887	-	-
Mov Cap-2 Maneuver	309	286	-	316	289	-	-	-	-	-	-	-
Stage 1	445	473	-	418	465	-	-	-	-	-	-	-
Stage 2	573	465	-	647	473	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	17.9	0	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	990	-	-	704	444	887	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.377	0.015	-	-
HCM Control Delay (s)	0	-	-	10.1	17.9	9.1	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.7	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	86	54	35	74	17	10	2	5	827	104	1	29
Future Volume (vph)	86	54	35	74	17	10	2	5	827	104	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		7.9			6.7	5.8	5.8		6.5
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95	1.00		1.00
Frt		1.00	0.85		0.99			1.00	1.00	0.85		1.00
Flt Protected		0.97	1.00		0.96			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1791	1615		1631			1264	3343	1495		1754
Flt Permitted		0.97	1.00		0.96			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1791	1615		1631			1264	3343	1495		1754
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	95	59	38	81	19	11	2	5	909	114	1	32
RTOR Reduction (vph)	0	0	33	0	4	0	0	0	0	67	0	0
Lane Group Flow (vph)	0	154	5	0	107	0	0	7	909	47	0	33
Heavy Vehicles (%)	1%	6%	0%	8%	18%	20%	50%	40%	8%	8%	0%	3%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3							6		
Actuated Green, G (s)		11.8	11.8		11.6			1.4	40.2	40.2		4.6
Effective Green, g (s)		11.8	11.8		11.6			1.4	40.2	40.2		4.6
Actuated g/C Ratio		0.12	0.12		0.12			0.01	0.42	0.42		0.05
Clearance Time (s)		8.3	8.3		7.9			6.7	5.8	5.8		6.5
Vehicle Extension (s)		4.0	4.0		4.0			3.0	6.0	6.0		3.0
Lane Grp Cap (vph)		218	197		195			18	1389	621		83
v/s Ratio Prot		c0.09			c0.07			0.01	c0.27			c0.02
v/s Ratio Perm			0.00							0.03		
v/c Ratio		0.71	0.02		0.55			0.39	0.65	0.08		0.40
Uniform Delay, d1		40.8	37.4		40.1			47.2	22.7	17.0		44.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		10.7	0.1		4.1			13.4	1.8	0.1		3.1
Delay (s)		51.4	37.4		44.2			60.6	24.5	17.2		47.8
Level of Service		D	D		D			E	C	B		D
Approach Delay (s)		48.7			44.2				23.9			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	96.7	Sum of lost time (s)	28.8
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	537	34
Future Volume (vph)	537	34
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3312	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3312	1568
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	590	37
RTOR Reduction (vph)	0	21
Lane Group Flow (vph)	590	16
Heavy Vehicles (%)	9%	3%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	43.1	43.1
Effective Green, g (s)	43.1	43.1
Actuated g/C Ratio	0.45	0.45
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1476	698
v/s Ratio Prot	c0.18	
v/s Ratio Perm		0.01
v/c Ratio	0.40	0.02
Uniform Delay, d1	18.1	15.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.5	0.0
Delay (s)	18.6	15.1
Level of Service	B	B
Approach Delay (s)	19.8	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	1	68	7	395	4	6	885	96	2	251
Future Volume (vph)	0	0	1	68	7	395	4	6	885	96	2	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95	1.00		1.00
Frt		0.86			1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected		1.00			0.96	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)		1644			1679	1509		1805	3374	1568		1642
Flt Permitted		1.00			0.74	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)		1644			1307	1509		1805	3374	1568		1642
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	1	72	7	420	4	6	941	102	2	267
RTOR Reduction (vph)	0	1	0	0	0	364	0	0	0	57	0	0
Lane Group Flow (vph)	0	0	0	0	79	56	0	10	941	45	0	269
Heavy Vehicles (%)	0%	0%	0%	9%	0%	7%	0%	0%	7%	3%	0%	10%
Turn Type		NA		Perm	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)		13.8			13.8	13.8		1.3	45.7	45.7		23.4
Effective Green, g (s)		13.8			13.8	13.8		1.3	45.7	45.7		23.4
Actuated g/C Ratio		0.13			0.13	0.13		0.01	0.44	0.44		0.23
Clearance Time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Vehicle Extension (s)		4.0			4.0	4.0		4.0	5.0	5.0		4.0
Lane Grp Cap (vph)		220			175	202		22	1499	697		373
v/s Ratio Prot		0.00						0.01	c0.28			c0.16
v/s Ratio Perm					c0.06	0.04				0.03		
v/c Ratio		0.00			0.45	0.28		0.45	0.63	0.07		0.72
Uniform Delay, d1		38.5			41.0	40.0		50.4	22.0	16.3		36.7
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2		0.0			2.5	1.0		19.0	1.2	0.1		7.2
Delay (s)		38.5			43.5	41.1		69.4	23.2	16.4		43.9
Level of Service		D			D	D		E	C	B		D
Approach Delay (s)		38.5			41.4				23.0			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	19.9
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	568	6
Future Volume (vph)	568	6
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	
Lane Util. Factor	0.95	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3280	
Flt Permitted	1.00	
Satd. Flow (perm)	3280	
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	604	6
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	610	0
Heavy Vehicles (%)	10%	0%
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	68.2	
Effective Green, g (s)	68.2	
Actuated g/C Ratio	0.66	
Clearance Time (s)	5.6	
Vehicle Extension (s)	5.0	
Lane Grp Cap (vph)	2176	
v/s Ratio Prot	0.19	
v/s Ratio Perm		
v/c Ratio	0.28	
Uniform Delay, d1	7.2	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	7.3	
Level of Service	A	
Approach Delay (s)	18.5	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Future Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00		1.00	0.95
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.96			0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1277			1612	1599	1262	3374	1429		1736	3223
Flt Permitted		0.96			0.95	1.00	0.39	1.00	1.00		0.09	1.00
Satd. Flow (perm)		1277			1612	1599	517	3374	1429		158	3223
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	2	27	0	391	8	1279	9	1	104	691
RTOR Reduction (vph)	0	9	0	0	0	345	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	46	8	1279	4	0	105	691
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA
Protected Phases	4	4		3	3		1	6		5	5	2
Permitted Phases						3	6		6	2	2	
Actuated Green, G (s)		1.6			11.2	11.2	44.3	42.7	42.7		59.3	50.2
Effective Green, g (s)		1.6			11.2	11.2	44.3	42.7	42.7		59.3	50.2
Actuated g/C Ratio		0.02			0.12	0.12	0.47	0.45	0.45		0.63	0.53
Clearance Time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0	1.0	1.0	1.0		2.0	1.0
Lane Grp Cap (vph)		21			190	188	254	1519	643		250	1706
v/s Ratio Prot		c0.00			0.02		0.00	c0.38			c0.04	c0.21
v/s Ratio Perm						c0.03	0.01		0.00		0.22	
v/c Ratio		0.01			0.14	0.25	0.03	0.84	0.01		0.42	0.41
Uniform Delay, d1		45.8			37.5	38.0	13.5	23.1	14.4		13.6	13.4
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.0			0.1	0.2	0.0	4.2	0.0		0.4	0.1
Delay (s)		45.9			37.6	38.2	13.6	27.3	14.4		14.0	13.4
Level of Service		D			D	D	B	C	B		B	B
Approach Delay (s)		45.9			38.2			27.1				13.5
Approach LOS		D			D			C				B

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	30.2
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1455
Flt Permitted	1.00
Satd. Flow (perm)	1455
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	10
RTOR Reduction (vph)	5
Lane Group Flow (vph)	5
Heavy Vehicles (%)	11%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	50.2
Effective Green, g (s)	50.2
Actuated g/C Ratio	0.53
Clearance Time (s)	8.4
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	770
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	10.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	10.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: US 29 & English Tavern Road

06/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Future Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00		1.00	0.95
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.96			0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1277			1612	1599	1262	3374	1429		1736	3223
Flt Permitted		0.96			0.95	1.00	0.37	1.00	1.00		0.10	1.00
Satd. Flow (perm)		1277			1612	1599	487	3374	1429		185	3223
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	2	27	0	391	8	1279	9	1	104	691
RTOR Reduction (vph)	0	9	0	0	0	345	0	0	5	0	0	0
Lane Group Flow (vph)	0	0	0	0	27	46	8	1279	4	0	105	691
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Turn Type	Split	NA		Split	NA	Perm	D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		1	6		5	5	2
Permitted Phases						3	2		6	6	6	
Actuated Green, G (s)		1.6			11.2	11.2	51.8	42.7	42.7		51.8	50.2
Effective Green, g (s)		1.6			11.2	11.2	51.8	42.7	42.7		51.8	50.2
Actuated g/C Ratio		0.02			0.12	0.12	0.55	0.45	0.45		0.55	0.53
Clearance Time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0	1.0	1.0	1.0		2.0	1.0
Lane Grp Cap (vph)		21			190	188	279	1519	643		249	1706
v/s Ratio Prot		c0.00			0.02		0.00	c0.38			c0.04	c0.21
v/s Ratio Perm						c0.03	0.02		0.00		0.19	
v/c Ratio		0.01			0.14	0.25	0.03	0.84	0.01		0.42	0.41
Uniform Delay, d1		45.8			37.5	38.0	9.9	23.1	14.4		14.1	13.4
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.0			0.1	0.2	0.0	4.2	0.0		0.4	0.1
Delay (s)		45.9			37.6	38.2	9.9	27.3	14.4		14.5	13.4
Level of Service		D			D	D	A	C	B		B	B
Approach Delay (s)		45.9			38.2			27.1				13.5
Approach LOS		D			D			C				B

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	30.2
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1455
Flt Permitted	1.00
Satd. Flow (perm)	1455
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	10
RTOR Reduction (vph)	5
Lane Group Flow (vph)	5
Heavy Vehicles (%)	11%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	50.2
Effective Green, g (s)	50.2
Actuated g/C Ratio	0.53
Clearance Time (s)	8.4
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	770
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	10.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	10.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

PM Delay

HCM Signalized Intersection Capacity Analysis
1: US 29 & Lawless Creek Road

04/11/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	52	13	52	14	9	22	3	21	430	22	5	32
Future Volume (vph)	52	13	52	14	9	22	3	21	430	22	5	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95			1.00
Frt		1.00	0.85		0.94			1.00	0.99			1.00
Flt Protected		0.96	1.00		0.98			0.95	1.00			0.95
Satd. Flow (prot)		1769	1524		1576			1729	3488			1676
Flt Permitted		0.96	1.00		0.98			0.95	1.00			0.95
Satd. Flow (perm)		1769	1524		1576			1729	3488			1676
Peak-hour factor, PHF	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)	58	14	58	16	10	24	3	23	478	24	6	36
RTOR Reduction (vph)	0	0	51	0	23	0	0	0	2	0	0	0
Lane Group Flow (vph)	0	72	7	0	27	0	0	26	500	0	0	42
Heavy Vehicles (%)	4%	0%	6%	14%	11%	9%	0%	5%	2%	18%	0%	9%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA		Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3									
Actuated Green, G (s)		9.6	9.6		4.3			2.6	31.0			4.3
Effective Green, g (s)		9.6	9.6		4.3			2.6	31.0			4.3
Actuated g/C Ratio		0.13	0.13		0.06			0.03	0.41			0.06
Clearance Time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Vehicle Extension (s)		6.0	6.0		3.5			3.0	6.0			3.0
Lane Grp Cap (vph)		223	192		89			59	1422			94
v/s Ratio Prot		c0.04			c0.02			0.02	c0.14			c0.03
v/s Ratio Perm			0.00									
v/c Ratio		0.32	0.04		0.31			0.44	0.35			0.45
Uniform Delay, d1		30.2	29.1		34.4			36.0	15.6			34.7
Progression Factor		1.00	1.00		1.00			1.00	1.00			1.00
Incremental Delay, d2		2.4	0.2		2.3			5.2	0.4			3.4
Delay (s)		32.6	29.4		36.7			41.2	16.0			38.1
Level of Service		C	C		D			D	B			D
Approach Delay (s)		31.2			36.7				17.2			
Approach LOS		C			D				B			

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	455	42
Future Volume (vph)	455	42
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1538
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1538
Peak-hour factor, PHF	0.90	0.90
Adj. Flow (vph)	506	47
RTOR Reduction (vph)	0	27
Lane Group Flow (vph)	506	20
Heavy Vehicles (%)	2%	5%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	31.7	31.7
Effective Green, g (s)	31.7	31.7
Actuated g/C Ratio	0.42	0.42
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1476	641
v/s Ratio Prot	0.14	
v/s Ratio Perm		0.01
v/c Ratio	0.34	0.03
Uniform Delay, d1	15.1	13.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.1
Delay (s)	15.5	13.1
Level of Service	B	B
Approach Delay (s)	16.9	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	4	5	3	104	3	58	1	387	141	2	84	419
Future Volume (vph)	4	5	3	104	3	58	1	387	141	2	84	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1	6.1		7.5	7.5	6.4	5.7	5.7		6.6	5.8
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	0.95
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.98	1.00		0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1285	1214		1740	1583	1805	1845	1583		1737	3523
Flt Permitted		0.98	1.00		0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)		1285	1214		1740	1583	1805	1845	1583		1737	3523
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	5	6	4	122	4	68	1	455	166	2	99	493
RTOR Reduction (vph)	0	0	4	0	0	60	0	0	96	0	0	0
Lane Group Flow (vph)	0	11	0	0	126	8	1	455	70	0	101	495
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Prot	Prot	Prot	NA
Protected Phases	4	4		3	3		1	6	6	5	5	2
Permitted Phases			4			3						
Actuated Green, G (s)		3.1	3.1		9.1	9.1	1.2	32.2	32.2		6.2	37.3
Effective Green, g (s)		3.1	3.1		9.1	9.1	1.2	32.2	32.2		6.2	37.3
Actuated g/C Ratio		0.04	0.04		0.12	0.12	0.02	0.42	0.42		0.08	0.49
Clearance Time (s)		6.1	6.1		7.5	7.5	6.4	5.7	5.7		6.6	5.8
Vehicle Extension (s)		5.0	5.0		4.0	4.0	3.5	5.0	5.0		3.5	5.0
Lane Grp Cap (vph)		52	49		206	188	28	776	666		140	1717
v/s Ratio Prot		c0.01			c0.07		0.00	c0.25	0.04		c0.06	c0.14
v/s Ratio Perm			0.00			0.01						
v/c Ratio		0.21	0.00		0.61	0.04	0.04	0.59	0.10		0.72	0.29
Uniform Delay, d1		35.5	35.2		32.0	29.8	37.1	17.0	13.4		34.3	11.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		4.2	0.1		6.0	0.1	0.6	1.8	0.1		17.2	0.2
Delay (s)		39.7	35.3		38.1	30.0	37.7	18.8	13.6		51.5	11.9
Level of Service		D	D		D	C	D	B	B		D	B
Approach Delay (s)		38.5			35.2			17.4				18.6
Approach LOS		D			D			B				B

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	25.9
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lanes, Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.85
Adj. Flow (vph)	2
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	194	31	56	23	20	21	6	128	588	14	48	34
Future Volume (vph)	194	31	56	23	20	21	6	128	588	14	48	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Lane Util. Factor		1.00			1.00			1.00	0.95	1.00		1.00
Frt		0.97			0.95			1.00	1.00	0.85		1.00
Flt Protected		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1682			1726			1579	3167	1509		1784
Flt Permitted		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1682			1726			1579	3167	1509		1784
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	218	35	63	26	22	24	7	144	661	16	54	38
RTOR Reduction (vph)	0	6	0	0	14	0	0	0	0	9	0	0
Lane Group Flow (vph)	0	310	0	0	58	0	0	151	661	7	0	92
Heavy Vehicles (%)	6%	3%	9%	9%	0%	0%	0%	15%	14%	7%	2%	0%
Turn Type	Split	NA		Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	4	4		3	3		1	1	6		5	5
Permitted Phases										6		
Actuated Green, G (s)		15.8			9.4			15.3	38.8	38.8		9.3
Effective Green, g (s)		15.8			9.4			15.3	38.8	38.8		9.3
Actuated g/C Ratio		0.17			0.10			0.16	0.41	0.41		0.10
Clearance Time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)		5.0			6.0			4.0	6.0	6.0		4.0
Lane Grp Cap (vph)		278			170			253	1289	614		174
v/s Ratio Prot		c0.18			c0.03			c0.10	c0.21			0.05
v/s Ratio Perm										0.00		
v/c Ratio		1.12			0.34			0.60	0.51	0.01		0.53
Uniform Delay, d1		39.8			40.1			37.1	21.2	16.8		40.9
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		88.7			3.3			4.4	0.9	0.0		3.7
Delay (s)		128.5			43.4			41.5	22.1	16.8		44.7
Level of Service		F			D			D	C	B		D
Approach Delay (s)		128.5			43.4				25.5			
Approach LOS		F			D				C			

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	95.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	614	98
Future Volume (vph)	614	98
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	6.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3343	1509
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3343	1509
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	690	110
RTOR Reduction (vph)	0	54
Lane Group Flow (vph)	690	56
Heavy Vehicles (%)	8%	7%
Turn Type	NA	pt+ov
Protected Phases	2	2 4
Permitted Phases		
Actuated Green, G (s)	32.8	48.6
Effective Green, g (s)	32.8	48.6
Actuated g/C Ratio	0.34	0.51
Clearance Time (s)	6.0	
Vehicle Extension (s)	6.0	
Lane Grp Cap (vph)	1150	769
v/s Ratio Prot	c0.21	0.04
v/s Ratio Perm		
v/c Ratio	0.60	0.07
Uniform Delay, d1	25.8	11.9
Progression Factor	1.00	1.00
Incremental Delay, d2	1.6	0.1
Delay (s)	27.4	12.0
Level of Service	C	B
Approach Delay (s)	27.3	
Approach LOS	C	

Intersection Summary

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	1	52	1	40	15	682	83	81	834	10
Future Vol, veh/h	0	1	1	52	1	40	15	682	83	81	834	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	105	120	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	6	0	8	0	6	4	4	6	10
Mvmt Flow	0	1	1	55	1	43	16	726	88	86	887	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1460	1822	449	1373	1827	363	898	0	0	726	0	0
Stage 1	1065	1065	-	757	757	-	-	-	-	-	-	-
Stage 2	395	757	-	616	1070	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.62	6.5	7.06	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.62	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.62	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.56	4	3.38	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	92	78	563	101	78	617	765	-	-	860	-	-
Stage 1	241	302	-	357	419	-	-	-	-	-	-	-
Stage 2	607	419	-	435	300	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	77	69	563	91	69	617	765	-	-	860	-	-
Mov Cap-2 Maneuver	173	166	-	206	172	-	-	-	-	-	-	-
Stage 1	236	272	-	350	410	-	-	-	-	-	-	-
Stage 2	552	410	-	389	270	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	23.9	0.2	0.8
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	765	-	-	256	288	860	-	-
HCM Lane V/C Ratio	0.021	-	-	0.008	0.344	0.1	-	-
HCM Control Delay (s)	9.8	-	-	19.2	23.9	9.7	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	1.5	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	48	24	11	115	39	13	1	19	634	95	8	835
Future Volume (vph)	48	24	11	115	39	13	1	19	634	95	8	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		7.9			6.7	5.8	5.8	6.5	5.9
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95	1.00	1.00	0.95
Frt		1.00	0.85		0.99			1.00	1.00	0.85	1.00	1.00
Flt Protected		0.97	1.00		0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1838	1482		1725			1805	3252	1568	1444	3406
Flt Permitted		0.97	1.00		0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1838	1482		1725			1805	3252	1568	1444	3406
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	51	25	12	121	41	14	1	20	667	100	8	879
RTOR Reduction (vph)	0	0	11	0	3	0	0	0	0	58	0	0
Lane Group Flow (vph)	0	76	1	0	173	0	0	21	667	42	8	879
Heavy Vehicles (%)	0%	0%	9%	6%	0%	15%	0%	0%	11%	3%	25%	6%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA	Perm	Prot	NA
Protected Phases	3	3		4	4		1	1	6		5	2
Permitted Phases			3							6		
Actuated Green, G (s)		7.9	7.9		13.3			2.6	37.1	37.1	1.2	35.4
Effective Green, g (s)		7.9	7.9		13.3			2.6	37.1	37.1	1.2	35.4
Actuated g/C Ratio		0.09	0.09		0.15			0.03	0.42	0.42	0.01	0.40
Clearance Time (s)		8.3	8.3		7.9			6.7	5.8	5.8	6.5	5.9
Vehicle Extension (s)		4.0	4.0		4.0			3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)		165	133		260			53	1371	661	19	1370
v/s Ratio Prot		c0.04			c0.10			c0.01	0.21		0.01	c0.26
v/s Ratio Perm			0.00							0.03		
v/c Ratio		0.46	0.01		0.67			0.40	0.49	0.06	0.42	0.64
Uniform Delay, d1		38.0	36.5		35.3			41.9	18.5	15.1	43.1	21.2
Progression Factor		1.00	1.00		1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.8	0.0		6.9			4.8	0.8	0.1	14.4	1.7
Delay (s)		40.8	36.5		42.2			46.7	19.3	15.2	57.4	22.9
Level of Service		D	D		D			D	B	B	E	C
Approach Delay (s)		40.2			42.2				19.5			22.6
Approach LOS		D			D				B			C

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	28.8
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.9
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1538
Flt Permitted	1.00
Satd. Flow (perm)	1538
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	88
RTOR Reduction (vph)	53
Lane Group Flow (vph)	35
Heavy Vehicles (%)	5%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	35.4
Effective Green, g (s)	35.4
Actuated g/C Ratio	0.40
Clearance Time (s)	5.9
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	618
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	16.1
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.2
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	3	0	4	54	1	296	4	4	685	64	3	447
Future Volume (vph)	3	0	4	54	1	296	4	4	685	64	3	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95	1.00		1.00
Frt		0.92			1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected		0.98			0.95	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)		1717			1664	1568		1805	3282	1583		1770
Flt Permitted		0.87			0.73	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)		1518			1266	1568		1805	3282	1583		1770
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	0	4	56	1	305	4	4	706	66	3	461
RTOR Reduction (vph)	0	6	0	0	0	270	0	0	0	42	0	0
Lane Group Flow (vph)	0	1	0	0	57	35	0	8	706	24	0	464
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	0%	10%	2%	0%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)		11.6			11.6	11.6		1.3	37.4	37.4		32.7
Effective Green, g (s)		11.6			11.6	11.6		1.3	37.4	37.4		32.7
Actuated g/C Ratio		0.11			0.11	0.11		0.01	0.37	0.37		0.32
Clearance Time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Vehicle Extension (s)		4.0			4.0	4.0		4.0	5.0	5.0		4.0
Lane Grp Cap (vph)		173			144	179		23	1208	582		569
v/s Ratio Prot								0.00	c0.22			c0.26
v/s Ratio Perm		0.00			c0.05	0.02				0.02		
v/c Ratio		0.00			0.40	0.19		0.35	0.58	0.04		0.82
Uniform Delay, d1		39.9			41.7	40.8		49.7	25.8	20.6		31.7
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2		0.0			2.4	0.7		12.0	1.1	0.1		9.2
Delay (s)		39.9			44.2	41.5		61.8	27.0	20.7		40.9
Level of Service		D			D	D		E	C	C		D
Approach Delay (s)		39.9			41.9				26.8			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	19.9
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	939	0
Future Volume (vph)	939	0
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	
Lane Util. Factor	0.95	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3406	
Flt Permitted	1.00	
Satd. Flow (perm)	3406	
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	968	0
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	968	0
Heavy Vehicles (%)	6%	0%
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	69.2	
Effective Green, g (s)	69.2	
Actuated g/C Ratio	0.68	
Clearance Time (s)	5.6	
Vehicle Extension (s)	5.0	
Lane Grp Cap (vph)	2319	
v/s Ratio Prot	0.28	
v/s Ratio Perm		
v/c Ratio	0.42	
Uniform Delay, d1	7.2	
Progression Factor	1.00	
Incremental Delay, d2	0.3	
Delay (s)	7.5	
Level of Service	A	
Approach Delay (s)	18.3	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Future Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Lane Util. Factor		1.00			1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt		1.00			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1743			1703	1615		3374	1615	1787	3471	1346
Flt Permitted		0.96			0.95	1.00		1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)		1743			1703	1615		3374	1615	262	3471	1346
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	3	0	19	0	228	0	822	22	381	1305	5
RTOR Reduction (vph)	0	0	0	0	0	201	0	0	16	0	0	2
Lane Group Flow (vph)	0	25	0	0	19	27	0	822	6	381	1305	3
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases						3	6		6	2		2
Actuated Green, G (s)		3.3			10.8	10.8		26.4	26.4	55.7	55.7	55.7
Effective Green, g (s)		3.3			10.8	10.8		26.4	26.4	55.7	55.7	55.7
Actuated g/C Ratio		0.04			0.12	0.12		0.29	0.29	0.61	0.61	0.61
Clearance Time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0		1.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)		62			200	190		972	465	507	2110	818
v/s Ratio Prot		c0.01			0.01			c0.24		0.17	c0.38	
v/s Ratio Perm						c0.02			0.00	0.29		0.00
v/c Ratio		0.40			0.10	0.14		0.85	0.01	0.75	0.62	0.00
Uniform Delay, d1		43.2			36.0	36.2		30.7	23.3	19.3	11.3	7.1
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.6			0.1	0.1		6.6	0.0	5.5	0.4	0.0
Delay (s)		44.7			36.1	36.4		37.3	23.3	24.8	11.7	7.1
Level of Service		D			D	D		D	C	C	B	A
Approach Delay (s)		44.7			36.3			36.9			14.6	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	30.2
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: US 29 & English Tavern Road

06/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Future Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Lane Util. Factor		1.00			1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt		1.00			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1743			1703	1615		3374	1615	1787	3471	1346
Flt Permitted		0.96			0.95	1.00		1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)		1743			1703	1615		3374	1615	352	3471	1346
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	3	0	19	0	228	0	822	22	381	1305	5
RTOR Reduction (vph)	0	0	0	0	0	201	0	0	16	0	0	2
Lane Group Flow (vph)	0	25	0	0	19	27	0	822	6	381	1305	3
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Turn Type	Split	NA		Split	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases						3	2		6	6		2
Actuated Green, G (s)		3.3			10.8	10.8		26.6	26.6	46.9	55.3	55.3
Effective Green, g (s)		3.3			10.8	10.8		26.6	26.6	46.9	55.3	55.3
Actuated g/C Ratio		0.04			0.12	0.12		0.29	0.29	0.51	0.61	0.61
Clearance Time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0		1.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)		63			201	191		984	471	500	2104	816
v/s Ratio Prot		c0.01			0.01			c0.24		0.17	c0.38	
v/s Ratio Perm						c0.02			0.00	0.22		0.00
v/c Ratio		0.40			0.09	0.14		0.84	0.01	0.76	0.62	0.00
Uniform Delay, d1		43.0			35.8	36.0		30.2	23.0	16.8	11.3	7.1
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.5			0.1	0.1		6.0	0.0	6.1	0.4	0.0
Delay (s)		44.5			35.9	36.2		36.2	23.0	23.0	11.7	7.1
Level of Service		D			D	D		D	C	C	B	A
Approach Delay (s)		44.5			36.1			35.9			14.3	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	30.2
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX F-3

Queue Summary Table

Synchro Capacity Analysis - 95th Percentile Queue Length
2018 Existing Conditions
US 29 Arterial Preservation Plan

Intersection Number and Description		Type of Control	Lane Group	Northbound			Southbound			Eastbound			Westbound		
				Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)			US 29			US 29			Lawless Creek Road			E Witt Road		
		Signal	Left	185	76	39	150	37	54	-	118	76	-	79	48
			Through	-	91	168	-	196	168						
			Right				140	26	0	385	11	0			
2	US 29 at Malmaison Road			US 29			US 29			Malmaison Road			Malmaison Road		
		Signal	Left	370	6	5	265	61	#103	-	7	19	-	183	103
			Through	-	181	#359	-	135	150						
			Right	360	0	20				75	0	0	-	0	0
3	US 29 at Tightsqueeze Road/Fairview Road			US 29			US 29			Tight Squeeze Road			Fairview Road		
		Signal	Left	275	#220	178	295	77	#145	-	#297	#503	-	80	84
			Through	-	204	217	-	234	264						
			Right	335	0	0	1,000	14	13						
4	US 29 at Gladys Road			US 29			US 29			-			Gladys Road		
		Two-Way Stop	Left	95	0	3	120	0	8	-	0	0	-	43	38
			Through	-	†	†	-	-	-						
			Right	105	†	†									
5	US 29 at Colonial Highway			US 29			US 29			Colonial Highway			Colonial Highway		
		Signal	Left	255	19	38	255	52	21	-	#210	95	-	#131	#244
			Through	-	326	218	-	190	305						
			Right	225	2	0	245	0	0	40	0	0			
6	US 29 at Calohan Road			US 29			US 29			-			Calohan Road		
		Signal	Left	120	28	23	550	300	#507	-	0	0	-	114	84
			Through	-	423	295	-	155	244						
			Right	635	15	0							-	103	84
7	US 29 at English Tavern Road			US 29			US 29			-			English Tavern Road		
		Signal	Left	280	10	0	535	70	#322	-	0	45	-	41	36
			Through	-	#643	346	-	254	362						
			Right	65	0	0	150	0	0				135	90	72

Notes:

Synchro 95th percentile queue length results reported for signalized intersections.

HCM 2010 95th percentile queue length results, assuming an average vehicle length of 25 feet, reported for unsignalized intersections.

Shared lane results are shown as one value that corresponds to all movements in that lane.

† SYNCHRO does not provide queue length for movements with no conflicting volumes.

95th percentile volume exceeds capacity, queue may be longer.

APPENDIX F-4

Synchro Queue Reports

AM Queue

Queues
1: US 29 & Lawless Creek Road

04/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	78	18	74	14	26	24	1	48	215	6	3	15
Future Volume (vph)	78	18	74	14	26	24	1	48	215	6	3	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		385	0		0		185		0		150
Storage Lanes	0		1	0		0		1		0		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		458			1712				2546			
Travel Time (s)		6.9			25.9				38.6			
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	10%	11%	1%	0%	4%	4%	0%	6%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	90	0	78	0	0	60	269	0	0	22
v/c Ratio		0.38	0.22		0.33			0.29	0.18			0.11
Control Delay		39.3	4.0		37.4			44.9	18.8			44.9
Queue Delay		0.0	0.0		0.0			0.0	0.0			0.0
Total Delay		39.3	4.0		37.4			44.9	18.8			44.9
Queue Length 50th (ft)		57	0		31			31	41			11
Queue Length 95th (ft)		118	11		79			76	91			37
Internal Link Dist (ft)		378			1632				2466			
Turn Bay Length (ft)			385					185				150
Base Capacity (vph)		729	776		512			538	2018			466
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		0.16	0.12		0.15			0.11	0.13			0.05

Intersection Summary	
Area Type:	Other

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	449	104
Future Volume (vph)	449	104
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		140
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1476	
Travel Time (s)	22.4	
Peak Hour Factor	0.82	0.82
Heavy Vehicles (%)	2%	11%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	548	127
v/c Ratio	0.47	0.22
Control Delay	26.9	5.2
Queue Delay	0.0	0.0
Total Delay	26.9	5.2
Queue Length 50th (ft)	129	0
Queue Length 95th (ft)	196	26
Internal Link Dist (ft)	1396	
Turn Bay Length (ft)		140
Base Capacity (vph)	1852	826
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.30	0.15

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	199	2	93	1	226	104	47	376	2
Future Volume (vph)	2	0	0	199	2	93	1	226	104	47	376	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	370		360	265		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		1460			1586			1379			1830	
Travel Time (s)		39.8			24.0			20.9			27.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	218	101	1	246	113	51	411	0
v/c Ratio		0.01			0.50	0.19	0.01	0.44	0.19	0.18	0.29	
Control Delay		29.0			26.6	0.8	31.0	22.1	0.7	29.9	13.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		29.0			26.6	0.8	31.0	22.1	0.7	29.9	13.8	
Queue Length 50th (ft)		1			64	0	0	70	0	15	35	
Queue Length 95th (ft)		7			183	0	6	181	0	61	135	
Internal Link Dist (ft)		1380			1506			1299			1750	
Turn Bay Length (ft)							370		360	265		
Base Capacity (vph)		255			615	664	158	905	852	297	1894	
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		0.01			0.35	0.15	0.01	0.27	0.13	0.17	0.22	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	127	14	49	22	22	15	2	158	564	21	31	14
Future Volume (vph)	127	14	49	22	22	15	2	158	564	21	31	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		275		335		295
Storage Lanes	0		0	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			35				45			
Link Distance (ft)		530			1421				1189			
Travel Time (s)		8.0			27.7				18.0			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	3%	0%	10%	0%	5%	7%	0%	16%	11%	5%	0%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	218	0	0	67	0	0	184	648	24	0	52
v/c Ratio		0.76			0.29			0.65	0.43	0.03		0.34
Control Delay		58.7			40.2			51.8	20.2	0.1		52.9
Queue Delay		0.0			0.0			0.0	0.0	0.0		0.0
Total Delay		58.7			40.2			51.8	20.2	0.1		52.9
Queue Length 50th (ft)		129			33			107	152	0		31
Queue Length 95th (ft)		#297			80			#220	204	0		77
Internal Link Dist (ft)		450			1341				1109			
Turn Bay Length (ft)								275		335		295
Base Capacity (vph)		287			484			324	2281	1110		170
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		0.76			0.14			0.57	0.28	0.02		0.31

Intersection Summary	
Area Type:	Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	550	128
Future Volume (vph)	550	128
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		1000
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1191	
Travel Time (s)	18.0	
Peak Hour Factor	0.87	0.87
Heavy Vehicles (%)	11%	8%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	632	147
v/c Ratio	0.59	0.18
Control Delay	29.5	1.8
Queue Delay	0.0	0.0
Total Delay	29.5	1.8
Queue Length 50th (ft)	176	0
Queue Length 95th (ft)	234	14
Internal Link Dist (ft)	1111	
Turn Bay Length (ft)		1000
Base Capacity (vph)	1925	1075
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.33	0.14

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	86	54	35	74	17	10	2	5	827	104	1	29
Future Volume (vph)	86	54	35	74	17	10	2	5	827	104	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0		255		225		255
Storage Lanes	0		1	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		759			662				864			
Travel Time (s)		11.5			10.0				13.1			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	6%	0%	8%	18%	20%	50%	40%	8%	8%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	154	38	0	111	0	0	7	909	114	0	33
v/c Ratio		0.67	0.11		0.53			0.06	0.66	0.16		0.20
Control Delay		58.1	0.6		50.8			46.8	25.2	0.6		47.3
Queue Delay		0.0	0.0		0.0			0.0	0.0	0.0		0.0
Total Delay		58.1	0.6		50.8			46.8	25.2	0.6		47.3
Queue Length 50th (ft)		101	0		68			4	247	0		21
Queue Length 95th (ft)		#210	0		#131			19	326	2		52
Internal Link Dist (ft)		679			582				784			
Turn Bay Length (ft)			40					255		225		255
Base Capacity (vph)		236	357		226			260	1665	839		365
Starvation Cap Reductn		0	0		0			0	0	0		0
Spillback Cap Reductn		0	0		0			0	0	0		0
Storage Cap Reductn		0	0		0			0	0	0		0
Reduced v/c Ratio		0.65	0.11		0.49			0.03	0.55	0.14		0.09

Intersection Summary

Area Type: Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	537	34
Future Volume (vph)	537	34
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		245
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1006	
Travel Time (s)	15.2	
Peak Hour Factor	0.91	0.91
Heavy Vehicles (%)	9%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	590	37
v/c Ratio	0.38	0.04
Control Delay	16.6	0.1
Queue Delay	0.0	0.0
Total Delay	16.6	0.1
Queue Length 50th (ft)	104	0
Queue Length 95th (ft)	190	0
Internal Link Dist (ft)	926	
Turn Bay Length (ft)		245
Base Capacity (vph)	1840	955
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.32	0.04

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	1	68	7	395	4	6	885	96	2	251
Future Volume (vph)	0	0	1	68	7	395	4	6	885	96	2	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		120		635		550
Storage Lanes	0		0	0		1		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		25			45				45			
Link Distance (ft)		173			184				1209			
Travel Time (s)		4.7			2.8				18.3			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	9%	0%	7%	0%	0%	7%	3%	0%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	79	420	0	10	941	102	0	269
v/c Ratio		0.00			0.43	0.73		0.07	0.69	0.14		0.69
Control Delay		0.0			51.4	13.0		54.2	28.1	1.8		46.0
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		0.0			51.4	13.0		54.2	28.1	1.8		46.0
Queue Length 50th (ft)		0			45	0		6	241	0		150
Queue Length 95th (ft)		0			114	103		28	423	15		300
Internal Link Dist (ft)		93			104				1129			
Turn Bay Length (ft)								120		635		550
Base Capacity (vph)		706			318	685		265	1979	978		682
Starvation Cap Reductn		0			0	0		0	0	0		0
Spillback Cap Reductn		0			0	0		0	0	0		0
Storage Cap Reductn		0			0	0		0	0	0		0
Reduced v/c Ratio		0.00			0.25	0.61		0.04	0.48	0.10		0.39

Intersection Summary	
Area Type:	Other

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	568	6
Future Volume (vph)	568	6
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1418	
Travel Time (s)	21.5	
Peak Hour Factor	0.94	0.94
Heavy Vehicles (%)	10%	0%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	610	0
v/c Ratio	0.27	
Control Delay	6.8	
Queue Delay	0.0	
Total Delay	6.8	
Queue Length 50th (ft)	56	
Queue Length 95th (ft)	155	
Internal Link Dist (ft)	1338	
Turn Bay Length (ft)		
Base Capacity (vph)	2728	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.22	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Future Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65		535	
Storage Lanes	0		0	0		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		563			795			1192				985
Travel Time (s)		15.4			12.0			18.1				14.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	27	391	8	1279	9	0	105	691
v/c Ratio		0.03			0.12	0.71	0.02	0.83	0.01		0.31	0.35
Control Delay		0.1			36.6	11.9	8.4	29.0	0.0		13.0	11.9
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		0.1			36.6	11.9	8.4	29.0	0.0		13.0	11.9
Queue Length 50th (ft)		0			13	0	1	300	0		15	62
Queue Length 95th (ft)		0			41	90	10	#643	0		77	254
Internal Link Dist (ft)		483			715			1112				905
Turn Bay Length (ft)						135	280		65		535	
Base Capacity (vph)		366			460	736	467	1533	738		524	2026
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		0.02			0.06	0.53	0.02	0.83	0.01		0.20	0.34

Intersection Summary	
Area Type:	Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1900
Storage Length (ft)	150
Storage Lanes	1
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	11%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	10
v/c Ratio	0.01
Control Delay	0.0
Queue Delay	0.0
Total Delay	0.0
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	150
Base Capacity (vph)	975
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.01

Intersection Summary

Queues
7: US 29 & English Tavern Road

06/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Future Volume (vph)	6	0	2	25	0	360	7	1177	8	1	96	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65		535	
Storage Lanes	0		0	0		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		563			795			1192				985
Travel Time (s)		15.4			12.0			18.1				14.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	27	391	8	1279	9	0	105	691
v/c Ratio		0.03			0.12	0.71	0.02	0.83	0.01		0.31	0.35
Control Delay		0.1			36.6	11.9	8.0	29.0	0.0		12.9	11.9
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		0.1			36.6	11.9	8.0	29.0	0.0		12.9	11.9
Queue Length 50th (ft)		0			13	0	1	300	0		15	62
Queue Length 95th (ft)		0			41	90	10	#643	0		70	254
Internal Link Dist (ft)		483			715			1112				905
Turn Bay Length (ft)						135	280		65		535	
Base Capacity (vph)		366			460	736	470	1533	738		534	2026
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		0.02			0.06	0.53	0.02	0.83	0.01		0.20	0.34

Intersection Summary

Area Type: Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1900
Storage Length (ft)	150
Storage Lanes	1
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	11%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	10
v/c Ratio	0.01
Control Delay	0.0
Queue Delay	0.0
Total Delay	0.0
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	150
Base Capacity (vph)	975
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.01

Intersection Summary

PM Queue

Queues
1: US 29 & Lawless Creek Road

04/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	52	13	52	14	9	22	3	21	430	22	5	32
Future Volume (vph)	52	13	52	14	9	22	3	21	430	22	5	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		385	0		0		185		0		150
Storage Lanes	0		1	0		0		1		0		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		458			1712				2546			
Travel Time (s)		6.9			25.9				38.6			
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 (%)	4%	0%	6%	14%	11%	9%	0%	5%	2%	18%	0%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	58	0	50	0	0	26	502	0	0	42
v/c Ratio		0.21	0.15		0.21			0.11	0.31			0.18
Control Delay		31.4	0.8		24.7			36.3	19.8			35.8
Queue Delay		0.0	0.0		0.0			0.0	0.0			0.0
Total Delay		31.4	0.8		24.7			36.3	19.8			35.8
Queue Length 50th (ft)		30	0		11			11	103			18
Queue Length 95th (ft)		76	0		48			39	168			54
Internal Link Dist (ft)		378			1632				2466			
Turn Bay Length (ft)			385					185				150
Base Capacity (vph)		977	899		586			685	2527			542
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		0.07	0.06		0.09			0.04	0.20			0.08

Intersection Summary	
Area Type:	Other

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	455	42
Future Volume (vph)	455	42
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		140
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1477	
Travel Time (s)	22.4	
Peak Hour Factor	0.90	0.90
Heavy Vehicles (%)	2%	5%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	506	47
v/c Ratio	0.28	0.06
Control Delay	17.7	0.1
Queue Delay	0.0	0.0
Total Delay	17.7	0.1
Queue Length 50th (ft)	75	0
Queue Length 95th (ft)	168	0
Internal Link Dist (ft)	1397	
Turn Bay Length (ft)		140
Base Capacity (vph)	2323	1056
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.22	0.04

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	4	5	3	104	3	58	1	387	141	2	84	419
Future Volume (vph)	4	5	3	104	3	58	1	387	141	2	84	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	370		360		265	
Storage Lanes	0		1	0		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		1460			1588			1379				1830
Travel Time (s)		39.8			24.1			20.9				27.7
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	4	0	126	68	1	455	166	0	101	495
v/c Ratio		0.05	0.01		0.37	0.15	0.00	0.53	0.20		0.42	0.23
Control Delay		32.3	0.0		31.7	0.7	34.0	25.4	2.5		39.0	13.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		32.3	0.0		31.7	0.7	34.0	25.4	2.5		39.0	13.1
Queue Length 50th (ft)		4	0		44	0	0	138	0		36	37
Queue Length 95th (ft)		19	0		103	0	5	#359	20		#103	150
Internal Link Dist (ft)		1380			1508			1299				1750
Turn Bay Length (ft)			75				370		360		265	
Base Capacity (vph)		299	439		510	597	260	872	857		244	2116
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	0.01		0.25	0.11	0.00	0.52	0.19		0.41	0.23

Intersection Summary	
Area Type:	Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.85
Heavy Vehicles (%)	100%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	194	31	56	23	20	21	6	128	588	14	48	34
Future Volume (vph)	194	31	56	23	20	21	6	128	588	14	48	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		275		335		295
Storage Lanes	0		0	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			35				45			
Link Distance (ft)		530			1421				1189			
Travel Time (s)		8.0			27.7				18.0			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	3%	9%	9%	0%	0%	0%	15%	14%	7%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	72	0	0	151	661	16	0	92
v/c Ratio		1.11			0.30			0.59	0.51	0.02		0.53
Control Delay		125.5			38.5			51.1	22.3	0.1		59.0
Queue Delay		0.0			0.0			0.0	0.0	0.0		0.0
Total Delay		125.5			38.5			51.1	22.3	0.1		59.0
Queue Length 50th (ft)		~236			32			88	157	0		56
Queue Length 95th (ft)		#503			84			178	217	0		#145
Internal Link Dist (ft)		450			1341				1109			
Turn Bay Length (ft)								275		335		295
Base Capacity (vph)		285			490			333	2223	1090		178
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		1.11			0.15			0.45	0.30	0.01		0.52

Intersection Summary	
Area Type:	Other

~ 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.

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	614	98
Future Volume (vph)	614	98
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		1000
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1192	
Travel Time (s)	18.1	
Peak Hour Factor	0.89	0.89
Heavy Vehicles (%)	8%	7%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	690	110
v/c Ratio	0.60	0.13
Control Delay	28.7	1.8
Queue Delay	0.0	0.0
Total Delay	28.7	1.8
Queue Length 50th (ft)	186	0
Queue Length 95th (ft)	264	13
Internal Link Dist (ft)	1112	
Turn Bay Length (ft)		1000
Base Capacity (vph)	2003	1089
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.34	0.10

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	48	24	11	115	39	13	1	19	634	95	8	835
Future Volume (vph)	48	24	11	115	39	13	1	19	634	95	8	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0		255		225	255	
Storage Lanes	0		1	0		0		1		1	1	
Taper Length (ft)	0			0				0			0	
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			45
Link Distance (ft)		759			662				864			1006
Travel Time (s)		11.5			10.0				13.1			15.2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	9%	6%	0%	15%	0%	0%	11%	3%	25%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	12	0	176	0	0	21	667	100	8	879
v/c Ratio		0.29	0.03		0.62			0.11	0.45	0.12	0.05	0.61
Control Delay		42.7	0.2		50.1			43.8	17.3	0.3	44.2	21.9
Queue Delay		0.0	0.0		0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		42.7	0.2		50.1			43.8	17.3	0.3	44.2	21.9
Queue Length 50th (ft)		35	0		82			10	116	0	4	165
Queue Length 95th (ft)		95	0		#244			38	218	0	21	305
Internal Link Dist (ft)		679			582				784			926
Turn Bay Length (ft)			40					255		225	255	
Base Capacity (vph)		288	372		283			443	2026	1048	358	2017
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		0.26	0.03		0.62			0.05	0.33	0.10	0.02	0.44

Intersection Summary

Area Type: Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Storage Length (ft)	245
Storage Lanes	1
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.95
Heavy Vehicles (%)	5%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	88
v/c Ratio	0.12
Control Delay	0.3
Queue Delay	0.0
Total Delay	0.3
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	245
Base Capacity (vph)	988
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.09

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	3	0	4	54	1	296	4	4	685	64	3	447
Future Volume (vph)	3	0	4	54	1	296	4	4	685	64	3	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		120		635		550
Storage Lanes	0		0	0		1		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		25			45				45			
Link Distance (ft)		173			184				1209			
Travel Time (s)		4.7			2.8				18.3			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	0%	10%	2%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	57	305	0	8	706	66	0	464
v/c Ratio		0.02			0.38	0.67		0.06	0.65	0.11		0.77
Control Delay		0.1			50.8	13.1		50.5	31.6	0.4		40.5
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		0.1			50.8	13.1		50.5	31.6	0.4		40.5
Queue Length 50th (ft)		0			33	0		5	196	0		245
Queue Length 95th (ft)		0			84	84		23	295	0		#507
Internal Link Dist (ft)		93			104				1129			
Turn Bay Length (ft)								120		635		550
Base Capacity (vph)		462			304	608		262	1899	975		725
Starvation Cap Reductn		0			0	0		0	0	0		0
Spillback Cap Reductn		0			0	0		0	0	0		0
Storage Cap Reductn		0			0	0		0	0	0		0
Reduced v/c Ratio		0.02			0.19	0.50		0.03	0.37	0.07		0.64

Intersection Summary	
Area Type:	Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	939	0
Future Volume (vph)	939	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1418	
Travel Time (s)	21.5	
Peak Hour Factor	0.97	0.97
Heavy Vehicles (%)	6%	0%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	968	0
v/c Ratio	0.40	
Control Delay	6.9	
Queue Delay	0.0	
Total Delay	6.9	
Queue Length 50th (ft)	89	
Queue Length 95th (ft)	244	
Internal Link Dist (ft)	1338	
Turn Bay Length (ft)		
Base Capacity (vph)	2828	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.34	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Future Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65	535		150
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		563			795			1192			985	
Travel Time (s)		15.4			12.0			18.1			14.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	19	228	0	822	22	381	1305	5
v/c Ratio		0.12			0.09	0.57		0.82	0.04	0.72	0.59	0.01
Control Delay		43.6			42.4	12.5		37.1	0.1	27.0	11.7	0.0
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		43.6			42.4	12.5		37.1	0.1	27.0	11.7	0.0
Queue Length 50th (ft)		12			9	0		196	0	104	148	0
Queue Length 95th (ft)		45			36	72		346	0	#338	362	0
Internal Link Dist (ft)		483			715			1112			905	
Turn Bay Length (ft)						135			65	535		150
Base Capacity (vph)		279			461	604		1456	790	554	2201	913
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		0.09			0.04	0.38		0.56	0.03	0.69	0.59	0.01

Intersection Summary	
Area Type:	Other

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

Queues
7: US 29 & English Tavern Road

06/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Future Volume (vph)	21	3	0	18	0	217	0	781	21	362	1240	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65	535		150
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		563			795			1192			985	
Travel Time (s)		15.4			12.0			18.1			14.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	19	228	0	822	22	381	1305	5
v/c Ratio		0.12			0.09	0.57		0.81	0.04	0.73	0.59	0.01
Control Delay		43.5			42.4	12.4		36.2	0.1	28.0	11.8	0.0
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		43.5			42.4	12.4		36.2	0.1	28.0	11.8	0.0
Queue Length 50th (ft)		12			9	0		196	0	101	148	0
Queue Length 95th (ft)		45			36	72		346	0	#322	362	0
Internal Link Dist (ft)		483			715			1112			905	
Turn Bay Length (ft)						135			65	535		150
Base Capacity (vph)		281			464	606		1465	794	563	2195	911
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		0.09			0.04	0.38		0.56	0.03	0.68	0.59	0.01

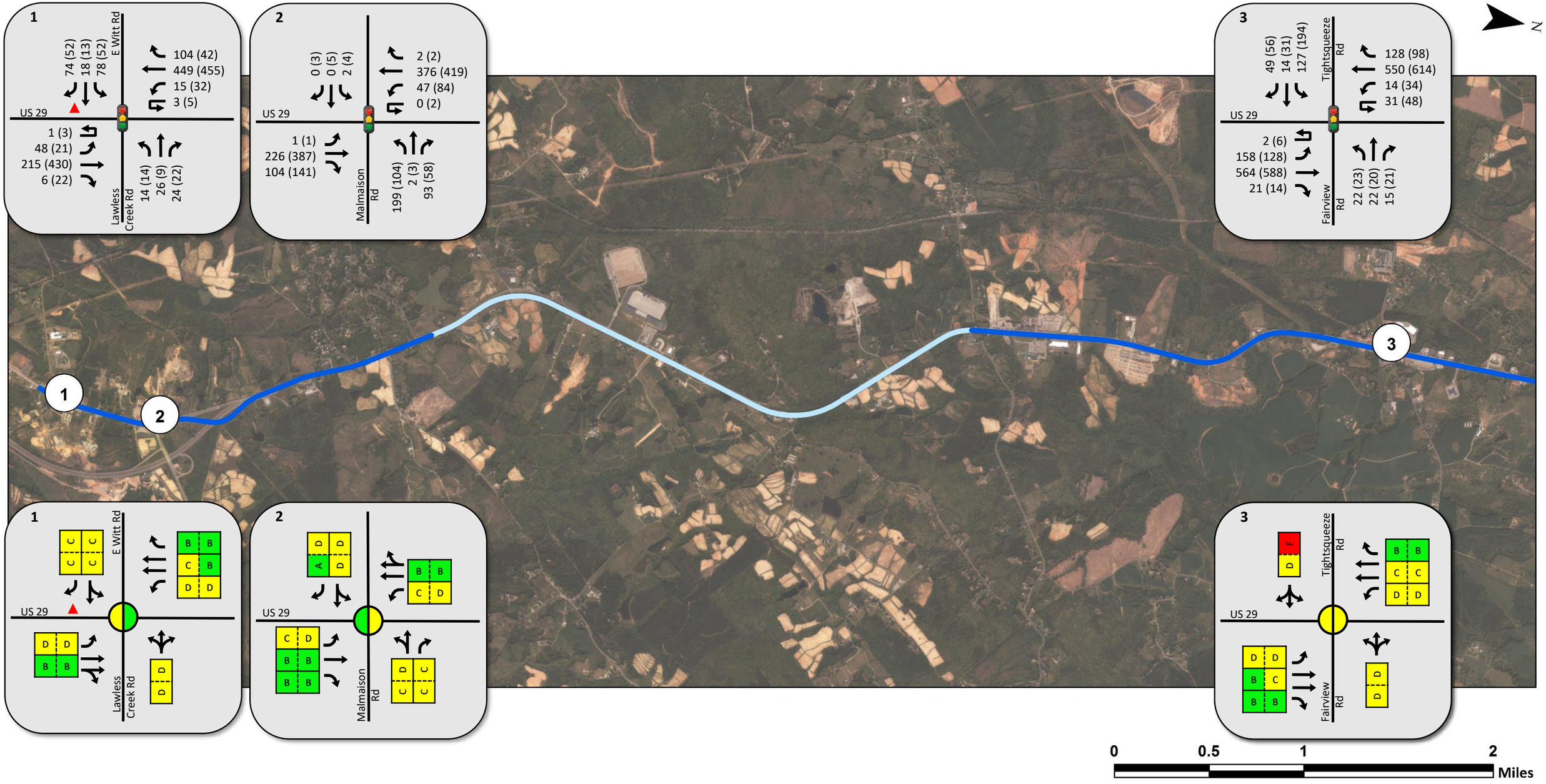
Intersection Summary

Area Type: Other

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

APPENDIX F-5

Existing Volume and Delay Figures



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

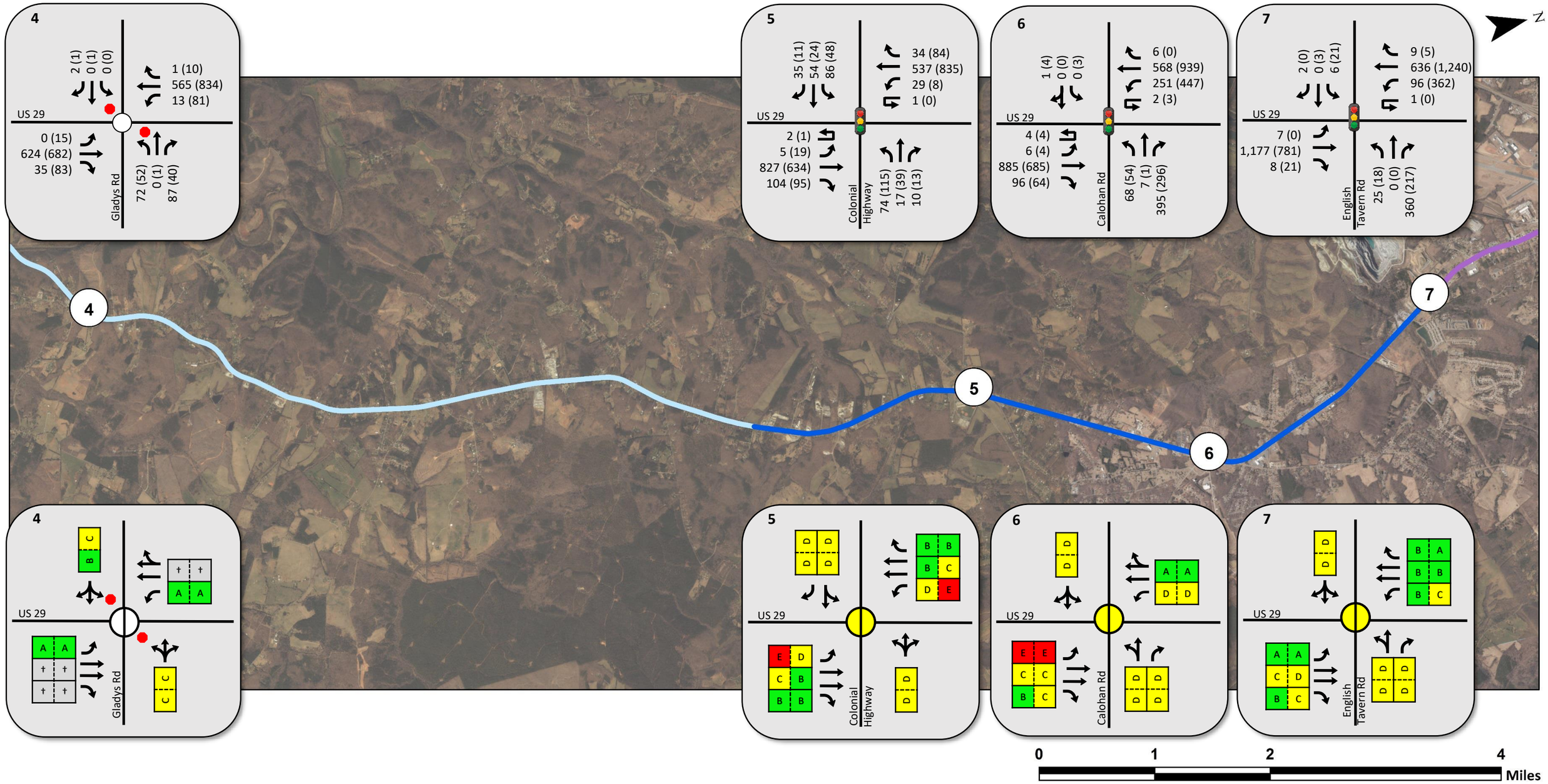
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

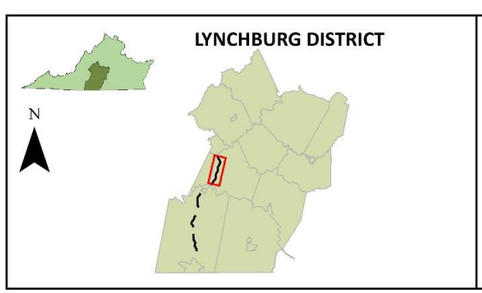
AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Existing Conditions Map
Page 1 of 2

VDOT ARTERIAL PRESERVATION PROGRAM





Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Existing Conditions Map
Page 2 of 2

VDOT ARTERIAL PRESERVATION PROGRAM

APPENDIX G

No-Build Operational Analysis

APPENDIX G-1

Delay Summary Table

HCM - Intersection Delay and LOS
2040 No-Build Conditions
US 29 Arterial Preservation Plan

Intersection Number and Description		Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)			US 29				US 29				Lawless Creek Road				E Witt Road				Intersection	
		Signal	Left	42.8	D	39.6	D	49.7	D	41.2	D	35.9	D	36.4	D	42.6	D	36.3	D	Delay	Delay
			Through	17.6	B	17.8	B	24.2	C	18.1	B									26.4	21.3
			Right					20.3	C	14.8	B	31.3	C	31.9	C					LOS	LOS
			Approach	22.1	C	18.9	B	24.3	C	19.5	B	33.9	C	34.4	C	42.6	D	36.3	D	C	C
2	US 29 at Malmaison Road			US 29				US 29				Malmaison Road				Malmaison Road				Intersection	
		Signal	Left	35.5	D	39.6	D	40.5	D	62.6	E	38.4	D	41.6	D	28.0	C	33.5	C	Delay	Delay
			Through	21.5	C	24.0	C	17.2	B	14.0	B									21.6	23.5
			Right	17.1	B	15.5	B					0.0	A	37.0	D	20.5	C	29.0	C	LOS	LOS
			Approach	20.2	C	21.7	C	19.8	B	22.2	C	38.4	D	40.4	D	25.6	C	31.9	C	C	C
3	US 29 at Tight Squeeze Road/Fairview Road							US 29				Tight Squeeze Road				Fairview Road				Intersection	
		Signal	Left	56.3	E	52.1	D	58.2	E	65.7	E	118.3	F	320.3	F	51.1	D	51.1	D	Delay	Delay
			Through	18.8	B	21.3	C	29.2	C	28.5	C									38.3	73.1
			Right	13.9	B	15.3	B	13.5	B	12.4	B									LOS	LOS
			Approach	26.7	C	26.6	C	28.2	C	30.3	C	118.3	F	320.3	F	51.1	D	51.1	D	D	E
4	US 29 at Gladys Road			US 29				US 29				Gladys Road				Gladys Road				Intersection	
		Two-Way Stop	Left	0.0	A	10.3	B	9.4	A	10.1	B	10.4	B	21.5	C	21.2	C	30.2	D	Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right	†	†	†	†													LOS	LOS
			Approach	-	-	-	-	-	-	-	-	10.4	B	21.5	C	21.2	C	30.2	D	-	-
5	US 29 at Colonial Highway			US 29				US 29				Colonial Highway				Colonial Highway				Intersection	
		Signal	Left	70.2	E	52.0	D	51.2	D	83.0	F	82.1	F	48.4	D	55.1	E	80.0	E	Delay	Delay
			Through	26.9	C	18.9	B	18.8	B	23.3	C									30.3	27.6
			Right	16.9	B	14.1	B	14.5	B	15.1	B	40.2	D	39.8	D					LOS	LOS
			Approach	26.1	C	19.1	B	20.2	C	23.1	C	73.7	E	47.2	D	55.1	E	80.0	E	C	C
6	US 29 at Calohan Road			US 29				US 29				Calohan Road				Calohan Road				Intersection	
		Signal	Left	62.2	E	76.9	E	55.8	E	68.3	E	43.9	D	46.5	D	50.9	D	52.6	D	Delay	Delay
			Through	30.6	C	31.9	C	8.7	A	8.0	A									33.5	31.9
			Right	19.1	B	22.6	C									61.5	E	48.7	D	LOS	LOS
			Approach	29.8	C	31.6	C	23.1	C	27.5	C	43.9	D	46.5	D	59.8	E	49.3	D	C	C
7	US 29 at English Tavern Road			US 29				US 29				Access Driveway				English Tavern Road				Intersection	
		Signal	Left	9.8	A	0.0	A	18.8	B	77.3	E	48.5	D	48.4	D	40.0	D	42.7	D	Delay	Delay
			Through	64.1	E	38.5	D	13.8	B	13.9	B									44.0	32.6
			Right	15.6	B	22.5	C	10.2	B	7.0	A					40.9	D	42.9	D	LOS	LOS
			Approach	63.4	E	38.0	D	14.4	B	28.2	C	48.5	D	48.4	D	40.9	D	42.9	D	D	C

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

APPENDIX G-2

Synchro Delay Reports

AM Delay

HCM Signalized Intersection Capacity Analysis
1: US 29 & Lawless Creek Road

04/11/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	95	22	90	17	32	29	1	59	262	7	4	18
Future Volume (vph)	95	22	90	17	32	29	1	59	262	7	4	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95			1.00
Frt		1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected		0.96	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)		1657	1599		1730			1704	3428			1805
Flt Permitted		0.96	1.00		0.99			0.95	1.00			0.95
Satd. Flow (perm)		1657	1599		1730			1704	3428			1805
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	24	98	18	35	32	1	64	285	8	4	20
RTOR Reduction (vph)	0	0	80	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	127	18	0	69	0	0	65	292	0	0	24
Heavy Vehicles (%)	10%	11%	1%	0%	4%	4%	0%	6%	5%	0%	0%	0%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA		Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3									
Actuated Green, G (s)		16.6	16.6		7.8			7.4	37.6			2.7
Effective Green, g (s)		16.6	16.6		7.8			7.4	37.6			2.7
Actuated g/C Ratio		0.18	0.18		0.09			0.08	0.41			0.03
Clearance Time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Vehicle Extension (s)		6.0	6.0		3.5			3.0	6.0			3.0
Lane Grp Cap (vph)		300	290		147			137	1408			53
v/s Ratio Prot		c0.08			c0.04			c0.04	c0.09			0.01
v/s Ratio Perm			0.01									
v/c Ratio		0.42	0.06		0.47			0.47	0.21			0.45
Uniform Delay, d1		33.2	31.0		39.9			40.2	17.4			43.7
Progression Factor		1.00	1.00		1.00			1.00	1.00			1.00
Incremental Delay, d2		2.7	0.3		2.7			2.6	0.2			6.0
Delay (s)		35.9	31.3		42.6			42.8	17.6			49.7
Level of Service		D	C		D			D	B			D
Approach Delay (s)		33.9			42.6				22.1			
Approach LOS		C			D				C			

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	91.5	Sum of lost time (s)	27.8
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	548	127
Future Volume (vph)	548	127
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1455
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1455
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	596	138
RTOR Reduction (vph)	0	89
Lane Group Flow (vph)	596	49
Heavy Vehicles (%)	2%	11%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	31.9	31.9
Effective Green, g (s)	31.9	31.9
Actuated g/C Ratio	0.35	0.35
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1233	507
v/s Ratio Prot	c0.17	
v/s Ratio Perm		0.03
v/c Ratio	0.48	0.10
Uniform Delay, d1	23.3	20.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.8	0.2
Delay (s)	24.2	20.3
Level of Service	C	C
Approach Delay (s)	24.3	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Future Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			7.5	7.5	6.4	5.7	5.7	6.6	5.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		902			1725	1524	902	1827	1509	1736	3503	
Flt Permitted		0.95			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		902			1725	1524	902	1827	1509	1736	3503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	0	264	2	123	1	300	138	62	499	2
RTOR Reduction (vph)	0	0	0	0	0	94	0	0	96	0	0	0
Lane Group Flow (vph)	0	2	0	0	266	29	1	300	42	62	501	0
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Prot	Prot	NA	
Protected Phases	4	4		3	3		1	6	6	5	2	
Permitted Phases			4			3						
Actuated Green, G (s)		1.4			15.9	15.9	1.1	20.7	20.7	4.1	23.8	
Effective Green, g (s)		1.4			15.9	15.9	1.1	20.7	20.7	4.1	23.8	
Actuated g/C Ratio		0.02			0.23	0.23	0.02	0.30	0.30	0.06	0.35	
Clearance Time (s)		6.1			7.5	7.5	6.4	5.7	5.7	6.6	5.8	
Vehicle Extension (s)		5.0			4.0	4.0	3.5	5.0	5.0	3.5	5.0	
Lane Grp Cap (vph)		18			403	356	14	556	459	104	1226	
v/s Ratio Prot		c0.00			c0.15		0.00	c0.16	0.03	c0.04	c0.14	
v/s Ratio Perm						0.02						
v/c Ratio		0.11			0.66	0.08	0.07	0.54	0.09	0.60	0.41	
Uniform Delay, d1		32.7			23.6	20.3	32.9	19.7	16.9	31.1	16.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.7			4.4	0.1	2.6	1.8	0.2	9.4	0.5	
Delay (s)		38.4			28.0	20.5	35.5	21.5	17.1	40.5	17.2	
Level of Service		D			C	C	D	C	B	D	B	
Approach Delay (s)		38.4			25.6			20.2			19.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	25.9
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	155	17	60	27	27	18	2	193	688	26	38	17
Future Volume (vph)	155	17	60	27	27	18	2	193	688	26	38	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Lane Util. Factor		1.00			1.00			1.00	0.95	1.00		1.00
Frt		0.97			0.97			1.00	1.00	0.85		1.00
Flt Protected		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1696			1741			1558	3252	1538		1731
Flt Permitted		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1696			1741			1558	3252	1538		1731
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	176	19	68	31	31	20	2	219	782	30	43	19
RTOR Reduction (vph)	0	9	0	0	10	0	0	0	0	15	0	0
Lane Group Flow (vph)	0	254	0	0	72	0	0	221	782	15	0	62
Heavy Vehicles (%)	3%	0%	10%	0%	5%	7%	0%	16%	11%	5%	0%	14%
Turn Type	Split	NA		Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	4	4		3	3		1	1	6		5	5
Permitted Phases										6		
Actuated Green, G (s)		15.5			10.4			19.6	53.6	53.6		6.7
Effective Green, g (s)		15.5			10.4			19.6	53.6	53.6		6.7
Actuated g/C Ratio		0.14			0.10			0.18	0.50	0.50		0.06
Clearance Time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)		5.0			6.0			4.0	6.0	6.0		4.0
Lane Grp Cap (vph)		242			167			282	1610	761		107
v/s Ratio Prot		c0.15			c0.04			c0.14	0.24			0.04
v/s Ratio Perm										0.01		
v/c Ratio		1.05			0.43			0.78	0.49	0.02		0.58
Uniform Delay, d1		46.4			46.1			42.3	18.1	13.9		49.4
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		72.0			5.0			14.0	0.7	0.0		8.8
Delay (s)		118.3			51.1			56.3	18.8	13.9		58.2
Level of Service		F			D			E	B	B		E
Approach Delay (s)		118.3			51.1				26.7			
Approach LOS		F			D				C			

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	108.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	671	156
Future Volume (vph)	671	156
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	6.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3252	1495
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3252	1495
Peak-hour factor, PHF	0.88	0.88
Adj. Flow (vph)	762	177
RTOR Reduction (vph)	0	85
Lane Group Flow (vph)	763	92
Heavy Vehicles (%)	11%	8%
Turn Type	NA	pt+ov
Protected Phases	2	2 4
Permitted Phases		
Actuated Green, G (s)	40.7	56.2
Effective Green, g (s)	40.7	56.2
Actuated g/C Ratio	0.38	0.52
Clearance Time (s)	6.0	
Vehicle Extension (s)	6.0	
Lane Grp Cap (vph)	1223	776
v/s Ratio Prot	c0.23	0.06
v/s Ratio Perm		
v/c Ratio	0.62	0.12
Uniform Delay, d1	27.5	13.3
Progression Factor	1.00	1.00
Incremental Delay, d2	1.7	0.2
Delay (s)	29.2	13.5
Level of Service	C	B
Approach Delay (s)	28.2	
Approach LOS	C	

Intersection Summary

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	80	0	97	0	693	39	14	627	1
Future Vol, veh/h	0	0	2	80	0	97	0	693	39	14	627	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	105	120	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	3	0	2	0	7	20	8	14	0
Mvmt Flow	0	0	2	84	0	102	0	729	41	15	660	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1055	1419	331	1088	1420	365	661	0	0	729	0	0
Stage 1	690	690	-	729	729	-	-	-	-	-	-	-
Stage 2	365	729	-	359	691	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.56	6.5	6.94	4.1	-	-	4.26	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.53	4	3.32	2.2	-	-	2.28	-	-
Pot Cap-1 Maneuver	183	138	671	169	138	632	937	-	-	832	-	-
Stage 1	406	449	-	378	431	-	-	-	-	-	-	-
Stage 2	632	431	-	629	449	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	151	136	671	166	136	632	937	-	-	832	-	-
Mov Cap-2 Maneuver	275	257	-	283	261	-	-	-	-	-	-	-
Stage 1	406	441	-	378	431	-	-	-	-	-	-	-
Stage 2	530	431	-	616	441	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	21.2	0	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	937	-	-	671	406	832	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.459	0.018	-	-
HCM Control Delay (s)	0	-	-	10.4	21.2	9.4	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	2.3	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	105	66	43	90	21	12	2	6	1009	127	1	35
Future Volume (vph)	105	66	43	90	21	12	2	6	1009	127	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		7.9			6.7	5.8	5.8		6.5
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95	1.00		1.00
Frt		1.00	0.85		0.99			1.00	1.00	0.85		1.00
Flt Protected		0.97	1.00		0.96			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1791	1615		1632			1269	3343	1495		1754
Flt Permitted		0.97	1.00		0.96			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1791	1615		1632			1269	3343	1495		1754
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	115	73	47	99	23	13	2	7	1109	140	1	38
RTOR Reduction (vph)	0	0	42	0	4	0	0	0	0	78	0	0
Lane Group Flow (vph)	0	188	5	0	131	0	0	9	1109	62	0	39
Heavy Vehicles (%)	1%	6%	0%	8%	18%	20%	50%	40%	8%	8%	0%	3%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3							6		
Actuated Green, G (s)		11.9	11.9		11.8			1.5	45.1	45.1		5.0
Effective Green, g (s)		11.9	11.9		11.8			1.5	45.1	45.1		5.0
Actuated g/C Ratio		0.12	0.12		0.12			0.01	0.44	0.44		0.05
Clearance Time (s)		8.3	8.3		7.9			6.7	5.8	5.8		6.5
Vehicle Extension (s)		4.0	4.0		4.0			3.0	6.0	6.0		3.0
Lane Grp Cap (vph)		208	187		188			18	1473	659		85
v/s Ratio Prot		c0.10			c0.08			0.01	c0.33			c0.02
v/s Ratio Perm			0.00							0.04		
v/c Ratio		0.90	0.03		0.70			0.50	0.75	0.09		0.46
Uniform Delay, d1		44.6	40.1		43.5			50.0	23.9	16.7		47.3
Progression Factor		1.00	1.00		1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		37.5	0.1		11.6			20.2	2.9	0.2		3.9
Delay (s)		82.1	40.2		55.1			70.2	26.9	16.9		51.2
Level of Service		F	D		E			E	C	B		D
Approach Delay (s)		73.7			55.1				26.1			
Approach LOS		E			E				C			

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	102.3	Sum of lost time (s)	28.8
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	655	41
Future Volume (vph)	655	41
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3312	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3312	1568
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	720	45
RTOR Reduction (vph)	0	24
Lane Group Flow (vph)	720	21
Heavy Vehicles (%)	9%	3%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	48.3	48.3
Effective Green, g (s)	48.3	48.3
Actuated g/C Ratio	0.47	0.47
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1563	740
v/s Ratio Prot	c0.22	
v/s Ratio Perm		0.01
v/c Ratio	0.46	0.03
Uniform Delay, d1	18.2	14.4
Progression Factor	1.00	1.00
Incremental Delay, d2	0.6	0.0
Delay (s)	18.8	14.5
Level of Service	B	B
Approach Delay (s)	20.2	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	1	83	9	482	5	7	1080	117	2	306
Future Volume (vph)	0	0	1	83	9	482	5	7	1080	117	2	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95	1.00		1.00
Frt		0.86			1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected		1.00			0.96	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)		1644			1682	1509		1805	3374	1568		1642
Flt Permitted		1.00			0.75	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)		1644			1314	1509		1805	3374	1568		1642
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	1	88	10	513	5	7	1149	124	2	326
RTOR Reduction (vph)	0	1	0	0	0	355	0	0	0	69	0	0
Lane Group Flow (vph)	0	0	0	0	98	158	0	12	1149	55	0	328
Heavy Vehicles (%)	0%	0%	0%	9%	0%	7%	0%	0%	7%	3%	0%	10%
Turn Type		NA		Perm	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)		17.2			17.2	17.2		2.9	53.5	53.5		29.2
Effective Green, g (s)		17.2			17.2	17.2		2.9	53.5	53.5		29.2
Actuated g/C Ratio		0.14			0.14	0.14		0.02	0.45	0.45		0.24
Clearance Time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Vehicle Extension (s)		4.0			4.0	4.0		4.0	5.0	5.0		4.0
Lane Grp Cap (vph)		236			188	216		43	1506	700		400
v/s Ratio Prot		0.00						0.01	c0.34			c0.20
v/s Ratio Perm					0.07	c0.10				0.04		
v/c Ratio		0.00			0.52	0.73		0.28	0.76	0.08		0.82
Uniform Delay, d1		43.9			47.5	49.1		57.4	27.8	19.0		42.8
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2		0.0			3.4	12.4		4.8	2.8	0.1		13.0
Delay (s)		43.9			50.9	61.5		62.2	30.6	19.1		55.8
Level of Service		D			D	E		E	C	B		E
Approach Delay (s)		43.9			59.8				29.8			
Approach LOS		D			E				C			

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	119.8	Sum of lost time (s)	19.9
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	693	7
Future Volume (vph)	693	7
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	
Lane Util. Factor	0.95	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3280	
Flt Permitted	1.00	
Satd. Flow (perm)	3280	
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	737	7
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	744	0
Heavy Vehicles (%)	10%	0%
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	80.2	
Effective Green, g (s)	80.2	
Actuated g/C Ratio	0.67	
Clearance Time (s)	5.6	
Vehicle Extension (s)	5.0	
Lane Grp Cap (vph)	2195	
v/s Ratio Prot	0.23	
v/s Ratio Perm		
v/c Ratio	0.34	
Uniform Delay, d1	8.5	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	8.7	
Level of Service	A	
Approach Delay (s)	23.1	
Approach LOS	C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: US 29 & English Tavern Road

06/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	0	2	31	0	439	9	1436	10	1	117	776
Future Volume (vph)	7	0	2	31	0	439	9	1436	10	1	117	776
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00		1.00	0.95
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.96			0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1270			1612	1599	1262	3374	1429		1736	3223
Flt Permitted		0.96			0.95	1.00	0.30	1.00	1.00		0.09	1.00
Satd. Flow (perm)		1270			1612	1599	394	3374	1429		165	3223
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	2	34	0	477	10	1561	11	1	127	843
RTOR Reduction (vph)	0	10	0	0	0	417	0	0	6	0	0	0
Lane Group Flow (vph)	0	0	0	0	34	60	10	1561	5	0	128	843
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Turn Type	Split	NA		Split	NA	Perm	D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		1	6		5	5	2
Permitted Phases						3	2		6	6	6	
Actuated Green, G (s)		1.6			11.7	11.7	56.6	44.3	44.3		56.6	55.0
Effective Green, g (s)		1.6			11.7	11.7	56.6	44.3	44.3		56.6	55.0
Actuated g/C Ratio		0.02			0.12	0.12	0.57	0.44	0.44		0.57	0.55
Clearance Time (s)		6.4			7.0	7.0	8.4	8.4	8.4		8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0	1.0	1.0	1.0		2.0	1.0
Lane Grp Cap (vph)		20			188	186	236	1493	632		286	1770
v/s Ratio Prot		c0.00			0.02		0.00	c0.46			c0.05	c0.26
v/s Ratio Perm						c0.04	0.02		0.00		0.20	
v/c Ratio		0.01			0.18	0.32	0.04	1.05	0.01		0.45	0.48
Uniform Delay, d1		48.5			39.9	40.6	9.7	27.9	15.6		18.4	13.8
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.1			0.2	0.4	0.0	36.2	0.0		0.4	0.1
Delay (s)		48.5			40.0	40.9	9.8	64.1	15.6		18.8	13.8
Level of Service		D			D	D	A	E	B		B	B
Approach Delay (s)		48.5			40.9			63.4				14.4
Approach LOS		D			D			E				B

Intersection Summary			
HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	30.2
Intersection Capacity Utilization	110.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	11
Future Volume (vph)	11
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1455
Flt Permitted	1.00
Satd. Flow (perm)	1455
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	12
RTOR Reduction (vph)	5
Lane Group Flow (vph)	7
Heavy Vehicles (%)	11%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	55.0
Effective Green, g (s)	55.0
Actuated g/C Ratio	0.55
Clearance Time (s)	8.4
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	799
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	10.2
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	10.2
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

PM Delay

HCM Signalized Intersection Capacity Analysis
1: US 29 & Lawless Creek Road

04/11/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	63	16	63	17	11	27	4	26	525	27	6	39
Future Volume (vph)	63	16	63	17	11	27	4	26	525	27	6	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95			1.00
Frt		1.00	0.85		0.93			1.00	0.99			1.00
Flt Protected		0.96	1.00		0.98			0.95	1.00			0.95
Satd. Flow (prot)		1770	1524		1575			1729	3487			1676
Flt Permitted		0.96	1.00		0.98			0.95	1.00			0.95
Satd. Flow (perm)		1770	1524		1575			1729	3487			1676
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	17	68	18	12	29	4	28	571	29	7	42
RTOR Reduction (vph)	0	0	60	0	26	0	0	0	2	0	0	0
Lane Group Flow (vph)	0	85	8	0	33	0	0	32	598	0	0	49
Heavy Vehicles (%)	4%	0%	6%	14%	11%	9%	0%	5%	2%	18%	0%	9%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA		Prot	Prot
Protected Phases	3	3		4	4		1	1	6		5	5
Permitted Phases			3									
Actuated Green, G (s)		9.9	9.9		6.7			4.3	33.3			4.8
Effective Green, g (s)		9.9	9.9		6.7			4.3	33.3			4.8
Actuated g/C Ratio		0.12	0.12		0.08			0.05	0.41			0.06
Clearance Time (s)		7.1	7.1		8.4			6.4	5.6			5.7
Vehicle Extension (s)		6.0	6.0		3.5			3.0	6.0			3.0
Lane Grp Cap (vph)		215	185		129			91	1424			98
v/s Ratio Prot		c0.05			c0.02			0.02	c0.17			c0.03
v/s Ratio Perm			0.01									
v/c Ratio		0.40	0.04		0.26			0.35	0.42			0.50
Uniform Delay, d1		33.0	31.6		35.1			37.3	17.2			37.2
Progression Factor		1.00	1.00		1.00			1.00	1.00			1.00
Incremental Delay, d2		3.4	0.3		1.3			2.3	0.6			4.0
Delay (s)		36.4	31.9		36.3			39.6	17.8			41.2
Level of Service		D	C		D			D	B			D
Approach Delay (s)		34.4			36.3				18.9			
Approach LOS		C			D				B			

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	27.8
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	555	51
Future Volume (vph)	555	51
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	5.9
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1538
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1538
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	603	55
RTOR Reduction (vph)	0	33
Lane Group Flow (vph)	603	22
Heavy Vehicles (%)	2%	5%
Turn Type	NA	Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	32.8	32.8
Effective Green, g (s)	32.8	32.8
Actuated g/C Ratio	0.40	0.40
Clearance Time (s)	5.9	5.9
Vehicle Extension (s)	6.0	6.0
Lane Grp Cap (vph)	1424	618
v/s Ratio Prot	0.17	
v/s Ratio Perm		0.01
v/c Ratio	0.42	0.04
Uniform Delay, d1	17.5	14.8
Progression Factor	1.00	1.00
Incremental Delay, d2	0.6	0.1
Delay (s)	18.1	14.8
Level of Service	B	B
Approach Delay (s)	19.5	
Approach LOS	B	

Intersection Summary

Movement	SBR
Lanes, Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	2
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Future Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1	6.1		7.5	7.5	6.4	5.7	5.7		6.6	5.8
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	0.95
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.98	1.00		0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1291	1214		1746	1583	1805	1845	1583		1737	3525
Flt Permitted		0.98	1.00		0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)		1291	1214		1746	1583	1805	1845	1583		1737	3525
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	7	4	138	4	77	1	513	187	2	111	555
RTOR Reduction (vph)	0	0	4	0	0	65	0	0	113	0	0	0
Lane Group Flow (vph)	0	12	0	0	142	12	1	513	74	0	113	557
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Prot	Prot	Prot	NA
Protected Phases	4	4		3	3		1	6	6	5	5	2
Permitted Phases			4			3						
Actuated Green, G (s)		3.4	3.4		12.6	12.6	1.3	32.0	32.0		6.6	37.4
Effective Green, g (s)		3.4	3.4		12.6	12.6	1.3	32.0	32.0		6.6	37.4
Actuated g/C Ratio		0.04	0.04		0.16	0.16	0.02	0.40	0.40		0.08	0.46
Clearance Time (s)		6.1	6.1		7.5	7.5	6.4	5.7	5.7		6.6	5.8
Vehicle Extension (s)		5.0	5.0		4.0	4.0	3.5	5.0	5.0		3.5	5.0
Lane Grp Cap (vph)		54	51		273	247	29	733	629		142	1637
v/s Ratio Prot		c0.01			c0.08		0.00	c0.28	0.05		c0.07	c0.16
v/s Ratio Perm			0.00			0.01						
v/c Ratio		0.22	0.00		0.52	0.05	0.03	0.70	0.12		0.80	0.34
Uniform Delay, d1		37.3	36.9		31.2	28.9	39.0	20.2	15.3		36.3	13.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		4.3	0.1		2.3	0.1	0.6	3.7	0.2		26.3	0.3
Delay (s)		41.6	37.0		33.5	29.0	39.6	24.0	15.5		62.6	14.0
Level of Service		D	D		C	C	D	C	B		E	B
Approach Delay (s)		40.4			31.9			21.7				22.2
Approach LOS		D			C			C				C

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	25.9
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	237	38	68	28	24	26	7	156	717	17	59	41
Future Volume (vph)	237	38	68	28	24	26	7	156	717	17	59	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Lane Util. Factor		1.00			1.00			1.00	0.95	1.00		1.00
Frt		0.97			0.95			1.00	1.00	0.85		1.00
Flt Protected		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (prot)		1682			1727			1579	3167	1509		1784
Flt Permitted		0.97			0.98			0.95	1.00	1.00		0.95
Satd. Flow (perm)		1682			1727			1579	3167	1509		1784
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	266	43	76	31	27	29	8	175	806	19	66	46
RTOR Reduction (vph)	0	6	0	0	14	0	0	0	0	10	0	0
Lane Group Flow (vph)	0	379	0	0	73	0	0	183	806	9	0	112
Heavy Vehicles (%)	6%	3%	9%	9%	0%	0%	0%	15%	14%	7%	2%	0%
Turn Type	Split	NA		Split	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	4	4		3	3		1	1	6		5	5
Permitted Phases										6		
Actuated Green, G (s)		15.6			10.5			17.7	50.9	50.9		9.3
Effective Green, g (s)		15.6			10.5			17.7	50.9	50.9		9.3
Actuated g/C Ratio		0.14			0.10			0.16	0.47	0.47		0.09
Clearance Time (s)		5.0			5.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)		5.0			6.0			4.0	6.0	6.0		4.0
Lane Grp Cap (vph)		242			167			258	1488	709		153
v/s Ratio Prot		c0.23			c0.04			c0.12	0.25			0.06
v/s Ratio Perm										0.01		
v/c Ratio		1.57			0.43			0.71	0.54	0.01		0.73
Uniform Delay, d1		46.4			46.1			42.9	20.4	15.3		48.3
Progression Factor		1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2		273.9			5.0			9.2	0.9	0.0		17.5
Delay (s)		320.3			51.1			52.1	21.3	15.3		65.7
Level of Service		F			D			D	C	B		E
Approach Delay (s)		320.3			51.1				26.8			
Approach LOS		F			D				C			

Intersection Summary			
HCM 2000 Control Delay	73.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	108.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	749	120
Future Volume (vph)	749	120
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	6.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3343	1509
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3343	1509
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	842	135
RTOR Reduction (vph)	0	63
Lane Group Flow (vph)	842	72
Heavy Vehicles (%)	8%	7%
Turn Type	NA	pt+ov
Protected Phases	2	2 4
Permitted Phases		
Actuated Green, G (s)	42.5	58.1
Effective Green, g (s)	42.5	58.1
Actuated g/C Ratio	0.39	0.54
Clearance Time (s)	6.0	
Vehicle Extension (s)	6.0	
Lane Grp Cap (vph)	1311	809
v/s Ratio Prot	c0.25	0.05
v/s Ratio Perm		
v/c Ratio	0.64	0.09
Uniform Delay, d1	26.7	12.2
Progression Factor	1.00	1.00
Incremental Delay, d2	1.8	0.1
Delay (s)	28.5	12.4
Level of Service	C	B
Approach Delay (s)	30.3	
Approach LOS	C	

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	1	58	1	44	17	757	92	90	926	11
Future Vol, veh/h	0	1	1	58	1	44	17	757	92	90	926	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	105	120	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	6	0	8	0	6	4	4	6	10
Mvmt Flow	0	1	1	62	1	47	18	805	98	96	985	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1621	2023	498	1526	2029	403	997	0	0	805	0	0
Stage 1	1182	1182	-	841	841	-	-	-	-	-	-	-
Stage 2	439	841	-	685	1188	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.62	6.5	7.06	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.62	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.62	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.56	4	3.38	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	70	59	523	77	58	580	702	-	-	802	-	-
Stage 1	205	266	-	317	383	-	-	-	-	-	-	-
Stage 2	572	383	-	395	264	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	57	51	523	68	50	580	702	-	-	802	-	-
Mov Cap-2 Maneuver	145	139	-	176	145	-	-	-	-	-	-	-
Stage 1	200	234	-	309	373	-	-	-	-	-	-	-
Stage 2	511	373	-	345	232	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	30.2	0.2	0.9
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	702	-	-	220	250	802	-	-
HCM Lane V/C Ratio	0.026	-	-	0.01	0.438	0.119	-	-
HCM Control Delay (s)	10.3	-	-	21.5	30.2	10.1	-	-
HCM Lane LOS	B	-	-	C	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	2.1	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	59	29	13	140	48	16	1	23	773	116	10	1019
Future Volume (vph)	59	29	13	140	48	16	1	23	773	116	10	1019
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		7.9			6.7	5.8	5.8	6.5	5.9
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95	1.00	1.00	0.95
Frt		1.00	0.85		0.99			1.00	1.00	0.85	1.00	1.00
Flt Protected		0.97	1.00		0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1839	1482		1726			1805	3252	1568	1444	3406
Flt Permitted		0.97	1.00		0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1839	1482		1726			1805	3252	1568	1444	3406
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	31	14	147	51	17	1	24	814	122	11	1073
RTOR Reduction (vph)	0	0	13	0	3	0	0	0	0	65	0	0
Lane Group Flow (vph)	0	93	1	0	212	0	0	25	814	57	11	1073
Heavy Vehicles (%)	0%	0%	9%	6%	0%	15%	0%	0%	11%	3%	25%	6%
Turn Type	Split	NA	Perm	Split	NA		Prot	Prot	NA	Perm	Prot	NA
Protected Phases	3	3		4	4		1	1	6		5	2
Permitted Phases			3							6		
Actuated Green, G (s)		8.2	8.2		12.7			2.8	44.5	44.5	1.3	42.7
Effective Green, g (s)		8.2	8.2		12.7			2.8	44.5	44.5	1.3	42.7
Actuated g/C Ratio		0.09	0.09		0.13			0.03	0.47	0.47	0.01	0.45
Clearance Time (s)		8.3	8.3		7.9			6.7	5.8	5.8	6.5	5.9
Vehicle Extension (s)		4.0	4.0		4.0			3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)		158	127		230			53	1520	732	19	1527
v/s Ratio Prot		c0.05			c0.12			c0.01	0.25		0.01	c0.32
v/s Ratio Perm			0.00							0.04		
v/c Ratio		0.59	0.01		0.92			0.47	0.54	0.08	0.58	0.70
Uniform Delay, d1		41.9	39.8		40.8			45.5	18.0	14.0	46.7	21.1
Progression Factor		1.00	1.00		1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.5	0.0		39.2			6.5	0.9	0.1	36.3	2.2
Delay (s)		48.4	39.8		80.0			52.0	18.9	14.1	83.0	23.3
Level of Service		D	D		E			D	B	B	F	C
Approach Delay (s)		47.2			80.0				19.1			23.1
Approach LOS		D			E				B			C

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.2	Sum of lost time (s)	28.8
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	102
Future Volume (vph)	102
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.9
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1538
Flt Permitted	1.00
Satd. Flow (perm)	1538
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	107
RTOR Reduction (vph)	59
Lane Group Flow (vph)	48
Heavy Vehicles (%)	5%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	42.7
Effective Green, g (s)	42.7
Actuated g/C Ratio	0.45
Clearance Time (s)	5.9
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	689
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.07
Uniform Delay, d1	14.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.1
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	4	0	4	66	1	361	5	5	836	78	4	545
Future Volume (vph)	4	0	4	66	1	361	5	5	836	78	4	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95	1.00		1.00
Frt		0.93			1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected		0.98			0.95	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)		1729			1663	1568		1805	3282	1583		1770
Flt Permitted		0.85			0.72	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)		1507			1263	1568		1805	3282	1583		1770
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	4	0	4	68	1	372	5	5	862	80	4	562
RTOR Reduction (vph)	0	7	0	0	0	330	0	0	0	49	0	0
Lane Group Flow (vph)	0	1	0	0	69	42	0	10	862	31	0	566
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	0%	10%	2%	0%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)		13.4			13.4	13.4		1.5	45.8	45.8		39.0
Effective Green, g (s)		13.4			13.4	13.4		1.5	45.8	45.8		39.0
Actuated g/C Ratio		0.11			0.11	0.11		0.01	0.39	0.39		0.33
Clearance Time (s)		7.5			7.5	7.5		6.4	5.8	5.8		6.6
Vehicle Extension (s)		4.0			4.0	4.0		4.0	5.0	5.0		4.0
Lane Grp Cap (vph)		170			143	177		22	1272	613		584
v/s Ratio Prot								0.01	c0.26			c0.32
v/s Ratio Perm		0.00			c0.05	0.03				0.02		
v/c Ratio		0.01			0.48	0.24		0.45	0.68	0.05		0.97
Uniform Delay, d1		46.4			49.1	47.7		57.9	30.0	22.6		39.0
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2		0.0			3.5	1.0		19.0	1.9	0.1		29.4
Delay (s)		46.5			52.6	48.7		76.9	31.9	22.6		68.3
Level of Service		D			D	D		E	C	C		E
Approach Delay (s)		46.5			49.3				31.6			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	118.1	Sum of lost time (s)	19.9
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1146	0
Future Volume (vph)	1146	0
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	
Lane Util. Factor	0.95	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3406	
Flt Permitted	1.00	
Satd. Flow (perm)	3406	
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	1181	0
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	1181	0
Heavy Vehicles (%)	6%	0%
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	83.7	
Effective Green, g (s)	83.7	
Actuated g/C Ratio	0.71	
Clearance Time (s)	5.6	
Vehicle Extension (s)	5.0	
Lane Grp Cap (vph)	2413	
v/s Ratio Prot	0.35	
v/s Ratio Perm		
v/c Ratio	0.49	
Uniform Delay, d1	7.7	
Progression Factor	1.00	
Incremental Delay, d2	0.3	
Delay (s)	8.0	
Level of Service	A	
Approach Delay (s)	27.5	
Approach LOS	C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: US 29 & English Tavern Road

06/01/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	0	22	0	265	0	953	26	442	1513	6
Future Volume (vph)	26	4	0	22	0	265	0	953	26	442	1513	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Lane Util. Factor		1.00			1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt		1.00			1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1745			1703	1615		3374	1615	1787	3471	1346
Flt Permitted		0.96			0.95	1.00		1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)		1745			1703	1615		3374	1615	239	3471	1346
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	4	0	23	0	279	0	1003	27	465	1593	6
RTOR Reduction (vph)	0	0	0	0	0	250	0	0	18	0	0	2
Lane Group Flow (vph)	0	31	0	0	23	29	0	1003	9	465	1593	4
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Turn Type	Split	NA		Split	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases						3	2		6	6		2
Actuated Green, G (s)		5.6			10.8	10.8		36.0	36.0	57.8	66.2	66.2
Effective Green, g (s)		5.6			10.8	10.8		36.0	36.0	57.8	66.2	66.2
Actuated g/C Ratio		0.05			0.10	0.10		0.34	0.34	0.55	0.63	0.63
Clearance Time (s)		6.4			7.0	7.0		8.4	8.4	8.4	8.4	8.4
Vehicle Extension (s)		1.0			2.0	2.0		1.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)		93			176	167		1163	556	455	2200	853
v/s Ratio Prot		c0.02			0.01			0.30		c0.21	0.46	
v/s Ratio Perm						c0.02			0.01	c0.35		0.00
v/c Ratio		0.33			0.13	0.17		0.86	0.02	1.02	0.72	0.00
Uniform Delay, d1		47.6			42.5	42.7		31.9	22.5	29.4	12.9	7.0
Progression Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8			0.1	0.2		6.6	0.0	47.9	1.0	0.0
Delay (s)		48.4			42.7	42.9		38.5	22.5	77.3	13.9	7.0
Level of Service		D			D	D		D	C	E	B	A
Approach Delay (s)		48.4			42.9			38.0			28.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	30.2
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX G-3

Queue Summary Table

Synchro Capacity Analysis - 95th Percentile Queue Length
2040 No-Build Conditions
US 29 Arterial Preservation Plan

Intersection Number and Description		Type of Control	Lane Group	Northbound			Southbound			Eastbound			Westbound		
				Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)			US 29			US 29			Lawless Creek Road			E Witt Road		
		Signal	Left	185	92	49	150	45	66	-	146	96	-	99	58
			Through	-	112	214	-	248	212						
			Right				140	45	0	385	26	3			
2	US 29 at Malmaison Road			US 29			US 29			Malmaison Road			Malmaison Road		
		Signal	Left	370	6	6	265	71	#135	-	7	22	-	#251	122
			Through	-	222	#478	-	165	185						
			Right	360	11	37				75	0	0	-	13	0
3	US 29 at Tight Squeeze Road/Fairview Road			US 29			US 29			Tight Squeeze Road			Fairview Road		
		Signal	Left	275	#332	#259	295	96	#205	-	#429	#680	-	103	105
			Through	-	263	282	-	300	341						
			Right	335	0	0	1,000	15	14						
4	US 29 at Gladys Road			US 29			US 29			-			Gladys Road		
		Two-Way Stop	Left	95	0	3	120	3	10	-	0	0	-	58	53
			Through	-	†	†	-	-	-						
			Right	105	†	†									
5	US 29 at Colonial Highway			US 29			US 29			Colonial Highway			Colonial Highway		
		Signal	Left	255	23	43	255	59	26	-	#270	112	-	#180	#312
			Through	-	432	278	-	238	400						
			Right	225	16	6	245	0	0	40	0	0			
6	US 29 at Calohan Road			US 29			US 29			-			Calohan Road		
		Signal	Left	120	32	28	550	371	#797	-	0	0	-	139	104
			Through	-	573	392	-	196	352						
			Right	635	30	0							-	#289	95
7	US 29 at English Tavern Road			US 29			US 29			-			English Tavern Road		
		Signal	Left	280	12	0	535	104	#529	-	0	53	-	49	41
			Through	-	#908	#490	-	340	525						
			Right	65	0	0	150	0	0				135	104	80

Notes:

Synchro 95th percentile queue length results reported for signalized intersections.

HCM 2010 95th percentile queue length results, assuming an average vehicle length of 25 feet, reported for unsignalized intersections.

Shared lane results are shown as one value that corresponds to all movements in that lane.

† SYNCHRO does not provide queue length for movements with no conflicting volumes.

95th percentile volume exceeds capacity, queue may be longer.

APPENDIX G-4

Synchro Queue Reports

AM Queue

Queues
1: US 29 & Lawless Creek Road

04/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	95	22	90	17	32	29	1	59	262	7	4	18
Future Volume (vph)	95	22	90	17	32	29	1	59	262	7	4	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		385	0		0		185		0		150
Storage Lanes	0		1	0		0		1		0		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		458			1712				2546			
Travel Time (s)		6.9			25.9				38.6			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	11%	1%	0%	4%	4%	0%	6%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	98	0	85	0	0	65	293	0	0	24
v/c Ratio		0.40	0.24		0.36			0.32	0.20			0.13
Control Delay		41.5	4.9		39.6			47.3	19.0			47.3
Queue Delay		0.0	0.0		0.0			0.0	0.0			0.0
Total Delay		41.5	4.9		39.6			47.3	19.0			47.3
Queue Length 50th (ft)		65	0		36			35	47			13
Queue Length 95th (ft)		146	26		99			92	112			45
Internal Link Dist (ft)		378			1632				2466			
Turn Bay Length (ft)			385					185				150
Base Capacity (vph)		706	754		497			520	1958			451
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		0.18	0.13		0.17			0.13	0.15			0.05

Intersection Summary	
Area Type:	Other

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	548	127
Future Volume (vph)	548	127
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		140
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1476	
Travel Time (s)	22.4	
Peak Hour Factor	0.92	0.92
Heavy Vehicles (%)	2%	11%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	596	138
v/c Ratio	0.49	0.23
Control Delay	27.7	6.2
Queue Delay	0.0	0.0
Total Delay	27.7	6.2
Queue Length 50th (ft)	147	0
Queue Length 95th (ft)	248	45
Internal Link Dist (ft)	1396	
Turn Bay Length (ft)		140
Base Capacity (vph)	1792	804
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.33	0.17

Intersection Summary

Queues
2: US 29 & Malmaison Road

04/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Future Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	370		360	265		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		1460			1586			1379			1830	
Travel Time (s)		39.8			24.0			20.9			27.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	266	123	1	300	138	62	501	0
v/c Ratio		0.01			0.57	0.22	0.01	0.52	0.22	0.23	0.35	
Control Delay		30.5			29.2	2.3	32.0	23.7	1.8	32.0	14.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		30.5			29.2	2.3	32.0	23.7	1.8	32.0	14.8	
Queue Length 50th (ft)		1			87	0	0	97	0	22	52	
Queue Length 95th (ft)		7			#251	13	6	222	11	71	165	
Internal Link Dist (ft)		1380			1506			1299			1750	
Turn Bay Length (ft)							370		360	265		
Base Capacity (vph)		237			570	630	146	839	805	275	1825	
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		0.01			0.47	0.20	0.01	0.36	0.17	0.23	0.27	

Intersection Summary

Area Type: Other

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	155	17	60	27	27	18	2	193	688	26	38	17
Future Volume (vph)	155	17	60	27	27	18	2	193	688	26	38	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		275		335		295
Storage Lanes	0		0	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			35				45			
Link Distance (ft)		530			1421				1189			
Travel Time (s)		8.0			27.7				18.0			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	3%	0%	10%	0%	5%	7%	0%	16%	11%	5%	0%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	263	0	0	82	0	0	221	782	30	0	62
v/c Ratio		1.03			0.36			0.76	0.48	0.04		0.44
Control Delay		109.1			46.2			63.3	20.2	0.1		62.4
Queue Delay		0.0			0.0			0.0	0.0	0.0		0.0
Total Delay		109.1			46.2			63.3	20.2	0.1		62.4
Queue Length 50th (ft)		~199			46			149	198	0		42
Queue Length 95th (ft)		#429			103			#332	263	0		96
Internal Link Dist (ft)		450			1341				1109			
Turn Bay Length (ft)								275		335		295
Base Capacity (vph)		256			433			289	2031	1000		151
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		1.03			0.19			0.76	0.39	0.03		0.41

Intersection Summary

Area Type: Other

~ 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.

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	671	156
Future Volume (vph)	671	156
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		1000
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1191	
Travel Time (s)	18.0	
Peak Hour Factor	0.88	0.88
Heavy Vehicles (%)	11%	8%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	763	177
v/c Ratio	0.64	0.21
Control Delay	30.4	1.7
Queue Delay	0.0	0.0
Total Delay	30.4	1.7
Queue Length 50th (ft)	228	0
Queue Length 95th (ft)	300	15
Internal Link Dist (ft)	1111	
Turn Bay Length (ft)		1000
Base Capacity (vph)	1714	1002
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.45	0.18

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	105	66	43	90	21	12	2	6	1009	127	1	35
Future Volume (vph)	105	66	43	90	21	12	2	6	1009	127	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0		255		225		255
Storage Lanes	0		1	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		759			662				864			
Travel Time (s)		11.5			10.0				13.1			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	6%	0%	8%	18%	20%	50%	40%	8%	8%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	188	47	0	135	0	0	9	1109	140	0	39
v/c Ratio		0.86	0.14		0.67			0.08	0.76	0.18		0.25
Control Delay		79.1	0.8		59.7			47.8	28.2	1.6		48.7
Queue Delay		0.0	0.0		0.0			0.0	0.0	0.0		0.0
Total Delay		79.1	0.8		59.7			47.8	28.2	1.6		48.7
Queue Length 50th (ft)		127	0		86			6	330	0		25
Queue Length 95th (ft)		#270	0		#180			23	432	16		59
Internal Link Dist (ft)		679			582				784			
Turn Bay Length (ft)			40					255		225		255
Base Capacity (vph)		218	343		210			243	1545	792		339
Starvation Cap Reductn		0	0		0			0	0	0		0
Spillback Cap Reductn		0	0		0			0	0	0		0
Storage Cap Reductn		0	0		0			0	0	0		0
Reduced v/c Ratio		0.86	0.14		0.64			0.04	0.72	0.18		0.12

Intersection Summary

Area Type: Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	655	41
Future Volume (vph)	655	41
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		245
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1006	
Travel Time (s)	15.2	
Peak Hour Factor	0.91	0.91
Heavy Vehicles (%)	9%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	720	45
v/c Ratio	0.44	0.05
Control Delay	17.1	0.1
Queue Delay	0.0	0.0
Total Delay	17.1	0.1
Queue Length 50th (ft)	134	0
Queue Length 95th (ft)	238	0
Internal Link Dist (ft)	926	
Turn Bay Length (ft)		245
Base Capacity (vph)	1729	909
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.42	0.05

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	1	83	9	482	5	7	1080	117	2	306
Future Volume (vph)	0	0	1	83	9	482	5	7	1080	117	2	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		120		635		550
Storage Lanes	0		0	0		1		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		25			45				45			
Link Distance (ft)		173			184				1209			
Travel Time (s)		4.7			2.8				18.3			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	9%	0%	7%	0%	0%	7%	3%	0%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	98	513	0	12	1149	124	0	328
v/c Ratio		0.00			0.51	0.89		0.10	0.81	0.17		0.80
Control Delay		0.0			58.4	29.9		60.6	36.2	3.4		57.3
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		0.0			58.4	29.9		60.6	36.2	3.4		57.3
Queue Length 50th (ft)		0			73	76		10	422	0		255
Queue Length 95th (ft)		0			139	#289		32	573	30		371
Internal Link Dist (ft)		93			104				1129			
Turn Bay Length (ft)								120		635		550
Base Capacity (vph)		602			263	634		219	1634	832		563
Starvation Cap Reductn		0			0	0		0	0	0		0
Spillback Cap Reductn		0			0	0		0	0	0		0
Storage Cap Reductn		0			0	0		0	0	0		0
Reduced v/c Ratio		0.00			0.37	0.81		0.05	0.70	0.15		0.58

Intersection Summary

Area Type: Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	693	7
Future Volume (vph)	693	7
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1418	
Travel Time (s)	21.5	
Peak Hour Factor	0.94	0.94
Heavy Vehicles (%)	10%	0%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	744	0
v/c Ratio	0.33	
Control Delay	9.0	
Queue Delay	0.0	
Total Delay	9.0	
Queue Length 50th (ft)	100	
Queue Length 95th (ft)	196	
Internal Link Dist (ft)	1338	
Turn Bay Length (ft)		
Base Capacity (vph)	2432	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.31	

Intersection Summary

Queues
7: US 29 & English Tavern Road

06/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	0	2	31	0	439	9	1436	10	1	117	776
Future Volume (vph)	7	0	2	31	0	439	9	1436	10	1	117	776
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65		535	
Storage Lanes	0		0	0		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		563			795			1192				985
Travel Time (s)		15.4			12.0			18.1				14.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	0%	0%	12%	0%	1%	43%	7%	13%	0%	4%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	34	477	10	1561	11	0	128	843
v/c Ratio		0.03			0.16	0.77	0.03	1.10	0.02		0.41	0.42
Control Delay		0.2			36.9	13.2	8.6	81.2	0.0		18.4	12.9
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		0.2			36.9	13.2	8.6	81.2	0.0		18.4	12.9
Queue Length 50th (ft)		0			16	2	1	~465	0		19	81
Queue Length 95th (ft)		0			49	104	12	#908	0		104	340
Internal Link Dist (ft)		483			715			1112				905
Turn Bay Length (ft)						135	280		65		535	
Base Capacity (vph)		352			427	770	424	1424	697		499	2028
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		0.03			0.08	0.62	0.02	1.10	0.02		0.26	0.42

Intersection Summary

Area Type: Other

~ 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.

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	11
Future Volume (vph)	11
Ideal Flow (vphpl)	1900
Storage Length (ft)	150
Storage Lanes	1
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	11%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	12
v/c Ratio	0.01
Control Delay	0.0
Queue Delay	0.0
Total Delay	0.0
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	150
Base Capacity (vph)	976
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.01

Intersection Summary

PM Queue

Queues
1: US 29 & Lawless Creek Road

04/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	63	16	63	17	11	27	4	26	525	27	6	39
Future Volume (vph)	63	16	63	17	11	27	4	26	525	27	6	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		385	0		0		185		0		150
Storage Lanes	0		1	0		0		1		0		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			
Link Distance (ft)		458			1712				2546			
Travel Time (s)		6.9			25.9				38.6			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	6%	14%	11%	9%	0%	5%	2%	18%	0%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	68	0	59	0	0	32	600	0	0	49
v/c Ratio		0.26	0.18		0.26			0.15	0.37			0.23
Control Delay		35.4	1.3		26.8			40.3	21.6			40.1
Queue Delay		0.0	0.0		0.0			0.0	0.0			0.0
Total Delay		35.4	1.3		26.8			40.3	21.6			40.1
Queue Length 50th (ft)		39	0		15			15	130			24
Queue Length 95th (ft)		96	3		58			49	214			66
Internal Link Dist (ft)		378			1632				2466			
Turn Bay Length (ft)			385					185				150
Base Capacity (vph)		862	807		522			603	2233			478
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		0.10	0.08		0.11			0.05	0.27			0.10

Intersection Summary	
Area Type:	Other

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	555	51
Future Volume (vph)	555	51
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		140
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1477	
Travel Time (s)	22.4	
Peak Hour Factor	0.92	0.92
Heavy Vehicles (%)	2%	5%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	603	55
v/c Ratio	0.37	0.07
Control Delay	21.6	0.2
Queue Delay	0.0	0.0
Total Delay	21.6	0.2
Queue Length 50th (ft)	133	0
Queue Length 95th (ft)	212	0
Internal Link Dist (ft)	1397	
Turn Bay Length (ft)		140
Base Capacity (vph)	2047	947
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.29	0.06

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Future Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		0	370		360		265	
Storage Lanes	0		1	0		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		1460			1588			1379				1830
Travel Time (s)		39.8			24.1			20.9				27.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	4	0	142	77	1	513	187	0	113	557
v/c Ratio		0.06	0.01		0.46	0.18	0.00	0.71	0.25		0.55	0.30
Control Delay		32.9	0.0		33.4	0.9	34.0	30.6	3.8		44.7	13.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		32.9	0.0		33.4	0.9	34.0	30.6	3.8		44.7	13.9
Queue Length 50th (ft)		4	0		50	0	0	165	0		42	45
Queue Length 95th (ft)		22	0		122	0	6	#478	37		#135	185
Internal Link Dist (ft)		1380			1508			1299				1750
Turn Bay Length (ft)			75				370		360		265	
Base Capacity (vph)		257	405		437	537	222	725	748		208	1847
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	0.01		0.32	0.14	0.00	0.71	0.25		0.54	0.30

Intersection Summary	
Area Type:	Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	100%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	237	38	68	28	24	26	7	156	717	17	59	41
Future Volume (vph)	237	38	68	28	24	26	7	156	717	17	59	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		275		335		295
Storage Lanes	0		0	0		0		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			35				45			
Link Distance (ft)		530			1421				1189			
Travel Time (s)		8.0			27.7				18.0			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	3%	9%	9%	0%	0%	0%	15%	14%	7%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	0	0	87	0	0	183	806	19	0	112
v/c Ratio		1.55			0.38			0.71	0.54	0.02		0.73
Control Delay		298.1			45.1			62.0	21.9	0.1		79.2
Queue Delay		0.0			0.0			0.0	0.0	0.0		0.0
Total Delay		298.1			45.1			62.0	21.9	0.1		79.2
Queue Length 50th (ft)		~402			48			125	209	0		80
Queue Length 95th (ft)		#680			105			#259	282	0		#205
Internal Link Dist (ft)		450			1341				1109			
Turn Bay Length (ft)								275		335		295
Base Capacity (vph)		249			428			289	1954	971		154
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		1.55			0.20			0.63	0.41	0.02		0.73

Intersection Summary

Area Type: Other

~ 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.

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	749	120
Future Volume (vph)	749	120
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		1000
Storage Lanes		1
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1192	
Travel Time (s)	18.1	
Peak Hour Factor	0.89	0.89
Heavy Vehicles (%)	8%	7%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	842	135
v/c Ratio	0.64	0.15
Control Delay	29.6	1.6
Queue Delay	0.0	0.0
Total Delay	29.6	1.6
Queue Length 50th (ft)	259	0
Queue Length 95th (ft)	341	14
Internal Link Dist (ft)	1112	
Turn Bay Length (ft)		1000
Base Capacity (vph)	1740	983
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.48	0.14

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	59	29	13	140	48	16	1	23	773	116	10	1019
Future Volume (vph)	59	29	13	140	48	16	1	23	773	116	10	1019
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0		255		225	255	
Storage Lanes	0		1	0		0		1		1	1	
Taper Length (ft)	0			0				0			0	
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		45			45				45			45
Link Distance (ft)		759			662				864			1006
Travel Time (s)		11.5			10.0				13.1			15.2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	9%	6%	0%	15%	0%	0%	11%	3%	25%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	14	0	215	0	0	25	814	122	11	1073
v/c Ratio		0.40	0.04		0.86			0.14	0.50	0.14	0.08	0.67
Control Delay		46.8	0.2		72.7			45.3	17.3	0.8	45.6	22.8
Queue Delay		0.0	0.0		0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		46.8	0.2		72.7			45.3	17.3	0.8	45.6	22.8
Queue Length 50th (ft)		49	0		119			13	154	0	6	223
Queue Length 95th (ft)		112	0		#312			43	278	6	26	400
Internal Link Dist (ft)		679			582				784			926
Turn Bay Length (ft)			40					255		225	255	
Base Capacity (vph)		255	349		250			392	1806	955	317	1785
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		0.36	0.04		0.86			0.06	0.45	0.13	0.03	0.60

Intersection Summary

Area Type: Other

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

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	102
Future Volume (vph)	102
Ideal Flow (vphpl)	1900
Storage Length (ft)	245
Storage Lanes	1
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.95
Heavy Vehicles (%)	5%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	107
v/c Ratio	0.13
Control Delay	0.3
Queue Delay	0.0
Total Delay	0.3
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	245
Base Capacity (vph)	896
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.12

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	4	0	4	66	1	361	5	5	836	78	4	545
Future Volume (vph)	4	0	4	66	1	361	5	5	836	78	4	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		120		635		550
Storage Lanes	0		0	0		1		1		1		1
Taper Length (ft)	0			0				0				0
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		25			45				45			
Link Distance (ft)		173			184				1209			
Travel Time (s)		4.7			2.8				18.3			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	0%	10%	2%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	69	372	0	10	862	80	0	566
v/c Ratio		0.03			0.46	0.72		0.09	0.74	0.12		0.93
Control Delay		0.1			58.7	13.7		57.6	35.8	0.4		60.6
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		0.1			58.7	13.7		57.6	35.8	0.4		60.6
Queue Length 50th (ft)		0			47	0		7	277	0		389
Queue Length 95th (ft)		0			104	95		28	392	0		#797
Internal Link Dist (ft)		93			104				1129			
Turn Bay Length (ft)								120		635		550
Base Capacity (vph)		406			255	613		220	1598	843		610
Starvation Cap Reductn		0			0	0		0	0	0		0
Spillback Cap Reductn		0			0	0		0	0	0		0
Storage Cap Reductn		0			0	0		0	0	0		0
Reduced v/c Ratio		0.02			0.27	0.61		0.05	0.54	0.09		0.93

Intersection Summary

Area Type: Other

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

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1146	0
Future Volume (vph)	1146	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Right Turn on Red		Yes
Link Speed (mph)	45	
Link Distance (ft)	1418	
Travel Time (s)	21.5	
Peak Hour Factor	0.97	0.97
Heavy Vehicles (%)	6%	0%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1181	0
v/c Ratio	0.47	
Control Delay	7.8	
Queue Delay	0.0	
Total Delay	7.8	
Queue Length 50th (ft)	129	
Queue Length 95th (ft)	352	
Internal Link Dist (ft)	1338	
Turn Bay Length (ft)		
Base Capacity (vph)	2569	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.46	

Intersection Summary

Queues
7: US 29 & English Tavern Road

06/01/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	0	22	0	265	0	953	26	442	1513	6
Future Volume (vph)	26	4	0	22	0	265	0	953	26	442	1513	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		135	280		65	535		150
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		563			795			1192			985	
Travel Time (s)		15.4			12.0			18.1			14.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	0%	6%	0%	0%	0%	7%	0%	1%	4%	20%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	23	279	0	1003	27	465	1593	6
v/c Ratio		0.18			0.13	0.66		0.84	0.04	1.00	0.71	0.01
Control Delay		48.5			46.0	13.9		39.4	0.1	71.4	15.2	0.0
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		48.5			46.0	13.9		39.4	0.1	71.4	15.2	0.0
Queue Length 50th (ft)		20			15	0		343	0	~298	385	0
Queue Length 95th (ft)		53			41	80		#490	0	#529	525	0
Internal Link Dist (ft)		483			715			1112			905	
Turn Bay Length (ft)						135			65	535		150
Base Capacity (vph)		235			389	584		1226	691	467	2259	933
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		0.13			0.06	0.48		0.82	0.04	1.00	0.71	0.01

Intersection Summary

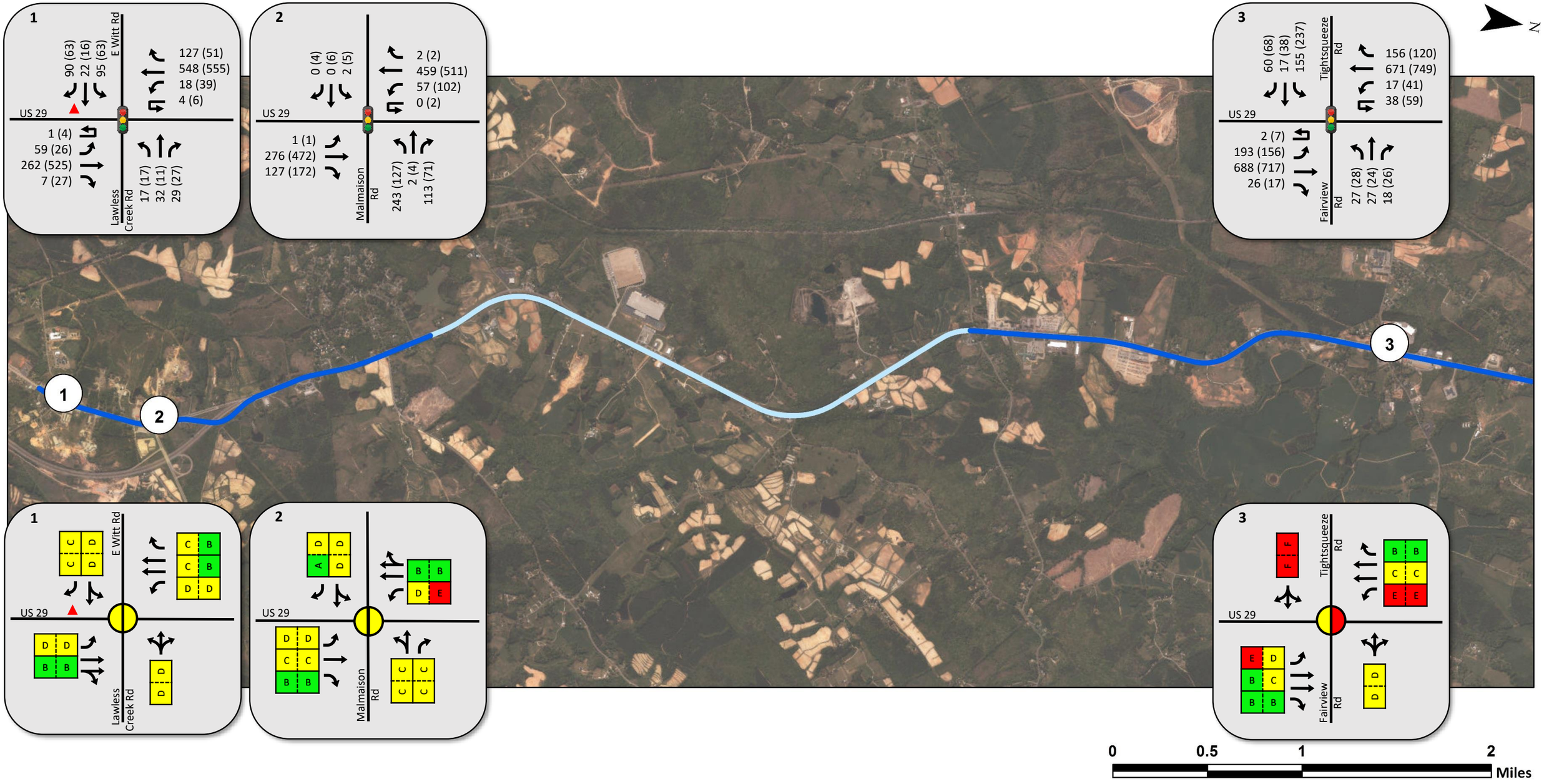
Area Type: Other

~ 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.

APPENDIX G-5

No-Build Volume and Delay Reports



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

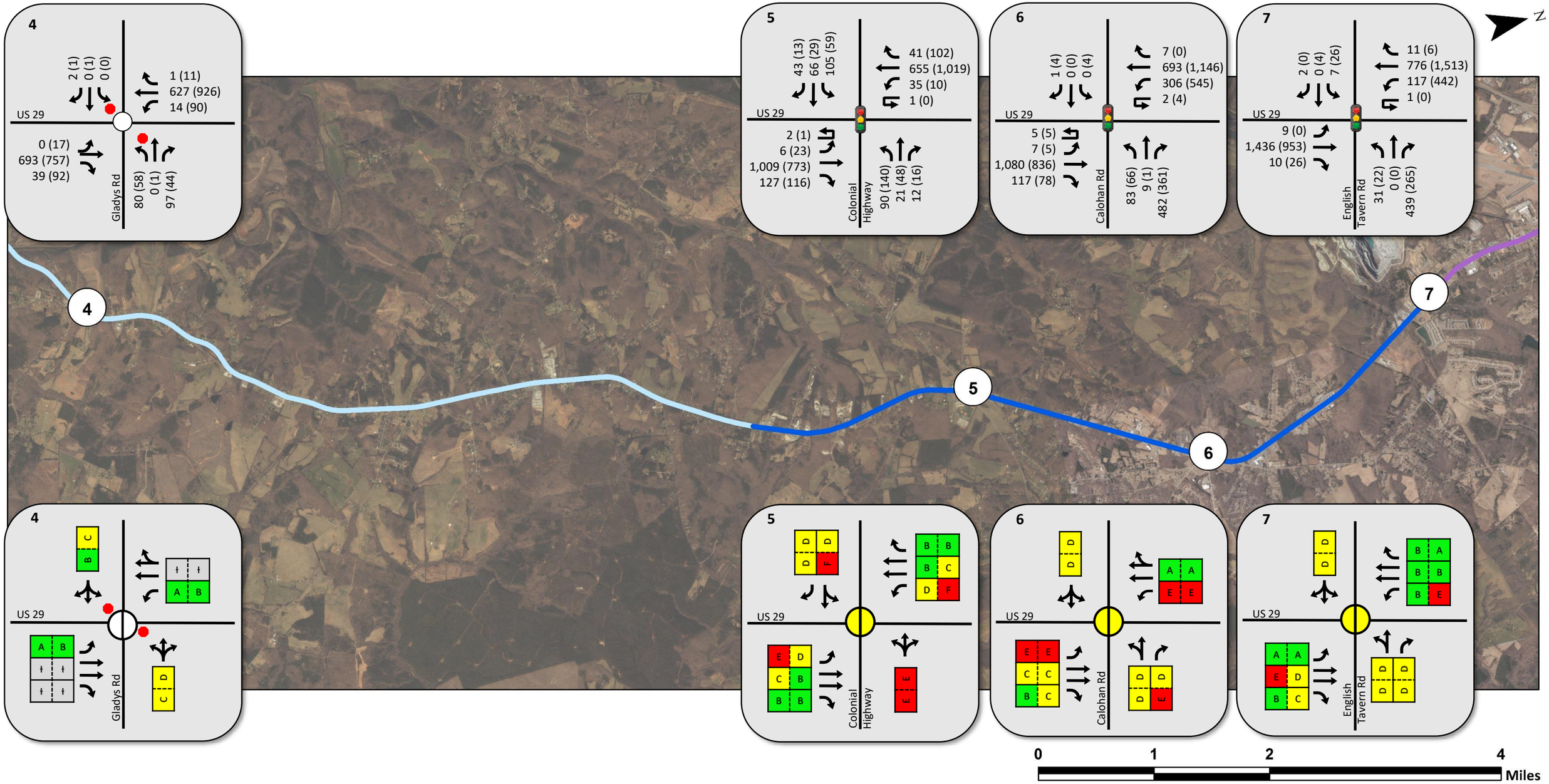
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

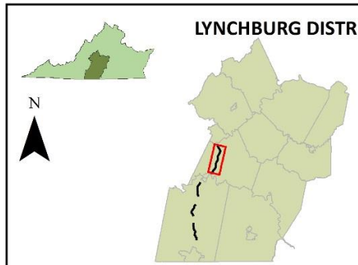
Segment Type:
- Developed
- Emerging
- Stable

US 29 No-Build (2040) Conditions Map
Page 1 of 2

VDOT ARTERIALO PRESERVATION PROGRAM



LYNCHBURG DISTRICT



Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 No-Build (2040) Conditions Map

VDOT ARTERIAL PRESERVATION PROGRAM

APPENDIX H

Alternatives Workshop

APPENDIX H-1

Presentation

ARTERIAL PRESERVATION PROGRAM

US 29 Arterial Preservation Plan

Existing Conditions and Alternatives Development Workshop

Monday, April 16, 2018

12:30 PM – 3:00 PM

VDOT Virginia Department of Transportation

Introductions

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

Meeting Agenda

- Arterial Preservation Program
- Existing Conditions
- VTrans, Park & Ride, and Systemic Improvements
- Emerging Intersection Alternatives
- Access Management
- Next Steps

3

US 29 Corridor

Arterial Preservation Program

4

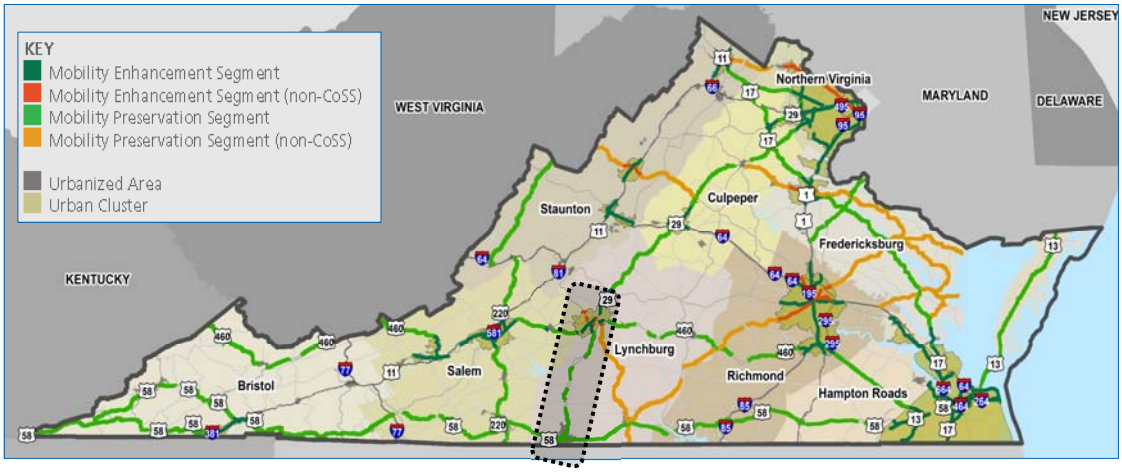
Program Goals

To preserve and enhance the capacity of the Arterial Preservation Network while ensuring that:

- Mainline through traffic is served with priority
- Future land use and economic development is supported
- Access points and traffic control do not degrade travel speed and safety
- Safety is improved

5

Arterial Preservation Network



6

Study Corridor

Emerging Intersection Criteria

- Signalized Intersections
- Potential for Safety Improvement (PSI) Intersections
- Junction of two primary routes
- Minor street ADT ≥ 10% of major street ADT
- Crashes
- Intersections that will experience heavy increased in traffic due to future development
- Park & Ride investment strategy intersection
- District input

US 29 Corridor: Emerging Intersections

Implementation Strategies

- Integrate program priorities with local economic development goals
- Improve access management
- Educate communities on the benefits of improved mobility
- Inspire comprehensive, transportation and zoning planning efforts
- Eliminate unjustified traffic signals
- Implement innovative intersection configurations

US 29 Corridor

Existing Conditions

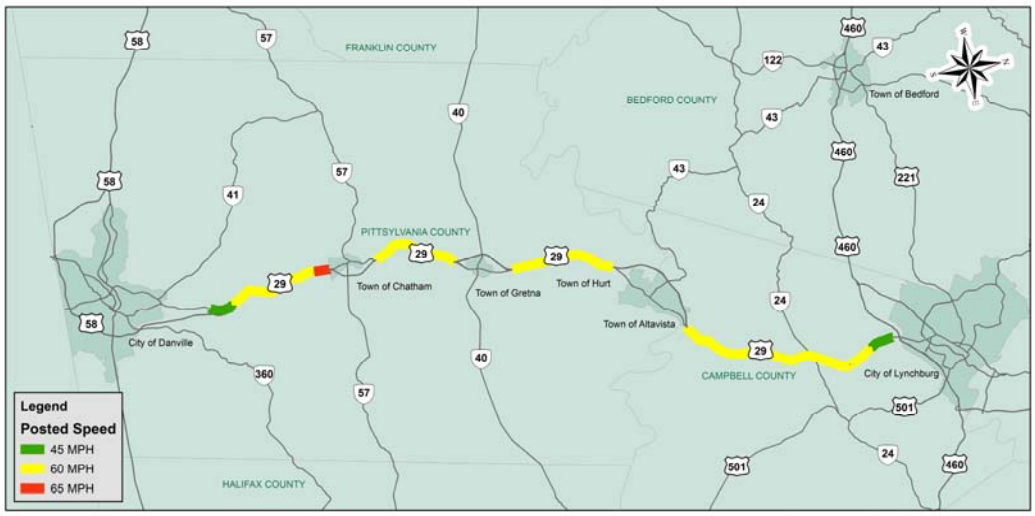
11

Field Review

- Review roadway and intersection configurations
- Document safety-related issues
  - Sight distance constraints
  - Roadside features
- Observe traffic operations
  - Signal phasing and splits
  - Unusual driver patterns
  - Queuing

12

US 29 Corridor: Posted Speed Limit



Source: 2016 VDOT Statewide Planning System

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

13

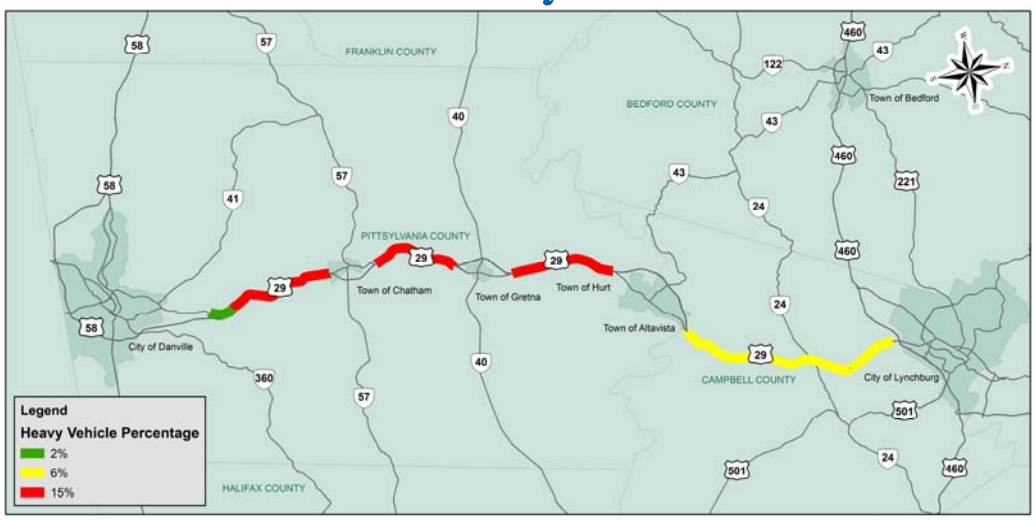
US 29 Corridor: Traffic Volumes

Source: 2016 VDOT Statewide Planning System

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

14

US 29 Corridor: Heavy Vehicles



Source: 2016 VDOT Statewide Planning System

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

15

US 29 Corridor: V/C Ratio

Source: 2016 VDOT Statewide Planning System

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

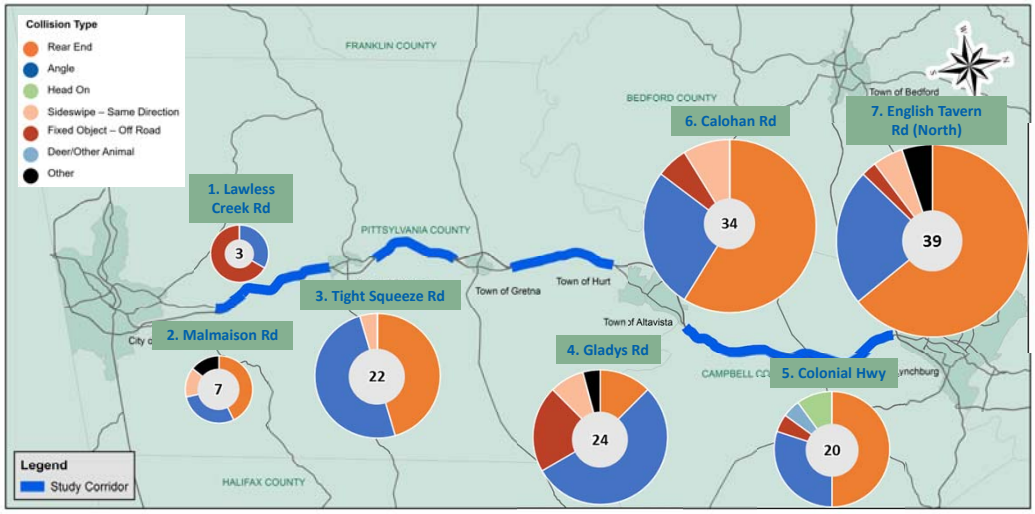
16

Targeted Safety Need (TSN)

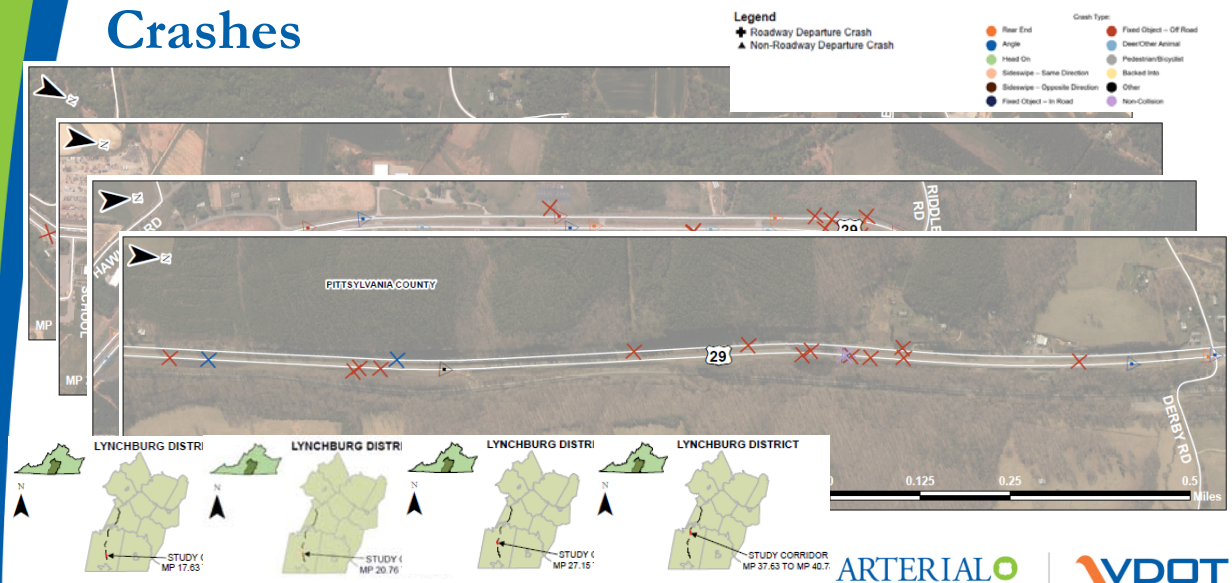
- TSN - Locations where the actual number of crashes is greater than expected for 3 or more years (2012 – 2016 analysis period)
  - Intersection:
    - US 29 at Route 699 (Gladys Road)
      - Emerging intersection
  - Segments:
    - Four segments near Lynchburg City Limits
      - Studied under SHRP2 Route 29 Corridor Assessment (2016)

Note: There were no VDOT Pedestrian Safety Action Plan Locations identified within the study area.

US 29 Corridor: Intersection Crashes



US 29 Corridor: Roadway Departure Crashes



Corridor Observations

- Absence of rumble strips and rumble stripes

Corridor Observations

- Taper-only or narrow turn lanes

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

21

Corridor Observations

- Diverse mix of heavy vehicle classifications, may necessitate loons for u-turn movements

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

22

Corridor Observations

- Three schools located adjacent to the corridor, may necessitate loons for u-turn movements

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

23

Corridor Observations

- Bifurcated roadway alignment present challenges to sight distance and opportunities to implement innovative intersection configurations

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

24

US 29 Corridor

VTrans, Park & Ride, and Systemic Improvements

VTrans VMTP 2025 Tier 1 Recommendations

- LY6:
  - Construct regional bikeway that parallels US 29 corridor, multi-jurisdictional
- LY9:
  - Construct new Park & Ride lot along US 29, Pittsylvania County
- LY11:
  - Improve safety of intersection of US 29 & Gladys Road (VA 699), Campbell County
- LY19:
  - US 29 (Wards Road) SHRP blended solution improvements, Campbell County
- LY24:
  - US 29 access management studies, multi-jurisdictional

Park & Ride Locations

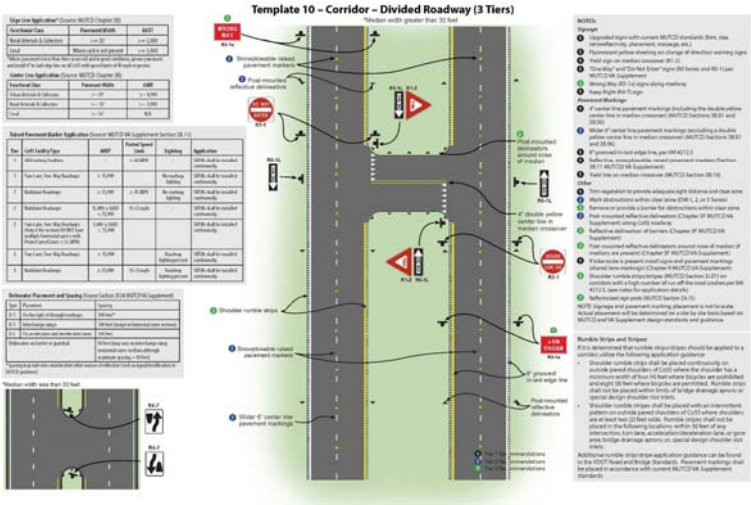
Source: VDOT Park & Ride Program Investment Strategy

Park & Ride Locations

ID	Site	Jurisdiction	Description
A	LYN-2	Pittsylvania County	New lot near US 29 and US 29 BUS (Main St), near Sycamore Creek
B	LYN-3	Pittsylvania County	New lot near US 29 & Route 40 (W Gretna Rd)
C	LYN-4	Pittsylvania County	New 25-space lot along US 29 near Route 703 (Tightsqueeze Rd)
D	LYN-13	Town of Altavista	Obtain an agreement to use spaces at the Shopping Center along US 29 BUS near 7th St
E	LYN-15	Pittsylvania County	New lot near US 29 BUS & Route 726 (Malmaison Rd)
F	LYN-16	Pittsylvania County	New lot near US 29 & S Main St, near Route 1443
G	LYN-17	Pittsylvania County	New lot near US 29 & Route 40 (W Gretna Rd), near Gretna High School
H	LYN-18	Pittsylvania County	New lot on Route 935 (Farmers Mountain Rd), near Route 40 (W Gretna Rd)
I	LYN-19	Pittsylvania County	New lot near US 29 & Route 924 (Pocket Rd)
J	LYN-1A	Town of Altavista	Town and Country Shopping Center, Altavista
K*	LYN-1O	Pittsylvania County	Along US 29 in the Chatham, Gretna, and Hurt areas of Pittsylvania County

Source: VDOT Park & Ride Program Investment Strategy
* VTrans Recommendation

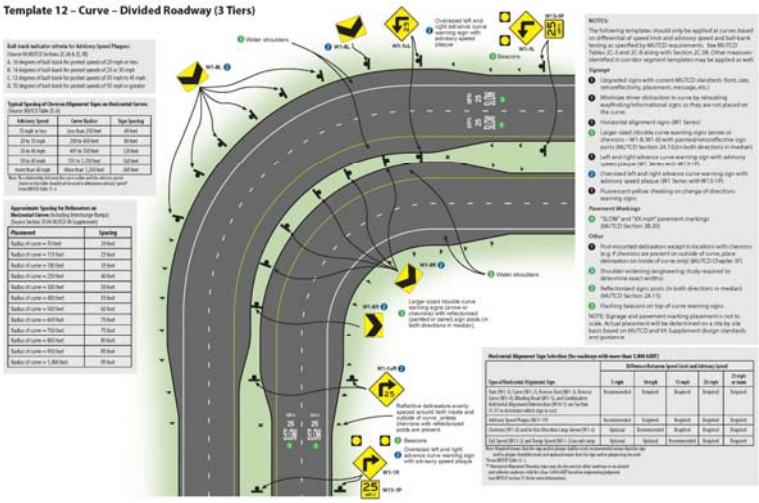
Systemic Improvements – Segments



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

29

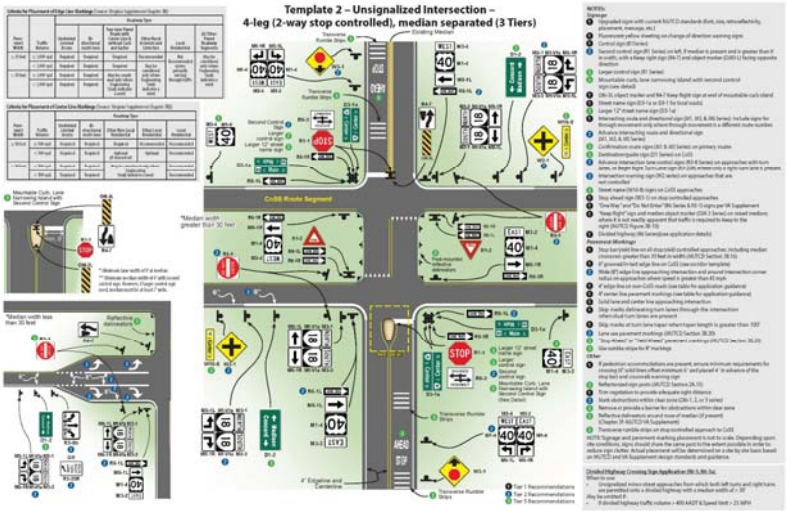
Systemic Improvements – Curves



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

30

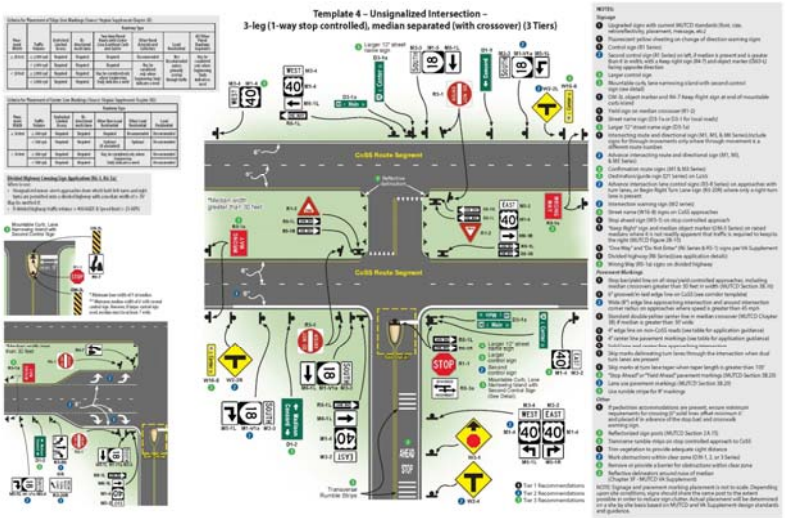
Systemic Improvements – 4-Leg Stop



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

31

Systemic Improvements – 3-Leg Stop



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

32

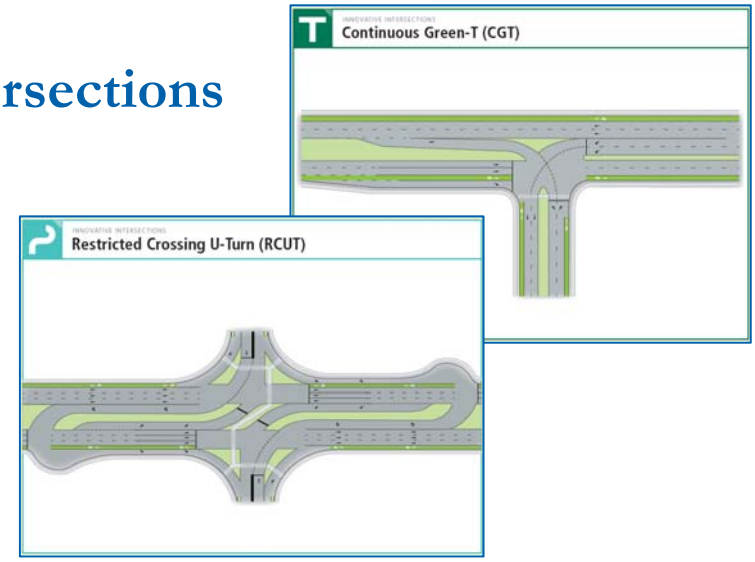
US 29 Corridor

Emerging Intersection Alternatives

33

Innovative Intersections

- Designs where traffic movements are modified to:
  - Improve safety
  - Reduce delay
  - Increase efficiency
- Can reduce delays and crashes as much as 50%
- Also known as:
  - Alternative
  - Non-traditional
  - Unconventional
  - Reduced Conflict



www.virginiadot.org/innovativeintersections/

34

Intersection Traffic Operations and Safety Analysis

- Traffic Operations
  - Analysis Tool
    - Synchro 9
  - Analysis Scenarios
    - 2018 Existing AM and PM peak hour
    - 2040 No-Build AM and PM peak hour
- Measures of Effectiveness (MOEs)
  - 95th percentile queue length (feet)
  - Control delay (seconds per vehicle)
- Safety Analysis
  - 5 year crash history (2012 – 2016)
  - VDOT Targeted Safety Need (TSN) Locations
  - VDOT Pedestrian Safety Action Plan Locations

LOS Thresholds (sec/veh)

LOS	Signalized	Unsignalized
A	0 – 10	0 – 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

35

US 29 Corridor: Growth Rate

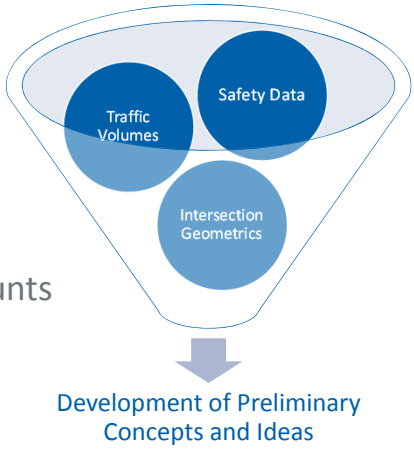
Source: 2016 VDOT Statewide Planning System

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

36

Intersection Alternatives Development

- Previous studies
  - Blairs Access Management Plan (2010)
  - Blairs Fire Station and Route 29 Study (2014)
  - Tightsqueeze Access Management Plan (2010)
  - SHRP2 Route 29 Corridor Assessment (2016)
- 2040 PM peak hour turning movement counts
- Existing crash patterns
- Intersection geometrics
- Focused on emerging intersections



ARTERIAL PRESERVATION PROGRAM | VDOT

US 29 Corridor: Emerging Intersections

ARTERIAL PRESERVATION PROGRAM | VDOT

8-Hour Signal Warrant Analysis

Intersection	Warrant Met?
1 Lawless Creek Road (signalized)	No
2 Malmaison Road (signalized)	Yes
3 Tightsqueeze Road (signalized)	Yes
4 Gladys Road (unsignalized)	Yes
5 Colonial Highway (signalized)	Yes
6 Calohan Road (signalized)	Yes
7 English Tavern Road – North (signalized)	Yes

1 US 29 BUS at Lawless Creek Rd/E Witt Rd

Safety

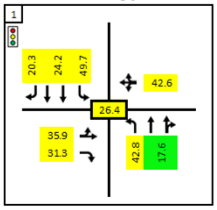
- 3 crashes from 2012 – 2016
  - 2 fixed object off road crashes
  - 1 angle crash

8-Hour Signal Warrant Met?

- No

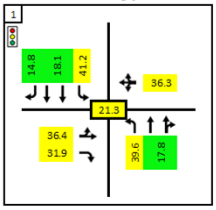
Traffic Operations

AM Peak



7:30 AM – 8:30 AM

PM Peak



3:00 PM – 4:00 PM

1 US 29 BUS at Lawless Creek Rd/E Witt Rd

Alternatives considered

1. Signalized EB right turn lane
2. Two-way stop control
3. Unsignalized RCUT
4. Roundabout

This Photo by Unknown Author is licensed under CC BY-SA

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

41

1 Lawless Creek Rd/E Witt Rd – Option 1 of 4

Signalized EB right turn lane (signal timings optimized)

Primarily a safety improvement

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INTERSECTION

		B	B				
C	C			C	C	D	D
		B	B				

EB = +0.6s delay
INT = -5.2s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

42

1 Lawless Creek Rd/E Witt Rd – Option 2 of 4

Two-way stop control

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INTERSECTION

		B	†				
C	D	C	-	D	D		
		B	†				

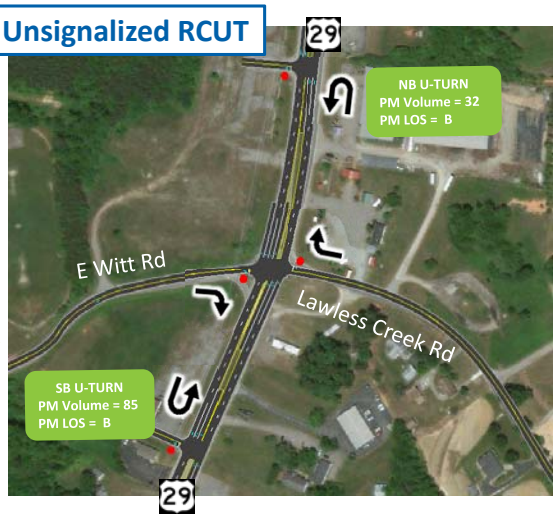
† Delay for movements with no conflicts have not been included.

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

43

1 Lawless Creek Rd/E Witt Rd – Option 3 of 4

Unsignalized RCUT



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INTERSECTION

		B	†				
C	B	C	-	D	B		
		B	†				

† Delay for movements with no conflicts have not been included.

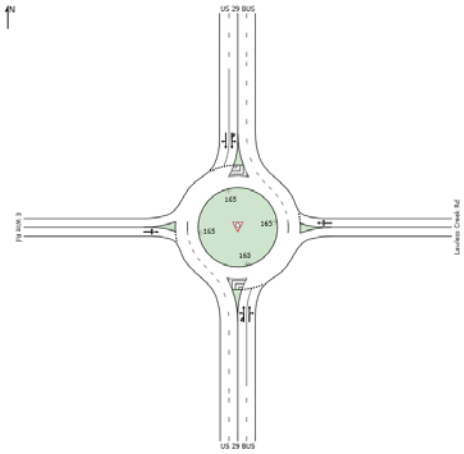
ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

44

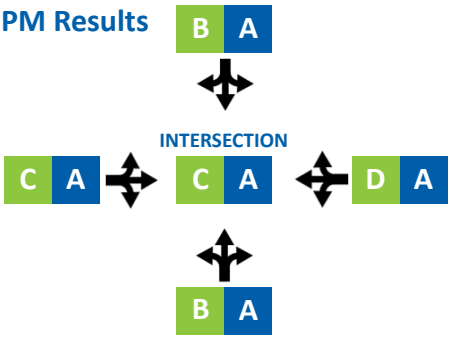
1 Lawless Creek Rd/E Witt Rd – Option 4 of 4

Roundabout
Near business district, 45 mph

Legend
LOS No-Build LOS
LOS Build LOS



PM Results



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

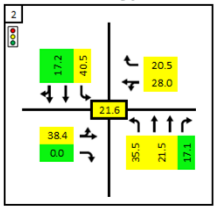
45

2 US 29 BUS at Malmaison Rd

Safety
- 7 crashes from 2012 – 2016
  - 3 rear-end crashes
  - 2 angle crashes
  - 1 serious injury crash
  - 1 crash involving alcohol

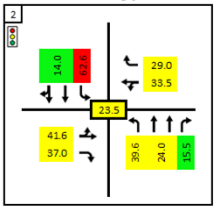
Traffic Operations

AM Peak



7:15 AM – 8:15 AM

PM Peak



3:30 PM – 4:30 PM

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

46

2 US 29 BUS at Malmaison Rd

Recommendations from previous studies

- VDOT's Park & Ride Investment Strategy Report
  - Construct a new 30 space park & ride lot
- Blairs Access Management Plan (2010)
  - Construct a reverse frontage road from Malmaison Rd to the Arc Dr (North)

Alternatives considered

1. Additional WB left turn lane
2. RCUT
3. Hybrid roundabout

Park & Ride

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

47

2 Malmaison Rd – Option 1 of 3

Legend

LOS	No-Build LOS
LOS	Build LOS

Additional WB left turn lane (signal timings optimized)

PM Results

C B

INTERSECTION

D D | C B | C D

C B

WB = +3.5s delay
INT = -3.5s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

48

2 Malmaison Rd – Option 1 of 3

Additional WB left turn lane (signal timings optimized) + NB right turn overlap

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C B		
		INTERSECTION		
D D		C B		C C
		C B		

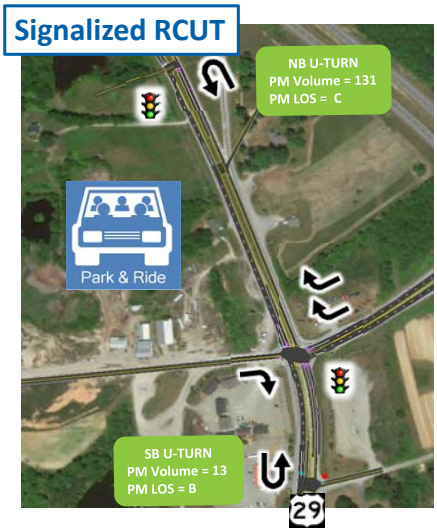
WB = +0.5s delay
INT = -3.1s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

49

2 Malmaison Rd – Option 2 of 3

Signalized RCUT



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

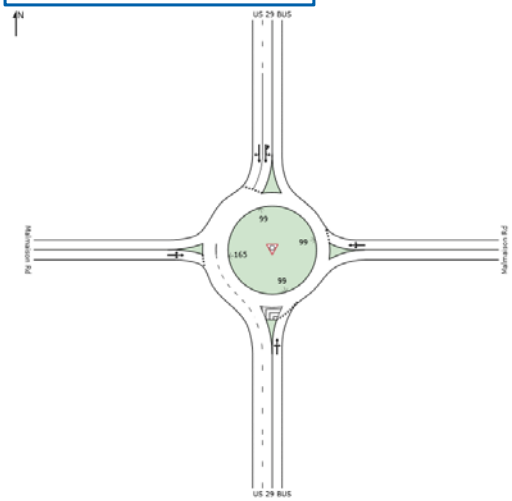
		C A		
		INTERSECTION		
D D		C A		C C
		C A		

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

50

2 Malmaison Rd – Option 3 of 3

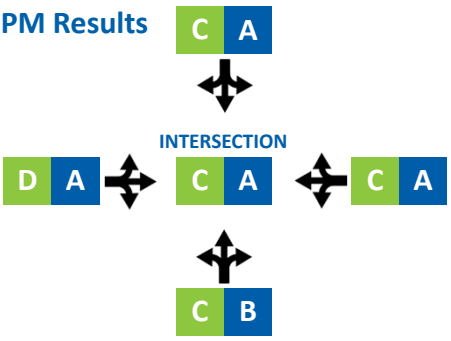
Hybrid Roundabout



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

51

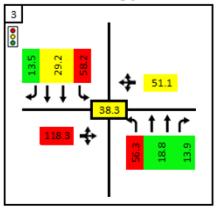
3 US 29 at Fairview Rd/Tightsqueeze Rd

Safety

- 22 crashes from 2012 – 2016
  - 50% rear-end crashes
  - 45% angle crashes
  - 1 serious injury crash
  - 1 crash involving alcohol

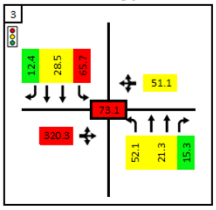
Traffic Operations

AM Peak



7:30 AM – 8:30 AM

PM Peak



3:15 PM – 4:15 PM

Threshold
- LOS A/B
- LOS C/D
- LOS E/F

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

52

3 US 29 at Fairview Rd/Tightsqueeze Rd

Recommendations from previous studies

- VDOT's Park & Ride Investment Strategy Report
  - Construct a new 25 space park & ride lot (~2.5 miles west of intersection)
- Tightsqueeze Access Management Plan
  - Install a median and exclusive right turn lane on Tightsqueeze Road
  - US 29 SB: Extend shoulder to truncate continuous right turn lane at median opening and the shopping mall's right-in/right-out access point
- VDOT Southwestern Region Work Order
  - US 29 SB: Right turn overlap with green on Tightsqueeze Road (Implemented)

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

53

3 US 29 at Fairview Rd/Tightsqueeze Rd

Alternatives considered

1. Additional EB left turn lane
2. Additional NB left turn lane
3. Additional EB left + NB left turn lanes
4. Signalized partial MUT
5. Signalized RCUT

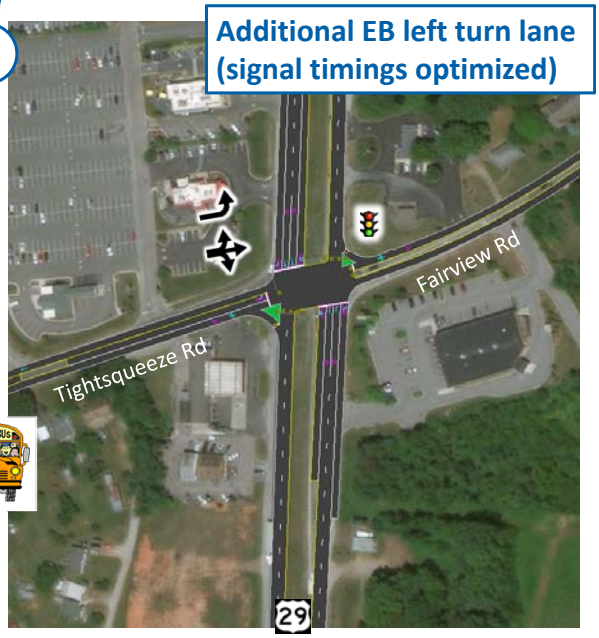
ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

54

Tightsqueeze Rd – Option 1 of 5

3

Additional EB left turn lane (signal timings optimized)



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INTERSECTION

		C	C				
F	D	E	C	D	E		
		C	C				

EB = -272.2s delay
INT = -38.1s delay

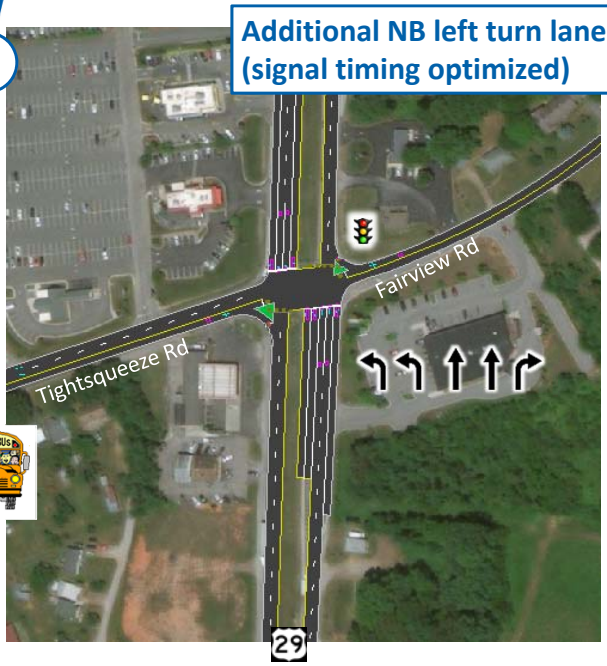
ARTERIALO PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

55

Tightsqueeze Rd – Option 2 of 5

3

Additional NB left turn lane (signal timing optimized)



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INT = -33.5s delay

INTERSECTION

		C	C				
F	D	E	D	D	E		
		C	D				

EB = -270.8s delay

NB = +12.5s delay

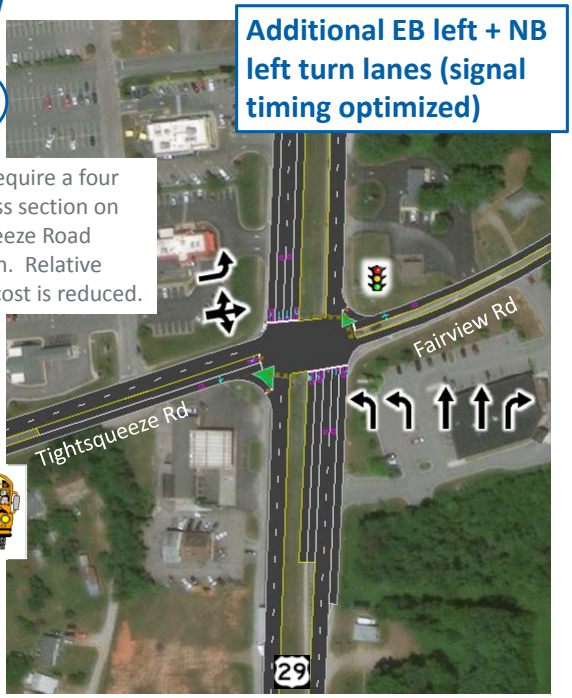
ARTERIALO PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

56

3

Additional EB left + NB left turn lanes (signal timing optimized)

Would require a four lane cross section on Tighsqueeze Road approach. Relative benefit cost is reduced.



Tightsqueeze Rd – Option 3 of 5

Legend
LOS No-Build LOS
LOS Build LOS

PM Results

INT = -40.0s delay

INTERSECTION

	C C	
F D	E C	D D
	C C	

EB = -275.8s delay

NB = +5.7s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

57

3

Northbound Partial MUT

Tight Squeeze Rd – Option 4 of 5

Legend
LOS No-Build LOS
LOS Build LOS

PM Results

INTERSECTION

	C B	
F D	E C	D C
	C B	

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

58

3

Tight Squeeze Rd – Option 5 of 5

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INTERSECTION

	C A	
F C	E A	D C
	C A	

ARTERIALO PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

59

4

US 29 at Gladys Rd

Safety

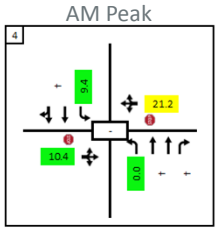
- TSN, PSI #20
- 24 crashes from 2012 – 2016
  - 54% angle crashes
  - 21% fixed object off road crashes
  - 1 fatal crash
  - 2 crashes involving alcohol

Traffic Operations

† Delay for movements with no conflicts have not been included.

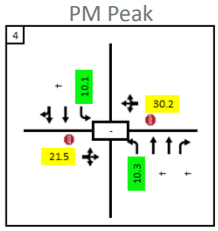
Threshold
- LOS A/B
- LOS C/D
- LOS E/F

AM Peak



7:15 AM – 8:15 AM

PM Peak



4:45 PM – 5:45 PM

ARTERIALO PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

60

4 US 29 at Gladys Rd

Recommendations from previous studies

- HSIP Application
  - Install dynamic flashers on US 29 NB and SB
- Campbell County's Comprehensive Plan
  - Mid-term: Consider signalizing the intersection
  - Long-term: Reroute truck traffic away from Gladys Road
- VTrans VMTP 2025
  - Improve intersection function & mitigate horizontal sight distance issues
  - Clear sight triangles, install acceleration lanes and/or possible R-CUT solution

4 US 29 at Gladys Rd

Alternatives considered

1. Continuous green-T
2. Unsignalized RCUT

Gladys Rd – Option 1 of 2

4

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	-			
			INTERSECTION			
29	†	B	-	A	†	A	29
		D	C			

† Delay for movements with no conflicts have not been included.

Continuous green-T

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

63

Gladys Rd – Option 1 of 2

4

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	-			
			INTERSECTION			
29	†	B	-	A	†	A	29
		D	C			

† Delay for movements with no conflicts have not been included.

Continuous green-T with WB right turn lane

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

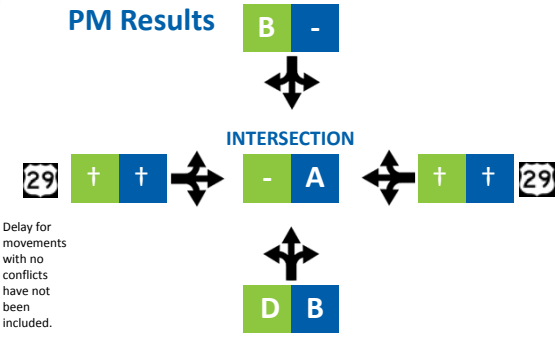
64

4 Gladys Rd – Option 2 of 2

Legend

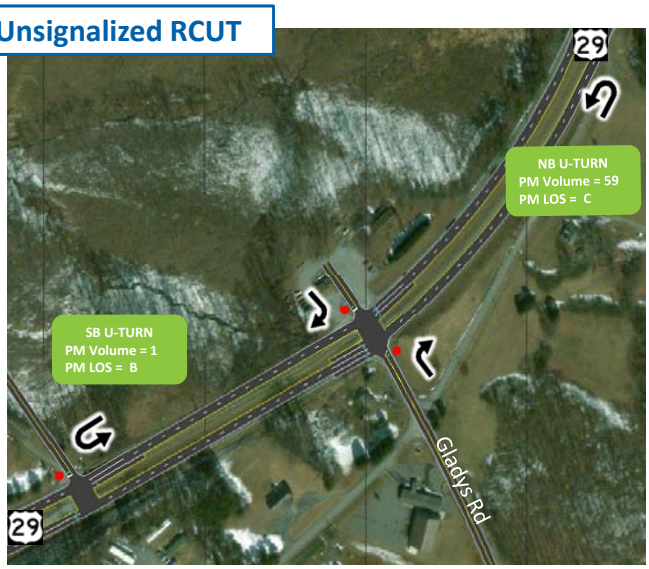
LOS	No-Build LOS
LOS	Build LOS

PM Results



† Delay for movements with no conflicts have not been included.

Unsignalized RCUT



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

4 US 29 at Gladys Rd

Other potential recommendations

- Increase length of northbound right turn lane (50' short of current standards)

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

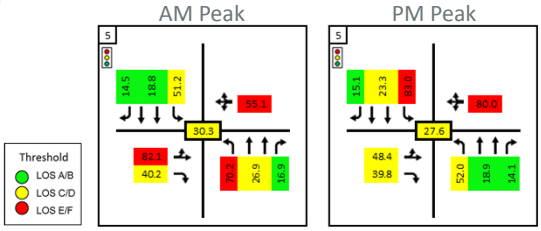
5 US 29 at Colonial Highway

Safety

- 20 crashes from 2012 – 2016
  - 50% rear-end crashes
  - 30% angle crashes
  - 2 serious injury crashes
  - 4 crashes involving alcohol

Traffic Operations

AM Peak



7:15 AM – 8:15 AM

PM Peak

4:30 PM – 5:30 PM

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

67

5 US 29 at Colonial Highway

Recommendations from previous studies

- High Risk Rural Roads Study
  - Modify clearance intervals for all approaches

Alternatives considered

1. EB left + WB left turn lanes with permissive phasing
2. Bowtie
3. Partial MUT
4. Signalized RCUT

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

68

5 Colonial Highway – Option 1 of 4

EB left + WB left turn lanes with permissive phasing

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

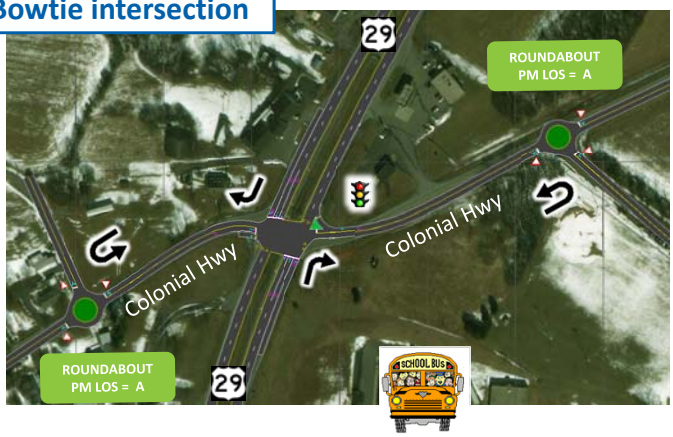
INT = -6.4s delay

		C	C		
D	D	C	C	E	C
		B	B		

INTERSECTION

5 Colonial Highway – Option 2 of 4

Bowtie intersection



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	B		
D	B	C	B	E	C
		B	B		

INTERSECTION

5 Colonial Highway – Option 3 of 4

Northbound Partial MUT

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INT = -6.2s delay

		C	C			
D	C	C	C	E	D	
		B	B			

INTERSECTION

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

71

5 Colonial Highway – Option 4 of 4

Signalized RCUT

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	A			
D	C	C	A	E	C	
		B	A			

INTERSECTION

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

72

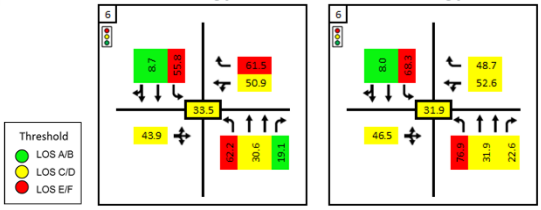
6 US 29 at Calohan Rd

Safety

- PSI #47
- 34 crashes from 2012 – 2016
  - 59% rear-end crashes
  - 26% angle crashes
  - 2 serious injury crashes
  - 1 crash involving alcohol

Traffic Operations

AM Peak



7:15 AM – 8:15 AM

PM Peak

4:30 PM – 5:30 PM

6 US 29 at Calohan Rd

Recommendations from previous studies

- SHRP2 Route 29 Corridor Assessment
  - Extend northbound left turn lane
  - Install flashing yellow (protected/permissive phasing)

Alternatives considered

1. Additional WB right lane
2. Additional SB left lane
3. Additional WB right + SB left lanes
4. Continuous green-T
5. 3-legged RCUT

6 Calohan Road– Option 1 of 5

Additional WB right lane (signal timings optimized)

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	C			
D	D	C	C	D	D	
		C	C			

INTERSECTION

WB = -1.0s delay
INT = -2.3s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

75

6 Calohan Road– Option 2 of 5

Additional SB left lane (signal timings optimized)

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

SB = -9.2s delay
INT = -9.1s delay

		C	B			
D	D	C	C	D	D	
		C	C			

INTERSECTION

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

76

6 Calohan Road– Option 3 of 5

Additional WB right and SB left turn lanes (signal timings optimized)

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

INT = -5.6s delay

	C / C	
	SB = -6.0s delay	
INTERSECTION		
D / D	C / C	D / D
	WB = -6.0s delay	
	C / C	

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

77

6 Calohan Road– Option 4 of 5

Continuous green-T

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

	C / B	
INTERSECTION		
D / -	C / B	D / B
	C / C	

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

78

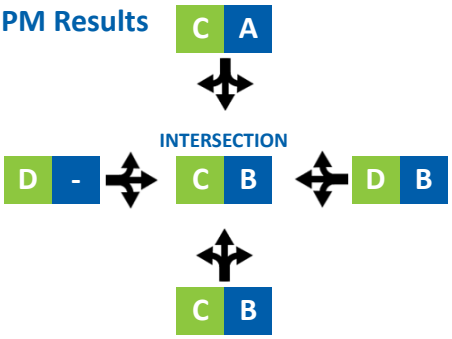
6 Calohan Road– Option 5 of 5

3-legged RCUT

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results



ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

79

6 US 29 at Calohan Road

Other recommendations

- Add signal heads for west leg
- Add Do Not Block Intersection markings at Calohan Road and Route 674

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

80

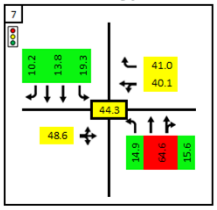
7 US 29 at English Tavern Rd (North)

Safety

- 39 crashes from 2012 – 2016
  - 64% rear-end crashes
  - 23% angle crashes
  - 1 serious injury crash

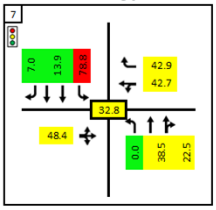
Traffic Operations

AM Peak



7:15 AM – 8:15 AM

PM Peak



4:45 PM – 5:45 PM

Threshold
- LOS A/B
- LOS C/D
- LOS E/F

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

81

7 US 29 at English Tavern Rd (North)

Recommendations from previous studies

- Central Virginia MPO LRTP
- STARS I Wards Road (Route 29)
  - Short term
    - Add street names to all mast arms
    - Check coordination and clearance intervals
    - Move westbound stop bar forward by 5 feet
    - Install stay right of median signs
    - Install deer crossing sign
  - Intermediate
    - Install pork chop island between the northbound through and right lanes
- Route 29 Corridor Study (SHRP 2)
  - Extend northbound and southbound right turn lanes

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

82

7 US 29 at English Tavern Rd (North)

Alternatives considered

1. Additional WB right lane
2. Additional SB left lane
3. Additional WB right + SB left lanes
4. RCUT

83

7 English Tavern Rd (North) – Option 1 of 4

Additional WB right turn lane

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

C C

INTERSECTION

D D | C C | D D

D D

WB = -0.2s delay
INT = -0.9s delay

84

7 English Tavern Rd (North) – Option 1 of 4

Additional WB right turn lane (signal timings optimized)

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

	C	B				
			INTERSECTION			
D	D		C	C		D	D
			D	D		

WB = +2.4s delay
INT = -2.1s delay

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

85

7 English Tavern Rd (North) – Option 2 of 4

Additional SB left turn lane (signal timings optimized)

Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

SB = -7.7s delay
INT = -5.5s delay

	C	C				
			INTERSECTION			
D	D		C	C		D	D
			D	C		

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

86

7 English Tavern Rd (North) – Option 3 of 4

Additional WB right and SB left turn lanes

Legend
LOS No-Build LOS
LOS Build LOS

PM Results
INT = -6.4s delay

C C
SB = -7.5s delay

INTERSECTION

D D C C D D
WB = -2.7s delay

D C

ARTERIAL PRESERVATION PROGRAM | VDOT

87

7 English Tavern Rd (North) – Option 3 of 4

Additional WB right and SB left turn lanes (signal timings optimized)

Legend
LOS No-Build LOS
LOS Build LOS

PM Results
INT = -5.6s delay

C C
SB = -7.9s delay

INTERSECTION

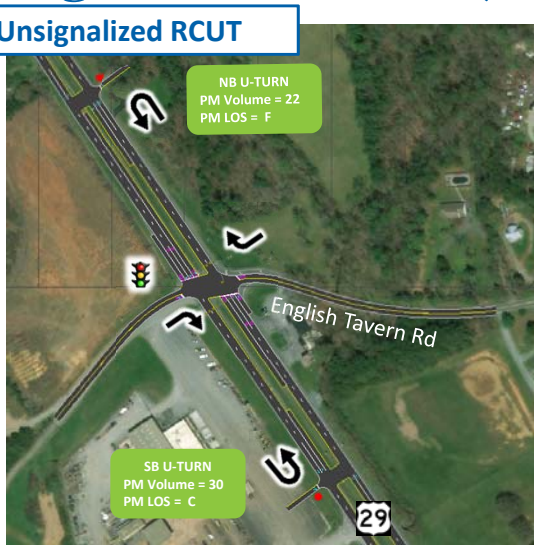
D D C C D D
WB = -3.9s delay

D D

ARTERIAL PRESERVATION PROGRAM | VDOT

7 English Tavern Rd (North) – Option 4 of 4

Unsignalized RCUT



Legend

LOS	No-Build LOS
LOS	Build LOS

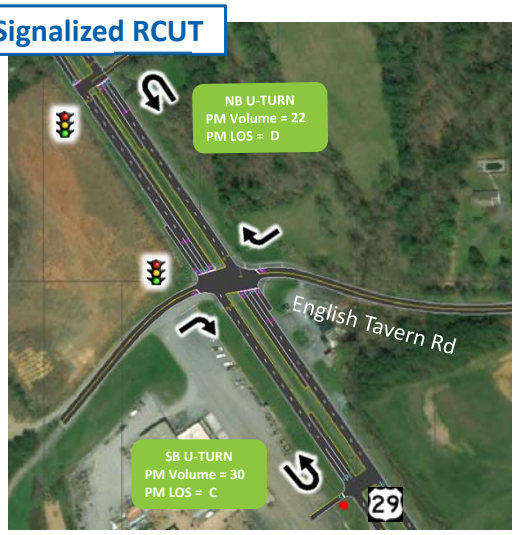
PM Results

		C	A			
			INTERSECTION			
D	C	C	B	D	B	
		D	B			

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

7 English Tavern Rd (North) – Option 4 of 4

Signalized RCUT



Legend

LOS	No-Build LOS
LOS	Build LOS

PM Results

		C	B			
			INTERSECTION			
D	C	C	B	D	B	
		D	B			

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

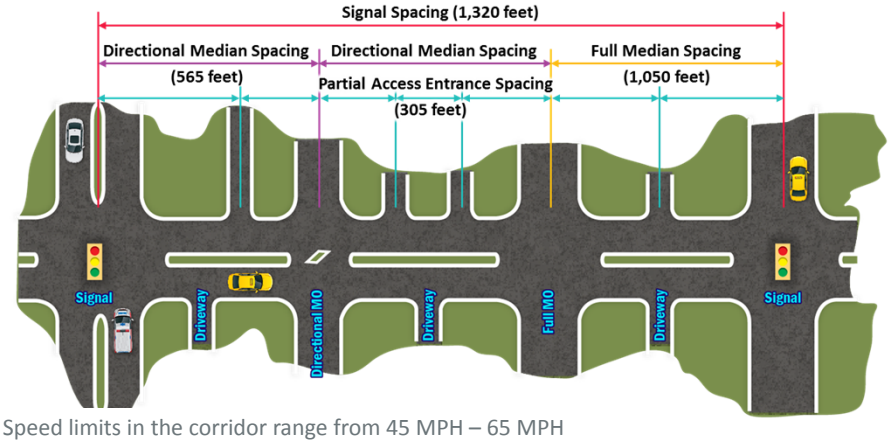
Arterial Preservation Program

Access Management

91

Access Management Guidelines

VDOT Spacing Standards (*35-45 MPH Principal Arterial*)

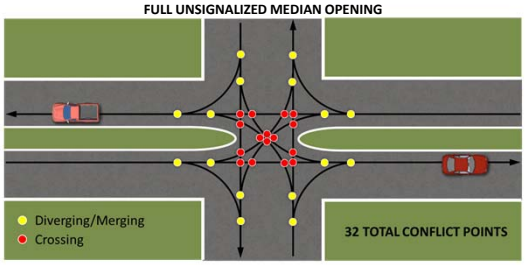


- Speed limits in the corridor range from 45 MPH – 65 MPH
- VDOT Road Design Manual Appendix F spacing standards applied to develop access management recommendations

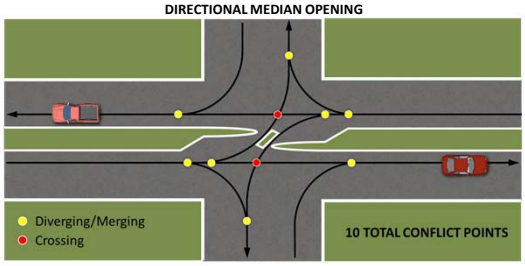
92

Conflict Points

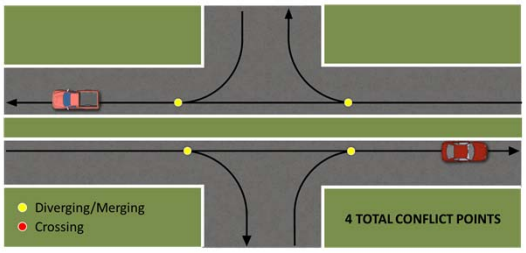
FULL UNSIGNALIZED MEDIAN OPENING



DIRECTIONAL MEDIAN OPENING



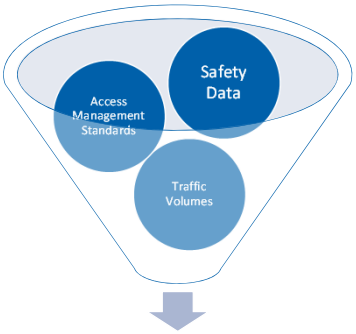
RIGHT-IN/RIGHT-OUT DRIVEWAY



93

Recommendation Considerations

- Previous studies
  - Blairs Access Management Plan (2010)
  - Blairs Fire Station and Route 29 Study (2014)
  - Tightsqueeze Access Management Plan (2010)
  - SHRP2 Route 29 Corridor Assessment (2016)
- AADTs
- Existing crash patterns
  - Angle crashes at unsignalized median openings
- U-turn feasibility, desktop review
- VDOT Road Design Manual
  - Minimum spacing standards
- Focused on emerging segments



Preliminary Access Management Plan

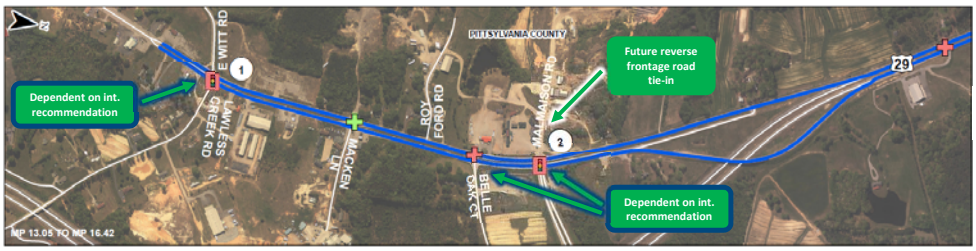
94

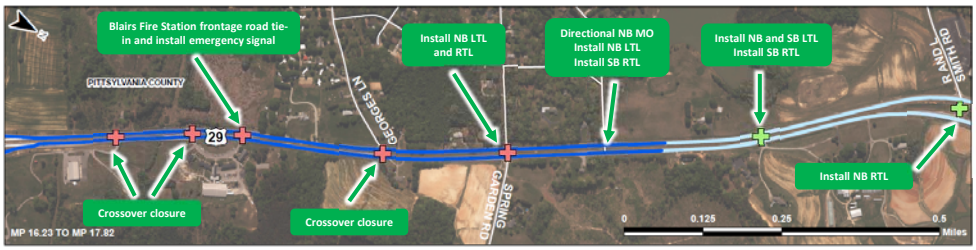
Access Management

Access Point Type	Access Management Spacing Met?		Total
	Yes	No	
Signalized Intersection	0	9	9
Full Median Crossover	17	52	69
Unsignalized Intersection	15	45	60
Grand Total	**32 (23%)**	**106 (77%)**	**138**

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

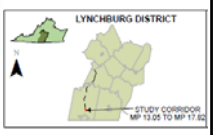
Access Management – Emerging Segment 1





Signalized Intersection
Unsignalized Intersection/ Full Median Crossover
Directional Median Crossover/ Full Access Entrance
Emerging Intersection

Segment Type:
- Developed
- Emerging
- Stable



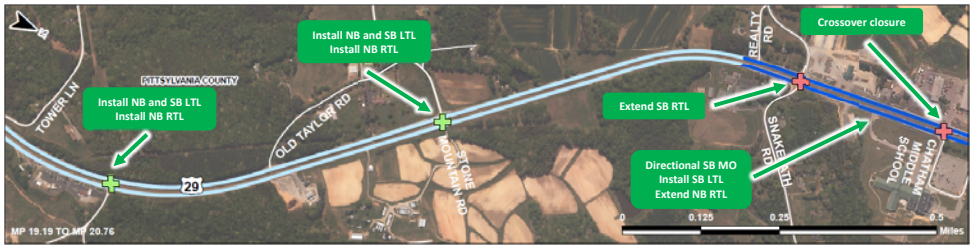
Access Management Spacing:
- Meets Requirements
- Does Not Meet Requirements

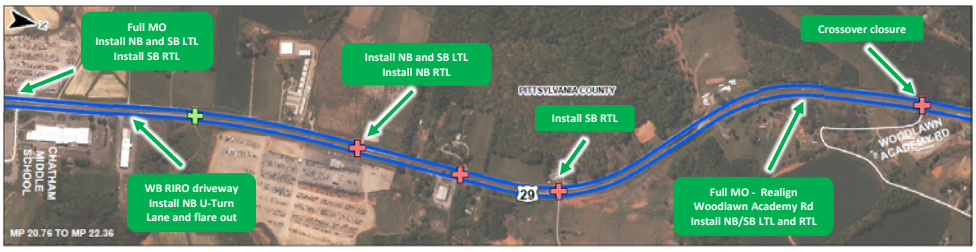
Previous study recommendation

APP recommendation

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

Access Management – Emerging Segment 2





Signalized Intersection
Unsignalized Intersection/ Full Median Crossover
Directional Median Crossover/ Full Access Entrance
Emerging Intersection

Segment Type:
- Developed
- Emerging
- Stable

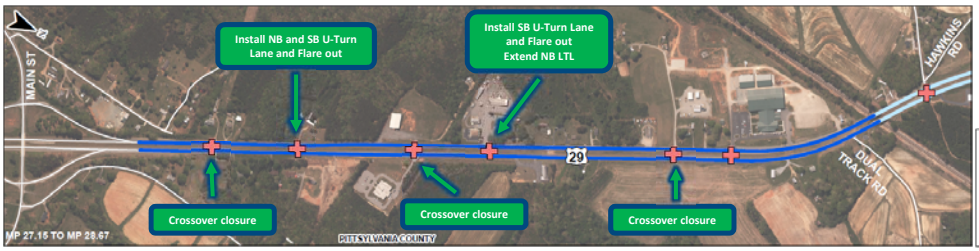
Access Management Spacing:
- Meets Requirements
- Does Not Meet Requirements

Previous study recommendation
APP recommendation

ARTERIAL PRESERVATION PROGRAM
VDOT Virginia Department of Transportation

97

Access Management – Emerging Segment 2/3



Signalized Intersection
Unsignalized Intersection/ Full Median Crossover
Directional Median Crossover/ Full Access Entrance
Emerging Intersection

Segment Type:
- Developed
- Emerging
- Stable

Access Management Spacing:
- Meets Requirements
- Does Not Meet Requirements

Previous study recommendation
APP recommendation

ARTERIAL PRESERVATION PROGRAM
VDOT Virginia Department of Transportation

98

Access Management – Emerging Segment 4

Signalized Intersection
Unsignalized Intersection/ Full Median Crossover
Directional Median Crossover/ Full Access Entrance
Emerging Intersection

Segment Type:
- Developed
- Emerging
- Stable

Access Management Spacing:
- Meets Requirements
- Does Not Meet Requirements

Previous study recommendation

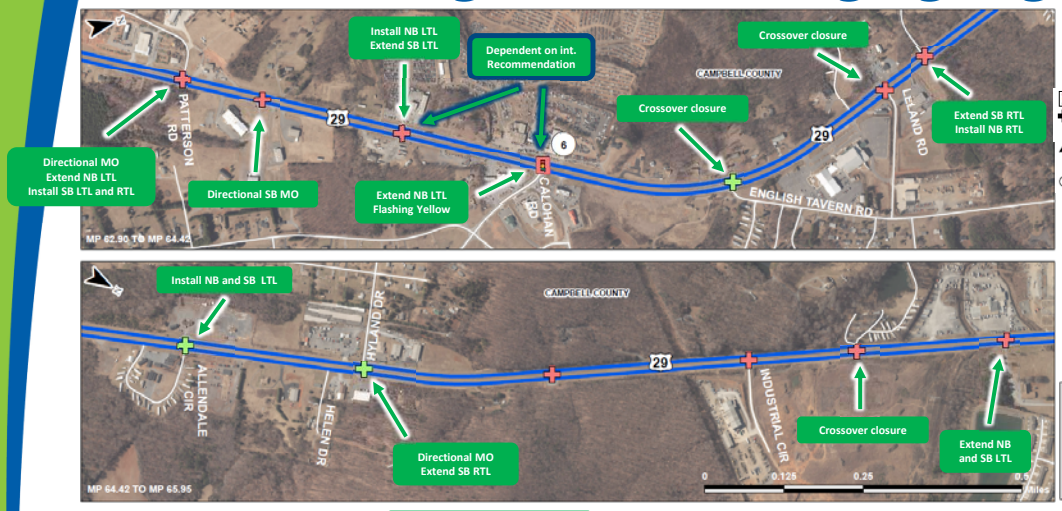
APP recommendation

ARTERIAL PRESERVATION PROGRAM

VDOT Virginia Department of Transportation

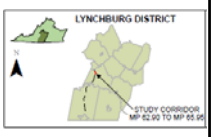
99

Access Management – Emerging Segment 4



Signalized Intersection
Unsignalized Intersection/ Full Median Crossover
Directional Median Crossover/ Full Access Entrance
Emerging Intersection

Segment Type:
- Developed
- Emerging
- Stable



Access Management Spacing:
- Meets Requirements
- Does Not Meet Requirements

Previous study recommendation

APP recommendation

ARTERIAL PRESERVATION PROGRAM

VDOT Virginia Department of Transportation

100

Next Steps

Project Schedule

- Receive comments from SWG by **April 25**
- Finalize intersection alternatives analysis
- Summarize corridor-wide recommendations
- Finalize access management plan
- Scope conceptual design phase

SMART SCALE Schedule

- New applications – June 1, 2018
- Refinement – August 1, 2018

Are there any potential SMART SCALE applications coming from this study?

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

101

Project Contact Information

VDOT District Contacts

Rick Youngblood
Rick.Youngblood@vdot.virginia.gov
(434) 856-8331

VDOT Central Office Contact

Terrell C. Hughes
Terrell.Hughes@vdot.virginia.gov
(804) 343-9025

Consultant Team Contacts

Amanda Harmon
Amanda.Harmon@kimley-horn.com
(804) 672-4704

Andy Nagle
Andy.Nagle@kimley-horn.com
(804) 292-2074

ARTERIAL PRESERVATION PROGRAM | VDOT Virginia Department of Transportation

102

APPENDIX H-2

Sign-In Sheet

ARTERIAL PRESERVATION PROGRAM

US 29 APP Meeting Sign-In Sheet

Meeting Date: Monday, April 16, 2018
Meeting Time: 12:30 PM – 3:00 PM
Meeting Location: VDOT Lynchburg District Office - Learning Center A/B - 4219 Campbell Avenue, Lynchburg, VA 24501

Name	Organization	Email Address	Phone Number	Present
Robert Williams	VDOT TMPD	RobertJ.Williams@vdot.virginia.gov	804-371-4868	✓
Terrell Hughes	VDOT TMPD	Terrell.Hughes@vdot.virginia.gov	804-343-9025	✓
Dakota Clifford	VDOT TMPD	Dakota.Clifford@vdot.virginia.gov	757-759-5242	✓
Rick Youngblood	VDOT District Planning	Rick.Youngblood@vdot.virginia.gov	434-856-8331	✓
David Cook	VDOT District Planning	David.Cook@vdot.virginia.gov	434-856-8252	✓
Jeffery Kessler	VDOT District Planning	Jefferyb.Kessler@vdot.virginia.gov	434-856-8293	-
Gerry Harter	VDOT Traffic Engineering	Gerry.Harter@vdot.virginia.gov	434-836-8211	-
Ken Carlton	VDOT Lynchburg District	Ken.Carlton@vdot.virginia.gov	434 856-8365	-
Robert Guercia	VDOT Lynchburg District	Robert.Guercia@vdot.virginia.gov	434-856-8174	-
Chris Winstead	VDOT Lynchburg District	Chris.Winstead@vdot.virginia.gov	434-856-8173	-
Kenneth Martin	VDOT Halifax Residency	Kenneth.Martin@vdot.virginia.gov	434-476-6342	-
Paul Harvey	Campbell County	PEHarvey@co.campbell.va.us	434-332-9592	✓
Gregory Sides	Pittsylvania County	Greg.Sides@pittgov.org	434-432-7974	-
Matthew Rowe	Pittsylvania County	Matthew.Rowe@pittgov.org	434-432-1669	-
Don DeBerry	City of Lynchburg	Donald.Deberry@lynchburg.gov	434-455-3935	✓
Brian Dunevant	City of Danville	Dunevbl@danvilleva.gov	434-799-5245	-
Lee Beaumont	Liberty University	Lbeaumont@liberty.edu	434-592-3315	-
Kenneth Craig	Liberty University	Kbcraig@liberty.edu	434-582-7850	-
Dan Deter	Liberty University	Ddeter@liberty.edu	434-592-7341	✓
Scott Smith	Region 2000 Local Government Council	Ssmith@region2000.org	434-845-5678 (ext. 214)	✓
Philipp Gabathuler	Region 2000 Local Government Council	PGabathuler@region2000.org	434-845-5678 (ext. 217)	-
David Hoback	West Piedmont Planning District Commission	DHoback@wppdc.org	276-638-3987	✓
Joseph Bonanno	West Piedmont Planning District Commission	Jbonanno@wppdc.org	276-638-3987	-
Tim White	Kimley-Horn	Tim.White@kimley-horn.com	804-672-4705	✓
Amanda Harmon	Kimley-Horn	Amanda.Harmon@kimley-horn.com	804-672-4704	✓
Andy Nagle	Kimley-Horn	Andy.Nagle@kimley-horn.com	804-292-2074	✓
Nazana Weeks	Kimley-Horn	Nazana.Weeks@kimley-horn.com	804-396-6041	✓

**Some SWG members were unable to attend the meeting due to cleanup efforts after the storm on Sunday, April 15, 2018*

VDOT

APPENDIX H-3

Meeting Summary

Arterial Preservation Program

Existing Conditions and Alternatives Development Workshop

April 17, 2018

12:30 PM – 3:00 PM

Note: Red text refers to an action item for Kimley-Horn or VDOT.
Blue text refers to attachments to this document.
*Questions **(Q)** and comments **(C)** from the meeting participants and corresponding answers from the study team follow each section.*

1. Introductions
    a. Refer to the attached Meeting Sign-In sheet for a record of the attendees.
2. Arterial Preservation Program
    a. Kimley-Horn provided a summary of the Arterial Preservation Program, the goals of the program, the selection criteria for the emerging intersections, and the implementation strategies.
3. Existing Conditions
    a. Kimley-Horn presented transportation statistics about the corridor, intersection and roadway departure crash statistics, and corridor observations from the field review.
    b. **(Q)** Why does the heavy vehicle percentage drop to 2% at the southern end of the corridor?
        i. The 2% heavy vehicles shown is on the business route of US 29. The bypass road to the east has a heavy vehicle percentage of 17%.
    c. **(C)** VDOT is currently updating the inventory of existing rumble strips and rumble stripes and is making recommendations for new rumble strips and rumble stripes.
        i. VDOT will provide Kimley-Horn with the locations of existing and proposed rumble strips and rumble stripes along the US 29 corridor.
4. VTrans, Park & Ride, and Systemic Improvements
    a. Kimley-Horn presented the VTrans Tier 1 recommendations for the corridor, the location of existing and proposed park & ride lots, and the VDOT templates for systemic improvements on along segments, curves, and intersections.
5. Emerging Intersections Alternatives
    a. Kimley-Horn gave an overview of innovative intersections and showed the VDOT instructional videos for the restricted crossing u-turn (RCUT) and the continuous green-T (CGT) intersections. Additionally, Kimley-Horn described the traffic operations and safety issues for the seven emerging intersections, and presented traditional capacity improvements and innovative intersection alternatives for each emerging intersection.
        i. US 29 BUS at Lawless Creek Road
            - Alternatives considered:
                a. Signalized EB right turn lane
                b. Two-way stop control
                c. Unsignalized RCUT
                d. Roundabout

- **(C)** While the current traffic signal does not meet warrants, the traffic signal may have met warrants before the bypass road was constructed.
- **Preferred alternatives to advance:**
    a. RCUT
    b. Roundabout

ii. US 29 BUS at Malmaison Road

- Alternatives considered:
    a. Additional WB left turn lane
    b. RCUT
    c. Hybrid roundabout
- RCUT
    a. **(Q)** What criteria was used to signalize the u-turn locations of the RCUT?
        i. The decision to signalize the RCUT was based on the TOSAM requirements for protected/permissive left turns and the FHWA RCUT Informational Guide. The TOSAM requirement is "If there are two or three through lanes on the opposing approach and the product of the left-turn volume and the opposing right-turn/through volume is greater than 100,000 during the peak hour, the left-turn phase should be protected + permissive or protected only." The FHWA RCUT Informational Guide recommends signalizing the u-turn locations if the side street ADT is greater than or equal to 5,000 vehicles per day.
    b. **(Q)** Was an unsignalized u-turn considered for the northern location?
        i. Yes, an unsignalized u-turn was considered for the northern location. Under this configuration in the PM peak hour, u-turning vehicles experience an average control delay of 18.1 second per vehicle and the level of service for the movement is C. In the AM peak hour, u-turning vehicles experience an average control delay of 20.8 second per vehicle and the level of service for the movement is C. Additionally, product of the u-turning vehicles with the opposing through vehicles is greater than 100,000 in the AM peak hour. The AM product 126,910 and the PM product is 80,827. A signal is preferred based on the assumed guidelines from TOSAM and the FHWA RCUT Informational Guide, but the unsignalized u-turn operates acceptably.
- Roundabout
    a. (Q) Was a single lane roundabout considered for this intersection?

i. Yes, a single lane roundabout was analyzed for the intersection. The overall roundabout operates at LOS B and all approaches operate at LOS of B or better.

b. **(C)** The roundabout provides better access to the park and ride lot, serves as a gateway into the city of Danville, and slows drivers from US 29 SB.

- Park & ride lot
  a. **(Q)** Was the volume generated from the Park & Ride lot included in the traffic analysis?
     i. No, the proposed lot has a maximum capacity of 30 vehicles and was assumed to be captured in the background traffic development.
  b. **(Q)** Is the location of the park & ride lot final?
     i. No, the locations of the park & ride lot are pre-populated from the VDOT Park & Ride lot investment strategy report. The exact location of the lot is yet to be determined.
     ii. The Pittsylvania County parcel map shows that the parcels directly adjacent to the intersection are privately owned.
- **Preferred alternatives to advance:**
  a. Additional WB left turn lane with NB right turn overlap (short term)
  b. Roundabout (long term)

iii. US 29 at Tightsqueeze Road

- Alternatives considered
  a. Additional EB left turn lane
  b. Additional NB left turn lane
  c. Additional EB left + NB left turn lanes
  d. Signalized partial MUT
  e. Signalized RCUT
- **(C)** The location of the park & ride lot at this intersection is yet to be determined. Pittsylvania County is exploring the option of leasing lots from the Food Lion in the northwest quadrant.
- **(Q)** Were any of the intersection crashes caused by red light running?
  a. Two of the intersection crashes can be attributed to red light running.
- **(Q)** Does any alternative reduce the number of angle crashes?
  a. The angle crashes will not be mitigated with the traditional capacity improvements (additional turn lanes), but the partial MUT and RCUT alternatives can help mitigate the number of angle crashes.
- **Preferred alternative to advance:**
  a. Signalized RCUT

iv. US 29 at Gladys Road
- Alternatives considered
  a. Continuous green-T
  b. Unsignalized RCUT
- **(C)** VDOT is currently analyzing this intersection and one of the alternatives that they are considering is an RCUT.
  a. VDOT will provide Kimley-Horn with a copy of the analysis files for alternatives being considered.
- **Preferred alternative to advance:**
  a. Unsignalized RCUT

v. US 29 at Colonial Highway
- Alternatives considered
  a. EB left + WB left turn lanes with permissive phasing
  b. Bowtie
  c. Partial MUT
  d. Signalized RCUT
- **(C)** Yellow Branch Elementary School forces drivers to exit at the intersection of Dennis Riddle Drive and Colonial Highway.
- **(C)** A driving school is located in the southeast quadrant of US 29 and Colonial Highway. Any innovative intersection recommendations at this location could be tied into the curriculum to educate future drivers.
- **(C)** The vacant parcels in the northeast quadrant of US 29 and Colonial Highway is available for sale. Any improvements on Colonial Highway or US 29 should factor in access for the future development.
- **Preferred alternative to advance:**
  a. Bowtie

vi. US 29 at Calohan Road
- **(C)** The preferred alternative will depend on the roadway improvements that are approved for the downstream intersections. The SHRP 2 study recommends closing off the median opening at English Tavern Road (South) and realigning Leland Road to tie into Lynbrook Road.
- Alternatives considered
  a. Additional WB right lane
  b. Additional SB left lane
  c. Additional WB right + SB left lanes
  d. Continuous green-T
  e. 3-legged RCUT
- **Preferred alternative to advance:**
  a. To Be Determined with SWG feedback

vii. US 29 at English Tavern Road
- Alternatives considered:
  a. Additional WB right lane
  b. Additional SB left lane
  c. Additional WB right + SB left lanes

d. RCUT

- **Preferred alternative to advance:**
  - **a. RCUT**

6. Access Management
   a. Kimley-Horn presented a compilation of the previous access management recommendations along the emerging sections of the corridor and a draft of the proposed recommendations. The final access management recommendations will depend of the preferred alternatives for each intersection.
7. General Notes
   a. **(Q)** Was a road diet considered for the US 29 BUS section of the corridor?
      i. No, a road diet was not considered the US 29 BUS section of the corridor. Kimley-Horn will explore this option moving forward.
   b. **(C)** All innovative intersection options will require education on usage as a part of the public involvement process.
   c. **(C)** Campbell County adopted the vehicular recommendations from the SHRP 2 study. The county did not adopt the bike/ped improvements due to the cost/benefit tradeoff.
   d. **(C)** VDOT is currently analyzing US 29 at Gladys Road and is preparing a SMART SCALE recommendation for the intersection.
   e. **(C)** The recently completed West Piedmont Planning District Commission Regional Bicycle Plan proposes the US 29 Priority Corridor that parallels US 29 from the City of Danville to the Town of Hurt.
   f. **(Q)** Does Pittsylvania County have ordinances that support access management?
      i. Yes, Pittsylvania County has ordinances that support access management
8. Action Items
   a. VDOT
      i. Provide Kimley-Horn with the latest analysis files and results for US 29 at Gladys Road.
      ii. Provide Kimley-Horn with the locations of existing and proposed rumble strips and rumble stripes along the US 29 corridor.
   b. SWG:
      i. Review and provide Kimley-Horn with a list of preferred alternatives for each intersection.
      ii. Provide comments on the initial access management recommendations.
   c. Kimley-Horn:
      i. Consider road diet options for the US 29 BUS section of the corridor.
      ii. Kimley-Horn will work with VDOT to develop a plan for the corridor-wide safety improvements.
      iii. Kimley-Horn will work with VDOT to create a schedule for public involvement.
      iv. Scope conceptual design and cost estimating phase.

APPENDIX H-4

Alternatives Summary Sheet

US 29 Arterial Preservation Plan

Monday, April 16, 2018

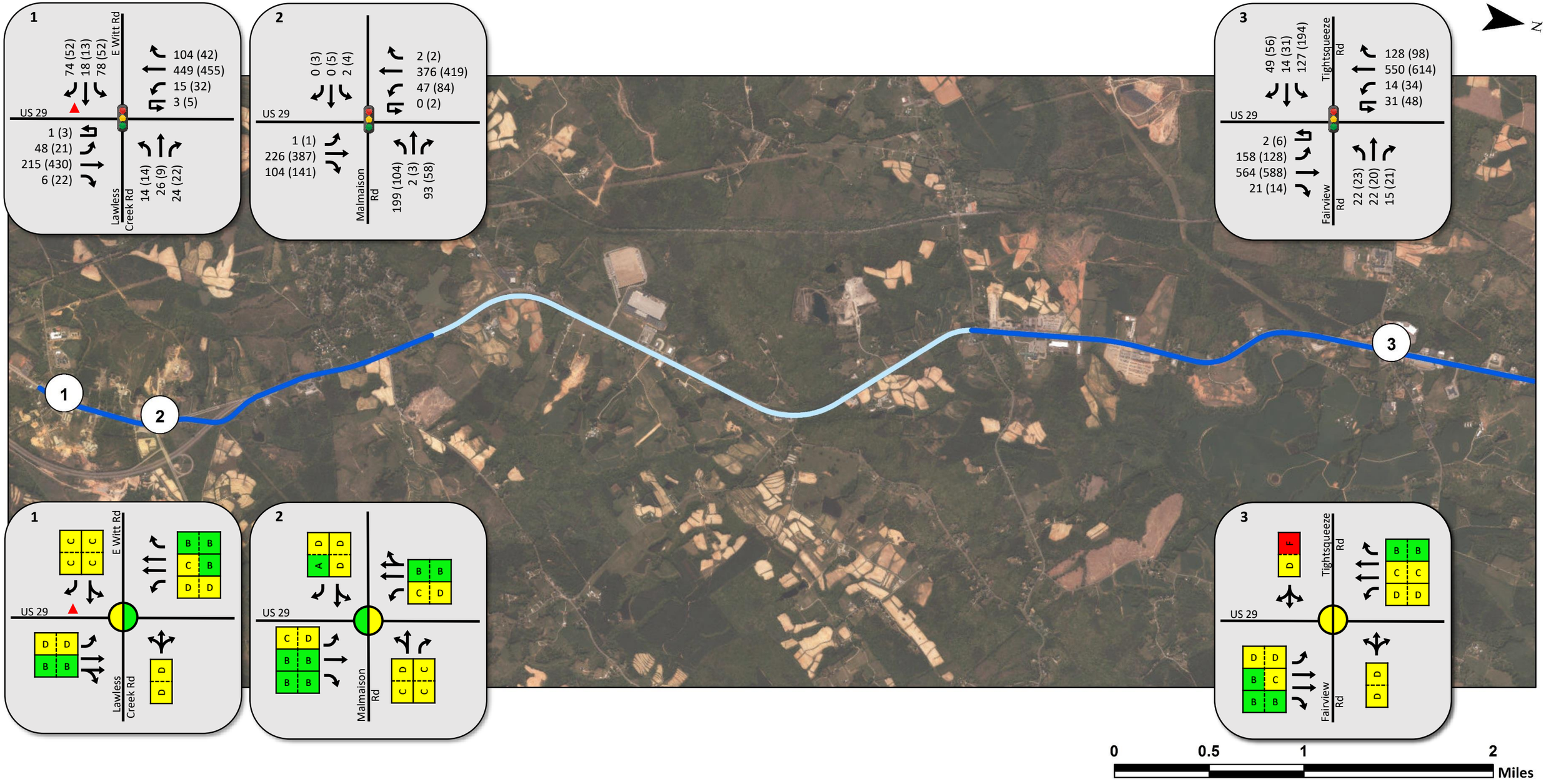
Existing Conditions and Alternatives Development Workshop

ID	Description	Alternatives Considered
1	US 29 BUS at Route 719 (Lawless Creek Road/E Witt Road)	• Signalized EB Right Turn Lane • Two-Way Stop Control • Unsignalized RCUT • Hybrid Roundabout • Single-Lane Roundabout
2	US 29 BUS at Route 726 (Malmaison Road)	• Additional WB Left Turn Lane • RCUT • Hybrid Roundabout
3	US 29 at Route 703 (Fairview Road/Tight Squeeze Road)	• Additional EB Left Turn Lane • Additional NB Left Turn Lane • Additional EB Left + NB Left Turn Lanes • Signalized Partial MUT • Signalized RCUT
4	US 29 at Route 699 (Gladys Road)	• Continuous Green-T • Unsignalized RCUT
5	US 29 at Route 24 (Colonial Highway)	• EB Left + WB Left Turn Lanes with Permissive Phasing • Bowtie • Partial MUT • Signalized RCUT
6	US 29 at Route 685 (Calohan Road)	• Additional WB Right Lane • Additional SB Left Lane • Additional WB Right + SB Left Lanes • Continuous Green-T • 3-Legged RCUT
7	US 29 at Route 738 (English Tavern Road – North Drive)	• Additional WB Right Lane • Additional SB Left Lane • Additional WB Right + SB Left Lanes • RCUT

ARTERIAL PRESERVATION PROGRAM VDOT

APPENDIX H-5

Volume and Delay Figures: Existing and No-Build Conditions



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

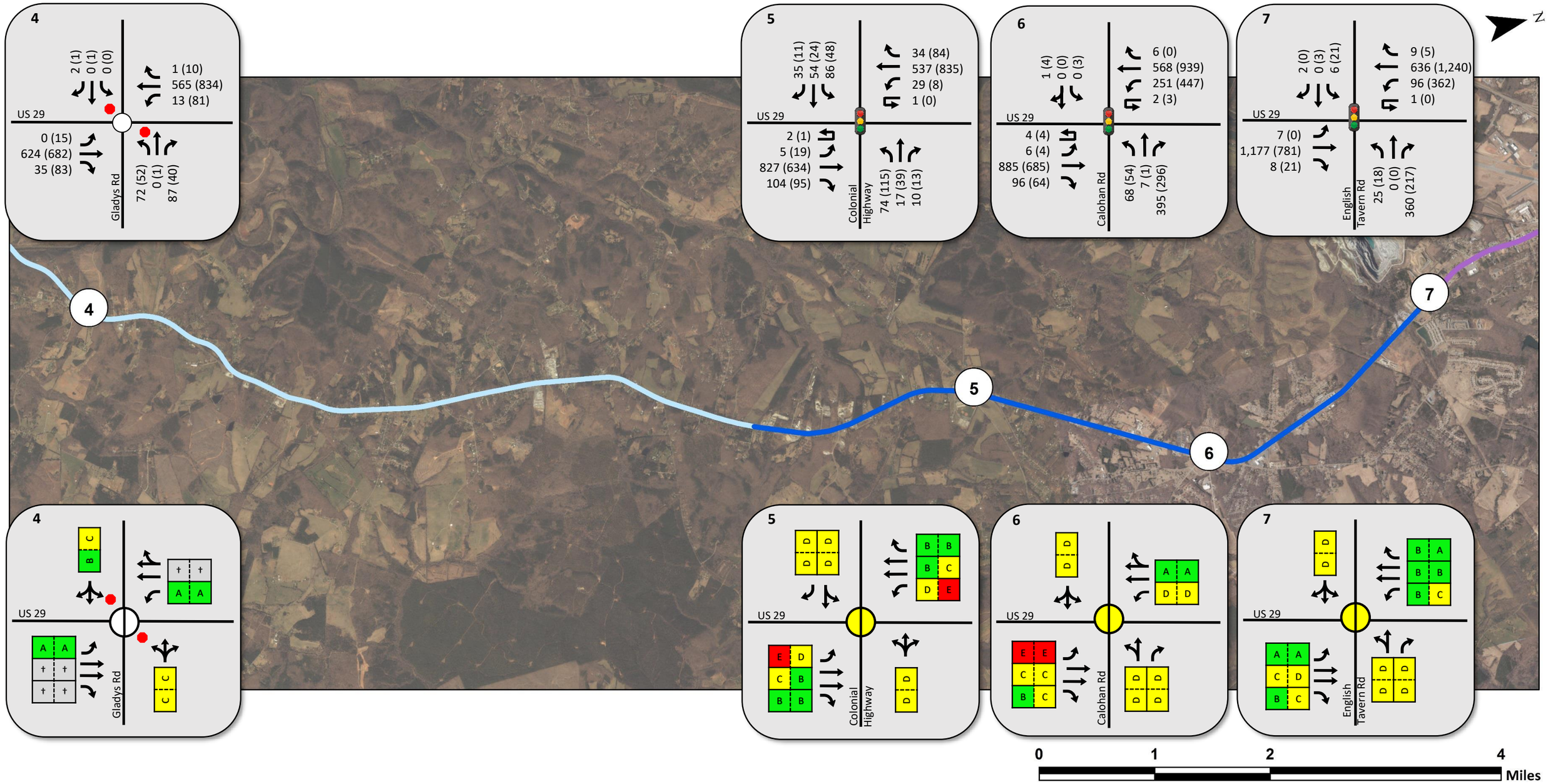
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

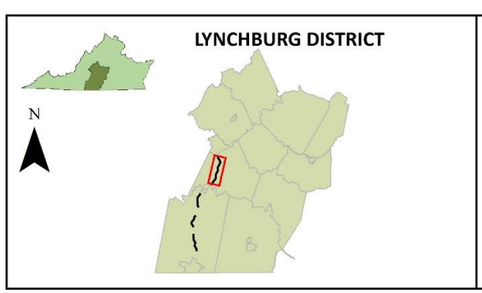
AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Existing Conditions Map
Page 1 of 2

VDOT ARTERIAL PRESERVATION PROGRAM





Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

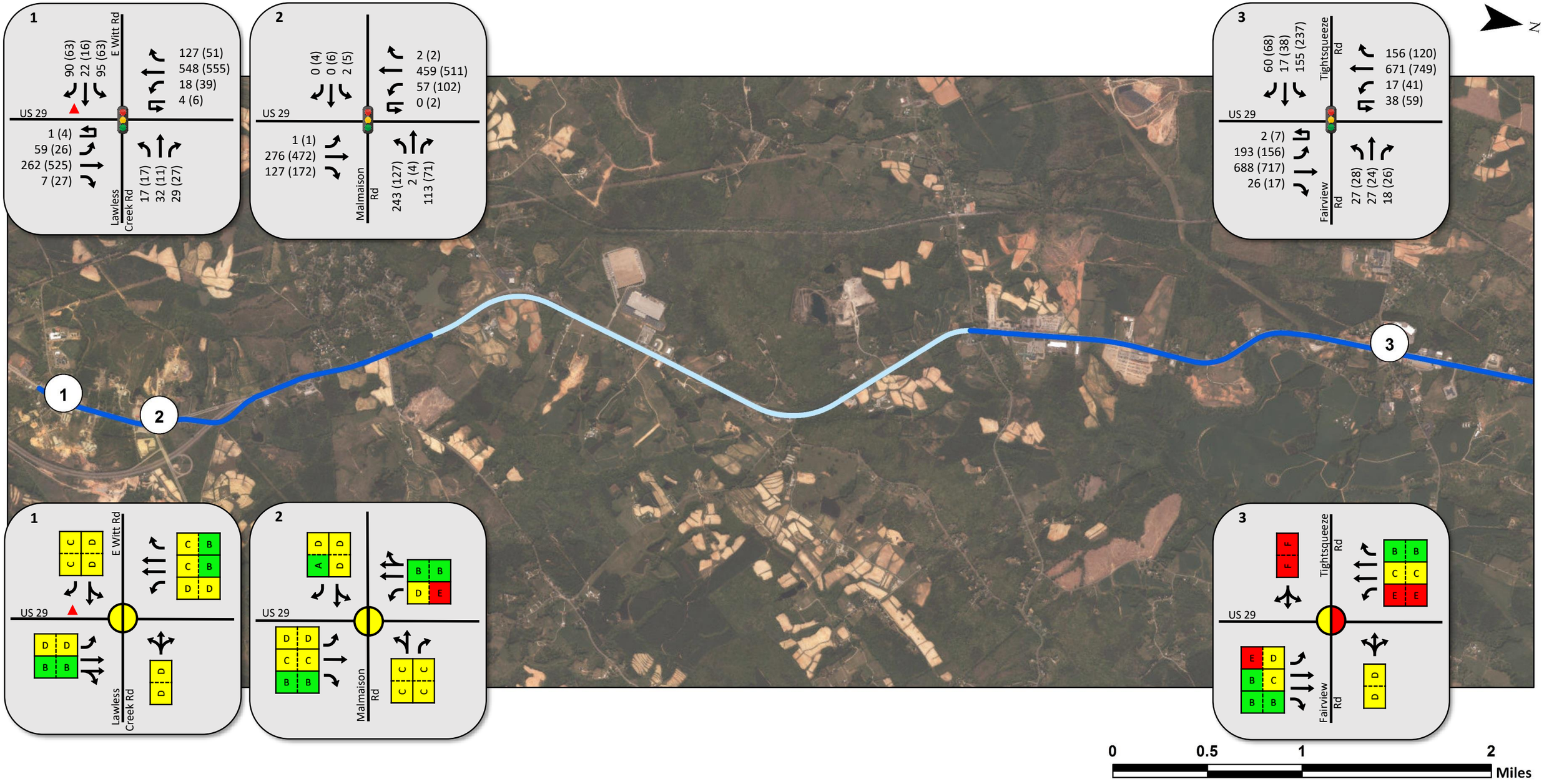
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Existing Conditions Map
Page 2 of 2

VDOT ARTERIAL PRESERVATION PROGRAM



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

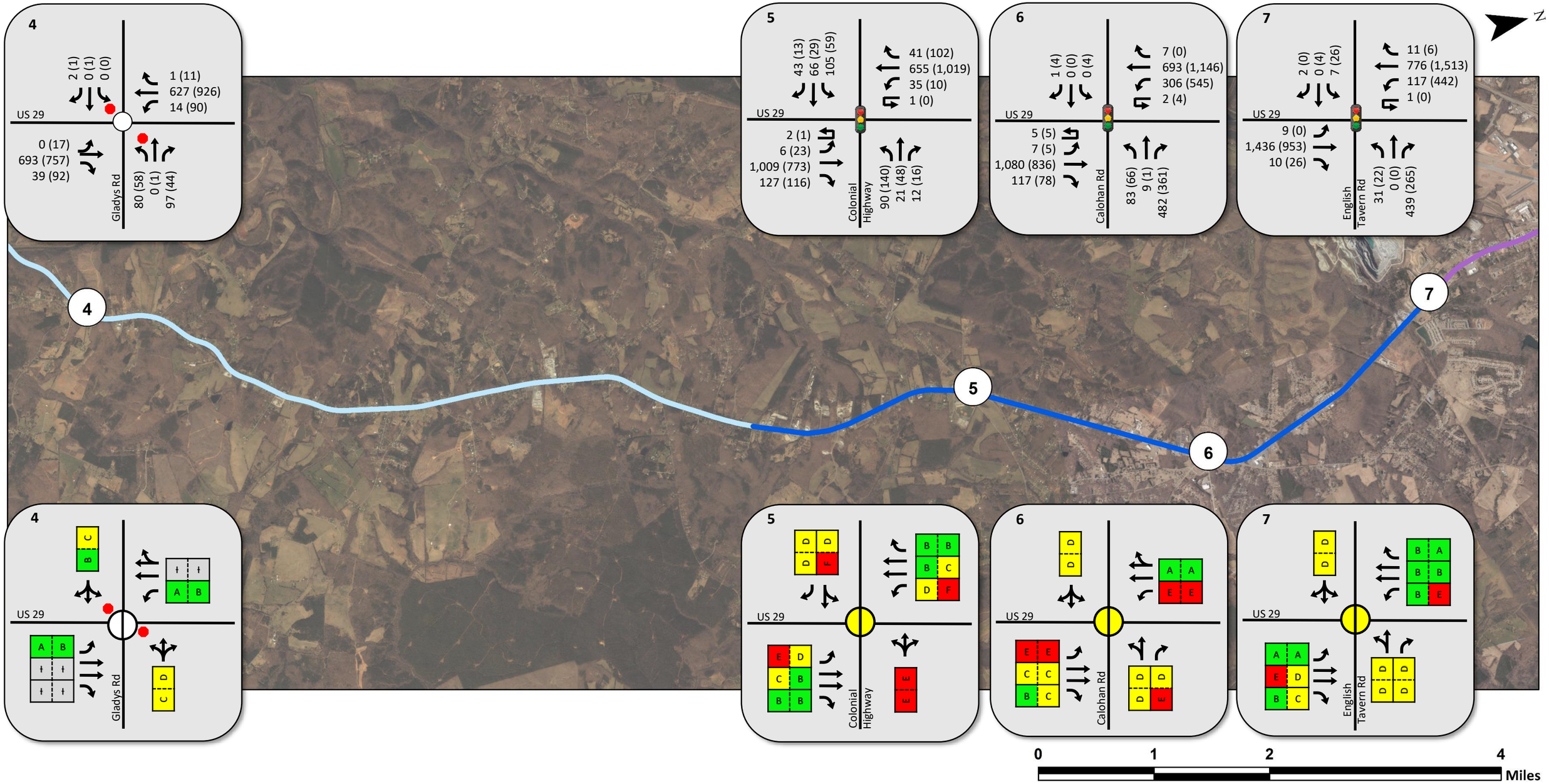
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

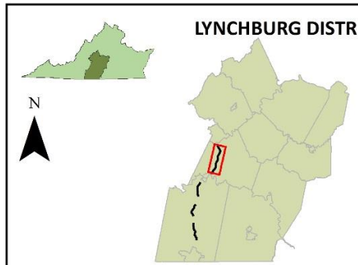
Segment Type:
- Developed
- Emerging
- Stable

US 29 No-Build (2040) Conditions Map
Page 1 of 2

VDOT ARTERIALO PRESERVATION PROGRAM



LYNCHBURG DISTRICT



Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- Existing Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 No-Build (2040) Conditions Map

VDOT ARTERIAL PRESERVATION PROGRAM

APPENDIX H-6

Innovative Intersection Brochures

INNOVATIVE INTERSECTIONS

Continuous Green-T (CGT)

US 40 (Columbia Pike) at Rivers Edge Road, Columbia, MD

A CGT IS ALSO KNOWN AS:

- Turbo-T Intersection
- High-T Intersection
- Seagull Intersection

What is a CGT?

- Intersection design where one major street direction of travel (the top side of the "T") can pass through the intersection without stopping and the opposite major street direction of travel is typically controlled by a traffic signal
- Left-turn vehicles from the side street use a channelized receiving lane on the major street to merge onto the major street
- Intersection is typically signalized but can also be designed without a traffic signal

When should a CGT be considered?

- At intersections with three legs
- At intersections with heavy through traffic volumes on the major street
- At intersections with moderate to low left-turn traffic volumes on the side street
- At intersections where there are no driveways along the major street opposite the side street
- At intersections with a limited number of pedestrian crossings across the major street or with an alternative pedestrian crossing location nearby

What are the benefits of a CGT?

- **Improved safety:** Channelization of left-turn vehicles from the side street reduces the potential for angle crashes
- **Increased efficiency:** Because one direction of travel on the major street is free-flow, more green time can be provided to the other movements, reducing delay at the intersection
- **Free-flow in one direction:** One direction of travel on the major street never stops, which improves traffic signal synchronization and reduces corridor travel times

What are innovative intersections?

Intersection designs where traffic movements are modified to improve safety, reduce delay, and increase efficiency.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

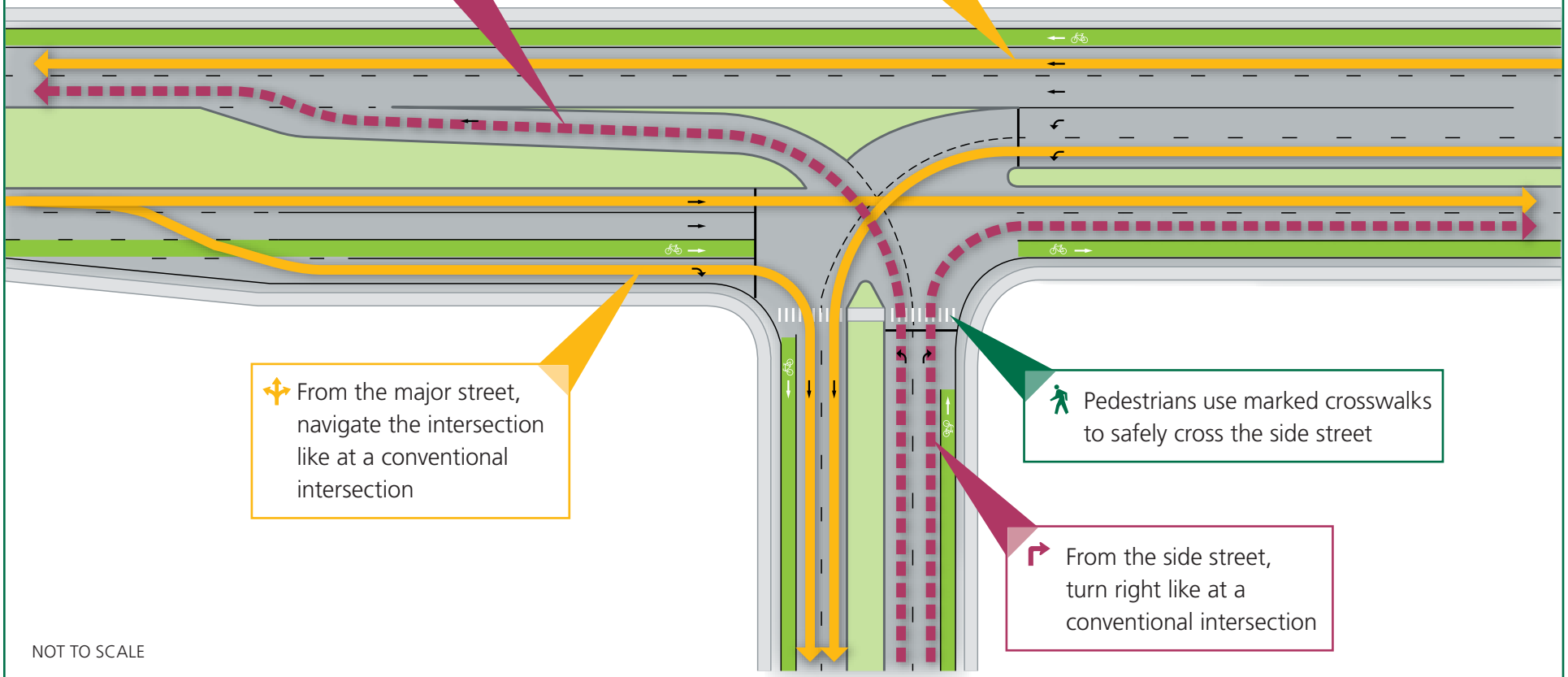
Navigating a Continuous Green-T (CGT)

Depending on their level of comfort, cyclists may navigate the intersection using vehicle or pedestrian paths

At CGTs, crosswalks are not provided across the major street. To cross the major street, pedestrians may use the nearest marked crosswalk (not shown)

To turn left from the side street, use the channelized lane to merge onto the major street

To continue straight on the top of the "T", pass through the intersection



From the major street, navigate the intersection like at a conventional intersection

Pedestrians use marked crosswalks to safely cross the side street

From the side street, turn right like at a conventional intersection

NOT TO SCALE

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Median U-Turn (MUT)

Poplar Tent Road at Derita Road, Concord, NC

AN MUT IS ALSO KNOWN AS:

- Michigan Left-Turn Intersection
- Median U-Turn Crossover
- Boulevard Turnaround
- Michigan Loon
- ThrU-Turn Intersection

What is an MUT?

- Intersection design where left-turn vehicles from one or both roads make u-turns at dedicated median openings to complete the desired movement
- Intersection can be designed with median u-turns on one or both roads
- Median u-turns can be designed as signalized, stop controlled, or yield controlled

When should an MUT be considered?

- On median divided highways
- At intersections with moderate to heavy through traffic volumes and low to moderate left-turn traffic volumes
- At intersections with three or four legs

What are the benefits of an MUT?

- **Improved safety:** Reduces the number of points where vehicles cross paths and decreases the potential for right-angle crashes
- **Increased efficiency:** Eliminates left-turn movements from the main intersection allowing for fewer traffic signal phases, which reduces delay and increases capacity
- **Shorter wait times:** Fewer traffic signal phases means less time stopping at the main intersection
- **Cost effective:** An MUT can be more cost-effective than adding lanes to increase capacity

What are innovative intersections?

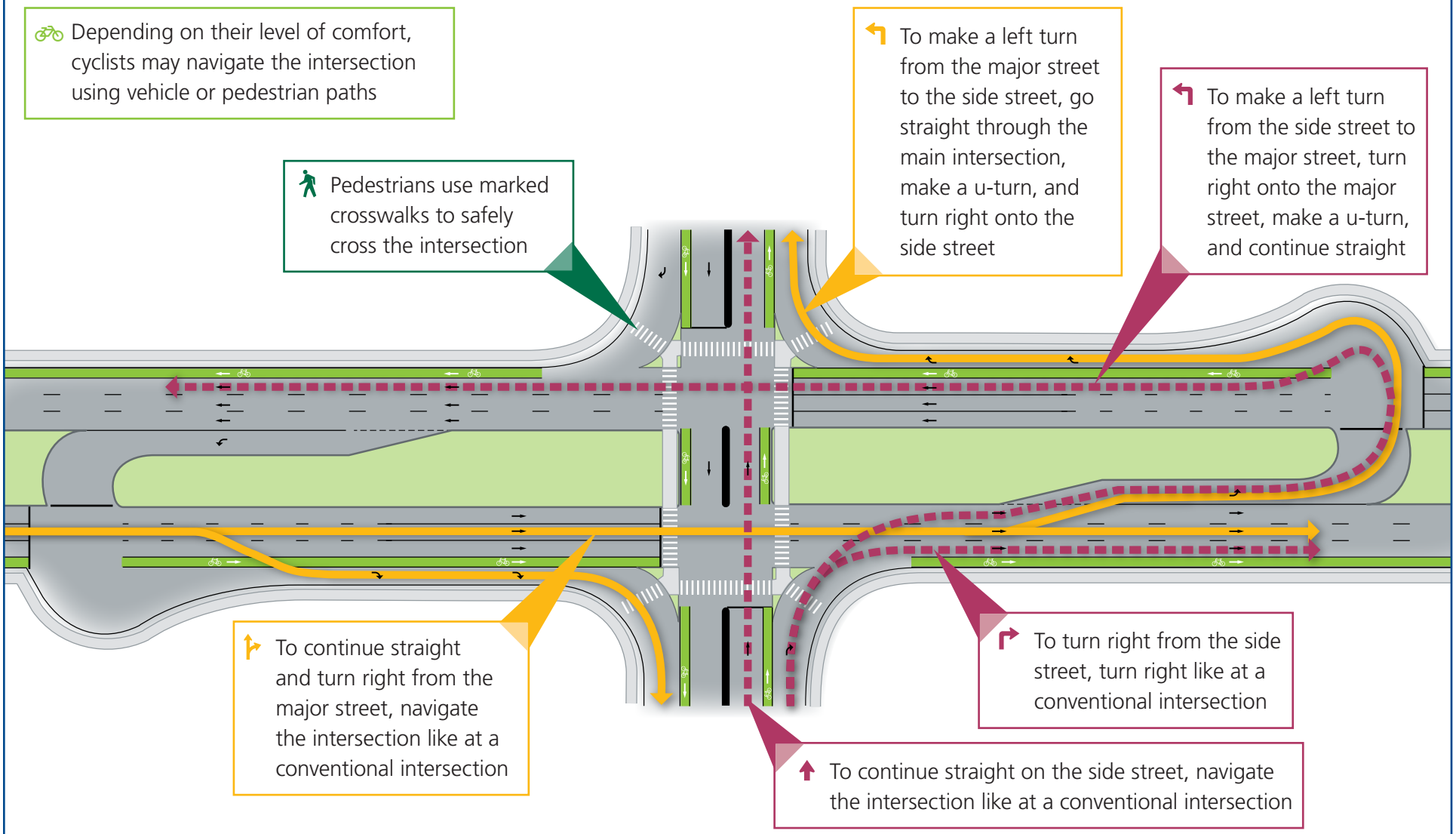
Intersection designs where traffic movements are modified to improve safety, reduce delay, and increase efficiency.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Median U-Turn (MUT)



NOT TO SCALE

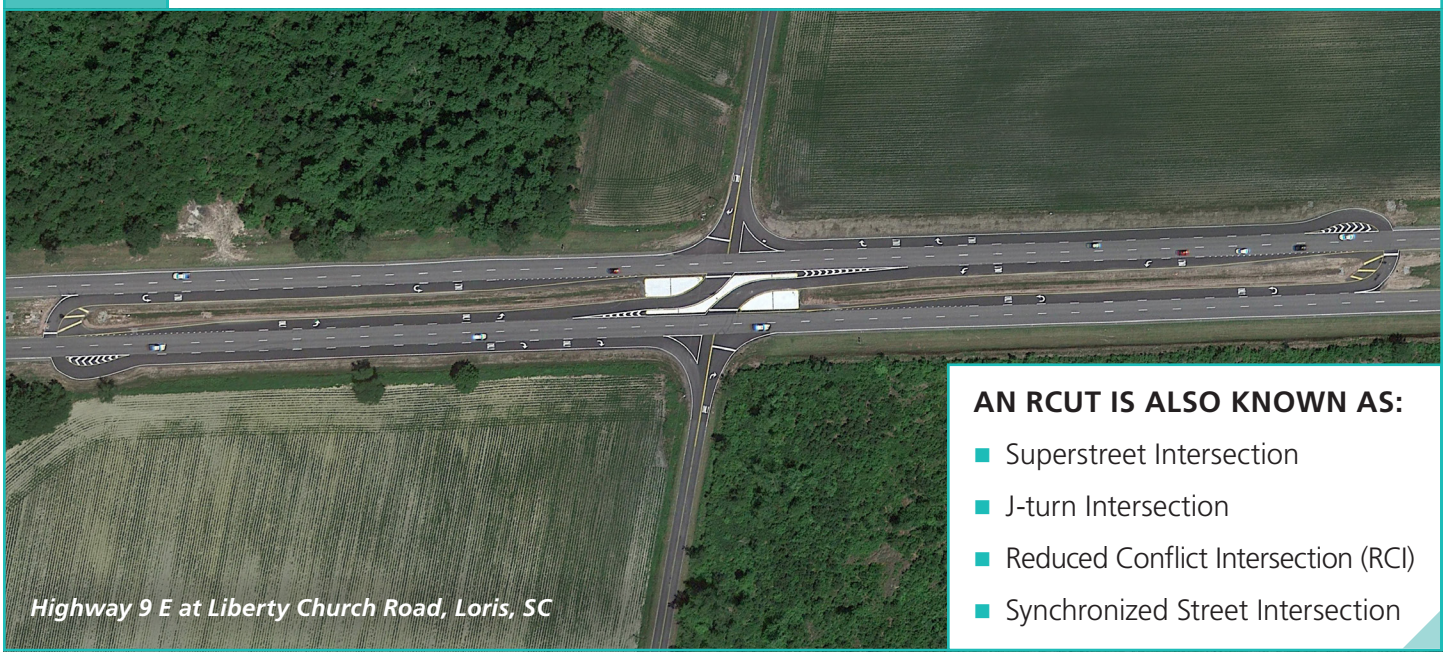
Note: For simplicity, only two directions of traffic are shown. Opposing traffic follows similar routes.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Restricted Crossing U-Turn (RCUT)



Highway 9 E at Liberty Church Road, Loris, SC

AN RCUT IS ALSO KNOWN AS:

- Superstreet Intersection
- J-turn Intersection
- Reduced Conflict Intersection (RCI)
- Synchronized Street Intersection

What is an RCUT?

- Intersection design where all side street movements begin with a right turn
- Side street left-turn and through vehicles turn right and make a u-turn at a dedicated downstream median opening to complete the desired movement
- Main intersection and median u-turns can be designed as signalized, stop controlled, or yield controlled

When should an RCUT be considered?

- On median-divided highways
- At intersections with heavy through and/or left-turn traffic volumes on the major street
- At intersections with low through and left-turn traffic volumes on the side street
- At intersections with three or four legs

What are the benefits of an RCUT?

- **Improved safety:** Reduces the number of points where vehicles cross paths and eliminates the potential for head-on crashes
- **Increased efficiency:** Each direction of the major street can operate independently creating two one-way streets and increasing the overall intersection capacity
- **Shorter wait times:** Fewer traffic signal phases means less stopping for mainline vehicles and right turns only from the side street vehicles means less time waiting
- **Cost-effective:** A RCUT can be more cost-effective than adding lanes to improve capacity

What are innovative intersections?

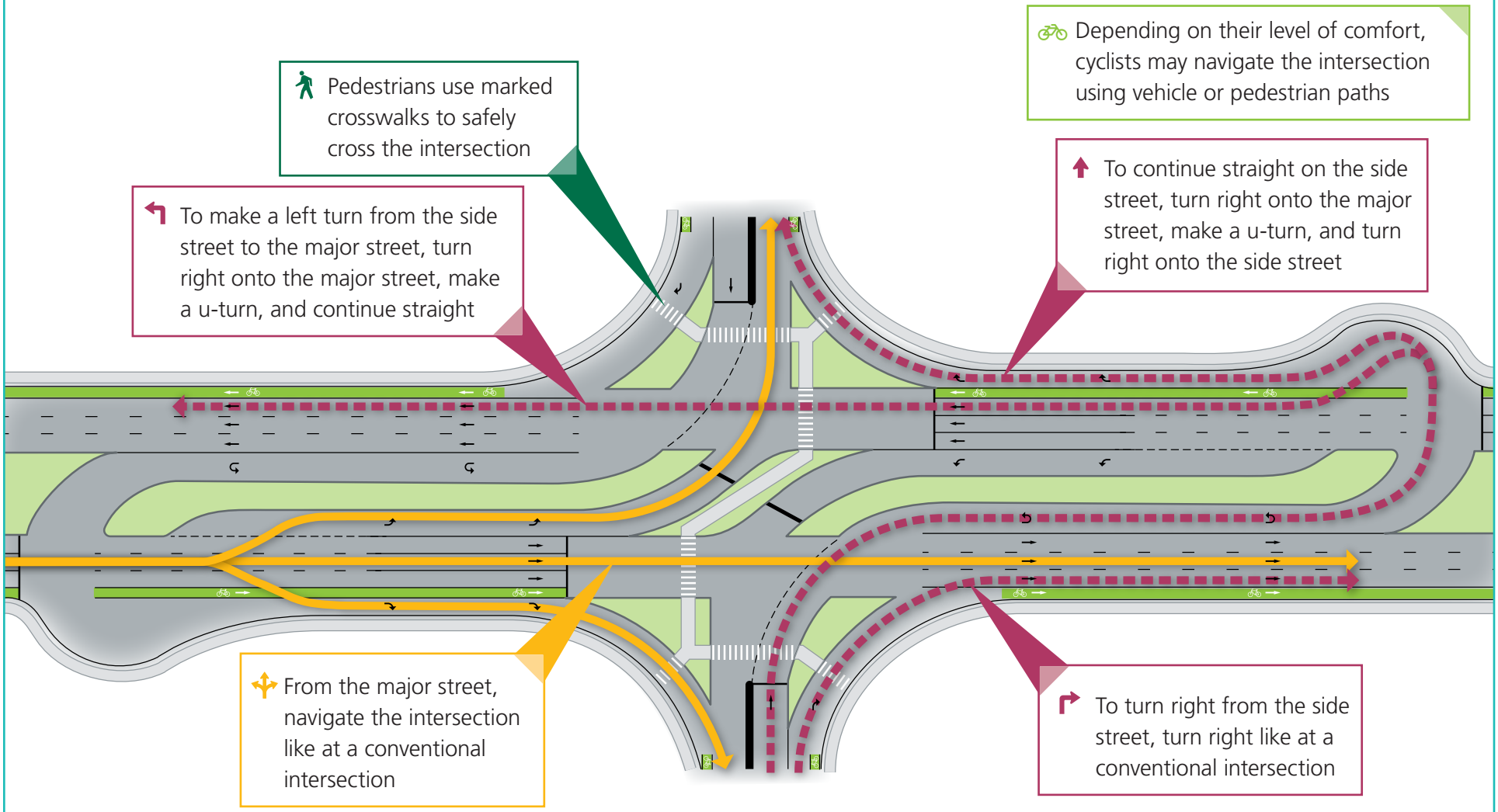
Intersection designs where traffic movements are modified to improve safety, reduce delay, and increase efficiency.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Navigating a Restricted Crossing U-Turn (RCUT)



NOT TO SCALE

Note: For simplicity, only two directions of traffic are shown. Opposing traffic follows similar routes.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Roundabout

Givens Lane at Progress Street, Blacksburg, VA

Roundabouts are not the same as neighborhood traffic circles. Typically, roundabouts are larger and designed for higher speeds than neighborhood traffic circles.

What is a roundabout?

- A circular unsignalized intersection where all traffic moves in a counterclockwise direction around a central island
- Traffic entering the roundabout slows down and yields to traffic already inside the roundabout
- Roundabouts can be designed with one or more circulating lanes
- Design options allow for right turns to be channelized to bypass the circulating lanes

When should a roundabout be considered?

- At intersections with heavy left-turn traffic or with similar traffic volumes on each leg
- At intersections with crashes involving conflicting through and left-turn vehicles
- At intersections with limited room for storing vehicles
- At intersections where there are limited nearby driveways
- At locations where vehicles from adjacent intersections will not queue into the roundabout

What are the benefits of a roundabout?

- **Improved safety:** Reduces the number of points where vehicles can cross paths and eliminates the potential for right-angle and head-on crashes
- **Increased efficiency:** Yield-controlled design means fewer stops, less delay, and shorter queues for overall improved efficiency
- **Safer Speeds:** Promotes lower vehicle speeds, which gives drivers more time to react
- **Long-term cost effective:** No traffic signal equipment means lower long-term costs for operations and maintenance
- **Aesthetics:** Creates opportunities for landscaping and beautification

What are innovative intersections?

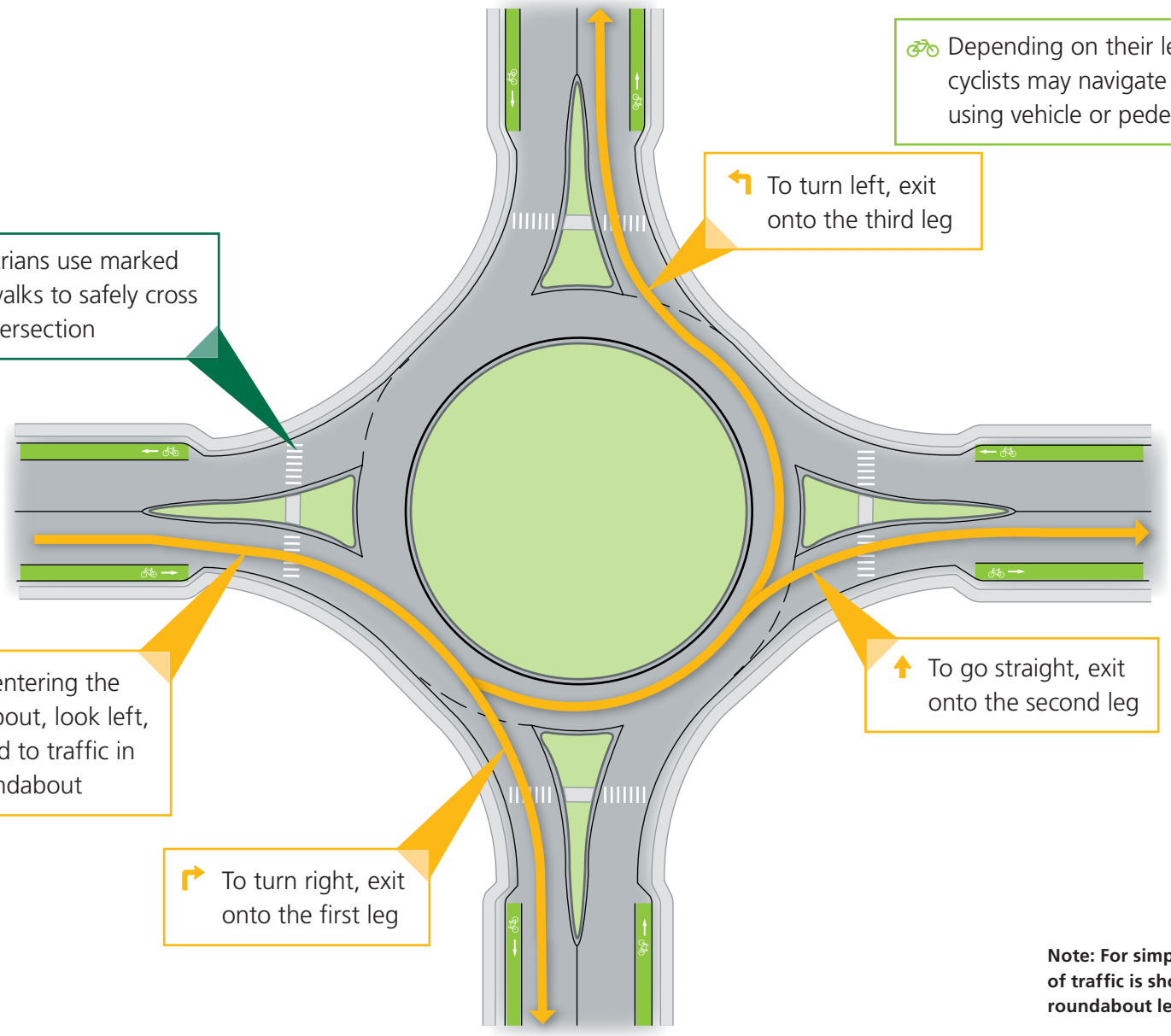
Intersection designs where traffic movements are modified to improve safety, reduce delay, and increase efficiency.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

INNOVATIVE INTERSECTIONS

Navigating a Roundabout



NOT TO SCALE

Note: For simplicity, only one direction of traffic is shown. Traffic on other roundabout legs follow similar routes.

Visit www.virginiadot.org/innovativeintersections to learn more.

VDOT

APPENDIX H-7

Systematic Improvement Templates

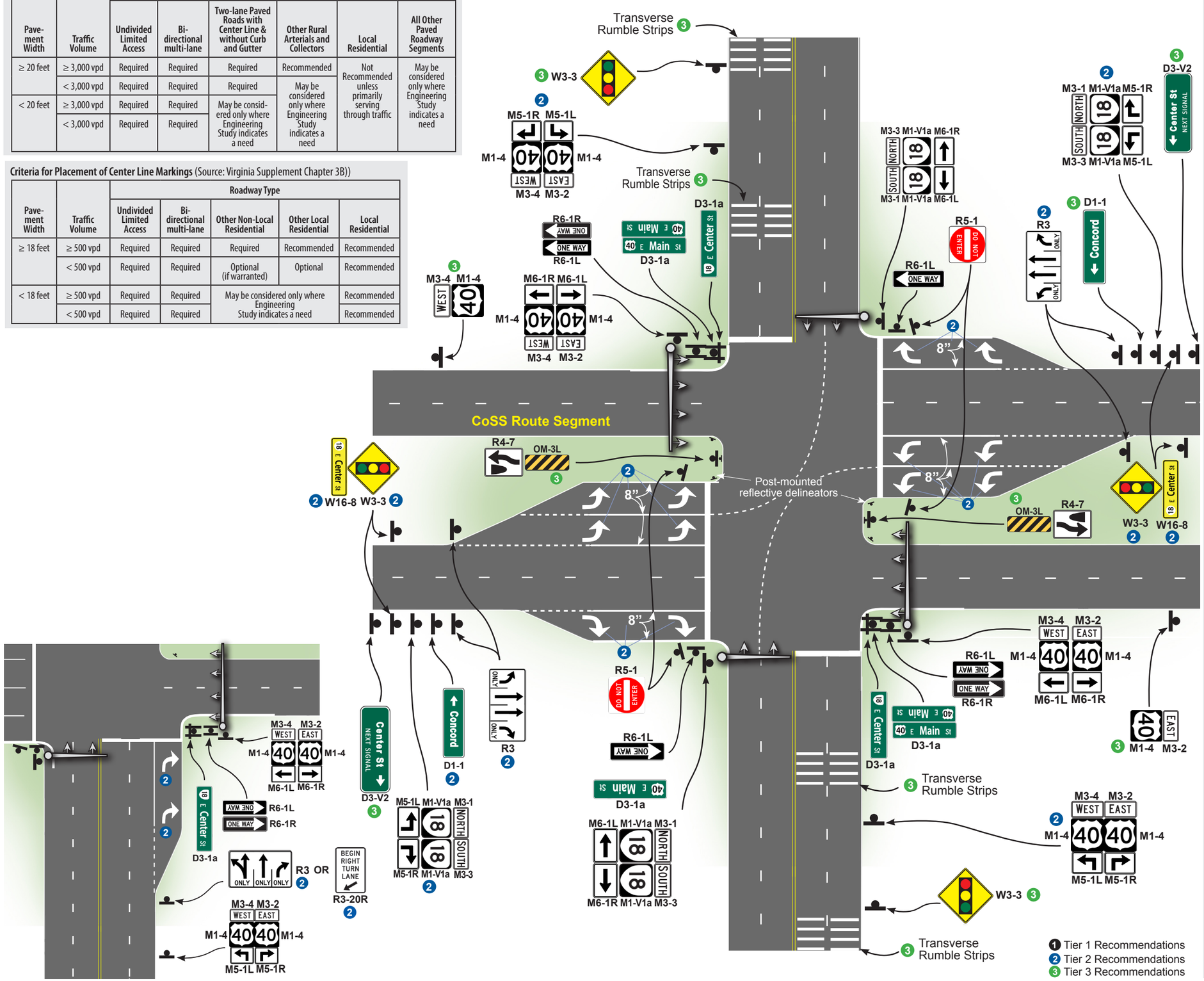
Template 8 – Signalized Intersection – 4-leg (3 Tiers)

Criteria for Placement of Edge Line Markings (Source: Virginia Supplement Chapter 3B)

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Two-lane Paved Roads with Center Line & without Curb and Gutter	Other Rural Arterials and Collectors	Local Residential	All Other Paved Roadway Segments
≥ 20 feet	≥ 3,000 vpd	Required	Required	Required	Recommended	Not Recommended unless primarily serving through traffic	May be considered only where Engineering Study indicates a need
	< 3,000 vpd	Required	Required	Required	May be considered only where Engineering Study indicates a need		
< 20 feet	≥ 3,000 vpd	Required	Required	May be consid-ered only where Engineering Study indicates a need			
	< 3,000 vpd	Required	Required				

Criteria for Placement of Center Line Markings (Source: Virginia Supplement Chapter 3B))

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Other Non-Local Residential	Other Local Residential	Local Residential
≥ 18 feet	≥ 500 vpd	Required	Required	Required	Recommended	Recommended
	< 500 vpd	Required	Required	Optional (if warranted)	Optional	Recommended
< 18 feet	≥ 500 vpd	Required	Required	May be considered only where Engineering Study indicates a need		Recommended
	< 500 vpd	Required	Required			Recommended



NOTES:

Signage

1. Upgraded signs with current MUTCD standards (font, size, retroreflectivity, placement, message, etc.)
1. Fluorescent yellow sheeting on change of direction warning signs

Post-Mounted

1. Street name sign (D3-1a or D3-1 for local roads)
1. Intersecting route and directional sign (M1, M3, & M6 Series)
1. "Keep Right" sign for median separated roads (R4-7 or R4-8 Series) on raised medians where it is not readily apparent that traffic is required to keep to the right (MUTCD Figure 2B-10)
3. Add object marker on same post as R4-7 or on separate post closer to road (OM-3L)
2. Advance intersecting route and directional sign (M1, M3, & M5 Series)
3. Confirmation route signs (M1-M3 Series) on primary routes
3. Destination/guide sign (D1-1) on CoSS
2. Advance intersection lane control signs (R3-8 Series) on approaches with turn lanes, or Begin Right Turn Lane sign (R3-20R) where only a right-turn lane is present
3. Advance Street Name Signs on CoSS (D3-2 & D3-V2)
2. Signal Ahead Warning Sign (left and right)(W3-3)
2. Street name (W16-8 series) signs on CoSS approaches
1. "One Way" and "Do Not Enter" signs per VA Supplement

Overhead

2. Overhead lane use signs and left turn regulatory signs
3. Mast arm mounted 12" street name sign (D3-1a or D3-V1 for local roads)

Pavement Markings

1. Stop bar/yield line (MUTCD Section 3B.16)
1. 6" grooved/in-laid edge line on CoSS (see Corridor Template)
2. Wide (8") edge line approaching intersection, around intersection corner radius, and on turn lane skip marks on approaches where speed is greater than 45 mph
1. 4" edge line on non-CoSS roads (see table for application guidance)
1. 4" center line pavement markings (see table for application guidance)
1. Solid lane and center line approaching intersection
1. Skip marks delineating turn lanes through the intersection when dual turn lanes are present
1. Skip marks at turn lane taper when taper length is greater than 100'
2. Lane use pavement markings (MUTCD Section 3B.20)
3. Use rumble stripe for 8" markings

Signal

1. Check signal sight distance
1. 12" LED signal lenses
1. Red and yellow arrow lenses for protected movements
1. Signal backplates with retroreflective border
1. Check for proper red clearance and yellow change intervals (VDOT TE 306.1)
1. One signal head per approach (where structural loading permits)
2. Provide near side signal heads if minimum signal sight distance is not provided

Other

3. Provide actuated signals
1. If pedestrian accommodations are present, ensure minimum requirements for crossing (6" solid lines offset minimum 6 feet and placed 4 feet in advance of the stop bar), pedestrian warning sign, and right turn yield to pedestrian signs.
1. If pedestrian phase is present, provide pedestrian countdown signals with pushbutton activation and appropriate pedestrian crossing clearance interval.
1. Restrict parking near intersection
3. Reflectorized sign posts
3. Reflective delineators around median nose for median (Chapter 3F MUTCD VA Supplement)
3. Transverse rumble strips on approach to CoSS
1. Trim vegetation to provide adequate sight distance within clear zone
2. Mark obstructions within clear zone (OM-1, 2, or 3 Series)
3. Remove, mark, or provide a barrier for obstructions within clear zone

NOTE: Signage and pavement marking placement is not to scale. Depending upon site conditions, signs should share the same post to the extent possible in order to reduce sign clutter. Actual placement will be determined on a site by site basis based on MUTCD and VA Supplement design standards and guidance.

Template 4 – Unsignalized Intersection – 3-leg (1-way stop controlled), median separated (with crossover) (3 Tiers)

Criteria for Placement of Edge Line Markings (Source: Virginia Supplement Chapter 3B)

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Two-lane Paved Roads with Center Line & without Curb and Gutter	Other Rural Arterials and Collectors	Local Residential	All Other Paved Roadway Segments
≥ 20 feet	≥ 3,000 vpd	Required	Required	Required	Recommended	Not Recommended unless primarily serving through traffic	May be considered only where Engineering Study indicates a need
	< 3,000 vpd	Required	Required	Required	May be considered only where Engineering Study indicates a need		
< 20 feet	≥ 3,000 vpd	Required	Required	May be considered only where Engineering Study indicates a need			
	< 3,000 vpd	Required	Required				

Criteria for Placement of Center Line Markings (Source: Virginia Supplement Chapter 3B))

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Other Non-Local Residential	Other Local Residential	Local Residential
≥ 18 feet	≥ 500 vpd	Required	Required	Required	Recommended	Recommended
	< 500 vpd	Required	Required	Optional (if warranted)	Optional	Recommended
< 18 feet	≥ 500 vpd	Required	Required	May be considered only where Engineering Study indicates a need		Recommended
	< 500 vpd	Required	Required			Recommended

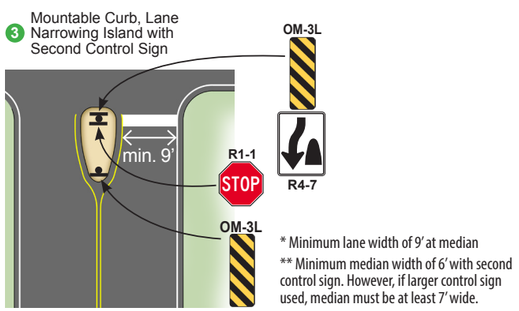
Divided Highway Crossing Sign Application (R6-3, R6-3a)

When to use:

- Unsignalized minor-street approaches from which both left turns and right turns are permitted onto a divided highway with a median width of > 30'

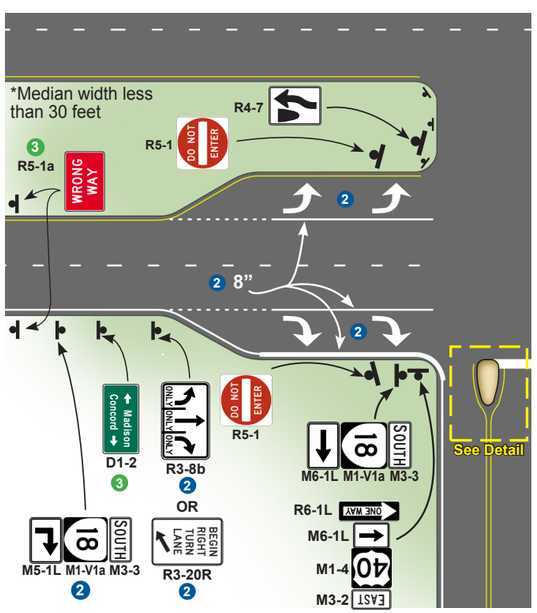
May be omitted if:

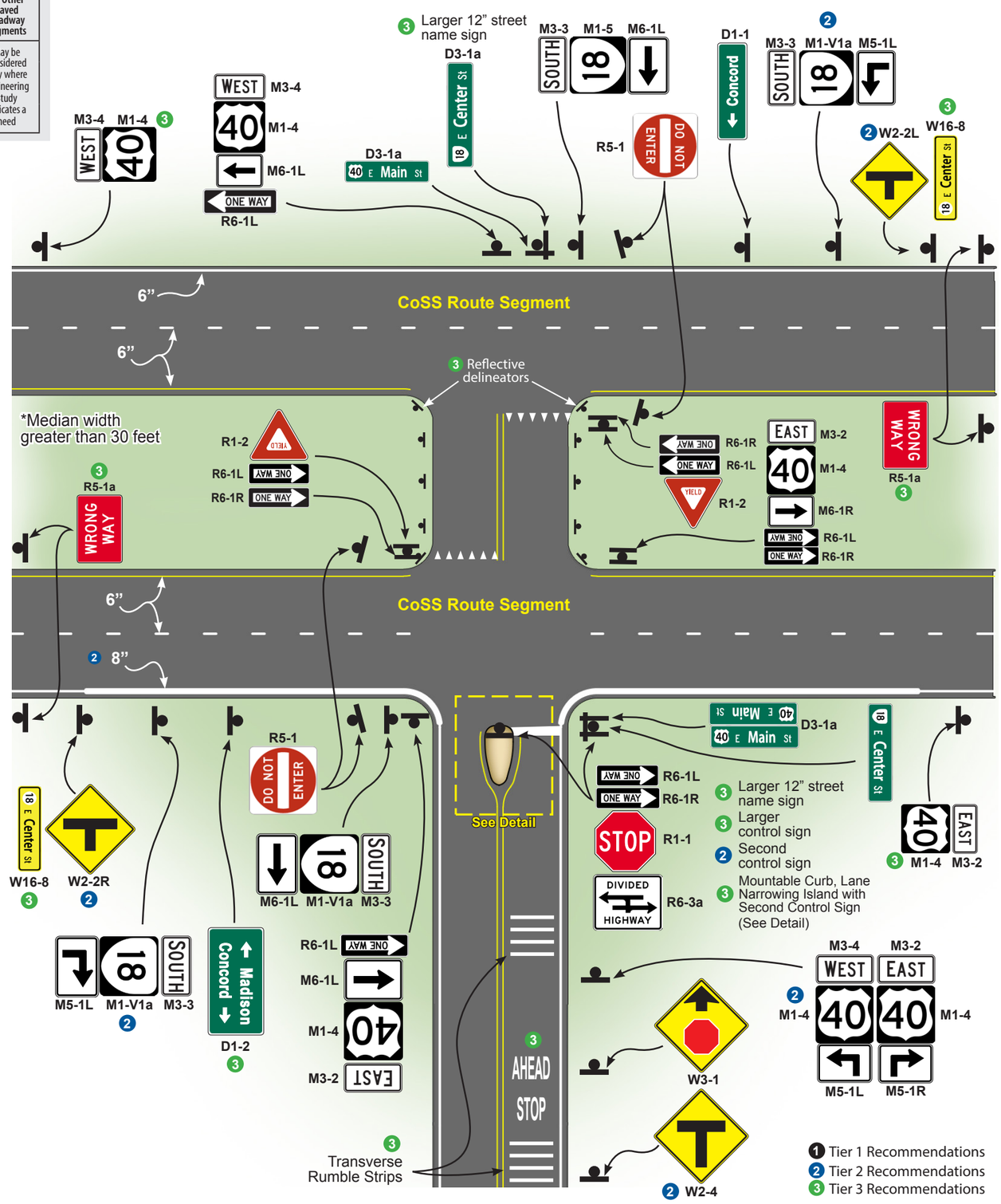
- If divided highway traffic volume > 400 AADT & Speed limit > 25 MPH



* Minimum lane width of 9' at median

** Minimum median width of 6' with second control sign. However, if larger control sign used, median must be at least 7' wide.





NOTES:

Signage

1. Upgraded signs with current MUTCD standards (font, size, retroreflectivity, placement, message, etc.)
1. Fluorescent yellow sheeting on change of direction warning signs
1. Control sign (R1 Series)
2. Second control sign (R1 Series) on left, if median is present and is greater than 6' in width, with a Keep right sign (R4-7) and object marker (OM3-L) facing opposite direction
3. Larger control sign
3. Mountable curb, lane narrowing island with second control sign (see detail)
1. OM-3L object marker and R4-7 Keep Right sign at end of mountable curb island
1. Yield sign on median crossover (R1-2)
1. Street name sign (D3-1a or D3-1 for local roads)
3. Larger 12" street name sign (D3-1a)
1. Intersecting route and directional sign (M1, M3, & M6 Series).Include signs for through movements only where through movement is a different route number.
2. Advance intersecting route and directional sign (M1, M3, & M5 Series)
3. Confirmation route signs (M1 & M3 Series)
3. Destination/guide sign (D1 Series) on CoSS
2. Advance intersection lane control signs (R3-8 Series) on approaches with turn lanes, or Begin Right Turn Lane sign (R3-20R) where only a right-turn lane is present
2. Intersection warning sign (W2 series)
3. Street name (W16-8) signs on CoSS approaches
1. Stop ahead sign (W3-1) on stop controlled approach
1. "Keep Right" sign and median object marker (OM-3 Series) on raised medians where it is not readily apparent that traffic is required to keep to the right (MUTCD Figure 2B-10)
1. "One Way" and "Do Not Enter" (R6 Series & R5-1) signs per VA Supplement
1. Divided highway (R6 Series)(see application details)
3. Wrong Way (R5-1a) signs on divided highway

Pavement Markings

1. Stop bar/yield line on all stop/yield controlled approaches, including median crossovers greater than 30 feet in width (MUTCD Section 3B.16)
1. 6" grooved/in-laid edge line on CoSS (see corridor template)
2. Wide (8") edge line approaching intersection and around intersection corner radius on approaches where speed is greater than 45 mph
1. Standard double yellow center line in median crossover (MUTCD Chapter 3B) if median is greater than 30' wide
1. 4" edge line on non-CoSS roads (see table for application guidance)
1. 4" center line pavement markings (see table for application guidance)
1. Solid lane and center line approaching intersection
1. Skip marks delineating turn lanes through the intersection when dual turn lanes are present
1. Skip marks at turn lane taper when taper length is greater than 100'
3. "Stop Ahead" or "Yield Ahead" pavement markings (MUTCD Section 3B.20)
2. Lane use pavement markings (MUTCD Section 3B.20)
3. Use rumble stripe for 8" markings

Other

1. If pedestrian accommodations are present, ensure minimum requirements for crossing (6" solid lines offset minimum 6' and placed 4' in advance of the stop bar) and crosswalk warning sign.
3. Reflectorized sign posts (MUTCD Section 2A.15)
3. Transverse rumble strips on stop controlled approach to CoSS
1. Trim vegetation to provide adequate sight distance
2. Mark obstructions within clear zone (OM-1, 2, or 3 Series)
3. Remove or provide a barrier for obstructions within clear zone
3. Reflective delineators around nose of median (Chapter 3F - MUTCD VA Supplement)

NOTE: Signage and pavement marking placement is not to scale. Depending upon site conditions, signs should share the same post to the extent possible in order to reduce sign clutter. Actual placement will be determined on a site by site basis based on MUTCD and VA Supplement design standards and guidance.

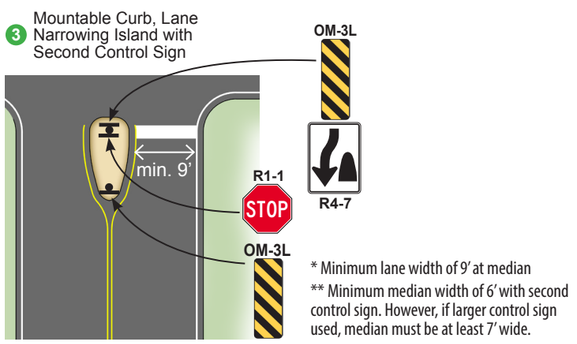
Template 5 – Unsignalized Intersection – 3-leg (1-way stop controlled), median separated (no crossover) (3 Tiers)

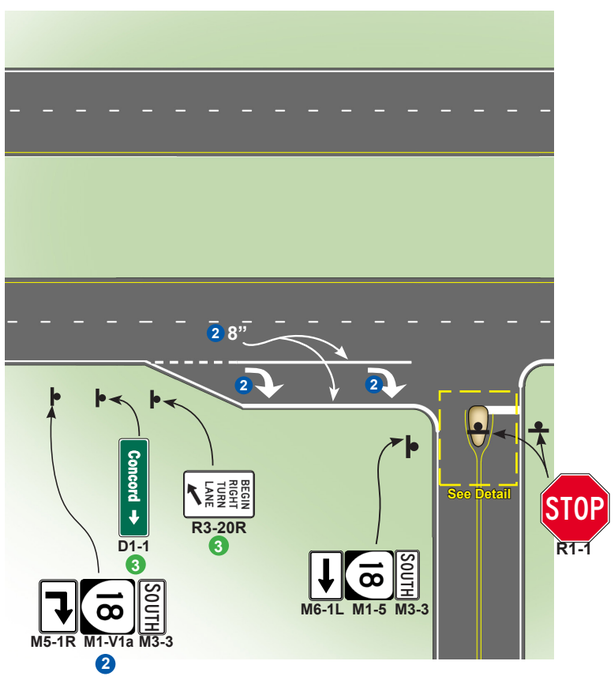
Criteria for Placement of Edge Line Markings (Source: Virginia Supplement Chapter 3B)

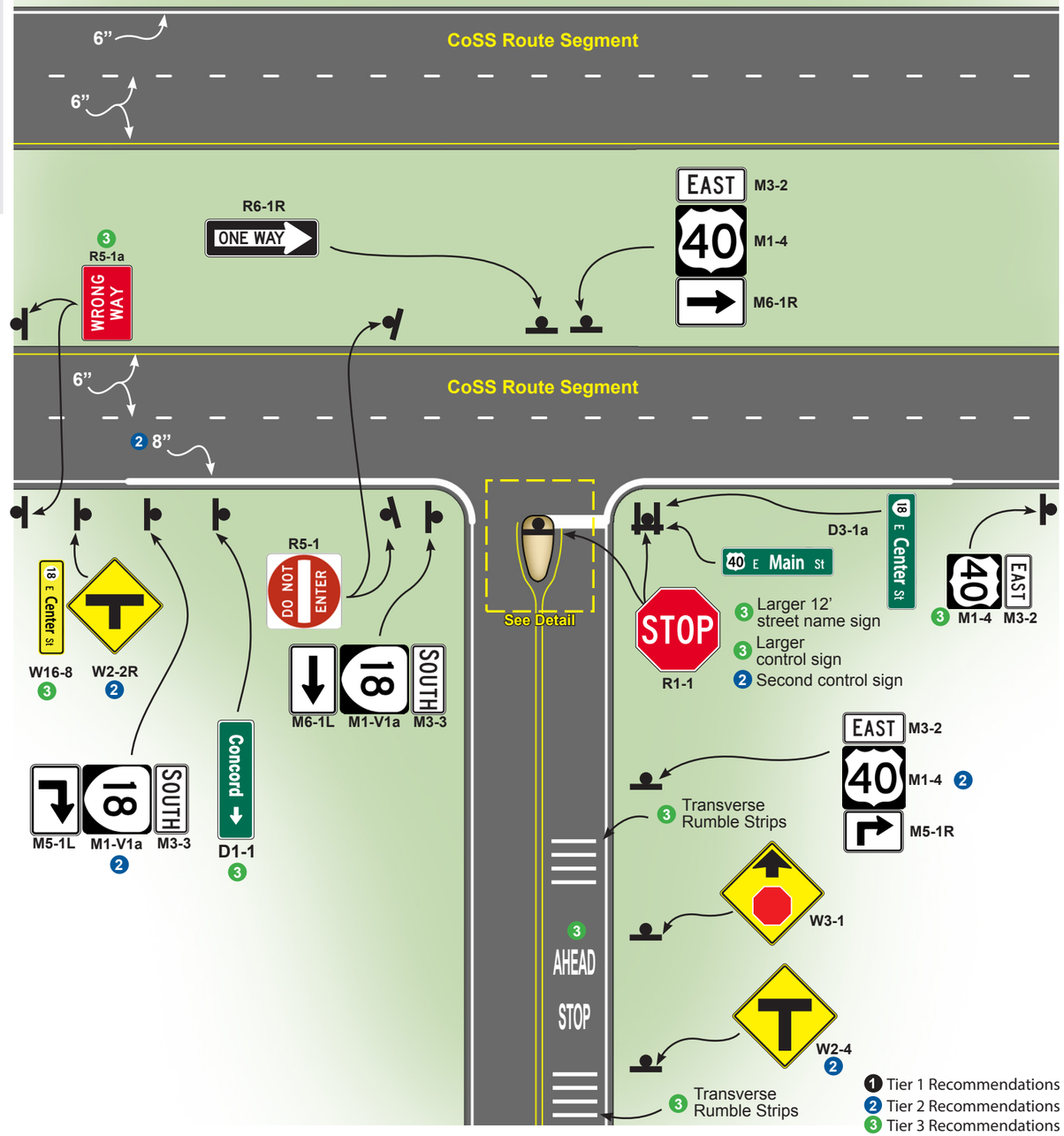
Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Two-lane Paved Roads with Center Line & without Curb and Gutter	Other Rural Arterials and Collectors	Local Residential	All Other Paved Roadway Segments
≥ 20 feet	≥ 3,000 vpd	Required	Required	Required	Recommended	Not Recommended unless primarily serving through traffic	May be considered only where Engineering Study indicates a need
	< 3,000 vpd	Required	Required	Required	May be considered only where Engineering Study indicates a need		
< 20 feet	≥ 3,000 vpd	Required	Required	May be considered only where Engineering Study indicates a need			
	< 3,000 vpd	Required	Required				

Criteria for Placement of Center Line Markings (Source: Virginia Supplement Chapter 3B))

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Other Non-Local Residential	Other Local Residential	Local Residential
≥ 18 feet	≥ 500 vpd	Required	Required	Required	Recommended	Recommended
	< 500 vpd	Required	Required	Optional (if warranted)	Optional	Recommended
< 18 feet	≥ 500 vpd	Required	Required	May be considered only where Engineering Study indicates a need		Recommended
	< 500 vpd	Required	Required			Recommended







NOTES:

Signage

1. Upgraded signs with current MUTCD standards (font, size, retroreflectivity, placement, message, etc.)
1. Fluorescent yellow sheeting on change of direction warning signs
1. Street name sign (D3-1a)
3. Larger street name sign (D3-1a)
1. Control signs (R1 Series)
2. Second control sign (R1 Series) on left, if median is present and is greater than 6' in width, with a Keep right sign (R4-7) and object marker (OM3-L) facing opposite direction
3. Larger control sign (R1 Series)
3. Mountable curb, lane narrowing island with second control sign (see detail)
1. OM-3L object marker and R4-7 Keep Right sign at end of mountable curb island
1. Intersecting route and directional sign (M1, M3, & M6 Series). Include signs for through movements only where through movement is a different route number.
2. Advance intersecting route and directional sign (M1, M3, & M5 Series)
3. Confirmation route signs (M1 & M3 Series) on primary routes
1. "One Way" and "Do Not Enter" signs per MUTCD VA Supplement (R6-1 Series and R5-1)
3. Destination/guide sign (D1 Series) on CoSS
3. Begin Right Turn Lane sign (R3-20R)
2. Intersection warning sign (W2 series) on intersecting approaches
3. Street name signs (W16-8) on CoSS approaches
1. Stop ahead sign (W3-1) on stop controlled approach
3. Wrong Way (R5-1a) signs on divided highway

Pavement Markings

1. Stop bar/yield line (MUTCD Section 3B.16)
1. 6" grooved/in-laid edge line on CoSS (see corridor template)
2. Wide (8") edge line approaching intersection, around intersection corner radius, and on turn lane skip marks approaches where speed is greater than 45 mph
1. 4" edge line on non-CoSS roads (see table for application guidance)
1. 4" center line pavement markings (see table for application guidance)
1. Solid lane and center line approaching intersection
1. Skip marks delineating turn lanes through the intersection when dual turn lanes are present
1. Skip marks at turn lane taper when taper length is greater than 100'
2. Lane use pavement markings (MUTCD Section 3B.20)
3. "Stop Ahead" or "Yield Ahead" pavement markings (MUTCD Section 3B.20)
3. Use rumble stripe for 8" markings

Other

1. If pedestrian accommodations are present, ensure minimum requirements for crossing (6" solid lines offset minimum 6 feet and placed 4 feet in advance of the stop bar) and crosswalk warning sign.
3. Reflectorized sign posts (MUTCD Section 2A.15)
3. Transverse rumble strips on stop controlled approach to CoSS
1. Trim vegetation to provide adequate sight distance
2. Mark obstructions with clear zone (OM-1, 2, or 3 Series)
3. Remove or provide a barrier for obstructions within clear zone

NOTE: Signage and pavement marking placement is not to scale. Depending upon site conditions, signs should share the same post to the extent possible in order to reduce sign clutter. Actual placement will be determined on a site by site basis based on MUTCD and VA Supplement design standards and guidance.

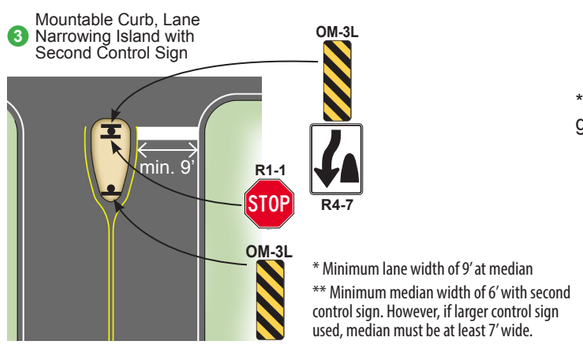
Template 2 – Unsignalized Intersection – 4-leg (2-way stop controlled), median separated (3 Tiers)

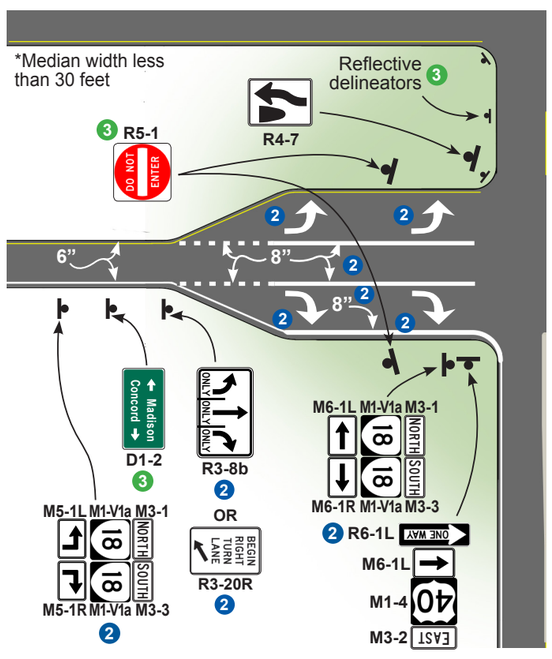
Criteria for Placement of Edge Line Markings (Source: Virginia Supplement Chapter 3B)

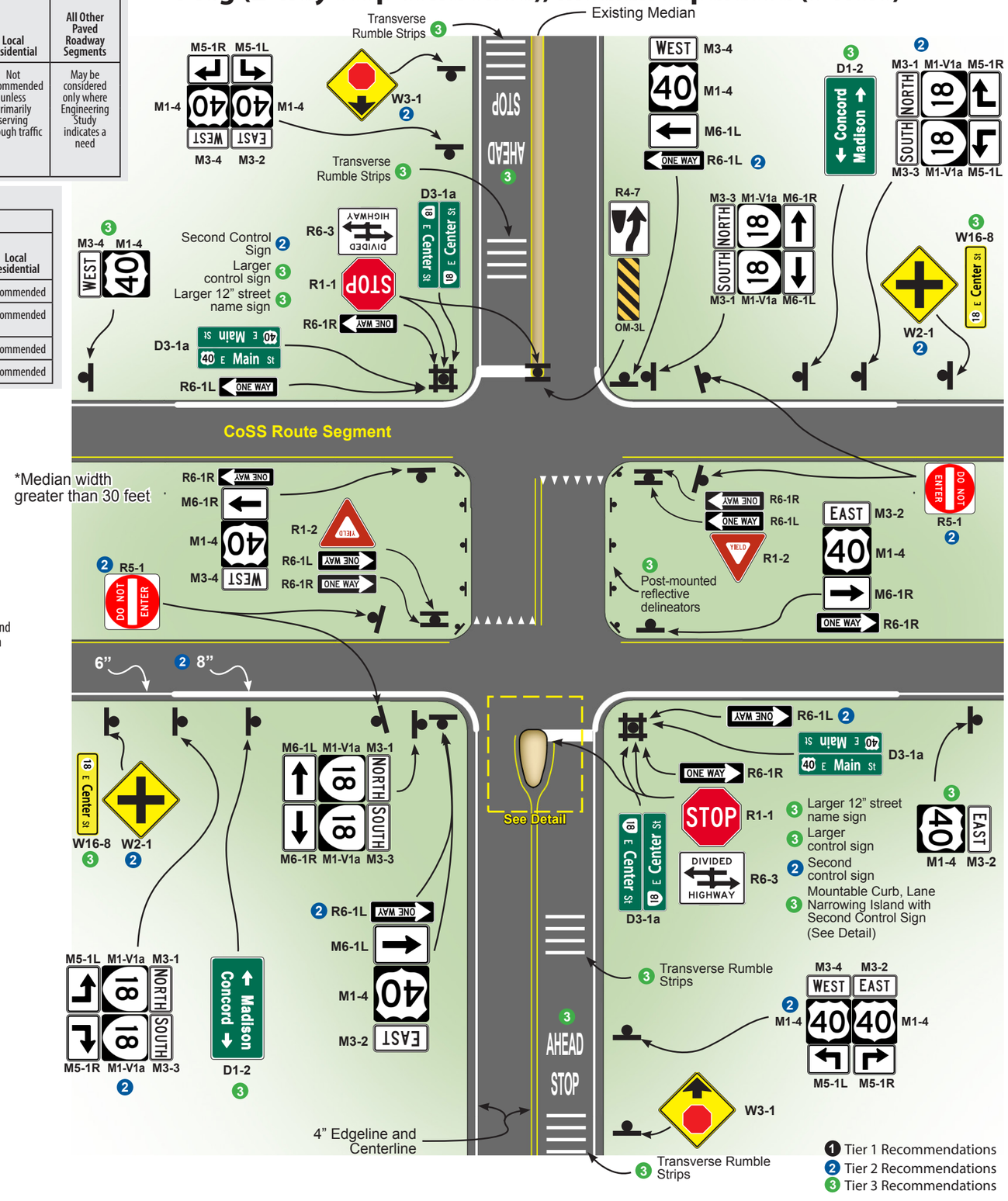
Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Two-lane Paved Roads with Center Line & without Curb and Gutter	Other Rural Arterials and Collectors	Local Residential	All Other Paved Roadway Segments
≥ 20 feet	≥ 3,000 vpd	Required	Required	Required	Recommended	Not Recommended unless primarily serving through traffic	May be considered only where Engineering Study indicates a need
	< 3,000 vpd	Required	Required	Required	May be considered only where Engineering Study indicates a need		
< 20 feet	≥ 3,000 vpd	Required	Required	May be consid-ered only where Engineering Study indicates a need			
	< 3,000 vpd	Required	Required				

Criteria for Placement of Center Line Markings (Source: Virginia Supplement Chapter 3B))

Pave-ment Width	Traffic Volume	Roadway Type: Undivided Limited Access	Bi-directional multi-lane	Other Non-Local Residential	Other Local Residential	Local Residential
≥ 18 feet	≥ 500 vpd	Required	Required	Required	Recommended	Recommended
	< 500 vpd	Required	Required	Optional (if warranted)	Optional	Recommended
< 18 feet	≥ 500 vpd	Required	Required	May be considered only where Engineering Study indicates a need		Recommended
	< 500 vpd	Required	Required			Recommended







NOTES:

Signage

- 1 Upgraded signs with current MUTCD standards (font, size, retroreflectivity, placement, message, etc.)
- 1 Fluorescent yellow sheeting on change of direction warning signs
- 1 Control sign (R1Series)
- 2 Second control sign (R1 Series) on left, if median is present and is greater than 6' in width, with a Keep right sign (R4-7) and object marker (OM3-L) facing opposite direction
- 3 Larger control sign (R1 Series)
- 3 Mountable curb, lane narrowing island with second control sign (see detail)
- 1 OM-3L object marker and R4-7 Keep Right sign at end of mountable curb island
- 1 Street name sign (D3-1a or D3-1 for local roads)
- 3 Larger 12" street name sign (D3-1a)
- 1 Intersecting route and directional sign (M1, M3, & M6 Series). Include signs for through movement only where through movement is a different route number.
- 2 Advance intersecting route and directional sign (M1, M3, & M5 Series)
- 3 Confirmation route signs (M1 & M3 Series) on primary routes
- 3 Destination/guide sign (D1 Series) on CoSS
- 2 Advance intersection lane control signs (R3-8 Series) on approaches with turn lanes, or Begin Right Turn Lane sign (R3-20R) where only a right-turn lane is present
- 2 Intersection warning sign (W2 series) on approaches that are not controlled
- 3 Street name (W16-8) signs on CoSS approaches
- 1 Stop ahead sign (W3-1) on stop controlled approaches
- 1 "One Way" and "Do Not Enter" (R6 Series & R5-1) signs per VA Supplement
- 1 "Keep Right" sign and median object marker (OM-3 Series) on raised medians where it is not readily apparent that traffic is required to keep to the right (MUTCD Figure 2B-10)
- 1 Divided highway (R6 Series)(see application details)

Pavement Markings

- 1 Stop bar/yield line on all stop/yield controlled approaches, including median crossovers greater than 30 feet in width (MUTCD Section 3B.16)
- 1 6" grooved/in-laid edge line on CoSS (see corridor template)
- 2 Wide (8") edge line approaching intersection and around intersection corner radius on approaches where speed is greater than 45 mph
- 1 4" edge line on non-CoSS roads (see table for application guidance)
- 1 4" center line pavement markings (see table for application guidance)
- 1 Solid lane and center line approaching intersection
- 1 Skip marks delineating turn lanes through the intersection when dual turn lanes are present
- 1 Skip marks at turn lane taper when taper length is greater than 100'
- 2 Lane use pavement markings (MUTCD Section 3B.20)
- 3 "Stop Ahead" or "Yield Ahead" pavement markings (MUTCD Section 3B.20)
- 3 Use rumble stripe for 8" markings

Other

- 1 If pedestrian accommodations are present, ensure minimum requirements for crossing (6" solid lines offset minimum 6' and placed 4' in advance of the stop bar) and crosswalk warning sign
- 3 Reflectorized sign posts (MUTCD Section 2A.15)
- 1 Trim vegetation to provide adequate sight distance
- 2 Mark obstructions within clear zone (OM-1, 2, or 3 series)
- 3 Remove or provide a barrier for obstructions within clear zone
- 3 Reflective delineators around nose of median (if present) (Chapter 3F-MUTCD VA Supplement)
- 3 Transverse rumble strips on stop controlled approach to CoSS

NOTE: Signage and pavement marking placement is not to scale. Depending upon site conditions, signs should share the same post to the extent possible in order to reduce sign clutter. Actual placement will be determined on a site by site basis based on MUTCD and VA Supplement design standards and guidance.

Divided Highway Crossing Sign Application (R6-3, R6-3a)

When to use:

- Unsignalized minor-street approaches from which both left turns and right turns are permitted onto a divided highway with a median width of > 30'

May be omitted if:

- If divided highway traffic volume > 400 AADT & Speed limit > 25 MPH

Template 6 – Unsignalized Intersection – Rural Village: 4-leg (2-way stop controlled), undivided

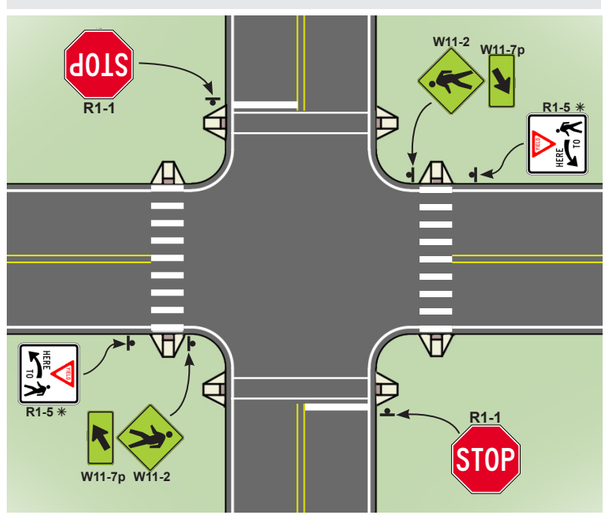
Yield Here to Pedestrian Signs (R1-5, R1-5A)
(Source: Section 2B.11 MUTCD VA Supplement)

- If yield lines and Yield Here To Pedestrians signs are used in advance of a crosswalk that crosses an uncontrolled multi-lane approach, they should be placed 20 to 50 feet in advance of the nearest crosswalk line (see Section 3B.16 and Figure 3B-17(VA) in this Supplement), and parking should be prohibited in the area between the yield (stop) line and the crosswalk.
- Yield Here to Pedestrians signs may be used in advance of a crosswalk that crosses an uncontrolled multi-lane approach to indicate to road users where to yield even if yield lines are not used.
- Yield lines and Yield Here To Pedestrians signs should not be used in advance of crosswalks that cross an approach to or departure from a roundabout.
- If a W11-2 sign has been post-mounted at the crosswalk location where a Yield Here To Pedestrians sign is used on the approach, the Yield Here To Pedestrians sign shall not be placed on the same post as or block the road user's view of the W11-2 sign.

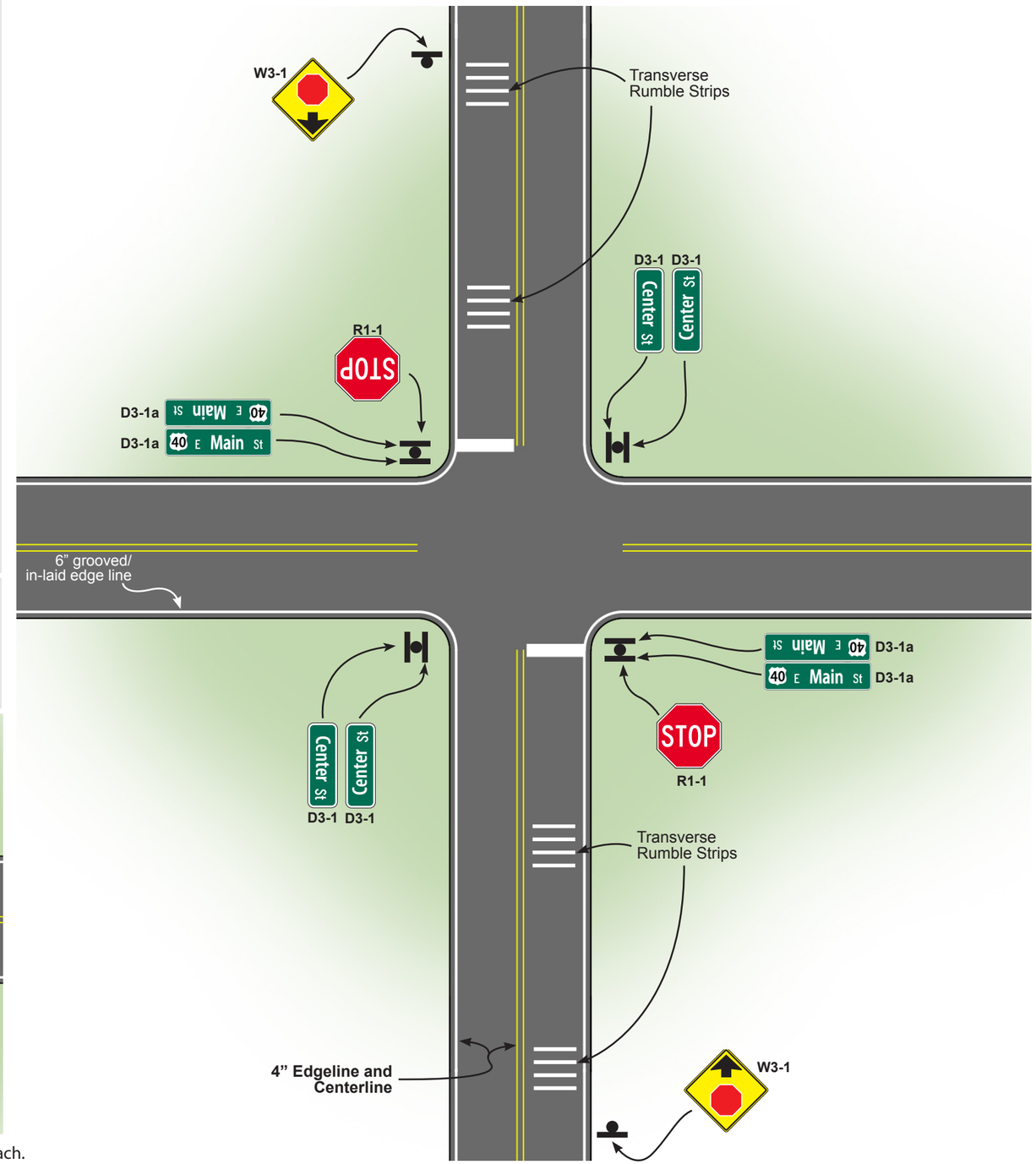
Supplemental Warning Plaques (W16-2/3/4 Series, W16-7P,W16-9P)
(Source 2C.53)

- Supplemental warning plaques shall be used only in combination with warning or regulatory signs; installed on the same post(s) as the warning or regulatory sign that it supplements and with the same legend, border, and background color as the warning sign with which it is displayed. A supplemental warning plaque used with a regulatory sign shall have a black legend and border on a yellow background.
- The Distance Ahead (W16-2 series and W16-3 series) plaques may be used to inform the road user of the distance to the condition indicated by the warning sign. These plaques can be used to indicate the distance to a specific crossing.
- The Next Distance (W16-4P) plaque may be used to inform road users of the length of roadway over which the condition indicated by the warning sign exists. This plaque can be used to indicate a specific length of road with multiple crossings.

Pedestrian Measures:
Where crosswalks and pedestrian signal phases do not already exist, they shall not be installed except where justified. Crosswalks across uncontrolled locations should not be installed without an engineering study as per VDOT's Guidelines for the Installation of Marked Crosswalks document.



✳ R1-5 signs should only be used where there is a multi-lane approach.



NOTES:
This template is for rural villages or more developed rural areas with speeds of 35 mph or less.

Signage

- Upgraded signs with current MUTCD standards (font, size, retroreflectivity, placement, message, etc.)
- Fluorescent yellow sheeting on change of direction warning signs
- Control sign (R1 series)
- Intersecting route and directional sign (M1, M3, & M6 Series) only at intersections with primary routes or secondary route of more importance. Include signs for through movements only where through movement is a different route number.
- Street name sign (D3-1a or D3-1 for local roads)
- Stop ahead warning sign (W3-1) on stop controlled approach

Pavement Markings

- Stop bar/yield line (MUTCD Section 3B.16)
- 6" grooved/in-laid edge line on CoSS (see corridor template)
- 4" edge line on non-CoSS roads (see table for application guidance)
- 4" center line pavement markings (see table for application guidance)

Other

- Trim vegetation provide adequate sight distance
- If pedestrian accommodations are present, ensure minimum requirements for crossing (6" solid lines offset minimum 6 feet and placed 4 feet in advance of the stop bar). See inset and Template 16 for pedestrian measures.
- Reflectorized sign posts (MUTCD Section 2A.15)
- Transverse rumble strips on stop controlled approaches

NOTE: Signage and pavement marking placement is not to scale. Depending upon site conditions, signs should share the same post to the extent possible in order to reduce sign clutter. Actual placement will be determined on a site by site basis based on MUTCD and VA Supplement design standards and guidance.

Edge Line Application (Source: MUTCD Chapter 3B)

Functional Class	Pavement Width	AADT
Rural Arterials & Collectors	>= 20'	>= 3,000
Local	Where curb is not present	>= 3,000

Center Line Application (Source: MUTCD Chapter 3B)

Functional Class	Pavement Width	AADT
Urban Arterials & Collectors	>=20'	>= 4,000
Rural Arterials & Collectors	>= 18'	>= 3,000
Local	>=16'	N/A

APPENDIX H-8

Park and Ride Design Guidelines

INTRODUCTION

Historically, there has not been a "go to" resource for developing or retrofitting Park & Ride lots in Virginia, making it challenging for local governments and agencies to design a lot that is safe, accessible, environmentally sensitive, and compliant with federal and state requirements.

The Park & Ride Design Guidelines, developed by the Virginia Department of Transportation (VDOT), seek to add clarity to Park & Ride design and provide a user-friendly framework from which users can make informed decisions regarding lot layout, services, amenities, and green infrastructure. The Guidelines are not prescriptive, but are intended to streamline information from agencies, such as VDOT, the Department of Rail and Public Transportation (DRPT), the Virginia Department of Conservation and Recreation (DCR), and the Virginia Department of Environmental Quality (DEQ). VDOT's Road Design Manual is particularly important, as it includes requirements for ADA parking and accessibility, drop-off and pick-up areas, bus loading/unloading, and other important requirements. *Note: the Road Design Manual is only viewable in Internet Explorer.*

UNDERSTANDING THE GUIDELINES

The Guidelines are segmented by lot type (High Density, Medium Density, Low Density) to help distinguish lots based on their services, amenities, and surrounding environments. These lot types were loosely developed based on the VTrans2040 Placetypes, but are not rigidly defined because VDOT understands that each lot varies in terms of its purpose and need. The lot types are briefly described below and illustrated through aerial visualizations.

HIGH DENSITY LOTS

High Density Lots are typically located in multimodal suburban/urban areas that are accessible by high capacity transit (Metrorail or frequent bus service) and to cyclists and/or pedestrians. They typically require specific traffic patterns and designated entrances/exits for varying vehicle types (transit, bicycles, single-occupancy vehicles etc.). They offer various services amenities and utilize a range of green infrastructure.

MEDIUM DENSITY LOTS

Medium Density Lots are typically located in suburban areas and/or near interstates/interchanges. They typically have bus service, car/vanpooling (including slugging), and may be accessible to cyclists and/or pedestrians. They typically require specific traffic patterns and may have designated entrances/exits for transit vehicles. They offer various services and amenities (based on lot size and demand) and include a range of green infrastructure.

LOW DENSITY LOTS

Low Density Lots are typically located in rural areas near interstates or arterial roadways. They typically have limited transit service, if at all, are typically used for car/vanpooling, and may require one-way traffic patterns and/or angled parking. They typically include green infrastructure.

Each lot type is displayed in the context of three themes: 1) Lot Layout; 2) Amenities and Features and; 3) Green Infrastructure and Technology, each of which is presented based on a series of potential characteristics (see Table 1).

In addition, the Guidelines identify the "Required", "Preferred", and, in some cases, "Suggested" features for each of the three themes. Required Features are typically consistent with federal and/or state guidelines; Preferred Features are recommended, but may depend on lot needs and characteristics; and Suggested Features are encouraged when feasible, but are not required. Design graphics are provided for illustrative purposes to show required, preferred and suggested accommodations and amenities and do not constitute design standards for referenced facilities. As referenced, the VDOT Road Design Manual provides detailed design guidance and specifications on amenities.

Table 1: Design Guidelines - Lot Characteristics

LOT LAYOUT	AMENITIES & FEATURES	GREEN INFRASTRUCTURE & TECHNOLOGY
Parking	Bike parking	Vegetation
Drop-off and pick-up (kiss & ride)	Bus stops and shelters	Stormwater management
Bus loading/unloading areas	Trash receptacles	Solar energy
Access/egress	Safety	Green technology
Vehicle circulation	Lighting	Integrated corridor management (ICM)
Non-vehicle circulation	Signage	
Car/vanpooling (including slugging)		

OTHER NOTES

The Guidelines are intended for digital viewing and hyperlinks are provided in cases where additional information may be needed. For example, the Guidelines frequently reference the VDOT Road Design Manual for more detailed requirements. *Note: the Road Design Manual is only viewable in Internet Explorer.*

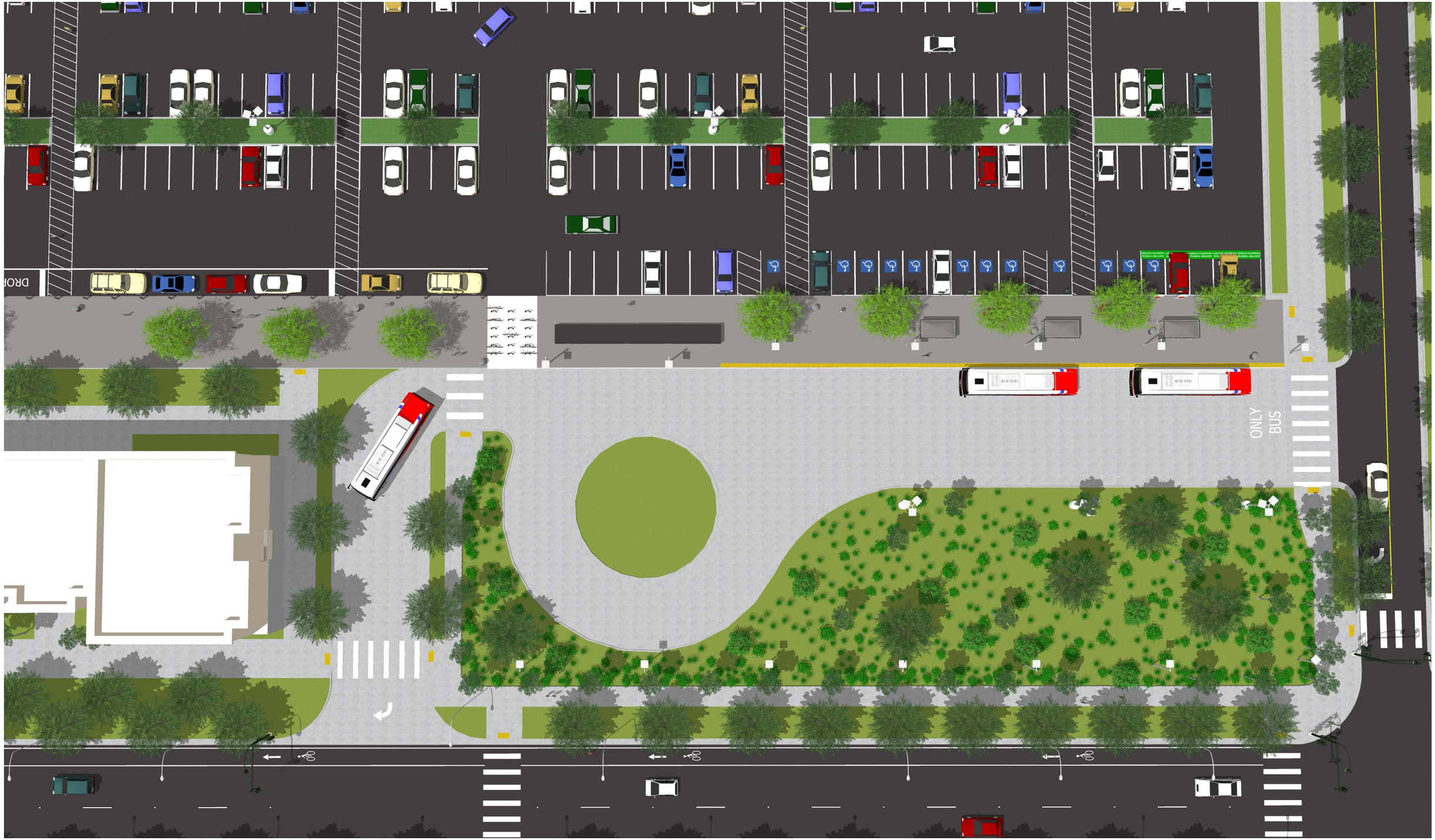
Prepared for:

Virginia Department of Transportation

Prepared by:

Michael Baker INTERNATIONAL

HIGH DENSITY PARK & RIDE LOT: VISUALIZATION AND EXAMPLE



The Park & Ride Design Guidelines provide various perspectives of the High Density Lot, helping users visualize the range of required, preferred, and suggested features.
Design graphics are provided for illustrative purposes and do not constitute design standards for referenced facilities/amenities.

HIGH DENSITY LOTS

Falls Church, Va (High Density Lot)

HIGH DENSITY LOTS

High density lots are typically located in multimodal suburban/urban areas that are accessible by foot, bicycle, and high capacity transit (Metrorail or frequent bus service). They typically have two-way traffic patterns, 90-degree parking and designated entrances/exits for transit vehicles. They offer various services and amenities and utilize a range of "green" parking lot techniques to minimize stormwater runoff.

LOT LAYOUT

REQUIRED FEATURES

A PARKING

Install perpendicular, 90-degree parking in order to maximize the number of spaces. Provide ADA-accessible parking (approximately 2-3% of all spaces must comply with ADA Standards for Accessible Design). See VDOT Road Design Manual for precise requirements, including van accessibility accommodations (Appendix C, Section C-1-Design Features - Park and Ride Lots).

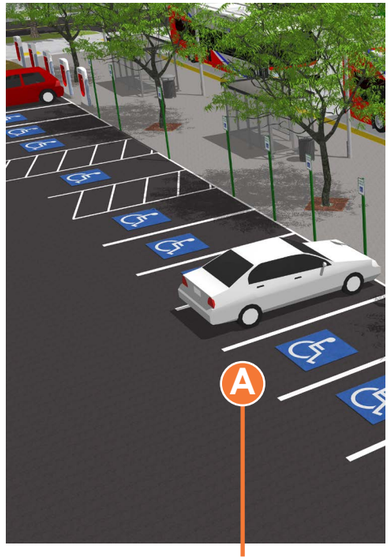
B DROP-OFF AND PICK UP

Include passenger drop-off and pick-up areas (kiss & ride) that are *at least* 8' wide and 20' long. See VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features - Park and Ride Lots).

C BUS LOADING/UNLOADING

If served by transit, provide bus boarding lanes (minimum of 12' wide) and bus boarding areas (minimum of 50' long) for each standard bus (70' for each articulated bus). Work with the local transit agencies to provide sufficient space for bus queuing. See VDOT Road Design Manual for design details on different bus boarding configurations (Appendix C, Section C-1-Design Features - Bus Turnout Design).

Figure 1: Bus Loading Area in High Density Lot



2-3% of spaces should be ADA-compliant

Figure 2: Bus Loading Area in High Density Lot

Bus boarding lanes that are at least 12' wide and 50' long for each standard bus (70' for articulated buses)

D VEHICLE CIRCULATION

Include 26' parking aisles (minimum) for lots with two-way traffic and 90-degree parking. See the VDOT Road Design Manual for detail on minimum one-way and two-way aisle widths for 90, 60, and 45-degree parking configurations (Appendix C, Section C-1-Design Features - Rest Areas). If served by transit, include Bus Only lanes and bus queuing areas. Include designated areas for drop-off/pick-up.

High Density Lot Overview

Include 26' parking aisles (minimum) for lots with two-way traffic and 90-degree parking

Provide two entrances. Provide access points on collectors or local streets rather than on major arterials or freeway ramps

Install 5'-7' wide sidewalks on the lot's periphery and between parking areas. Utilize high visibility crosswalks (ladder, zebra, continental)

E NON-VEHICLE CIRCULATION

Install walkways or sidewalks to connect parking areas and boarding areas. Sidewalks should be a minimum of 5' wide. Include ADA-accessible curb ramps for access onto sidewalks and loading areas. See the VDOT Roadway Design Manual (Appendix A, Section A-5-Bicycle and Pedestrian Facilities).

F SLUGGING ACCOMODATIONS

Provide designated areas/signage for slugging and include proper pedestrian accommodations to/from these areas.

PREFERRED FEATURES

G DROP-OFF AND PICK-UP

Provide a designated drop-off/pick-up area for mobility-on-demand services, like Uber and Lyft.

H ACCESS/EGRESS

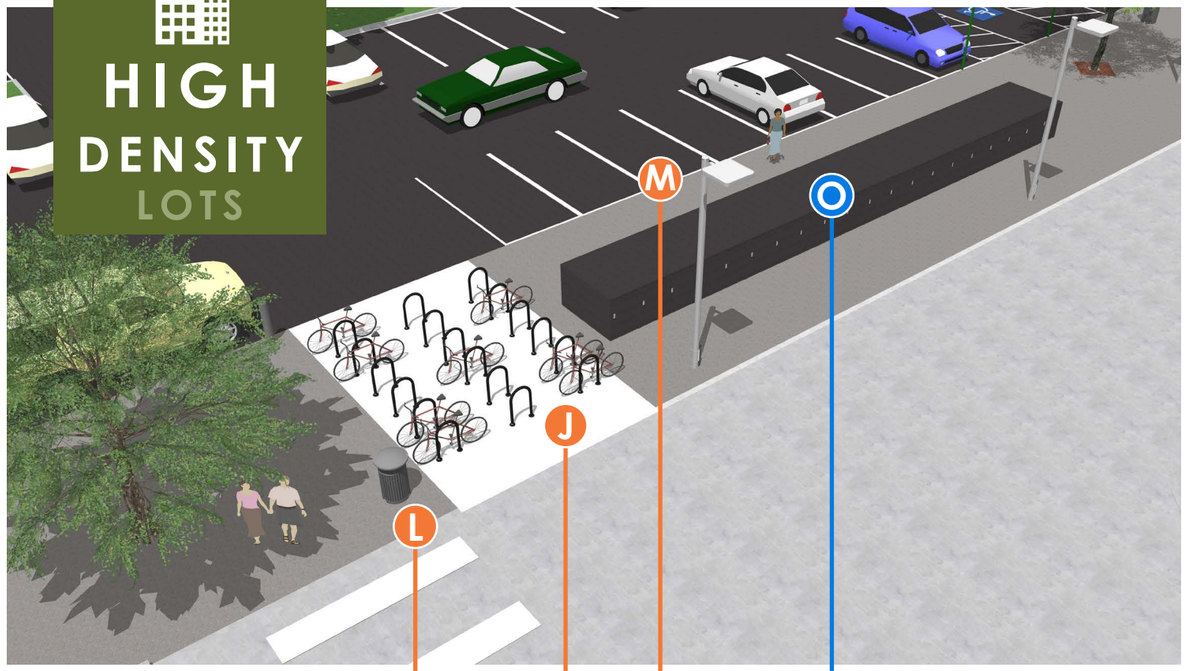
Provide two entrances. Provide access points on collectors or local streets rather than on major arterials or freeway ramps (Texas Transportation Institute).

I NON-VEHICLE CIRCULATION

Install 5'-7' wide sidewalks (NACTO, FHWA) on the lot's periphery and between parking areas. Utilize high visibility crosswalks (ladder, zebra, continental) where appropriate. Install 10' shared-use paths that connect to the surrounding area's active transportation network, If applicable (VDOT Road Design Manual, Appendix A, Section A-5-Bicycle and Pedestrian Facilities).

Figure 3: Bus Loading Area in High Density Lot

HIGH DENSITY LOTS



Bicycle Parking in High Density Lot

AMENITIES & FEATURES

REQUIRED FEATURES

J BIKE PARKING
Provide bicycle parking at a rate of 1 space for every 10 to 20 vehicle spaces. The "inverted u" is the preferred style and "comb racks" should be avoided. When installing, maintain the pedestrian through zone. See the Association of Pedestrian & Bicycle Professionals for more detail on installation/placement.

K BUS STOPS AND SHELTER
Provide Install shelters at bus transit stops (minimum 6' wide and 12' long). Visit the VDOT Road Design Manual for details on transit shelters (Appendix C, Section C-1-Design Features-Transit Signs, Benches, Stops, Shelters).

L TRASH
Install trash receptacles in **all** boarding areas.

M LIGHTING
Utilize fixtures that shield the light source to minimize light pollution, reduce glare, facilitate better vision at night, and conserve energy. Install LED lights to reduce carbon emissions, maximize energy efficiency, and reduce maintenance costs. The Department of Energy estimates that LED lighting can reduce parking lot energy use over 50% compared to typical code.

Bicycle parking should be provided at a rate of 1 to every 10-20 vehicle spaces

Consider installing bike lockers for additional security and all-day storage

Use fixtures that shield the light source to minimize light pollution, reduce glare, improve visibility at night, and conserve energy.

Install trash receptacles in all boarding areas

N SIGNAGE
Install directional signs and traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Coordinate with the local transit agencies to install bus route signage.

PREFERRED FEATURES

O BIKE PARKING
Consider installing covered bike racks and bike lockers for additional security and all-day storage.

P SHELTERS & BOARDING AREAS
Shelters should include a bench (with backrest) and a 2.5' x 4' area for wheelchairs or other mobility-assisted devices. Visit the VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features-Transit Signs, Benches, Stops, Shelters).

Q SECURITY
Install emergency assistance phones and video surveillance cameras (parking garages).

R SIGNAGE
Install bus timetables and route maps and provide bicycle route signage in accordance with the MUTCD. Utilize Integrated Corridor Management (ICM) technologies, such as digital, real-time information on parking space availability for travelers approaching the lot or station. Note: utility ROW may be required.

REQUIRED FEATURES

S VEGETATION
Install native, context-sensitive plants. Visit VIrginia DCR for information on Native Plants for Conservation, Restoration, and Landscaping.

Green Infrastructure in a High Density Lot

GREEN INFRASTRUCTURE AND TECHNOLOGY

T STORMWATER MANAGEMENT
Utilize green infrastructure and low impact development, such as: bioswales and bioretention ponds. The Virginia Stormwater BMP Clearinghouse provides design standards and specifications for all stormwater best management practices (BMPs) approved for use in Virginia to control the quality and/or quantity of stormwater runoff. The NACTO Urban Street Stormwater Guide provides practitioners, leaders, and other advocates with the tools to design streets/spaces for successful stormwater management.

PREFERRED FEATURES

U STORMWATER MANAGEMENT
Utilize Porous Asphalt Mix (PAM) when constructing new lots or resurfacing existing lots. Benefits include: reducing stormwater runoff, recharging groundwater, and potentially increasing the "developable" area of the site (since permeable paving can significantly reduce the need for large stormwater management structures). Refer to VDOT Materials Division's Manual of Instructions - Section 605.02 for PAM applications.

Native, context-sensitive vegetation

Bioswale for low-impact stormwater management

Utilize permeable/porous surface to reduce stormwater runoff, recharge groundwater, and reduce the need for large stormwater management structures

V SOLAR
Install solar panels in high-sun areas to reduce energy costs and minimize environmental impacts.

W GREEN TECHNOLOGY
Install electric vehicle (EV) charging stations in approximately 2% of all spaces. Consider accessibility, ease of use, and safety for disabled drivers, including those using wheelchairs or other assistive equipment.

SUGGESTED FEATURES

X VEGETATION
Include landscaping across approximately 10-20% of the lot (AASHTO).

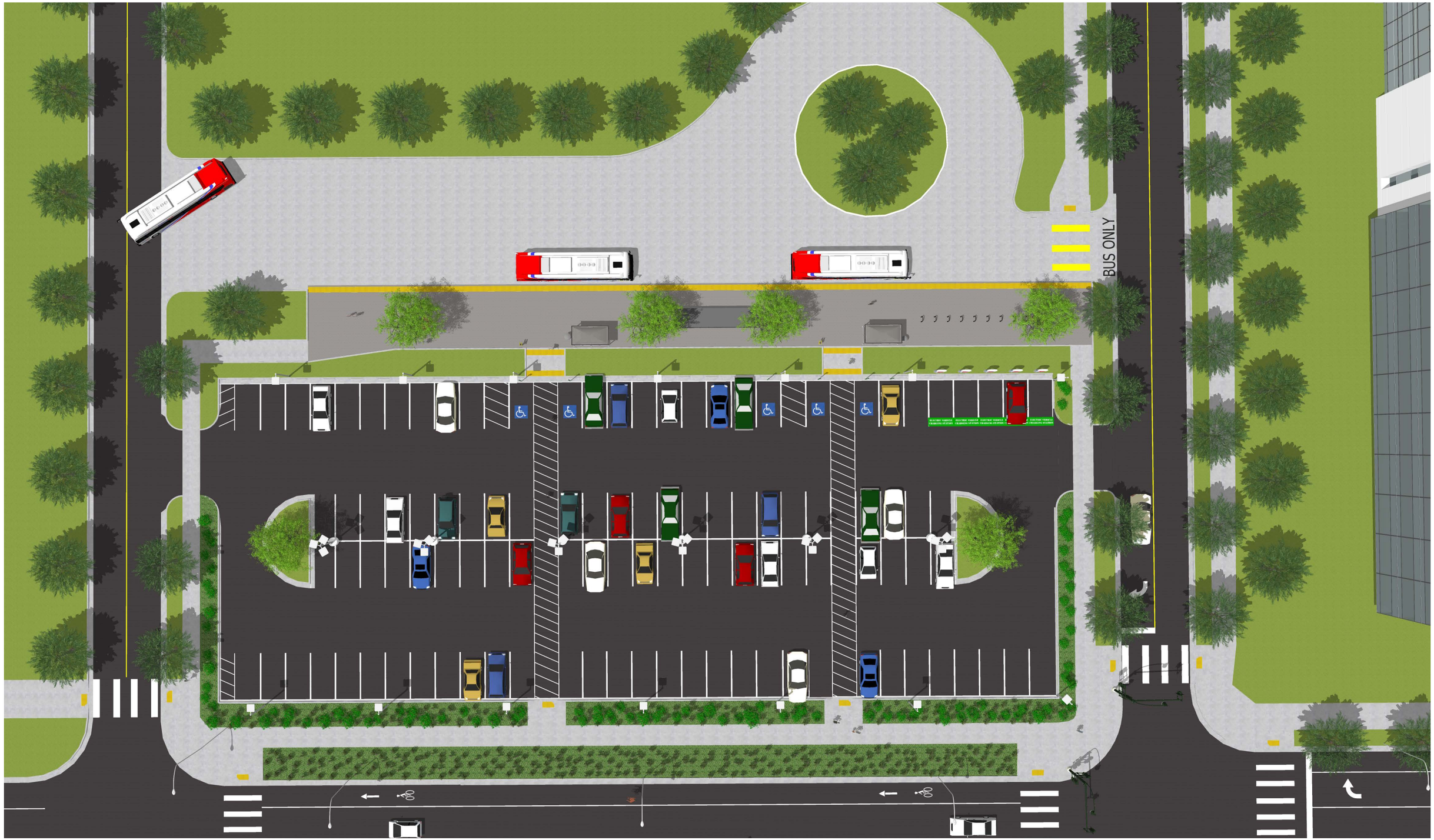
Y SOLAR
Consider installing solar canopies, which can maximize space, provide shelter for cars, and charge electric vehicles.

Figure 4: Electric Vehicle Charging in High Density Lot

Electric vehicle (EV) charging stations in priority locations while maintaining ADA parking access

Landscaping covering 10-20% of lot

MEDIUM DENSITY PARK & RIDE LOT: VISUALIZATION AND EXAMPLE



The Park & Ride Design Guidelines provide various perspectives of the Medium Density Lot, helping users visualize the range of required, preferred, and suggested features.

Design graphics are provided for illustrative purposes and do not constitute design standards for referenced facilities/amenities.

MEDIUM DENSITY LOTS

Stafford Plaza Lot, Va (Medium Density Lot)

MEDIUM DENSITY LOTS

Medium density lots are typically located in suburban areas and/or near interchanges. They typically have bus service, casual carpooling (slugging), and may be accessible by bicycle. They typically have two-way traffic patterns, 90-degree parking and may have designated entrances/exits for transit vehicles. They offer various services and amenities (based on lot size and demand) and include a range of green infrastructure treatments.

LOT LAYOUT

REQUIRED FEATURES

A PARKING

Install perpendicular, 90-degree parking in order to maximize the number of spaces. Provide ADA-accessible parking (approximately 2-3% of all spaces must comply with ADA Standards for Accessible Design). See VDOT Road Design Manual for precise requirements, including van accessibility accommodations (Appendix C, Section C-1-Design Features - Park and Ride Lots).

B BUS LOADING/UNLOADING

If served by transit, provide bus boarding lanes (minimum of 12' wide) and bus boarding areas (minimum of 50' long) for each standard bus (70' for each articulated bus). Work with the local transit agencies to provide sufficient space for bus queuing. See VDOT Road Design Manual for design details on different bus boarding configurations (Appendix C, Section C-1-Design Features - Bus Turnout Design).

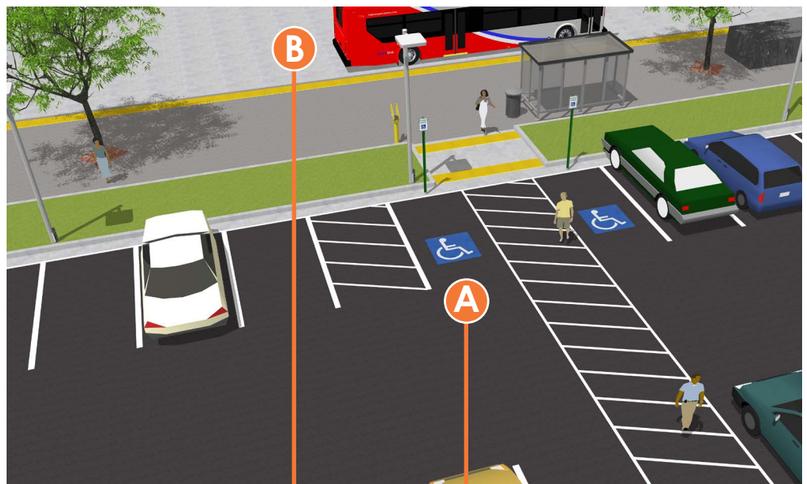
C VEHICLE CIRCULATION

Include 26' parking aisles (minimum) for lots with two-way traffic and 90-degree parking. See the VDOT Road Design Manual for detail on minimum one-way and two-way aisle widths for 90, 60, and 45-degree parking configurations (Appendix C, Section C-1-Design Features - Rest Areas).

D NON-VEHICLE CIRCULATION

Install walkways or sidewalks to connect parking areas and boarding areas. Sidewalks should be a minimum of 5' wide. Include ADA-accessible curb ramps for access onto sidewalks and loading areas. See the VDOT Road Design Manual (Appendix A, Section A-5-Bicycle and Pedestrian Facilities).

Figure 5: ADA Parking in Medium Density Lot



Bus boarding lanes that are at least 12' wide and 50' long for each standard bus (70' for articulated buses)

2-3% of spaces should be ADA-compliant

Medium Density Lot Overview

Bus Only lanes and bus queuing areas if lot is served by transit

Access points on collectors or local streets rather than on major arterials or freeway ramps

Walkways or sidewalks connecting parking areas to boarding areas (minimum 5' wide)

PREFERRED FEATURES

E DROP-OFF AND PICK-UP (KISS & RIDE)

Include passenger drop-off and pick-up areas (kiss & ride) that are at least 8' wide and 20' long. See VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features - Park and Ride Lots). Provide a designated drop-off/pick-up area for mobility-on-demand services, like Uber and Lyft.

F ACCESS/EGRESS

Provide two entrances. Provide access points on collectors or local streets rather than on major arterials or freeway ramps (Texas Transportation Institute).

G VEHICLE CIRCULATION

If served by transit, include Bus Only lanes and bus queuing areas. Include designated areas for drop-off/pick-up.

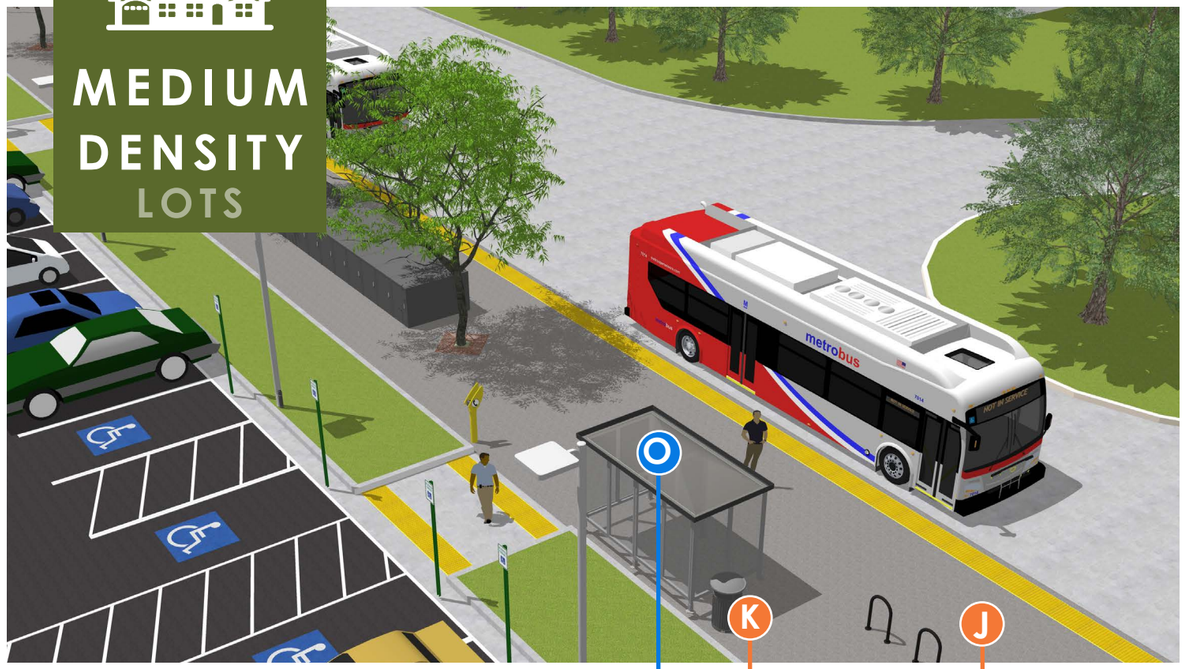
H NON-VEHICLE CIRCULATION

Install 5'-7' wide sidewalks (NACTO, FHWA) on the lot's periphery and between parking areas. Utilize high visibility crosswalks (ladder, zebra, continental) where appropriate. Install 10' shared-use paths that connect to the surrounding area's active transportation network, If applicable (VDOT Road Design Manual - Appendix A, Section A-5-Bicycle and Pedestrian Facilities).

I SLUGGING ACCOMODATIONS

Provide designated areas/signage for slugging and include proper pedestrian accommodations to/from these areas.

MEDIUM DENSITY LOTS



Bus Loading Zone in a Medium Density Lot

Medium Density Lot Overview

Utilize permeable/porous surface to reduce stormwater runoff, recharge groundwater, and reduce the need for large storm-water management structures

Install native, context-sensitive plants

Utilize green infrastructure such as bioswales if storm water management is required

Include landscaping across approximately 10-20% of the lot

If served by transit, install shelters in boarding areas.

Install trash receptacles in all boarding areas

Install bike racks (2-3 minimum)

AMENITIES & FEATURES

REQUIRED FEATURES

J BIKE PARKING
Install a minimum of 2-3 bike racks. The "inverted u" is the preferred style and "comb racks" should be avoided. When installing, maintain the pedestrian through zone. See the Association of Pedestrian & Bicycle Professionals for more detail on installation/placement.

K TRASH
Install trash receptacles in all boarding areas.

L LIGHTING
Utilize fixtures that shield the light source to minimize light pollution, reduce glare, facilitate better vision at night, and conserve energy. Install LED lights to reduce carbon emissions, maximize energy efficiency, and reduce maintenance costs. The Department of Energy estimates that LED lighting can reduce parking lot energy use over 50% compared to typical code.

M SIGNAGE
Install directional signs and traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Coordinate with the local transit agencies to install bus route signage.

PREFERRED FEATURES

N BICYCLE PARKING
Provide bicycle parking at a rate of 1 space for every 10 to 20 vehicle spaces. When installing racks, maintain the pedestrian through zone. [f] See www.apbp.org for more detail on recommended racks, installation, and placement. Consider including bike lockers at larger lots in multimodal environments.

O SHELTERS AND BOARDING AREAS
If applicable, install shelters at bus transit stops (approximately 6' wide and 12' long). Visit the VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features-Bus Stops).

P SECURITY
Install emergency assistance phones.

Q SIGNAGE
Install bus timetables and route maps and provide bicycle route signage in accordance with the MUTCD.

SUGGESTED FEATURES

R SHELTERS AND BOARDING AREAS
Shelters should include a bench (with back-rest) and a 2.5' x 4' area for wheelchairs or other mobility-assisted devices. Visit the VDOT Roadway Design Manual for detail (Appendix C, Section C-1-Design Features-Bus Stops).

S SIGNAGE
Utilize Integrated Corridor Management (ICM) technologies, such as digital, real-time information on parking space availability for travelers approaching the lot or station. Note: utility ROW may be required.

GREEN INFRASTRUCTURE AND TECHNOLOGY

REQUIRED FEATURES

T VEGETATION
Install native, context-sensitive plants. Visit Virginia DCR for information on Native Plants for Conservation, Restoration, and Landscaping.

U STORMWATER MANAGEMENT
Utilize green infrastructure and low impact development, such as: bioswales and bioretention ponds. The Virginia Stormwater BMP Clearinghouse provides design standards and specifications for all stormwater best management practices (BMPs) approved for use in Virginia to control the quality and/or quantity of stormwater runoff. The NACTO Urban Street Stormwater Guide provides practitioners, leaders, and other advocates with the tools to design streets/spaces for successful stormwater management.

PREFERRED FEATURES

V STORMWATER MANAGEMENT
Utilize Porous Asphalt Mix (PAM) when constructing new lots or resurfacing existing lots. Benefits include: reducing stormwater runoff, recharging groundwater, and potentially increasing the "developable" area of the site (since permeable paving can significantly reduce the need for large stormwater management structures). Refer to VDOT Materials Division's Manual of Instructions - Section 605.02 for PAM applications.

W SOLAR
Install solar panels in high-sun areas to reduce energy costs and minimize environmental impacts.

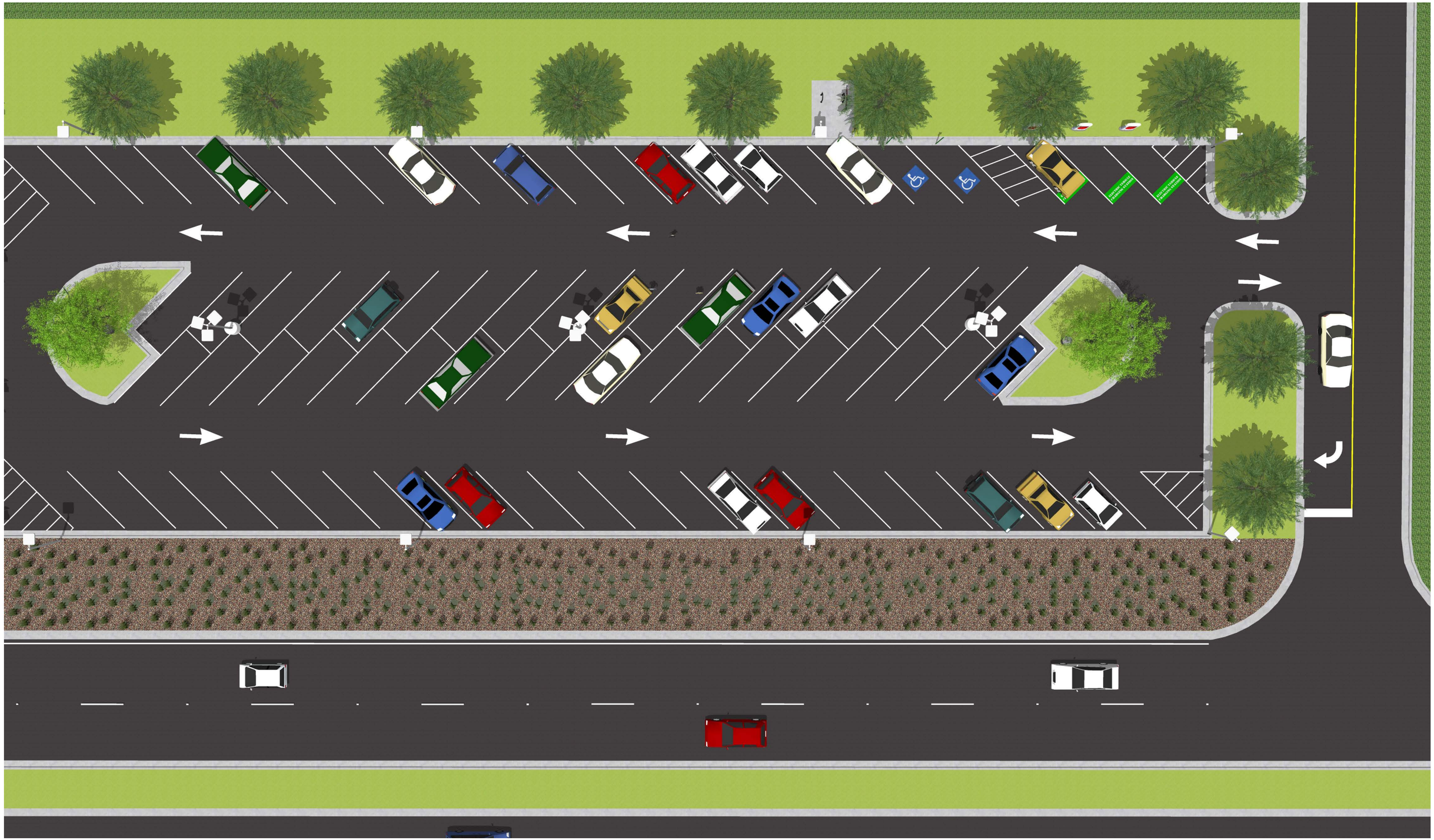
X GREEN TECHNOLOGY
Install electric vehicle (EV) charging stations in approximately 2% of all spaces. Consider accessibility, ease of use, and safety for disabled drivers, including those using wheelchairs or other assistive equipment.

SUGGESTED FEATURES

Y VEGETATION
Include landscaping across approximately 10-20% of the lot (AASHTO).

Z SOLAR
Consider installing solar canopies, which can maximize space, provide shelter for cars, and charge electric vehicles.

LOW DENSITY PARK & RIDE LOT: VISUALIZATION AND EXAMPLE



The Park & Ride Design Guidelines provide various perspectives of the Low Density Lot, helping users visualize the range of required, preferred, and suggested features.

Design graphics are provided for illustrative purposes and do not constitute design standards for referenced facilities/amenities.

LOW DENSITY LOTS

Midland, Va Lot

LOW DENSITY LOTS

Low density lots are typically located in rural areas near interstates or arterial roadways. They have limited transit service, if at all, and they typically have one-way traffic patterns and 60-degree parking. They include natural features (e.g. bioswales) to help manage stormwater runoff.

Include landscaping across approximately 10-20% of the lot

Utilize fixtures that shield the light source to minimize light pollution

Low Density Lot Overview

LOT LAYOUT

REQUIRED FEATURES

A PARKING

Utilize angled parking (60 degree or 45 degree) in order to facilitate one-way traffic circulation. Provide ADA-accessible parking (approximately 2-3% of all spaces must comply with ADA Standards for Accessible Design). See VDOT Road Design Manual for precise requirements, including van accessibility accommodations (Appendix C, Section C-1-Design Features - Park and Ride Lots).

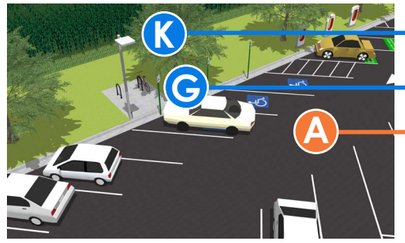
B BUS LOADING/UNLOADING

If served by transit, provide bus boarding lanes (minimum of 12' wide) and bus boarding areas (minimum of 50' long) for each standard bus (70' for each articulated bus). Work with the local transit agencies to provide sufficient space for bus queuing. See VDOT Road Design Manual for design details on different bus boarding configurations (Appendix C, Section C-1-Design Features - Bus Turnout Design).

C VEHICLE CIRCULATION

Include 15' parking aisles (minimum) for lots with one-way traffic and 60-degree parking. See the VDOT Road Design Manual for detail on minimum one-way and two-way aisle widths for 90, 60, and 45-degree parking configurations (Appendix C, Section C-1-Design Features - Rest Areas).

Figure 6: ADA Parking in a Low Density Lot



Use fixtures that shield the light source to minimize light pollution, reduce glare, improve visibility at night, and conserve energy.

Provide 2-3 bike racks

2-3% of spaces should be ADA-compliant

PREFERRED FEATURES

D NON-VEHICLE CIRCULATION

Install walkways or sidewalks to connect parking areas and boarding areas. Sidewalks should be a minimum of 5' wide. Include ADA-accessible curb ramps for access onto sidewalks and loading areas. See the VDOT Road Design Manual (Appendix A, Section A-5-Bicycle and Pedestrian Facilities).

SUGGESTED FEATURES

E DROP-OFF AND PICK-UP

If warranted based on demand, include passenger drop-off and pick-up areas (kiss & ride) that are at least 8' wide and 20' long. See VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features - Park and Ride Lots).

AMENITIES & FEATURES

REQUIRED FEATURES

F SIGNAGE

Install directional signs and traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

PREFERRED FEATURES

G BIKE PARKING

Provide 2-3 bike racks. The "inverted u" is the preferred style and "comb racks" should be avoided. When installing racks, maintain the pedestrian through zone. See the Association of Pedestrian & Bicycle Professionals for more detail on installation and placement.

H SHELTERS AND BOARDING AREAS

If applicable, install shelters at bus transit stops (approximately 6' wide and 12' long). Visit the VDOT Road Design Manual for detail (Appendix C, Section C-1-Design Features-Bus Stops).

TRASH

I Install trash receptacles.

SECURITY

J Install emergency assistance phones.

LIGHTING

K Utilize fixtures that shield the light source to minimize light pollution, reduce glare, facilitate better vision at night, and conserve energy. Install LED lights to reduce carbon emissions, maximize energy efficiency, and reduce maintenance costs. The Department of Energy estimates that LED lighting can reduce parking lot energy use over 50% compared to typical code.

SUGGESTED FEATURES

BIKE PARKING

L Consider installing bike lockers for additional security and all-day storage (based on demand).

SIGNAGE

M Coordinate with the local transit agencies to install bus route signage, if applicable.

GREEN INFRASTRUCTURE AND TECHNOLOGY

REQUIRED FEATURES

N VEGETATION

Install native, context-sensitive plants. Visit Virginia DCR for information on Native Plants for Conservation, Restoration, and Landscaping.

O STORMWATER MANAGEMENT

Utilize green infrastructure and low impact development, such as: bioswales and bioretention ponds. The Virginia Stormwater BMP Clearinghouse provides design standards and specifications for all stormwater best management practices (BMPs) approved for use in Virginia to control the quality and/or quantity of stormwater runoff. The NACTO Urban Street Stormwater Guide provides practitioners, leaders, and other advocates with the tools to design streets/spaces for successful stormwater management.

PREFERRED FEATURES

P SOLAR

Install solar panels in high-sun areas to reduce energy costs and minimize environmental impacts.

Figure 7: Green Infrastructure in Low Density Lot

Install native, context-sensitive plants

Utilize green infrastructure such as bioswales if storm water management is required

SUGGESTED FEATURES

Q VEGETATION

Include landscaping across approximately 10-20% of the lot (AASHTO).

R GREEN TECHNOLOGY

Install electric vehicle (EV) charging stations in approximately 2% of all spaces. Consider accessibility, ease of use, and safety for disabled drivers, including those using wheelchairs or other assistive equipment.

APPENDIX I

Preferred Intersection Alternatives

APPENDIX I-1

Intersection Concepts

US 29 at Lawless Creek Road - Short Term Unsignalized RCUT Concept

US 29 at Lawless Creek Road Short Term - RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and Lawless Creek Road to a Restricted Crossing U-Turn (RCUT). Construct median openings with loons to accommodate U-turns. The existing traffic signal would be removed.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	22.1 - C	18.9 - B	2.0 - A	0.7 - A
Southbound	24.3 - C	19.5 - B	0.4 - A	1.0 - A
Overall	26.4 - C	21.3 - C	-	-

Safety: A crash reduction of 35% would be expected by implementing an unsignalized RCUT improvement.

Cost:
Preliminary Engineering = $800,000
Right-of-Way = $710,000
Construction = $4,800,000
Total = $6,310,000

US 29 at Lawless Creek Road - Long Term Roundabout Concept

US 29 and Lawless Creek Road Long Term - Roundabout Concept

Recommendation: Reconfigure the intersection at US 29 and Lawless Creek Road to a roundabout. Consider possible options for road diet or bicycle and pedestrian accommodations to the north and south.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		Roundabout	
	AM	PM	AM	PM
Northbound	22.1 - C	18.9 - B	7.1 - A	10.6 - B
Southbound	24.3 - C	19.5 - B	13.3 - B	10.4 - B
Overall	26.4 - C	21.3 - C	10.1 - B	9.9 - A

Safety: A crash reduction of 60% would be expected by converting the existing signalized intersection to a roundabout.

Cost:

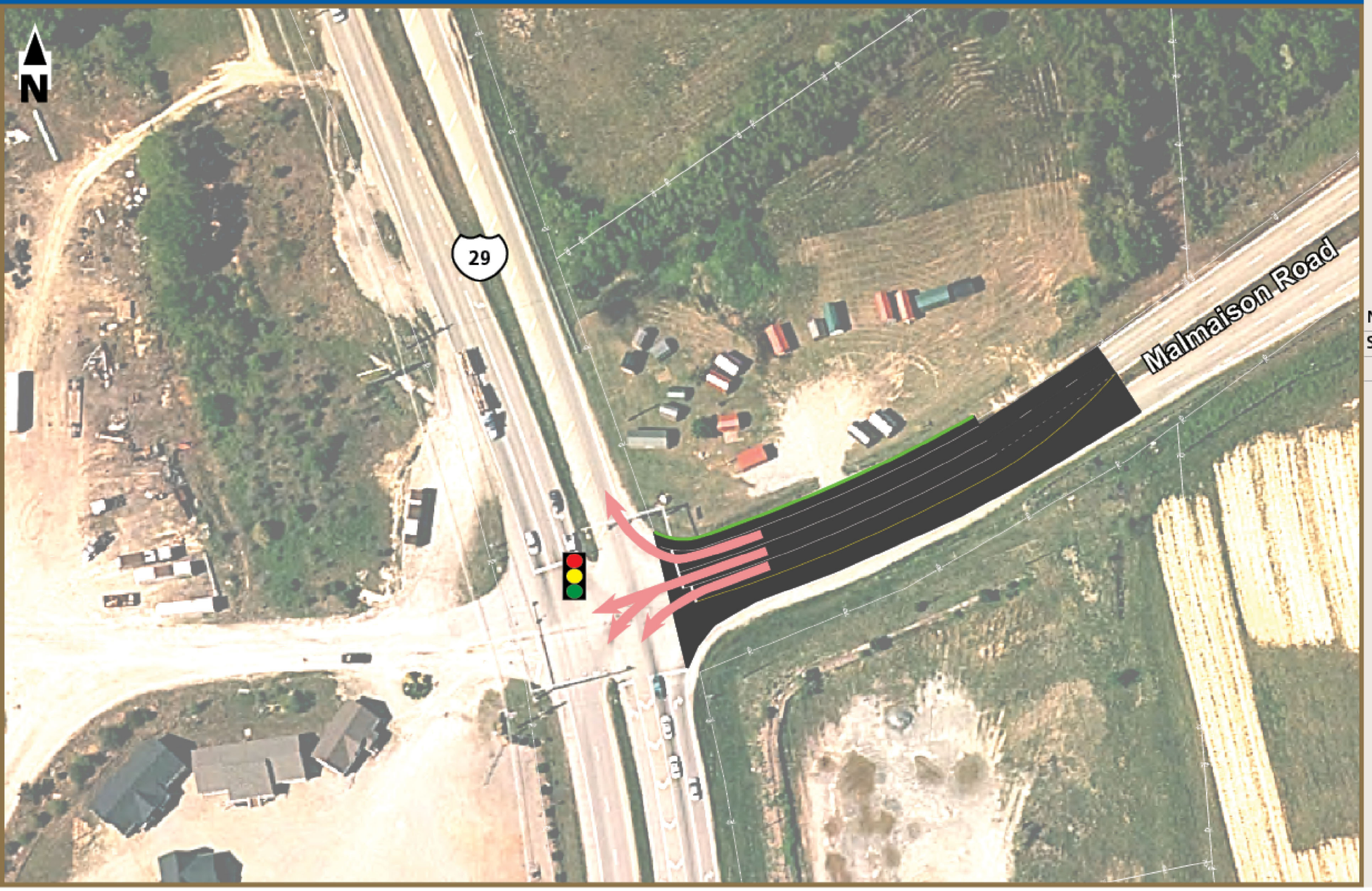
Preliminary Engineering = $560,000

Right-of-Way = $460,000

Construction = $3,450,000

Total = $4,470,000

US 29 at Malmaison Road - Short Term Additional Left Turn Lane Concept



US 29 and Malmaison Road Short Term - Additional Westbound Left Turn Concept

Recommendation: Reconfigure the westbound approach at US 29 and Malmaison Road to include a second westbound left turn lane.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		Additional Left	
	AM	PM	AM	PM
Northbound	20.2 - C	21.7 - C	14.8 - B	17.4 - B
Southbound	19.8 - C	22.2 - C	17.7 - B	18.6 - B
Overall	21.6 - C	23.5 - C	18.5 - B	20.1 - C

Safety: A crash reduction of 3% would be expected by adding an additional left turn lane.

Cost:

Preliminary Engineering = $60,000
Right-of-Way = $0
Construction = $370,000
Total = $430,000

US 29 at Malmaison Road - Long Term Roundabout Concept

US 29 and Malmaison Road Long Term - Roundabout Concept

Recommendation: Reconfigure the intersection at US 29 and Malmaison Road to a roundabout. Convert the existing median opening south of the intersection to a left-in only.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		Roundabout	
	AM	PM	AM	PM
Northbound	20.2 - C	21.7 - C	7.0 - A	12.1 - B
Southbound	19.8 - C	22.2 - C	12.3 - B	11.8 - B
Overall	21.6 - C	23.5 - C	8.2 - A	10.8 - B

Safety: A crash reduction of 60% would be expected by converting the existing signalized intersection to a roundabout.

Cost:

Preliminary Engineering = $640,000
Right-of-Way = $300,000
Construction = $4,000,000
Total = $4,940,000

US 29 and Tightsqueeze Road RCUT Concept

US 29 and Tightsqueeze Road RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and Tightsqueeze Road to a Restricted Crossing U-Turn (RCUT). Construct signalized median openings with loons to the north and south of the intersection to accommodate U-turns. Construct a left-in only median north of the intersection.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	26.7 - C	26.6 - C	14.3 - B	19.1 - B
Southbound	28.2- C	30.3 - C	12.0 - B	14.7 - B
Overall	38.3 - D	73.1 - E	19.3 - B	25.0 - C

Safety: A crash reduction of 20% would be expected from implementing an RCUT improvement

Cost:

Preliminary Engineering = $1,300,000

Right-of-Way = $840,000

Construction = $8,050,000

Total = $10,190,000

US 29 at Gladys Road
RCUT Concept

US 29 at Gladys Road RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and Gladys Road to a Restricted Crossing U-Turn (RCUT). Construct a median opening with a loon to the north to accommodate northbound U-turns.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	0.0 - A	10.3 - B	0.0 - A	0.2 - A
Southbound	9.4 - A	10.1 - B	0.2 - A	0.9 - A
Overall	-	-	-	-

Safety: A crash reduction of 35% would be expected from implementing an unsignalized RCUT improvement.

Cost:

Preliminary Engineering = $755,000

Right-of-Way = $160,000

Construction = $4,600,000

Total = $5,515,000

US 29 at Colonial Highway

Bowtie Concept

US 29 at Colonial Highway Bowtie Concept

Recommendation: Reconfigure the intersection at US 29 and Colonial Highway to a bowtie intersection. Construct roundabouts east and west of the intersection to accommodate left turns from all approaches at the main intersection.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		Bowtie	
	AM	PM	AM	PM
Northbound	26.1 - C	19.1 - B	12.2 - B	12.0 - B
Southbound	20.2 - C	23.1 - C	11.3 - B	12.6 - B
Overall	30.3 - C	27.6 - C	16.1 - B	16.0 - B

Safety: A conventional intersection has 32 conflict points, or locations where vehicle paths cross, merge, or diverge. A bowtie configuration would reduce the number of conflict points to 20.

Cost:

Preliminary Engineering = $1,650,000

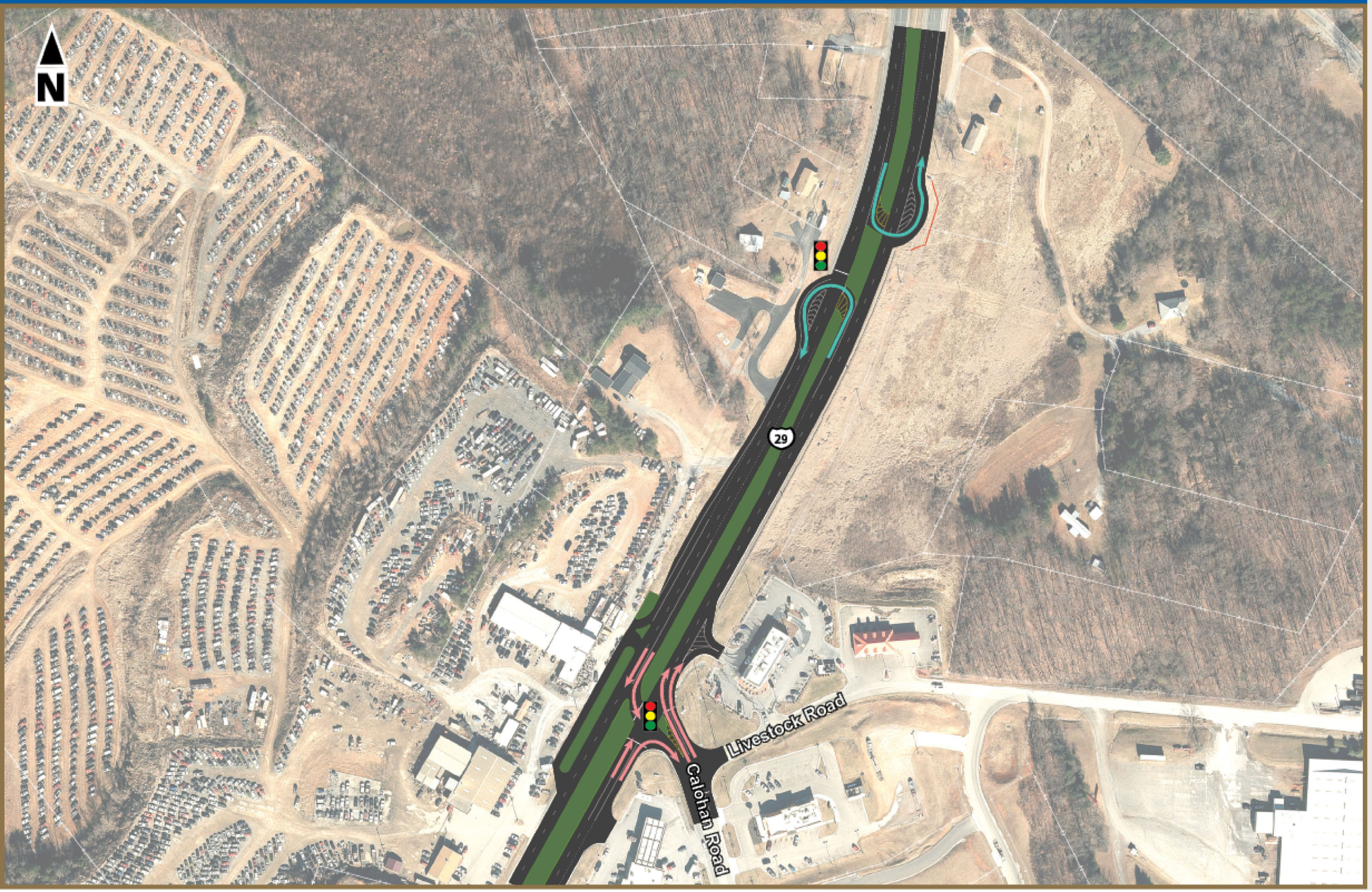
Right-of-Way = $1,375,000

Construction = $10,000,000

Total = $13,250,000

US 29 at Calohan Road

RCUT Concept



US 29 and Calohan Road RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and Calohan Road to a Restricted Crossing U-turn (RCUT). Construct a signalized median opening with a loon to accommodate U-turns to the north. The southbound through at Calohan becomes free-flow.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	29.8 - C	31.6 - C	13.8 - B	17.1 - B
Southbound	23.1 - C	27.5 - C	11.4 - B	12.7 - B
Overall	33.5 - C	31.9 - C	16.7 - B	15.8 - B

Safety: A crash reduction of 20% would be expected from implementing an RCUT improvement

Cost:

Preliminary Engineering = $500,000

Right-of-Way = $75,000

Construction = $3,000,000

Total = $3,575,000

US 29 at English Tavern Road RCUT Concept

US 29 and English Tavern Road RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and English Tavern Road to a Restricted Crossing U-turn (RCUT). Construct median openings with loons to accommodate U-turns.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	63.4 - E	38.0 - D	24.5 - C	12.5 - B
Southbound	14.4 - B	28.2 - C	4.0 - A	8.4 - A
Overall	44.0 - D	32.6 - C	26.2 - C	12.2 - B

Safety: A crash reduction of 20% would be expected by implementing an RCUT improvement.

Cost:

Preliminary Engineering = $1,025,000

Right-of-way = $580,000

Construction = $6,300,000

Total = $7,905,000

APPENDIX I-2

Planning Level Cost Estimates

Intersection Route 29 and Lawless Creek Road - RCUT
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 220,000	$ 220,000
2	Regular Excavation	CY	500	$ 35	$ 17,500
3	Borrow Excavation	CY	200	$ 35	$ 7,000
4	Clearing and Grubbing	AC	2	$ 18,000	$ 38,678
	Subtotal				$ 283,178
	Pavement Items				
5	Mill and Overlay Existing Pavement	SY	6,400	$ 25	$ 160,000
6	Demolition of Pavement (Flexible)	SY	800	$ 10	$ 8,000
7	Saw-cut Asphalt Conc. (Full Depth)	LF	1,200	$ 7	$ 8,400
	Subtotal				$ 176,400
	Incidental Items				
8	Median Reconstruction (MS-2 or Depressed)	LF	200	$ 60	$ 12,000
9	Median Strip (MS-1 or MS-1A)	SY	70	$ 110	$ 7,700
	Subtotal				$ 19,700
	Lump Sum Items				
10	Southbound Left Turn Lane at Loon (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
11	Southbound Loon	LS	1	$ 200,000	$ 200,000
12	Northbound Left Turn Lane at Lawless Creek Road (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
13	Southbound Left Turn Lane at Lawless Creek Road (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
14	Northbound Left Turn Lane at Loon (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
15	Northbound Loon	LS	1	$ 200,000	$ 200,000
16	Southbound Acceleration Lane & Continuous Right Turn Lane	LF	700	$ 710	$ 497,000
17	Signing & Marking	LS	1	$ 150,000	$ 150,000
18	Signal Reconstruction	EA	0	$ 500,000	$ -
19	Signal Modification	EA	1	$ 200,000	$ 200,000
20	Remove Existing Signal	EA	0	$ 50,000	$ -
21	SWM Basins	EA	1	$ 250,000	$ 250,000
22	SWM Proprietary Devices	EA	0	$ 75,000	$ -
23	Maintenance of Traffic	LS	1	$ 350,000	$ 350,000
24	Erosion and Sediment Control	LS	1	$ 150,000	$ 150,000
25	In-Plan (Wet) Utilities	LS	1	$ -	$ -
	Subtotal				$ 2,937,000
	Construction Totals				
	Construction Contract Subtotal				$ 3,416,278
	Unidentified Project Risk (25%)	LS	1	$ 854,070	$ 854,070
	Construction Contract Total				$ 4,270,348
	Construction Engineering & Inspection (15%)	LS	1	$ 513,000	$ 513,000
				Total Construction Phase	$ 4,784,000

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 641,000
	Nutrient Credits	LB	1	$ 15,000.00	$ 15,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 128,200	$ 128,200
				Total Preliminary Engineering Phase	$ 784,200

	Right of Way				
	Right of Way				$ 260,000
	Utilities				$ 450,000
				Total Right of Way Phase	$ 710,000

	Total Project Cost in FY2020 Dollars	$ 6,278,200

Intersection Route 29 and Lawless - Roundabout
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 169,000	$ 169,000
2	Regular Excavation	CY	-	$ 35	$ -
3	Borrow Excavation	CY	-	$ 35	$ -
6	Clearing and Grubbing	AC	0	$ 18,000	$ -
	Subtotal				$ 169,000
	Pavement Items				
4	Mill and Overlay Existing Pavement	SY		$ 25	$ -
5	Demolition of Pavement (Flexible)	SY		$ 10	$ -
6	Saw-cut Asphalt Conc. (Full Depth)	LF		$ 7	$ -
	Subtotal				$ -
	Incidental Items				
7	Median Reconstruction (MS-2 or Depressed)	LF		$ 60	$ -
8	Median Strip (MS-1 or MS-1A)	SY		$ 110	$ -
	Subtotal				$ -
	Lump Sum Items				
9	Single Lane Roundabout	EA	1	$ 2,080,000	$ 2,080,000
10	Signing & Marking	LS	1	$ 25,000	$ 25,000
11	Signal Reconstruction	EA	0	$ 500,000	$ -
12	Remove Existing Signal	EA	1	$ 50,000	$ 50,000
13	SWM Basins	EA	0	$ 250,000	$ -
14	SWM Proprietary Devices	EA	1	$ 75,000	$ 75,000
15	Maintenance of Traffic	LS	1	$ 50,000	$ 50,000
16	Erosion and Sediment Control	LS	1	$ 25,000	$ 25,000
17	In-Plan (Wet) Utilities	LS	1	$ -	$ -
	Subtotal				$ 2,305,000
	Construction Totals				
	Construction Contract Subtotal				$ 2,474,000
	Unidentified Project Risk (25%)	LS	1	$ 618,500	$ 618,500
	Construction Contract Total				$ 3,092,500
	Construction Engineering & Inspection (15%)	LS	1	$ 372,000	$ 372,000
				Total Construction Phase	$ 3,465,000
	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 464,000
	Nutrient Credits	LB		$ 15,000.00	$ -
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 92,800	$ 92,800
				Total Preliminary Engineering Phase	$ 556,800
	Right of Way				
	Right of Way				$ 110,000
	Utilities				$ 350,000
				Total Right of Way Phase	$ 460,000
	Total Project Cost in FY2020 Dollars				$ 4,481,800

Intersection Route 29 and Malmaison - Turn Lane - Short Term
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 26,000	$ 26,000
2	Regular Excavation	CY	-	$ 35	$ -
3	Borrow Excavation	CY	-	$ 35	$ -
6	Clearing and Grubbing	AC	0	$ 18,000	$ -
	Subtotal				**$ 26,000**
	Pavement Items				
4	Mill and Overlay Existing Pavement	SY	1,300	$ 25	$ 32,500
5	Demolition of Pavement (Flexible)	SY		$ 10	$ -
6	Saw-cut Asphalt Conc. (Full Depth)	LF		$ 7	$ -
	Subtotal				**$ 32,500**
	Incidental Items				
7	Median Reconstruction (MS-2 or Depressed)	LF		$ 60	$ -
8	Median Strip (MS-1 or MS-1A)	SY		$ 110	$ -
	Subtotal				**$ -**
	Lump Sum Items				
9	**Signing & Marking**	LS	1	$ 15,000	$ 15,000
10	**Signal Reconstruction**	EA	0	$ 500,000	$ -
11	**Signal Modification**	EA	1	$ 150,000	$ 150,000
12	**Remove Existing Signal**	EA	0	$ 50,000	$ -
13	**SWM Basins**	EA	0	$ 250,000	$ -
14	**SWM Proprietary Devices**	EA	0	$ 75,000	$ -
15	**Maintenance of Traffic**	LS	1	$ 25,000	$ 25,000
16	**Erosion and Sediment Control**	LS	1	$ 15,000	$ 15,000
17	**In-Plan (Wet) Utilities**	LS	1	$ -	$ -
	Subtotal				**$ 205,000**
	Construction Totals				
	Construction Contract Subtotal				**$ 263,500**
	Unidentified Project Risk (25%)	LS	1	$ 65,875	$ 65,875
	Construction Contract Total				**$ 329,375**
	Construction Engineering & Inspection (15%)	LS	1	$ 40,000	$ 40,000
				Total Construction Phase	**$ 370,000**

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 50,000
	Nutrient Credits	LB		$ 15,000.00	$ -
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 10,000	$ 10,000
				Total Preliminary Engineering Phase	**$ 60,000**

	Right of Way				
	Right of Way				$ -
	Utilities				$ -
				Total Right of Way Phase	**$ -**

	Total Project Cost in FY2020 Dollars	**$ 430,000**

Intersection Route 29 and Malmaison - Roundabout - Long Term
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 189,000	$ 189,000
2	Regular Excavation	CY	-	$ 35	$ -
3	Borrow Excavation	CY	-	$ 35	$ -
6	Clearing and Grubbing	AC	0	$ 18,000	$ -
	Subtotal				$ 189,000
	Pavement Items				
4	Mill and Overlay Existing Pavement	SY		$ 25	$ -
5	Demolition of Pavement (Flexible)	SY		$ 10	$ -
6	Saw-cut Asphalt Conc. (Full Depth)	LF		$ 7	$ -
	Subtotal				$ -
	Incidental Items				
7	Median Reconstruction (MS-2 or Depressed)	LF		$ 60	$ -
8	Median Strip (MS-1 or MS-1A)	SY		$ 110	$ -
	Subtotal				$ -
	Lump Sum Items				
9	Southbound Left Turn Lane at Directional Median (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
10	Single Lane Roundabout	EA	1	$ 2,080,000	$ 2,080,000
11	Signing & Marking	LS	1	$ 50,000	$ 50,000
12	Signal Reconstruction	EA	0	$ 500,000	$ -
13	Remove Existing Signal	EA	1	$ 50,000	$ 50,000
14	SWM Basins	EA	0	$ 250,000	$ -
15	SWM Proprietary Devices	EA	1	$ 75,000	$ 75,000
16	Maintenance of Traffic	LS	1	$ 100,000	$ 100,000
17	Erosion and Sediment Control	LS	1	$ 50,000	$ 50,000
18	In-Plan (Wet) Utilities	LS	1	$ -	$ -
	Subtotal				$ 2,640,000
	Construction Totals				
	Construction Contract Subtotal				$ 2,829,000
	Unidentified Project Risk (25%)	LS	1	$ 707,250	$ 707,250
	Construction Contract Total				$ 3,536,250
	Construction Engineering & Inspection (15%)	LS	1	$ 425,000	$ 425,000
				Total Construction Phase	$ 3,962,000
	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 531,000
	Nutrient Credits	LB		$ 15,000.00	$ -
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 106,200	$ 106,200
				Total Preliminary Engineering Phase	$ 637,200
	Right of Way				
	Right of Way				$ 100,000
	Utilities				$ 210,000
				Total Right of Way Phase	$ 310,000
	Total Project Cost in FY2020 Dollars				$ 4,909,200

Intersection Route 29 and Tight Squeeze Road - Signalized RCUT
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 354,000	$ 354,000
2	Regular Excavation	CY	0	$ 35	$ -
3	Borrow Excavation	CY	0	$ 35	$ -
4	Clearing and Grubbing	AC	1	$ 18,000	$ 18,000
	Subtotal				**$ 372,000**
	Pavement Items				
5	Mill and Overlay Existing Pavement	SY	7,000	$ 25	$ 175,000
6	Demolition of Pavement (Flexible)	SY	270	$ 10	$ 2,700
7	Saw-cut Asphalt Conc. (Full Depth)	LF	800	$ 7	$ 5,600
	Subtotal				**$ 183,300**
	Incidental Items				
8	Median Reconstruction (MS-2 or Depressed)	LF	200	$ 60	$ 12,000
9	Median Strip (MS-1 or MS-1A)	SY	100	$ 110	$ 11,000
	Subtotal				**$ 23,000**
	Lump Sum Items				
10	**Southbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
11	**Southbound Loon**	LS	1	$ 200,000	$ 200,000
12	**Northbound Left Turn Lane at Tight Squeeze Road (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
13	**Northbound Acceleration Lane & Continuous Right Turn Lane**	LF	630	$ 710	$ 447,300
14	**Southbound Left Turn Lane at Tight Squeeze Road (200' Storage, 200' Taper)**	LS	2	$ 235,000	$ 470,000
15	**Northbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
16	**Northbound Loon**	LS	1	$ 200,000	$ 200,000
17	**Signing & Marking**	LS	1	$ 300,000	$ 300,000
18	**Signal Reconstruction**	EA	3	$ 500,000	$ 1,500,000
19	**Signal Modification**	EA	1	$ 200,000	$ 200,000
20	**Remove Existing Signal**	EA	2	$ 50,000	$ 100,000
21	**SWM Basins**	EA	1	$ 250,000	$ 250,000
22	**SWM Proprietary Devices**	EA	0	$ 75,000	$ -
23	**Maintenance of Traffic**	LS	1	$ 500,000	$ 500,000
24	**Erosion and Sediment Control**	LS	1	$ 300,000	$ 300,000
25	**In-Plan (Wet) Utilities**	LS	1	$ -	$ -
	Subtotal				**$ 5,172,300**
	Construction Totals				
	Construction Contract Subtotal				**$ 5,750,600**
	Unidentified Project Risk (25%)	LS	1	$ 1,437,650	$ 1,437,650
	Construction Contract Total				**$ 7,188,250**
	Construction Engineering & Inspection (15%)	LS	1	$ 863,000	$ 863,000
				Total Construction Phase	**$ 8,052,000**
	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 1,079,000
	Nutrient Credits	LB	1	$ 15,000.00	$ 15,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 215,800	$ 215,800
				Total Preliminary Engineering Phase	**$ 1,309,800**
	Right of Way				
	Right of Way				$ 130,000
	Utilities				$ 709,000
				Total Right of Way Phase	**$ 839,000**
	Total Project Cost in FY2020 Dollars				**$ 10,200,800**

Intersection Route 29 and Gladys Road - RCUT
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 216,000	$ 216,000
2	Regular Excavation	CY		$ 35	$ -
3	Borrow Excavation	CY		$ 35	$ -
6	Clearing and Grubbing	AC	1	$ 18,000	$ 18,000
	Subtotal				$ 216,000
	Pavement Items				
4	Mill and Overlay Existing Pavement	SY	4,900	$ 25	$ 122,500
5	Demolition of Pavement (Flexible)	SY		$ 10	$ -
6	Saw-cut Asphalt Conc. (Full Depth)	LF		$ 7	$ -
	Subtotal				$ 122,500
	Incidental Items				
7	Median Reconstruction (MS-2 or Depressed)	LF		$ 60	$ -
8	Median Strip (MS-1 or MS-1A)	SY	50	$ 110	$ 5,500
9	Retaining Wall (MSE)	SY	300	$ 75	$ 22,500
	Subtotal				$ 28,000
	Lump Sum Items				
10	Southbound Left Turn Lane (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
11	Southbound Left Turn Lane at Gladys Road (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
12	Southbound Acceleration Lane & Continuous Right Turn Lane	LF	650	$ 710	$ 461,500
13	Northbound Left Turn Lane at Gladys Road (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
14	Northbound Right Turn Lane	LS	1	$ 220,000	$ 220,000
15	Northbound Left Turn Lane at Loon (200' Storage, 200' Taper)	LS	1	$ 235,000	$ 235,000
16	Northbound Loon	LS	1	$ 200,000	$ 200,000
17	Signing & Marking	LS	1	$ 175,000	$ 175,000
18	Signal Reconstruction	EA	0	$ 500,000	$ -
19	Remove Existing Signal	EA	0	$ 50,000	$ -
20	SWM Basins	EA	1	$ 250,000	$ 250,000
21	SWM Proprietary Devices	EA	1	$ 75,000	$ 75,000
22	Maintenance of Traffic	LS	1	$ 425,000	$ 425,000
23	Erosion and Sediment Control	LS	1	$ 175,000	$ 175,000
24	In-Plan (Wet) Utilities	LS	1	$ -	$ -
	Subtotal				$ 2,921,500
	Construction Totals				
	Construction Contract Subtotal				$ 3,288,000
	Unidentified Project Risk (25%)	LS	1	$ 822,000	$ 822,000
	Construction Contract Total				$ 4,110,000
	Construction Engineering & Inspection (15%)	LS	1	$ 494,000	$ 494,000
				Total Construction Phase	$ 4,604,000

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 617,000
	Nutrient Credits	LB	1	$ 15,000.00	$ 15,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 123,400	$ 123,400
				Total Preliminary Engineering Phase	$ 755,400

	Right of Way				
	Right of Way				$ 160,000
	Utilities				
				Total Right of Way Phase	$ 160,000

	Total Project Cost in FY2020 Dollars	$ 5,519,400

Intersection Route 29 and Colonial Highway - Bowtie
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 435,000	$ 435,000
2	Regular Excavation	CY	400	$ 35	$ 14,000
3	Borrow Excavation	CY	150	$ 35	$ 5,250
6	Clearing and Grubbing	AC	1	$ 18,000	$ 23,467
	Subtotal				$ 454,250
	Pavement Items				
4	Mill and Overlay Existing Pavement	SY	3,900	$ 25	$ 97,500
5	Demolition of Pavement (Flexible)	SY	1,340	$ 10	$ 13,400
6	Saw-cut Asphalt Conc. (Full Depth)	LF	800	$ 7	$ 5,600
	Subtotal				$ 116,500
	Incidental Items				
7	Median Reconstruction (MS-2 or Depressed)	LF	700	$ 60	$ 42,000
8	Median Strip (MS-1 or MS-1A)	SY		$ 110	$ -
	Subtotal				$ 42,000
	Lump Sum Items				
9	Single Lane Roundabout	EA	2	$ 2,080,000	$ 4,160,000
10	Southbound Left Turn Lane at Directional Median (200' Storage, 200' Taper)	LS	0	$ 235,000	$ -
11	Southbound Left Turn Lane at Directional Median (200' Storage, 200' Taper)	LS	2	$ 235,000	$ 470,000
12	Signing & Marking	LS	1	$ 200,000	$ 200,000
13	Signal Reconstruction	EA	0	$ 500,000	$ -
14	Signal Modification	EA	1	$ 200,000	$ 200,000
15	Remove Existing Signal	EA	0	$ 50,000	$ -
16	SWM Basins	EA	2	$ 250,000	$ 500,000
17	SWM Proprietary Devices	EA	1	$ 75,000	$ 75,000
18	Maintenance of Traffic	LS	1	$ 750,000	$ 750,000
19	Erosion and Sediment Control	LS	1	$ 200,000	$ 200,000
20	In-Plan (Wet) Utilities	LS	1	$ -	$ -
	Subtotal				$ 6,555,000
	Construction Totals				
	Construction Contract Subtotal				$ 7,167,750
	Unidentified Project Risk (25%)	LS	1	$ 1,791,938	$ 1,791,938
	Construction Contract Total				$ 8,959,688
	Construction Engineering & Inspection (15%)	LS	1	$ 1,076,000	$ 1,076,000
				Total Construction Phase	$ 10,036,000

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 1,344,000
	Nutrient Credits	LB	2	$ 15,000.00	$ 30,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 268,800	$ 268,800
				Total Preliminary Engineering Phase	$ 1,642,800

	Right of Way				
	Right of Way				$ 1,310,000
	Utilities				$ 65,000
				Total Right of Way Phase	$ 1,375,000

	Total Project Cost in FY2020 Dollars	$ 13,053,800

Intersection Route 29 and Calohan - RCUT
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 151,000	$ 151,000
2	Regular Excavation	CY	300	$ 35	$ 10,500
3	Borrow Excavation	CY	100	$ 35	$ 3,500
4	Clearing and Grubbing	AC	1	$ 18,000	$ 18,000
	Subtotal				**$ 165,000**
	Pavement Items				
5	Mill and Overlay Existing Pavement	SY	2,200	$ 25	$ 55,000
6	Demolition of Pavement (Flexible)	SY	1,070	$ 10	$ 10,700
7	Saw-cut Asphalt Conc. (Full Depth)	LF	800	$ 7	$ 5,600
	Subtotal				**$ 71,300**
	Incidental Items				
8	Median Reconstruction (MS-2 or Depressed)	LF	100	$ 60	$ 6,000
9	Median Strip (MS-1 or MS-1A)	SY	1,200	$ 110	$ 132,000
	Subtotal				**$ 138,000**
	Lump Sum Items				
10	**Southbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
11	**Southbound Loon**	LS	1	$ 200,000	$ 200,000
12	**Northbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
13	**Northbound Loon**	LS	1	$ 200,000	$ 200,000
14	**Southbound Acceleration Right Turn Lane**	LS	1	$ 220,000	$ 220,000
15	**Signing & Marking**	LS	1	$ 125,000	$ 125,000
16	**Signal Reconstruction**	EA	0	$ 500,000	$ -
17	**Signal Modification**	EA	1	$ 200,000	$ 200,000
18	**Remove Existing Signal**	EA	0	$ 50,000	$ -
19	**SWM Basins**	EA	0	$ 250,000	$ -
20	**SWM Proprietary Devices**	EA	0	$ 75,000	$ -
21	**Maintenance of Traffic**	LS	1	$ 225,000	$ 225,000
22	**Erosion and Sediment Control**	LS	1	$ 125,000	$ 125,000
23	**In-Plan (Wet) Utilities**	LS	0	$ -	$ -
	Subtotal				**$ 1,765,000**
	Construction Totals				
	Construction Contract Subtotal				**$ 2,139,300**
	Unidentified Project Risk (25%)	LS	1	$ 534,825	$ 534,825
	Construction Contract Total				**$ 2,674,125**
	Construction Engineering & Inspection (15%)	LS	1	$ 321,000	$ 321,000
				Total Construction Phase	**$ 2,996,000**

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 402,000
	Nutrient Credits	LB	1	$ 15,000.00	$ 15,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 80,400	$ 80,400
				Total Preliminary Engineering Phase	**$ 497,400**

	Right of Way				
	Right of Way				$ 30,000
	Utilities				$ 33,000
				Total Right of Way Phase	**$ 63,000**

	Total Project Cost in FY2020 Dollars	**$ 3,556,400**

Intersection Route 29 and English Tavern Road - RCUT
Conceptual Opinion of Probable Project Costs - 10/03/2019
Non-inflated Costs are in FY2020 Dollars

Item	Description	Unit	Quantity	Unit Cost	Extension
	Construction Costs				
1	Construction Surveying & Mobilization	LS	1	$ 283,000	$ 283,000
2	Regular Excavation	CY	0	$ 35	$ -
3	Borrow Excavation	CY	0	$ 35	$ -
4	Clearing and Grubbing	AC	1	$ 18,000	$ 18,000
	Subtotal				**$ 301,000**
	Pavement Items				
5	Mill and Overlay Existing Pavement	SY	4,900	$ 25	$ 122,500
6	Demolition of Pavement (Flexible)	SY		$ 10	$ -
7	Saw-cut Asphalt Conc. (Full Depth)	LF		$ 7	$ -
	Subtotal				**$ 122,500**
	Incidental Items				
8	Median Reconstruction (MS-2 or Depressed)	LF	300	$ 60	$ 18,000
9	Median Strip (MS-1 or MS-1A)	SY	300	$ 110	$ 33,000
	Subtotal				**$ 51,000**
	Lump Sum Items				
10	**Southbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
11	**Southbound Loon**	LS	1	$ 200,000	$ 200,000
12	**Southbound Left Turn Lane at English Tavern Road (300' Storage, 200' Taper)**	LS	1	$ 275,000	$ 275,000
13	**Southbound Acceleration Lane & Continuous Right Turn Lane**	LF	400	$ 710	$ 284,000
14	**Northbound Left Turn Lane at English Tavern Road (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
15	**Northbound Acceleration Lane & Continuous Right Turn Lane**	LF	850	$ 710	$ 603,500
16	**Northbound Left Turn Lane at Loon (200' Storage, 200' Taper)**	LS	1	$ 235,000	$ 235,000
17	**Northbound Loon**	LS	1	$ 200,000	$ 200,000
18	**Signing & Marking**	LS	1	$ 225,000	$ 225,000
19	**Signal Reconstruction (Partial Signals at Loon)**	EA	1	$ 350,000	$ 350,000
20	**Signal Modification**	EA	1	$ 200,000	$ 200,000
21	**Remove Existing Signal**	EA	1	$ 50,000	$ 50,000
22	**SWM Basins**	EA	1	$ 250,000	$ 250,000
23	**SWM Proprietary Devices**	EA	0	$ 75,000	$ -
24	**Maintenance of Traffic**	LS	1	$ 450,000	$ 450,000
25	**Erosion and Sediment Control**	LS	1	$ 225,000	$ 225,000
26	**In-Plan (Wet) Utilities**	LS	1	$ -	$ -
	Subtotal				**$ 4,017,500**
	Construction Totals				
	Construction Contract Subtotal				**$ 4,492,000**
	Contingency (25%)	LS	1	$ 1,123,000	$ 1,123,000
	Construction Contract Total				**$ 5,615,000**
	Construction Engineering & Inspection (15%)	LS	1	$ 674,000	$ 674,000
				Total Construction Phase	**$ 6,289,000**

	Preliminary Engineering				
	Preliminary Engineering (15%)				$ 843,000
	Nutrient Credits	LB	1	$ 15,000.00	$ 15,000
	Environmental Mitigation & Permitting	LS			$ -
	VDOT & County Oversight/Management (20%)	LS	1	$ 168,600	$ 168,600
				Total Preliminary Engineering Phase	**$ 1,026,600**

	Right of Way				
	Right of Way				$ 360,000
	Utilities				$ 156,000
				Total Right of Way Phase	**$ 516,000**

	Total Project Cost in FY2020 Dollars	**$ 7,831,600**

APPENDIX J

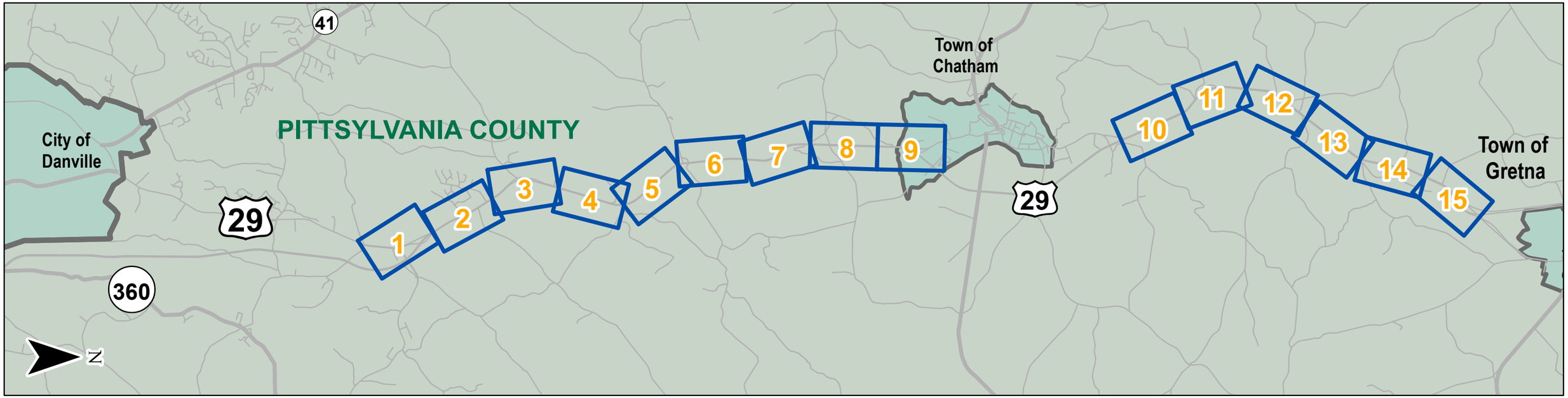
Corridor Improvement Recommendations

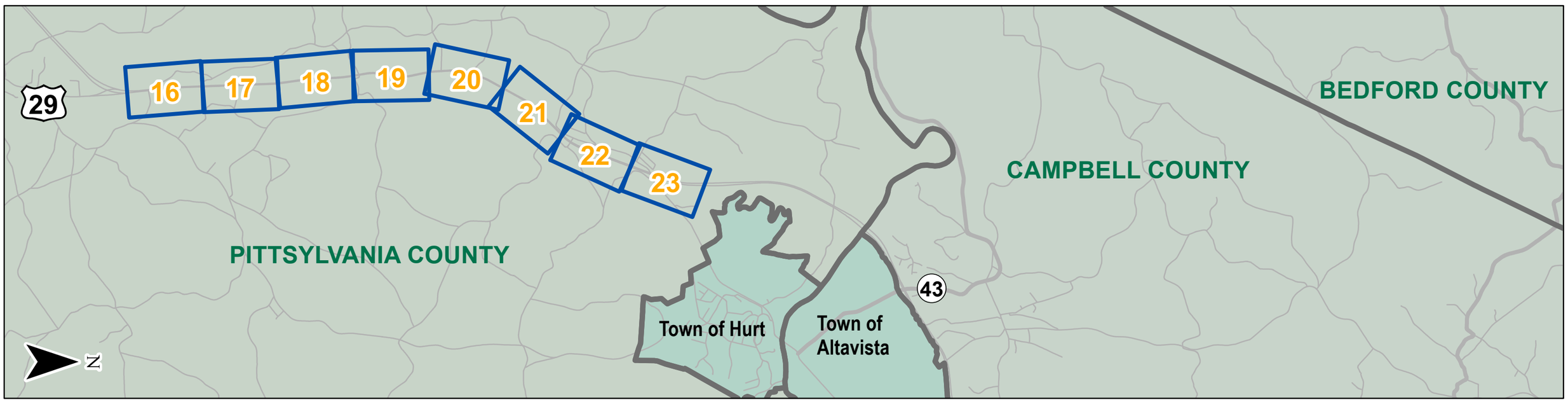
ARTERIAL
PRESERVATION PROGRAM

Arterial Preservation Plan: US 29 Corridor

VDOT Lynchburg District

Recommendation Summary

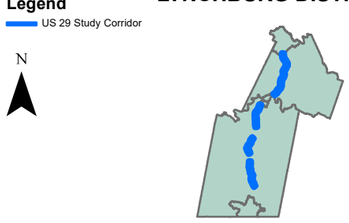




Legend

US 29 Study Corridor

LYNCHBURG DISTRICT



0 1.5 3 6 Miles

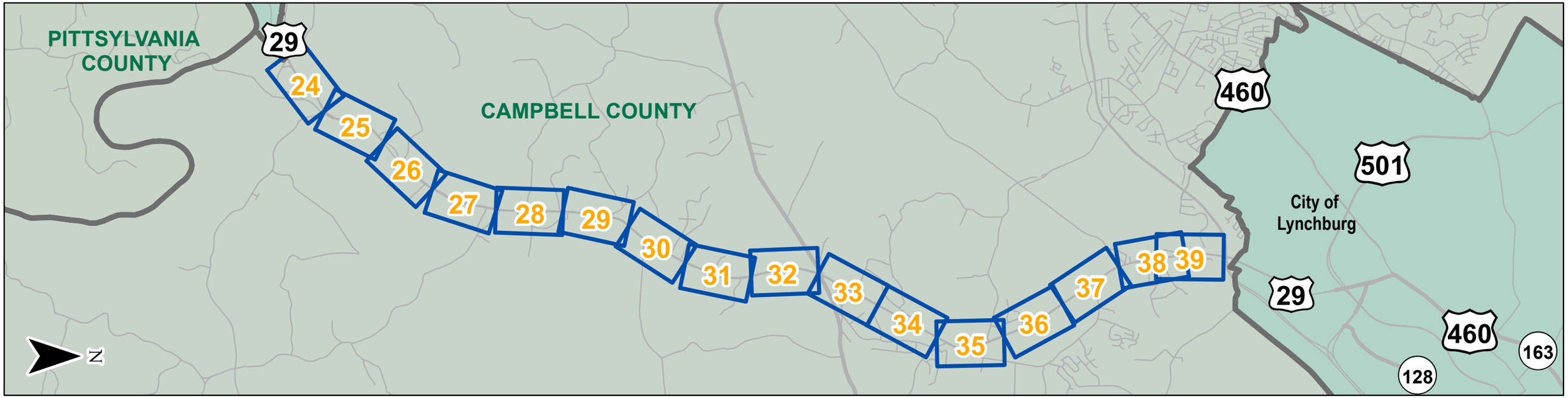
Figures by County

Pittsylvania County
Figures 1 - 23

Campbell County
Figures 24 - 39

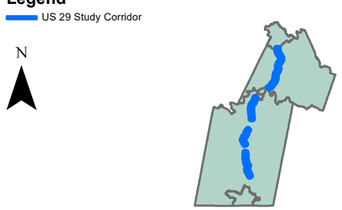
US 29 Arterial Preservation Plan
Figures 1 - 23

VDOT ARTERIAL PRESERVATION PROGRAM



Legend
US 29 Study Corridor

LYNCHBURG DISTRICT



0 1.5 3 6 Miles

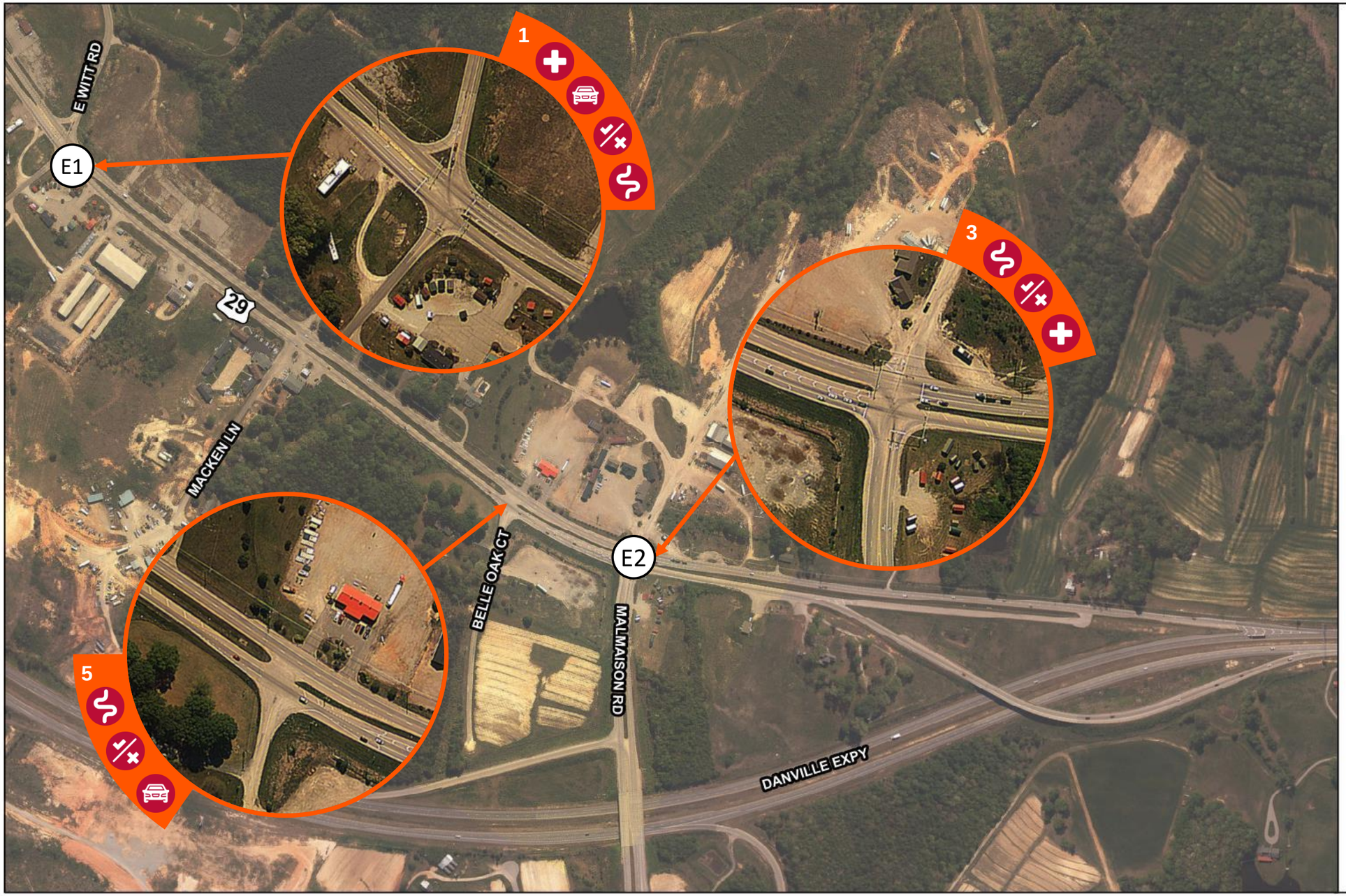
Figures by County

Pittsylvania County
Figures 1 - 23

Campbell County
Figures 24 - 39

US 29 Arterial Preservation Plan
Figures 24 - 39

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

1 (E1). US 29 BUS at Lawless Creek Road/E Witt Road

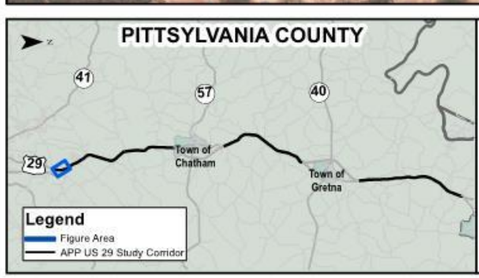
- Short Term: RCUT Concept
- Long Term: Roundabout Concept

2. US 29 at Belle Oak Court

- Convert to directional median opening

3 (E2). US 29 at Malmaison Road

- Short term: Additional Westbound Left-Turn Lane Concept
- Long term: Roundabout Concept



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 1
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Lawless Creek Road/ E. Witt Road Short Term - RCUT Concept

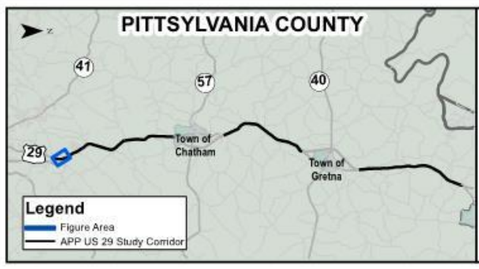
Recommendation: Reconfigure the intersection at US 29 and Lawless Creek Road/E. Witt Road to a Restricted Crossing U-turn (RCUT). Constrict median openings with loons to accommodate U-turns. The existing traffic signal should be removed.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	22.1 – C	18.9 – B	18.9 –B	0.7 – A
Southbound	24.3 – C	19.5 – B	19.5 – B	1.0 – A
Overall	26.4 -C	21.3 – C	8.4 – A	5.4 – A

Safety: A crash reduction of 20% would be expected by implementing an unsignalized RCUT improvement.

Cost:
Preliminary Engineering = $800,000
Right-of-Way = $710,000
Construction = $4,800,000
Total = $6,310,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry

Safety

Access Management

Traffic Operations

US 29 Arterial Preservation Plan
Figure 1A
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Lawless Creek Road/ E. Witt Road Long Term – Roundabout Concept

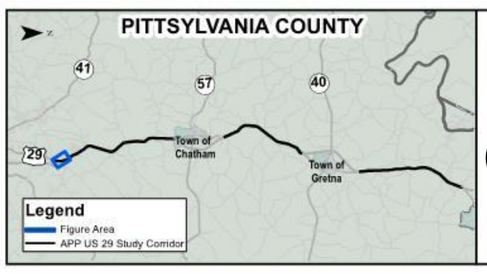
Recommendation: Reconfigure the intersection at US 29 and Lawless Creek Road/E. Witt Road to a roundabout. Consider possible options for road diet or bicycle and pedestrian accommodations to the north and south.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	22.1 – C	18.9 – B	7.1 – A	10.6 – B
Southbound	24.3 – C	19.5 – B	13.3 – B	10.4 – B
Overall	26.4 -C	21.3 – C	10.1 – B	9.9 – A

Safety: A crash reduction of 60% would be expected by converting the existing signalized intersection to a roundabout.

Cost:
Preliminary Engineering = $560,000
Right-of-Way = $460,000
Construction = $3,450,000
Total = $4,470,000



LEGEND

Intersection Number

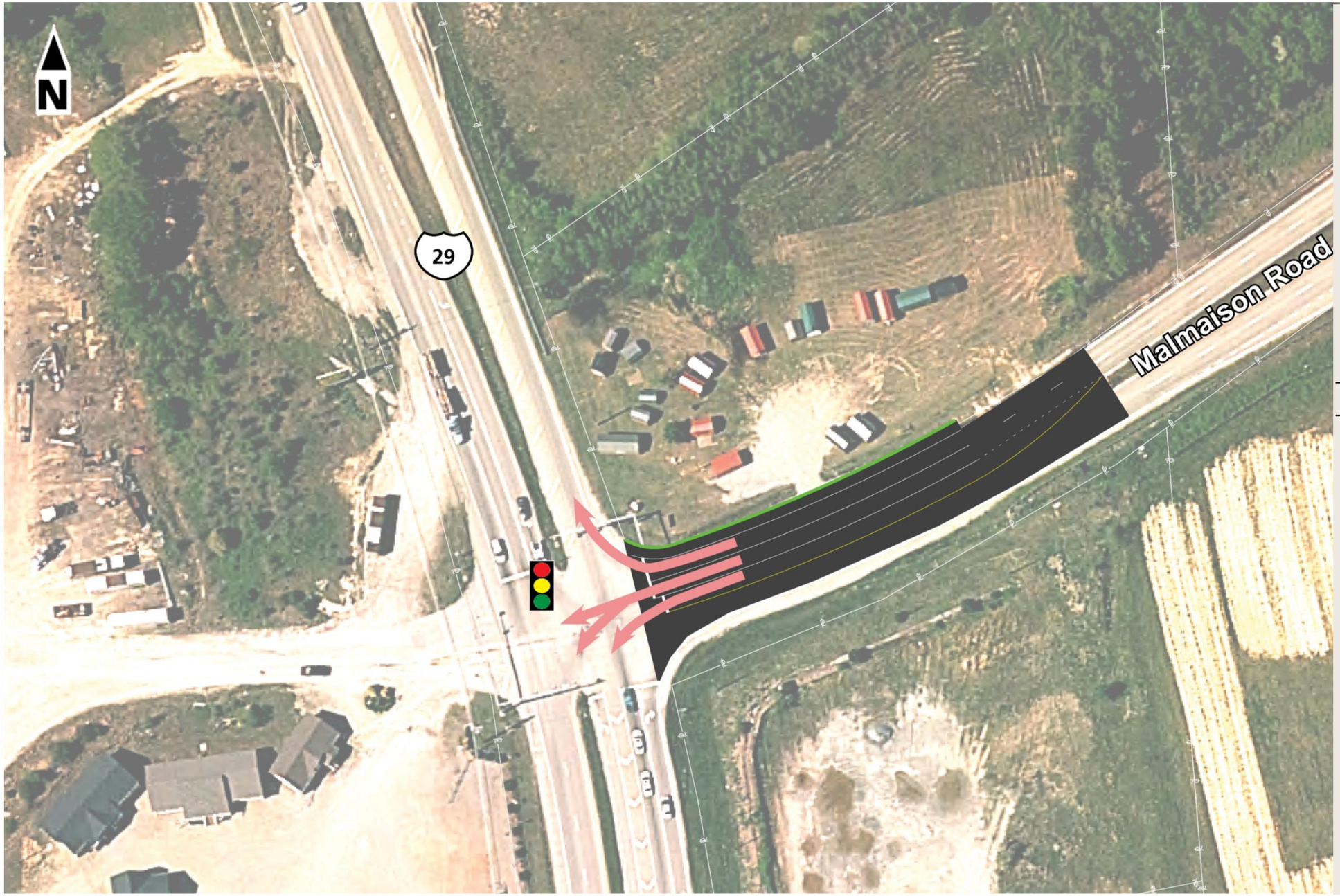
(#) Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 1B
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



US 29 at Malmaison Road Short Term – Additional Westbound Left Turn Concept

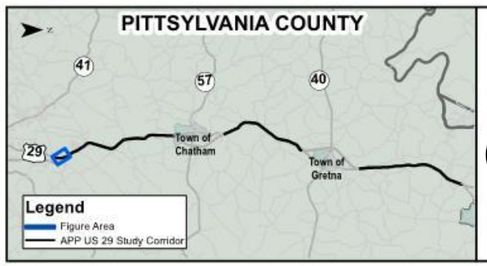
Recommendation: Reconfigure the westbound approach at US 29 and Malmaison Road to include a dedicated left turn lane and through left lane.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	20.2 – C	21.7 – C	14.8 – B	17.4 – B
Southbound	19.8 – C	22.2 – C	17.7 – B	18.6 – B
Overall	21.6 – C	23.5 – C	18.5 – B	20.1 – C

Safety: A crash reduction of 3% would be expected by adding an additional left turn lane.

Cost:
Preliminary Engineering = $60,000
Right-of-Way = $0
Construction = $370,000
Total = $430,000



LEGEND

Intersection Number

(#) Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 1C
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Malmaison Road Long Term – Roundabout Concept

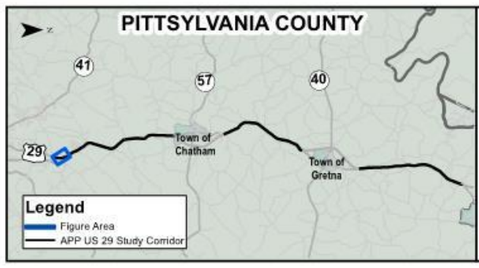
Recommendation: Reconfigure the westbound approach at US 29 and Malmaison Road to a roundabout. Convert the existing median opening south of the intersection to a left-in only.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	20.2 – C	21.7 – C	7.0 – A	12.1 – B
Southbound	19.8 – C	22.2 – C	12.3 – B	11.8 – B
Overall	21.6 – C	23.5 – C	8.2 – A	10.8 – B

Safety: A crash reduction of 60% would be expected by converting the existing signalized intersection to a roundabout.

Cost:
Preliminary Engineering = $640,000
Right-of-Way = $300,000
Construction = $4,000,000
Total = $4,940,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry

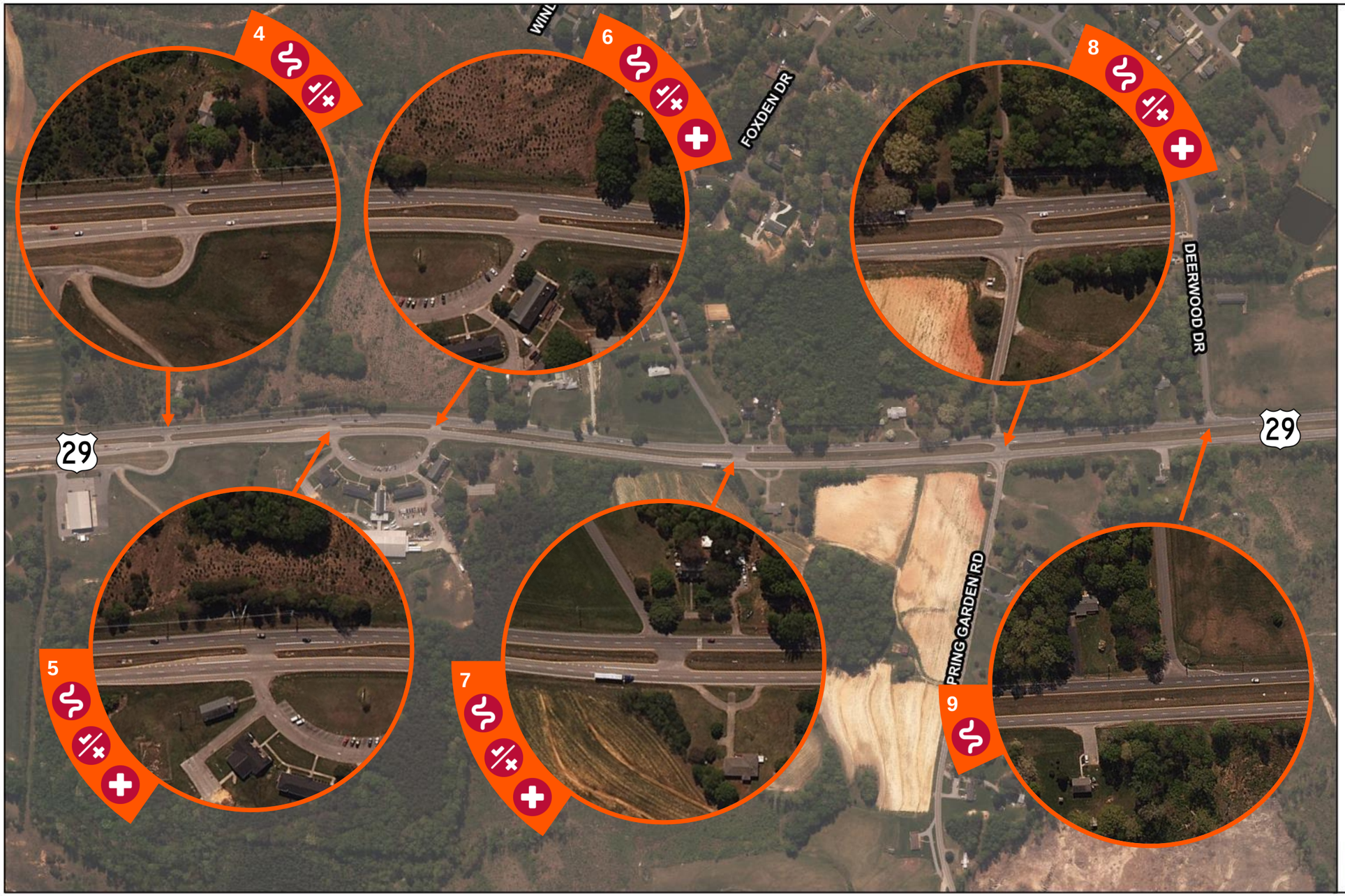
Safety

Access Management

Traffic Operations

US 29 Arterial Preservation Plan
Figure 1D
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

4. US 29 at Shields Drive
- Close median opening

5. US 29 at The Arc (South Drive)
- Close median opening

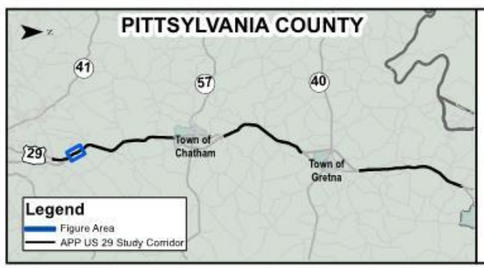
6. US 29 at The Arc (North Drive)
- Install emergency signal and road tie-in to Blairs Fire Station

7. US 29 at Route 946 (Georges Lane)
- Close median opening

8. US 29 at Route 640 (Spring Garden Road/Woodcrest Drive)
- Install northbound right-turn and left-turn lanes

9. US 29 at Deerwood Drive
- Construct northbound left-turn directional median opening
- Install northbound left-turn lane and southbound right-turn lane

Roadway Improvements
US 29 from Deerwood Drive to Four Pond Terrace
- Install curve delineation/warning signs
- Install rumble strips
- Improve shoulder



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 2
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

10. US 29 south of R and L Smith Road

- Install southbound right-turn and left-turn lanes
- Construct northbound left-turn lane

11. US 29 at Route 863 (R and L Smith Road)

- Construct northbound left-turn lane

12. US 29 at Four Pond Terrace

- Convert to directional median opening

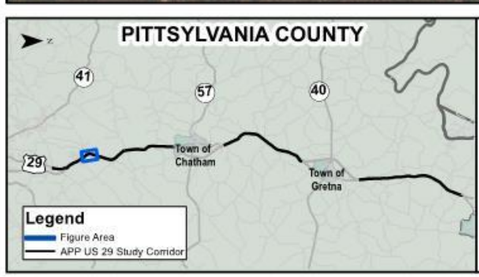
Roadway Improvements

US 29 from Deerwood Drive to Four Pond Terrace

- Install curve delineation/warning signs
- Install rumble strips
- Improve shoulder

US 29 at Toy Lane

- Further study required to identify if any improvements are needed to accommodate trucks



LEGEND

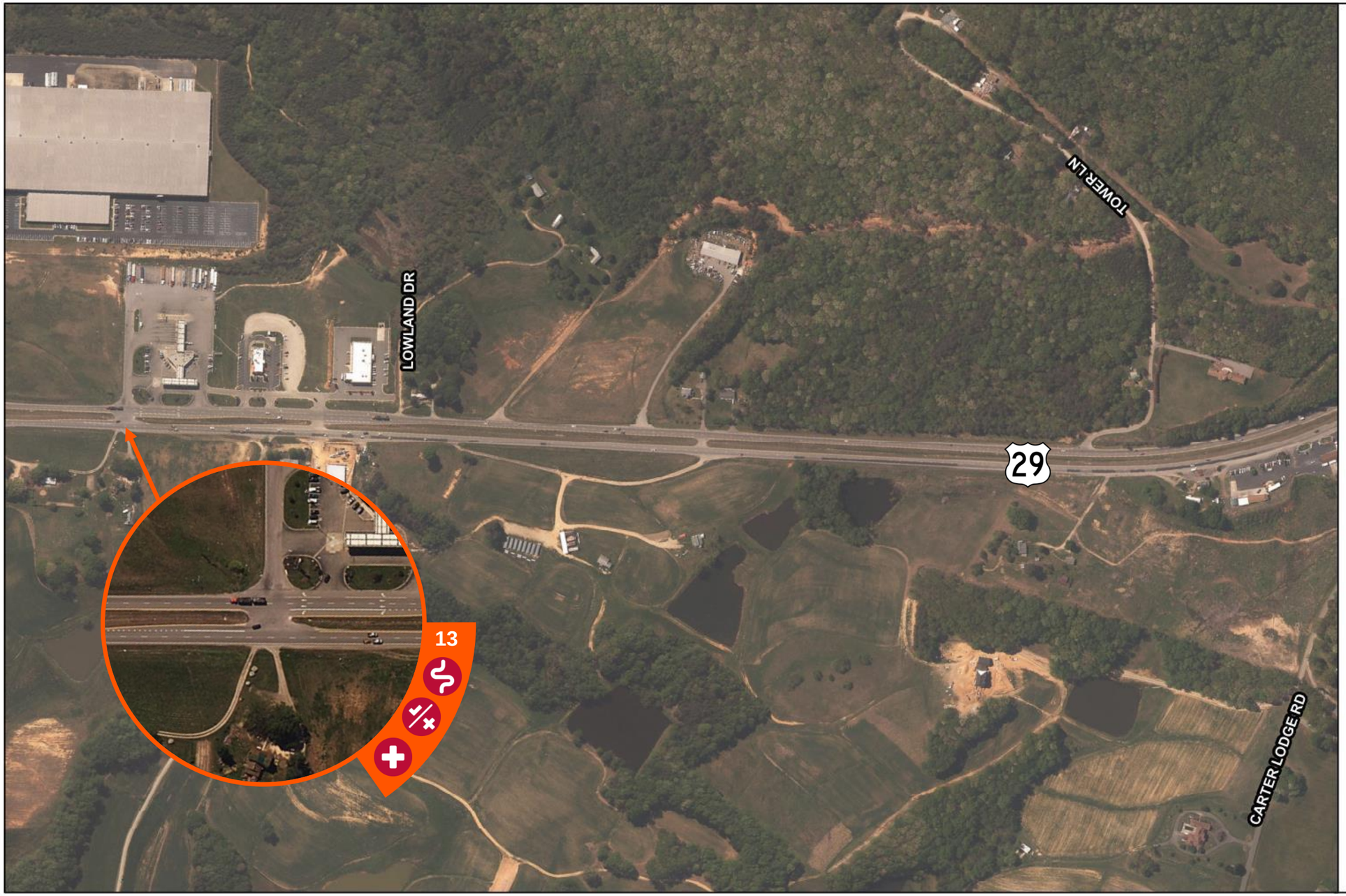
#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 3
Pittsylvania County

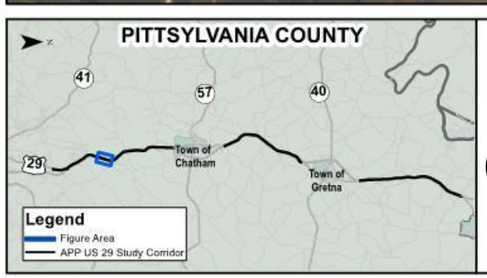
VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

13. US 29 south of Lowland Drive (BP access)

- Construct directional median opening



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 4
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

14. US 29 at Route 825 (Carter Lodge Road)

- Install northbound left-turn and right-turn lanes
- Extend northbound left-turn lane

15. US 29 at Stone Mountain Road

- Install northbound right-turn and left-turn lanes
- Install southbound left-turn lane

Roadway Improvements
From Carter Lodge Road to Dry Fork Road

- Install rumble strips and
- Improve shoulder
- Evaluate for curve delineation/warning signs

LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 5
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

16. US 29 at Route 718 (Dry Fork Road/Snakepath Road)
- Convert to a directional median opening
- Extend southbound right-turn lane

17. US 29 at Chatham Middle School (South Entrance)
- Construct southbound directional median opening
- Install southbound left-turn lane
- Extend northbound right-turn lane

18. US 29 at Route 9330 (Chatham Middle School Entrance)
- Close median opening

19. US 29 at Chatham Middle School (North Entrance)
- Construct median opening
- Install southbound left-turn lane and right-turn lane
- Install northbound left-turn lane

20. US 29 north of Chatham Middle School
- Install northbound U-turn lane and loon

LEGEND

Intersection Number

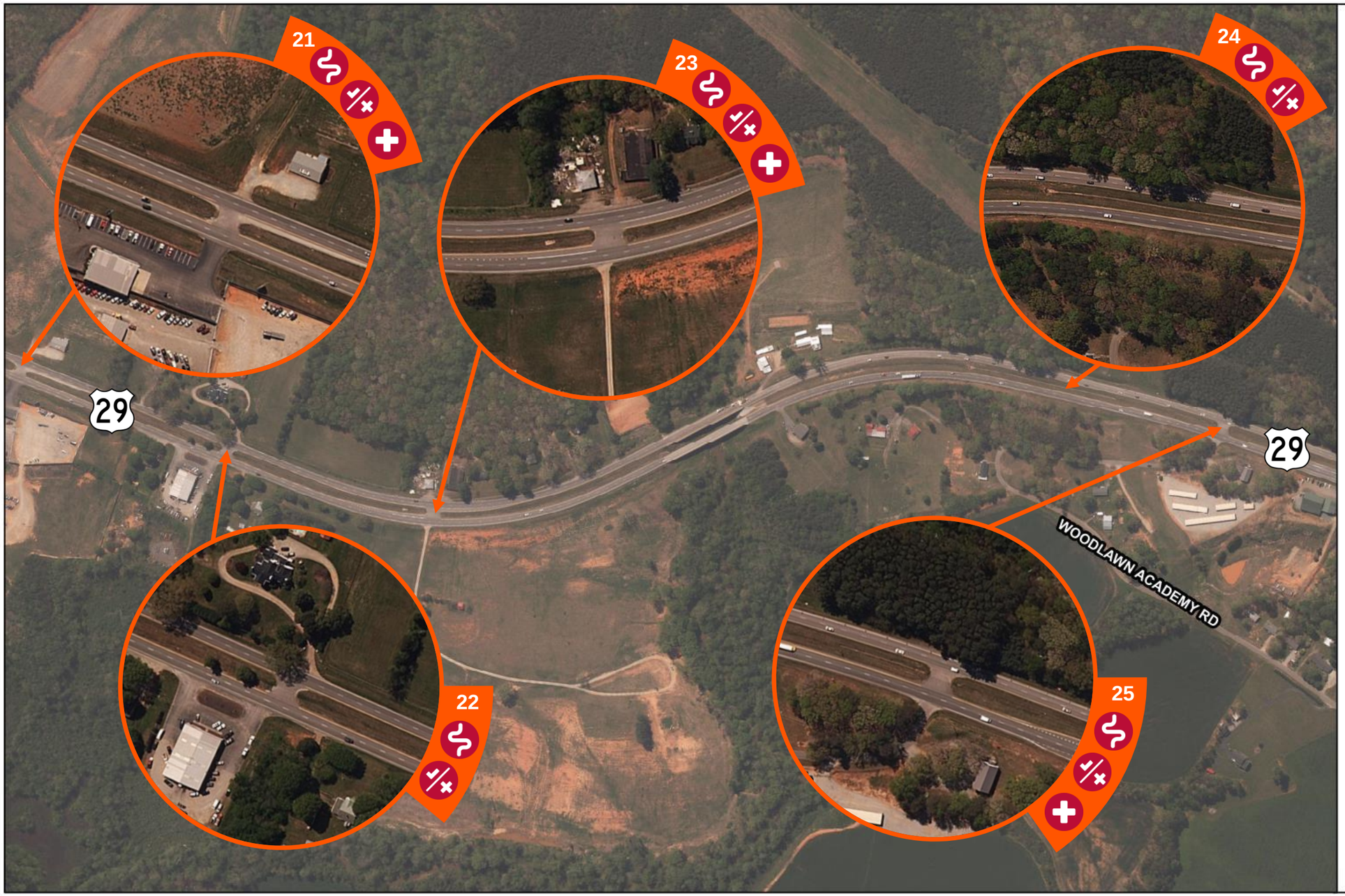
(#) Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 6
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

21. US 29 at Median Opening (Co-Parts)
- Install northbound right-turn and left-turn lanes
- Install southbound right-turn lane

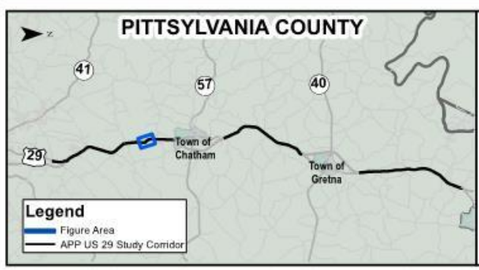
22. US 29 at Median Opening (Meadows Service Center)
- Convert to directional median opening

23. US 29 at Median Opening (south of Woodlawn Academy Road)
- Install southbound right-turn lane

24. US 29 at Route 1437 (New Woodlawn Academy Road)
- Realign Woodlawn Academy Road
- Construct full median opening
- Install northbound and southbound right-turn and left-turn lanes

25. US 29 at Route 1437 (Old Woodlawn Academy Road)
- Close existing Woodlawn Academy Road median opening

Roadway Improvements From Meadow Service Center to Woodlawn Academy Road
- Install rumble strips and improve shoulder
- Evaluate for curve delineation/warning signs



LEGEND

Intersection Number

(#) Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 7
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

26. US 29 at Route 1434 (Samuel Harris Lane)

- Extend southbound right-turn lane

27 (E3). US 29 at Route 703 (Fairview Road/Tightsqueeze Road)

- RCUT Concept

28. US 29 at Median Opening (Valero Entrance)

- Convert to directional median opening (as part of Fairview Road/Tightsqueeze Road intersection improvements)

LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 8
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Tightsqueeze Road – RCUT Concept

Recommendation: Reconfigure the intersection at US 29 and Tightsqueeze Road to a Restricted Crossing U-Turn (RCUT). Construct signalized median openings with loons to the north and south of the intersection to accommodate U-turns. Construct a left-in only median north of the intersection.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	26.7 – C	26.6 – C	14.3 – B	19.1 – B
Southbound	28.2 – C	30.3 – C	12.0 – B	14.7 – B
Overall	38.3 – D	73.1 – E	19.3 – B	25.0 – C

Safety: A crash reduction of 20% would be expected by implementing an RCUT improvement.

Cost:
Preliminary Engineering = $1,300,000
Right-of-Way = $840,000
Construction = $8,050,000
Total = $10,190,000

LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 8A
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

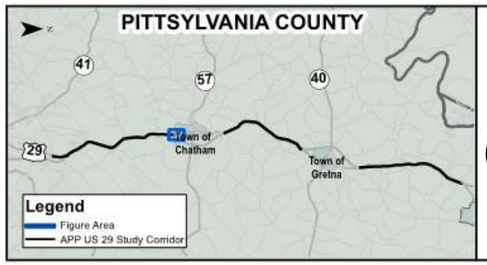
Roadway, Intersection, and Median Crossover Recommendations

29. US 29 at Median Opening (Cherrystone Veterinary Hospital)

- Install northbound U-turn and loon
- Install southbound right-turn lane

30. US 29 at Route 1433 (Cherrystone Road)

- Covert to directional median opening
- Extend northbound left-turn lane
- Install southbound right-turn taper



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 9
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

31. US 29 north of Chatham US 29 BUS interchange
- Close median opening

32. US 29 north of Chatham US 29 BUS interchange
- Construct northbound and southbound U-turn lanes and loons

33. US 29 north of Chatham (Chatham Family Medical Center)
- Close median opening

34. US 29 north of Chatham (VDOT Facility and Virginia State Police Entrance)
- Construct southbound U-turn lane and loon
- Extend northbound left-turn lane

35. US 29 north of Chatham (Real Estate office)
- Close median opening

Roadway Improvements
From VDOT Facility Entrance to Dry Bridge Road
- Install rumble strips
- Improve shoulder

LEGEND

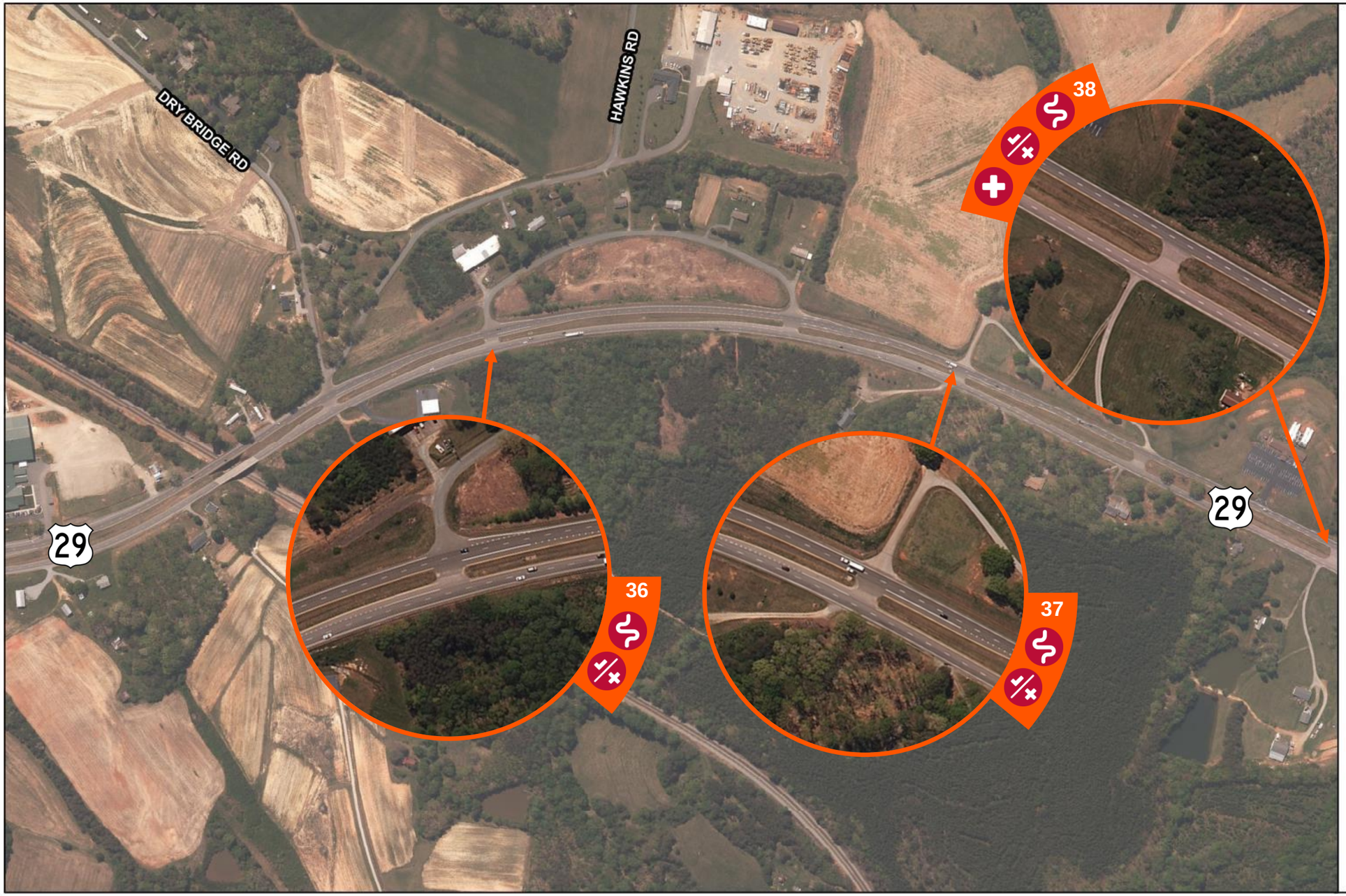
#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

Geometry	Safety
Access Management	Traffic Operations

US 29 Arterial Preservation Plan
Figure 10
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

36. US 29 at Route 1400 (South Drive)
- Close median opening

37. US 29 north of North Drive
- Close median opening

38. US 29 north of North Drive (Wayne's Cabinet Shop)
- Convert to directional median opening

LEGEND

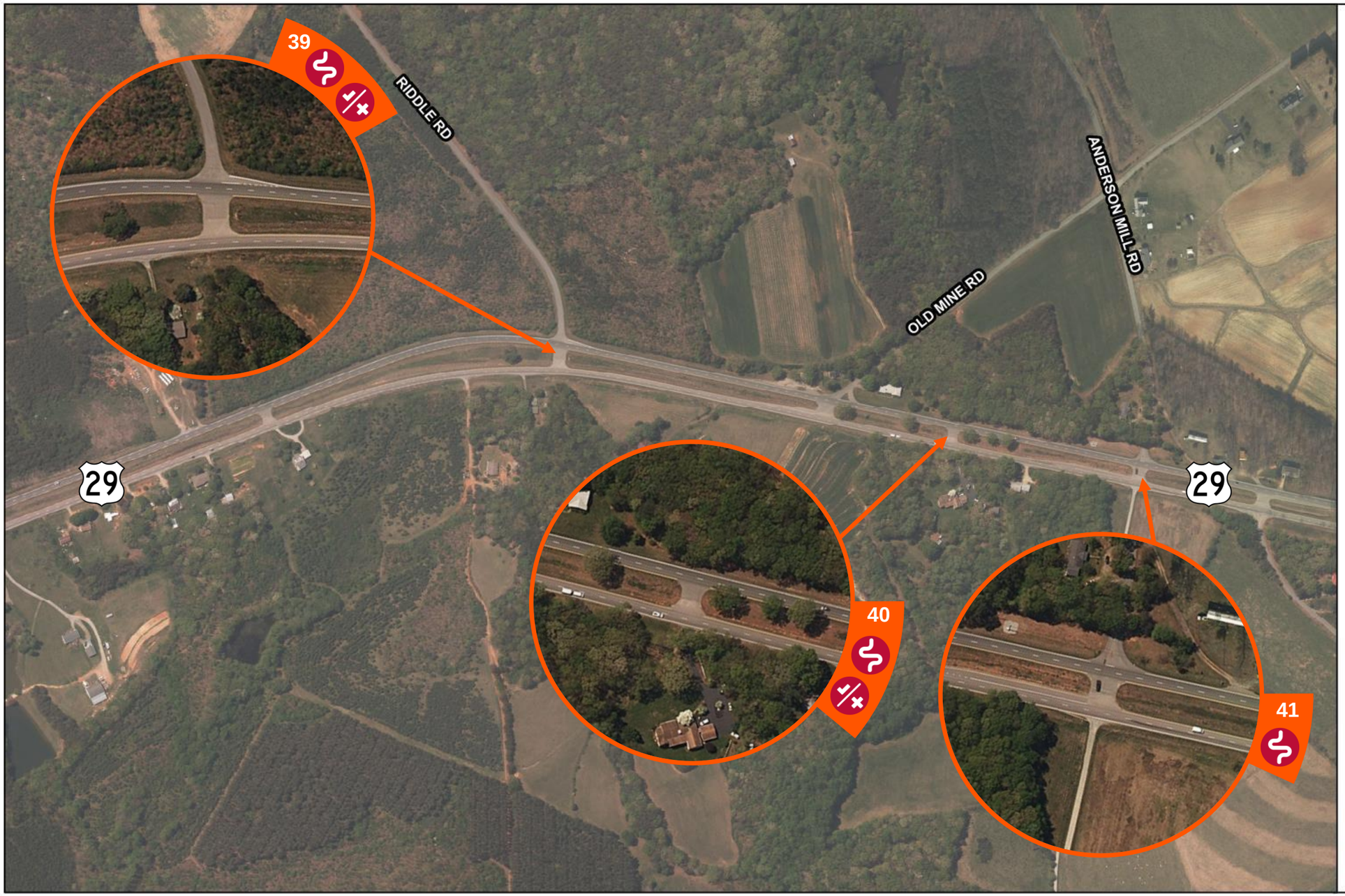
#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 11
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

39. US 29 at Route 797 (Riddle Road)
- Convert to directional median opening

40. US 29 north of Old Mine Road
- Close median opening

41. US 29 at Route 649 (Anderson Mill Road)
- Close median opening

Roadway Improvements
From 1,000 ft south of Riddle Road to Riddle Road
- Install curve delineation/warning signs in northbound direction

From Wayne's Cabinet Shop to Riddle Road
- Install rumble strips
- Consider shoulder widening at horizontal curve

LEGEND

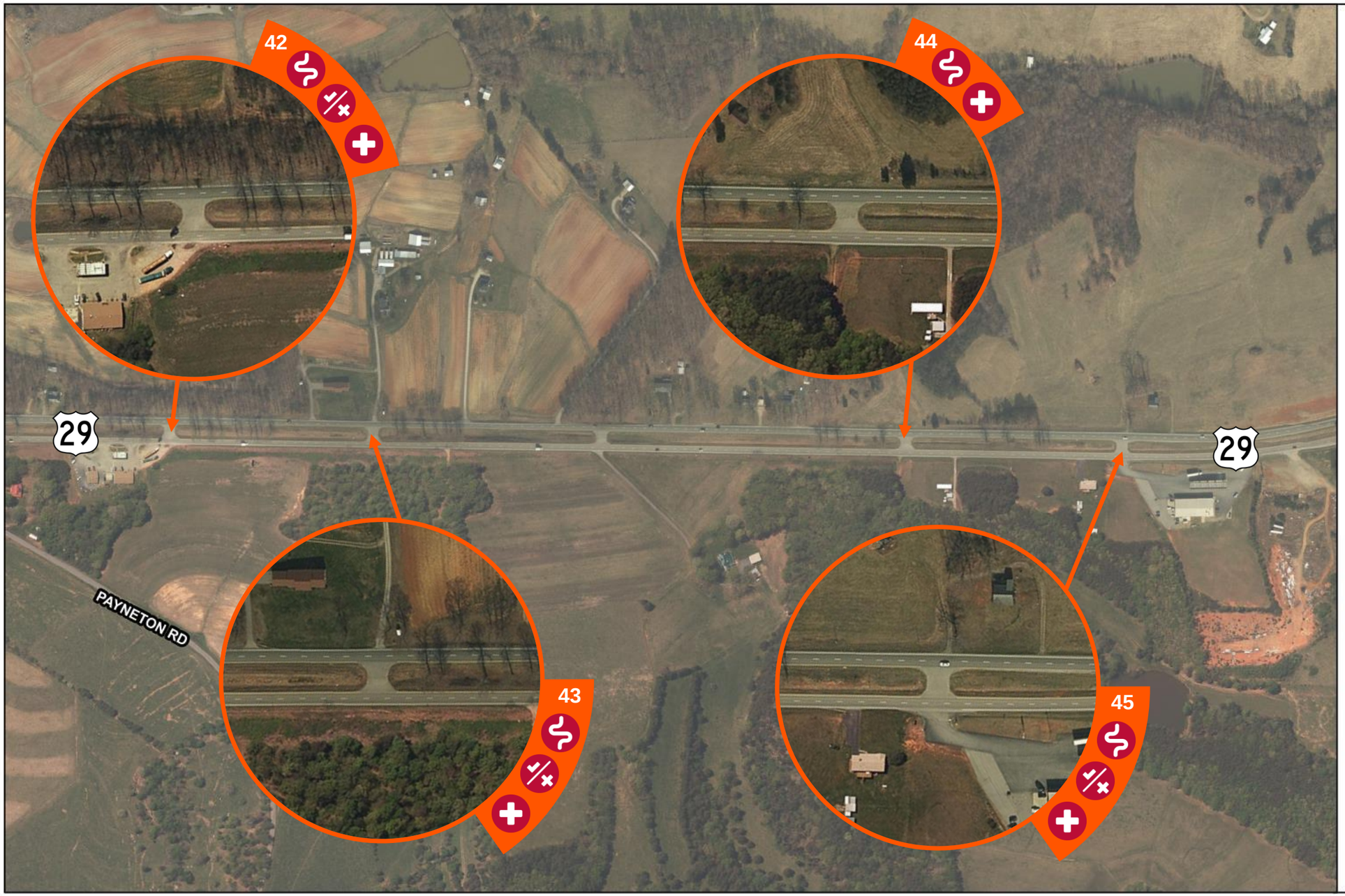
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 12
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

42. US 29 north of Payneton Road
- Convert to directional median opening

43. US 29 north of Payneton Road
- Convert to directional median opening

44. US 29 north of Payneton Road
- Close median opening

45. US 29 north of Payneton Road (Sunoco Entrance)
- Convert to directional median opening

Roadway Improvements
From north of Payneton Road to Sunoco Entrance
- Install rumble strips
- Consider shoulder widening

LEGEND

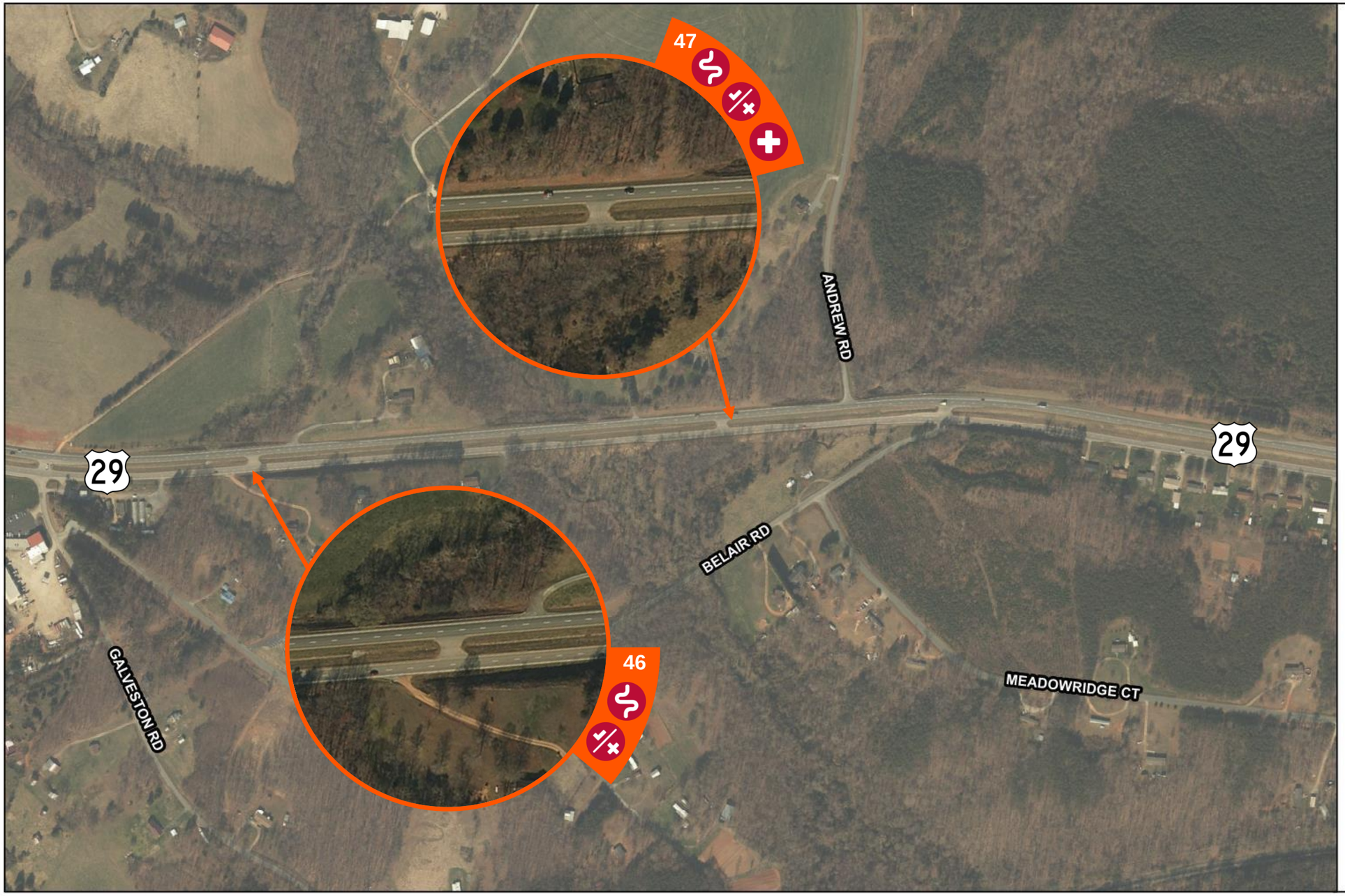
#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 13
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

46. US 29 north of Galveston Road
- Convert to directional median opening

47. US 29 south of Andrew Road
- Convert to directional median opening

Roadway Improvements:

From the Sunoco Entrance to Andrew Road
- Install curve delineation/warning signs
- Install rumble strips
- Consider shoulder widening

From Galveston Road to Belair Road
- Install rumble strips

LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

Geometry	Safety
Access Management	Traffic Operations

US 29 Arterial Preservation Plan
Figure 14
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

48. US 29 south of Squirrel Road

- Convert to directional median opening

LEGEND

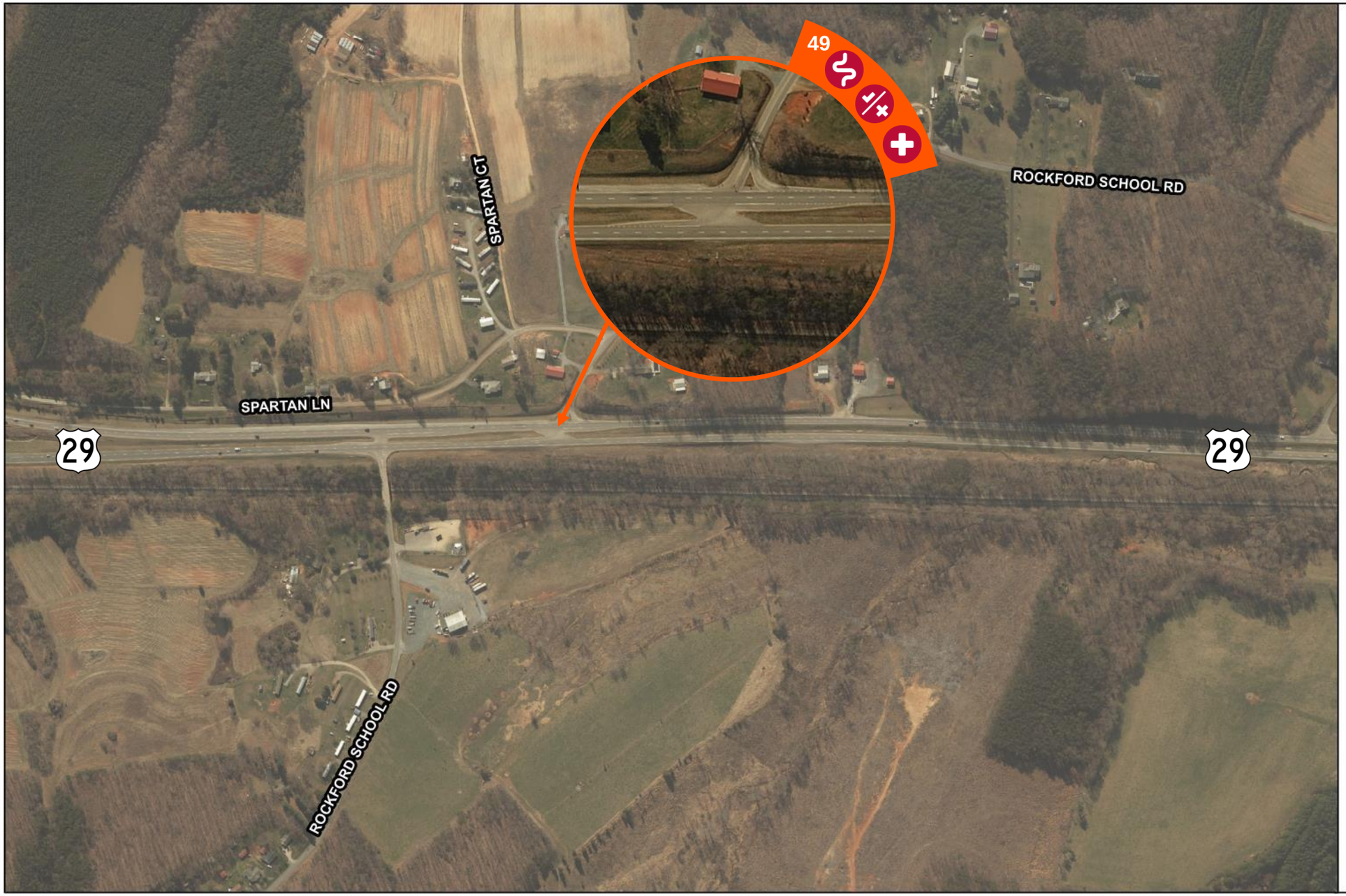
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 15
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

49. US 29 at Route 665 (Rockford School Road – North)

- Convert to directional median opening

Roadway Improvements
From Rockford School Road – South to Derby Road

- Install rumble strips

LEGEND

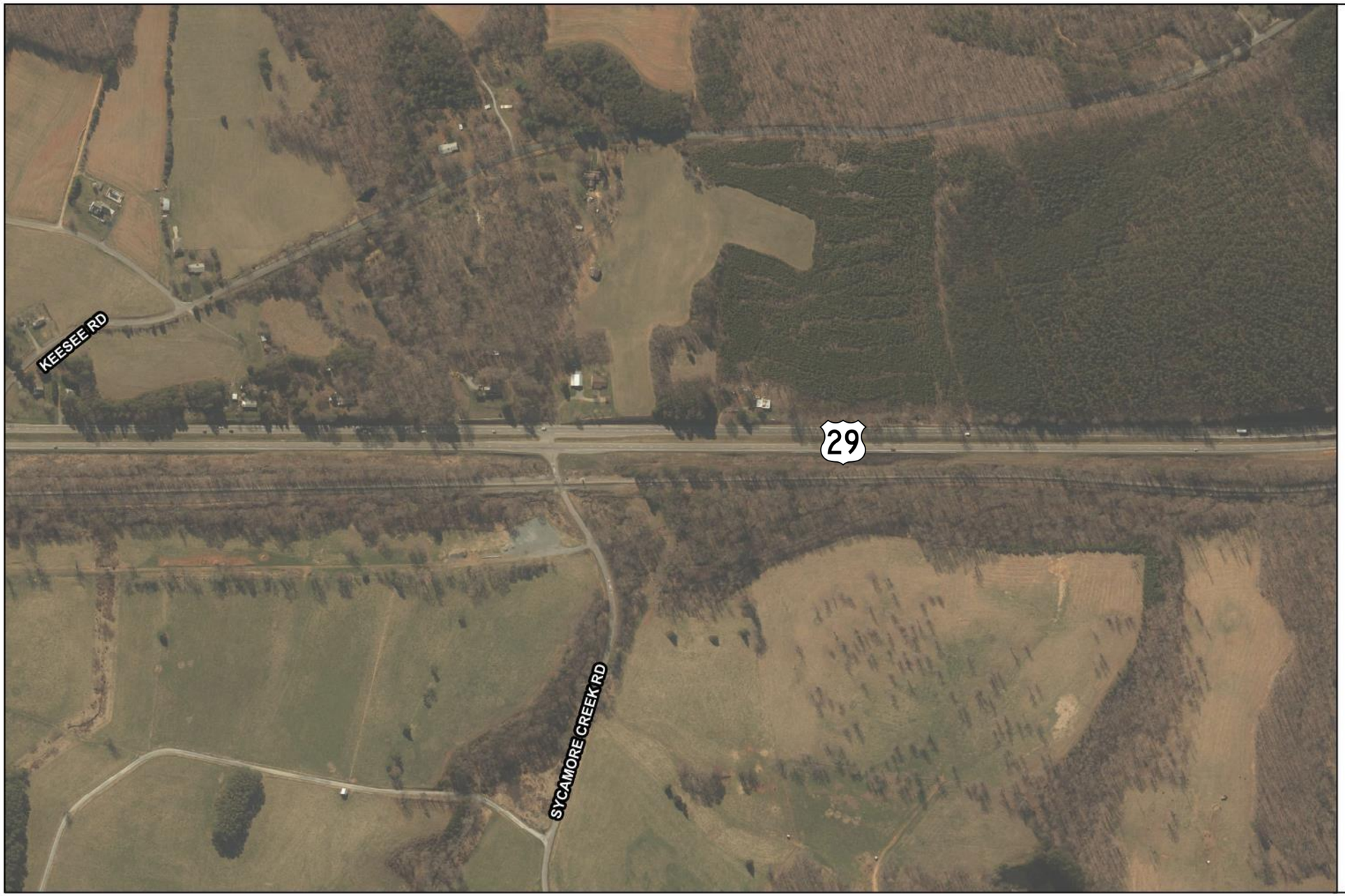
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

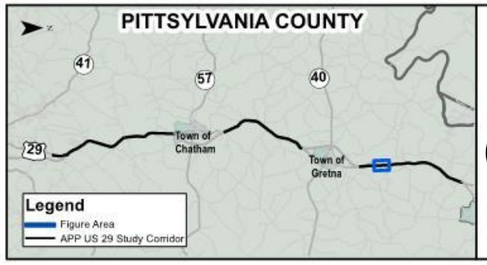
- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 16
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



No Recommendations



LEGEND

#	Intersection Number
#	Emerging Intersection

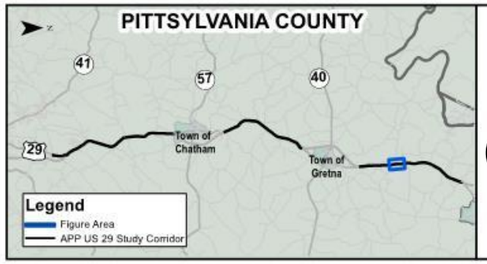
Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 17
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

No Recommendations



LEGEND

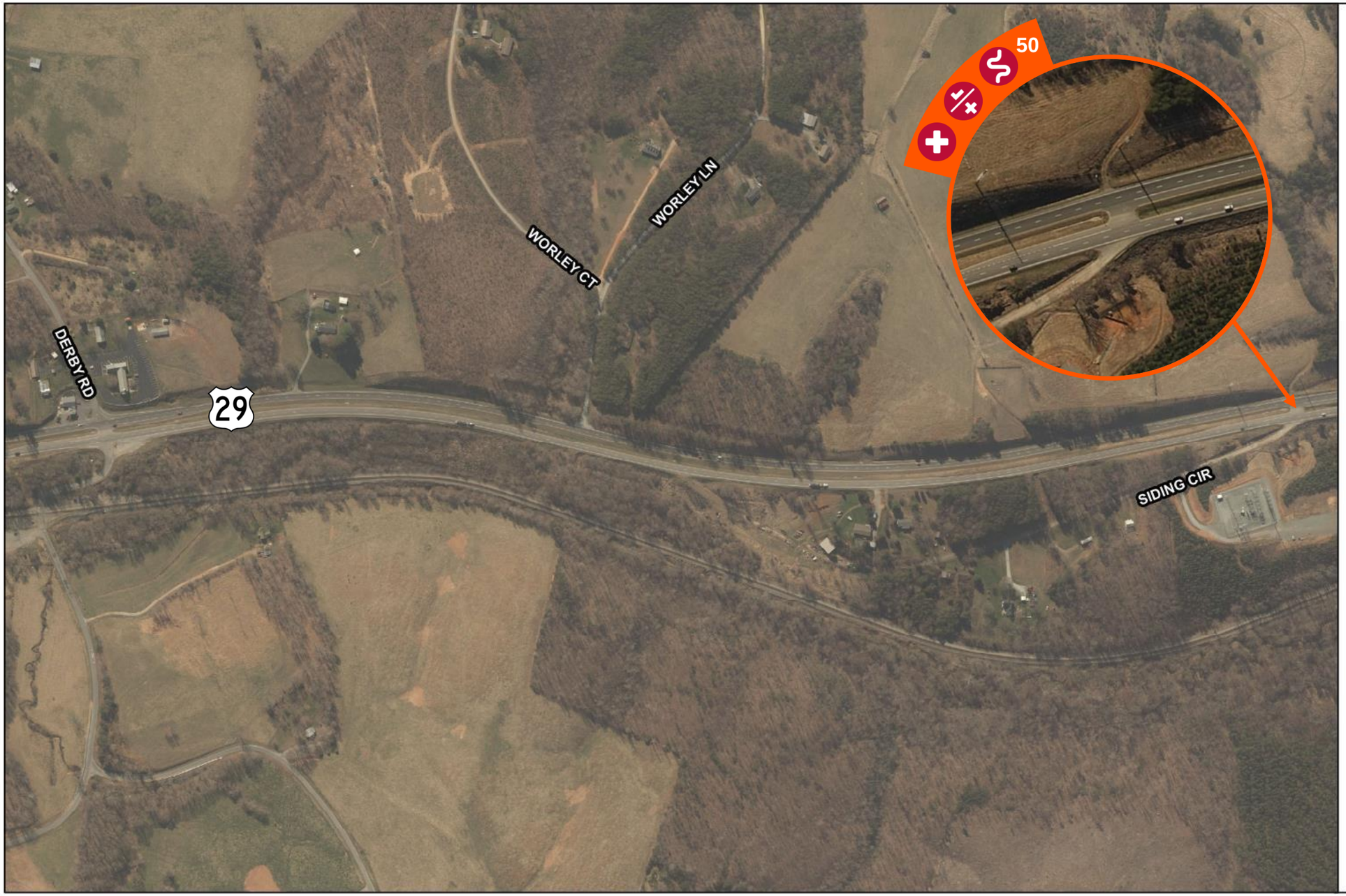
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 18
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

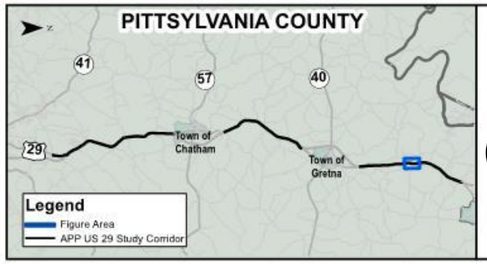
50. US 29 at Sliding Circle

- Convert to directional median opening

Roadway Improvements:

From Derby Road to Sliding Circle

- Install curve delineation/warning signs
- Install rumble strips



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

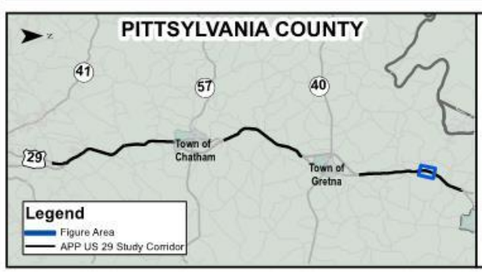
US 29 Arterial Preservation Plan
Figure 19
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

Roadway Recommendations
From Keatts Road to Shula Drive

- Install curve delineation/warning signs
- Install rumble strips



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 20
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

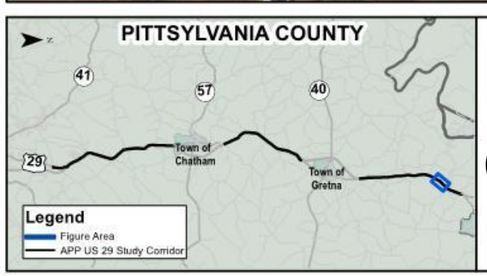
Roadway, Intersection, and Median Crossover Recommendations

50. US 29 at Sliding Circle

- Project funded through SMART SCALE.

Roadway Recommendations
From Keatts Road to Shula Drive

- Install curve delineation/warning signs
- Install rumble strips



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

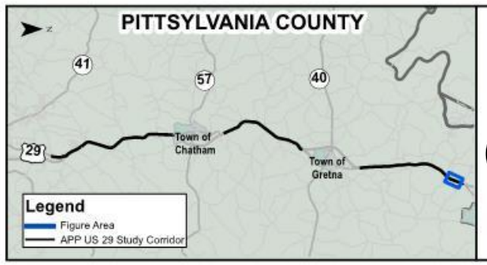
US 29 Arterial Preservation Plan
Figure 21
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

51. US 29 at Shula Drive

- Project funded through SMART SCALE (Proposed offset T-Intersection or RCUT)



LEGEND

#	Intersection Number
#	Emerging Intersection

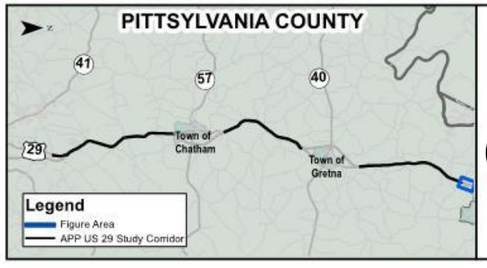
Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 22
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

No Recommendations



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 23
Pittsylvania County

VDOT ARTERIAL PRESERVATION PROGRAM

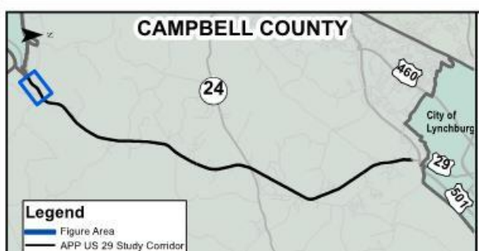
Roadway, Intersection, and Median Crossover Recommendations

52. US 29 at Altavista Memorial Park

- Extend southbound left-turn lane (as part of Glady's Road intersection improvements)

53. US 29 at Route 699 (Glady's Road)

- RCUT Concept



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 24
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Gladys Road – RCUT Concept

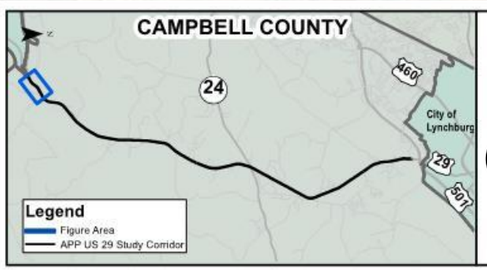
Recommendation: Reconfigure the intersection at US 29 and Gladys Road to a Restricted Crossing U-Turn (RCUT). Construct a median opening with a loon to accommodate northbound U-turns.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	0.0 – A	10.3 – B	0.0 – A	0.2 – A
Southbound	9.4 – A	10.1 – B	0.2 – A	0.9 – A
Overall	–	–	–	–

Safety: A crash reduction of 35% would be expected by implementing an unsignalized RCUT improvement.

Cost:
Preliminary Engineering = $755,000
Right-of-Way = $160,000
Construction = $4,600,000
Total = $5,515,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry

Safety

Access Management

Traffic Operations

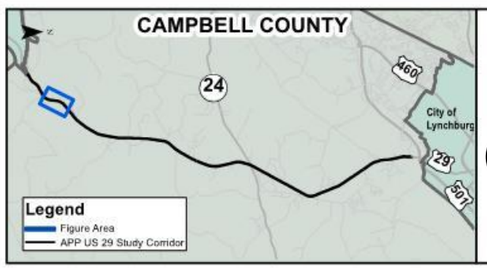
US 29 Arterial Preservation Plan
Figure 24A
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

Roadway Recommendations
From Fox Ridge Lane to Peerman School Road

- Install curve delineation/warning signs
- Install rumble strips



LEGEND

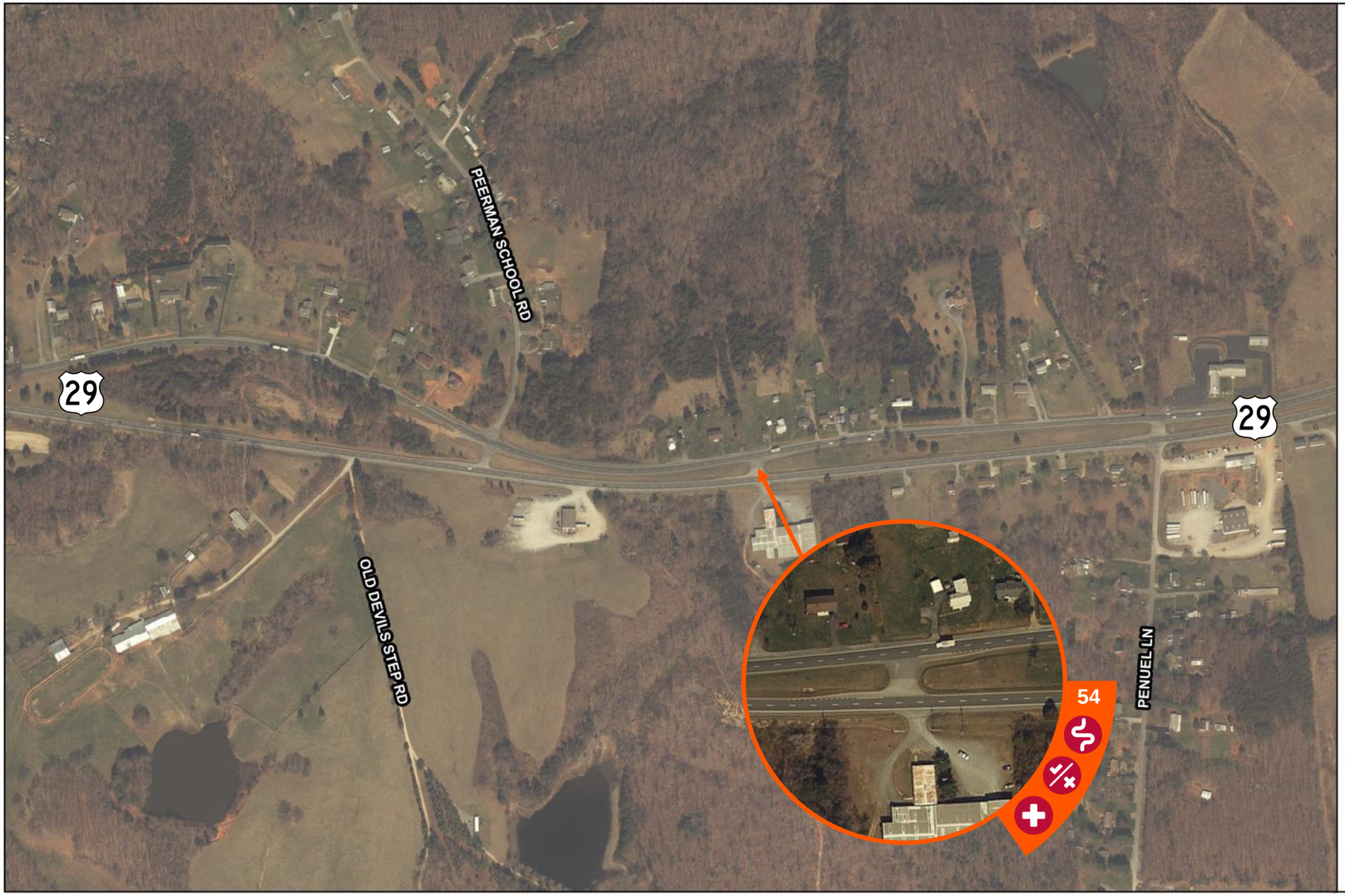
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 25
Campbell County

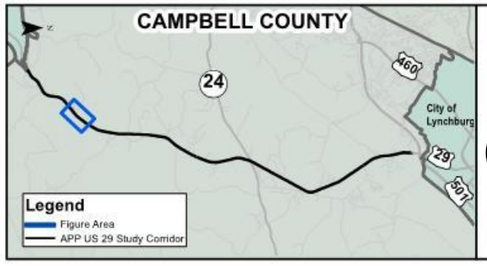
VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

54. US 29 north of Peerman School Road

- Convert to directional median opening



LEGEND

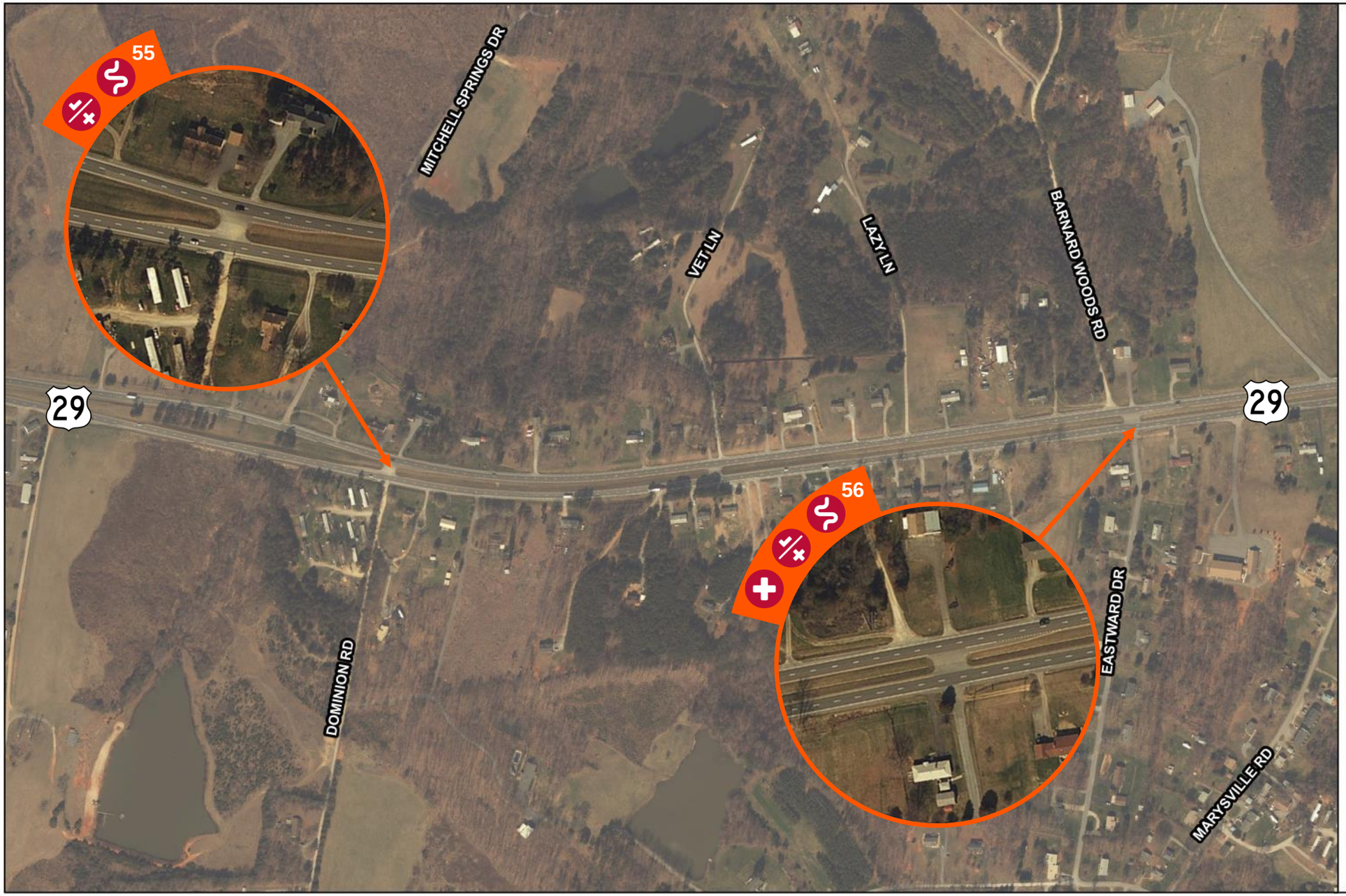
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 26
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



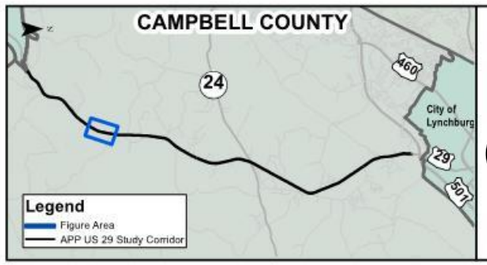
Roadway, Intersection, and Median Crossover Recommendations

55. US 29 at Dominion Road

- Convert to directional median opening

56. US 29 at Route 906 (Eastward Drive)

- Convert to directional median opening
- Install northbound left-turn lane



LEGEND

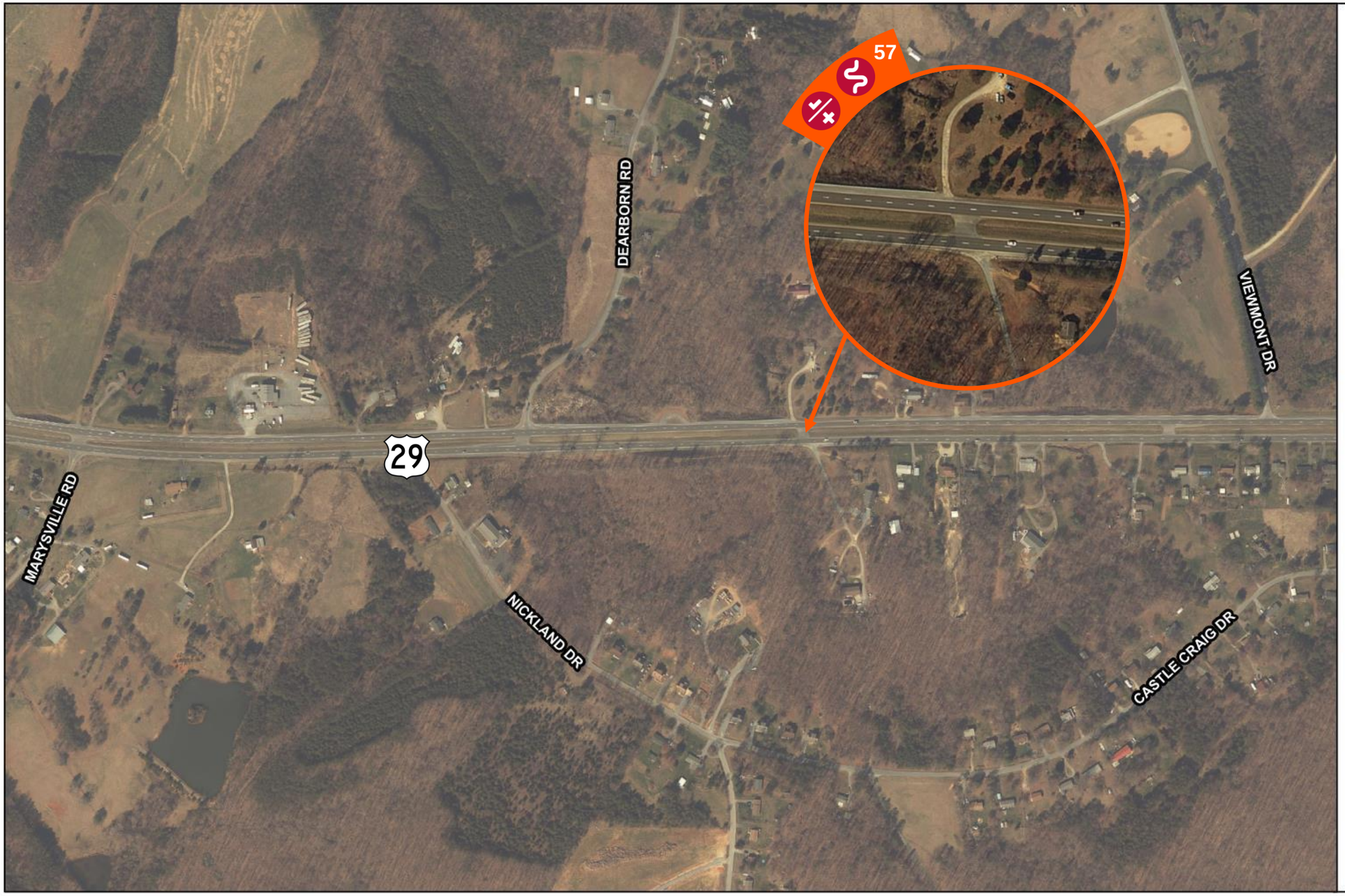
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 27
Campbell County

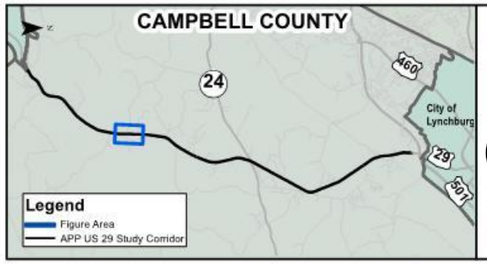
VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

57. US 29 north of Dearborn Road

- Convert to directional median opening
- Install northbound and southbound left-turn lanes



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 28
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

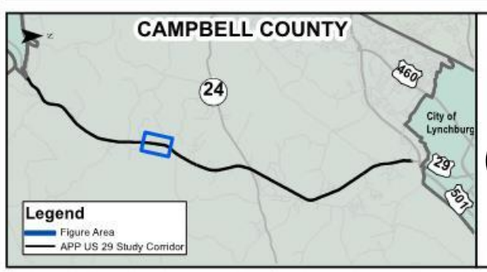
Roadway, Intersection, and Median Crossover Recommendations

58. US 29 at Route 912 (Castle Craig Drive)

- Convert to directional median opening

59. US 29 at Tinsel Lane

- Convert to directional median opening



LEGEND

#	Intersection Number
#	Emerging Intersection

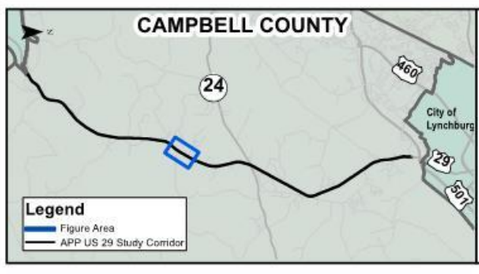
Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 29
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

No Recommendations



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 30
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

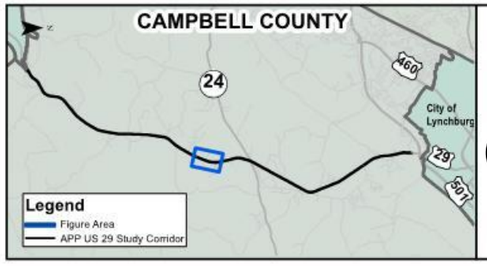
Roadway, Intersection, and Median Crossover Recommendations

60. US 29 at John Puckett Drive
- Close median opening

61. US 29 at Route 747 (Ewing Drive)
- Construct northbound U-turn and loon

62. US 29 north of Ewing Drive
- Close median opening

Roadway Improvements
From John Puckett Drive to Ewing Drive
- Install rumble strips
- Consider shoulder widening



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 31
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

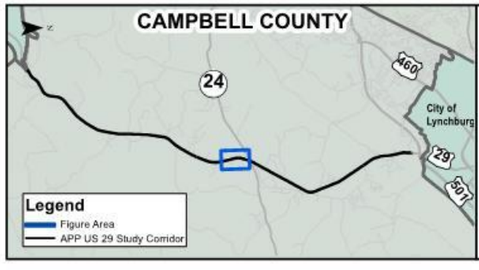
Roadway, Intersection, and Median Crossover Recommendations

63. US 29 south of Jersey Level Lane
- Install northbound and southbound left-turn lanes

64. US 29 north of Jersey Level Lane
- Close median opening

65. US 29 south of Dennis Riddle Drive
- Convert to directional median opening

66. US 29 at Dennis Riddle Drive
- Convert to southbound directional median opening



LEGEND

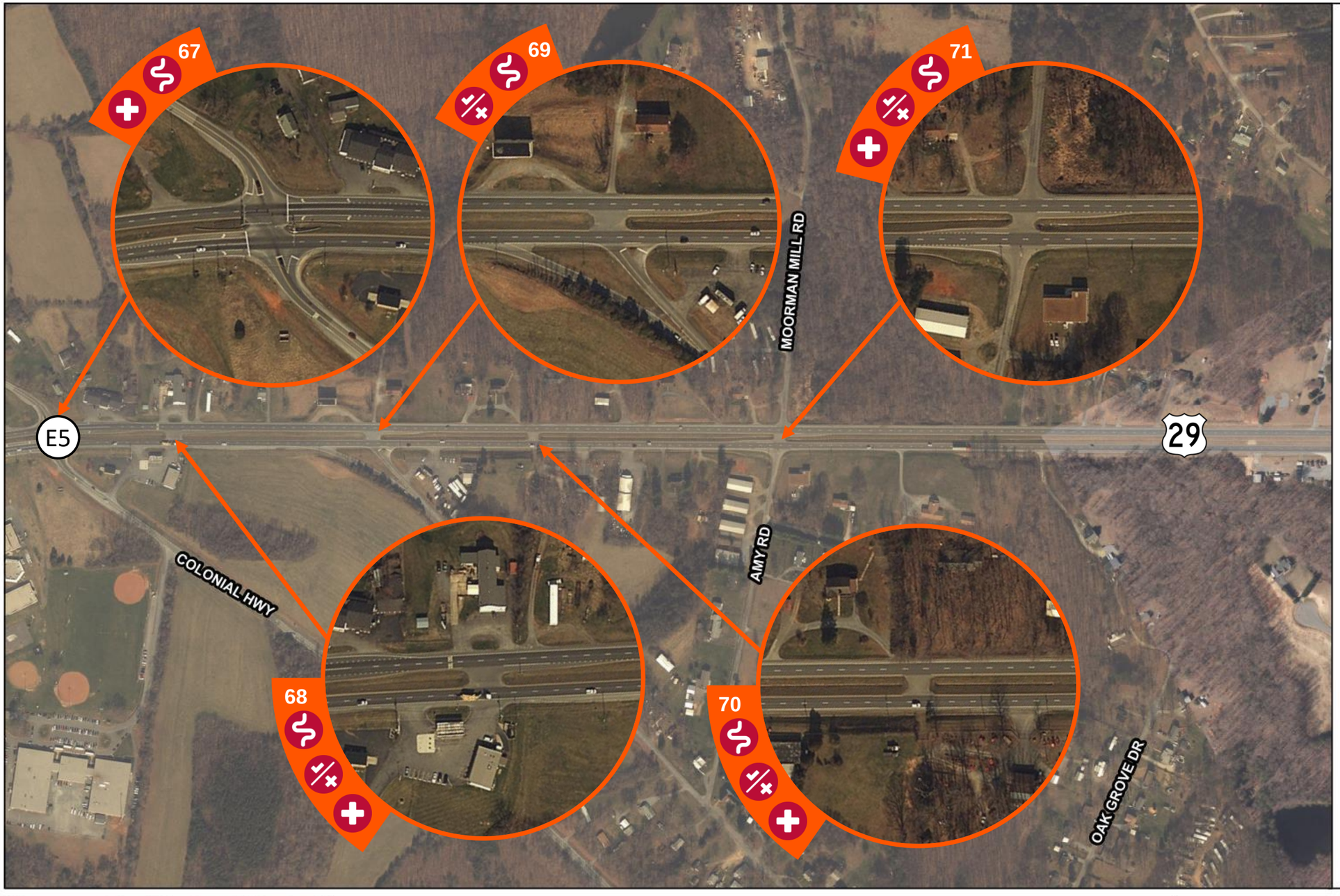
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 32
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

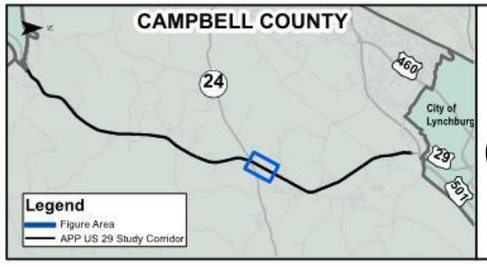
67 (E5). US 29 at Colonial Highway
- Bowtie Concept

68. US 29 north of Colonial Highway
- Extend southbound left turn lane
- Construction southbound directional median opening

69. US 29 at Anstey Road
- Close median opening

70. US 29 north of Anstey Road
- Install northbound and southbound left turn lanes

71. US 29 at Route 689 (Moorman Mill Road/Amy Road)
- Extend northbound and southbound left-turn lanes
- Extend northbound right-turn lane
- Install southbound right-turn lane
- Restrict left turns from minor street



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 33
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at Colonial Highway – Bowtie Concept

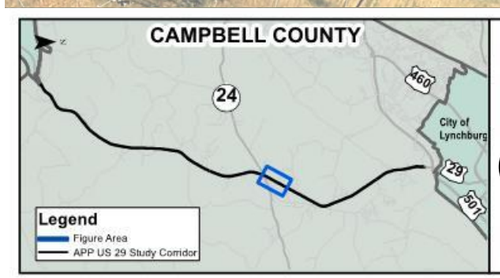
Recommendation: Reconfigure the intersection at US 29 and Colonial Highway to a bowtie intersection. Construct roundabouts east and west of the intersection to accommodate left turns from all approaches at the main intersection.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	26.1 – C	19.1 – B	12.2 – B	12.0 – B
Southbound	20.2 – C	23.1 – B	11.3 – B	12.6 – B
Overall	30.3 – C	27.6 – C	16.1 – B	16.0 – B

Safety: A conventional intersection as 32 conflict points, or locations where vehicle paths cross, merge, or diverge. A bowtie configuration would reduce the number of conflict points to 20.

Cost:
Preliminary Engineering = $1,650,000
Right-of-Way = $1,375,000
Construction = $10,000,000
Total = $13,250,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry

Safety

Access Management

Traffic Operations

US 29 Arterial Preservation Plan
Figure 33A
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

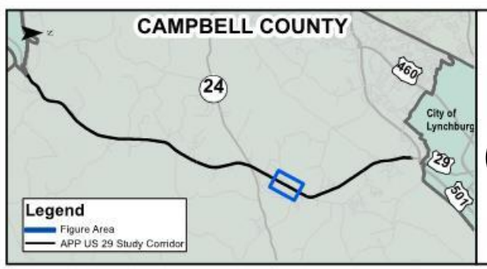
72. US 29 south of Patterson Road
- Install northbound and southbound left-turn lanes

73. US 29 south of Patterson Road
- Close median opening

74. US 29 at Route 688 (Patterson Road)
- Restrict left turns from Patterson Road
- Extend northbound left-turn lane
- Install southbound right-turn and left-turn lanes

75. US 29 north of Patterson Road
- Convert to directional median opening

76. US 29 at Used Auto Complex
- Install northbound left-turn lane
- Extend southbound left-turn lane



LEGEND

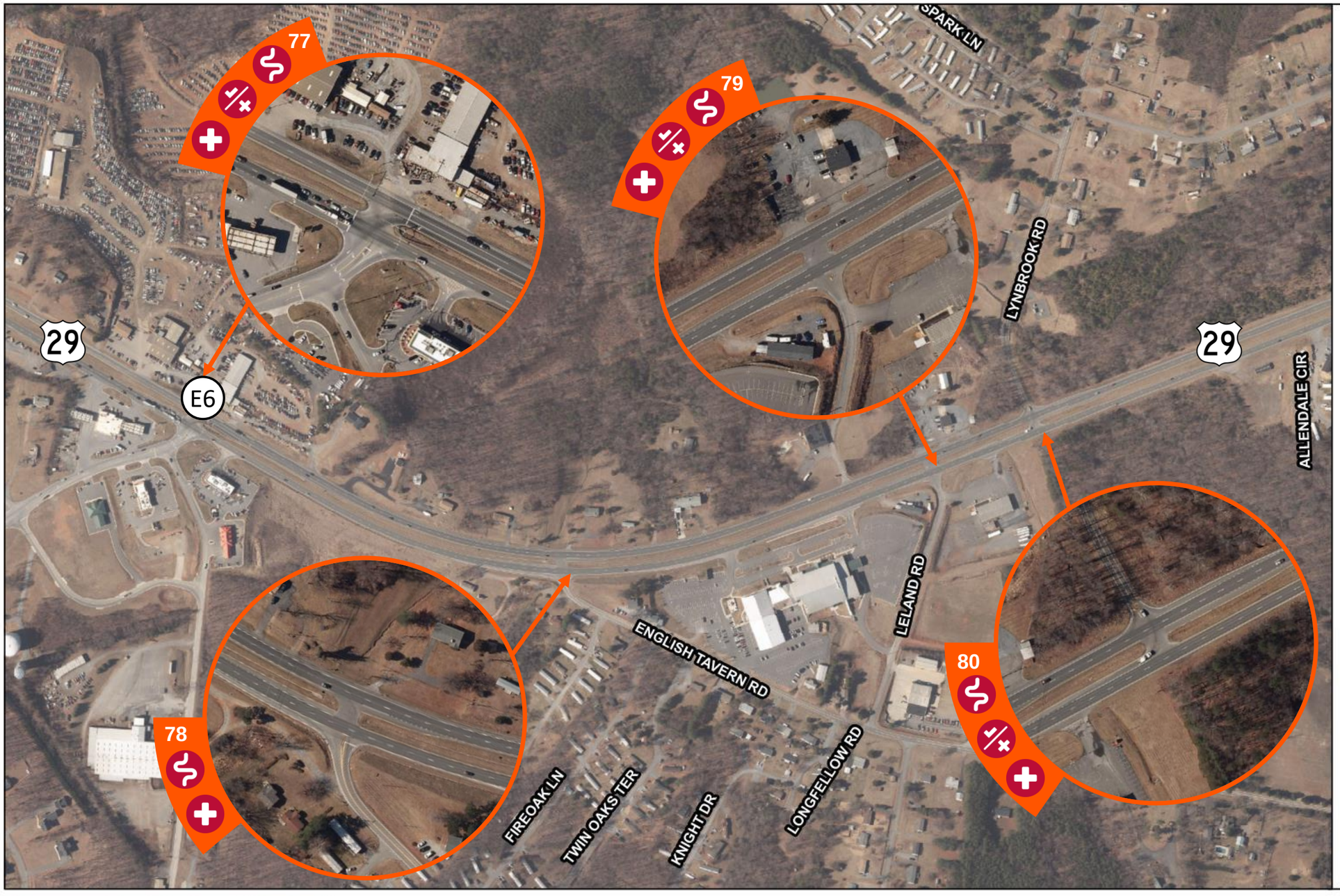
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 34
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

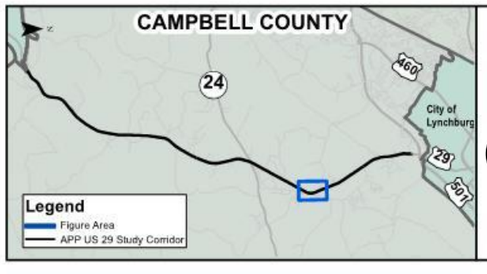
77 (E6). US 29 at Route 738 (Calohan Road)
- RCUT Concept

78. US 29 at Route 738 (English Tavern Road)
- Close median opening

79. US 29 at Leland Road
- Close median opening

80. US 29 at Lynbrook Road
- Install northbound right-turn lane
- Extend southbound right-turn lane
- Realign Leland Road to intersect with Lynbrook Road

Roadway Improvements
From Leland Road to Hyland Drive
- Install rumble strips



LEGEND

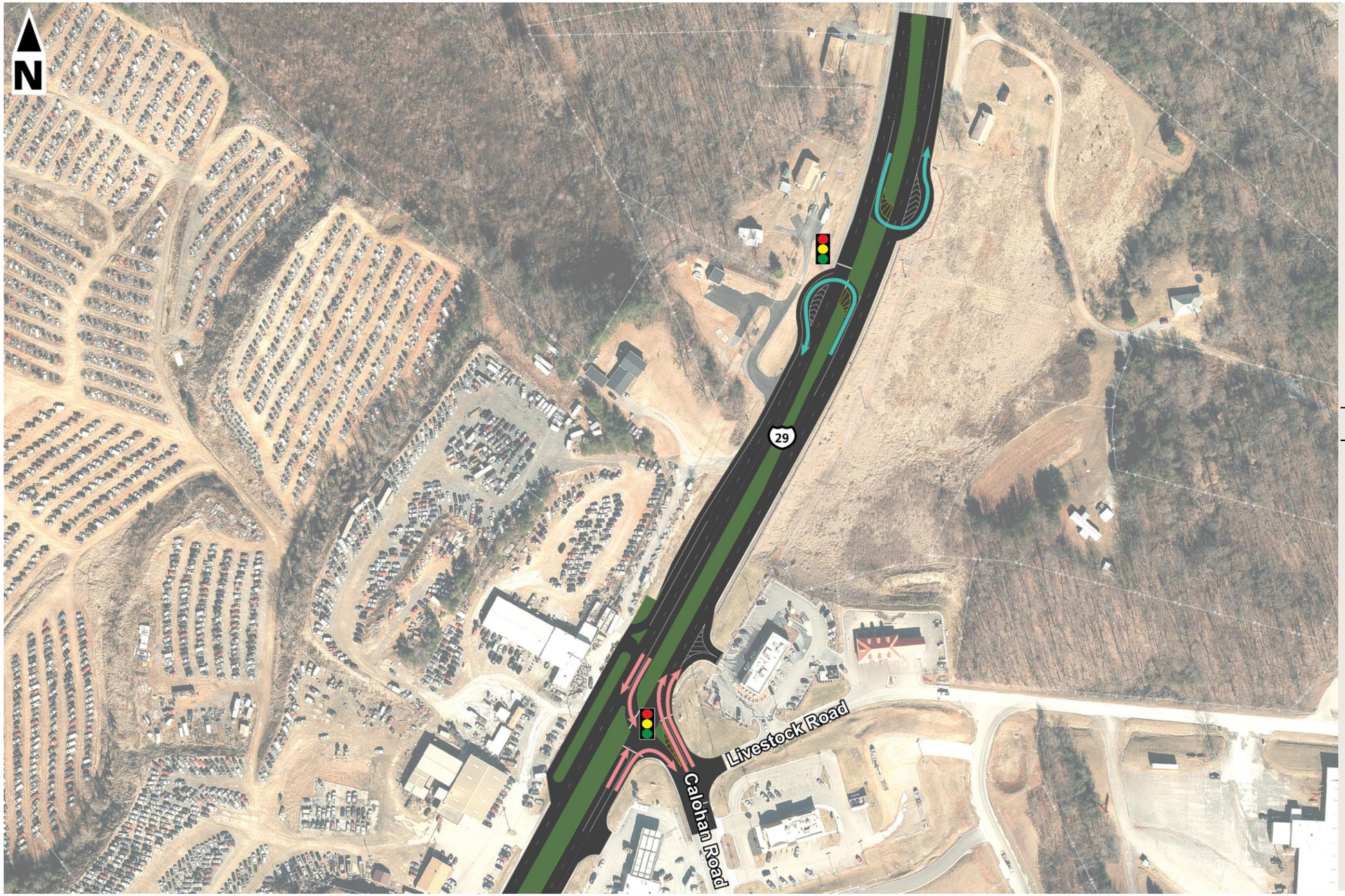
#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 35
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



US 29 at Calohan Road – RCUT Concept

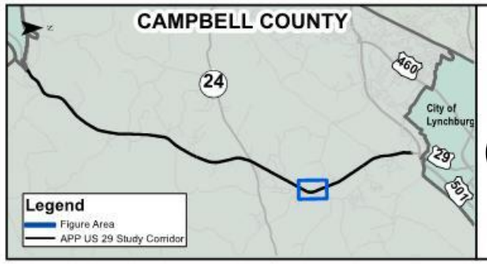
Recommendation: Reconfigure the intersection at US 29 and Calohan Road to a Restricted Crossing U-Turn (RCUT). Construct a signalized median opening with a loon to accommodate U-turns to the north. The southbound through movement at Calohan Road becomes free-flow.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	29.8 – C	31.6 – C	13.8 – B	17.1 – B
Southbound	23.1 – C	27.5 – C	11.4 – B	12.7 – B
Overall	33.5 – C	31.9 – C	16.7 – B	15.8 – B

Safety: A crash reduction of 20% would be expected from implementing an RCUT improvement.

Cost:
Preliminary Engineering = $500,000
Right-of-Way = $75,000
Construction = $3,000,000
Total = $3,575,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry
Safety
Access Management
Traffic Operations

US 29 Arterial Preservation Plan
Figure 35A
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

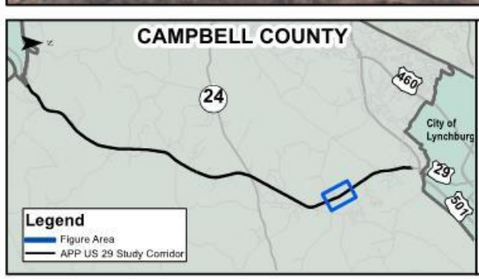
Roadway, Intersection, and Median Crossover Recommendations

81. US 29 at Allendale Circle

- Install northbound and southbound left-turn lanes

82. US 29 at Route 1602 (Hyland Drive)

- Restrict left turns from Hyland Drive
- Install northbound right-turn lane
- Extend southbound right-turn lane



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 36
Campbell County

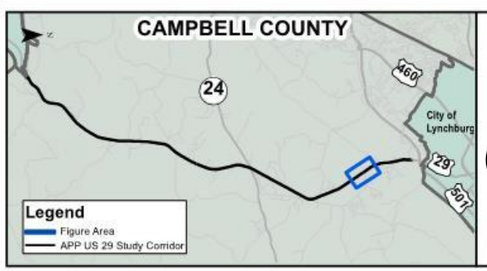
VDOT ARTERIAL PRESERVATION PROGRAM

Roadway, Intersection, and Median Crossover Recommendations

83. US 29 at Terra Way
- Close median opening

84 (E7). US 29 at Route 738 (English Tavern Road)
- RCUT Concept

85. US 29 at Watson Drive
- Extend northbound and southbound left-turn lanes



LEGEND

#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 37
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

US 29 at English Tavern Road – RCUT Concept

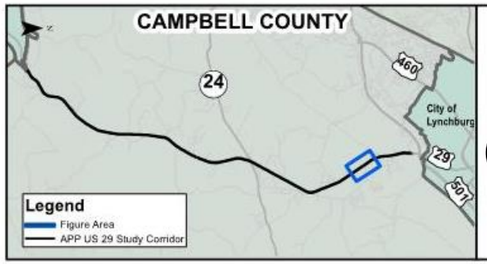
Recommendation: Reconfigure the intersection at US 29 and English Tavern Road to a Restricted Crossing U-Turn (RCUT). Construct median openings with loons to accommodate U-turns.

Traffic Operations:
Delay (seconds) - Level of Service

	Conventional		RCUT	
	AM	PM	AM	PM
Northbound	63.4 – E	38.0 – D	24.5 – C	12.5 – B
Southbound	14.4 – B	28.2 – C	4.0 – A	8.4 – B
Overall	44.0 – D	32.6 – C	26.2 – C	12.2 – B

Safety: A crash reduction of 20% would be expected from implementing an RCUT improvement.

Cost:
Preliminary Engineering = $1,025,000
Right-of-Way = $580,000
Construction = $6,300,000
Total = $7,905,000



LEGEND

Intersection Number

Emerging Intersection

Existing Deficiency

Geometry

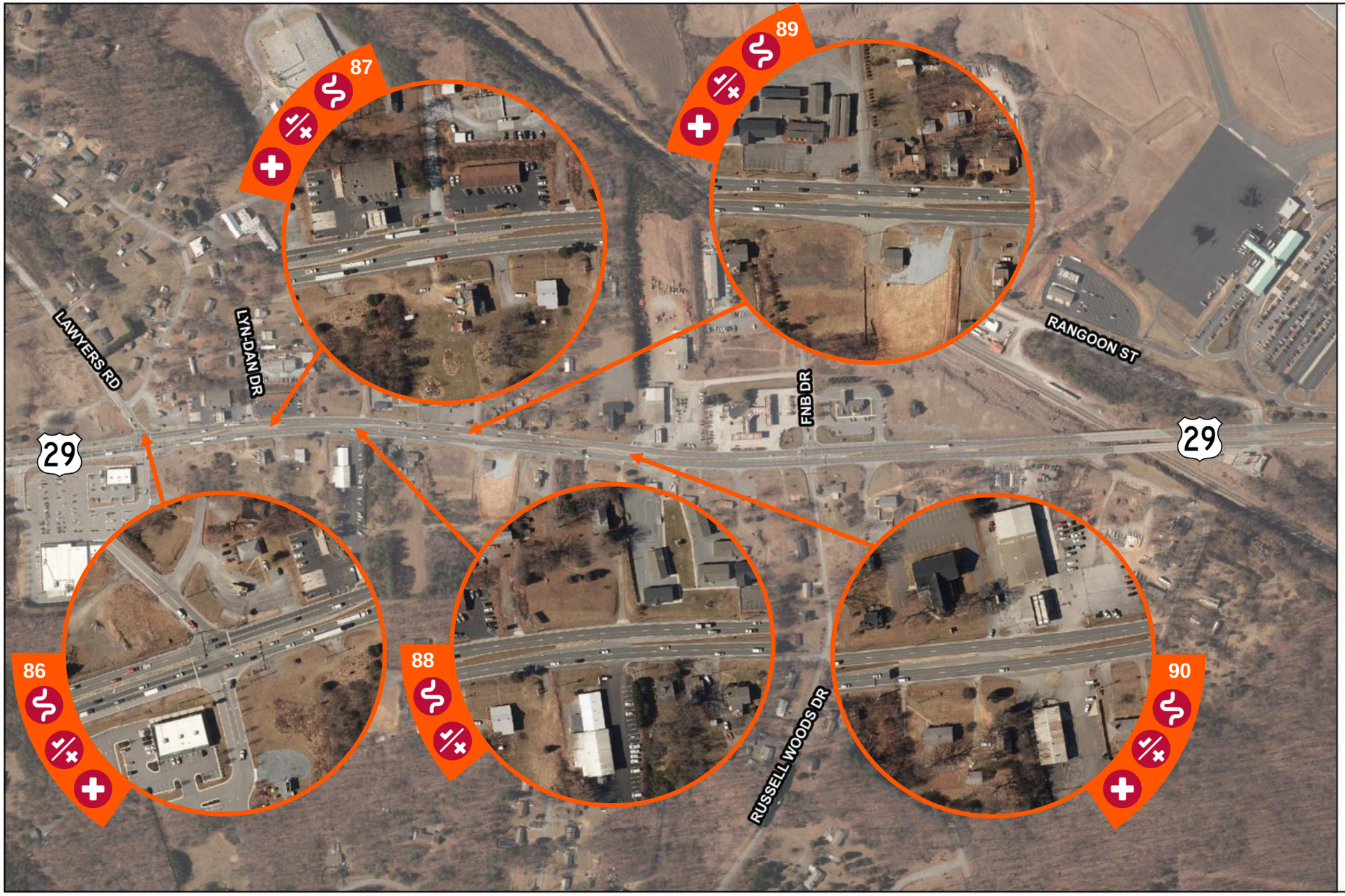
Safety

Access Management

Traffic Operations

US 29 Arterial Preservation Plan
Figure 37A
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



Roadway, Intersection, and Median Crossover Recommendations

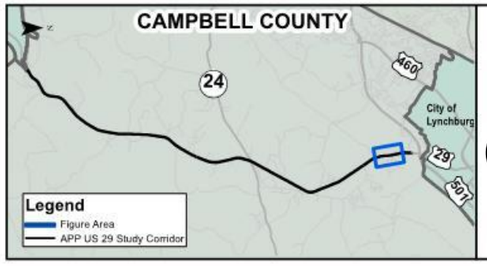
86. US 29 at Route 683 (Lawyer's Road)
- Extend southbound right-turn lane

87. US 29 at Route 863 (Lyn Dan Drive)
- Close median opening

88. US 29 north of Lyn Dan Drive
- Restrict left turns out of Wooldridge driveway

89. US 29 at Baker Road
- Extend northbound and southbound left-turn lanes

90. US 29 at Median Opening (Flat Creek Baptist Church Entrance)
- Close median opening



LEGEND

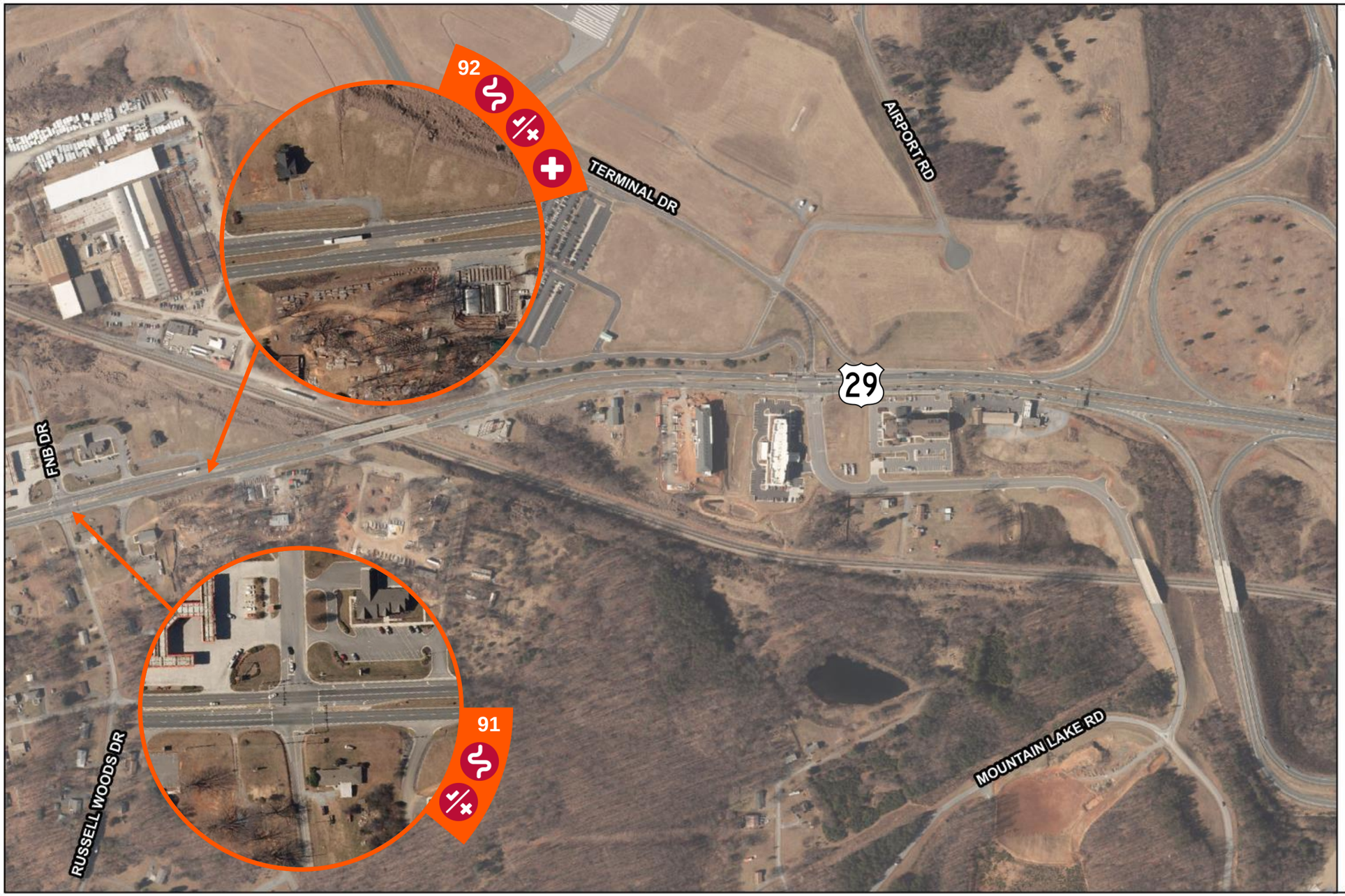
#	Intersection Number
(#)	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 38
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM



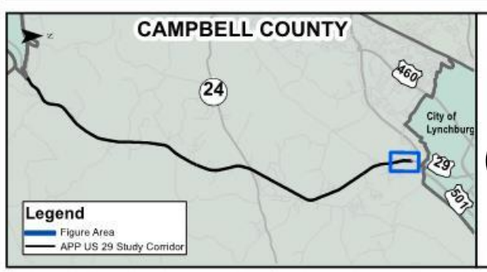
Roadway, Intersection, and Median Crossover Recommendations

91. US 29 at Route 679 (Russell Woods Drive)

- Install northbound right-turn lane
- Extend southbound left-turn lane

92. US 29 at Route 1430 (Quartz Road)

- Extend southbound right-turn lane



LEGEND

#	Intersection Number
#	Emerging Intersection

Existing Deficiency

- Geometry
- Safety
- Access Management
- Traffic Operations

US 29 Arterial Preservation Plan
Figure 39
Campbell County

VDOT ARTERIAL PRESERVATION PROGRAM

APPENDIX K

Build Operational Analysis

APPENDIX K-1

Delay Summary Table

HCM - Intersection Delay and LOS
2040 Build Conditions
US 29 Arterial Preservation Plan

	Intersection Number and Description	Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)			US 29				US 29				Lawless Creek Road				E Witt Road				Intersection	
		Unsignalized RCUT	Left	10.4	B	9.3	A	8.3	A	9.5	A	54.6	D	54.4	D	50.5	D	49.7	D	Delay	Delay
			Through	†	†	†	†	†	†	†	†	54.6	D	54.4	D	50.5	D	49.7	D	-	-
			Right	†	†	†	†	†	†	†	†	14.3	B	12.1	B	10.4	B	11.5	B	LOS	LOS
			Approach	-	-	-	-	-	-	-	-	47.1	D	35.6	D	35.4	D	30.9	C	-	-
2	US 29 at Malmaison Road			US 29				US 29				Malmaison Road				Malmaison Road				Intersection	
		Signal	Left	38.3	D	43.3	D	36.0	D	48.4	D	38.5	D	42.4	D	24.4	C	33.1	C	Delay	Delay
			Through	19.3	B	21.8	C	15.4	B	12.5	B									18.5	20.1
			Right	5.0	A	5.1	A					0.0	A	37.4	D	21.9	C	31.0	C	LOS	LOS
			Approach	14.8	B	17.4	B	17.7	B	18.6	B	38.5	D	41.2	D	23.6	C	32.4	C	B	C
3	US 29 at Tight Squeeze Road/Fairview Road			US 29				US 29				Tight Squeeze Road				Fairview Road				Intersection	
		Signalized RCUT	Left	27.8	C	31.1	C	25.8	C	27.8	C	62.1	E	69.9	E	83.9	F	81.7	F	Delay	Delay
			Through	10.6	B	16.1	B	10.4	B	12.2	B	60.5	E	67.5	E	81.2	F	75.8	E	19.3	25.0
			Right	9.0	A	13.7	B	7.7	A	6.3	A	19.7	B	27.2	C	25.0	C	25.8	C	LOS	LOS
			Approach	14.3	B	19.1	B	12.0	B	14.7	B	51.0	D	61.2	E	68.5	E	61.2	E	B	C
4	US 29 at Gladys Road			US 29				US 29				Gladys Road				Gladys Road				Intersection	
		Unsignalized RCUT	Left	0.0	A	10.6	B	9.6	A	10.6	B	29.9	C	45.9	D	44.9	D	52.9	D	Delay	Delay
			Through	†	†	†	†	†	†	†	†	29.9	C	45.9	D	44.9	D	52.9	D	-	-
			Right	†	†	†	†					10.7	B	12.2	B	13.1	B	12.6	B	LOS	LOS
			Approach	-	-	-	-	-	-	-	-	10.7	B	29.0	C	27.5	C	35.7	D	-	-
5	US 29 at Colonial Highway			US 29				US 29				Colonial Highway				Colonial Highway				Intersection	
		Signal	Left	56.6	E	56.5	E	48.7	D	45.8	D	51.2	D	45.8	D	46.6	D	48.2	D	Delay	Delay
			Through	11.7	B	10.5	B	9.2	A	12.2	B	30.6	C	25.1	C	30.1	C	30.9	C	16.1	16.0
			Right	13.3	B	12.4	B	11.7	B	13.0	B	21.7	C	21.2	C	25.5	C	25.6	C	LOS	LOS
			Approach	12.2	B	12.0	B	11.3	B	12.6	B	38.9	D	36.6	D	41.8	D	42.3	D	B	B
6	US 29 at Calohan Road			US 29				US 29				Calohan Road				Calohan Road				Intersection	
		Signal	Left	-				23.0	C	26.3	C					74.7	E	84.9	F	Delay	Delay
			Through	14.3	B	17.3	B	6.2	A	6.1	A									16.7	15.8
			Right	8.3	A	11.1	B									23.6	C	13.7	B	LOS	LOS
			Approach	13.8	B	17.1	B	11.4	B	12.7	B					31.8	C	24.8	C	B	B
7	US 29 at English Tavern Road			US 29				US 29				Access Driveway				English Tavern Road				Intersection	
		Signalized RCUT	Left	1.6	A	0.0	A	8.2	A	10.0	A	147.8	F	86.6	F	112.7	F	140.3	F	Delay	Delay
			Through	24.7	C	12.6	B	3.3	A	8.0	A	133.4	F	82.2	F	111.8	F	136.0	F	26.2	12.2
			Right	10.3	B	8.2	A	2.4	A	3.7	A	41.6	D	24.5	C	69.6	E	20.2	C	LOS	LOS
			Approach	24.5	C	12.5	B	4.0	A	8.4	A	126.6	F	86.1	F	72.5	E	29.3	C	C	B

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

LOS and Delay for rerouted movements through Innovative Intersections reported based on Estimated Travel Times (ETT).

APPENDIX K-2

Synchro Delay Reports

AM Delay

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	207	0	0	78	59	362	29	18	570	159
Future Vol, veh/h	0	0	207	0	0	78	59	362	29	18	570	159
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	185	-	-	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	6	0	0	3	6	6	8	0	2	9
Mvmt Flow	0	0	252	0	0	95	72	441	35	22	695	194

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	348	-	-	238	889	0	0	476	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.02	-	-	6.96	4.22	-	-	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.36	-	-	3.33	2.26	-	-	2.2	-	-
Pot Cap-1 Maneuver	0	0	637	0	0	760	733	-	-	1097	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	637	-	-	760	733	-	-	1097	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	10.4	1.4	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	733	-	-	637	760	1097	-	-
HCM Lane V/C Ratio	0.098	-	-	0.396	0.125	0.02	-	-
HCM Control Delay (s)	10.4	-	-	14.3	10.4	8.3	-	-
HCM Lane LOS	B	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.9	0.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Future Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1		7.5	7.5	7.5	6.4	5.7	5.7	6.6	5.8	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		902		1633	1640	1524	902	1827	1509	1736	3503	
Flt Permitted		0.95		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		902		1633	1640	1524	902	1827	1509	1736	3503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	0	264	2	123	1	300	138	62	499	2
RTOR Reduction (vph)	0	0	0	0	0	98	0	0	54	0	0	0
Lane Group Flow (vph)	0	2	0	132	134	25	1	300	84	62	501	0
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	pt+ov	Prot	NA	
Protected Phases	4	4		3	3		1	6	6 3	5	2	
Permitted Phases			4			3						
Actuated Green, G (s)		1.3		13.3	13.3	13.3	1.0	21.8	40.8	4.4	25.3	
Effective Green, g (s)		1.3		13.3	13.3	13.3	1.0	21.8	40.8	4.4	25.3	
Actuated g/C Ratio		0.02		0.20	0.20	0.20	0.01	0.33	0.61	0.07	0.38	
Clearance Time (s)		6.1		7.5	7.5	7.5	6.4	5.7		6.6	5.8	
Vehicle Extension (s)		5.0		4.0	4.0	4.0	3.5	5.0		3.5	5.0	
Lane Grp Cap (vph)		17		325	327	303	13	597	923	114	1328	
v/s Ratio Prot		c0.00		0.08	c0.08		0.00	c0.16	0.06	c0.04	c0.14	
v/s Ratio Perm						0.02						
v/c Ratio		0.12		0.41	0.41	0.08	0.08	0.50	0.09	0.54	0.38	
Uniform Delay, d1		32.1		23.3	23.3	21.7	32.4	18.1	5.3	30.2	15.0	
Progression Factor		1.00		1.00	1.00	1.00	1.09	0.99	0.91	1.00	1.00	
Incremental Delay, d2		6.4		1.1	1.1	0.2	3.0	1.4	0.1	5.8	0.4	
Delay (s)		38.5		24.4	24.4	21.9	38.3	19.3	5.0	36.0	15.4	
Level of Service		D		C	C	C	D	B	A	D	B	
Approach Delay (s)		38.5			23.6			14.8			17.6	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	25.9
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	232	0	0	72	193	883	43	17	738	183
Future Volume (vph)	0	0	232	0	0	72	193	883	43	17	738	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.86			0.86	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1565			1596	1556	3312	1568	1583	3282	1509
Flt Permitted			1.00			1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1565			1596	1556	3312	1568	1583	3282	1509
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	267	0	0	83	222	1015	49	20	848	210
RTOR Reduction (vph)	0	0	124	0	0	75	0	0	14	0	0	93
Lane Group Flow (vph)	0	0	143	0	0	8	222	1015	35	20	848	117
Heavy Vehicles (%)	0%	0%	5%	0%	0%	3%	16%	9%	3%	14%	10%	7%
Turn Type			Over			Over	Prot	NA	Perm	Prot	NA	Perm
Protected Phases			1			5	1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)			14.7			5.6	14.7	42.4	42.4	5.6	33.3	33.3
Effective Green, g (s)			14.7			5.6	14.7	42.4	42.4	5.6	33.3	33.3
Actuated g/C Ratio			0.24			0.09	0.24	0.71	0.71	0.09	0.55	0.55
Clearance Time (s)			6.0			6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)			4.0			4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Grp Cap (vph)			383			148	381	2340	1108	147	1821	837
v/s Ratio Prot			0.09			0.00	c0.14	0.31		0.01	c0.26	
v/s Ratio Perm									0.02			0.08
v/c Ratio			0.37			0.05	0.58	0.43	0.03	0.14	0.47	0.14
Uniform Delay, d1			18.8			24.8	19.9	3.7	2.6	25.0	8.0	6.4
Progression Factor			1.00			1.00	0.88	0.58	0.42	0.83	0.62	0.44
Incremental Delay, d2			0.8			0.2	2.3	0.5	0.0	0.5	0.8	0.3
Delay (s)			19.7			25.0	19.9	2.7	1.1	21.2	5.8	3.1
Level of Service			B			C	B	A	A	C	A	A
Approach Delay (s)		19.7			25.0			5.6			5.6	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	0	0	177	0	693	39	14	707	1
Future Vol, veh/h	0	0	2	0	0	177	0	693	39	14	707	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	3	0	7	20	8	13	0
Mvmt Flow	0	0	2	0	0	186	0	729	41	15	744	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	372	-	-	365	745	0	0	770	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	6.96	4.1	-	-	4.26	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.33	2.2	-	-	2.28	-	-
Pot Cap-1 Maneuver	0	0	631	0	0	629	872	-	-	802	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	631	-	-	629	872	-	-	802	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	13.1	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	872	-	-	631	629	802	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.296	0.018	-	-
HCM Control Delay (s)	0	-	-	10.7	13.1	9.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	207	135	0	119	118	0	1009	135	0	655	77
Future Volume (vph)	0	207	135	0	119	118	0	1009	135	0	655	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		8.3			5.8	5.8		5.9	5.9
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00		0.95	1.00
Frt		1.00	0.85		0.93			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1845	1524		1648			3343	1468		3312	1568
Flt Permitted		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1845	1524		1648			3343	1468		3312	1568
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	227	148	0	131	130	0	1109	148	0	720	85
RTOR Reduction (vph)	0	0	107	0	39	0	0	0	73	0	0	42
Lane Group Flow (vph)	0	227	41	0	222	0	0	1109	75	0	720	43
Heavy Vehicles (%)	0%	3%	6%	0%	12%	3%	0%	8%	10%	0%	9%	3%
Turn Type		NA	Perm		NA			NA	Perm		NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases			4						6			2
Actuated Green, G (s)		13.3	13.3		13.3			27.9	27.9		27.8	27.8
Effective Green, g (s)		13.3	13.3		13.3			27.9	27.9		27.8	27.8
Actuated g/C Ratio		0.24	0.24		0.24			0.50	0.50		0.50	0.50
Clearance Time (s)		8.3	8.3		8.3			5.8	5.8		5.9	5.9
Vehicle Extension (s)		4.0	4.0		4.0			6.0	6.0		6.0	6.0
Lane Grp Cap (vph)		443	366		396			1686	740		1664	788
v/s Ratio Prot		0.12			c0.13			c0.33			0.22	
v/s Ratio Perm			0.03						0.05			0.03
v/c Ratio		0.51	0.11		0.56			0.66	0.10		0.43	0.05
Uniform Delay, d1		18.2	16.4		18.4			10.2	7.2		8.7	7.0
Progression Factor		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		1.3	0.2		2.2			1.5	0.2		0.5	0.1
Delay (s)		19.5	16.6		20.6			11.7	7.3		9.2	7.1
Level of Service		B	B		C			B	A		A	A
Approach Delay (s)		18.4			20.6			11.2			9.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	14.2
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	574	1094	117	306	783
Future Volume (vph)	0	574	1094	117	306	783
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.6	5.8	5.8	6.6	4.0
Lane Util. Factor		0.88	0.95	1.00	1.00	0.95
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2656	3374	1568	1641	3282
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2656	3374	1568	1641	3282
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	611	1164	124	326	833
RTOR Reduction (vph)	0	0	0	63	0	0
Lane Group Flow (vph)	0	611	1164	61	326	833
Heavy Vehicles (%)	0%	7%	7%	3%	10%	10%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		1	2		1	Free
Permitted Phases				2		
Actuated Green, G (s)		18.1	29.5	29.5	18.1	60.0
Effective Green, g (s)		18.1	29.5	29.5	18.1	60.0
Actuated g/C Ratio		0.30	0.49	0.49	0.30	1.00
Clearance Time (s)		6.6	5.8	5.8	6.6	
Vehicle Extension (s)		4.0	5.0	5.0	4.0	
Lane Grp Cap (vph)		801	1658	770	495	3282
v/s Ratio Prot		c0.23	c0.35		0.20	0.25
v/s Ratio Perm				0.04		
v/c Ratio		0.76	0.70	0.08	0.66	0.25
Uniform Delay, d1		19.0	11.8	8.1	18.3	0.0
Progression Factor		1.00	1.00	1.00	0.76	1.00
Incremental Delay, d2		4.6	2.5	0.2	3.2	0.2
Delay (s)		23.6	14.3	8.3	17.0	0.2
Level of Service		C	B	A	B	A
Approach Delay (s)	23.6		13.8			4.9
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	9	0	0	470	9	1444	10	117	808	11
Future Volume (vph)	0	0	9	0	0	470	9	1444	10	117	808	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			8.4			8.4	8.4	8.4	8.4	8.4	8.4	8.4
Lane Util. Factor			1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.86			0.86	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1182			1627	1262	3374	1429	1736	3223	1455
Flt Permitted			1.00			1.00	0.32	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)			1182			1627	430	3374	1429	154	3223	1455
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	10	0	0	511	10	1570	11	127	878	12
RTOR Reduction (vph)	0	0	10	0	0	46	0	0	5	0	0	3
Lane Group Flow (vph)	0	0	0	0	0	465	10	1570	6	127	878	9
Heavy Vehicles (%)	0%	0%	39%	0%	0%	1%	43%	7%	13%	4%	12%	11%
Turn Type			Over			Over	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases			1			5	1	6		5	2	
Permitted Phases							2		6	6		2
Actuated Green, G (s)			3.8			26.2	73.7	47.5	47.5	73.7	69.9	69.9
Effective Green, g (s)			3.8			26.2	73.7	47.5	47.5	73.7	69.9	69.9
Actuated g/C Ratio			0.04			0.29	0.81	0.52	0.52	0.81	0.77	0.77
Clearance Time (s)			8.4			8.4	8.4	8.4	8.4	8.4	8.4	8.4
Vehicle Extension (s)			1.0			2.0	1.0	1.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)			49			471	385	1770	750	583	2489	1123
v/s Ratio Prot			0.00			c0.29	0.00	c0.47		0.06	0.27	
v/s Ratio Perm							0.02		0.00	0.11		0.01
v/c Ratio			0.01			0.99	0.03	0.89	0.01	0.22	0.35	0.01
Uniform Delay, d1			41.5			32.0	1.6	19.1	10.3	8.3	3.2	2.4
Progression Factor			1.00			1.00	1.00	1.00	1.00	0.98	1.02	1.00
Incremental Delay, d2			0.0			37.6	0.0	5.6	0.0	0.1	0.0	0.0
Delay (s)			41.6			69.6	1.6	24.7	10.3	8.2	3.3	2.4
Level of Service			D			E	A	C	B	A	A	A
Approach Delay (s)		41.6			69.6			24.5			3.9	
Approach LOS		D			E			C			A	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	16.8
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations			↑↑		↓		↑↑
Traffic Volume (vph)	0	0	909	0	210	0	760
Future Volume (vph)	0	0	909	0	210	0	760
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0		4.5		4.0
Lane Util. Factor			0.95		1.00		0.95
Frt			1.00		1.00		1.00
Flt Protected			1.00		0.95		1.00
Satd. Flow (prot)			3223		1770		3282
Flt Permitted			1.00		0.95		1.00
Satd. Flow (perm)			3223		1770		3282
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	1045	0	241	0	874
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1045	0	241	0	874
Heavy Vehicles (%)	2%	2%	12%	0%	2%	0%	10%
Turn Type			NA		Prot		NA
Protected Phases			2		1		Free
Permitted Phases							
Actuated Green, G (s)			36.4		13.1		60.0
Effective Green, g (s)			36.4		13.1		60.0
Actuated g/C Ratio			0.61		0.22		1.00
Clearance Time (s)			6.0		4.5		
Vehicle Extension (s)			6.0		3.0		
Lane Grp Cap (vph)			1955		386		3282
v/s Ratio Prot			c0.32		c0.14		0.27
v/s Ratio Perm							
v/c Ratio			0.53		0.62		0.27
Uniform Delay, d1			6.9		21.2		0.0
Progression Factor			1.00		0.67		1.00
Incremental Delay, d2			1.1		2.8		0.2
Delay (s)			7.9		17.0		0.2
Level of Service			A		B		A
Approach Delay (s)	0.0		7.9				3.8
Approach LOS	A		A				A

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	50	0	390	697	0
Future Vol, veh/h	0	0	50	0	390	697	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	150	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	0	6	3	2
Mvmt Flow	0	0	61	0	476	850	0

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1210	425	850	-	0	-	0
Stage 1	850	-	-	-	-	-	-
Stage 2	360	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	-	-
Pot Cap-1 Maneuver	175	578	414	0	-	-	0
Stage 1	379	-	-	0	-	-	0
Stage 2	677	-	-	0	-	-	0
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	149	578	414	-	-	-	-
Mov Cap-2 Maneuver	149	-	-	-	-	-	-
Stage 1	323	-	-	-	-	-	-
Stage 2	677	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	EBLn1	SBT
Capacity (veh/h)	414	-	-	-
HCM Lane V/C Ratio	0.147	-	-	-
HCM Control Delay (s)	15.2	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	-

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	56	899	0	0	882
Future Volume (vph)	0	0	56	899	0	0	882
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.5	4.0			6.0
Lane Util. Factor			1.00	0.95			0.95
Frt			1.00	1.00			1.00
Flt Protected			0.95	1.00			1.00
Satd. Flow (prot)			1770	3312			3282
Flt Permitted			0.95	1.00			1.00
Satd. Flow (perm)			1770	3312			3282
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	64	1033	0	0	1014
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	64	1033	0	0	1014
Heavy Vehicles (%)	2%	2%	2%	9%	0%	0%	10%
Turn Type			Prot	NA			NA
Protected Phases			5	Free			6
Permitted Phases							
Actuated Green, G (s)			7.6	60.0			41.9
Effective Green, g (s)			7.6	60.0			41.9
Actuated g/C Ratio			0.13	1.00			0.70
Clearance Time (s)			4.5				6.0
Vehicle Extension (s)			3.0				6.0
Lane Grp Cap (vph)			224	3312			2291
v/s Ratio Prot			0.04	0.31			c0.31
v/s Ratio Perm							
v/c Ratio			0.29	0.31			0.44
Uniform Delay, d1			23.7	0.0			4.0
Progression Factor			1.34	1.00			1.00
Incremental Delay, d2			0.7	0.2			0.6
Delay (s)			32.5	0.2			4.6
Level of Service			C	A			A
Approach Delay (s)	0.0			2.1			4.6
Approach LOS	A			A			A

Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	732	0	709	0
Future Vol, veh/h	0	0	0	732	0	709	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	0	8	0	13	0
Mvmt Flow	0	0	0	771	0	746	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1132	373	-	0	771	-	0
Stage 1	746	-	-	-	-	-	-
Stage 2	386	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	197	624	0	-	472	-	0
Stage 1	430	-	0	-	-	-	0
Stage 2	656	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	197	624	-	-	472	-	-
Mov Cap-2 Maneuver	197	-	-	-	-	-	-
Stage 1	430	-	-	-	-	-	-
Stage 2	656	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	472	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	329	121	656	0
Future Vol, veh/h	0	0	0	329	121	656	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	5	10	2	0
Mvmt Flow	0	0	0	401	148	800	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1297	400	-	0	401	-	0
Stage 1	1096	-	-	-	-	-	-
Stage 2	201	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.6	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.6	-	-
Pot Cap-1 Maneuver	154	600	0	-	765	-	0
Stage 1	282	-	0	-	-	-	0
Stage 2	813	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	124	600	-	-	765	-	-
Mov Cap-2 Maneuver	124	-	-	-	-	-	-
Stage 1	228	-	-	-	-	-	-
Stage 2	813	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	1.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	765	-
HCM Lane V/C Ratio	-	-	0.193	-
HCM Control Delay (s)	-	0	10.8	-
HCM Lane LOS	-	A	B	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	80	790	0	0	642
Future Vol, veh/h	0	0	80	790	0	0	642
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	150	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	7	0	0	14
Mvmt Flow	0	0	84	832	0	0	676

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	1338	416	676	0	-	-	-
Stage 1	1000	-	-	-	-	-	-
Stage 2	338	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.46	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.53	-	-	-	-
Pot Cap-1 Maneuver	144	585	531	-	0	0	-
Stage 1	317	-	-	-	0	0	-
Stage 2	694	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	121	585	531	-	-	-	-
Mov Cap-2 Maneuver	121	-	-	-	-	-	-
Stage 1	267	-	-	-	-	-	-
Stage 2	694	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	531	-	-	-
HCM Lane V/C Ratio	0.159	-	-	-
HCM Control Delay (s)	13.1	-	0	-
HCM Lane LOS	B	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	1455	8	809	0
Future Vol, veh/h	0	0	0	1455	8	809	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	7	44	12	0
Mvmt Flow	0	0	0	1582	9	879	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1688	440	-	0	1582	-	0
Stage 1	897	-	-	-	-	-	-
Stage 2	791	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	7.28	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.94	-	-
Pot Cap-1 Maneuver	86	570	0	-	89	-	0
Stage 1	363	-	0	-	-	-	0
Stage 2	412	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	77	570	-	-	89	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-	-
Stage 1	326	-	-	-	-	-	-
Stage 2	412	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	89	-
HCM Lane V/C Ratio	-	-	0.098	-
HCM Control Delay (s)	-	0	49.8	-
HCM Lane LOS	-	A	E	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	31	1883	0	0	905
Future Vol, veh/h	0	0	31	1883	0	0	905
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	200	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	12	5	0	0	11
Mvmt Flow	0	0	34	2047	0	0	984

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	2607	1024	984	0	-	-	-
Stage 1	2115	-	-	-	-	-	-
Stage 2	492	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.64	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.62	-	-	-	-
Pot Cap-1 Maneuver	21	236	313	-	0	0	-
Stage 1	80	-	-	-	0	0	-
Stage 2	586	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	19	236	313	-	-	-	-
Mov Cap-2 Maneuver	19	-	-	-	-	-	-
Stage 1	71	-	-	-	-	-	-
Stage 2	586	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	313	-	-	-
HCM Lane V/C Ratio	0.108	-	-	-
HCM Control Delay (s)	17.9	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	1209	2	782	0
Future Vol, veh/h	0	0	0	1209	2	782	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	6	0	10	0
Mvmt Flow	0	0	0	1286	2	832	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1479	416	-	0	1286	-	0
Stage 1	836	-	-	-	-	-	-
Stage 2	643	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	6.4	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.5	-	-
Pot Cap-1 Maneuver	119	591	0	-	221	-	-
Stage 1	391	-	0	-	-	-	-
Stage 2	491	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	118	591	-	-	221	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-	-
Stage 1	387	-	-	-	-	-	-
Stage 2	491	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	221	-	-
HCM Lane V/C Ratio	-	-	0.01	-	-
HCM Control Delay (s)	-	0	21.4	-	-
HCM Lane LOS	-	A	C	-	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	104	1564	0	0	1008
Future Volume (vph)	0	0	104	1564	0	0	1008
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.6	4.0			5.8
Lane Util. Factor			1.00	0.95			0.95
Frt			1.00	1.00			1.00
Flt Protected			0.95	1.00			1.00
Satd. Flow (prot)			1671	3374			3282
Flt Permitted			0.95	1.00			1.00
Satd. Flow (perm)			1671	3374			3282
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	111	1664	0	0	1072
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	111	1664	0	0	1072
Heavy Vehicles (%)	0%	0%	8%	7%	0%	0%	10%
Turn Type			Prot	NA			NA
Protected Phases			5	Free			6
Permitted Phases							
Actuated Green, G (s)			8.0	60.0			39.6
Effective Green, g (s)			8.0	60.0			39.6
Actuated g/C Ratio			0.13	1.00			0.66
Clearance Time (s)			6.6				5.8
Vehicle Extension (s)			3.0				3.0
Lane Grp Cap (vph)			222	3374			2166
v/s Ratio Prot			0.07	0.49			0.33
v/s Ratio Perm							
v/c Ratio			0.50	0.49			0.49
Uniform Delay, d1			24.1	0.0			5.2
Progression Factor			0.95	1.00			1.00
Incremental Delay, d2			1.2	0.4			0.8
Delay (s)			24.1	0.4			6.0
Level of Service			C	A			A
Approach Delay (s)	0.0			1.8			6.0
Approach LOS	A			A			A

Intersection Summary			
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

PM Delay

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	142	0	0	55	26	598	43	39	582	62
Future Vol, veh/h	0	0	142	0	0	55	26	598	43	39	582	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	185	-	-	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	4	0	0	11	5	2	11	9	2	6
Mvmt Flow	0	0	158	0	0	61	29	664	48	43	647	69

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	324	-	-	356	716	0	0	712	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.98	-	-	7.12	4.2	-	-	4.28	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.34	-	-	3.41	2.25	-	-	2.29	-	-
Pot Cap-1 Maneuver	0	0	666	0	0	615	861	-	-	838	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	666	-	-	615	861	-	-	838	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	11.5	0.4	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	861	-	-	666	615	838	-	-
HCM Lane V/C Ratio	0.034	-	-	0.237	0.099	0.052	-	-
HCM Control Delay (s)	9.3	-	-	12.1	11.5	9.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.3	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Future Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1	6.1	7.5	7.5	7.5	6.4	5.7	5.7		6.6	5.8
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00		1.00	0.95
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected		0.98	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)		1291	1214	1698	1618	1583	1805	1845	1583		1737	3525
Flt Permitted		0.98	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)		1291	1214	1698	1618	1583	1805	1845	1583		1737	3525
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	7	4	138	4	77	1	513	187	2	111	555
RTOR Reduction (vph)	0	0	4	0	0	67	0	0	72	0	0	0
Lane Group Flow (vph)	0	12	0	70	72	10	1	513	115	0	113	557
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	pt+ov	Prot	Prot	NA
Protected Phases	4	4		3	3		1	6	6 3	5	5	2
Permitted Phases			4			3						
Actuated Green, G (s)		3.3	3.3	10.6	10.6	10.6	1.3	33.7	50.0		7.6	40.1
Effective Green, g (s)		3.3	3.3	10.6	10.6	10.6	1.3	33.7	50.0		7.6	40.1
Actuated g/C Ratio		0.04	0.04	0.13	0.13	0.13	0.02	0.42	0.62		0.09	0.49
Clearance Time (s)		6.1	6.1	7.5	7.5	7.5	6.4	5.7			6.6	5.8
Vehicle Extension (s)		5.0	5.0	4.0	4.0	4.0	3.5	5.0			3.5	5.0
Lane Grp Cap (vph)		52	49	221	211	206	28	766	975		162	1742
v/s Ratio Prot		c0.01		0.04	c0.04		0.00	c0.28	0.07		c0.07	c0.16
v/s Ratio Perm			0.00			0.01						
v/c Ratio		0.23	0.00	0.32	0.34	0.05	0.04	0.67	0.12		0.70	0.32
Uniform Delay, d1		37.7	37.3	32.0	32.1	30.8	39.3	19.2	6.4		35.6	12.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.09	0.98	0.77		1.00	1.00
Incremental Delay, d2		4.7	0.1	1.1	1.3	0.1	0.6	3.0	0.1		12.7	0.2
Delay (s)		42.4	37.4	33.1	33.4	31.0	43.3	21.8	5.1		48.4	12.5
Level of Service		D	D	C	C	C	D	C	A		D	B
Approach Delay (s)		41.1			32.4			17.3				18.6
Approach LOS		D			C			B				B

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	81.1	Sum of lost time (s)	25.9
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	2
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	343	0	0	78	156	1020	55	41	843	144
Future Volume (vph)	0	0	343	0	0	78	156	1020	55	41	843	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.86			0.86	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1550			1596	1570	3223	1553	1805	3343	1524
Flt Permitted			1.00			1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1550			1596	1570	3223	1553	1805	3343	1524
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	0	385	0	0	88	175	1146	62	46	947	162
RTOR Reduction (vph)	0	0	52	0	0	81	0	0	17	0	0	79
Lane Group Flow (vph)	0	0	333	0	0	7	175	1146	45	46	947	83
Heavy Vehicles (%)	0%	0%	6%	0%	0%	3%	15%	12%	4%	0%	8%	6%
Turn Type			Over			Over	Prot	NA	Perm	Prot	NA	Perm
Protected Phases			1			5	1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)			17.1			4.8	17.1	43.2	43.2	4.8	30.9	30.9
Effective Green, g (s)			17.1			4.8	17.1	43.2	43.2	4.8	30.9	30.9
Actuated g/C Ratio			0.29			0.08	0.29	0.72	0.72	0.08	0.51	0.51
Clearance Time (s)			6.0			6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)			4.0			4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Grp Cap (vph)			441			127	447	2320	1118	144	1721	784
v/s Ratio Prot			c0.21			0.00	0.11	0.36		0.03	c0.28	
v/s Ratio Perm									0.03			0.05
v/c Ratio			0.75			0.06	0.39	0.49	0.04	0.32	0.55	0.11
Uniform Delay, d1			19.5			25.5	17.3	3.7	2.4	26.1	9.8	7.5
Progression Factor			1.00			1.00	1.02	0.72	0.31	0.83	0.67	0.22
Incremental Delay, d2			7.6			0.2	0.6	0.6	0.1	1.6	1.2	0.3
Delay (s)			27.2			25.8	18.2	3.2	0.8	23.4	7.8	1.9
Level of Service			C			C	B	A	A	C	A	A
Approach Delay (s)		27.2			25.8			5.0			7.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	0	0	103	17	757	93	90	984	12
Future Vol, veh/h	0	0	2	0	0	103	17	757	93	90	984	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	6	0	6	4	4	6	9
Mvmt Flow	0	0	2	0	0	110	18	805	99	96	1047	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	524	-	-	403	1060	0	0	904	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	7.02	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.36	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	0	0	503	0	0	586	665	-	-	736	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	503	-	-	586	665	-	-	736	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	12.6	0.2	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	665	-	-	503	586	736	-	-
HCM Lane V/C Ratio	0.027	-	-	0.004	0.187	0.13	-	-
HCM Control Delay (s)	10.6	-	-	12.2	12.6	10.6	-	-
HCM Lane LOS	B	-	-	B	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	0.7	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	98	154	0	212	75	0	773	140	0	1019	112
Future Volume (vph)	0	98	154	0	212	75	0	773	140	0	1019	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.3	8.3		8.3			5.8	5.8		5.9	5.9
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00		0.95	1.00
Frt		1.00	0.85		0.96			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1845	1524		1767			3252	1568		3406	1509
Flt Permitted		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1845	1524		1767			3252	1568		3406	1509
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	103	162	0	223	79	0	814	147	0	1073	118
RTOR Reduction (vph)	0	0	39	0	22	0	0	0	75	0	0	61
Lane Group Flow (vph)	0	103	123	0	280	0	0	814	72	0	1073	57
Heavy Vehicles (%)	0%	3%	6%	0%	4%	3%	0%	11%	3%	0%	6%	7%
Turn Type		NA	Perm		NA			NA	Perm		NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases			4						6			2
Actuated Green, G (s)		14.3	14.3		14.3			27.0	27.0		26.9	26.9
Effective Green, g (s)		14.3	14.3		14.3			27.0	27.0		26.9	26.9
Actuated g/C Ratio		0.26	0.26		0.26			0.49	0.49		0.49	0.49
Clearance Time (s)		8.3	8.3		8.3			5.8	5.8		5.9	5.9
Vehicle Extension (s)		4.0	4.0		4.0			6.0	6.0		6.0	6.0
Lane Grp Cap (vph)		476	393		456			1584	764		1653	732
v/s Ratio Prot		0.06			c0.16			0.25			c0.32	
v/s Ratio Perm			0.08						0.05			0.04
v/c Ratio		0.22	0.31		0.61			0.51	0.09		0.65	0.08
Uniform Delay, d1		16.1	16.6		18.1			9.7	7.6		10.7	7.6
Progression Factor		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	0.6		2.8			0.7	0.2		1.5	0.1
Delay (s)		16.5	17.2		20.9			10.5	7.8		12.2	7.7
Level of Service		B	B		C			B	A		B	A
Approach Delay (s)		16.9			20.9			10.1			11.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	14.2
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	428	854	78	545	1221
Future Volume (vph)	0	428	854	78	545	1221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.6	5.8	5.8	6.6	4.0
Lane Util. Factor		0.88	0.95	1.00	1.00	0.95
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2733	3282	1583	1770	3406
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2733	3282	1583	1770	3406
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	441	880	80	562	1259
RTOR Reduction (vph)	0	0	0	48	0	0
Lane Group Flow (vph)	0	441	880	32	562	1259
Heavy Vehicles (%)	0%	4%	10%	2%	2%	6%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		1	2		1	Free
Permitted Phases				2		
Actuated Green, G (s)		23.4	24.2	24.2	23.4	60.0
Effective Green, g (s)		23.4	24.2	24.2	23.4	60.0
Actuated g/C Ratio		0.39	0.40	0.40	0.39	1.00
Clearance Time (s)		6.6	5.8	5.8	6.6	
Vehicle Extension (s)		4.0	5.0	5.0	4.0	
Lane Grp Cap (vph)		1065	1323	638	690	3406
v/s Ratio Prot		0.16	c0.27		c0.32	0.37
v/s Ratio Perm				0.02		
v/c Ratio		0.41	0.67	0.05	0.81	0.37
Uniform Delay, d1		13.3	14.6	10.9	16.4	0.0
Progression Factor		1.00	1.00	1.00	0.86	1.00
Incremental Delay, d2		0.4	2.7	0.2	6.2	0.2
Delay (s)		13.7	17.3	11.1	20.2	0.2
Level of Service		B	B	B	C	A
Approach Delay (s)	13.7		16.7			6.4
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	30	0	0	287	0	979	30	442	1535	6
Future Volume (vph)	0	0	30	0	0	287	0	979	30	442	1535	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			8.4			8.4		8.4	8.4	8.4	8.4	8.4
Lane Util. Factor			1.00			1.00		0.95	1.00	1.00	0.95	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1580			1627		3374	1615	1787	3471	1346
Flt Permitted			1.00			1.00		1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)			1580			1627		3374	1615	430	3471	1346
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	32	0	0	302	0	1031	32	465	1616	6
RTOR Reduction (vph)	0	0	30	0	0	75	0	0	17	0	0	2
Lane Group Flow (vph)	0	0	2	0	0	227	0	1031	15	465	1616	4
Heavy Vehicles (%)	0%	0%	4%	0%	0%	1%	0%	7%	0%	1%	4%	20%
Turn Type			Over			Over	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases			1			5	1	6		5	2	
Permitted Phases							2		6	6		2
Actuated Green, G (s)			3.4			13.2		25.5	25.5	38.7	35.3	35.3
Effective Green, g (s)			3.4			13.2		25.5	25.5	38.7	35.3	35.3
Actuated g/C Ratio			0.06			0.24		0.46	0.46	0.70	0.64	0.64
Clearance Time (s)			8.4			8.4		8.4	8.4	8.4	8.4	8.4
Vehicle Extension (s)			1.0			2.0		1.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)			96			386		1550	742	622	2207	856
v/s Ratio Prot			0.00			0.14		0.31		c0.18	c0.47	
v/s Ratio Perm									0.01	0.34		0.00
v/c Ratio			0.02			0.59		0.67	0.02	0.75	0.73	0.00
Uniform Delay, d1			24.5			18.7		11.7	8.2	5.7	6.9	3.7
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0			1.5		0.8	0.0	4.3	1.1	0.0
Delay (s)			24.5			20.2		12.6	8.2	10.0	8.0	3.7
Level of Service			C			C		B	A	A	A	A
Approach Delay (s)		24.5			20.2			12.4			8.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	16.8
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	897	0	334	0	852
Future Volume (vph)	0	0	897	0	334	0	852
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0		6.0		4.0
Lane Util. Factor			0.95		1.00		0.95
Frt			1.00		1.00		1.00
Flt Protected			1.00		0.95		1.00
Satd. Flow (prot)			3167		1719		3343
Flt Permitted			1.00		0.95		1.00
Satd. Flow (perm)			3167		1719		3343
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	0	1008	0	375	0	957
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1008	0	375	0	957
Heavy Vehicles (%)	2%	2%	14%	0%	5%	0%	8%
Turn Type			NA		Prot		NA
Protected Phases			2		1		Free
Permitted Phases							
Actuated Green, G (s)			30.1		17.9		60.0
Effective Green, g (s)			30.1		17.9		60.0
Actuated g/C Ratio			0.50		0.30		1.00
Clearance Time (s)			6.0		6.0		
Vehicle Extension (s)			6.0		4.0		
Lane Grp Cap (vph)			1588		512		3343
v/s Ratio Prot			c0.32		c0.22		0.29
v/s Ratio Perm							
v/c Ratio			0.63		0.73		0.29
Uniform Delay, d1			10.9		18.9		0.0
Progression Factor			1.00		0.64		1.00
Incremental Delay, d2			1.9		4.7		0.2
Delay (s)			12.9		16.8		0.2
Level of Service			B		B		A
Approach Delay (s)	0.0		12.9				4.8
Approach LOS	A		B				A

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	59	1039	0	0	969
Future Volume (vph)	0	0	59	1039	0	0	969
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0			6.0
Lane Util. Factor			1.00	0.95			0.95
Frt			1.00	1.00			1.00
Flt Protected			0.95	1.00			1.00
Satd. Flow (prot)			1736	3223			3374
Flt Permitted			0.95	1.00			1.00
Satd. Flow (perm)			1736	3223			3374
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	0	66	1167	0	0	1089
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	66	1167	0	0	1089
Heavy Vehicles (%)	2%	2%	4%	12%	0%	0%	7%
Turn Type			Prot	NA			NA
Protected Phases			5	Free			6
Permitted Phases							
Actuated Green, G (s)			5.6	60.0			42.4
Effective Green, g (s)			5.6	60.0			42.4
Actuated g/C Ratio			0.09	1.00			0.71
Clearance Time (s)			6.0				6.0
Vehicle Extension (s)			4.0				6.0
Lane Grp Cap (vph)			162	3223			2384
v/s Ratio Prot			0.04	0.36			c0.32
v/s Ratio Perm							
v/c Ratio			0.41	0.36			0.46
Uniform Delay, d1			25.6	0.0			3.8
Progression Factor			0.99	1.00			1.00
Incremental Delay, d2			2.1	0.3			0.6
Delay (s)			27.5	0.3			4.4
Level of Service			C	A			A
Approach Delay (s)	0.0			1.7			4.4
Approach LOS	A			A			A

Intersection Summary			
HCM 2000 Control Delay	3.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	866	1	985	0
Future Vol, veh/h	0	0	0	866	1	985	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	0	6	0	6	0
Mvmt Flow	0	0	0	921	1	1048	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1511	524	-	0	921	-	0
Stage 1	1050	-	-	-	-	-	-
Stage 2	461	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	111	498	0	-	379	-	-
Stage 1	298	-	0	-	-	-	-
Stage 2	601	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	111	498	-	-	379	-	-
Mov Cap-2 Maneuver	111	-	-	-	-	-	-
Stage 1	297	-	-	-	-	-	-
Stage 2	601	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	379	-	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	-	0	14.5	-	-
HCM Lane LOS	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	59	801	0	0	1027
Future Vol, veh/h	0	0	59	801	0	0	1027
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	150	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	6	6	0	0	6
Mvmt Flow	0	0	63	852	0	0	1093

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	1525	426	1093	0	-	-	-
Stage 1	978	-	-	-	-	-	-
Stage 2	547	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.52	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.56	-	-	-	-
Pot Cap-1 Maneuver	109	577	279	-	0	0	-
Stage 1	325	-	-	-	0	0	-
Stage 2	544	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	84	577	279	-	-	-	-
Mov Cap-2 Maneuver	84	-	-	-	-	-	-
Stage 1	252	-	-	-	-	-	-
Stage 2	544	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	279	-	-	-
HCM Lane V/C Ratio	0.225	-	-	-
HCM Control Delay (s)	21.6	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	979	30	1535	0
Future Vol, veh/h	0	0	0	979	30	1535	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	7	4	4	0
Mvmt Flow	0	0	0	1031	32	1616	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	2196	808	-	0	1031	-	0
Stage 1	1680	-	-	-	-	-	-
Stage 2	516	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	6.48	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.54	-	-
Pot Cap-1 Maneuver	39	328	0	-	312	-	0
Stage 1	139	-	0	-	-	-	0
Stage 2	570	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	35	328	-	-	312	-	-
Mov Cap-2 Maneuver	35	-	-	-	-	-	-
Stage 1	125	-	-	-	-	-	-
Stage 2	570	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	312	-
HCM Lane V/C Ratio	-	-	0.101	-
HCM Control Delay (s)	-	0	17.8	-
HCM Lane LOS	-	A	C	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	22	1244	0	0	1961
Future Vol, veh/h	0	0	22	1244	0	0	1961
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	200	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	6	5	2	0	4
Mvmt Flow	0	0	23	1309	0	0	2064

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	2387	655	2064	0	-	-	-
Stage 1	1355	-	-	-	-	-	-
Stage 2	1032	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.52	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.56	-	-	-	-
Pot Cap-1 Maneuver	29	413	64	-	0	0	-
Stage 1	209	-	-	-	0	0	-
Stage 2	309	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	19	413	64	-	-	-	-
Mov Cap-2 Maneuver	19	-	-	-	-	-	-
Stage 1	134	-	-	-	-	-	-
Stage 2	309	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	64	-	-	-
HCM Lane V/C Ratio	0.362	-	-	-
HCM Control Delay (s)	90.2	-	0	-
HCM Lane LOS	F	-	A	-
HCM 95th %tile Q(veh)	1.3	-	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	582	85	639	0
Future Vol, veh/h	0	0	0	582	85	639	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90
Heavy Vehicles, %	3	0	0	3	3	3	0
Mvmt Flow	0	0	0	647	94	710	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1222	355	-	0	647	-	0
Stage 1	898	-	-	-	-	-	-
Stage 2	324	-	-	-	-	-	-
Critical Hdwy	6.86	6.9	-	-	6.46	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-	-
Follow-up Hdwy	3.53	3.3	-	-	2.53	-	-
Pot Cap-1 Maneuver	171	647	0	-	555	-	0
Stage 1	356	-	0	-	-	-	0
Stage 2	702	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	142	647	-	-	555	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-	-
Stage 1	296	-	-	-	-	-	-
Stage 2	702	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	555	-
HCM Lane V/C Ratio	-	-	0.17	-
HCM Control Delay (s)	-	0	12.8	-
HCM Lane LOS	-	A	B	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	32	0	621	651	0
Future Vol, veh/h	0	0	32	0	621	651	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	150	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	11	0	3	3	0
Mvmt Flow	0	0	36	0	690	723	0

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1140	362	723	-	0	-	0
Stage 1	723	-	-	-	-	-	-
Stage 2	417	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.62	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.61	-	-	-	-
Pot Cap-1 Maneuver	198	641	469	0	-	-	0
Stage 1	447	-	-	0	-	-	0
Stage 2	639	-	-	0	-	-	0
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	183	641	469	-	-	-	-
Mov Cap-2 Maneuver	183	-	-	-	-	-	-
Stage 1	413	-	-	-	-	-	-
Stage 2	639	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	EBLn1	SBT
Capacity (veh/h)	469	-	-	-
HCM Lane V/C Ratio	0.076	-	-	-
HCM Control Delay (s)	13.3	-	0	-
HCM Lane LOS	B	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	924	8	1221	0
Future Vol, veh/h	0	0	0	924	8	1221	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	0	9	0	6	0
Mvmt Flow	0	0	0	953	8	1259	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1752	630	-	0	953	-	0
Stage 1	1275	-	-	-	-	-	-
Stage 2	477	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	77	424	0	-	362	-	-
Stage 1	226	-	0	-	-	-	-
Stage 2	590	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	75	424	-	-	362	-	-
Mov Cap-2 Maneuver	75	-	-	-	-	-	-
Stage 1	221	-	-	-	-	-	-
Stage 2	590	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	362	-	-
HCM Lane V/C Ratio	-	-	0.023	-	-
HCM Control Delay (s)	-	0	15.2	-	-
HCM Lane LOS	-	A	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	-	-

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	77	1205	0	0	1695
Future Volume (vph)	0	0	77	1205	0	0	1695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.6	4.0			5.8
Lane Util. Factor			1.00	0.95			0.95
Frt			1.00	1.00			1.00
Flt Protected			0.95	1.00			1.00
Satd. Flow (prot)			1671	3343			3438
Flt Permitted			0.95	1.00			1.00
Satd. Flow (perm)			1671	3343			3438
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	79	1242	0	0	1747
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	79	1242	0	0	1747
Heavy Vehicles (%)	0%	0%	8%	8%	2%	2%	5%
Turn Type			Prot	NA			NA
Protected Phases			5	Free			6
Permitted Phases							
Actuated Green, G (s)			3.8	60.0			43.8
Effective Green, g (s)			3.8	60.0			43.8
Actuated g/C Ratio			0.06	1.00			0.73
Clearance Time (s)			6.6				5.8
Vehicle Extension (s)			3.0				3.0
Lane Grp Cap (vph)			105	3343			2509
v/s Ratio Prot			0.05	0.37			c0.51
v/s Ratio Perm							
v/c Ratio			0.75	0.37			0.70
Uniform Delay, d1			27.6	0.0			4.4
Progression Factor			0.81	1.00			1.00
Incremental Delay, d2			22.0	0.3			1.6
Delay (s)			44.4	0.3			6.1
Level of Service			D	A			A
Approach Delay (s)	0.0			2.9			6.1
Approach LOS	A			A			A

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX K-3

Queue Summary Table

Synchro Capacity Analysis - 95th Percentile Queue Length
2040 Build Conditions
US 29 Arterial Preservation Plan

Intersection Number and Description			Type of Control	Lane Group	Northbound			Southbound			Eastbound			Westbound		
					Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)
1	US 29 BUS at Lawless Creek Road/E Witt Road (Route 719)	Northern Crossover			US 29			US 29			-			-		
			-	Left/U-turn	150	10	4	-			-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								
2		Main Intersection			US 29			US 29			Lawless Creek Road			E Witt Road		
			Two-Way Stop	Left	185	6	2	150	2	4	-			-		
				Through	-	†	†	-	†	†						
				Right	-	†	†	-	†	†	-	38	18	-	8	6
3		Southern Crossover			US 29			US 29			-			-		
			-	Left/U-turn	-			150	14	12	-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								
4	Malmasion Road	Intersection			US 29			US 29			Malmasion Road			Malmasion Road		
			Two-Way Stop	Left	370	*5	*5	265	73	116	-	8	23	350	133	82
				Through	-	198	#379	-	157	161				-	135	84
				Right	360	19	22				75	0	0	-	15	0
5	US 29 at Tightsqueeze Road	Northern Crossover			US 29			US 29			-			-		
			Signal	Left/U-turn	275	55	m52	-			-			-		
				Through	-	0	0	-	105	131						
				Right	-			-								
6		Main Intersection			US 29			US 29			Tightsqueeze Road			Fairview Road		
			Signal	Left	275	92	m80	295	*14	m41	-			-		
				Through	-	41	37	-	73	65						
				Right	-	*1	m1	-	9	5	-	71	178	-	3	7
7		Southern Crossover			US 29			US 29			-			-		
			Signal	Left/U-turn	-			295	50	m85	-			-		
				Through	-	168	206	-	0	0						
				Right	-			-								
8	US 29 at Gladys Road	Northern Crossover			US 29			US 29			-			-		
			Two-Way Stop	Left/U-turn	150	12	16	-			-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								
9		Main Intersection			US 29			US 29			Gladys Road			Gladys Road		
			Two-Way Stop	Left	200	0	2	200	2	8	-			-		
				Through	-	†	†	-	†	†						
				Right	200	†	†	-	†	†	-	0	0	-	24	14
10		Southern Crossover			US 29			US 29			-			-		
			Two-Way Stop	Left/U-turn	-			150	0	0	-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								
11	US 29 at Colonial Highway	Western Roundabout			Cross Roads Lane			-			Colonial Highway			Colonial Highway		
			Yield	Left	-	3	3	-			-	25	43	-	35	14
				Through	-											
				Right	-	3	3									
12		Main Intersection			US 29			US 29			Colonial Highway			Colonial Highway		
			Signal	Left	-			-			-			-		
				Through	-	213	148	-	122	209	-	123	59	-	126	150
				Right	225	24	24	245	16	22	40	37	72			
13		Eastern Roundabout			-			Dennis Riddle Drive			Colonial Highway			Colonial Highway		
			Yield	Left/U-turn	-			-	4	12	-	26	26	-	50	27
				Through					-							
				Right				-	4	12	-					
14	US 29 at Calohan Road	Northern Crossover			US 29			US 29			-			-		
			Signal	Left/U-turn	250	*49	*46		-		-			-		
				Through	-	†	†	-	155	238						
				Right	-			-								
15		Main Intersection			US 29			US 29			Calohan Road			Calohan Road		
			Signal	Left	-			550	177	#29	-			-		
				Through	-	236	201	-	0	0				-		
				Right	-	22	22	-						-	165	94
16		Southern Crossover			US 29			US 29			-			-		
			Two-Way Stop	Left/U-turn	-			200	0	2	-			-		
				Through	-	†	†	-	†	†	-					
				Right	-			-	†	†	-	0	0			
17	US 29 at Engish Tavern Road	Northern Crossover			US 29			US 29			-			-		
			Two-Way Stop	Left/U-turn	200	8	26	-			-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								
18		Main Intersection			US 29			US 29			English Tavern Road			English Tavern Road		
			Signal	Left	280	1	0	535	*43	#184	-			-		
				Through	-	#584	545	-	*121	330						
				Right	200	0	*0	-	*0	0	-	0	0	-	#452	137
19		Southern Crossover			US 29			US 29			-			-		
			Two-Way Stop	Left/U-turn	-			200	6	6	-			-		
				Through	-	†	†	-	†	†						
				Right	-			-								

Notes:

Synchro 95th percentile queue length results reported for signalized intersections.

HCM 2010 95th percentile queue length results, assuming an average vehicle length of 25 feet, reported for unsignalized intersections.

Shared lane results are shown as one value that corresponds to all movements in that lane.

† SYNCHRO does not provide queue length for movements with no conflicting volumes.

95th percentile volume exceeds capacity, queue may be longer.

*95th percentile volume queue is metered by upstream signal

APPENDIX K-4

Synchro Queue Reports

AM Queues

Queues
2: US 29 & Malmaison Road

10/08/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Future Volume (vph)	2	0	0	243	2	113	1	276	127	57	459	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	350		0	370		360	265		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		1460			1588			539			1827	
Travel Time (s)		39.8			24.1			8.2			27.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	5%	0%	6%	100%	4%	7%	4%	3%	0%
Adj. Flow (vph)	2	0	0	264	2	123	1	300	138	62	499	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	2	0	132	134	123	1	300	138	62	501	0
Act Effct Green (s)		11.3		13.3	13.3	13.3	9.0	19.5	44.8	9.4	25.4	
Actuated g/C Ratio		0.20		0.23	0.23	0.23	0.16	0.34	0.78	0.16	0.44	
v/c Ratio		0.01		0.35	0.35	0.25	0.01	0.48	0.11	0.22	0.32	
Control Delay		30.5		27.7	27.8	2.8	36.0	21.0	1.6	31.1	12.7	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		30.5		27.7	27.8	2.8	36.0	21.0	1.6	31.1	12.7	
LOS		C		C	C	A	D	C	A	C	B	
Approach Delay		30.5			19.9			14.9			14.7	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)		1		41	42	0	0	83	0	19	41	
Queue Length 95th (ft)		8		133	135	15	m5	198	19	73	157	
Internal Link Dist (ft)		1380			1508			459			1747	
Turn Bay Length (ft)				350			370		360	265		
Base Capacity (vph)		192		496	498	591	170	1085	1221	320	2180	
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		0.01		0.27	0.27	0.21	0.01	0.28	0.11	0.19	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 57.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 59.4% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	232	0	0	72	193	883	43	17	738	183
Future Volume (vph)	0	0	232	0	0	72	193	883	43	17	738	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	275		0	295		700
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			45			45	
Link Distance (ft)		530			1421			603			808	
Travel Time (s)		8.0			27.7			9.1			12.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	5%	0%	0%	3%	16%	9%	3%	14%	10%	7%
Adj. Flow (vph)	0	0	267	0	0	83	222	1015	49	20	848	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	267	0	0	83	222	1015	49	20	848	210
Act Effct Green (s)			14.7			6.9	14.7	44.8	44.8	6.9	33.3	33.3
Actuated g/C Ratio			0.24			0.12	0.24	0.75	0.75	0.12	0.56	0.56
v/c Ratio			0.53			0.25	0.58	0.41	0.04	0.11	0.47	0.23
Control Delay			11.3			2.3	22.3	2.7	0.5	21.1	6.5	1.3
Queue Delay			0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay			11.3			2.3	22.3	2.7	0.5	21.1	6.5	1.3
LOS			B			A	C	A	A	C	A	A
Approach Delay		11.3			2.3			6.0			5.7	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)			30			0	51	40	1	7	27	0
Queue Length 95th (ft)			71			3	92	41	m1	m14	73	9
Internal Link Dist (ft)		450			1341			523			728	
Turn Bay Length (ft)							275			295		700
Base Capacity (vph)			631			331	518	2473	1184	184	1820	930
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			0.42			0.25	0.43	0.41	0.04	0.11	0.47	0.23

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 1 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 6.3 Intersection LOS: A
Intersection Capacity Utilization 44.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	207	135	0	119	118	0	1009	135	0	655	77
Future Volume (vph)	0	207	135	0	119	118	0	1009	135	0	655	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0	255		225	255		245
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		500			672			676			511	
Travel Time (s)		7.6			10.2			10.2			7.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	3%	6%	0%	12%	3%	0%	8%	10%	0%	9%	3%
Adj. Flow (vph)	0	227	148	0	131	130	0	1109	148	0	720	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	227	148	0	261	0	0	1109	148	0	720	85
Act Effct Green (s)		13.3	13.3		13.3			27.9	27.9		27.8	27.8
Actuated g/C Ratio		0.24	0.24		0.24			0.50	0.50		0.50	0.50
v/c Ratio		0.51	0.31		0.60			0.66	0.18		0.43	0.10
Control Delay		23.1	6.2		21.5			13.0	2.5		10.1	2.3
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		23.1	6.2		21.5			13.0	2.5		10.1	2.3
LOS		C	A		C			B	A		B	A
Approach Delay		16.4			21.5			11.7			9.3	
Approach LOS		B			C			B			A	
Queue Length 50th (ft)		67	2		62			130	0		72	0
Queue Length 95th (ft)		123	37		126			213	24		122	16
Internal Link Dist (ft)		420			592			596			431	
Turn Bay Length (ft)			40						225			245
Base Capacity (vph)		561	561		536			1777	849		1754	875
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.40	0.26		0.49			0.62	0.17		0.41	0.10

Intersection Summary	
Area Type: Other	
Cycle Length: 60	
Actuated Cycle Length: 55.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 12.6	Intersection LOS: B
Intersection Capacity Utilization 53.1%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	574	1094	117	306	783
Future Volume (vph)	0	574	1094	117	306	783
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	550	
Storage Lanes	0	2		1	1	
Taper Length (ft)	0				0	
Right Turn on Red		No		Yes		
Link Speed (mph)	45		45			45
Link Distance (ft)	184		900			924
Travel Time (s)	2.8		13.6			14.0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	7%	7%	3%	10%	10%
Adj. Flow (vph)	0	611	1164	124	326	833
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	611	1164	124	326	833
Act Effct Green (s)		18.1	29.5	29.5	18.1	60.0
Actuated g/C Ratio		0.30	0.49	0.49	0.30	1.00
v/c Ratio		0.76	0.70	0.15	0.66	0.25
Control Delay		25.8	15.2	2.6	20.1	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		25.8	15.2	2.6	20.1	0.2
LOS		C	B	A	C	A
Approach Delay	25.8		14.0			5.8
Approach LOS	C		B			A
Queue Length 50th (ft)		108	167	0	102	0
Queue Length 95th (ft)		165	236	22	177	0
Internal Link Dist (ft)	104		820			844
Turn Bay Length (ft)					550	
Base Capacity (vph)		858	1657	833	530	3282
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.71	0.70	0.15	0.62	0.25

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 26 (43%), Referenced to phase 2:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 60.7% ICU Level of Service B
Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	9	0	0	470	9	1444	10	117	808	11
Future Volume (vph)	0	0	9	0	0	470	9	1444	10	117	808	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	280		200	535		0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		563			795			625			612	
Travel Time (s)		15.4			12.0			9.5			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	39%	0%	0%	1%	43%	7%	13%	4%	12%	11%
Adj. Flow (vph)	0	0	10	0	0	511	10	1570	11	127	878	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	10	0	0	511	10	1570	11	127	878	12
Act Effct Green (s)			10.1			26.2	73.7	42.2	42.2	68.4	75.2	75.2
Actuated g/C Ratio			0.12			0.31	0.86	0.49	0.49	0.80	0.88	0.88
v/c Ratio			0.03			0.94	0.02	0.94	0.01	0.21	0.31	0.01
Control Delay			0.2			53.4	0.9	33.3	0.0	7.3	3.2	0.0
Queue Delay			0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay			0.2			53.4	0.9	33.3	0.0	7.3	3.2	0.0
LOS			A			D	A	C	A	A	A	A
Approach Delay		0.2			53.4			32.9			3.7	
Approach LOS		A			D			C			A	
Queue Length 50th (ft)			0			251	1	412	0	2	0	0
Queue Length 95th (ft)			0			#452	1	#584	0	m43	m121	m0
Internal Link Dist (ft)		483			715			545			532	
Turn Bay Length (ft)							280		200	535		
Base Capacity (vph)			331			575	475	1820	848	642	2775	1262
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			0.03			0.89	0.02	0.86	0.01	0.20	0.32	0.01

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 85.4
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 26.6 Intersection LOS: C
Intersection Capacity Utilization 83.0% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	909	0	210	0	760
Future Volume (vph)	0	0	909	0	210	0	760
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0		295	
Storage Lanes	0	0		0		1	
Taper Length (ft)	0					0	
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		45				45
Link Distance (ft)	262		487				603
Travel Time (s)	6.0		7.4				9.1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	12%	0%	2%	0%	10%
Adj. Flow (vph)	0	0	1045	0	241	0	874
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1045	0	241	0	874
Act Effct Green (s)			36.4		13.1		60.0
Actuated g/C Ratio			0.61		0.22		1.00
v/c Ratio			0.54		0.62		0.27
Control Delay			8.9		20.3		0.2
Queue Delay			0.0		0.0		0.0
Total Delay			8.9		20.3		0.2
LOS			A		C		A
Approach Delay			8.9				4.5
Approach LOS			A				A
Queue Length 50th (ft)			100		72		0
Queue Length 95th (ft)			168		50		0
Internal Link Dist (ft)	182		407				523
Turn Bay Length (ft)					295		
Base Capacity (vph)			1953		516		3282
Starvation Cap Reductn			0		0		0
Spillback Cap Reductn			0		0		0
Storage Cap Reductn			0		0		0
Reduced v/c Ratio			0.54		0.47		0.27

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 34 (57%), Referenced to phase 2:NBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 45.5%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	56	899	0	0	882
Future Volume (vph)	0	0	56	899	0	0	882
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	275		0	0	
Storage Lanes	0	0	1		0	0	
Taper Length (ft)	0		0			0	
Right Turn on Red		Yes			Yes		
Link Speed (mph)	30			45			45
Link Distance (ft)	203			808			377
Travel Time (s)	4.6			12.2			5.7
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	9%	0%	0%	10%
Adj. Flow (vph)	0	0	64	1033	0	0	1014
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	64	1033	0	0	1014
Act Effct Green (s)			7.6	60.0			41.9
Actuated g/C Ratio			0.13	1.00			0.70
v/c Ratio			0.28	0.31			0.44
Control Delay			34.0	0.2			5.0
Queue Delay			0.0	0.0			0.0
Total Delay			34.0	0.2			5.0
LOS			C	A			A
Approach Delay				2.2			5.0
Approach LOS				A			A
Queue Length 50th (ft)			25	0			64
Queue Length 95th (ft)			55	0			105
Internal Link Dist (ft)	123			728			297
Turn Bay Length (ft)			275				
Base Capacity (vph)			309	3312			2289
Starvation Cap Reductn			0	0			0
Spillback Cap Reductn			0	0			0
Storage Cap Reductn			0	0			0
Reduced v/c Ratio			0.21	0.31			0.44

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 54 (90%), Referenced to phase 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 3.5 Intersection LOS: A
Intersection Capacity Utilization 37.3% ICU Level of Service A
Analysis Period (min) 15

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	104	1564	0	0	1008
Future Volume (vph)	0	0	104	1564	0	0	1008
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	250		0	0	
Storage Lanes	0	0	1		0	0	
Taper Length (ft)	0		0			0	
Right Turn on Red		Yes			Yes		
Link Speed (mph)	30			45			45
Link Distance (ft)	459			924			521
Travel Time (s)	10.4			14.0			7.9
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	8%	7%	0%	0%	10%
Adj. Flow (vph)	0	0	111	1664	0	0	1072
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	111	1664	0	0	1072
Act Effct Green (s)			9.2	60.0			42.0
Actuated g/C Ratio			0.15	1.00			0.70
v/c Ratio			0.44	0.49			0.47
Control Delay			24.9	0.4			6.6
Queue Delay			0.0	0.0			0.0
Total Delay			24.9	0.4			6.6
LOS			C	A			A
Approach Delay				1.9			6.6
Approach LOS				A			A
Queue Length 50th (ft)			33	0			91
Queue Length 95th (ft)			m49	0			155
Internal Link Dist (ft)	379			844			441
Turn Bay Length (ft)			250				
Base Capacity (vph)			345	3374			2299
Starvation Cap Reductn			0	0			0
Spillback Cap Reductn			0	0			0
Storage Cap Reductn			0	0			0
Reduced v/c Ratio			0.32	0.49			0.47

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 37 (62%), Referenced to phase 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 3.7 Intersection LOS: A
Intersection Capacity Utilization 46.6% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	207	0	0	78	59	362	29	18	570	159
Future Vol, veh/h	0	0	207	0	0	78	59	362	29	18	570	159
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	185	-	-	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	6	0	0	3	6	6	8	0	2	9
Mvmt Flow	0	0	252	0	0	95	72	441	35	22	695	194

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	348	-	-	238	889	0	0	476	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.02	-	-	6.96	4.22	-	-	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.36	-	-	3.33	2.26	-	-	2.2	-	-
Pot Cap-1 Maneuver	0	0	637	0	0	760	733	-	-	1097	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	637	-	-	760	733	-	-	1097	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	10.4	1.4	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	733	-	-	637	760	1097	-	-
HCM Lane V/C Ratio	0.098	-	-	0.396	0.125	0.02	-	-
HCM Control Delay (s)	10.4	-	-	14.3	10.4	8.3	-	-
HCM Lane LOS	B	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.9	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	0	0	177	0	693	39	14	707	1
Future Vol, veh/h	0	0	2	0	0	177	0	693	39	14	707	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	3	0	7	20	8	13	0
Mvmt Flow	0	0	2	0	0	186	0	729	41	15	744	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	372	-	-	365	745	0	0	770	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	6.96	4.1	-	-	4.26	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.33	2.2	-	-	2.28	-	-
Pot Cap-1 Maneuver	0	0	631	0	0	629	872	-	-	802	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	631	-	-	629	872	-	-	802	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	13.1	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	872	-	-	631	629	802	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.296	0.018	-	-
HCM Control Delay (s)	0	-	-	10.7	13.1	9.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.2	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	50	0	390	697	0
Future Vol, veh/h	0	0	50	0	390	697	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	150	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	0	6	3	2
Mvmt Flow	0	0	61	0	476	850	0

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1210	425	850	-	0	-	0
Stage 1	850	-	-	-	-	-	-
Stage 2	360	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	-	-
Pot Cap-1 Maneuver	175	578	414	0	-	-	0
Stage 1	379	-	-	0	-	-	0
Stage 2	677	-	-	0	-	-	0
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	149	578	414	-	-	-	-
Mov Cap-2 Maneuver	149	-	-	-	-	-	-
Stage 1	323	-	-	-	-	-	-
Stage 2	677	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	EBLn1	SBT
Capacity (veh/h)	414	-	-	-
HCM Lane V/C Ratio	0.147	-	-	-
HCM Control Delay (s)	15.2	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	732	0	709	0
Future Vol, veh/h	0	0	0	732	0	709	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	0	8	0	13	0
Mvmt Flow	0	0	0	771	0	746	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1132	373	-	0	771	-	0
Stage 1	746	-	-	-	-	-	-
Stage 2	386	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	197	624	0	-	472	-	0
Stage 1	430	-	0	-	-	-	0
Stage 2	656	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	197	624	-	-	472	-	-
Mov Cap-2 Maneuver	197	-	-	-	-	-	-
Stage 1	430	-	-	-	-	-	-
Stage 2	656	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	472	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	329	121	656	0
Future Vol, veh/h	0	0	0	329	121	656	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	5	10	2	0
Mvmt Flow	0	0	0	401	148	800	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1297	400	-	0	401	-	0
Stage 1	1096	-	-	-	-	-	-
Stage 2	201	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.6	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.6	-	-
Pot Cap-1 Maneuver	154	600	0	-	765	-	0
Stage 1	282	-	0	-	-	-	0
Stage 2	813	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	124	600	-	-	765	-	-
Mov Cap-2 Maneuver	124	-	-	-	-	-	-
Stage 1	282	-	-	-	-	-	-
Stage 2	656	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	1.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	765	-
HCM Lane V/C Ratio	-	-	0.193	-
HCM Control Delay (s)	-	0	10.8	-
HCM Lane LOS	-	A	B	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	80	790	0	0	642
Future Vol, veh/h	0	0	80	790	0	0	642
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	150	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	7	0	0	14
Mvmt Flow	0	0	84	832	0	0	676

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	1338	416	676	0	-	-	-
Stage 1	1000	-	-	-	-	-	-
Stage 2	338	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.46	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.53	-	-	-	-
Pot Cap-1 Maneuver	144	585	531	-	0	0	-
Stage 1	317	-	-	-	0	0	-
Stage 2	694	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	121	585	531	-	-	-	-
Mov Cap-2 Maneuver	121	-	-	-	-	-	-
Stage 1	267	-	-	-	-	-	-
Stage 2	694	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	531	-	-	-
HCM Lane V/C Ratio	0.159	-	-	-
HCM Control Delay (s)	13.1	-	0	-
HCM Lane LOS	B	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	1455	8	809	0
Future Vol, veh/h	0	0	0	1455	8	809	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	7	44	12	0
Mvmt Flow	0	0	0	1582	9	879	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1688	440	-	0	1582	-	0
Stage 1	897	-	-	-	-	-	-
Stage 2	791	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	7.28	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.94	-	-
Pot Cap-1 Maneuver	86	570	0	-	89	-	0
Stage 1	363	-	0	-	-	-	0
Stage 2	412	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	77	570	-	-	89	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-	-
Stage 1	363	-	-	-	-	-	-
Stage 2	370	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	89	-
HCM Lane V/C Ratio	-	-	0.098	-
HCM Control Delay (s)	-	0	49.8	-
HCM Lane LOS	-	A	E	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	31	1883	0	0	905
Future Vol, veh/h	0	0	31	1883	0	0	905
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	200	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	12	5	0	0	11
Mvmt Flow	0	0	34	2047	0	0	984

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	2607	1024	984	0	-	-	-
Stage 1	2115	-	-	-	-	-	-
Stage 2	492	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.64	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.62	-	-	-	-
Pot Cap-1 Maneuver	21	236	313	-	0	0	-
Stage 1	80	-	-	-	0	0	-
Stage 2	586	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	19	236	313	-	-	-	-
Mov Cap-2 Maneuver	19	-	-	-	-	-	-
Stage 1	71	-	-	-	-	-	-
Stage 2	586	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	313	-	-	-
HCM Lane V/C Ratio	0.108	-	-	-
HCM Control Delay (s)	17.9	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	1209	2	782	0
Future Vol, veh/h	0	0	0	1209	2	782	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	6	0	10	0
Mvmt Flow	0	0	0	1286	2	832	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1479	416	-	0	1286	-	0
Stage 1	836	-	-	-	-	-	-
Stage 2	643	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	6.4	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.5	-	-
Pot Cap-1 Maneuver	119	591	0	-	221	-	-
Stage 1	391	-	0	-	-	-	-
Stage 2	491	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	118	591	-	-	221	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-	-
Stage 1	391	-	-	-	-	-	-
Stage 2	487	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	221	-	-
HCM Lane V/C Ratio	-	-	0.01	-	-
HCM Control Delay (s)	-	0	21.4	-	-
HCM Lane LOS	-	A	C	-	-
HCM 95th %tile Q(veh)	-	-	0	-	-

PM Queues

Queues
2: US 29 & Malmaison Road

10/08/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Future Volume (vph)	5	6	4	127	4	71	1	472	172	2	102	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	350		0	370		360		265	
Storage Lanes	0		1	1		1	1		1		1	
Taper Length (ft)	0			0			0				0	
Right Turn on Red			Yes			Yes			Yes			
Link Speed (mph)		25			45			45				45
Link Distance (ft)		1460			1588			535				1818
Travel Time (s)		39.8			24.1			8.1				27.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	40%	33%	1%	100%	2%	0%	3%	2%	0%	4%	2%
Adj. Flow (vph)	5	7	4	138	4	77	1	513	187	2	111	555
Shared Lane Traffic (%)				49%								
Lane Group Flow (vph)	0	12	4	70	72	77	1	513	187	0	113	557
Act Effct Green (s)		10.5	10.5	10.6	10.6	10.6	8.3	29.8	49.8		9.8	40.1
Actuated g/C Ratio		0.15	0.15	0.15	0.15	0.15	0.12	0.41	0.69		0.14	0.56
v/c Ratio		0.06	0.01	0.28	0.30	0.20	0.00	0.67	0.16		0.48	0.28
Control Delay		34.9	0.0	36.2	36.7	1.1	39.0	25.6	1.5		40.8	11.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		34.9	0.0	36.2	36.7	1.1	39.0	25.6	1.5		40.8	11.2
LOS		C	A	D	D	A	D	C	A		D	B
Approach Delay		26.2			24.0			19.2				16.2
Approach LOS		C			C			B				B
Queue Length 50th (ft)		4	0	27	28	0	0	165	0		43	42
Queue Length 95th (ft)		23	0	82	84	0	m5	#379	22		116	161
Internal Link Dist (ft)		1380			1508			455				1738
Turn Bay Length (ft)			75	350			370		360		265	
Base Capacity (vph)		203	361	257	245	397	224	862	1108		261	2022
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		0.06	0.01	0.27	0.29	0.19	0.00	0.60	0.17		0.43	0.28

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 72.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 18.7 Intersection LOS: B
Intersection Capacity Utilization 69.8% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Right Turn on Red	Yes
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	100%
Adj. Flow (vph)	2
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	343	0	0	78	156	1020	55	41	843	144
Future Volume (vph)	0	0	343	0	0	78	156	1020	55	41	843	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	275		0	295		700
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			45			45	
Link Distance (ft)		530			1421			603			808	
Travel Time (s)		8.0			27.7			9.1			12.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	6%	0%	0%	3%	15%	12%	4%	0%	8%	6%
Adj. Flow (vph)	0	0	385	0	0	88	175	1146	62	46	947	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	385	0	0	88	175	1146	62	46	947	162
Act Effct Green (s)			17.1			6.0	17.1	45.6	45.6	6.0	30.9	30.9
Actuated g/C Ratio			0.28			0.10	0.28	0.76	0.76	0.10	0.52	0.52
v/c Ratio			0.78			0.29	0.39	0.47	0.05	0.26	0.55	0.19
Control Delay			27.5			3.3	18.9	3.2	0.4	24.4	8.4	0.9
Queue Delay			0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay			27.5			3.3	18.9	3.2	0.4	24.4	8.4	0.9
LOS			C			A	B	A	A	C	A	A
Approach Delay		27.5			3.3			5.1			8.0	
Approach LOS		C			A			A			A	
Queue Length 50th (ft)			98			0	42	11	0	16	52	0
Queue Length 95th (ft)			178			7	m80	37	m1	m41	65	5
Internal Link Dist (ft)		450			1341			523			728	
Turn Bay Length (ft)							275			295		700
Base Capacity (vph)			565			307	523	2449	1195	180	1724	865
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			0.68			0.29	0.33	0.47	0.05	0.26	0.55	0.19

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 59 (98%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 9.0 Intersection LOS: A
Intersection Capacity Utilization 54.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	98	154	0	212	75	0	773	140	0	1019	112
Future Volume (vph)	0	98	154	0	212	75	0	773	140	0	1019	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		40	0		0	255		225	255		245
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		500			672			676			511	
Travel Time (s)		7.6			10.2			10.2			7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	6%	0%	4%	3%	0%	11%	3%	0%	6%	7%
Adj. Flow (vph)	0	103	162	0	223	79	0	814	147	0	1073	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	162	0	302	0	0	814	147	0	1073	118
Act Effct Green (s)		14.3	14.3		14.3			27.0	27.0		26.9	26.9
Actuated g/C Ratio		0.26	0.26		0.26			0.49	0.49		0.48	0.48
v/c Ratio		0.22	0.38		0.63			0.52	0.18		0.65	0.15
Control Delay		17.6	14.7		23.2			11.6	2.6		13.5	2.8
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay		17.6	14.7		23.2			11.6	2.6		13.5	2.8
LOS		B	B		C			B	A		B	A
Approach Delay		15.8			23.2			10.2			12.5	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		28	30		81			91	0		132	0
Queue Length 95th (ft)		59	72		150			148	24		209	22
Internal Link Dist (ft)		420			592			596			431	
Turn Bay Length (ft)			40						225			245
Base Capacity (vph)		593	525		588			1666	875		1739	828
Starvation Cap Reductn		0	0		0			0	0		0	0
Spillback Cap Reductn		0	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.17	0.31		0.51			0.49	0.17		0.62	0.14

Intersection Summary	
Area Type: Other	
Cycle Length: 60	
Actuated Cycle Length: 55.5	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 13.2	Intersection LOS: B
Intersection Capacity Utilization 55.7%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	428	854	78	545	1221
Future Volume (vph)	0	428	854	78	545	1221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		635	550	
Storage Lanes	0	2		0	1	
Taper Length (ft)	0				0	
Right Turn on Red		No		Yes		
Link Speed (mph)	45		45			45
Link Distance (ft)	184		900			848
Travel Time (s)	2.8		13.6			12.8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	4%	10%	2%	2%	6%
Adj. Flow (vph)	0	441	880	80	562	1259
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	441	880	80	562	1259
Act Effct Green (s)		23.4	24.2	24.2	23.4	60.0
Actuated g/C Ratio		0.39	0.40	0.40	0.39	1.00
v/c Ratio		0.41	0.67	0.12	0.81	0.37
Control Delay		14.1	18.4	4.2	22.8	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		14.1	18.4	4.2	22.8	0.2
LOS		B	B	A	C	A
Approach Delay	14.1		17.2			7.2
Approach LOS	B		B			A
Queue Length 50th (ft)		59	140	0	181	0
Queue Length 95th (ft)		94	201	22	#329	0
Internal Link Dist (ft)	104		820			768
Turn Bay Length (ft)				635	550	
Base Capacity (vph)		1156	1321	685	749	3406
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.38	0.67	0.12	0.75	0.37

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 11.1 Intersection LOS: B
Intersection Capacity Utilization 64.1% 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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	30	0	0	287	0	979	30	442	1535	6
Future Volume (vph)	0	0	30	0	0	287	0	979	30	442	1535	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	280		200	535		0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			45			45			45	
Link Distance (ft)		563			795			625			612	
Travel Time (s)		15.4			12.0			9.5			9.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	4%	0%	0%	1%	0%	7%	0%	1%	4%	20%
Adj. Flow (vph)	0	0	32	0	0	302	0	1031	32	465	1616	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	32	0	0	302	0	1031	32	465	1616	6
Act Effct Green (s)			10.2			13.2		19.7	19.7	32.9	41.1	41.1
Actuated g/C Ratio			0.20			0.26		0.39	0.39	0.66	0.82	0.82
v/c Ratio			0.08			0.60		0.78	0.05	0.73	0.57	0.01
Control Delay			0.4			18.2		17.6	0.1	17.2	7.6	0.0
Queue Delay			0.0			0.0		0.0	0.0	0.0	0.0	0.0
Total Delay			0.4			18.2		17.6	0.1	17.2	7.6	0.0
LOS			A			B		B	A	B	A	A
Approach Delay		0.4			18.2			17.1			9.7	
Approach LOS		A			B			B			A	
Queue Length 50th (ft)			0			47		124	0	54	0	0
Queue Length 95th (ft)			0			137		194	m0	#184	#330	0
Internal Link Dist (ft)		483			715			545			532	
Turn Bay Length (ft)									200	535		
Base Capacity (vph)			419			554		1972	984	701	2705	1070
Starvation Cap Reductn			0			0		0	0	0	0	0
Spillback Cap Reductn			0			0		0	0	0	0	0
Storage Cap Reductn			0			0		0	0	0	0	0
Reduced v/c Ratio			0.08			0.55		0.52	0.03	0.66	0.60	0.01

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 50.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 65.5% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	897	0	334	0	852
Future Volume (vph)	0	0	897	0	334	0	852
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0		295	
Storage Lanes	0	0		0		1	
Taper Length (ft)	0					0	
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		45				45
Link Distance (ft)	262		487				603
Travel Time (s)	6.0		7.4				9.1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	14%	0%	5%	0%	8%
Adj. Flow (vph)	0	0	1008	0	375	0	957
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1008	0	375	0	957
Act Effct Green (s)			30.1		17.9		60.0
Actuated g/C Ratio			0.50		0.30		1.00
v/c Ratio			0.64		0.73		0.29
Control Delay			14.0		19.1		0.2
Queue Delay			0.0		0.0		0.0
Total Delay			14.0		19.1		0.2
LOS			B		B		A
Approach Delay			14.0				5.5
Approach LOS			B				A
Queue Length 50th (ft)			134		60		0
Queue Length 95th (ft)			206		m85		0
Internal Link Dist (ft)	182		407				523
Turn Bay Length (ft)					295		
Base Capacity (vph)			1586		601		3343
Starvation Cap Reductn			0		0		0
Spillback Cap Reductn			0		0		0
Storage Cap Reductn			0		0		0
Reduced v/c Ratio			0.64		0.62		0.29

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 34 (57%), Referenced to phase 2:NBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	59	1039	0	0	969
Future Volume (vph)	0	0	59	1039	0	0	969
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	275		0	0	
Storage Lanes	0	0	1		0	0	
Taper Length (ft)	0		0			0	
Right Turn on Red		Yes			Yes		
Link Speed (mph)	30			45			45
Link Distance (ft)	203			808			377
Travel Time (s)	4.6			12.2			5.7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	4%	12%	0%	0%	7%
Adj. Flow (vph)	0	0	66	1167	0	0	1089
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	66	1167	0	0	1089
Act Effct Green (s)			8.4	60.0			47.2
Actuated g/C Ratio			0.14	1.00			0.79
v/c Ratio			0.27	0.36			0.41
Control Delay			25.1	0.3			4.7
Queue Delay			0.0	0.0			0.0
Total Delay			25.1	0.3			4.7
LOS			C	A			A
Approach Delay				1.6			4.7
Approach LOS				A			A
Queue Length 50th (ft)			22	0			86
Queue Length 95th (ft)			m52	0			131
Internal Link Dist (ft)	123			728			297
Turn Bay Length (ft)			275				
Base Capacity (vph)			289	3223			2652
Starvation Cap Reductn			0	0			0
Spillback Cap Reductn			0	0			0
Storage Cap Reductn			0	0			0
Reduced v/c Ratio			0.23	0.36			0.41

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 49 (82%), Referenced to phase 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 3.1 Intersection LOS: A
Intersection Capacity Utilization 41.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	0	77	1205	0	0	1695
Future Volume (vph)	0	0	77	1205	0	0	1695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	250		0	0	
Storage Lanes	0	0	1		0	0	
Taper Length (ft)	0		0			0	
Right Turn on Red		Yes			Yes		
Link Speed (mph)	30			45			45
Link Distance (ft)	400			848			558
Travel Time (s)	9.1			12.8			8.5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	8%	8%	2%	2%	5%
Adj. Flow (vph)	0	0	79	1242	0	0	1747
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	79	1242	0	0	1747
Act Effct Green (s)			6.2	60.0			48.7
Actuated g/C Ratio			0.10	1.00			0.81
v/c Ratio			0.46	0.37			0.63
Control Delay			28.0	0.3			5.7
Queue Delay			0.0	0.0			0.0
Total Delay			28.0	0.3			5.7
LOS			C	A			A
Approach Delay				1.9			5.7
Approach LOS				A			A
Queue Length 50th (ft)			25	0			166
Queue Length 95th (ft)			m46	0			238
Internal Link Dist (ft)	320			768			478
Turn Bay Length (ft)			250				
Base Capacity (vph)			178	3343			2791
Starvation Cap Reductn			0	0			0
Spillback Cap Reductn			0	0			0
Storage Cap Reductn			0	0			0
Reduced v/c Ratio			0.44	0.37			0.63

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 4.1 Intersection LOS: A
Intersection Capacity Utilization 61.5% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	142	0	0	55	26	598	43	39	582	62
Future Vol, veh/h	0	0	142	0	0	55	26	598	43	39	582	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	185	-	-	150	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	4	0	0	11	5	2	11	9	2	6
Mvmt Flow	0	0	158	0	0	61	29	664	48	43	647	69

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	324	-	-	356	716	0	0	712	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.98	-	-	7.12	4.2	-	-	4.28	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.34	-	-	3.41	2.25	-	-	2.29	-	-
Pot Cap-1 Maneuver	0	0	666	0	0	615	861	-	-	838	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	666	-	-	615	861	-	-	838	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	11.5	0.4	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	861	-	-	666	615	838	-	-
HCM Lane V/C Ratio	0.034	-	-	0.237	0.099	0.052	-	-
HCM Control Delay (s)	9.3	-	-	12.1	11.5	9.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	0	0	103	17	757	93	90	984	12
Future Vol, veh/h	0	0	2	0	0	103	17	757	93	90	984	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	0
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	6	0	6	4	4	6	9
Mvmt Flow	0	0	2	0	0	110	18	805	99	96	1047	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	524	-	-	403	1060	0	0	904	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	7.02	4.1	-	-	4.18	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.36	2.2	-	-	2.24	-	-
Pot Cap-1 Maneuver	0	0	503	0	0	586	665	-	-	736	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	503	-	-	586	665	-	-	736	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	12.6	0.2	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	665	-	-	503	586	736	-	-
HCM Lane V/C Ratio	0.027	-	-	0.004	0.187	0.13	-	-
HCM Control Delay (s)	10.6	-	-	12.2	12.6	10.6	-	-
HCM Lane LOS	B	-	-	B	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	0.7	0.4	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	866	1	985	0
Future Vol, veh/h	0	0	0	866	1	985	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	0	6	0	6	0
Mvmt Flow	0	0	0	921	1	1048	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1511	524	-	0	921	-	0
Stage 1	1050	-	-	-	-	-	-
Stage 2	461	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	111	498	0	-	379	-	-
Stage 1	298	-	0	-	-	-	-
Stage 2	601	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	111	498	-	-	379	-	-
Mov Cap-2 Maneuver	111	-	-	-	-	-	-
Stage 1	298	-	-	-	-	-	-
Stage 2	599	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	379	-	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	-	0	14.5	-	-
HCM Lane LOS	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	59	801	0	0	1027
Future Vol, veh/h	0	0	59	801	0	0	1027
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	150	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	6	6	0	0	6
Mvmt Flow	0	0	63	852	0	0	1093

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	1525	426	1093	0	-	-	-
Stage 1	978	-	-	-	-	-	-
Stage 2	547	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.52	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.56	-	-	-	-
Pot Cap-1 Maneuver	109	577	279	-	0	0	-
Stage 1	325	-	-	-	0	0	-
Stage 2	544	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	84	577	279	-	-	-	-
Mov Cap-2 Maneuver	84	-	-	-	-	-	-
Stage 1	252	-	-	-	-	-	-
Stage 2	544	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	279	-	-	-
HCM Lane V/C Ratio	0.225	-	-	-
HCM Control Delay (s)	21.6	-	0	-
HCM Lane LOS	C	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	979	30	1535	0
Future Vol, veh/h	0	0	0	979	30	1535	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	7	4	4	0
Mvmt Flow	0	0	0	1031	32	1616	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	2196	808	-	0	1031	-	0
Stage 1	1680	-	-	-	-	-	-
Stage 2	516	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	6.48	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.54	-	-
Pot Cap-1 Maneuver	39	328	0	-	312	-	0
Stage 1	139	-	0	-	-	-	0
Stage 2	570	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	35	328	-	-	312	-	-
Mov Cap-2 Maneuver	35	-	-	-	-	-	-
Stage 1	139	-	-	-	-	-	-
Stage 2	511	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	312	-
HCM Lane V/C Ratio	-	-	0.101	-
HCM Control Delay (s)	-	0	17.8	-
HCM Lane LOS	-	A	C	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	0	0	22	1244	0	0	1961
Future Vol, veh/h	0	0	22	1244	0	0	1961
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	200	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	6	5	2	0	4
Mvmt Flow	0	0	23	1309	0	0	2064

Major/Minor	Minor1		Major1			Major2	
Conflicting Flow All	2387	655	2064	0	-	-	-
Stage 1	1355	-	-	-	-	-	-
Stage 2	1032	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.52	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.56	-	-	-	-
Pot Cap-1 Maneuver	29	413	64	-	0	0	-
Stage 1	209	-	-	-	0	0	-
Stage 2	309	-	-	-	0	0	-
Platoon blocked, %				-			-
Mov Cap-1 Maneuver	19	413	64	-	-	-	-
Mov Cap-2 Maneuver	19	-	-	-	-	-	-
Stage 1	134	-	-	-	-	-	-
Stage 2	309	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	WBLn1	SBT
Capacity (veh/h)	64	-	-	-
HCM Lane V/C Ratio	0.362	-	-	-
HCM Control Delay (s)	90.2	-	0	-
HCM Lane LOS	F	-	A	-
HCM 95th %tile Q(veh)	1.3	-	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	582	85	639	0
Future Vol, veh/h	0	0	0	582	85	639	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	150	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90
Heavy Vehicles, %	3	0	0	3	3	3	0
Mvmt Flow	0	0	0	647	94	710	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1222	355	-	0	647	-	0
Stage 1	898	-	-	-	-	-	-
Stage 2	324	-	-	-	-	-	-
Critical Hdwy	6.86	6.9	-	-	6.46	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-	-
Follow-up Hdwy	3.53	3.3	-	-	2.53	-	-
Pot Cap-1 Maneuver	171	647	0	-	555	-	0
Stage 1	356	-	0	-	-	-	0
Stage 2	702	-	0	-	-	-	0
Platoon blocked, %				-		-	
Mov Cap-1 Maneuver	142	647	-	-	555	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-	-
Stage 1	356	-	-	-	-	-	-
Stage 2	583	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT
Capacity (veh/h)	-	-	555	-
HCM Lane V/C Ratio	-	-	0.17	-
HCM Control Delay (s)	-	0	12.8	-
HCM Lane LOS	-	A	B	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	32	0	621	651	0
Future Vol, veh/h	0	0	32	0	621	651	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	150	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	11	0	3	3	0
Mvmt Flow	0	0	36	0	690	723	0

Major/Minor	Minor2		Major1			Major2	
Conflicting Flow All	1140	362	723	-	0	-	0
Stage 1	723	-	-	-	-	-	-
Stage 2	417	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	6.62	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.61	-	-	-	-
Pot Cap-1 Maneuver	198	641	469	0	-	-	0
Stage 1	447	-	-	0	-	-	0
Stage 2	639	-	-	0	-	-	0
Platoon blocked, %					-	-	
Mov Cap-1 Maneuver	183	641	469	-	-	-	-
Mov Cap-2 Maneuver	183	-	-	-	-	-	-
Stage 1	413	-	-	-	-	-	-
Stage 2	639	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBU	NBT	EBLn1	SBT
Capacity (veh/h)	469	-	-	-
HCM Lane V/C Ratio	0.076	-	-	-
HCM Control Delay (s)	13.3	-	0	-
HCM Lane LOS	B	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Vol, veh/h	0	0	0	924	8	1221	0
Future Vol, veh/h	0	0	0	924	8	1221	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	200	-	-
Veh in Median Storage, #	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	0	9	0	6	0
Mvmt Flow	0	0	0	953	8	1259	0

Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	1752	630	-	0	953	-	0
Stage 1	1275	-	-	-	-	-	-
Stage 2	477	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.4	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.5	-	-
Pot Cap-1 Maneuver	77	424	0	-	362	-	-
Stage 1	226	-	0	-	-	-	-
Stage 2	590	-	0	-	-	-	-
Platoon blocked, %				-		-	-
Mov Cap-1 Maneuver	75	424	-	-	362	-	-
Mov Cap-2 Maneuver	75	-	-	-	-	-	-
Stage 1	226	-	-	-	-	-	-
Stage 2	577	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBU	SBT	SBR
Capacity (veh/h)	-	-	362	-	-
HCM Lane V/C Ratio	-	-	0.023	-	-
HCM Control Delay (s)	-	0	15.2	-	-
HCM Lane LOS	-	A	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	-	-

APPENDIX K-5

SIDRA Intersection Results

MOVEMENT SUMMARY

Site: 101 [Lawless Creek Rd]

US 29 and Lawless Creek Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 29 BUS												
3u	U	1	0.0	0.346	6.9	LOS A	2.5	65.1	0.49	0.32	0.49	36.9
3	L2	64	6.0	0.346	7.1	LOS A	2.5	65.1	0.49	0.32	0.49	35.1
8	T1	285	5.0	0.346	7.1	LOS A	2.5	65.1	0.49	0.32	0.49	34.2
18	R2	8	0.0	0.346	6.9	LOS A	2.5	65.1	0.49	0.32	0.49	35.1
Approach		358	5.1	0.346	7.1	LOS A	2.5	65.1	0.49	0.32	0.49	34.4
East: Lawless Creek Rd												
1	L2	18	0.0	0.107	5.4	LOS A	0.6	15.5	0.62	0.48	0.62	36.7
6	T1	35	4.0	0.107	5.7	LOS A	0.6	15.5	0.62	0.48	0.62	36.2
16	R2	32	4.0	0.107	5.7	LOS A	0.6	15.5	0.62	0.48	0.62	33.8
Approach		85	3.1	0.107	5.6	LOS A	0.6	15.5	0.62	0.48	0.62	35.5
North: US 29 BUS												
7u	U	4	0.0	0.682	13.2	LOS B	7.5	194.1	0.64	0.40	0.64	29.7
7	L2	20	0.0	0.682	13.2	LOS B	7.5	194.1	0.64	0.40	0.64	31.4
4	T1	596	2.0	0.682	13.3	LOS B	7.5	194.1	0.64	0.40	0.64	31.2
14	R2	138	11.0	0.682	13.6	LOS B	7.5	194.1	0.64	0.40	0.64	29.1
Approach		758	3.6	0.682	13.3	LOS B	7.5	194.1	0.64	0.40	0.64	30.8
West: E Witt Rd												
5	L2	103	10.0	0.168	6.6	LOS A	1.1	30.4	0.76	0.63	0.76	31.8
2	T1	24	11.0	0.168	6.6	LOS A	1.1	30.4	0.76	0.63	0.76	33.1
12	R2	98	1.0	0.112	5.2	LOS A	0.8	19.0	0.72	0.56	0.72	36.6
Approach		225	6.2	0.168	6.0	LOS A	1.1	30.4	0.74	0.60	0.74	34.0
All Vehicles		1425	4.3	0.682	10.1	LOS B	7.5	194.1	0.62	0.41	0.62	32.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Lawless Creek Rd]

US 29 and Lawless Creek Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 29 BUS												
3u	U	4	0.0	0.579	10.5	LOS B	5.5	139.8	0.59	0.37	0.59	35.2
3	L2	28	5.0	0.579	10.7	LOS B	5.5	139.8	0.59	0.37	0.59	33.8
8	T1	571	2.0	0.579	10.6	LOS B	5.5	139.8	0.59	0.37	0.59	32.7
18	R2	29	18.0	0.579	11.2	LOS B	5.5	139.8	0.59	0.37	0.59	31.5
Approach		633	2.9	0.579	10.6	LOS B	5.5	139.8	0.59	0.37	0.59	32.7
East: Lawless Creek Rd												
1	L2	18	14.0	0.106	8.0	LOS A	0.6	17.0	0.75	0.64	0.75	33.2
6	T1	12	11.0	0.106	7.7	LOS A	0.6	17.0	0.75	0.64	0.75	33.9
16	R2	29	9.0	0.106	7.6	LOS A	0.6	17.0	0.75	0.64	0.75	31.9
Approach		60	10.9	0.106	7.7	LOS A	0.6	17.0	0.75	0.64	0.75	32.8
North: US 29 BUS												
7u	U	7	0.0	0.597	10.3	LOS B	6.3	159.8	0.44	0.22	0.44	31.5
7	L2	42	9.0	0.597	10.6	LOS B	6.3	159.8	0.44	0.22	0.44	31.5
4	T1	603	2.0	0.597	10.4	LOS B	6.3	159.8	0.44	0.22	0.44	32.7
14	R2	55	5.0	0.597	10.5	LOS B	6.3	159.8	0.44	0.22	0.44	31.3
Approach		708	2.6	0.597	10.4	LOS B	6.3	159.8	0.44	0.22	0.44	32.5
West: E Witt Rd												
5	L2	68	4.0	0.103	5.4	LOS A	0.7	17.2	0.73	0.57	0.73	33.1
2	T1	17	0.0	0.103	5.2	LOS A	0.7	17.2	0.73	0.57	0.73	35.2
12	R2	68	6.0	0.081	5.1	LOS A	0.5	13.3	0.69	0.53	0.69	35.9
Approach		154	4.4	0.103	5.2	LOS A	0.7	17.2	0.71	0.55	0.71	34.6
All Vehicles		1554	3.2	0.597	9.9	LOS A	6.3	159.8	0.54	0.33	0.54	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 29 at Malmaison Rd]

US 29 at Malmaison Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 29 BUS												
3	L2	1	100.0	0.383	9.5	LOS A	3.1	81.1	0.35	0.17	0.35	22.8
8	T1	300	4.0	0.383	7.0	LOS A	3.1	81.1	0.35	0.17	0.35	32.9
18	R2	138	7.0	0.383	7.1	LOS A	3.1	81.1	0.35	0.17	0.35	26.4
Approach		439	5.2	0.383	7.0	LOS A	3.1	81.1	0.35	0.17	0.35	31.2
East: Malmaison Rd												
1	L2	264	5.0	0.238	5.4	LOS A	1.5	39.0	0.54	0.38	0.54	25.3
6	T1	2	0.0	0.238	5.2	LOS A	1.5	39.0	0.54	0.38	0.54	22.2
16	R2	123	6.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.6
Approach		389	5.3	0.238	3.7	LOS A	1.5	39.0	0.37	0.26	0.37	29.5
North: US 29 BUS												
7	L2	62	4.0	0.597	12.3	LOS B	6.5	165.6	0.75	0.65	0.88	30.4
4	T1	499	3.0	0.597	12.3	LOS B	6.5	165.6	0.75	0.65	0.88	28.7
14	R2	2	0.0	0.597	12.1	LOS B	6.5	165.6	0.75	0.65	0.88	27.3
Approach		563	3.1	0.597	12.3	LOS B	6.5	165.6	0.75	0.65	0.88	28.8
West: Malmaison Rd												
5	L2	2	100.0	0.012	20.1	LOS C	0.1	2.3	0.76	0.65	0.76	18.6
Approach		2	100.0	0.012	20.1	LOS C	0.1	2.3	0.76	0.65	0.76	18.6
All Vehicles		1393	4.5	0.597	8.2	LOS A	6.5	165.6	0.52	0.39	0.57	29.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [US 29 at Malmaison Rd]

US 29 at Malmaison Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 29 BUS												
3	L2	1	0.0	0.640	12.0	LOS B	6.8	174.0	0.64	0.41	0.64	21.5
8	T1	513	3.0	0.640	12.1	LOS B	6.8	174.0	0.64	0.41	0.64	29.7
18	R2	187	2.0	0.640	12.1	LOS B	6.8	174.0	0.64	0.41	0.64	23.2
Approach		701	2.7	0.640	12.1	LOS B	6.8	174.0	0.64	0.41	0.64	28.3
East: Malmaison Rd												
1	L2	138	1.0	0.158	5.4	LOS A	1.0	26.8	0.69	0.53	0.69	25.3
6	T1	4	100.0	0.158	12.1	LOS B	1.0	26.8	0.69	0.53	0.69	21.7
16	R2	77	2.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	38.5
Approach		220	3.3	0.158	3.6	LOS A	1.0	26.8	0.45	0.35	0.45	30.2
North: US 29 BUS												
7u	U	2	0.0	0.623	11.7	LOS B	6.4	164.7	0.66	0.43	0.66	34.3
7	L2	111	4.0	0.623	11.9	LOS B	6.4	164.7	0.66	0.43	0.66	30.5
4	T1	555	2.0	0.623	11.8	LOS B	6.4	164.7	0.66	0.43	0.66	28.8
14	R2	2	100.0	0.623	14.9	LOS B	6.4	164.7	0.66	0.43	0.66	27.3
Approach		671	2.6	0.623	11.8	LOS B	6.4	164.7	0.66	0.43	0.66	29.1
West: Malmaison Rd												
5	L2	5	50.0	0.051	13.4	LOS B	0.3	8.9	0.79	0.70	0.79	21.6
2	T1	7	40.0	0.051	11.9	LOS B	0.3	8.9	0.79	0.70	0.79	18.9
12	R2	4	33.0	0.051	11.0	LOS B	0.3	8.9	0.79	0.70	0.79	16.8
Approach		16	41.5	0.051	12.2	LOS B	0.3	8.9	0.79	0.70	0.79	19.6
All Vehicles		1608	3.2	0.640	10.8	LOS B	6.8	174.0	0.63	0.41	0.63	28.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Colonial Highway at Dennis Riddle Drive]

Colonial Highway at Dennis Riddle Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Dennis Riddle Drive												
3	L2	11	2.0	0.023	3.9	LOS A	0.1	3.5	0.50	0.27	0.50	15.4
18	R2	11	2.0	0.023	3.9	LOS A	0.1	3.5	0.50	0.27	0.50	30.0
Approach		22	2.0	0.023	3.9	LOS A	0.1	3.5	0.50	0.27	0.50	22.5
East: Colonial Highway												
1	L2	44	2.0	0.159	4.6	LOS A	1.0	26.3	0.36	0.19	0.36	33.1
6	T1	124	11.0	0.159	4.9	LOS A	1.0	26.3	0.36	0.19	0.36	33.9
Approach		168	8.6	0.159	4.9	LOS A	1.0	26.3	0.36	0.19	0.36	33.7
West: Colonial Highway												
5u	U	125	4.0	0.315	6.0	LOS A	1.9	50.1	0.19	0.08	0.19	16.5
2	T1	207	6.0	0.315	6.0	LOS A	1.9	50.1	0.19	0.08	0.19	31.8
12	R2	44	2.0	0.315	5.9	LOS A	1.9	50.1	0.19	0.08	0.19	22.8
Approach		376	4.9	0.315	6.0	LOS A	1.9	50.1	0.19	0.08	0.19	25.5
All Vehicles		566	5.9	0.315	5.6	LOS A	1.9	50.1	0.25	0.12	0.25	27.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Colonial Highway at Dennis Riddle Drive]

Colonial Highway at Dennis Riddle Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Dennis Riddle Drive												
3	L2	42	2.0	0.080	4.1	LOS A	0.5	12.3	0.42	0.24	0.42	15.3
18	R2	42	2.0	0.080	4.1	LOS A	0.5	12.3	0.42	0.24	0.42	29.9
Approach		84	2.0	0.080	4.1	LOS A	0.5	12.3	0.42	0.24	0.42	22.4
East: Colonial Highway												
1	L2	11	2.0	0.165	4.6	LOS A	1.0	26.1	0.34	0.17	0.34	34.1
6	T1	173	5.0	0.165	4.7	LOS A	1.0	26.1	0.34	0.17	0.34	35.2
Approach		183	4.8	0.165	4.7	LOS A	1.0	26.1	0.34	0.17	0.34	35.1
West: Colonial Highway												
5u	U	87	0.0	0.197	4.4	LOS A	1.1	26.9	0.07	0.02	0.07	17.0
2	T1	153	4.0	0.197	4.6	LOS A	1.1	26.9	0.07	0.02	0.07	33.0
12	R2	11	2.0	0.197	4.5	LOS A	1.1	26.9	0.07	0.02	0.07	23.6
Approach		251	2.5	0.197	4.5	LOS A	1.1	26.9	0.07	0.02	0.07	26.9
All Vehicles		518	3.3	0.197	4.5	LOS A	1.1	26.9	0.22	0.11	0.22	28.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [Colonial Highway at Cross Roads Lane]

Colonial Highway at Cross Roads Lane
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Colonial Highway												
1u	U	141	7.0	0.180	4.5	LOS A	0.9	25.3	0.08	0.02	0.08	21.9
6	T1	64	11.0	0.180	4.6	LOS A	0.9	25.3	0.08	0.02	0.08	30.1
16	R2	11	11.0	0.180	4.6	LOS A	0.9	25.3	0.08	0.02	0.08	23.1
Approach		215	8.4	0.180	4.6	LOS A	0.9	25.3	0.08	0.02	0.08	25.0
North: Cross Roads Lane												
7	L2	11	2.0	0.020	3.5	LOS A	0.1	3.0	0.39	0.18	0.39	23.3
14	R2	11	2.0	0.020	3.5	LOS A	0.1	3.0	0.39	0.18	0.39	28.4
Approach		22	2.0	0.020	3.5	LOS A	0.1	3.0	0.39	0.18	0.39	26.1
West: Colonial Highway												
5	L2	11	2.0	0.210	5.1	LOS A	1.4	34.8	0.38	0.21	0.38	30.5
2	T1	224	2.0	0.210	5.1	LOS A	1.4	34.8	0.38	0.21	0.38	33.3
Approach		235	2.0	0.210	5.1	LOS A	1.4	34.8	0.38	0.21	0.38	33.1
All Vehicles		473	4.9	0.210	4.8	LOS A	1.4	34.8	0.24	0.12	0.24	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [Colonial Highway at Cross Roads Lane]

Colonial Highway at Cross Roads Lane
Site Category: (None)
Roundabout

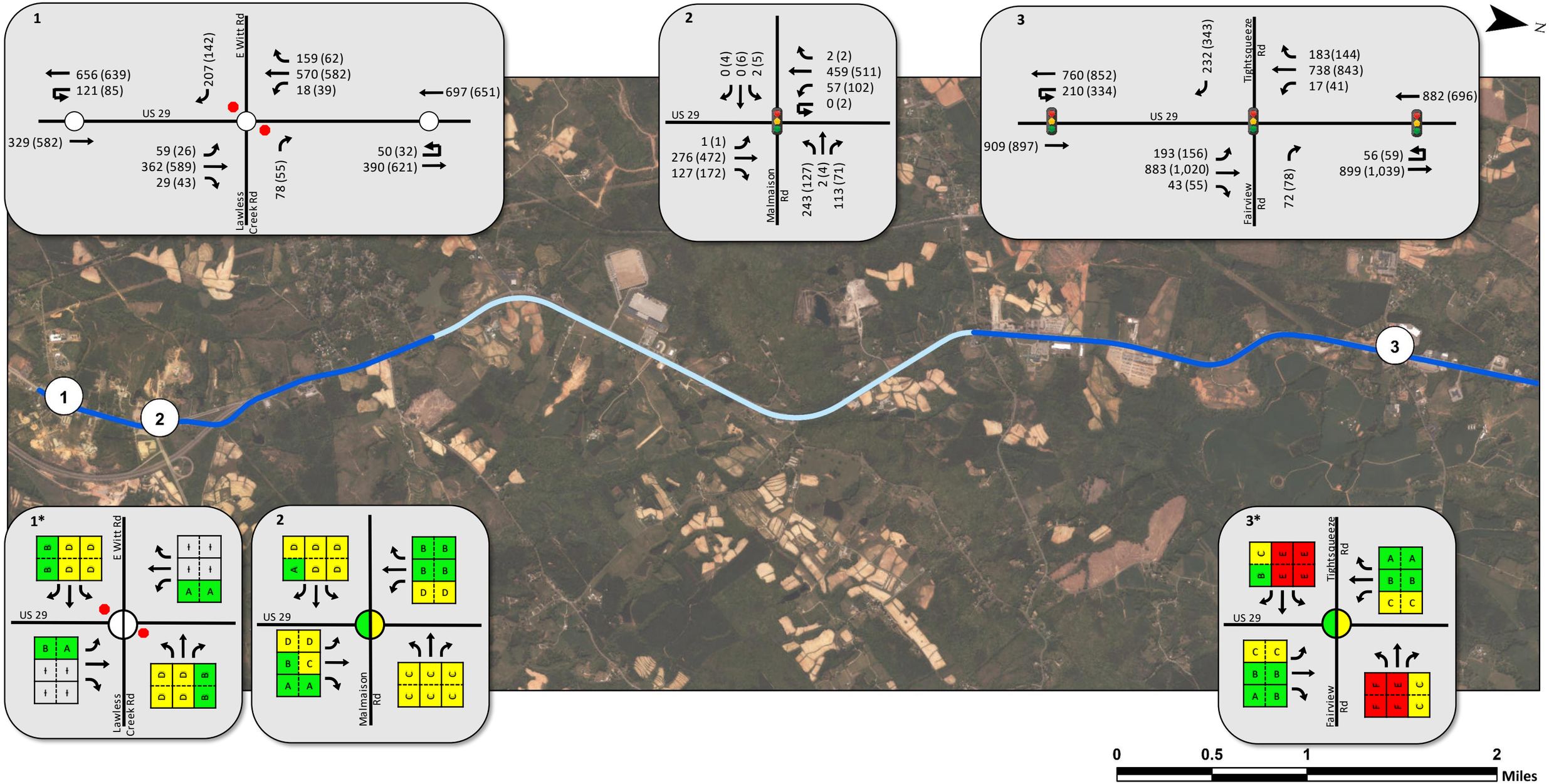
Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Colonial Highway												
1u	U	159	7.0	0.275	5.4	LOS A	1.6	42.5	0.08	0.02	0.08	22.1
6	T1	172	3.0	0.275	5.3	LOS A	1.6	42.5	0.08	0.02	0.08	31.7
16	R2	11	3.0	0.275	5.3	LOS A	1.6	42.5	0.08	0.02	0.08	23.2
Approach		341	4.9	0.275	5.4	LOS A	1.6	42.5	0.08	0.02	0.08	27.7
North: Cross Roads Lane												
7	L2	11	2.0	0.021	3.8	LOS A	0.1	3.3	0.49	0.26	0.49	23.2
14	R2	11	2.0	0.021	3.8	LOS A	0.1	3.3	0.49	0.26	0.49	28.2
Approach		21	2.0	0.021	3.8	LOS A	0.1	3.3	0.49	0.26	0.49	26.0
West: Colonial Highway												
5	L2	11	2.0	0.095	4.1	LOS A	0.6	14.3	0.37	0.19	0.37	30.8
2	T1	96	1.0	0.095	4.0	LOS A	0.6	14.3	0.37	0.19	0.37	33.9
Approach		106	1.1	0.095	4.0	LOS A	0.6	14.3	0.37	0.19	0.37	33.4
All Vehicles		468	3.9	0.275	5.0	LOS A	1.6	42.5	0.16	0.07	0.16	29.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX K-6

Build Volume and Delay Figures



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- * LOS based on ETT
- Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

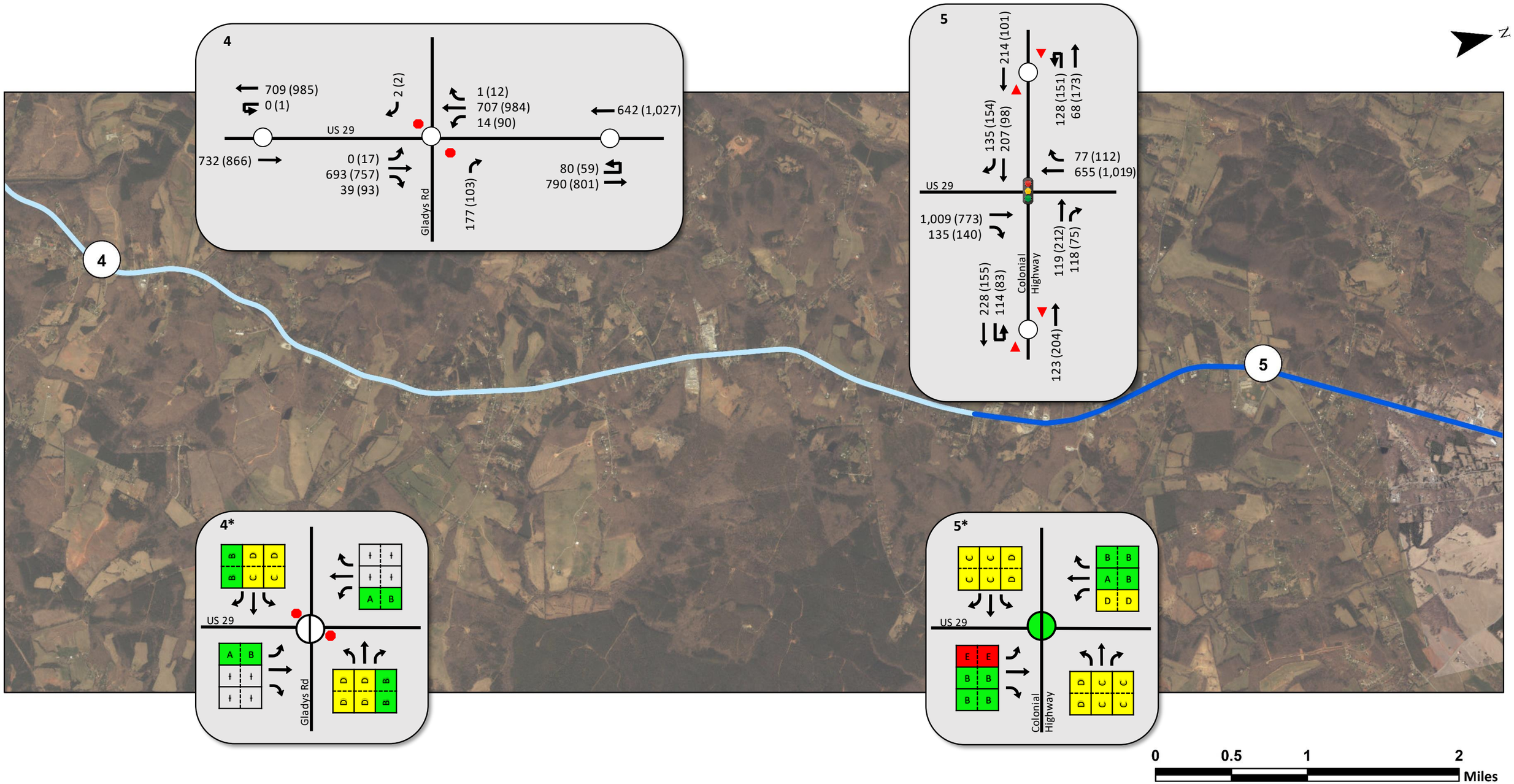
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

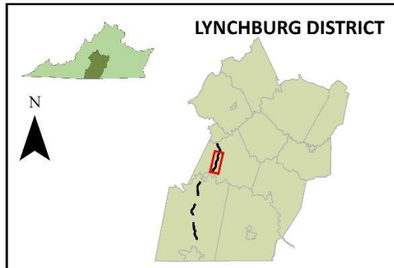
AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Build (2040) Conditions Map
Page 1 of 3

VDOT ARTERIALO PRESERVATION PROGRAM





Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- * LOS based on ETT
- Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

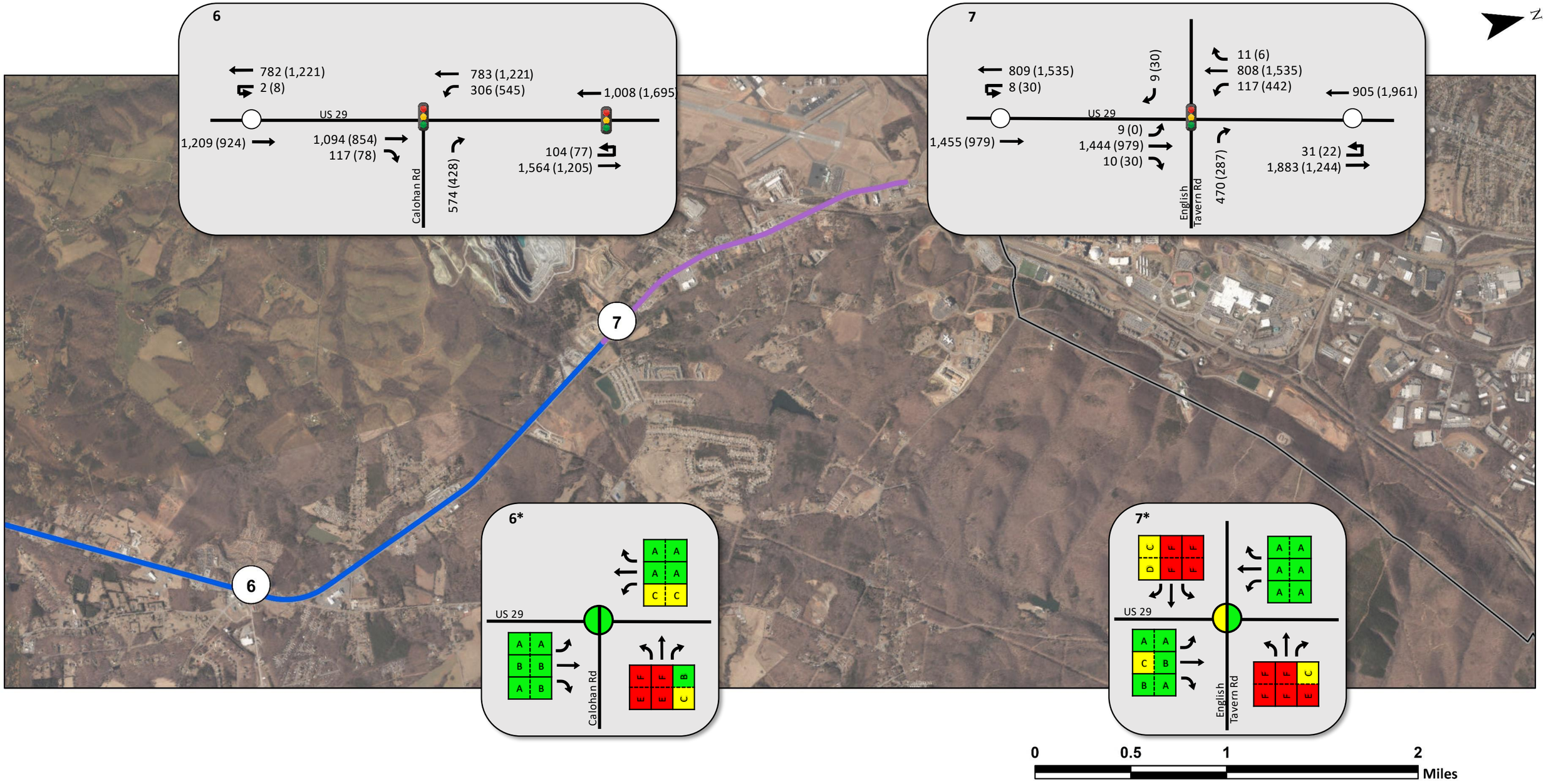
AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Build (2040) Conditions Map
Page 2 of 3

VDOT ARTERIALO PRESERVATION PROGRAM



LYNCHBURG DISTRICT

Legend

- Unsignalized Intersection
- Signalized Intersection
- Stop Controlled Approach
- Yield Controlled Movement
- * LOS based on ETT
- Vehicle Movement
- ### AM Peak Hour Volume
- (###) PM Peak Hour Volume

AM|PM Intersection LOS
- LOS A or B
- LOS C or D
- LOS E or F
- Unsignalized (No Intersection LOS)

AM|PM Lane Group LOS
- LOS A or B
- LOS C or D
- LOS E or F
- No Conflicting Movements

Segment Type:
- Developed
- Emerging
- Stable

US 29 Build (2040) Conditions Map
Page 3 of 3

VDOT ARTERIAL PRESERVATION PROGRAM