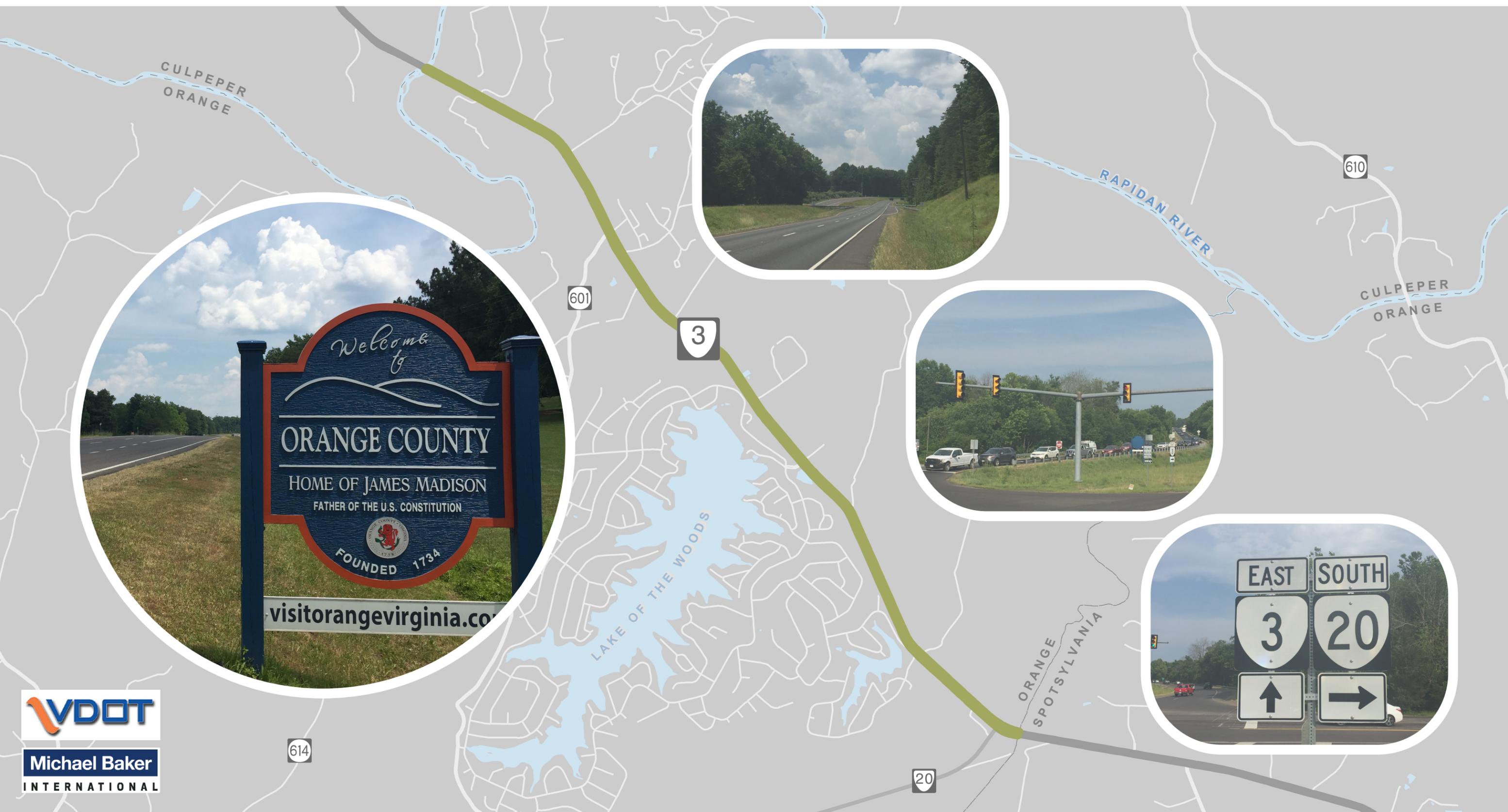


# VA Route 3 ARTERIAL PRESERVATION PLAN

January 24, 2019



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INTERNATIONAL



# Route 3 Arterial Preservation Plan Orange County

January 24, 2019

Prepared for:

Virginia Department of Transportation



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# 1. Introduction

## 1.1 Background

The purpose of the Route 3 Arterial Preservation Plan is to develop a holistic approach that identifies ways to ensure the safety and preserve the capacity of the Commonwealth's arterial highway network without wide-scale roadway widenings or increased signal proliferation. The purpose of this plan is to identify investment recommendations that will help preserve and enhance this key transportation corridor due to the vital role it plays in the region.

### 1.1.1 What is the Arterial Preservation Program?

VDOT's Arterial Preservation Program is designed to preserve and enhance the capacity and safety of the critical transportation highways in Virginia. These major highways accommodate long-distance mobility of people and goods throughout the Commonwealth. Preserving mobility on these corridors is critical to the current and future economy.

Within the framework of the Arterial Preservation Program, VDOT is developing methodologies to consistently and programmatically evaluate the corridors, creating a toolbox of preservation and enhancement strategies and identifying opportunities to implement these strategies. As an alternative to widening major highways to add capacity, preservation and enhancement strategies promote the use of innovative transportation solutions, minimizing delays for through traffic and improving safety, while incorporating local economic development goals. Developed in partnership with localities, the strategies will be used as tools to plan for infrastructure that supports future land use and development.

## 1.2 Study Corridor

The study area includes the entire Route 3 corridor in Orange County; an approximately five-mile long roadway segment shown in Figure 1. Beyond the Route 3 corridor, this study will include the future land development for the surrounding areas that is detailed in the Germanna Wilderness Area Plan (G-WAP), adopted July 2015.

## 1.3 Public Involvement Process

The public involvement process began with the December 15<sup>th</sup>, 2016 project kick-off/scoping meeting and subsequent discussion within the core study team, project stakeholders were identified that included:

- Orange County
- Germanna-Wilderness Steering Committee
- VDOT at the Residency, District and Central Office level

This stakeholder group consisted of staff-level representatives from each of the organizations. This group met at key milestones throughout the study to review progress and results. These meetings were held in the Orange County Administrative Building in Orange, Virginia. Table 1 lists the dates and topics of these meetings.

Table 1: Core Study Team Meetings

Meeting Date	Meeting Topic
December 15, 2016	Study Kick-Off/Orientation
January 11, 2018	Existing Conditions / Opportunities for Improvements
August 2, 2018	Preliminary Recommendations

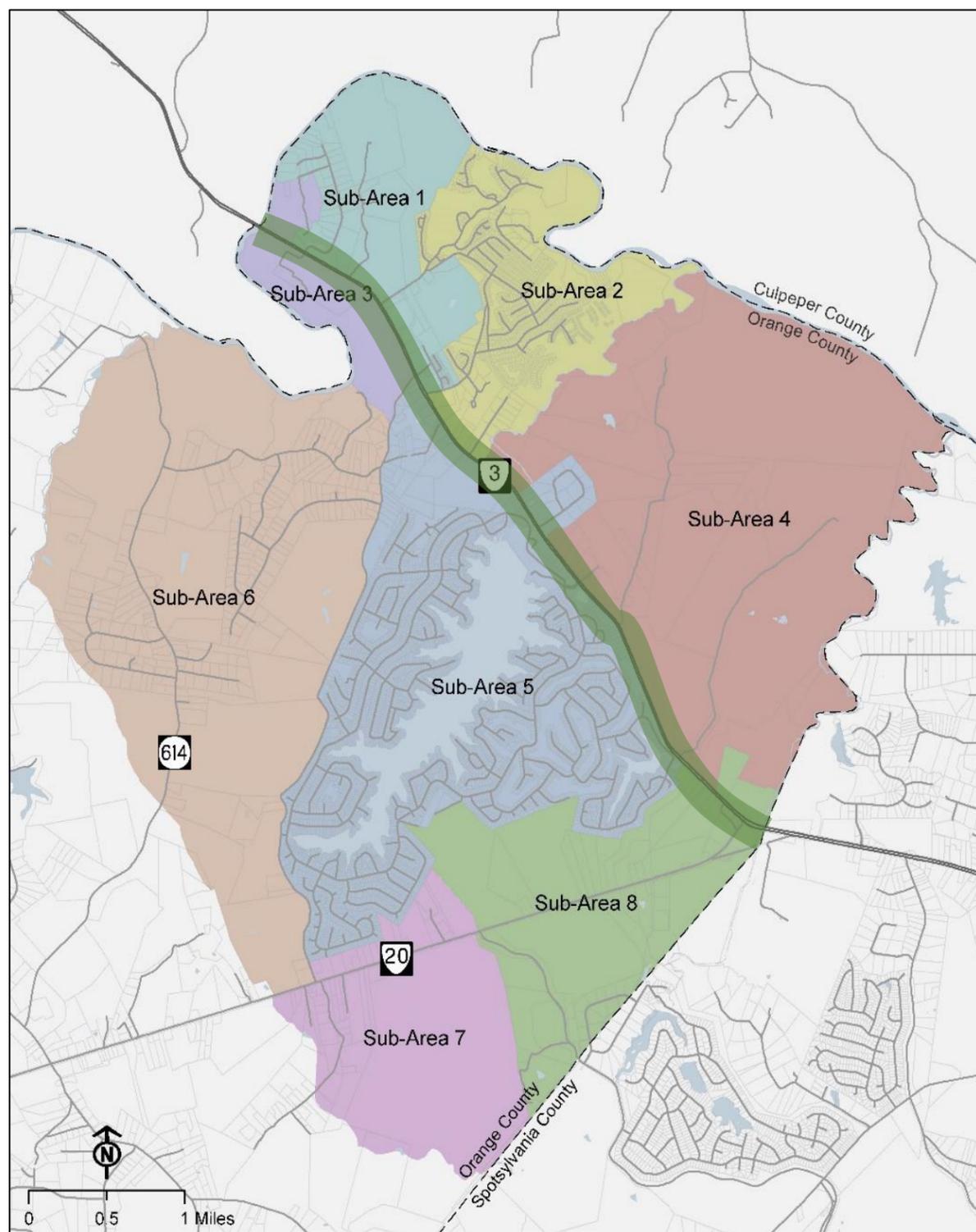
### 1.3.1 Stakeholder Interviews

As part of the public outreach process, individual phone calls or in-person meetings were conducted in early 2018 to discuss deficiencies along the corridor as well as possible improvements. Table 2 lists the stakeholders contacted during this process.

Table 2: Stakeholder Interviews

Stakeholder	Stakeholder Representative and Title
National Park Service (NPS)	Kirsten Talken-Spauling, Park Superintendent
Lake of the Woods	Phil Rodenberg, General Manager
	Larry Morlan, Chair of LOWA Board of Directors
Select property owners in Subarea 4	Mansour Azimipour
	Chip King
Select developers	Kenny Dotson
Germanna Community College	Dr. Janet Gullickson, President
Rappahannock-Rapidan Regional Commission	Patrick Mauney, Executive Director
Somerset Community Association	Robert Jones, Treasurer
Wilderness Shores Homeowners Association	William Edens, President
Wilderness Shores Property Owners Association	Tim Hall, Director of Land Development, Tricord
Germanna Foundation	J. Marc Wheat, President
Chamber of Commerce	Tammy Collins, Executive Director
	Sabrina Martyn, President
School Superintendent	Dr. Brenda Tanner, Superintendent
Orange County Economic Development	Phil Geer, Director of Economic Development
Orange County Planning and Zoning	Josh Frederick, Planning and Zoning Director
Rapidan Service Authority	Tim Clemons
Orange County Sheriff	Mark Amos, Sheriff
Orange County Fire and EMS	Nathan Mort, Interim Fire and EMS Chief

Figure 1: Study Area



### 1.3.2 Public Outreach

The G-WAP steering Committee hosted a public Town Hall on June 29, 2017 at the Locust Grove Middle School. The purpose of this meeting was for the Steering Committee to update the citizens on area progress in terms of economic development, historic and cultural assets, transportation, planning and zoning, and utilities and infrastructure. As part of the transportation update, the purpose of the Route 3 Preservation Plan was described as well as an explanation of the study scope.

A corridor-wide citizen information meeting was held on October 26, 2017 at the Locust Grove Middle School to review the existing conditions assessment and opportunities for improvements along the Route 3 corridor. Members of the public were invited to provide comments on the preliminary findings and to suggest additional locations for improvements. Feedback received from the public was further reviewed during the recommendations development process.

A second and final citizen outreach effort took place on September 5, 2018 at the Locust Grove Middle School to reveal the final corridor recommendations. The meeting included a formal presentation from the study team as well as various displays describing the study results, and a citizen comment area. 25 County citizens attended this meeting.

## 2. Existing Conditions

### 2.1 Existing Land Use

Existing land use in the study corridor is predominantly residential with concentrations of commercial development. It varies by location but is generally characterized as rural or small town. The largest residential development, Lake of the Woods, is located approximately mid-way between the Culpeper and Spotsylvania County lines on the south side of Route 3 and includes approximately 3,575 single family homes.

The 2015 G-WAP is a strategic visioning and planning document for Orange County along Route 3, the county's primary development area. The plan provides a detailed look at the existing land use and zoning along the corridor.

#### Existing Land Use Key Findings

- The entire corridor is agricultural (which includes residential uses), single- and multi-family residential, or commercial.
  - Single-family residential and agriculture accounts for a majority in the land uses in the corridor; and
  - Commercial and agricultural makes up a majority of the frontage on Route 3.
- There are commercial uses spread throughout the corridor, but high densities are found at:
  - The approximate midpoint at the entrance to the Lake of the Woods neighborhood;
  - The intersection of Route 30 and Route 20 near the eastern edge of the corridor; and
  - The western end of the corridor, where the largest commercial development is found.
- The eastern edge of the study corridor is home to Wilderness Battlefield unit of the Fredericksburg & Spotsylvania National Military Park.

### 2.2 Existing Infrastructure

Within the five-mile study corridor Route 3 is a four-lane divided road running east-west. Route 3 is classified as principal arterial and access is partially controlled in the study area.

A field review was conducted on June 3, 2017 to review roadway and intersection configurations; identify unique roadway features; and observe traffic operations. There were several items along the corridor that may reduce capacity, level of service or safety; the items that are most prevalent along the corridor are listed below. For more information regarding existing infrastructure please refer to the Field Review in Appendix A.

- Crossovers with vertical separations between eastbound and westbound lanes
- Sight distance limitations for side street and driveway approaches
- Below standard access management
- Lack of turn lanes at crossovers or sub-standard turn lanes

#### 2.2.1 Bicycle and Pedestrian Facilities

There are no marked bicycle and pedestrian facilities along the Route 3 corridor in the study area however, there is a community of aging residents in the Lake of the Woods residential development that uses golf carts or similar transportation to cross Route 3 at Goodwin Drive to access the commercial land uses on the north side of Route 3.

### 2.3 Existing Access Points

The commercial access points along the Route 3 study corridor were inventoried and the distance between each point measured and reviewed for compliance with VDOT's Access Management Spacing Standards. As VDOT access management standards do not apply to residential access points. Figure 2 is a graphical presentation of the access points along the Route 3 corridor. Table 3 outlines access segments within the study corridor.

Table 3: Route 3 Study Corridor Access Segments

Access Segments			
Type	Compliant	Non-Compliant	Total
Northbound	4	4	8
Southbound	1	15	16
Total	5	19	24

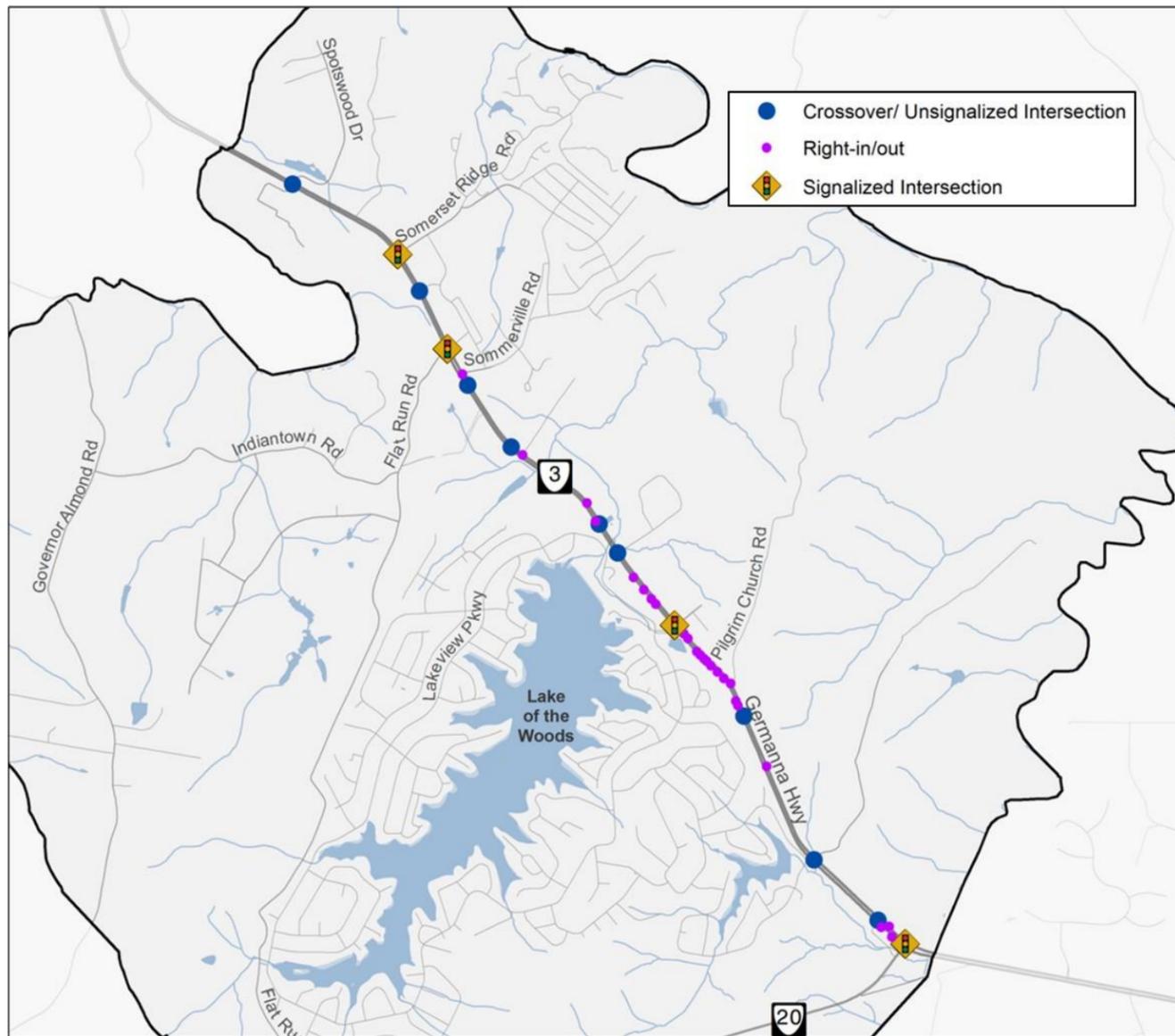
Due to the length and access control of the corridor, crossovers play a significant role in the function of the corridor and the preservation of corridor mobility. Many of these crossovers are non-compliant with VDOT design standards. Of the four signalized intersections, three are non-compliant. Two of the six unsignalized intersections in the study corridor are non-compliant. Table 4 further outlines the crossovers in the study corridor.

Table 4: Route 3 Study Corridor Crossovers\*

Crossovers			
Type	Compliant	Non-Compliant	Total
Signalized Intersection	1	3	4
Unsignalized Intersection	4	2	6
Median Crossover	2	1	3
Total	7	6	13

\*Compliance was calculated based on VDOT design standards, Table 2-2 of the Virginia Road Design Manual Appendix F, for access management of entrances and intersections.

Figure 2: Route 3 Access Points



## 2.4 Crash Analysis

An evaluation of corridor safety was conducted based on an analysis of crash summary information. A crash data analysis for the Route 3 study corridor over the latest seven years of available crash data (2011 through 2017) was obtained from VDOT’s Roadway Network System. Figure 3 illustrates the crash severity that occurred in the study corridor during this timeframe. Figure 4 illustrates the collision type within the study corridor during the same period. A key component of VDOT’s Arterial Preservation Program is to increase safety by eliminating unnecessary traffic signals or individual phases of signals. Figure 5 presents the crash densities along the corridor as they relate to the access points.

Analysis of existing conditions found that the crash rate is below the statewide average for principal arterials for most of the study corridor. The segment of the corridor between Goodwin Drive and the Spotsylvania County line has a crash rate that is greater than the statewide average for principle arterials. This segment includes the Route 3 intersection with Route 20, where the greatest density of crashes occur within the corridor. The number of crashes per segment is presented in Table 5.

Figure 3: Crash Severity

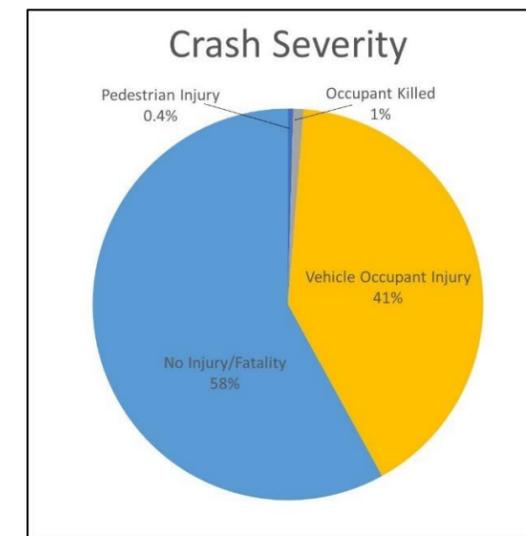


Table 5: Number of Crashes by Segment in the Route 3 Study Corridor

From/To	Segment Length	Number of Crashes (2011-2017)	Crashes Per 100-Million Vehicle Miles Traveled
Spotsylvania County line to Goodwin Dr	1.97	126	173.18
Goodwin Drive to Culpeper County line	3.09	105	52.44

### Key Findings

- In 58% of crashes, only property damage occurred with no injuries or fatalities. 1% of crashes resulted in fatal injury.
- Both angle crashes and off-road collisions accounted for more than 25% of all crashes. followed by rear end collisions. Deer-related accidents made up the majority of the remaining accidents.
- The highest crash rate was between the Spotsylvania County line and Constitution Highway (Route 20). The lowest rates were between Goodwin Drive and Somerville Road.
- Most crashes along the Route 3 corridor take place at traffic signal locations.

Figure 4: Collision Type

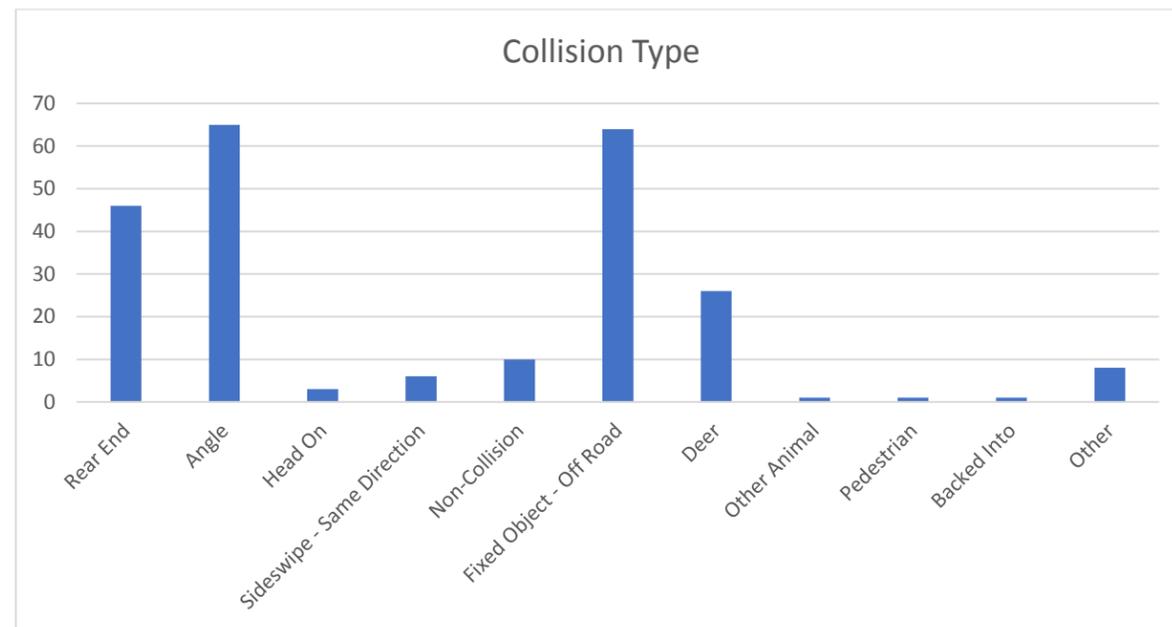
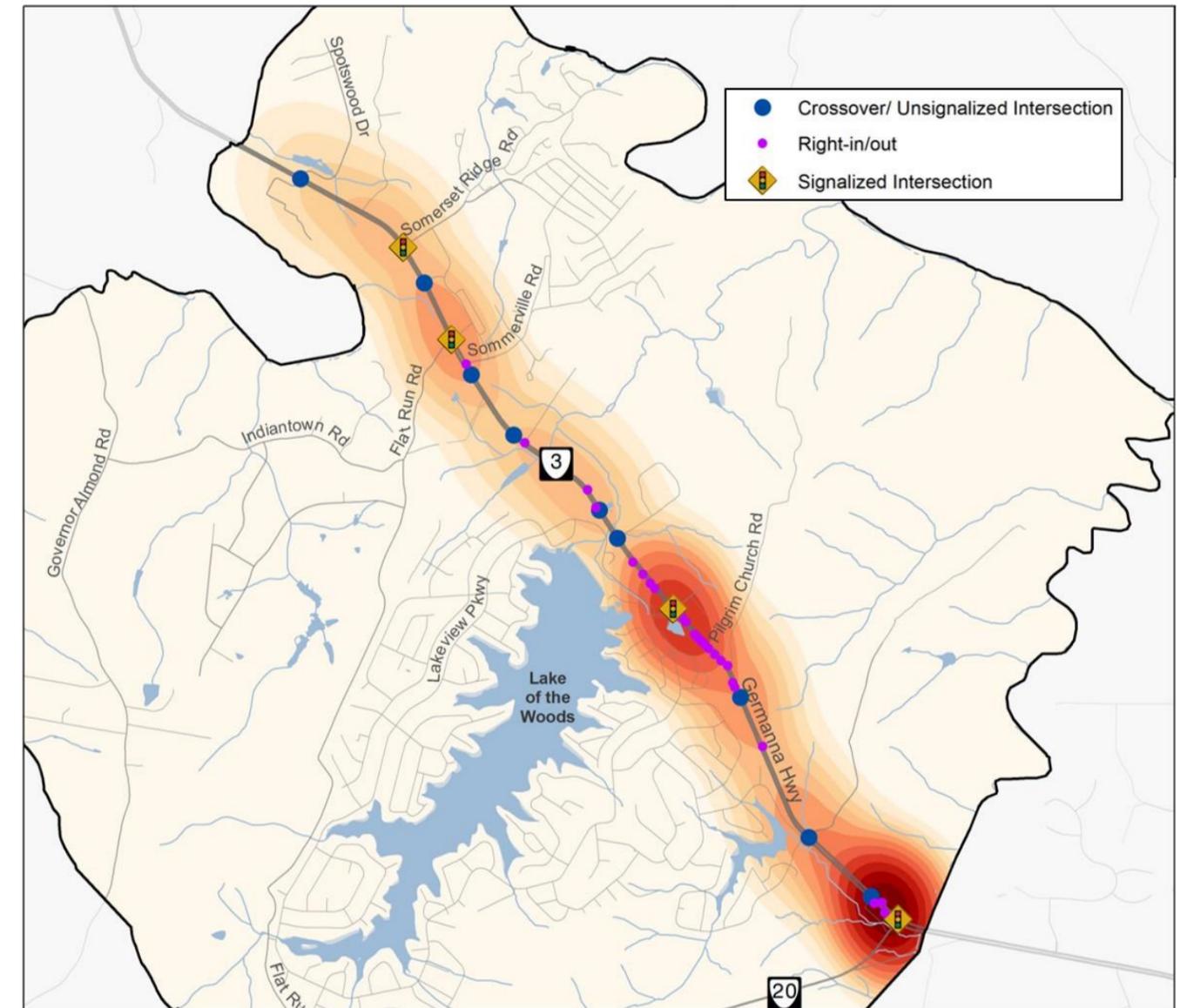


Figure 5: Crash Densities Related to Access Points



## 2.5 Existing Traffic Volumes

Existing peak hour traffic volumes were developed using turning movement counts collected on April 19<sup>th</sup>, 2017 at the intersections listed below. 48-hour speed and classification traffic counts were also conducted to supplement the turning movement counts. The AM and PM peak hours are the times of the highest traffic volumes in the study area. The AM peak hour for analysis is 7:45 to 8:45 and the PM peak hour is 4:45 to 5:45. The 2017 peak hour turning movement volumes are presented in detail in Appendix B.

- Route 3 / Spotswood Drive (unsignalized)
- Route 3 / Route 20
- Route 3 / Lake of the Woods Way
- Route 3 / Somerville Road (unsignalized)
- Route 3 / Flat Run Road
- Route 3 / Twin Drive (southern Walmart access – unsignalized)
- Route 3 / Somerset Ridge Road

## 2.6 Existing Traffic Operations

The peak hour intersection turning movement counts developed in the previous section were analyzed in Synchro using the Highway Capacity Manual (HCM) module for both the AM and PM peak hours. LOS is a qualitative measure used to relate the quality of traffic operations using letters A through F, A being the best and F being the worst. The operational analysis results for the study intersections are presented in Table 6. As shown in the table, the intersection of Route 3 and Route 20 currently operates at a LOS D during both peak hours and the intersection of Route 3 and Goodwin Drive operates at a LOS D during the PM peak hour. The remaining signalized intersection AM and PM peak hours operate at a LOS C or better. The analysis results for the unsignalized intersection do show that all of the turning movements from the minor approaches on the side streets are currently operating at a LOS B or better for both peak hours. Appendix C outlines the intersection levels of service in greater detail.

Table 6: Signalized Intersection LOS (2017 Existing Conditions)

Intersection	AM Peak Hour	PM Peak Hour
Route 3 and Route 20	D	D
Route 3 and Goodwin Drive	C	D
Route 3 and Somerville Road	A	A
Route 3 and Flat Run Road	C	C
Route 3 and Twin Drive (Walmart South)	A	A
Route 3 and Somerset Ridge Road	B	B
Route 3 and College Drive	A	A

### 3. Future Conditions

#### 3.1 Development of Growth Rates

The Route 3 corridor is likely to experience increased traffic based on a number of projects identified in the 2015 G-WAP. On the west end of the corridor, east of Somerset Ridge Road, the vision plan calls for a Town Center and mixed-use development adjacent to Route 3. Farther east, across from the Lake of the Woods development, the plan calls for “intensive planned commercial” on the north side of Route 3 just east of Goodwin Drive/Lake of the Woods Way and a Town Center on a yet-developed road north of Route 3. Additionally, the plan envisions a corporate campus planned development directly across Route 3 from Lake of the Woods.

In addition to the development that has not occurred, there will continue to be traffic generated by existing land uses along the corridor, including the National Park Service site at Route 3 and Route 20 and the Germanna Community College campus near the Culpeper County line. Expansion or growth of either of these land uses is likely to lead to additional traffic volume as well. A review of historic traffic trends may not capture this future growth. The following sections outline the steps taken to develop the future 2040 traffic volumes.

##### 3.1.1 Historical Average Annual Traffic Volumes and Travel Patterns

Historical average annual traffic volumes help establish a trend along the corridor and highlight places where traffic volume may increase. The study team used the VDOT historic traffic counts for two segments in the corridor. VDOT conducts traffic counts from sensors in or along streets and highways and other sources and compiles a blended two-way annual average daily traffic count. From this data, estimates of the number of vehicles that traveled each segment of road can be calculated. Daily vehicle miles traveled for specific groups of facilities and vehicle types are also calculated. Table 7 outlines these historic traffic volumes from 2007 to 2017.

Table 7: Historic Daily Two-Way VDOT Traffic Counts

Route 3 Segment		Year										
From	To	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spotsylvania County line	Route 20	25,000	25,000	25,000	26,000	24,000	24,000	25,000	25,000	26,000	27,000	27,000
Route 20	Culpeper County Line	13,000	13,000	14,000	14,000	13,000	13,000	13,000	16,000	16,000	17,000	17,000

Source: VDOT

Between 2007 and 2017, traffic counts show a slight increase on both segments of the study corridor. Between the Spotsylvania County line and Constitution Highway (Route 20), the annual growth rate over the 11-year period was 0.73% with the largest fluctuation between 2010 and 2011, where the volume dropped 7.7% from 26,000 to 24,000. Since 2012, the two-way traffic counts have shown a steady increase. Between Constitution Highway and the Culpeper County Line, the traffic volume increased 2.8% between 2007 and 2017. Volume remained relatively steady until 2014 when it jumped by 3,000 vehicles. The drops in traffic volume between 2010 and 2012 correspond to the economic recession and a nationwide decrease in average annual daily traffic (AADT). After 2013, with the recovery of the economy, traffic volumes on both segments began to increase to levels beyond those found prior to the recession.

##### 3.1.2 Annualized Background Growth Rate

A one percent non-compounded annual background growth rate was developed using the historic traffic counts, existing documentation, and coordination with VDOT and the Orange County Planning Department. This background growth rate represents the expected increase in traffic volumes that travel through Orange County and do not have an origin or destination along Route 3 within the study area. The trip generation for the study area (discussed in the following section) and this background growth rate will be added to the existing traffic volumes to develop the future 2040 traffic volumes.

#### 3.2 Projected Future Growth (2040) and Traffic Volumes

##### 3.2.1 Future Land Use and Approved Development

Future land use for the study area is included in the adopted 2015 G-WAP. This data, along with the trip generation rates shown in the ITE Trip Generation Manual were used to develop future traffic volumes at key intersections along the corridor.

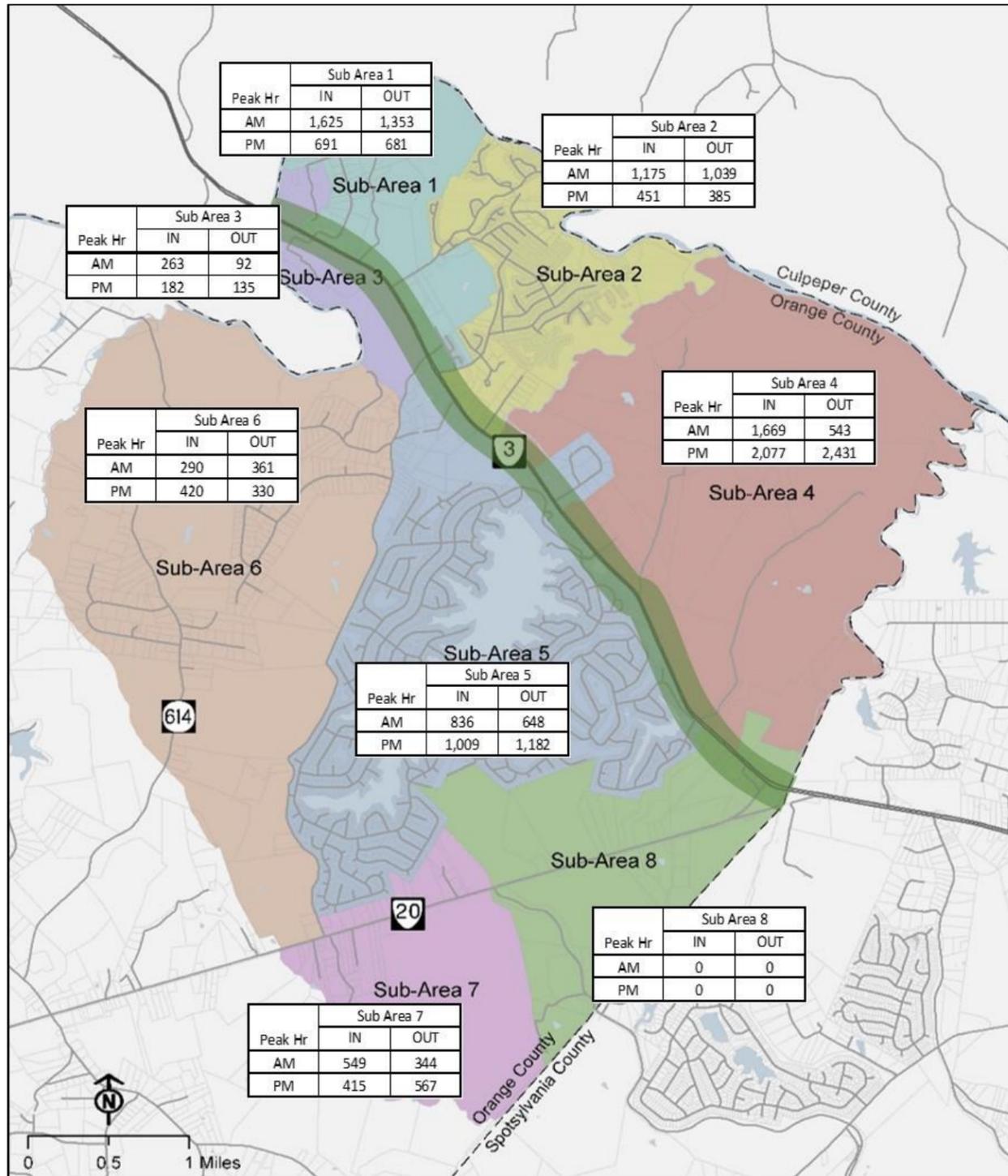
##### 3.2.2 Trip Generation and Distribution

The study team evaluated the future land use for each sub-area shown in the G-WAP that have a direct effect on the turning movement counts used for the existing and future analyses. Using the equations for the various land uses in the Institute of Transportation Engineers Trip Generation Manual, specific AM and PM peak trips were calculated for each sub-area. These trips were added to the calculated background growth for the corridor and then used in the year 2040 analyses.

The trips generated from the future land use and approved development were distributed using multiple methods and sources of information. For sub-areas with multiple uses and potential internal interaction, the National Cooperative Highway Research Program, Report 684 methodology and spreadsheet was used to estimate the internal capture percentages. This methodology approximates the interaction of trips between different land use types in the same area that may result in a single person making multiple stops within an area rather than each trip being generated by a separate person. The AM and PM peak hour trip generation for the planned development shown in the G-WAP are shown in Figure 6. Detailed tables for the trip generation for each sub-area are presented in Appendix D.

Traffic was then distributed at the study intersections based on the existing turning movement counts. With consideration for location, potential growth areas and infrastructure off Route 3, engineering judgement was used to make reasonable adjustments to the trip distribution. The future turning movement volumes are outlined in Appendix E for the minimally managed condition and Appendix G for the condition with the recommendations in place.

Figure 6: Trip Generation for Future Land Use in Germanna-Wilderness Area Plan



### 3.2.3 Future (2040) Traffic Volumes

Traffic volumes for the year 2040 were developed based on the trip generation discussed in the previous section and the background growth of one percent for the thru traffic along the Route 3 corridor. The projected AADT for 2040 at various point within the study area is listed in Table 8. These estimations are based on a one percent non-compounded annual growth of ADTs published in 2017 VDOT’s traffic counts. The future AADTs do not include the vehicles associated with the future land use as it is not known if or when the development will occur.

Table 8: Future (2040) Traffic Volumes

Route 3 Segment		Year	
From	To	2017	2040
Spotsylvania County line	Route 20	27,000	33,200
Route 20	Culpeper County Line	17,000	20,900

## 4. Future (2040) Traffic Conditions

### 4.1 Future No-Build Traffic Operations and Deficiencies

The following section details the deficiencies of the Route 3 corridor under the 2040 No-Build conditions. Although it is not known when the full build-out of the future land use shown in the G-WAP will occur, the operational analysis for the 2040 scenarios includes the future traffic volumes for the full build-out of development to maximize the project life span for the recommended improvements.

The future land use densities shown in the G-WAP for the sub-areas on the east side of Route 3 (Sub-areas 1, 2, and 4) will increase the peak hour traffic volumes by approximately 7,400 vehicles in the AM peak hour and 6,700 vehicles in the PM peak hour. The additional trips for the sub-areas on the west side of Route 3 (sub-areas 3, 6, 5, 7, and 8) will increase peak hour traffic volumes by approximately 4,400 vehicles and 3,900 vehicles for the AM and PM peak hours, respectively.

These enormous increases in traffic volumes, along with the background growth for through-vehicles would completely gridlock the Route 3 corridor during peak hours under the 2040 No-Build scenario. Conventional signalized intersections do not have enough capacity to operate efficiently with extremely large traffic volumes and at unsignalized intersections the through-movements along Route 3 would not allow large enough gaps in traffic for turning movements to occur. Crashes would rise due to queue lengths extending into mainline traffic and the increases in stop-and-go traffic due to more congestion.

Operational analysis results for the signalized intersections along Route 3 for the 2040 No-Build scenario are presented in Table 9. It is expected that the amount of traffic generated at the intersection with the Post Office Road will warrant a signal in the future so this location was added to the list of study intersections. As shown in the table, all of the intersections are expected to operate at a LOS F for one or both peak hours except the Twin Drive intersection, the Somerset Ridge Road intersection, and the College Drive intersection. The detailed LOS results in Appendix F show that the minor side-street turning movements at the intersections of Route 3 with Somerville Road will all operate at a LOS F for both peak hours; the exiting right-turn at Twin Drive will operate at a LOS C during the AM and PM peak hours; and the minor side street movements will operate at LOS E or LOS F at the College Drive intersection during the AM and PM peak hours.

Table 9: 2040 No-Build Signalized Intersection LOS

Intersection	AM Peak Hour	PM Peak Hour
Route 3 and Route 20	F	F
Route 3 and Post Office Road	F	F
Route 3 and Goodwin Drive	F	E
Route 3 and Somerville Road	F	C
Route 3 and Flat Run Road	F	F
Route 3 and Twin Drive (Walmart South)	A	A
Route 3 and Somerset Ridge Road	D	B
Route 3 and College Drive	D	A

### 4.2 Recommended Improvements Analyses

Analyses of the recommended improvements were conducted to evaluate the projected future traffic demand discussed in Chapter 3 of this document. Chapter 5 details the recommended improvements and operational and safety benefits of the recommendations. Recommendations were initially reviewed using VDOT’s Junction Screening Tool (VJuST) to determine which innovative intersections may be useful in facilitating the through traffic along Route 3 while also providing efficient access along the corridor.

### 4.3 Results of Operational Analyses for Recommended Improvements

Capacity analyses for the recommended improvements at signalized and un-signalized intersection were performed using Synchro in accordance with VDOT Traffic Operations and Safety Manual (TOSAM). Recommendations consisted mainly of alternative intersections developed using VJuST. Some of the alternative intersections are multiple intersections that function together as one system. Synchro does not currently have a method to analyze alternative intersections; however, Chapter 23 of the Highway Capacity Manual (HCM) outlines methodology for calculating delays and LOS by using travel time and the appropriate delay(s) through the alternative intersections. The HCM method provides a better way of comparing alternative intersections with the traditional intersection configurations that occupy the corridor today. Table 10 shows the LOS and delay values of typical signalized and un-signalized intersection and values used as part of the HCM method.

Table 10: LOS Delay Values for Signalized and Unsignalized Intersections, Based on HCM Method

LOS	Standard Signalized Intersection LOS Criteria per HCM	Standard Unsignalized Intersection LOS Criteria per HCM	LOS Criteria based on HCM Chapter 23 for Alternative Intersections
	Delay (s)	Delay (s)	Delay or Estimated Travel Time (s)
A	≤10	≤10	≤10
B	10-20	10-15	10-20
C	20-35	15-25	20-35
D	35-55	25-35	35-55
E	55-80	35-50	55-80
F	>80	>50	>80

Table 11: Recommended Improvement Analysis Intersection LOS

Intersection	AM Peak Hour	PM Peak Hour
Route 3 and Route 20 (DDI - North)	B	C
Route 3 and Route 20 (DDI - South)	B	C
Route 3 and Post Office Road	B	C
Route 3 and Goodwin Drive	C	B
Route 3 and Flat Run Rd/Somerville Rd	F	C
Route 3 and Twin Drive (Walmart South)	A	A
Route 3 and Somerset Ridge Road	D	B
Route 3 and College Drive	D	A

## 5. Alternatives and Recommendations

### 5.1 Route 3 Corridor Recommendations

Future traffic volumes and operating conditions show that the Route 3 corridor needs improvements to ensure capacity and safety within the corridor. While some of these improvements may be driven by development, many improvements will be driven by regional growth and the need to maintain capacity of the corridor. Additional improvements such as crossover closings may be implemented immediately to increase safety through access management. Based on capacity analyses of current and future conditions and a review of current corridor infrastructure, a “toolbox” of improvements were developed for the Route 3 study area. These include:

- Remove existing crossover (based on inadequate spacing/grade/etc.)
- Upgrade existing crossover to meet VDOT standards.
- Convert existing crossover to directional median to allow only certain movements.
- Install alternative intersection concepts.
- Consolidate existing access points based on VDOT access management standards.

A primary focus for this study was the existing traditional signalized intersections. As many of these traditional intersections will reach their operational limits, there is a need for new options. It is not intended for a conventional signalized intersection to be a traffic control device for this corridor. Instead, alternative intersections and access management techniques will be evaluated for any future project and development. Below is a list of alternative intersection designs that are included in the VDOT Arterial Preservation Plan toolbox that were evaluated as potential recommendations. Some of the alternative designs were not suitable for recommendation due to the location traffic volumes, concept’s principles, associated costs and/or Right-of-Way limitations. The concepts listed below were evaluated using VDOT’s Junction Screening Tool (VJuST) to screen individual concepts at every location to determine the most effective options for analysis and recommendation.

- Median U-turn intersection (MUT)
- Restricted crossing U-turn intersection (RCUT)
- Continuous green T (CGT)
- Quadrant road (QR)
- Roundabout
- Displaced left turn (DLT)
- Grade separation
- Single point urban interchange (SPUI)
- Diverging diamond interchange (DDI)

It is well documented that as the number of access points increase along a corridor, the running speed decreases and the number of crashes increase. VDOT’s Access Management Standards are an effort to ensure that development does not create undue burdens on a corridor. Given that the study segments of Route 3 are of vital importance to the state and region, it is important to ensure the safety and throughput capacity of the corridor.

Finally, recommendations were formulated by analyzing the future volumes from both planned and potential developments along the study corridor. However, corridor AADT, thru growth, crash history, and future development were used to develop recommendations. Project stakeholders and the public were engaged through

the project process to identify the most preferred recommendations. The following reflects a written description of the corridor recommendations for intersections only. Figure 7 presents a summary of the recommendations along the Route 3 Corridor. Graphical displays of complex recommendations are shown in Figure 8 through Figure 12. Cost estimates were developed using the VDOT TMPD Cost Estimate Spreadsheet tool and the figures include the range of costs in 2018 dollars for each recommendation.

It is intended that that the recommendations described below and presented in Figures 8 through 12 will accommodate the full build-out of development shown in the G-WAP as well as the increased vehicular through-put on Route 3. As part of this Route 3 Arterial Preservation Plan, it is recommended that no additional traffic signals be installed other than those listed in the below recommendations. It is also recommended that no additional crossover locations be constructed within the Route 3 median beyond the Preservation Plan recommendations.

#### **Intersection #1: Route 3 with Route 20**

**Short-term Recommendations:** *The short-term recommendation is to construct a signalized CGT intersection with an acceleration lane for vehicles turning left from Route 20 to westbound Route 3. This recommendation also includes the consolidation of commercial entrances on eastbound Route 3 within the intersection influence area. Dual left-turn lanes should be constructed for westbound Route 3 and U-turn areas should be constructed both east and west of the main intersection. It is also recommended that in the short-term, Orange County take steps to preserve the right-of-way for the realignment of Route 20 and the proposed DDI (long-term recommendation)*

**Long-term Recommendations:** *It is recommended that Route 20 be realigned approximately one half-mile west and the existing Route 20 turned into a cul-de-sac to eliminate the intersection with Route 3. A DDI should be constructed as part of that realignment. This configuration will require coordination with the National Park Service and additional study to meet NEPA requirements.*

**Long-term Option:** *As part of the realignment of Route 20, construct a grade-separated crossing of Route 3 that links to the Connector Roadway parallel to Route 3 that is recommended as part of the G-WAP.*

**Right-of-Way Impacts:** *Both the CGT intersection and the U-turns are within the existing right-of-way. The DDI and Route 20 realignment will require substantial land acquisition.*

#### **Intersection #2: Route 3 with Post Office entrance**

**Short-term Recommendations:** *An unsignalized RCUT with single lane U-turn areas east and west of the main intersection should be constructed. The commercial entrances on westbound Route 3 should be consolidated within the intersection influence area.*

**Long-term Recommendations:** *A second U-turn lane should be added at the western U-turn area. Traffic signals should be installed at the main intersection and at the western U-turn area. The post office approach should be widened to triple rights. A new inter-parcel roadway should be constructed (by others) that ties into the existing roadway adjacent to the post office.*

**Right-of-Way Impacts:** *There are minimal impacts at the main intersection. With the full build-out of U-turn areas, loons will be required, and the collector roadway will require land acquisition.*

**Intersection #3: Route 3 with Goodwin Drive**

Short-term Recommendations: The intersection should be reconfigured to create an RCUT with a single-lane U-turn east and west of the main intersection. Signalization will be reviewed during the design process to determine the optimal location. Commercial entrances on eastern Route 3 with the intersection influence area should be consolidated. Investigate opportunities for the construction of a golf cart crossing that connects the Lake of the Woods residents to the commercial properties on the opposite side of Route 3.

Long-term Recommendations: A second U-turn lane should be constructed for the west U-turn area. Signalization will be evaluated and modified as necessary. Goodwin Drive should be connected to future developments on the east side of Route 3 (by others).

Right-of-Way Impacts: There are minimal impacts at the main intersection. A full build out of the U-turn areas will require loans. The Goodwin Drive extension will require land acquisition.

**Intersection #4: Route 3 with relocated Flat Run Road  
and  
Intersection #5: Route 3 with existing Flat Run Road**

Intermediate-term Recommendations: It is recommended that Flat Run Road be relocated approximately 0.3 miles east of its existing location and that Somerville Road be realigned (by others) to the new intersection. Additionally, Route 603 should be extended to intersect with relocated Flat Run Road. The existing Flat Run Road can then be turned into a cul-de-sac south of Flat Run Church with the exact location to be determined in consultation with the church. Additionally, VDOT should cul-de-sac the existing Flat Run Road north of the Meadows Farms Golf Course and abandon the stretch of road within the course limits. At Route 3, an RCUT, permitted left turns from Route 3 and signalize the main intersection and west U-turn areas. Finally, it is recommended that the existing Somerville Road intersection with Route 3 be closed.

Long-term Recommendations: Traffic volumes should be monitored; additional modifications may be needed in the long-term as development occurs.

Right-of-Way Impacts: The relocation and realignment of existing intersection of Route 3 and Flat Run Road will require substantial land acquisition along Route 3. Both realignments of Flat Run Road and Somerville Road will also require substantial land acquisition and possible utility relocations.

**Intersection #6: Route 3 with Somerset Ridge Road**

The long-term recommendation for this intersection is to monitor traffic volumes. Additional modifications may be needed in the long term as development occurs in the immediate vicinity.

**Intersection #7: Route 3 with Hampton Lane**

Long-term Recommendations: Directional crossover permitting left-turns from eastbound Route 3 should be constructed. Additionally, a right-turn lane for westbound Route 3 should be added. Hampton Lane should be improved and an eastbound right-turn lane should be added on Route 3 (by others).

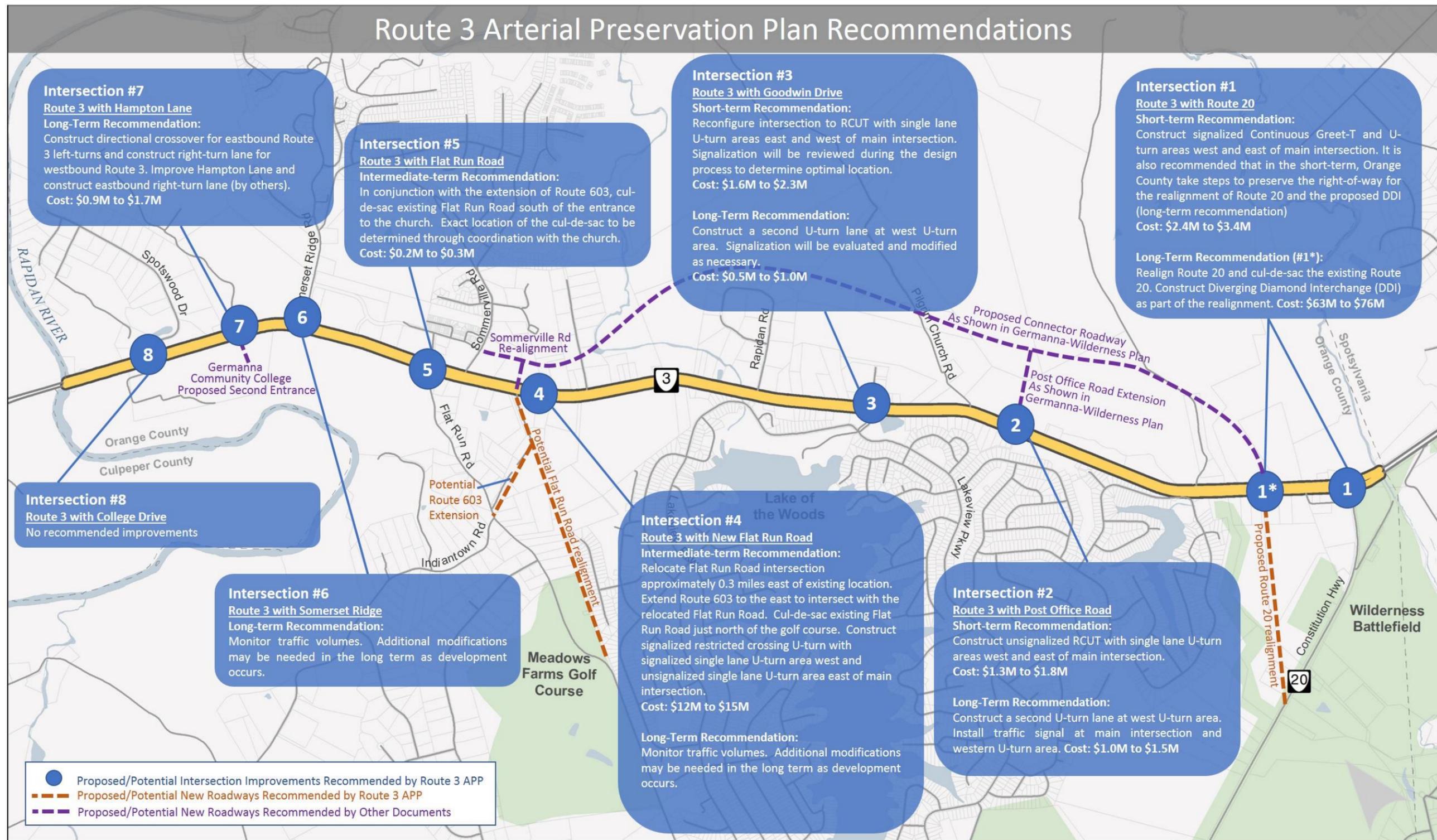
**Intersection #8: Route 3 with College Drive**

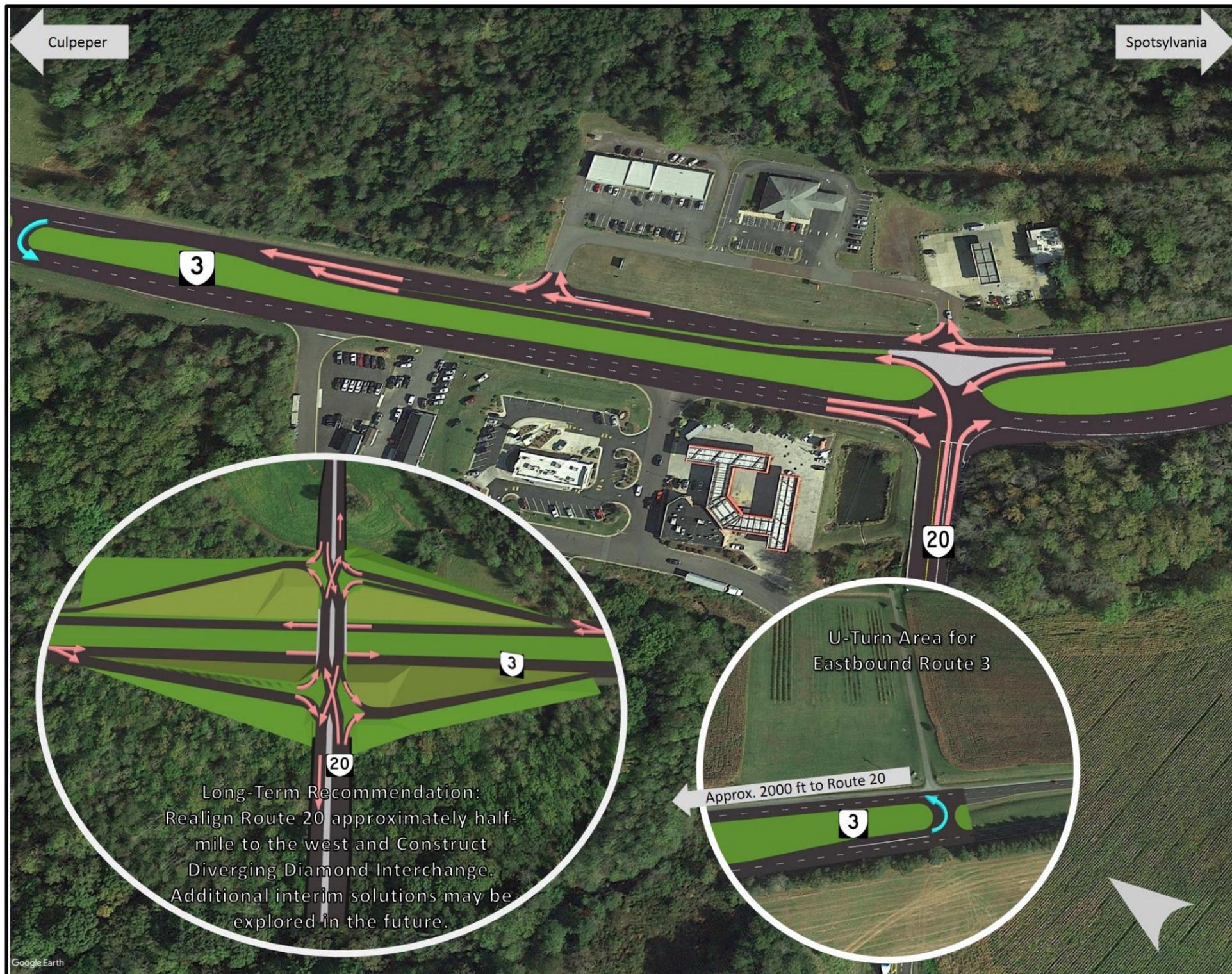
There are no recommendations for this intersection.

## 5.2 Possible Funding Sources

Implementation of the recommended improvements will require funding sources. The VDOT Smart Scale Program is a process which invests in projects that meet the most critical transportation needs in the state. Projects are evaluated based on improvements in certain categories such as congestion and safety. At the corridor level, more specific strategies and operational improvements can be assessed in studies and implemented using a variety of funding sources, including Federal funding streams such as the Surface Transportation Program (STP), National Highway System (NHS) funds, and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program, Revenue Sharing, Highway Safety Improvement Program (HSIP), as well as through state or local funding or other discretionary funding sources. For larger projects, particularly capacity-adding projects, demand management and operational strategies should also be analyzed for incorporation into the project as part of the project development process. The recommendations in Figure 8 through Figure 12 include improvement types which correspond with the categories required for specific funding sources.

Figure 7: Summary of Route 3 Arterial Preservation Plan Recommendations





**Route 3 Arterial Preservation Plan  
Figure 8  
Intersection #1: Route 3 and Route 20  
Continuous Green-T (CGT)  
Improvement Type: Congestion, Economic  
Development**

**Short-Term Recommendation:** Construct signalized CGT with acceleration lane for vehicles turning left from Route 20 to westbound Route 3. Consolidate commercial entrances on eastbound Route 3 within the intersection influence area. Construct dual left-turn lanes for westbound Route 3. Construct U-turn areas east and west of main intersection (pictured left). It is also recommended that in the short-term, Orange County take steps to preserve the right-of-way for the realignment of Route 20 and the proposed DDI (long-term recommendation)

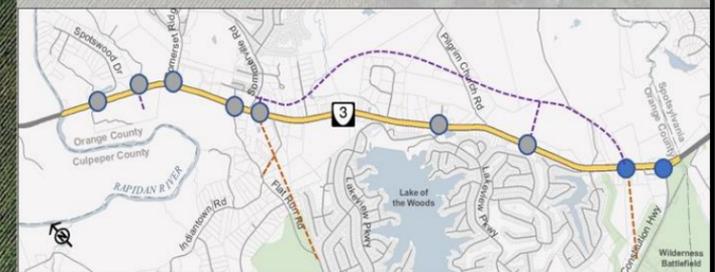
**Long-Term Recommendation:** Realign Route 20 approximately half-mile west and cul-de-sac the existing Route 20 to eliminate the intersection with Route 3. Construct Diverging Diamond Interchange (DDI) as part of the realignment. (DDI inset). Configuration will require coordination with National Park Service and additional study to meet NEPA requirement.

**ROW Impacts:** CGT acceleration lane and U-turns are within ROW. DDI and Route 20 realignment will require substantial land acquisition.

**Cost:**  
Short-Term: \$2.4M to \$3.4M  
Long-Term: \$63M to \$76M

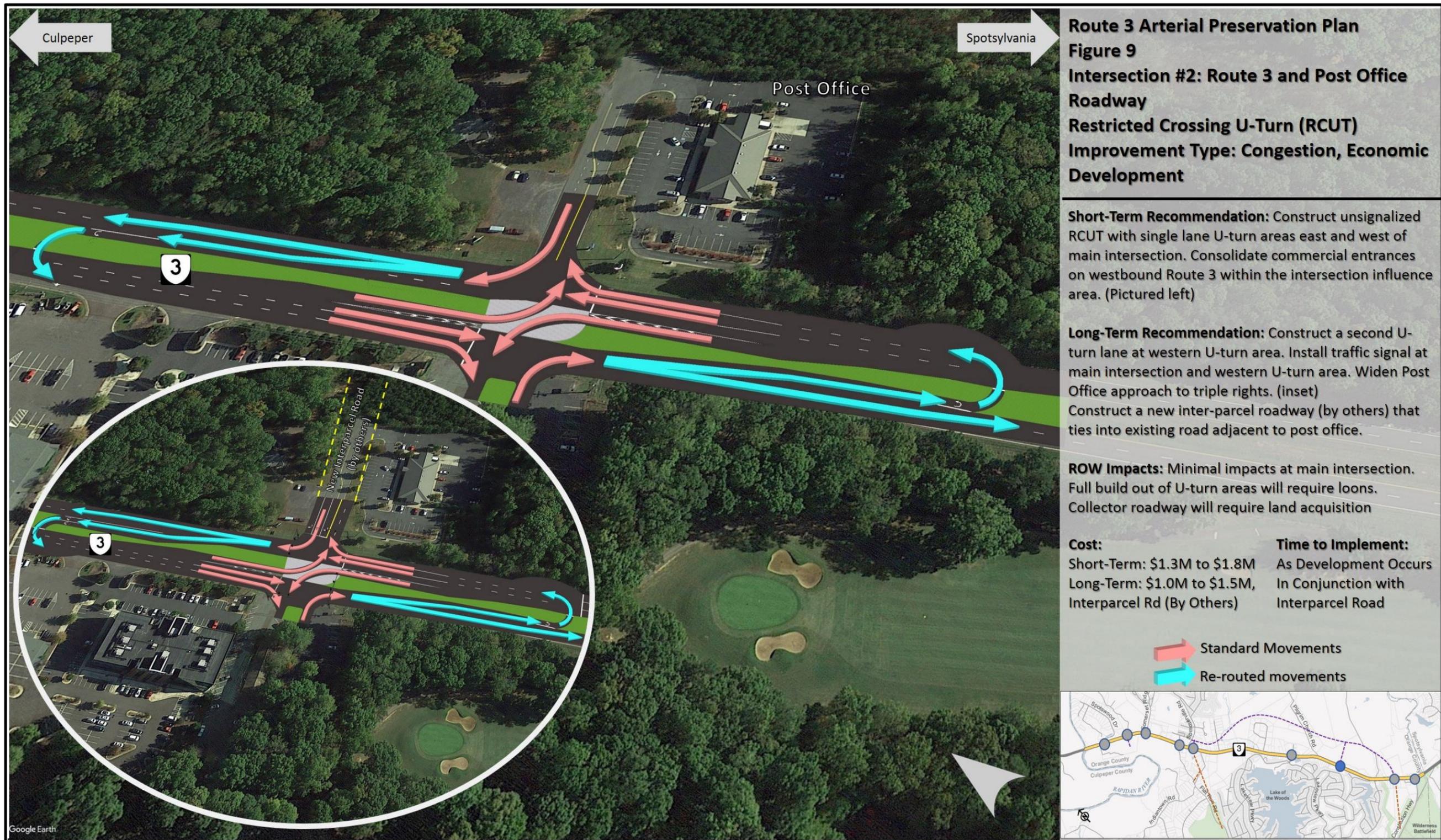
When Funding is Available  
As Development Occurs

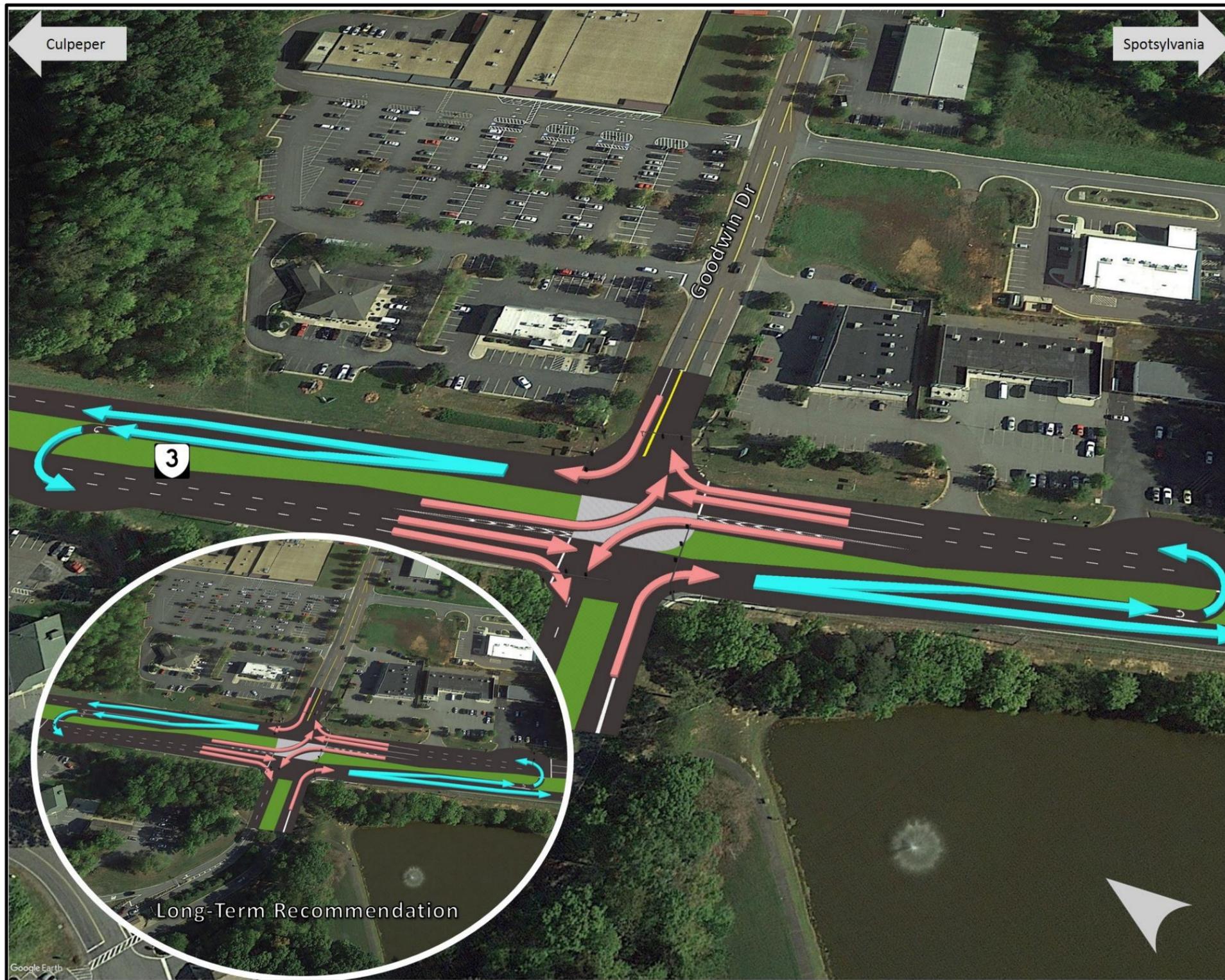
Standard Movements  
Re-routed movements



Long-Term Recommendation:  
Realign Route 20 approximately half-mile to the west and Construct Diverging Diamond Interchange. Additional interim solutions may be explored in the future.

U-Turn Area for Eastbound Route 3  
Approx. 2000 ft to Route 20





**Route 3 Arterial Preservation Plan**  
**Figure 10**  
**Intersection #3: Route 3 and Goodwin Drive**  
**Restricted Crossing U-Turn (RCUT)**  
**Improvement Type: Congestion, Economic Development**

**Short-Term Recommendation:** Reconfigure intersection to RCUT with single lane U-turn areas east and west of main intersection. Signalization will be reviewed during the design process to determine optimal location. Consolidate commercial entrances on eastern Route 3 within the intersection influence area. (Pictured Left)

**Long-Term Recommendation:** Construct a second U-turn lane for west U-turn area. Signalization will be evaluated and modified as necessary (inset). Extend Goodwin Drive to connect to future developments on east side of Route 3. (by others)

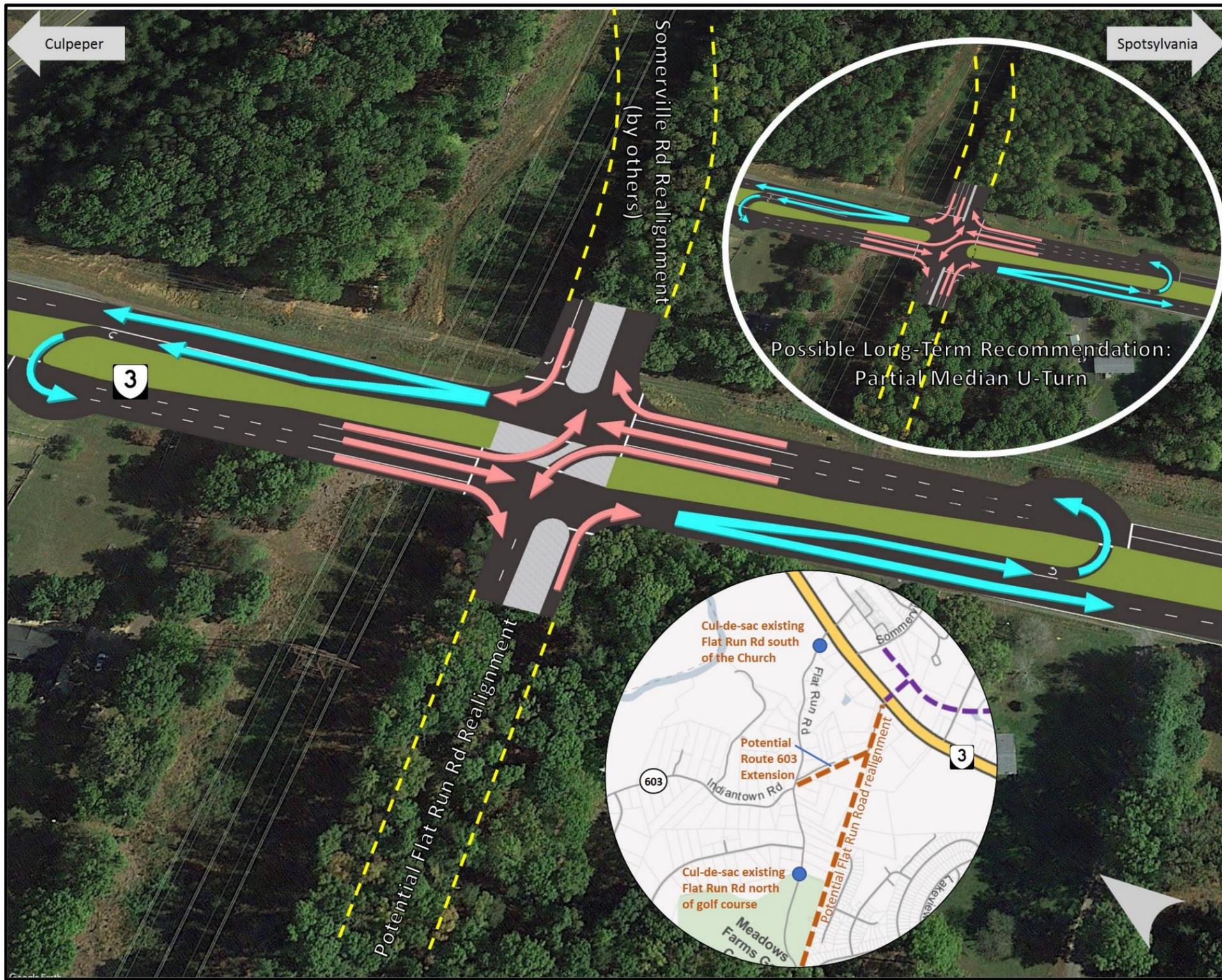
**ROW Impacts:** Minimal impacts at main intersection. Full build out of U-turn areas will require loons. Goodwin Drive will require land acquisition

**Cost:**  
 Short-Term: \$1.6M to \$2.3M  
 Long-Term: \$0.5M to \$1.0M

**Time to Implement:**  
 As Development Occurs  
 In Conjunction with Extend Goodwin Dr (By Others) Goodwin Dr Extension

Red Arrow Standard Movements  
 Blue Arrow Re-routed movements





**Route 3 Arterial Preservation Plan  
Figure 11  
Intersection #4, #5: Route 3 and Flat Run Road  
Restricted Crossing U-Turn (RCUT)  
Improvement Type: Safety, Congestion,  
Economic Development, Land Use**

**Intermediate-Term Recommendation:** Relocate Flat Run Road intersection approximately 0.3 miles east of existing location. Realign Somerville Road (by others) and Flat Run Road to new intersection. Extend Route 603 to the east to intersect with the relocated Flat Run Road (See Inset). Cul-de-sac existing flat run road just south of the church and coordinate with the church to determine the exact location of the cul-de-sac. Just north of the golf course, cul-de-sac existing Flat Run Road and abandon the portion of the roadway within the golf course limits. Construct restricted crossing U-Turn permitting left-turns from Route 3. Signalize main intersection and west U-turn areas. (pictured left) Close existing Somerville Road intersection with Route 3.

**Long-Term Recommendation:** Monitor traffic volumes. Additional modifications may be needed in the long term as development occurs.

**ROW Impacts:** Relocation and realignment of existing intersection of Route 3 with Flat Run Road will require substantial land acquisition along Route 3. Both realignments of Flat Run Road and Somerville Road will require substantial land acquisition and possible utility relocation.

**Cost:**  
 Intermediate-Term: \$12 to \$15M  
 Somerville Rd Realignment (By Others)

**Time to Implement:**  
 When Funding is Available  
 As Development Increases

Standard Movements  
 Re-routed movements





**Route 3 Arterial Preservation Plan  
Figure 12  
Intersection #7: Route 3 and Hampton Ln  
Directional Median  
Improvement Type: Economic  
Development**

**Long-Term Recommendation:** Construct directional crossover permitting left-turns from eastbound Route 3. Construct right-turn lane for westbound Route 3. (pictured left) Improve Hampton Lane and construct eastbound right-turn lane on Route 3 (by others)

**ROW Impacts:** Crossover is within ROW. Right turn lane will require minimal ROW acquisitions.

**Cost:**  
\$0.9M to \$1.7M  
Hampton Ln Improvement  
(By Others)  
Germanna Community  
College Second Entrance  
(By Others)

**Time to Implement:**  
As Development Occurs

Standard Movements



# Route 3 Arterial Preservation Plan Orange County

## Appendices

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## Appendix A: Field Review

Conducted: June 3, 2017

Objectives:

1. Review roadway and intersection configurations
2. Identify deficiencies and areas of concerns
  - a. Sight distance or grade issues
  - b. Identify unique roadway features
3. Observe traffic operations

Findings:

### Route 3 & Route 20 Intersection

- WB turn lane queueing into thru lane
- Lack of WB right-turn lane hinders thru traffic
- Limited queuing for EB and WB thru movements



### Route 3 from Route 20 to Lake of the Woods

- Access management challenges east of Lake of the Woods Way
- Sight distance limitations leaving Post Office



### Route 3 & Lake of the Woods Way Intersection

- Two access points in close proximity along WB Route 3
- Limited queuing for EB and WB thru
- Side street traffic clearing each cycle



### Route 3 from Lake of the Woods Way to Flat Run Road

- Multiple crossovers with severe grade differentials
- Limited sight distances due to steep grades and curves
- Some access management challenges



### Route 3 & Flat Run Drive Intersection

- Sight distance limitations for side street approaches
- Limited queueing on all approaches



### Route 3 & Somerest Ridge Road & Wal-Mart Intersection

- Sight distance limitations for Somerest Ridge Rd.
- Acceptable operations of traffic signal
- Grade differential at east Wal-Mart entrance



### Route 3 from Somerest Ridge Road to Culpepper Co.

- No significant concerns in this area



## Appendix B: 2017 Intersection Volumes

Spotswood Drive			Somerset Ridge Road			Twin Drive (Walmart South)			Germanna Heights Drive			Somerville Road			Goodwin Drive			Driveway																		
(1)	(0)	(10)	4	(5)	(41)	(81)	60	(70)	(58)	100	(125)	(4)	(61)	(115)	8	(16)	(30)	26	(96)	(67)	(134)	(97)	65	(149)	(17)	(22)	(29)	27	(59)							
1	0	4	445	(474)	29	79	482	(442)	51	491	(454)	4	33	80	500	(500)	55	514	(548)	18	27	33	424	(509)	17	8	11	526	(827)							
↶	↓	↷	↶	↷	↶	↶	↷	↶	↶	↷	↶	↶	↓	↷	↶	↷	↶	↶	↷	↶	↓	↷	↶	↷	↶	↓	↷	↶	↷							
(1)	2	↶	↷	↶	(76)	17	↶	↷	(68)	21	↶	(5)	1	↶	↷	↶	↷	(61)	38	↶	↷	↶	(37)	29	↶	↷	↶	↷	↶							
(737)	301	→	0	5	(698)	293	→	→	(711)	351	→	(609)	310	→	87	11	50	(754)	440	→	→	→	(534)	359	→	→	→	98	35	244	(648)	586	→	78	14	301
(1)	15	↷	(12)	(27)			↷	↷			↷	(97)	40	↷	(75)	(17)	(30)						(159)	43	↷	(68)	(59)	(162)	(108)	21	↷	(150)	(19)	(262)		
College Drive									Flat Run Road						Lake of the Woods Way			Route 20																		

XX = AM  
(XX) = PM

# Appendix C: 2017 Intersection Operations

Overall Intersection	Overall Intersection	Overall Intersection	Overall Intersection	Overall Intersection	Overall Intersection	Overall Intersection
0.7-A (0.5-A)	11.5-B (10.9-B)	0.7-A (0.8-A)	29.5-C (30.8-C)	0.6-A (0.2-A)	29.7-C (46-D)	35.8-D (50.2-D)
Spotswood Drive	Somerset Ridge Road	Twin Drive (Walmart South)	Germanna Heights Drive	Somerville Road	Goodwin Drive	Access Road
(13.2-B) (13.2-B) (13.2-B) ↶ 0-A (0-A) 14-B 14-B 14-B ↶ 0-A (0-A) ↷ ↘ ↶ ↷ 8.2-A (9.2-A) (8.3-A) 8.5-A ↷ ↶ ↷ (0-A) 0-A → 13.5-B 13.5-B (0-A) 0-A ↷ (12.5-B) (12.5-B)	(22-C) (24-C) ↶ 10.8-B (12.7-B) 19.6-B 21.5-C ↶ 12.9-B (5.9-A) ↷ ↷ (6-A) 6.2-A ↷ (5.9-A) 6.1-A →	(10-B) ↶ 0-A (0-A) 10.1-B ↶ 0-A (0-A) ↷ ↷ (9-A) 9-A ↷ (0-A) 0-A →	(38.2-D) (49-D) (49-D) ↶ 19.4-B (18.7-B) 34.2-C 39.4-D 39.4-D ↶ 24.2-C (28.4-C) ↷ ↘ ↶ ↷ 42.7-D (51.2-D) (61.5-E) 46.5-D ↷ ↶ ↷ ↷ (28.4-C) 27.1-C → 40.9-D 40.9-D 40.9-D (23.1-C) 23.8-C ↷ (46.6-D) (46.6-D) (46.6-D)	(10.4-B) ↶ 0-A (0-A) 10.5-B ↶ 0-A (0-A) ↷ ↷ (0-A) 0-A →	(65.5-E) (65.5-D) (54.1-D) ↶ 18.4-B (23-C) 42.2-D 42.2-D 41.7-D ↶ 21.4-C (46-D) ↷ ↘ ↶ ↷ 38.5-D (59.8-E) (68.4-E) 45.7-D ↷ ↶ ↷ ↷ (46-D) 27.9-C → 38.3-C 38.3-C 34.6-C (38.9-D) 24.3-C ↷ (65-E) (65-E) (55.4-E)	(68.6-E) (68.6-E) (68.6-E) ↶ 21.3-C (28.6-C) 55.8-E 55.8-E 55.8-E ↶ 21.3-C (49.3-D) ↷ ↘ ↶ ↷ 54.5-D (95.5-F) (72-E) 60.2-E ↷ ↶ ↷ ↷ (49.3-D) 33.7-C → 50.1-D 46.8-D 48.6-D (0.1-A) 0-A ↷ (69-E) (56.8-E) (57.8-E)
College Drive			Flat Run Road		Lake of the Woods Way	Route 20

XX = AM  
(XX) = PM

# Appendix D: Future Land Use Trip Generation

## Sub Area 1 – Full Build-Out Trip Generation

Site	Commercial		Residential		Notes	AM Percent	PM Percent	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips			
	Acres	GFA (SF)	Acres	Units					Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress	
Governor Spotswood Estates	0	0		9	Low-Turnover	80%		0	0	0	0	0	0	0	0	0	0	
					Medium-Turnover	10%		0	0	0	0	0	0	0	0	0	0	
					High-Turnover	10%		0	0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	0
					Low Density Residential	100%		9	86	43	43	7	2	5	9	6	3	
					Internal Capture	0%			0	0	0	0	0	0	0	0	0	
					<b>Total</b>				<b>86</b>	<b>43</b>	<b>43</b>	<b>7</b>	<b>2</b>	<b>5</b>	<b>9</b>	<b>6</b>	<b>3</b>	
Signature Station		237,500		230	Low-Turnover	90%		213,750	7,709	3,855	3,855	436	304	132	716	291	425	
					Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	0	
					High-Turnover	10%		23,750	18,397	9,199	9,199	1,596	808	788	1,312	664	648	
					Townhomes	High Density Residential	100%		230	1,433	717	717	109	20	89	131	86	45
					Low Density Residential	0%		0	0	0	0	0	0	0	0	0	0	
					Internal Capture - w/I SB1	7%	39%		-1,928	-964	-964	-150	-79	-71	-842	-406	-436	
					Internal Capture between SB1&2	9%	46%		-2,305	-1,153	-1,153	-179	-95	-84	-606	-292	-314	
					Adjustment SB1&2				0	0	0	1	1	0	0	0	0	
					Internal Capture between SB1&4	23%	33%		-5,360	-2,680	-2,680	-417	-220	-196	-235	-113	-121	
					Adjustment SB1&4				0	0	0	35	35	0	2	0	0	
					<b>Total</b>				<b>17,946</b>	<b>8,974</b>	<b>8,974</b>	<b>1,431</b>	<b>773</b>	<b>658</b>	<b>478</b>	<b>230</b>	<b>247</b>	
395 acres suburban/Residential	395			79	Low-Turnover	0%		0	0	0	0	0	0	0	0	0	0	
					Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	0	
					High-Turnover	0%		0	0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
					0.2 dwelling units/acre	Low Density Residential	100%		79	752	376	376	59	15	44	79	50	29
					Internal Capture - w/I SB1	7%	39%		-53	-26	-26	-4	-1	-3	-31	-20	-11	
					Internal Capture between SB1&2	9%	46%		-63	-32	-32	-5	-1	-4	-22	-14	-8	
					Adjustment SB1&2				0	0	0	0	0	0	0	0	0	
					Internal Capture between SB1&4	23%	33%		-146	-73	-73	-12	-3	-9	-9	-5	-3	
					Adjustment SB1&4				0	0	0	1	0	0	0	0	0	
					<b>Total</b>				<b>490</b>	<b>245</b>	<b>245</b>	<b>39</b>	<b>10</b>	<b>28</b>	<b>17</b>	<b>11</b>	<b>7</b>	
Germanna Heights	10	87,120		90	Low-Turnover	45%		39,204	1,414	707	707	80	56	24	131	53	78	
					0.2 FAR for commercial	Medium-Turnover	45%		39,204	4,264	2,132	2,132	231	161	70	382	205	177
					High-Turnover	10%		8,712	6,748	3,374	3,374	586	297	289	481	243	238	
					Townhomes	High Density Residential	100%		90	561	281	281	43	8	35	51	34	17
					Low Density Residential	0%		0	0	0	0	0	0	0	0	0	0	
					Internal Capture - w/I SB1	7%	39%		-909	-455	-455	-66	-37	-29	-408	-209	-199	
					Internal Capture between SB1&2	9%	46%		-1,087	-544	-544	-79	-44	-35	-293	-150	-143	
					Adjustment SB1&2				0	0	0	0	0	0	0	0	0	
					Internal Capture between SB1&4	23%	33%		-2,528	-1,264	-1,264	-183	-102	-81	-114	-58	-55	
					Adjustment SB1&4				0	0	0	16	16	0	1	0	0	
					<b>Total Commercial</b>				<b>11,562</b>	<b>5,781</b>	<b>5,781</b>	<b>834</b>	<b>479</b>	<b>355</b>	<b>606</b>	<b>302</b>	<b>304</b>	
					<b>Total Housing</b>				<b>516</b>	<b>258</b>	<b>258</b>	<b>40</b>	<b>6</b>	<b>34</b>	<b>31</b>	<b>24</b>	<b>7</b>	
					<b>Total</b>				<b>20,541</b>	<b>10,270</b>	<b>10,270</b>	<b>1,502</b>	<b>840</b>	<b>662</b>	<b>868</b>	<b>444</b>	<b>424</b>	
<b>Total</b>									<b>30,084</b>	<b>19,532</b>	<b>19,532</b>	<b>2,979</b>	<b>1,625</b>	<b>1,353</b>	<b>1,372</b>	<b>691</b>	<b>681</b>	

Sub Area 2 – Full Build-Out Trip Generation

Site	Commercial		Residential		Notes	AM Percent	PM Percent	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips				
	Acres	GFA (SF)	Acres	Units					Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress		
Somerset Farm	Built-Out				Low-Turnover	0%		0	0	0	0	0	0	0	0	0	0		
					Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	0	0	0
					High-Turnover	0%		0	0	0	0	0	0	0	0	0	0	0	0
					High Density Residential	0%		0	0	0	0	0	0	0	0	0	0	0	0
					Low Density Residential	0%		0	0	0	0	0	0	0	0	0	0	0	0
					Internal Capture	15%			0	0	0	0	0	0	0	0	0	0	0
					<b>Total</b>				<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>			
Edgewood					Low-Turnover	0%		0	0	0	0	0	0	0	0	0	0		
					Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	0	0	
					High-Turnover	0%		0	0	0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	0	0
					Low Density Residential	100%		11	105	53	53	8	2	6	11	7	4		
					Internal Capture - w/l SB2	10%	47%		-11	-5	-5	-1	0	-1	-5	-3	-2		
					Internal Capture between SB1&2	9%	46%		-8	-4	-4	-1	0	0	-3	-2	-1		
					Adjustment SB1&2				1	1	1	0	0	0	0	0	0		
					Internal Capture between SB2&4	26%	33%		-23	-12	-12	-2	-1	-1	-1	-1	0		
Adjustment SB2&4				0	0	0	0	0	0	0	0	0							
					<b>Total</b>				<b>64</b>	<b>33</b>	<b>33</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>1</b>		
General Mixed Use	35	304,920	20	175	55 total acres	Low-Turnover	45%		137,214	4,948	2,474	2,474	280	195	85	460	187	273	
					20 acres res-townhome	Medium-Turnover	45%		137,214	14,924	7,462	7,462	808	564	244	1,337	718	619	
					35 acres commercial	High-Turnover	10%		30,492	23,619	11,810	11,810	2,050	1,037	1,013	1,685	853	832	
					5 dwelling units/acre	High Density Residential	100%		175	1,090	545	545	83	15	68	100	66	34	
					0.2 FAR for commercial	Low Density Residential	0%		0	0	0	0	0	0	0	0	0	0	
					Internal Capture - w/l SB2	10%	47%		-4,458	-2,229	-2,229	-322	-181	-141	-1,684	-857	-826		
					Internal Capture between SB1&2	9%	46%		-3,611	-1,806	-1,806	-261	-147	-114	-873	-445	-429		
					Adjustment SB1&2				507	254	254	28	29	0	67	50	16		
					Internal Capture between SB2&4	26%	33%		-9,625	-4,813	-4,813	-693	-393	-300	-360	-189	-171		
					Adjustment SB2&4				-3	0	0	1	0	0	0	0	0		
					<b>Total</b>				<b>27,391</b>	<b>13,697</b>	<b>13,697</b>	<b>1,973</b>	<b>1,119</b>	<b>855</b>	<b>732</b>	<b>383</b>	<b>348</b>		
Wilderness Shores					Low-Turnover	0%		0	0	0	0	0	0	0	0	0	0		
					Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	0		
					High-Turnover	0%		0	0	0	0	0	0	0	0	0	0		
					250 Townhomes	High Density Residential	41%		248	1,545	773	773	118	22	96	141	93	48	
					355 single fam det	Low Density Residential	59%		357	3,398	1,699	1,699	268	67	201	357	225	132	
					Internal Capture - w/l SB2	10%	47%		-494	-247	-247	-39	-9	-30	-234	-149	-85		
					Internal Capture between SB1&2	9%	46%		-400	-200	-200	-31	-7	-24	-121	-78	-44		
					Adjustment SB1&2				56	28	28	3	1	0	9	9	2		
					Internal Capture between SB2&4	26%	33%		-1,067	-534	-534	-83	-19	-63	-50	-33	-17		
					Adjustment SB2&4				0	0	0	0	0	0	0	0	0		
					<b>Total</b>				<b>3,038</b>	<b>1,519</b>	<b>1,519</b>	<b>236</b>	<b>55</b>	<b>180</b>	<b>102</b>	<b>67</b>	<b>36</b>		
<b>Total</b>									<b>30,493</b>	<b>15,249</b>	<b>15,249</b>	<b>2,213</b>	<b>1,175</b>	<b>1,039</b>	<b>836</b>	<b>451</b>	<b>385</b>		

### Sub Area 3 – Full Build-Out Trip Generation

Site	Commercial		Residential		Notes	Percent	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips				
	Acres	GFA (SF)	Acres	Units				Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress		
Germanna Community College		117,000			Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0		
					Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0	
					Expansion of existing facility	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0
					High Density Residential	0%	0	0	0	0	0	0	0	0	0	0	0	
					Low Density Residential	0%	0	0	0	0	0	0	0	0	0	0	0	
					Community College	100%	117	3,216	1,608	1,608	350	259	91	297	172	125		
					Internal Capture	0%		0	0	0	0	0	0	0	0	0		
					<b>Total</b>			<b>3,216</b>	<b>1,608</b>	<b>1,608</b>	<b>350</b>	<b>259</b>	<b>91</b>	<b>297</b>	<b>172</b>	<b>125</b>		
Germanna Foundation Visitor's Center and Library		5,000			Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0		
					Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0		
					High-Turnover	0%	0	0	0	0	0	0	0	0	0	0		
					library	High Density Residential	0%	0	0	0	0	0	0	0	0	0		
					Admin offices	Low Density Residential	0%	0	0	0	0	0	0	0	0	0		
					Library	100%	5	60	30	30	5	4	1	20	10	10		
					Archaeology lab	Internal Capture	0%		0	0	0	0	0	0	0	0		
					<b>Total</b>			<b>60</b>	<b>30</b>	<b>30</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>20</b>	<b>10</b>	<b>10</b>		
<b>Total</b>						<b>3,276</b>	<b>1,638</b>	<b>1,638</b>	<b>355</b>	<b>263</b>	<b>92</b>	<b>317</b>	<b>182</b>	<b>135</b>				

Sub Area 4 – Full Build-Out Trip Generation (sheet 1 of 2)

Site	Commercial		Residential		Notes	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips		
	Acres	GFA (SF)	Acres	Units			Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress
Corporate Campus					Community College	300	8,247	4,124	4,124	897	664	233	762	442	320
					Medical Dental Office	100	3,874	1,937	1,937	239	189	50	292	82	210
					Office Park	800	8,745	4,373	4,373	1,220	1,086	134	1,072	150	922
					Internal Capture		-3,786	-1,893	-1,893	-438	-383	-55	-410	-70	-340
					Internal Capture between 2&4		-4,441	-2,220	-2,220	-499	-405	-94	-566	-199	-367
					Adjustment		2,161	1,080	1,080	155	196	1	451	160	291
					Internal Capture between 1&4		-3,404	-1,702	-1,702	-362	-310	-62	-528	-186	-342
					Adjustment		1,695	847	847	114	146	0	430	150	281
				<b>Total</b>		<b>13,091</b>	<b>6,545</b>	<b>6,545</b>	<b>1,326</b>	<b>1,183</b>	<b>207</b>	<b>1,503</b>	<b>529</b>	<b>975</b>	
Town Center					Apartments	200	1,336	668	668	101	20	81	128	83	45
					Shopping Center	120	7,645	3,823	3,823	115	71	44	677	325	352
					Speciality Retail Center	400	17,728	8,864	8,864	0	0	0	982	432	550
					Pharmacy	20	1,938	969	969	69	36	33	198	99	99
					Drive-In Bank *2	10	1,482	741	741	121	69	52	244	122	122
					Quality Restaurant * 5	25	2,249	1,125	1,125	20	10	10	187	125	62
					Turnover Restaurant * 5	25	3,179	1,590	1,590	270	149	121	247	148	99
					Internal Capture		-10,667	-5,334	-5,334	-208	-106	-102	-801	-401	-400
					Internal Capture between 2&4		-6,471	-3,236	-3,236	-127	-65	-62	-614	-308	-307
					Adjustment		3,149	1,574	1,574	39	31	1	490	247	243
					Internal Capture between 1&4		-4,961	-2,480	-2,480	-92	-50	-41	-573	-288	-285
				Pass-by Reduction		-2,212	-1,106	-1,106	-120	-66	-54	-218	-123	-95	
				<b>Total</b>		<b>16,865</b>	<b>8,431</b>	<b>8,431</b>	<b>217</b>	<b>123</b>	<b>83</b>	<b>1,413</b>	<b>692</b>	<b>720</b>	
Multi Family					Apartments	300	1,942	971	971	151	30	121	183	119	64
					Internal Capture		-582	-291	-291	-45	-9	-37	-55	-36	-19
					Internal Capture between 2&4		-354	-177	-177	-28	-5	-22	-42	-27	-15
					Adjustment		172	86	86	9	3	0	34	22	12
					Internal Capture between 1&4		-271	-135	-135	-20	-4	-14	-40	-26	-14
					Adjustment		135	67	67	6	2	0	32	21	11
				Pass By Reduction		0	0	0	0	0	0	0	0	0	
				<b>Total</b>		<b>1,042</b>	<b>521</b>	<b>521</b>	<b>73</b>	<b>17</b>	<b>48</b>	<b>112</b>	<b>73</b>	<b>39</b>	
Intensive Planned Commercial					Hotel*2	400	3,207	1,604	1,604	212	125	87	240	122	118
					Variety Store	20	1,281	641	641	76	38	38	136	68	68
					Specialty Center	100	4,432	2,216	2,216	0	0	0	261	115	146
					Supermarket	50	5,112	2,556	2,556	170	105	65	474	242	232
					Convenience Market w/ Gas *2	32	17,363	8,682	8,682	530	265	265	610	305	305
					Pet Supply Superstore	30	1,014	507	507	0	0	0	102	51	51
					Drinking Place * 2	8	907	454	454	0	0	0	91	60	31
					High-Turnover Restaurant *3	15	1,907	954	954	162	89	73	148	89	59
					Fast Food Restaurant w/Drive Thru *4	16	7,938	3,969	3,969	727	371	356	523	272	251
					Gas Station w/ Convenience Store *2	24	3,668	1,834	1,834	284	145	139	333	170	163
					Internal Capture		-13,087	-6,544	-6,544	-584	-303	-281	-804	-412	-392
					Internal Capture between 2&4		-8,773	-4,386	-4,386	-410	-217	-193	-698	-357	-341
					Adjustment		4,268	2,134	2,134	128	105	3	556	286	270
					Internal Capture between 1&4		-6,725	-3,362	-3,362	-298	-166	-127	-651	-334	-317
				Adjustment		3,348	1,673	1,673	94	79	0	529	268	261	
				Pass By Reduction		-12,291	-6,146	-6,146	-657	-335	-322	-646	-336	-310	
				<b>Total</b>		<b>13,570</b>	<b>6,784</b>	<b>6,784</b>	<b>433</b>	<b>301</b>	<b>103</b>	<b>1,203</b>	<b>609</b>	<b>595</b>	

Sub Area 4 – Full Build-Out Trip Generation (sheet 2 of 2)

Site	Commercial		Residential		Notes	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips		
	Acres	GFA (SF)	Acres	Units			Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress
Mixed Use					Single Family Detached Housing	150	1,525	763	763	115	29	86	151	95	56
					Internal Capture		-457	-229	-229	-35	-9	-26	-45	-28	-17
					Internal Capture between 2&4		-278	-139	-139	-21	-5	-16	-35	-22	-13
					Adjustment		135	68	68	6	3	0	28	18	10
					Internal Capture between 1&4		-213	-106	-106	-15	-4	-10	-33	-21	-12
					Adjustment		106	53	53	5	2	0	26	17	10
					Pass By Reduction		0	0	0	0	0	0	0	0	0
				<b>Total</b>		<b>818</b>	<b>409</b>	<b>409</b>	<b>55</b>	<b>15</b>	<b>34</b>	<b>92</b>	<b>58</b>	<b>34</b>	
Residential & Open Space Development 1					Single Family Detached Housing	150	1,525	763	763	115	29	86	151	95	56
					Internal Capture		-457	-229	-229	-35	-9	-26	-45	-28	-17
					Internal Capture between 2&4		-278	-139	-139	-21	-5	-16	-35	-22	-13
					Adjustment		135	68	68	6	3	0	28	18	10
					Internal Capture between 1&4		-213	-106	-106	-15	-4	-10	-33	-21	-12
					Adjustment		106	53	53	5	2	0	26	17	10
					Pass By Reduction		0	0	0	0	0	0	0	0	0
				<b>Total</b>		<b>818</b>	<b>409</b>	<b>409</b>	<b>55</b>	<b>15</b>	<b>34</b>	<b>92</b>	<b>58</b>	<b>34</b>	
Residential & Open Space Development 2					Single Family Detached Housing	150	1,525	763	763	115	29	86	151	95	56
					Internal Capture		-457	-229	-229	-35	-9	-26	-45	-28	-17
					Internal Capture between 2&4		-278	-139	-139	-21	-5	-16	-35	-22	-13
					Adjustment		135	68	68	6	3	0	28	18	10
					Internal Capture between 1&4		-213	-106	-106	-15	-4	-10	-33	-21	-12
					Adjustment		106	53	53	5	2	0	26	17	10
					Pass By Reduction		0	0	0	0	0	0	0	0	0
				<b>Total</b>		<b>818</b>	<b>409</b>	<b>409</b>	<b>55</b>	<b>15</b>	<b>34</b>	<b>92</b>	<b>58</b>	<b>34</b>	
<b>Total</b>							<b>47,022</b>	<b>23,508</b>	<b>23,508</b>	<b>2,214</b>	<b>1,669</b>	<b>543</b>	<b>4,507</b>	<b>2,077</b>	<b>2,431</b>

Sub Area 5 – Full Build-Out Trip Generation

Site	Commercial		Residential		Notes	Percent	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips			
	Acres	GFA (SF)	Acres	Units				Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress	
Low Intensity Mixed Use	100	435,600		3		Low-Turnover	100%	435,600	15,709	7,855	7,855	889	620	269	1,460	593	867
						Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
					single family det	High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
					0.1 FAR for commercial	Low Density Residential	100%	3	29	15	15	2	1	2	3	2	1
						Internal Capture	1%		-157	-79	-79	-9	-6	-3	-15	-6	-9
					<b>Total</b>			<b>15,581</b>	<b>7,791</b>	<b>7,791</b>	<b>882</b>	<b>615</b>	<b>268</b>	<b>1,448</b>	<b>589</b>	<b>859</b>	
Germanna Village				290		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	
						High-Turnover	0%	0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	50%	145	903	452	452	69	13	56	83	55	28
						Low Density Residential	50%	145	1,380	690	690	109	27	82	145	91	54
						Internal Capture	1%		-23	-11	-11	-2	0	-1	-2	-1	-1
					<b>Total</b>			<b>2,260</b>	<b>1,131</b>	<b>1,131</b>	<b>176</b>	<b>40</b>	<b>137</b>	<b>226</b>	<b>145</b>	<b>81</b>	
Commercial Parcels on Rt 3	16	69,696	0	0		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	
						High-Turnover	0%	0	0	0	0	0	0	0	0	0	
						General Office	100%	69,696	792	396	396	118	105	13	109	17	92
						High Density Residential	0%	0	0	0	0	0	0	0	0	0	
						Low Density Residential	0%	0	0	0	0	0	0	0	0	0	
	Internal Capture	1%		-8	-4	-4	-1	-1	0	-1	0	-1					
					<b>Total</b>			<b>784</b>	<b>392</b>	<b>392</b>	<b>117</b>	<b>104</b>	<b>13</b>	<b>108</b>	<b>17</b>	<b>91</b>	
Lake of the Woods				511		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	
						High-Turnover	0%	0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%	0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%	511	4,865	2,433	2,433	383	96	287	511	322	189
						Internal Capture	20%		-973	-487	-487	-77	-19	-57	-102	-64	-38
					<b>Total</b>			<b>3,892</b>	<b>1,946</b>	<b>1,946</b>	<b>306</b>	<b>77</b>	<b>230</b>	<b>409</b>	<b>258</b>	<b>151</b>	
<b>Total</b>								<b>22,517</b>	<b>11,260</b>	<b>11,260</b>	<b>1,481</b>	<b>836</b>	<b>648</b>	<b>2,191</b>	<b>1,009</b>	<b>1,182</b>	

Sub Area 6 – Full Build-Out Trip Generation (sheet 1 of 2)

Site	Commercial		Residential		Notes	AM	PM	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips			
	Acres	GFA (SF)	Acres	Units					Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress	
Rapidan Hills				16		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
							Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						single family det	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
							High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
							Low Density Residential	100%	16	152	76	76	12	3	9	16	10	6
							Internal Capture	12%	31%	-18	-9	-9	-1	0	-1	-5	-3	-2
					<b>Total</b>			<b>134</b>	<b>67</b>	<b>67</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>7</b>	<b>4</b>		
Rebel Acres				11		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
							Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						single family det	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
							High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
							Low Density Residential	100%	11	105	53	53	8	2	6	11	7	4
							Internal Capture	12%	31%	-13	-6	-6	-1	0	-1	-3	-2	-1
					<b>Total</b>			<b>92</b>	<b>47</b>	<b>47</b>	<b>7</b>	<b>2</b>	<b>5</b>	<b>8</b>	<b>5</b>	<b>3</b>		
Burtn Mill Estates				2		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
							Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						single family det	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
							High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
							Low Density Residential	100%	2	19	10	10	2	1	2	2	1	1
							Internal Capture	12%	31%	-2	-1	-1	0	0	0	-1	0	0
					<b>Total</b>			<b>17</b>	<b>9</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>		
Locust Grove Estates				9		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
							Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						single family det	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
							High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
							Low Density Residential	100%	9	86	43	43	7	2	5	9	6	3
							Internal Capture	12%	31%	-10	-5	-5	-1	0	-1	-3	-2	-1
					<b>Total</b>			<b>76</b>	<b>38</b>	<b>38</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>2</b>		
Indian Oakes				4		Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
							Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0
						single family det	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0
							High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
							Low Density Residential	100%	4	38	19	19	3	1	2	4	3	1
							Internal Capture	12%	31%	-5	-2	-2	0	0	0	-1	-1	0
					<b>Total</b>			<b>33</b>	<b>17</b>	<b>17</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>		

Sub Area 6 – Full Build-Out Trip Generation (sheet 2 of 2)

Site	Commercial		Residential		Notes	AM	PM	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips			
	Acres	GFA (SF)	Acres	Units					Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress	
Rapidan Hills				16		Low-Turnover	0%		0	0	0	0	0	0	0	0	0	
						Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	
						High-Turnover	0%		0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%		16	152	76	76	12	3	9	16	10	6
						Internal Capture	12%		31%	-18	-9	-9	-1	0	-1	-5	-3	-2
	<b>Total</b>				<b>134</b>	<b>67</b>	<b>67</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>7</b>	<b>4</b>					
Rebel Acres				11		Low-Turnover	0%		0	0	0	0	0	0	0	0	0	
						Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	
						High-Turnover	0%		0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%		11	105	53	53	8	2	6	11	7	4
						Internal Capture	12%		31%	-13	-6	-6	-1	0	-1	-3	-2	-1
	<b>Total</b>				<b>92</b>	<b>47</b>	<b>47</b>	<b>7</b>	<b>2</b>	<b>5</b>	<b>8</b>	<b>5</b>	<b>3</b>					
Burtn Mill Estates				2		Low-Turnover	0%		0	0	0	0	0	0	0	0	0	
						Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	
						High-Turnover	0%		0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%		2	19	10	10	2	1	2	2	1	1
						Internal Capture	12%		31%	-2	-1	-1	0	0	0	-1	0	0
	<b>Total</b>				<b>17</b>	<b>9</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>					
Locust Grove Estates				9		Low-Turnover	0%		0	0	0	0	0	0	0	0	0	
						Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	
						High-Turnover	0%		0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%		9	86	43	43	7	2	5	9	6	3
						Internal Capture	12%		31%	-10	-5	-5	-1	0	-1	-3	-2	-1
	<b>Total</b>				<b>76</b>	<b>38</b>	<b>38</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>2</b>					
Indian Oakes				4		Low-Turnover	0%		0	0	0	0	0	0	0	0	0	
						Medium-Turnover	0%		0	0	0	0	0	0	0	0	0	
						High-Turnover	0%		0	0	0	0	0	0	0	0	0	
					single family det	High Density Residential	0%		0	0	0	0	0	0	0	0	0	
						Low Density Residential	100%		4	38	19	19	3	1	2	4	3	1
						Internal Capture	12%		31%	-5	-2	-2	0	0	0	-1	-1	0
	<b>Total</b>				<b>33</b>	<b>17</b>	<b>17</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>					

### Sub Area 7 – Full Build-Out Trip Generation

Site	Commercial		Residential		Notes	Percent	KSF/DU/AC	Daily Trips			AM Peak Hour Trips			PM Peak Hour Trips			
	Acres	GFA (SF)	Acres	Units				Daily Total	Ingres	Egress	AM Total	Ingress	Egress	PM Total	Ingress	Egress	
Traditional low-density residential and Open Space				32	Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
					Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0
					High-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0
					High Density Residential	0%	0	0	0	0	0	0	0	0	0	0	0
					Low Density Residential	100%	32	305	153	153	24	6	18	32	20	12	
					Internal Capture	6%	22%	-18	-9	-9	-1	0	-1	-7	-4	-3	
			<b>Total</b>			<b>287</b>	<b>144</b>	<b>144</b>	<b>23</b>	<b>6</b>	<b>17</b>	<b>25</b>	<b>16</b>	<b>9</b>			
Planned Development and Open Space			735	368	Low-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
					Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
					High-Turnover	0%	0	0	0	0	0	0	0	0	0	0	
					0.5 dwellings per acre	High Density Residential	0%	0	0	0	0	0	0	0	0	0	0
					Low Density Residential	100%	368	3,499	1,750	1,750	276	69	207	368	232	136	
					Internal Capture	6%	22%	-210	-105	-105	-17	-4	-12	-81	-51	-30	
			<b>Total</b>			<b>3,289</b>	<b>1,645</b>	<b>1,645</b>	<b>259</b>	<b>65</b>	<b>195</b>	<b>287</b>	<b>181</b>	<b>106</b>			
Tourism/visitor focused commercial and professional services	80	348,480			Low-Turnover	50%	174,240	6,284	3,142	3,142	355	248	107	584	237	347	
			half low turnover commercial	Medium-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0	
			half general office	High-Turnover	0%	0	0	0	0	0	0	0	0	0	0	0	
				General Office	50%	174,240	1,981	991	991	294	261	33	274	42	232		
			0.1 FAR	High Density Residential	0%	0	0	0	0	0	0	0	0	0	0		
				Low Density Residential	0%	0	0	0	0	0	0	0	0	0	0		
				Internal Capture	6%	22%	-496	-248	-248	-39	-31	-8	-189	-61	-127		
	<b>Total</b>			<b>7,769</b>	<b>3,885</b>	<b>3,885</b>	<b>610</b>	<b>478</b>	<b>132</b>	<b>669</b>	<b>218</b>	<b>452</b>					
<b>Total</b>						<b>11,345</b>	<b>5,674</b>	<b>5,674</b>	<b>892</b>	<b>549</b>	<b>344</b>	<b>981</b>	<b>415</b>	<b>567</b>			



### Sub Area 8 – Full Build-Out Trip Generation

There is no future development shown in the Germanna-Wilderness Area Plan for Sub Area 8

# Appendix E: 2040 Intersection Volumes – Minimally Managed

Spotswood Drive				Somerset Ridge Road				Twin Drive (Walmart South)				Germanna Heights Drive				Somerville Road				Goodwin Drive				Post Office				Access Road														
(1)	(0)	(13)	↖	5	(10)	(73)	(143)	↖	423	(154)	(51)	↖	100	(100)	(10)	(295)	(298)	↖	344	(203)	(409)	↖	188	(156)	(145)	(217)	(366)	↖	236	(350)	(193)	(0)	(451)	↖	284	(298)	(37)	(494)	(872)	↖	945	(598)
2	0	8	←	1712	(1642)	145	395	←	1740	(1739)	51	←	2112	(1842)	21	330	427	←	1928	(1420)	534	←	2265	(1653)	30	44	74	←	2263	(1618)	32	0	74	←	2634	(2220)	19	141	738	←	2738	(2140)
↖	↓	↘	↖	↖	↘	↖	↘	↖	↘	↖	↘	↖	↓	↘	↖	↘	↖	↖	↓	↘	↖	↖	↓	↘	↖	↘	↖	↖	↓	↘	↖	↘	↖	↓	↘	↖	↘	↖	↓	↘		
(2)	3	↘	↖	↖	↘	(156)	120	↘	(21)	21	↘	(63)	43	↘	(467)	437	↘	(143)	138	↘	(128)	122	↘	(10)	10	↘	(130)	63	↘	(171)	531	660	↘	(351)	(582)	(613)						
(1324)	1524	→	28	69	(1250)	1247	→	(1372)	1621	→	(994)	1351	→	263	473	241	(1369)	1583	→	(1019)	1452	→	149	86	372	(1481)	1767	→	(10)	(10)	(1617)	1718	→	171	531	660						
(37)	66	↘	(54)	(119)	(315)	227	↘	(512)	(216)	(543)	(215)	58	↘	(98)	(107)	(234)	(10)	10	↘	(10)	(10)	(195)	70	↘	(351)	(582)	(613)															

XX = AM  
(XX) = PM

# Appendix F: 2040 Intersection Operations – Minimally Managed

Overall Intersection				Overall Intersection				Overall Intersection				Overall Intersection				Overall Intersection				Overall Intersection				Overall Intersection				Overall Intersection			
38.2-D (3.1-A)				35.3-D (15.1-B)				0.5-A (0.5-A)				271.7-F (132.8-F)				1145.5-F (31.1-C)				96.3-F (60.1-E)				337.6-F (247.5-F)				337.6-F (247.5-F)			
Spotswood Drive				Somerset Ridge Road				Twin Drive (Walmart South)				Germanna Heights Drive				Somerville Road				Goodwin Drive				Post Office Road				Access Road			
(128.3-F)	(128.3-F)	(128.3-F)	0-A (0-A)	(59.5-E)	(76.6-E)	4.4-A (5.9-A)	(22-C)	0-A (0-A)	(172.2-F)	(172.2-F)	(188.5-F)	24.9-C (33.8-C)	(298.8-F)	0-A (0-A)	(91.6-F)	(91.6-F)	(108.9-F)	12.2-B (23.1-C)	(48.5-D)	(48.5-D)	(54.4-D)	12.7-B (13.4-B)	(52.3-D)	(75.6-E)	(373.4-F)	111.2-F (35.2-D)					
360-F	360-F	360-F	0-A (0-A)	43.7-D	109.5-F	32-C (12.8-B)	27.3-C	0-A (0-A)	105.4-F	105.4-F	350.6-F	378.5-F (107.1-F)	360-F	0-A (0-A)	114-F	114-F	127-F	117.9-F (75.5-E)	64.1-E	64.1-E	66.7-E	166.2-F (18.2-B)	47.8-D	50.1-D	467-F	410.5-F (314.6-F)					
↻	↓	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↻	↓	↻	↻	↻	↓	↻	↻						
(14.6-B)	15.7-C	↻	↻	(24.7-C)	58.4-E	↻	↻	(19-B)	25.7-C	↻	↻	(167.2-F)	418.1-F	↻	↻	(127-F)	114.1-F	↻	↻	(905.8-F)	57.1-E	↻	↻	(328.8-F)	112.5-F	↻	↻				
(0-A)	0-A	→	→	(12.8-B)	23.9-C	→	→	(0-A)	0-A	→	→	(107.1-F)	129.2-F	→	→	(75.5-E)	51.9-D	→	→	(18.2-B)	11-B	→	→	(314.6-F)	281-F	→	→				
(0-A)	0-A	↻	↻	(37-E)	(37-E)	↻	↻	(43.5-D)	92.2-F	↻	↻	(167.9-F)	(175.3-F)	(58.5-E)	↻	↻	(36.8-D)	14-B	↻	↻	(9-A)	4.3-A	↻	↻	(0.1-A)	0.1-A	↻	↻			
College Drive								Flat Run Road								Lake of the Woods Way				Route 20											

XX = AM  
(XX) = PM

# Appendix G: 2040 Intersection Volumes – 2040 Recommendations

Spotswood Drive				Hampton Ln				Somerset Ridge Road				Twin Drive (Walmart South)				Somerville Road							
(1)	(0)	(13)	↶	5	(10)	(50)	↶	100	(60)	(73)	(143)	↶	423	(154)	(51)	↶	100	(100)	(469)	(533)	↶	188	(156)
2	0	8	←	1712	(1642)	206	←	1785	(1752)	145	395	←	1740	(1739)	51	←	2112	(1842)	780	511	←	2182	(1963)
↷	↓	↷	↷	274	(150)	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷
(2)	3	↷	↷	↷	(50)	235	↷	↷	(156)	120	↷	(21)	21	↷	(192)	390	↷	↷	↷	↷	↷	↷	
(1324)	1524	→	→	28	69	(1406)	1367	→	15	(1250)	1247	→	(1372)	1621	→	(1164)	1431	→	→	→	→	563	414
(37)	66	↷	↷	(54)	(119)	(15)	25	↷	(25)	↷	↷	↷	↷	↷	↷	(79)	57	↷	↷	↷	↷	(554)	(716)
College Drive																New Flat Run Road							

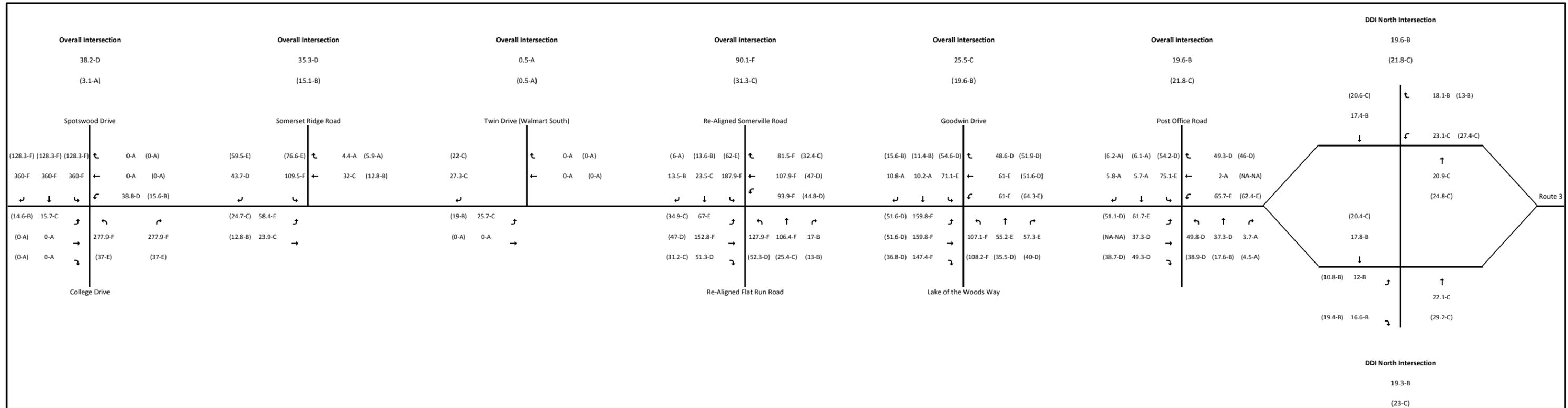
Matchline - Figure Below

XX = AM  
(XX) = PM

Goodwin Drive				Post Office				Access Road							
(727)	↶	321	(458)	(644)	↶	284	(298)	(37)	(494)	(872)	↶	945	(598)		
149	←	2412	(1716)	106	←	2644	(2230)	19	141	738	←	2738	(2140)		
↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷	↷		
(143)	138	↷	↷	(128)	122	↷	↷	(130)	63	↷	↷	↷	↷		
(1385)	1527	→	→	(1932)	1841	→	→	(1617)	1718	→	→	171	531	660	
(432)	102	↷	↷	(10)	10	↷	↷	(195)	70	↷	↷	(351)	(582)	(613)	
Lake of the Woods Way												Rte 20			

Matchline - Figure Above

# Appendix H: 2040 Intersection Operations – 2040 Recommendations



XX = AM  
(XX) = PM