



PROJECT PIPELINE

**US Route 17 (George Washington Memorial Highway) from
White Marsh Shopping Center to Hook Road/Guinea Road**

Fredericksburg District

Gloucester County

FR-25-03

PHASE 3 REPORT

JULY 2026

Prepared for



Prepared by



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Chapter 1: Needs Evaluation and Diagnosis

1.1 Introduction

Project Pipeline is a performance-based planning program to identify cost-effective solutions to multimodal transportation needs in Virginia. Through this planning process, projects and solutions may be considered for funding through programs, including SMART SCALE, revenue sharing, interstate funding, and others. Particularly, SMART SCALE is Virginia's data-driven prioritization process that scores and evaluates potential transportation projects based on key factors including congestion reduction, safety improvement, accessibility, land use, economic development, and environmental quality to determine which projects may receive state funding. Visit the Project Pipeline webpage for additional information:

<https://vapipeline.virginia.gov/>.

This study, entitled FR-25-03 at US Route 17 (George Washington Memorial Highway), focuses on concepts targeting identified needs including capacity preservation, safety improvement, and pedestrian and bicycle access. Transportation Demand Management (TDM) and transit access along the corridor are also of concern. The four key steps within the Project Pipeline performance-based planning and programming process are shown in **Figure 1**.



Figure 1: Project Pipeline Key Steps

1.2 Methodology

The Project Pipeline study process consists of three phases:

- **Phase 1:** Problem Diagnosis and Alternative Brainstorming
- **Phase 2:** Alternative Evaluation and Sketch-Level Analysis
- **Phase 3:** Investment Strategy and Cost Estimate

Figure 2 shows the overall Project Pipeline process, key milestones, and schedule in relation to critical SMART SCALE dates.

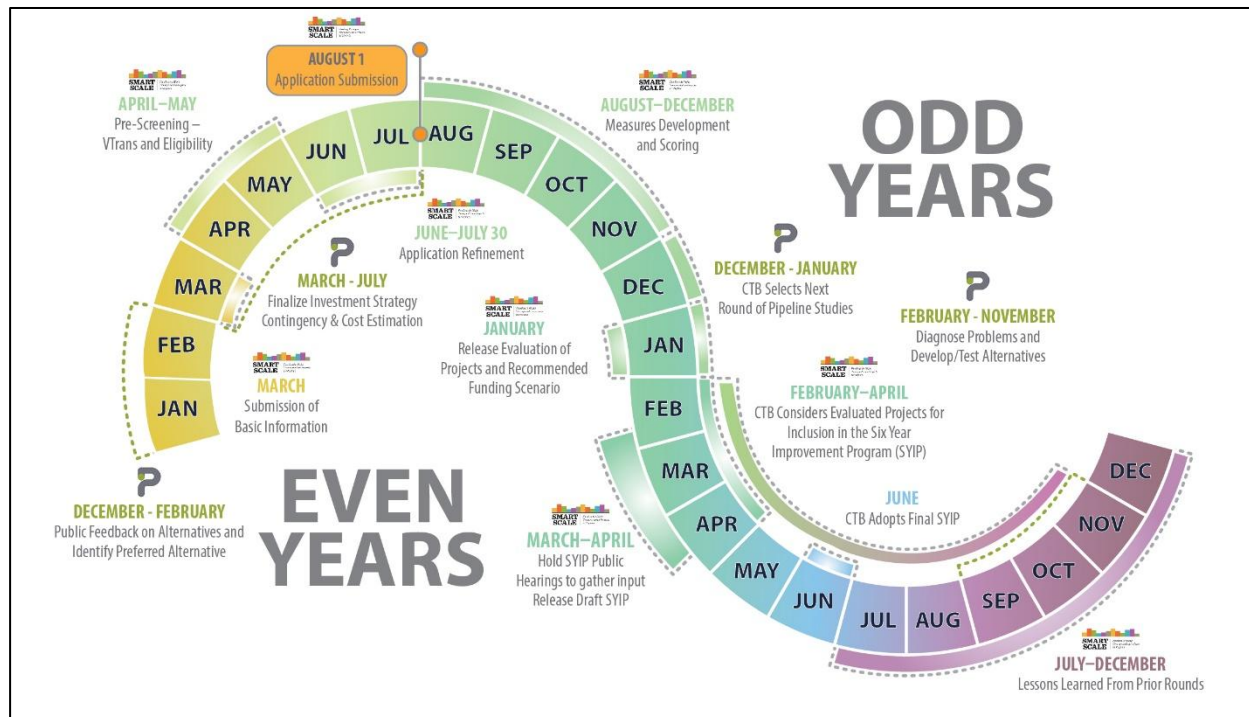


Figure 2: Study Phase Methods and Solutions

The study team is broken down into technical teams to review data, develop preliminary alternatives, refine solutions, and provide clear messages to stakeholders regarding the most viable and effective solutions related to the priorities and needs for each study. The priorities, needs, and scope of each study guides the level of Technical Team involvement. In general, the technical teams include the Office of Intermodal Planning and Investment (OIP), the Virginia Department of Transportation (VDOT), and consultant staff from the following departments and/or disciplines:

- District Planning
- District Traffic Operations
- District Location and Design (L&D)
- District subject matter experts (e.g., Right of Way, Utilities, and Environmental, as needed)
- Consultant Teams, Central Office Divisions, as needed
- Virginia Department of Rail and Public Transportation (DRPT), as needed
- Localities, if applicable
- Metropolitan Planning Organizations (MPOs) or Planning District Commissions (PDCs), if applicable

A sample organizational chart of a technical team is shown in **Figure 3**.

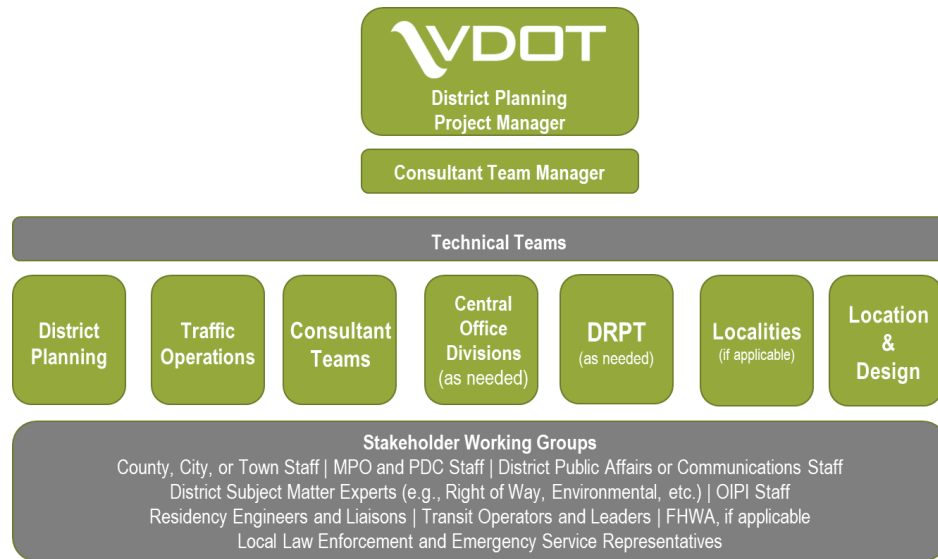


Figure 3: Structure of a Technical Team

1.3 Study Background

A Study Work Group (SWG) was formed for this study to capture input from local stakeholders and shape the development of potential improvements. The SWG provided local and institutional knowledge of the corridor, reviewed study methodologies, provided input on key assumptions, and reviewed and approved proposed improvements developed through the study process. The SWG included members representing the following organizations:

- Office of Intermodal Planning and Investment (OIPI)
- Virginia Department of Transportation (VDOT)
- Virginia Department of Rail and Public Transportation (DRPT)
- Hampton Roads Transportation Planning Organization (HRTPO)
- Gloucester County
- Hampton Roads Transit (HRT)
- Bay Transit
- Kimley-Horn

The study area along US Route 17 extends from the White Marsh Shopping Center to the north and Hook Road/Guinea Road to the south. US Route 17 is a four-lane divided roadway classified as an Other Principal Arterial, with a 55 miles per hour (mph) posted speed limit within the study area north of Hayes Road, and a 45 miles per hour (mph) posted speed limit south of Hayes Road.

The study area is in central Gloucester County south of Featherbed Lane and north of the Coleman Memorial Bridge. US Route 17 serves as a major commuter route into Newport News, as well as an emergency evacuation route. The majority of developments are situated to the west of US Route 17, encompassing residential, industrial, and commercial land uses. The area to the east of US Route 17 is predominantly characterized by marshland and is less densely developed. Bay Transit provides on-demand micro transit service throughout the study area.

The study area includes 13 at-grade intersections, comprised of five signalized intersections and eight unsignalized intersections. The 13 study intersections are shown in **Table 1** and **Figure 4**. VDOT administered an adjacent Strategically Targeted Affordable Roadway Solutions (STARS) study on US Route 17 between Short Lane and Featherbed Lane concurrently with this Project Pipeline study. The STARS study includes the analysis and concept development documentation for the intersections of US Route 17 and Featherbed Lane/Brother Sams Road and US Route 17 and White Marsh Shopping Center.

Table 1: Study Intersections

#	Intersection Name	Control Type
1	US Route 17 at White Marsh Shopping Center	Unsignalized
2	US Route 17 at Brays Point Road	Signalized
3	US Route 17 at Providence Road	Signalized
4	US Route 17 at Habitat for Humanity/Jaak's Auto Sales	Unsignalized
5	US Route 17 at Woodsville Road	Unsignalized
6	US Route 17 at Fields Landing Road	Unsignalized
7	US Route 17 at Colemans Crossing Avenue	Unsignalized
8	US Route 17 at Crewe Road	Signalized
9	US Route 17 at Powhatan Drive	Signalized
10	US Route 17 at Chapman Drive	Unsignalized
11	US Route 17 at Hayes Road	Unsignalized
12	US Route 17 at VAMAC/Farmers Daughter Produce	Unsignalized
13	US Route 17 at Hook Road/Guinea Road	Signalized

The study team collected traffic counts, signal timing data, and pedestrian and bicycle counts, to assist with the transportation analysis in the study area.

A framework document was developed prior to commencing the study, which outlined the study methods and assumptions. The signed framework document is in **Appendix A**. The SWG held a kickoff meeting, Round 3 Kickoff and Framework Meeting (SWG Meeting #1), on April 2, 2025, to provide an overview of the study and obtain feedback on the assumptions of the study. The kickoff meeting materials are in **Appendix A**.

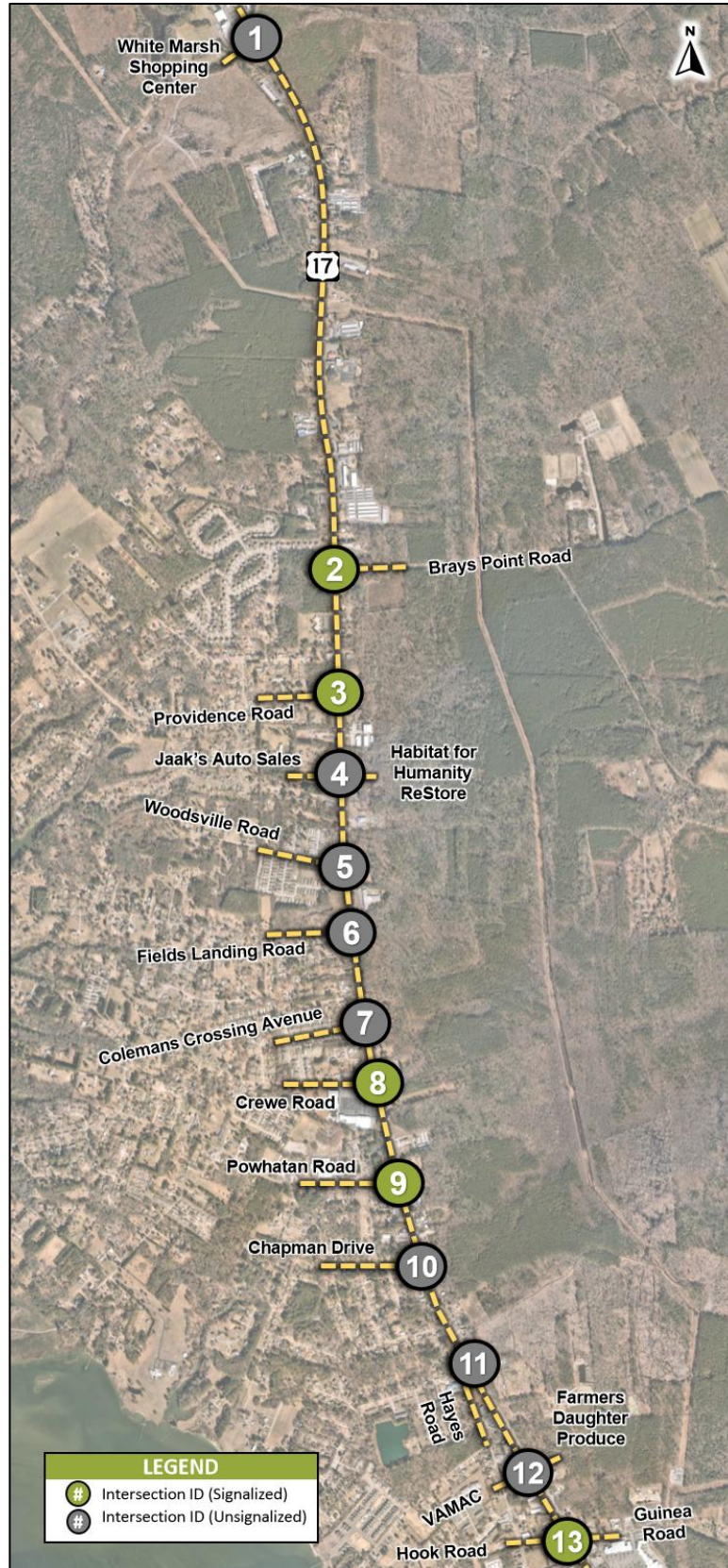


Figure 4: Project Study Area

1.4 VTrans Needs

Project Pipeline follows a performance-based planning approach to identify solutions that address VTrans mid-term needs. VTrans is Virginia's statewide transportation plan that is prepared by OIPI for the Commonwealth Transportation Board (CTB). VTrans mid-term needs (0-10 years) were identified from a data-informed process and were used as a primary source in the selection of Project Pipeline study corridors. **Table 2** outlines the VTrans needs in the study area.

Table 2: VTrans Needs Identified in the Study Area

VTrans 2023 Mid-Term Need	Priority
 Capacity Preservation	Very High
 Safety Improvement	Very High
 Pedestrian Safety Improvement	Low
 Transportation Demand Management (TDM)	Low
 Bicycle Access	High
 Transit Access	High

The US Route 17 corridor was selected as a Project Pipeline study location due to the presence of multiple VTrans needs. The project team took the following steps to confirm and evaluate the VTrans needs identified in the study area:

- Reviewed the Project Pipeline data dashboards to identify issues and transportation trends in the study area
- Conducted a field review of the study area to observe issues and document existing conditions
- Collected traffic counts at the study area intersections
- Reviewed relevant studies and plans near the study area to inform the development of alternatives
- Conducted detailed existing conditions and No-Build conditions traffic operational analyses using Synchro
- Assessed existing transit service, multimodal infrastructure, and the suitability for additional transit service within the study area

1.5 High-Level Needs Diagnosis

Data dashboards were developed by OIPI and VDOT to centralize data collection and leverage big data sources to streamline VTrans needs and problem diagnosis across all Project Pipeline studies, as well as to expand on the core issues and patterns identified in the study's framework document.

The data dashboards contained performance measures including VDOT crash data, Travel Time Index (TTI) data, level of travel time reliability (LOTTR) data, and speed data for each study area. The results of this analysis are summarized in the Needs and Existing Conditions Summary, which can be found in **Appendix B**.

The study team reviewed the dashboard performance measures in addition to other sources to validate the presence of VTrans needs and identify the most effective improvements in the study area.

1.5.1 Operations and Access Needs

As US Route 17 is a VDOT primary evacuation route and Arterial Preservation Network (APN) corridor, maintaining roadway capacity to provide efficient traffic flow is a priority. Due to the Very High Capacity Preservation need, it is also a priority to maintain the TTI around 1.0, ensuring consistent traveling speeds at all times of the day. TTI is the ratio of the travel time during the peak period to the travel time required to make the same trip at free-flow speeds. Values greater than 1.0 indicate that motorists experience increased travel times along the corridor. US Route 17 is a reliable corridor with the highest observed TTI occurring on northbound US Route 17 during the PM peak hour being less than 1.1. Although overall corridor reliability is high, operational deficiencies at several signalized intersections cause localized congestion during peak periods. The weekday TTI is shown in **Figure 5**.

Average speed data was reviewed on the US Route 17 corridor. As expected for a signalized urban arterial, US Route 17 typically operates below the posted speed limit. However, a significant speeding trend is observed between the hours of 4:00 AM and 6:00 AM on southbound US Route 17. **Figure 6** shows the weekday average speeds. The speed limit shown is 55 mph, representing the posted speed limit of a majority of the study corridor. Data included in this graph is inclusive of the 55 mph and 45 mph zones within the study corridor.

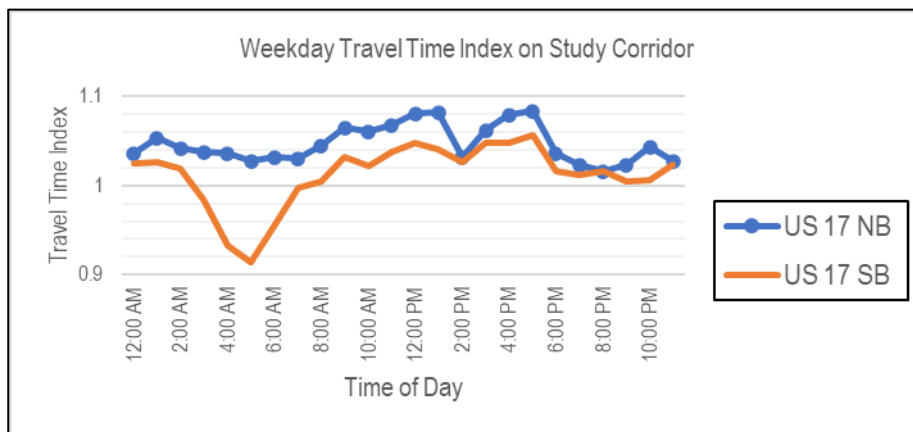


Figure 5: High-Level Operations Needs Weekday TTI

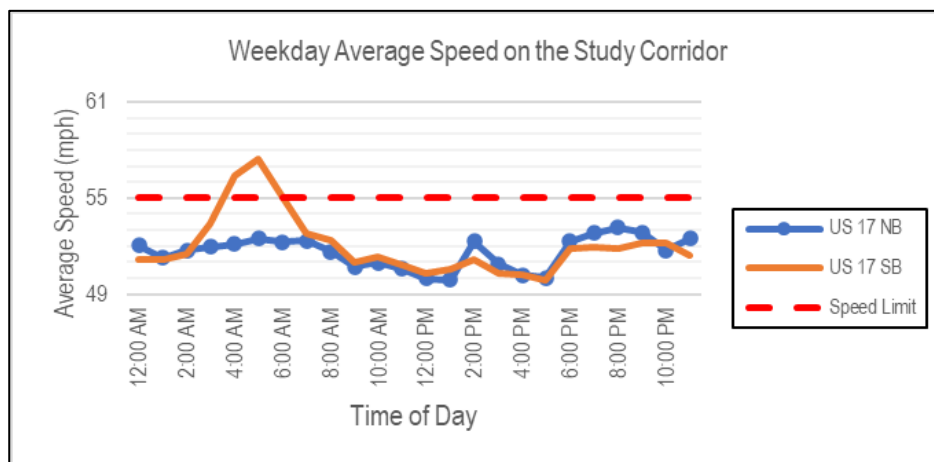


Figure 6: High-Level Operations Needs Weekday Average Speed

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The study team conducted field observations on April 3, 2025. In the afternoon, the study team observed congestion on US Route 17 near the intersections at Powhatan Drive and Hook Road/Guinea Road. The study team observed congestion at Powhatan Drive during afternoon school release (3:50 PM), where queues extended approximately 500' on the eastbound approach. The study team observed congestion near the intersection of Hook Road/Guinea Road during the PM peak period on the northbound approach, where queues extended to the upstream intersection of US Route 17 and Hayes Plaza Shopping Center.

The study area also has a High Bicycle Access VTrans need due to its proximity to activity centers, including Gloucester Courthouse, approximately 4.5 miles to the north, and Gloucester Point, approximately 1.7 miles to the south. There is no existing bike facilities, however, cyclists were observed biking on the shoulder and on the grass in both directions on US Route 17.

1.5.2 Safety and Reliability Needs

The study area exhibits a Very High VTrans need for Construction District Safety Improvement, a High need for Statewide Safety Improvement, and a Low need for Pedestrian Safety Improvement. The study team reviewed the VDOT crash data from 2020–2024 to identify high-level crash trends in the study corridor.

In total, 293 crashes were reported in the study area, including two fatalities, 120 injury crashes, and 171 crashes involving property damage only (PDO). Most crashes in the study area were either angle (43%) or rear-end (37%) crashes. **Figure 7** and **Figure 8** show additional details regarding crashes in the study area.

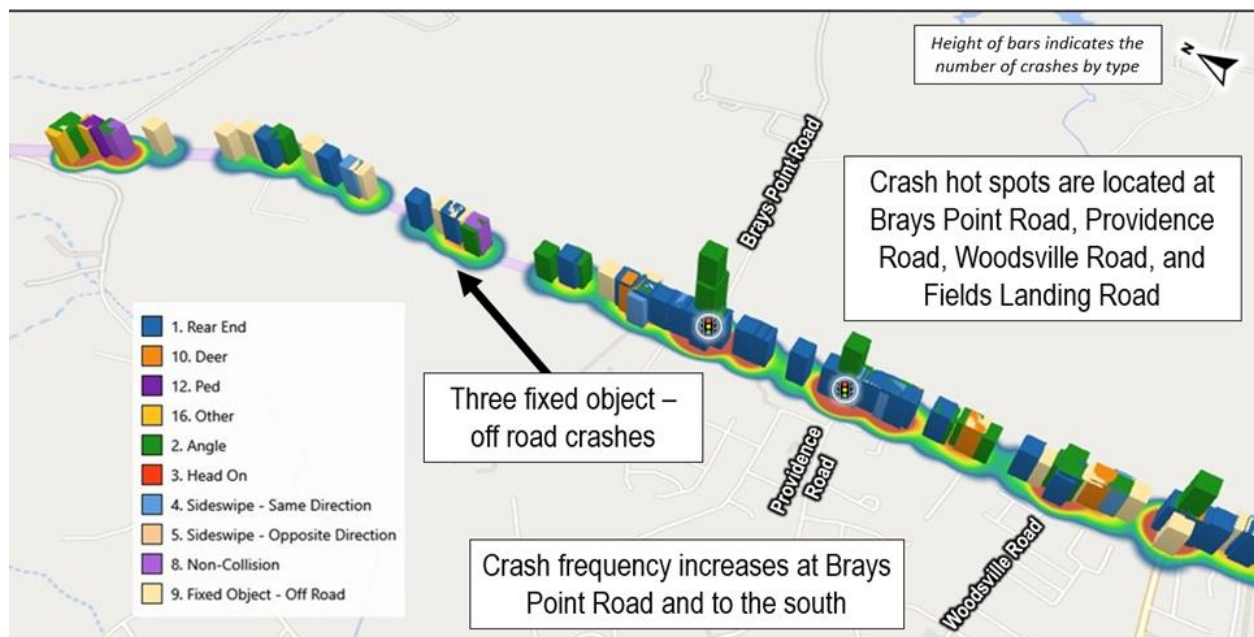


Figure 7: High-Level Safety Needs Summary – North (2020-2024)

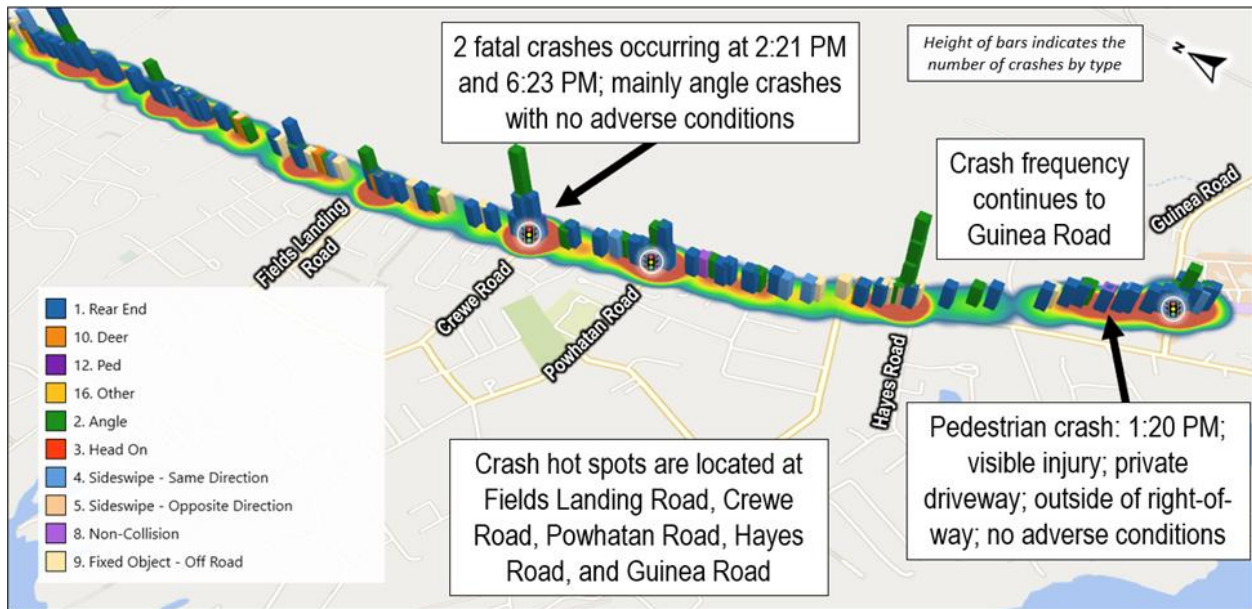


Figure 8: High-Level Safety Needs Summary – South (2020-2024)

1.5.3 Transit and Transportation Demand Management (TDM) Needs

The study area has a High Transit Access VTrans need along the entire corridor. This need is measured by the number of people who can access nearby activity centers via public transit. The nearby activity centers are Gloucester Courthouse to the north and Gloucester Point to the south. The study team reviewed transit services within the study corridor, including the Bay Transit Express micro transit service (ride-share) and the proposed Hampton Roads Transit (HRT) Metro Area Express (MAX) transit service, Route 975. This route will provide new peak period directional commuter express service between Gloucester (VDOT Park and Ride at the intersection of Route 216-Guinea Rd and York Crossing) and the Newport News Shipyard via US Route 17 and I-64. The route will operate three trips in the AM peak period and three trips in the PM peak period.

During a meeting on May 1, 2025, HRT staff confirmed that they are not planning a local fixed-route transit service within the study area. Bay Transit mentioned that the White Marsh Shopping Center serves informally as a waiting point for its buses due to it being in the middle of its service area. There is no local fixed-route public transit along the corridor. **Figure 9** depicts popular destinations served by the Bay Transit Express on-demand ride-share service. Destinations 5, 6, and 7 are located within the study corridor limits.

The study area also has a High TDM VTrans need. This need is measured through a review of VTrans Travel Markets, roadway functional classification, and roadway access management to reduce vehicle miles traveled. TDM options within or near the study area include commuter and rideshare services through MidPenRideShare, and standard Transportation Network Companies (TNC) availability (e.g., Uber, Lyft). The nearest Park and Ride is the Guinea Road Park and Ride, located at the southern terminus of the study area.

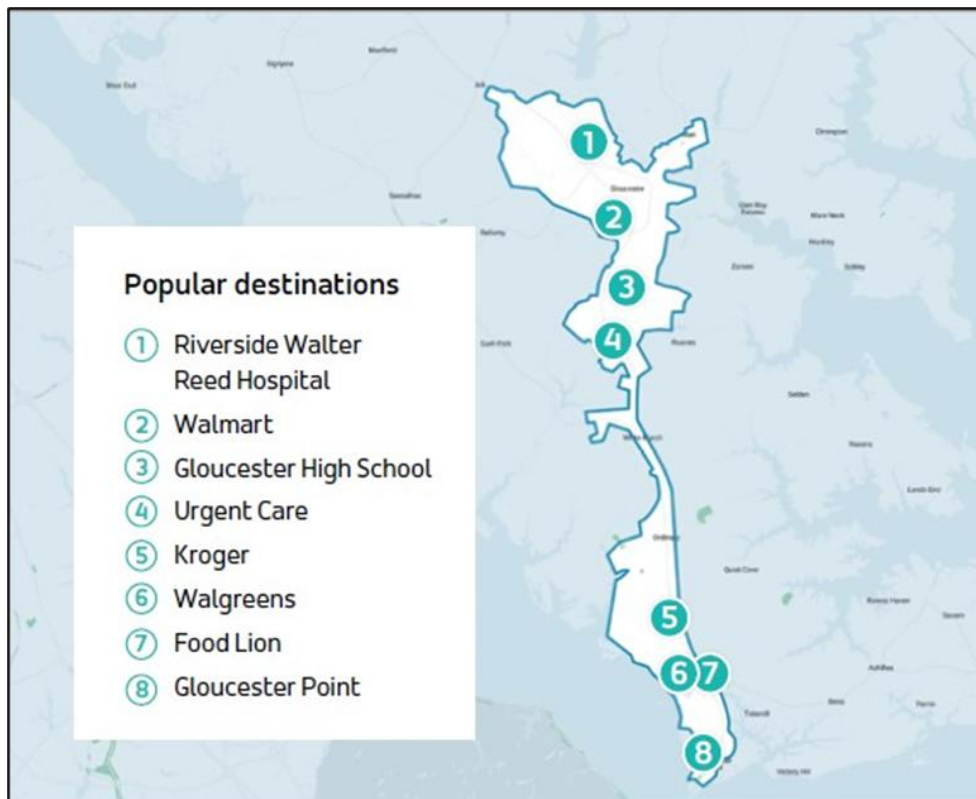


Figure 9: Bay Transit Express Popular Destinations

1.5.4 Environmental Considerations

A high-level review of existing environmental conditions was completed to better understand the existing environment, potential impacts of the project to resources within the study area, and future actions that may need to be taken to comply with state and federal environmental review regulations. The environmental resources discussed in this report are within the proposed project's study area.

A desktop review using readily available Geographic Information System (GIS) data, online environmental resource maps, census data, and other relevant information was referenced to identify existing socioeconomic and environmental conditions within the project study area. The methods utilized to complete this review were drawn from national, statewide, and local sources. Data was gathered to identify resources pertaining to the natural and human environment consistent with the resource categories included in the VDOT Categorical Exclusion checklist (Form EQ-104). The Virginia Department of Environmental Quality (DEQ) [EJScreen+ tool](#) is an enhanced environmental justice screening and mapping tool and was used to gather information on environmental and demographic indicators.

A summary of the environmental resources that were considered and the source for the data used to evaluate the existing conditions and potential impacts is summarized in **Table 3**. For this study, community services were defined as publicly accessible facilities used to provide services to the public or as gathering spaces for organizations. These may include public education, welfare, emergency services, postal office, libraries, social work, food banks, health care, police, fire services, public transportation, and public housing.

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The limits of the environmental resources review were developed by implementing a buffer from the identified roadways and interchanges that were being evaluated for improvements, as well as initial improvement concepts being developed. The width of the buffer varied based on the anticipated improvements or level of impacts in that area from 100 to 500 feet. Therefore, the limits of the environmental resources review conservatively captured an inventory of known environmental resources. As part of this review, it was assumed that the entire study area may experience some level of disturbance. However, avoidance and minimization measures would be applied throughout project development, resulting in reduced impacts as the project progresses. The resources identified in the study areas are also shown in **Figure 10**.

Table 3: Existing Environmental Conditions Summary (1)

Environmental Resource	Description	Source	Existing Resources in Study Area
Environmental Justice	Identifying communities of color and low-income communities adjacent to the project corridor, as defined by the Virginia Department of Environmental Quality. A low-income community has 30% or more of the population under the Department of Housing and Urban Development (HUD) 80% adjusted median income (AMI) and under two times the federal poverty level as defined by the American Community Survey. A community of color has a population with a higher percent of people of color as compared to the statewide average.	Virginia DEQ EJScreen+	Within the study area, there are zero Census Block Groups with communities of color (0% of population), and three Block Groups with a low-income community (37.04% below HUD 80% AMI and 35.03% below two times the poverty level; 46.34% below HUD 80% AMI and 33.64% below two times the poverty level; and 68.00% below HUD 80% AMI and 47.99% below two times the poverty level).
Limited English Proficiency	Populations who speak English less than very well within and adjacent to the project corridor	US Census Bureau People That Speak English Less Than “Very Well” in the United States	Within the study area, three census block groups were identified as having less than 3.5% (0.0-0.2%) of their populations considered as limited English proficiency (LEP).
Recreational Facilities	Places available for recreational or communal use, such as a YMCA or community parks.	Virginia Department of Conservation Recreation (VDCR) Natural Heritage Data Explorer (NHDE) VDCR Virginia Outdoor Plan Mapper Aerial Imagery Google Maps	Machicomoco State Park is located approximately 1 mile west of US Route 17 .
Community Services	Places available to the public such as hospitals, schools, and churches.	Aerial Imagery Virginia Geographic Information Network (VGIN) Gloucester County GIS Data Google Maps	The Abingdon Elementary School is located along Powhatan Drive just outside the study area. Additionally, there are several places of worship within and surrounding the study area. The Abingdon Volunteer Fire & Rescue – Station 3 is located along Hayes Road.

Table 4: Existing Environmental Conditions Summary (2)

Environmental Resource	Description	Source	Existing Resources in Study Area
Bike/Pedestrian Facilities	Existing sidewalks, bike paths, and trails.	Gloucester County GIS Data Aerial Imagery Google Maps VDCR Virginia Outdoor Plan Mapper	There are no bike facilities located within the study area. The existing sidewalk within the study area is located on the northwest and southwest corner of US Route 17 and Crewe Road, and the southwest and southeast corner of US Route 17 and Hook Road/Guinea Road. Marked pedestrian crossings are present across the south leg of US Route 17 and Hook Road/Guinea Road.
Section 6(f)	Sites funded through the Land and Water Conservation Fund (LWCF) and owned by state or local entities.	VDCR Virginia Outdoor Plan Mapper VDCR Conservation Lands	There are no conservation lands or easements near and within the study area.
Section 106* Resources	Known historic architectural or archaeological sites within or immediately adjacent to the project corridor including sites that are listed or eligible for listing on the National Register of Historic Places (NRHP) and sites that have not been evaluated are potentially eligible, or any other status as noted on the VDHR V-CRIS website.	Virginia Department of Historic Resources (VDHR) Virginia Cultural Resource Information System (V-CRIS) National Register of Historic Places (NRHP)	Several listed or determined eligible historic resources were identified within the study area including the Abingdon Episcopal Church and the former Rosenwald School.
Section 4(f)*	Publicly owned parks or recreation lands, wildlife and waterfowl refuges, and privately and publicly owned historic sites protected by Section 4(f) of the U.S. Department of Transportation Act of 1966.	VDCR NHDE VDCR Virginia Outdoor Plan Mapper VDHR V-CRIS Gloucester County GIS Data	No publicly owned parks or recreation lands, wildlife and waterfowl refuges, or privately and publicly owned historic sites are located within the study area or the surrounding vicinity.

Table 5: Existing Environmental Conditions Summary (3)

Environmental Resource	Description	Source	Existing Resources in Study Area
Protected Species	Threatened and endangered species, as defined by the state and federal government databases, existing within or near the project corridor.	United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) Virginia Department of Wildlife Resource (VDWR) Virginia Fish and Wildlife Information Services (VaFWIS) VDWR Wildlife Environmental Review Map Service (WERMS) VDWR Bat Consultation Tool (Northern Long-Eared Bat [NLEB], Tri-Colored Bat, and Little Brown Bat) Center for Conservation Biology (CCB) Eagle Nest Locator	USFWS No critical habitats are located within the study area. Bald and/or golden eagles were noted in the study area. VDWR Databases <u>VDWR VaFWIS</u>- Mabee's Salamander are listed as state threatened. Site observations were identified within a ¼ mile, 1-mile, and 2-mile search radius. The loggerhead sea turtles are listed as federally threatened and state threatened. Site observations were identified within a ¼ mile, 1-mile, and 2-mile search radius. Kemp's ridley sea turtles are listed as federal and state endangered. Site observations were identified within a ¼ mile, 1-mile, and 2-mile search radius. Atlantic sturgeons are listed as federal and state endangered. Site observations were identified within a 2-mile search radius. The Peregrine Falcon is listed as state threatened. Site observations were identified within a 2-mile search of the study area. <u>VDWR WERMS</u> - Mabee's Salamanders are located at the northern terminus of the study area as well as on the east side of US Route 17 at Brays Point Road. Loggerhead sea turtles are found at the southern terminus of the project on the west side of US Route 17. <u>VDWR Bat Consultation Tool</u> - The study area is within the maternity roost for the NLEB, and within the consultation range of the tri-colored bat but outside the year-round presence zone, capture area, and hibernacula regulatory buffer for all three bats CCB - No nests were identified within the study area.
Floodplains	Areas considered at risk for flooding during 100-year and 500-year storms.	Federal Emergency Management Agency (FEMA) Flood Hazard Areas	A small portion of the study area and the surrounding area along Guinea Road are in the 500-Year Floodplain areas.

Table 6: Existing Environmental Conditions Summary (4)

Environmental Resource	Description	Source	Existing Resources in Study Area
Surface Water & Wetlands	Review of NHD and NWI to determine the likelihood of streams and wetlands present within and immediately adjacent to the project corridor.	United States Geological Survey (USGS) National Hydrography Dataset (NHD) USFWS National Wetland Inventory (NWI)	Multiple wetlands are scattered within and around the study area. Portions of the study area and surrounding vicinity are located within the Chesapeake Bay Preservation Area.
Hazardous Materials	Any documented spills, releases, or history of contamination on surrounding sites that may be impacted by the proposed project.	Virginia Department of Environmental Quality (DEQ) Environmental Data Mapper	Multiple registered petroleum tank facilities and closed petroleum release cases are located within and directly outside the study area.
Open Space, Conservations Easements, Agricultural, and Forestal Districts	Lands protected by a voluntary agreement with a non-profit land trust or government agency that allows a landowner to limit the type or amount of development on the property. Agricultural and forestal districts are those defined as such in the zoning map.	VDCR NHDE VDCR Outdoors Plan Mapper Gloucester County GIS Data The Virginia Outdoor Foundation The Nature Conservancy	Forested areas are scattered within and around the study area in all directions. No conservation easements or agricultural districts were located within the study area or in the surrounding vicinity.
Farmland	Lands with soils that are considered prime farmland and outside a census-designated urban area.	United States Census Bureau Urban Area Maps Natural Resources Conservation Service Web Soil Survey	Prime farmland is scattered within the study area along US Route 17. The area to the west of US Route 17 between 1,600' north of Brays Point Road to Hook Road/Guinea Road, and the area south of Hook Road/Guinea Road is census designated urban area. All prime farmlands within the area are in census designated non-urban areas and is therefore subject to the Farmland Protection Policy Act.
Land Use	Land Area that has been given a specific use based on local jurisdiction land use designations.	Gloucester County GIS Data	The study area is primarily residential and commercial along US Route 17. Most of the development is located to the west of US Route 17 with more scattered development and marsh areas to the east.

**Assessment based on the currently listed, determined eligible, or recommended eligible for the NRHP properties pending potential further investigations for recommendations not yet confirmed by VDHR or for individual sites not yet evaluated.*

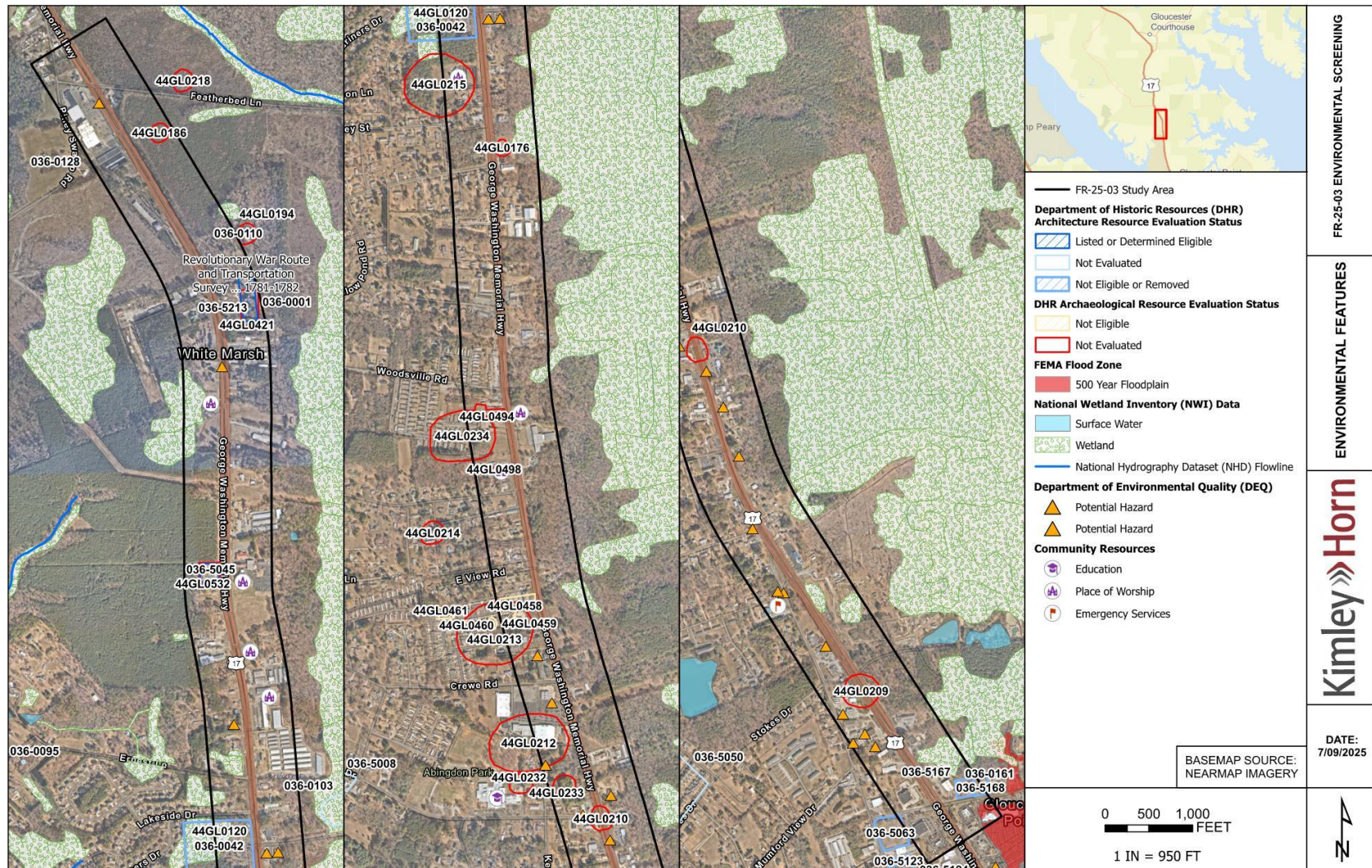


Figure 10: Existing Environmental Conditions Map

1.6 Detailed Needs Validation

The study team performed additional traffic operations and safety analysis to further quantify the existing and anticipated needs within the study area. Results from these analyses were used as a baseline when comparing the conditions of the proposed improvements to the existing and projected No-Build conditions.

1.6.1 Existing Conditions Traffic Operations and Safety Analysis

The study team conducted a multifaceted analysis of the existing conditions of the study corridor, which included reviewing previous studies, conducting a safety analysis, conducting a preliminary field review, analyzing traffic operations using Synchro, and reviewing pedestrian, bicycle, and transit activity. Preliminary Synchro results of the existing conditions analysis and preliminary brainstorming concepts were presented to the Study Work Group on June 10, 2025. The presentation is provided for reference in **Appendix C**.

Relevant Studies, Plans, and Projects

Information for the following studies, plans, and projects was collected and reviewed to identify previous or ongoing recommendations in and adjacent to the study area:

Operations Projects

- Modified flashing yellow arrow (FYA) phasing at Crewe Road (2025)
- US Route 17 (George Washington Memorial Highway) Traffic Signal Optimization (2019)
- Advanced warning on southbound US Route 17 for vehicles turning onto US Route 17 at Hayes Road (2018)
- US Route 17 at Route 216 intersection improvements (2024)

Funded Projects

- UPC 115631: Construct an eastbound right-turn lane at Providence Road
 - Hampton Roads staff indicated that this project has not been constructed due to unseen right-of-way costs during the planning phase
- UPC 110627: Widen US Route 17 from four to six lanes from Farmwood Road to 0.19 miles north of Guinea Road
- UPC 028633: Create HRT express commuter bus service between Gloucester, York County, and Newport News Shipyard

Previous Studies

- Hampton Road Long Range Transportation Plan (LRTP)
- Route 17 Widening – Tidemill to Guinea
- Previous studies at US Route 17 and Providence Road
- SMART SCALE round 5 and 6 concepts
- Hayes Royal Farms Development TIA

Safety Analysis

A safety analysis was conducted using crash data from the VDOT Crash Database over a five-year period (January 1, 2020–December 31, 2024). In total, 293 crashes were reported in the study area, including two fatalities. Summaries of crashes in the study area by severity and type are shown in **Table 7** and **Table 8**, respectively. **Appendix C** includes a detailed crash summary for the study area.

Crash severity is coded using the KABCO scale, which is defined using the following classifications:

- K—Fatality
- A—Suspected Serious Injury
- B—Suspected Minor Injury
- C—Possible Injury
- PDO—Property Damage Only

US Route 17 and White Marsh Shopping Center

The intersection of US Route 17 and White Marsh Shopping Center had six total crashes between 2020 and 2024. Five of these six crashes were reported to be angle crashes, of which two crashes involved a northbound left turn, and two crashes involved an eastbound left turn. Three of the six crashes occurred when drivers failed to yield the right-of-way when making a left turn.

US Route 17 and Brays Point Road

The intersection of US Route 17 and Brays Point Road had 32 total crashes between 2020 and 2024. Angle and rear-end crashes are the most significant crash types, with a pattern of serious injury crashes coming from the southbound left-turn lane. Twelve angle crashes occurred when a motorist made a southbound left turn. Of these twelve crashes, four occurred during flashing yellow arrow phases. A total of 17 rear-end crashes occurred at the intersection, of which eight occurred on US Route 17 northbound and seven occurred on US Route 17 southbound.

US Route 17 and Providence Road

The intersection of US Route 17 and Providence Road had 22 total crashes between 2020 and 2024. There were 10 rear-end crashes with six on US Route 17 southbound, three on US Route 17 northbound, and one on Providence Road eastbound. Four of the nine angle crashes occurred when a northbound vehicle failed to yield the right of way when making a left turn during a flashing yellow arrow.

US Route 17 and Jaak's Auto Sales/Habitat for Humanity

The intersection of US Route 17 and Jaak's Auto Sales/Habitat for Humanity had six total crashes between 2020 and 2024, including two rear-end crashes and two angle crashes. Four crashes were property damage only crashes, and two were visible injury crashes.

US Route 17 and Woodsville Road

The intersection of US Route 17 and Woodsville Road had eight total crashes between 2020 and 2024. Three of the crashes were linked to vehicles attempting U-turns, of which three crashes involved a motorist making a northbound U-turn, and one crash involved a motorist making a southbound U-turn. Two U-turn crashes resulted in injury crashes, one of which was reported as a severe injury crash. Two of the eight crashes involved motorists attempting left turns from Woodsville Road onto US Route 17 northbound.

US Route 17 and Fields Landing Road

The intersection of US Route 17 and Fields Landing Road had nine total crashes between 2020 to 2024. Five of the nine crashes occurred when an eastbound vehicle failed to yield the right of way when turning left onto northbound US Route 17. Four of the five eastbound angle crashes were reported with injuries.

US Route 17 and Colemans Crossing Avenue

The intersection of US Route 17 and Colemans Crossing Avenue had two total crashes between 2020 and 2024. One crash was a fixed-object off-road crash, and one crash was an angle crash due to road work. Colemans Crossing Avenue is a partial access (right-in right-out only) cross street with US Route 17.

US Route 17 and Crewe Road

The intersection of Crewe Road and US Route 17 had 41 total crashes between 2020 and 2024, including two fatalities. 26 crashes were angle crashes, with 16 involving northbound left turns, and nine of the 16 occurring with a flashing yellow arrow. 10 rear-end crashes occurred, with seven of them being due to vehicles slowing down or stopped at the signal, with the potential of two other rear-end crashes due to the signal, and one rear-end crash due to a lane change. Three head-on crashes occurred while making a northbound left-turn movement.

This is the only intersection in the study corridor to have fatalities in the five-year period. The left-turn signal heads at the intersection were upgraded from doghouse signals to a flashing yellow arrow (FYA) signals in late 2022. Following the modification, the highest number of crashes occurred at this intersection in 2023 and 2024, including the two fatalities in 2024. In response to an increase in crashes involving northbound left-turn movements, VDOT removed the northbound left-turn protected-permissive phasing between the hours of 7:30 AM – 7:30 PM and implemented northbound left-turn protected-only phasing during this time.

US Route 17 and Powhatan Drive

The intersection of US Route 17 and Powhatan Drive had 16 total crashes between 2020 and 2024. Eight of the 16 crashes occurred due to slowing or congested traffic at the signal, and four crashes occurred due to a vehicle running at a red light. This intersection has the highest proportion of property damage only (PDO) crashes with 75% of all crashes being PDO.

US Route 17 and Hayes Road

The intersection of US Route 17 and Hayes Road had 19 total crashes between 2020 and 2024. Nine angle crashes and one sideswipe – same direction crash occurred when motorists were making an eastbound left turn onto northbound US Route 17, with five more angle crashes expected to have been making an eastbound left as well.

US Route 17 and VAMAC/Farmers Daughter Produce

The intersection of US Route 17 and VAMAC/Farmers Daughter Produce had three total crashes between 2020 and 2024. Two angle crashes occurred due to vehicles not yielding the right of way to northbound vehicles. 1 fixed object – off road crash occurred due to equipment failure within the vehicle.

US Route 17 and Hook Road/Guinea Road

The intersection of US Route 17 and Hook Road/Guinea Road had 35 total crashes between 2020 and 2024. 19 rear-end crashes occurred with 11 related to the signal, two due to yielding to emergency

vehicles, two due to driving under the influence, and the four remaining crashes caused by other factors. 15 angle crashes occurred with six of the 15 occurring with at least one vehicle being reported speeding, and six angle crashes occurred when at least one vehicle did not obey the traffic signal.

Rest of Corridor

Along the rest of the US Route 17 corridor within the study area, there were 90 crashes between 2020 and 2024, with 38 rear-end crashes, 21 fixed object off-road crashes, 16 angle crashes, seven sideswipe same-direction crashes, 4 animal crashes, and 1 pedestrian crash. One-third of all crashes in this segment occurred at 11 median openings. These access-related conflicts specifically include rear-end crashes involving vehicles slowing down to make a turn and angle crashes involving vehicles turning left from a side street or median opening.

Table 7: Study Area Crashes by Crash Severity

Intersection	# of Crashes— K	# of Crashes— A	# of Crashes— B	# of Crashes— C	# of Crashes— PDO	Total
White Marsh Shopping Center	0	0	3	1	2	6
Brays Point Road	0	5	9	0	18	32
Providence Road	0	0	7	1	14	22
Jaak's Auto Sales/ Habitat for Humanity	0	0	2	0	4	6
Woodsville Road	0	1	1	0	6	8
Fields Landing Road	0	0	5	0	4	9
Colemans Crossing Avenue	0	1	0	0	1	2
Crewe Road	2	3	19	2	15	41
Powhatan Drive	0	1	3	0	12	16
Chapman Drive	0	0	1	0	3	4
Hayes Road	0	2	7	0	10	19
VAMAC/Farmers Daughter Produce	0	0	0	1	2	3
Hook Road/Guinea Road	0	2	11	1	21	35
Rest of Corridor (Crashes not at a study intersection)	0	3	24	4	59	90
Total	2 (1%)	18 (6%)	92 (31%)	10 (4%)	171 (58%)	293

Table 8: Study Area Crashes by Crash Type

Intersection	# of Crashes – Angle	# of Crashes – Rear End	# of Crashes – Head-On	# of Crashes – Fixed Object	# of Crashes – Side-swipe	# of Crashes – Pedestrian	# of Crashes – Other	Total
White Marsh Shopping Center	5	0	0	0	0	0	1	6
Brays Point Road	14	17	0	0	1	0	0	32
Providence Road	9	10	0	1	1	0	1	22
Jaak's Auto Sales/ Habitat for Humanity	2	2	0	0	1	0	1	6
Woodsville Road	5	2	0	0	0	0	1	8
Fields Landing Road	7	1	0	1	0	0	0	9
Colemans Crossing Avenue	1	0	0	1	0	0	0	2
Crewe Road	26	10	3	1	0	0	1	41
Powhatan Drive	7	6	0	0	2	0	1	16
Chapman Drive	1	3	0	0	0	0	0	4
Hayes Road	16	1	0	1	1	0	0	19
VAMAC/Farmers Daughter Produce	2	0	0	1	0	0	0	3
Hook Road/Guinea Road	15	19	0	0	1	0	0	35
Rest of Corridor (Crashes not at a study intersection)	16	38	0	21	7	1	7	90
Total	126 (43%)	109 (37%)	3 (1%)	27 (9%)	14 (5%)	1 (<1%)	13 (4%)	293

PROJECT PIPELINE

One pedestrian crash and two bicycle crashes occurred in the study area. The pedestrian crash occurred while a vehicle was turning right from a restaurant driveway and hit the pedestrian walking on the roadway against traffic. One of the bike crashes involved the cyclist attempting to cross the street, and the other crash occurred while the cyclist entered US Route 17 from a parking lot. Crossing infrastructure was not present for any of these collisions. A summary of the pedestrian and bicycle crashes is shown in **Figure 11**.

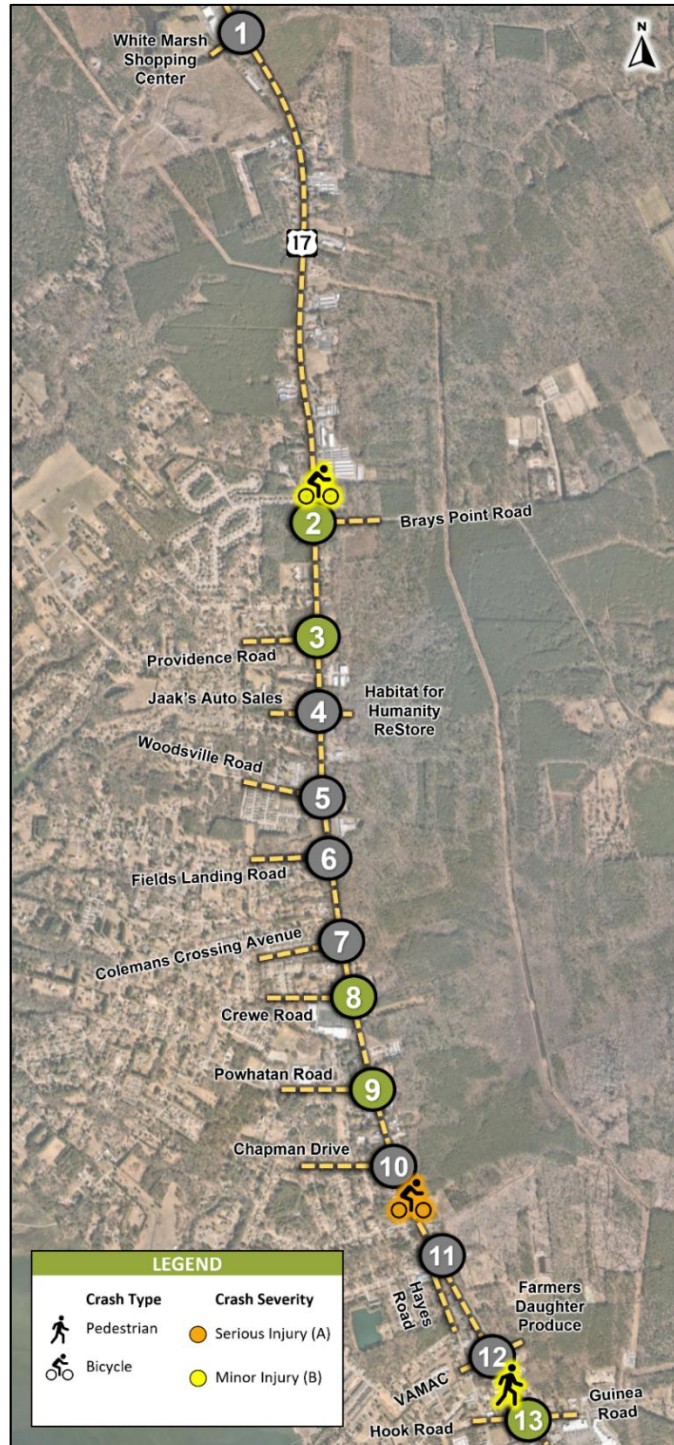


Figure 11: 2020 – 2024 Pedestrian and Bicycle Crash Map

Potential for Safety Improvement (PSI) and Pedestrian and Bicycle Safety Action Plan (PBSAP) Locations

All intersection and roadway segments within the VDOT linear referencing system (LRS) are evaluated annually for the potential for safety improvement (PSI) based on the Highway Safety Manual (HSM) methodology by VDOT. The crash frequency, severity of crashes, volume, and length of segment are contributing factors in the predictive analysis. Crash predictions, based on the safety performance function (SPF) crash data files, are made for intersections and segments. The top 100 intersections and 100 miles of segments are published by VDOT for each district on an annual basis.

US Route 17 and Brays Point Road, as well as US Route 17 and Crewe Road, were identified as 2020 PSI intersections with rankings of 63 and 25 within the Fredericksburg District, respectively. The section of US Route 17 between Featherbed Lane and 1,300' north of Ernest Lane is PSI Mile Rank 38.

Additionally, US Route 17 is a VDOT Pedestrian and Bicycle Safety Action Plan (PBSAP) priority corridor and is in the statewide top 5% of corridors.

Field Review Observations

A preliminary field review of the study area was conducted on Thursday, April 3, 2025, to verify existing conditions, confirm traffic control devices and lane configurations, and observe peak hour traffic conditions and driver behavior. The existing lane configurations and speed limits in the study area are summarized in **Figure 12**, **Figure 13**, and **Figure 14**. The following observations were made along US Route 17 during the field review:

US Route 17 and White Marsh Shopping Center

- Eastbound left turn queueing of three vehicles during the PM peak period. As queueing occurred for this approach, multiple vehicles were observed in the median at the same time, demonstrating that motorists make the left-turn to access northbound US Route 17 in two stages.

US Route 17 and Providence Road

- Northbound left turn maximum queue of nine vehicles (PM peak period)

US Route 17 and Fields Landing Road

- A southbound U-turn was performed by a pickup truck that was unable to complete the maneuver without going onto the outside grass shoulder of the northbound right lane

US Route 17 and Powhatan Drive

- Eastbound queueing observed at all times of the day, specifically during morning school drop-off times (8:30 AM-9:00 AM) and afternoon school release times (3:50 PM)
- During the afternoon school release, the eastbound right turn lane was blocked when approximately eight vehicles (200' upstream) were in the through-left lane. During this time, cycle failures and unsafe drive behavior on the eastbound approach were observed.

US Route 17 and Hayes Road

- Eastbound queueing of four vehicles was observed due to a lack of gaps in northbound and southbound traffic during the PM peak period. As queueing for the eastbound approach occurred, it

was more common to see multiple vehicles in the median at the same time as motorists attempted to make a two-stage left turn from Hayes Road to US Route 17 northbound

US Route 17 and Hook Road/Guinea Road

- Westbound right turn lane queuing (PM peak period) observed to extend beyond the storage length and block the upstream intersection of York Crossing Drive
- Northbound queues extended to the upstream signalized intersection (PM peak period)

Additional observations in the study area

- Multiple openings in medians that lead to smaller-sized businesses or abandoned buildings
- Negative offset left-turns are present at multiple intersections and offer reduced visibility if another vehicle is waiting to turn from the opposite lane
- Minimal pedestrians and bicyclists, three pedestrians and two bicyclists, observed alongside southbound US Route 17. Additionally, along northbound US Route 17, one bicyclist and one pedestrian were observed.

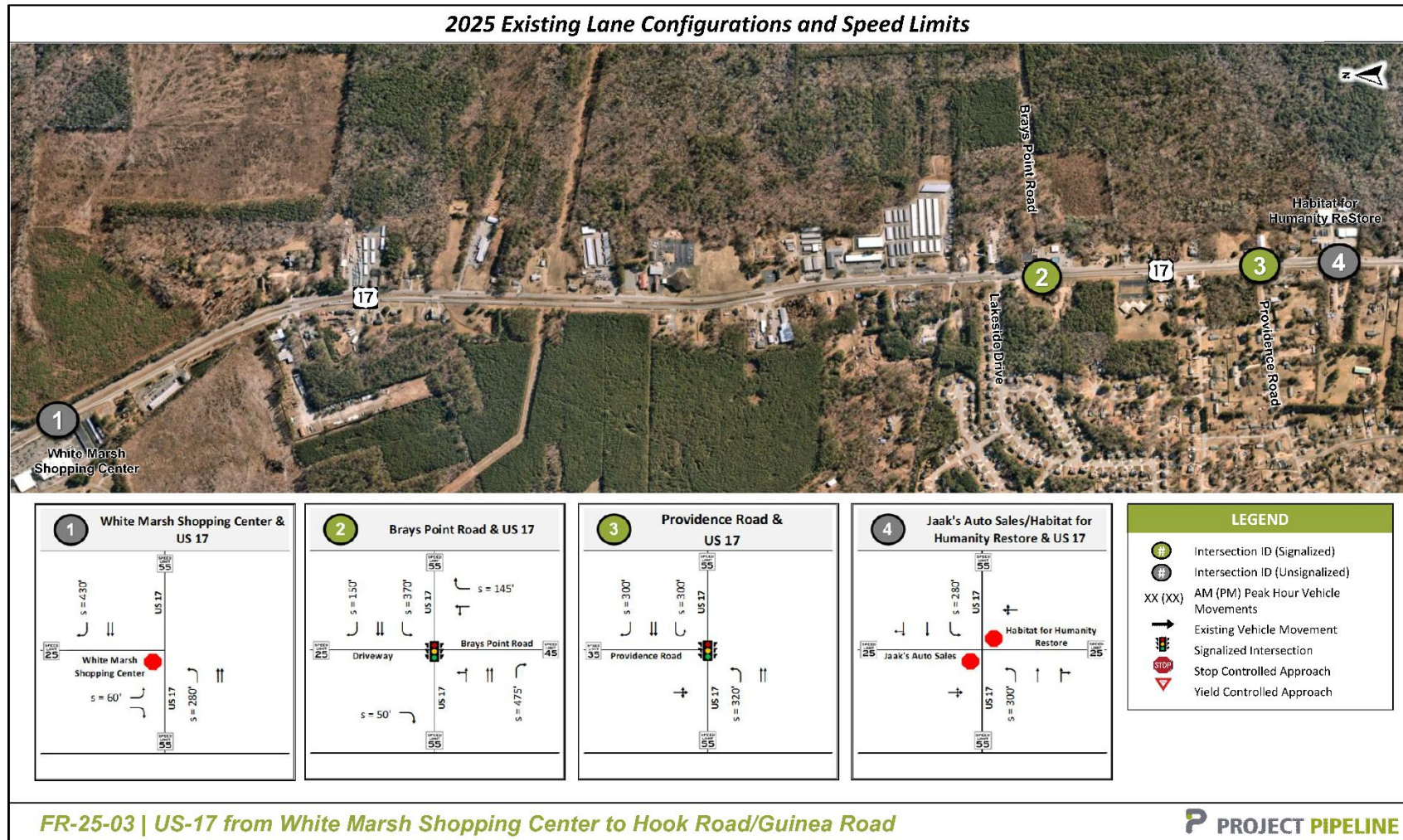


Figure 12: 2025 Existing Lane Configurations and Speed Limits (1)

2025 Existing Lane Configurations and Speed Limits

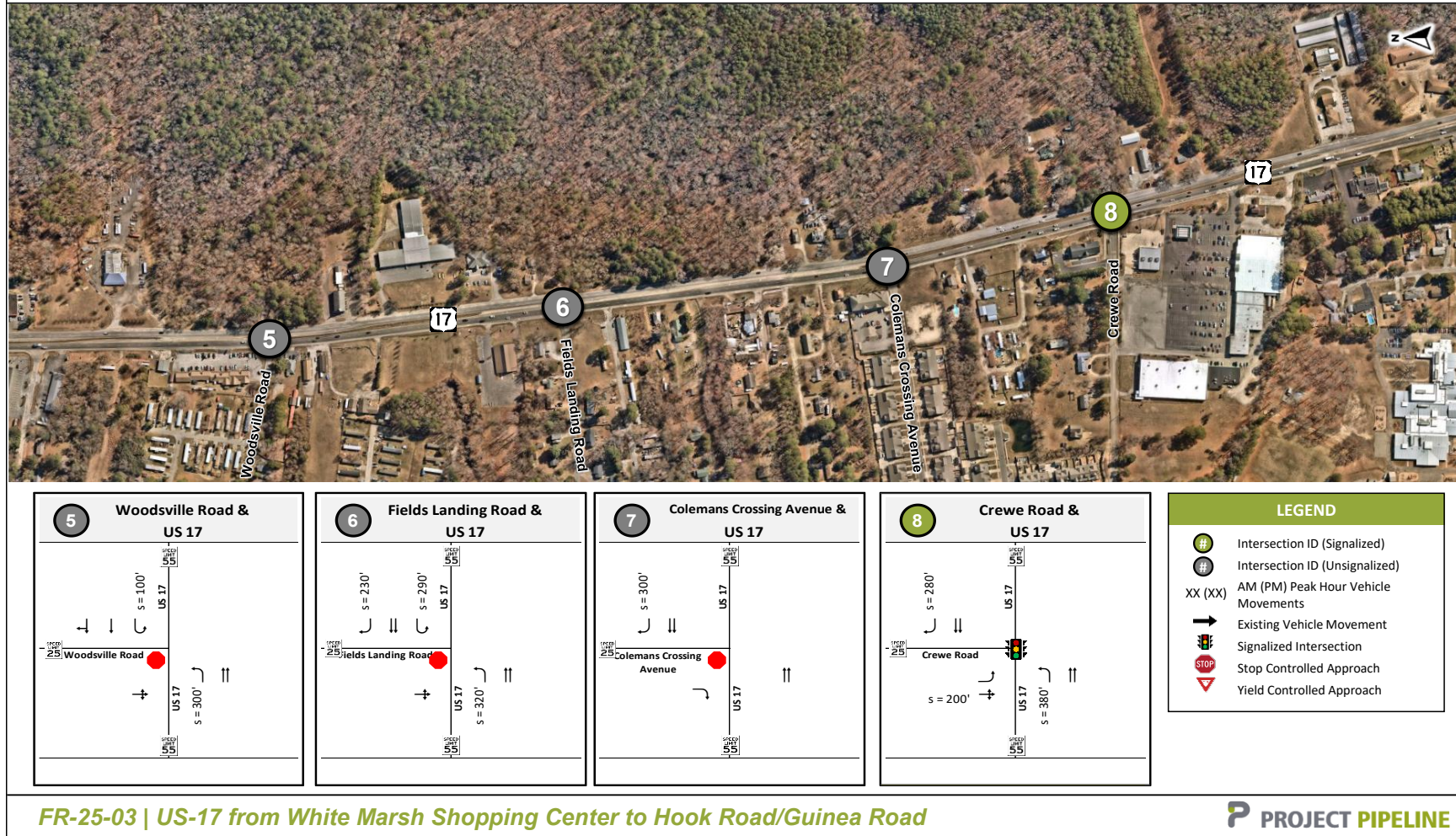
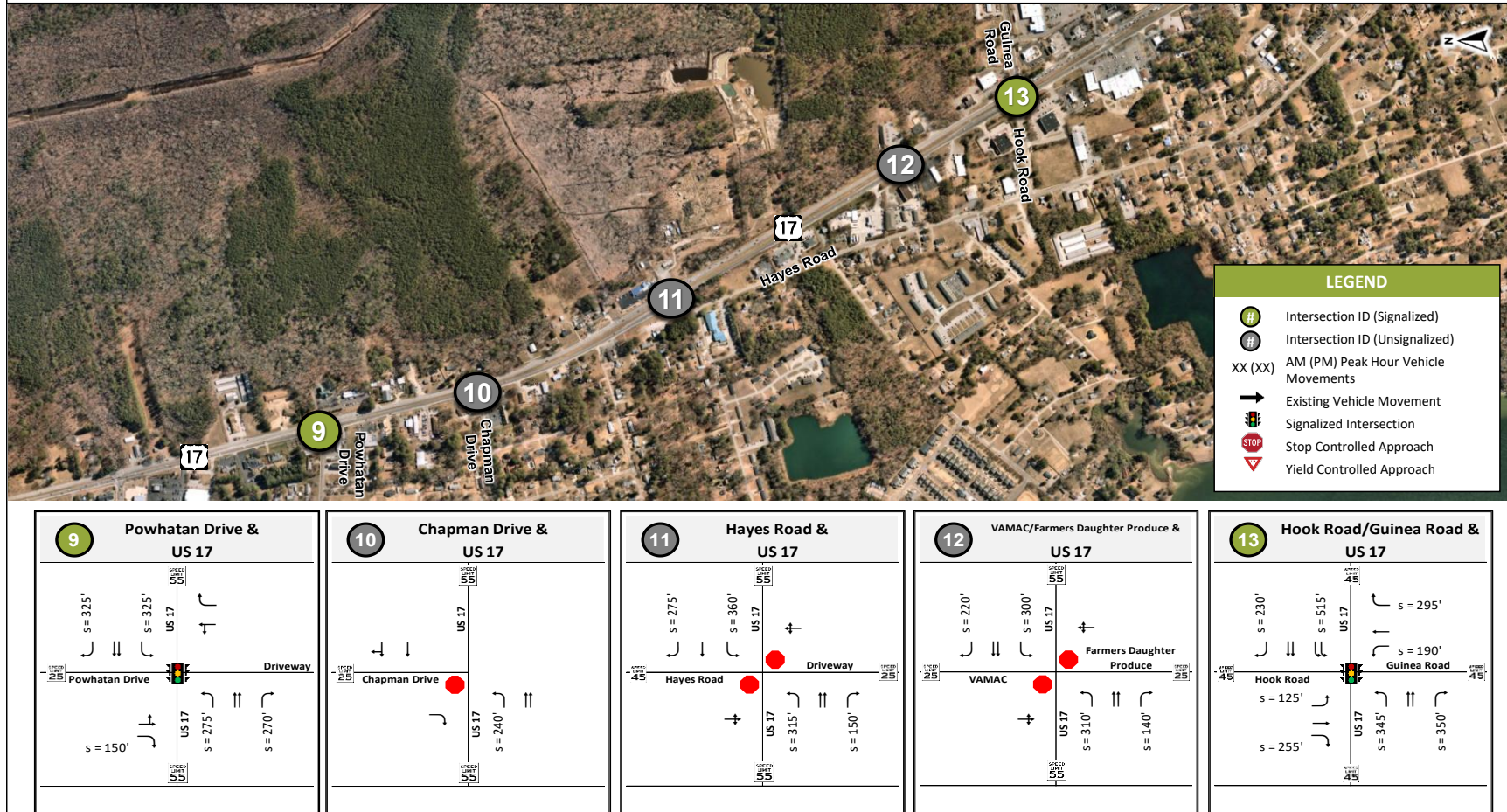


Figure 13: 2025 Existing Lane Configurations and Speed Limits (2)

2025 Existing Lane Configurations and Speed Limits



FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 14: 2025 Existing Lane Configurations and Speed Limits (3)

Existing Conditions Synchro Analysis

The study team conducted a traffic operations analysis to evaluate the overall performance of the study corridor under existing (2025) AM and PM peak hour conditions. Existing conditions were modeled using Synchro 11.

The existing AM and PM Synchro models were developed based on the existing roadway geometry and collected traffic count data. Input and analysis methodologies were consistent with the *VDOT Traffic Operations and Safety Analysis Manual (TOSAM)*, Version 2.0.

Traffic Data

Twelve-hour vehicular turning movement, pedestrian, and bicycle count data was collected at the 13 study intersections on Thursday, April 3, 2025. 48-hour vehicle classification count data was collected at two locations along the study corridor between Tuesday, April 1, 2025, and Thursday, April 3, 2025. Construction occurred in the northbound direction that interrupted the data collection on the vehicle classification counts north of Brays Point Road on Thursday, April 3, 2025. The study team used the available vehicle classification count data from Tuesday, April 1, 2025, to fill in the missing data for April 3, 2025. The AM and PM peak hours were determined to be 7:15 AM – 8:15 AM and 4:00 – 5:00 PM. Raw traffic data can be found in **Appendix C**.

Existing volumes were not balanced along the study corridor due to the compounding of imbalances attributed to driveways and uncounted intersections, creating large adjustments to the through volumes. The existing volumes are shown in **Figure 15**, **Figure 16**, and **Figure 17**. Heavy vehicle percentages and peak hour factors are included in **Figure 18**, **Figure 19**, and **Figure 20**.

Level of Service (LOS) Criteria

The intersection Level of Service (LOS) is a qualitative measure that describes a driver's perception of the operating conditions. LOS ratings range from A to F. LOS A indicates little or no congestion, and LOS F indicates severe congestion, unstable traffic flow, and/or stop-and-go conditions.

Table 9 summarizes the LOS corresponding to the delay at unsignalized and signalized intersections as specified in the HCM. The delay criteria for LOS differ slightly for unsignalized and signalized intersections due to driver expectations and behavior. For signalized intersections, LOS is calculated as the lost travel time caused by vehicles waiting at a traffic signal. For unsignalized intersections, LOS and corresponding delay is calculated by determining the number of gaps that are available in the conflicting traffic stream, since the LOS analysis assumes that the traffic on the mainline is not affected by the traffic on the side street.

Table 9: Level of Service Criteria

Level of Service	Control Delay (seconds/vehicle) - Signalized Intersection	Control Delay (seconds/vehicle) - Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 to 20.0	> 10.0 to 15.0
C	> 20.0 to 35.0	> 15.0 to 25.0
D	> 35.0 to 55.0	> 25.0 to 35.0
E	> 55.0 to 80.0	> 35.0 to 50.0
F	> 80.0	> 50.0

2025 Existing Peak Hour Volumes

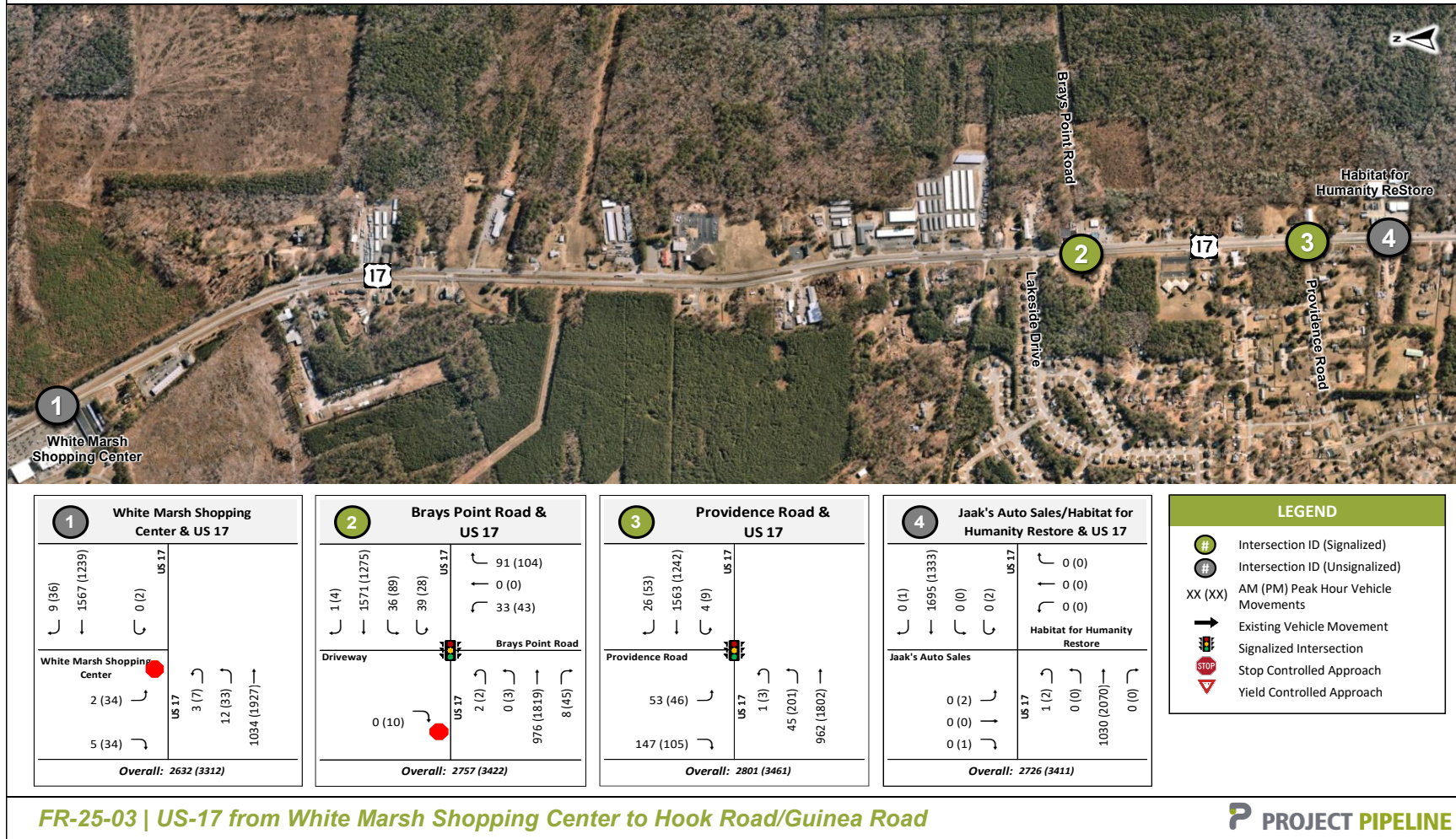
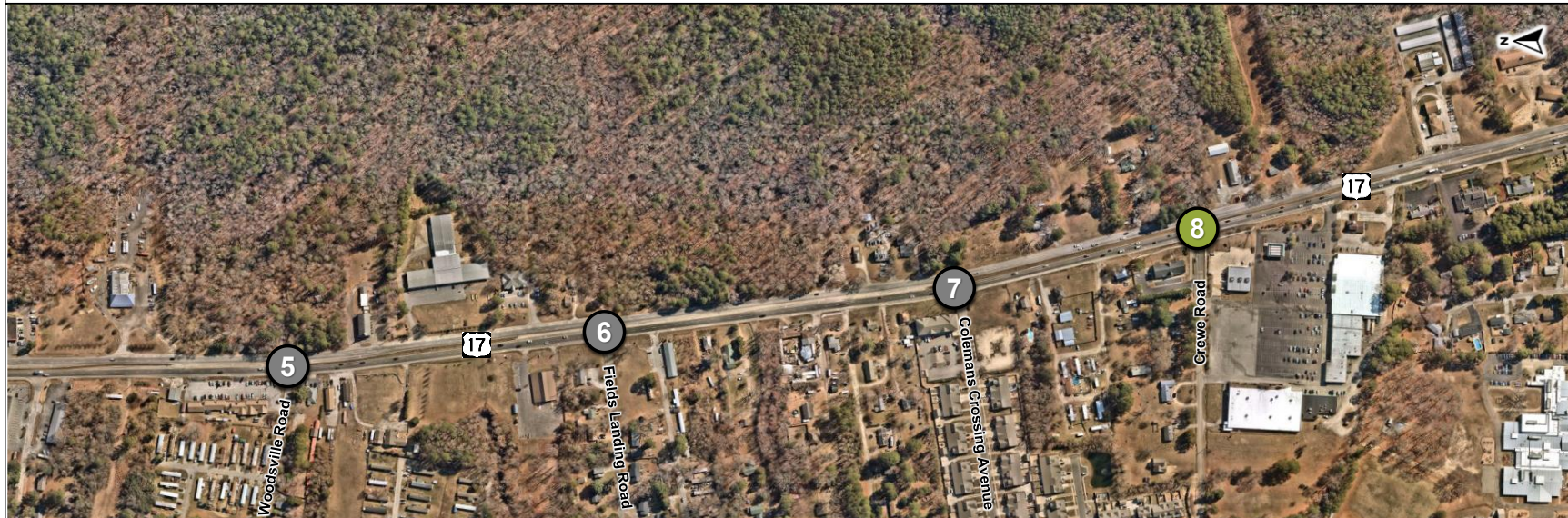


Figure 15: 2025 Existing Peak Hour Volumes (1)

2025 Existing Peak Hour Volumes



5 Woodville Road & US 17	
4 (24) 1685 (1325) 3 (7) US 17 13 (6) 30 (38)	0 (9) 12 (35) 1024 (2072) US 17
Overall: 2771 (3516)	

6 Fields Landing Road & US 17	
9 (25) 1665 (1324) 16 (5) US 17 8 (8) 36 (25)	0 (4) 5 (27) 1025 (2075) US 17
Overall: 2764 (3493)	

7 Colemans Crossing Avenue & US 17	
4 (8) 1709 (1348) US 17 8 (8)	1019 (2106) US 17
Overall: 2740 (3470)	

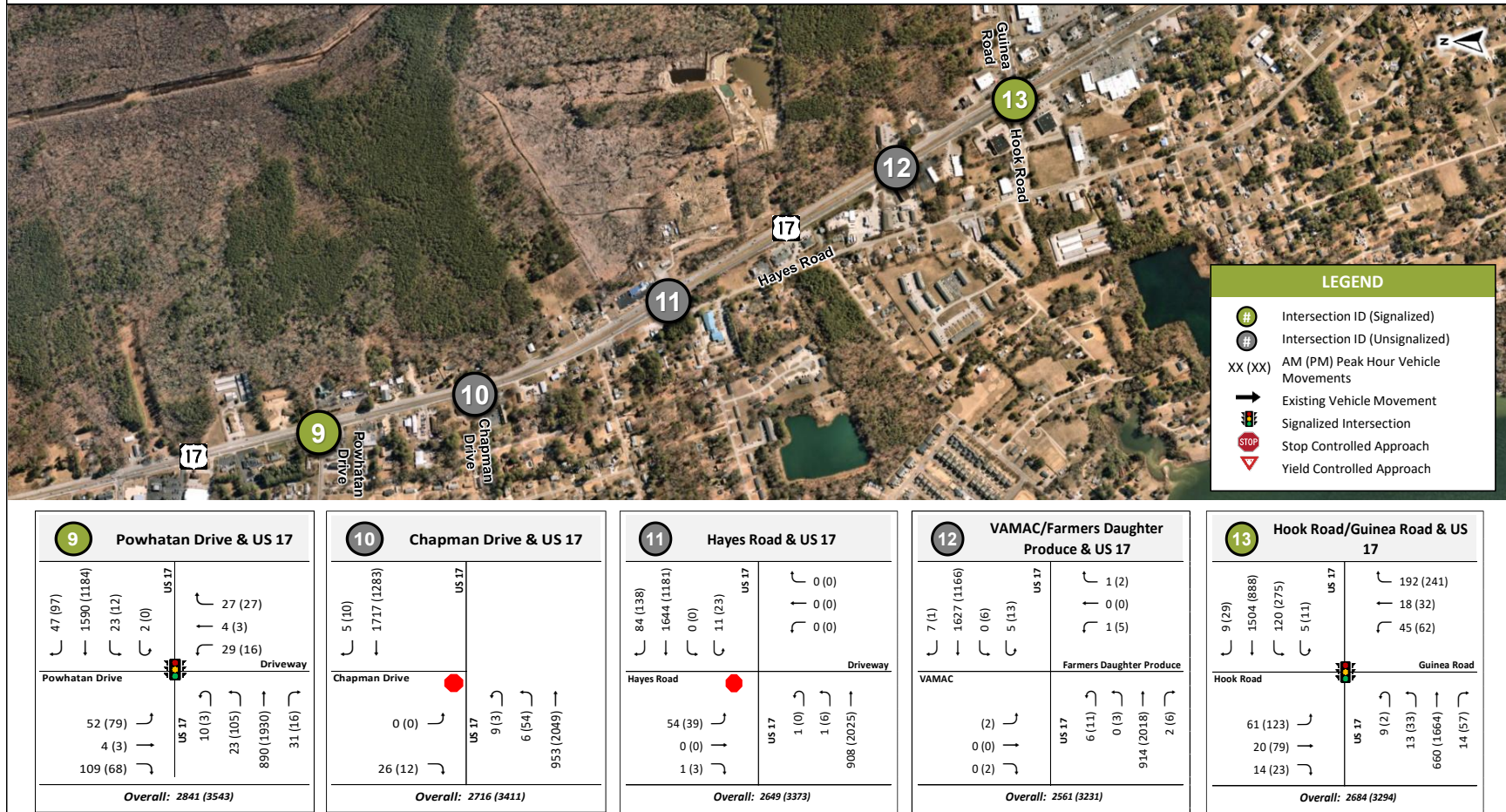
8 Crewe Road & US 17	
60 (156) 1644 (1208) US 17 94 (156) 25 (51)	0 (6) 30 (119) 914 (1927) US 17
Overall: 2767 (3623)	

LEGEND	
	Intersection ID (Signalized)
	Intersection ID (Unsignalized)
	AM (PM) Peak Hour Vehicle Movements
	Existing Vehicle Movement
	Signalized Intersection
	Stop Controlled Approach
	Yield Controlled Approach

FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 16: 2025 Existing Peak Hour Volumes (2)

2025 Existing Peak Hour Volumes



FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 17: 2025 Existing Peak Hour Volumes (3)

2025 Existing Heavy Vehicle Percentages and Peak Hour Factors

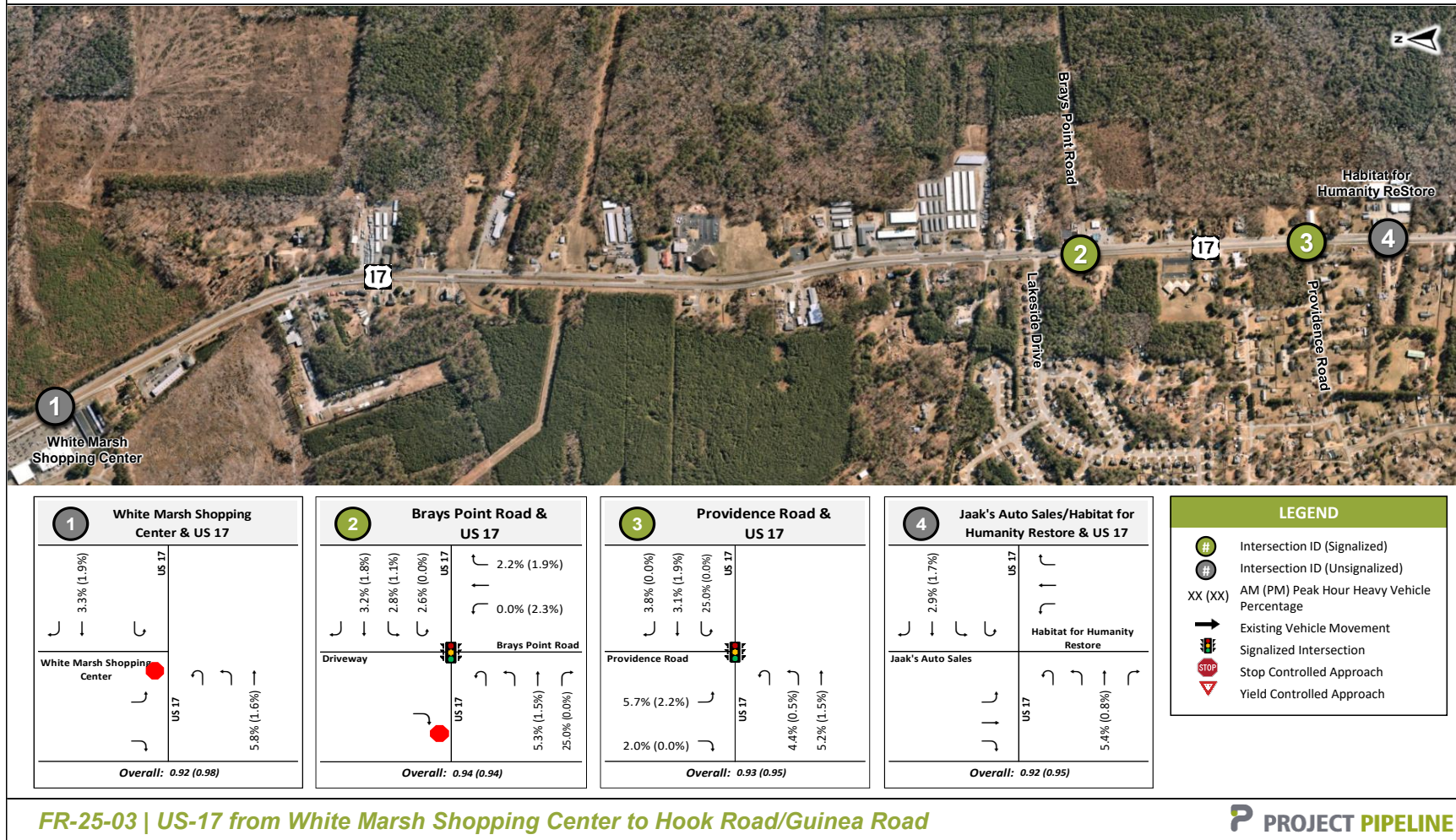
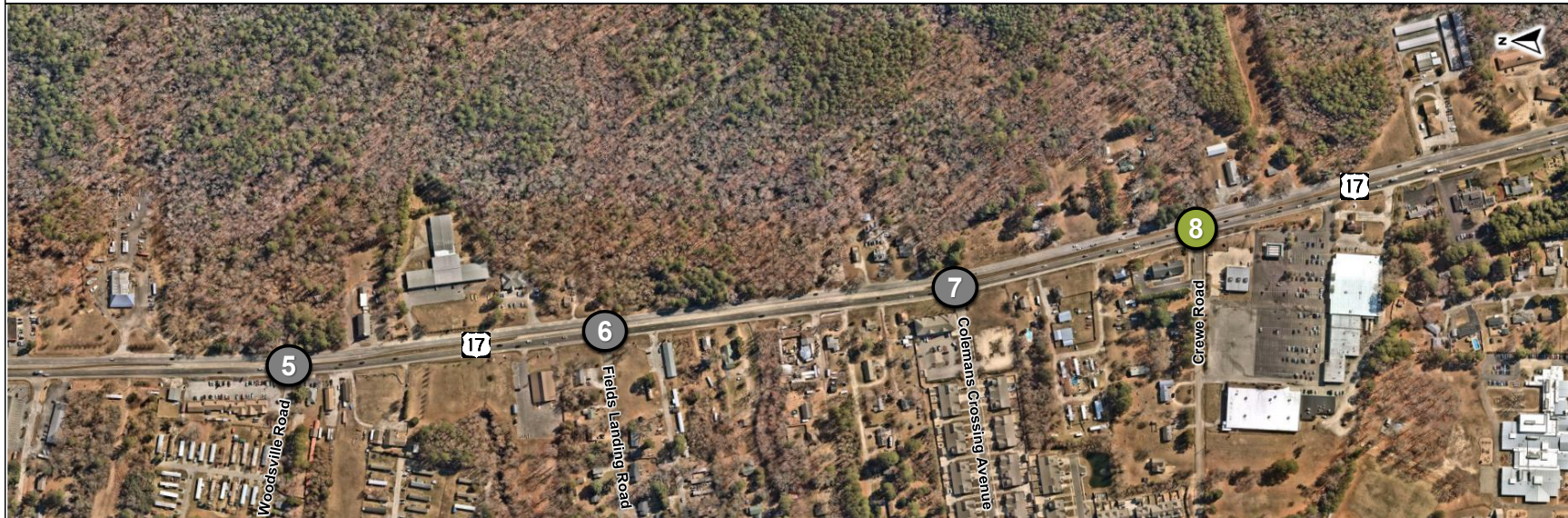


Figure 18: 2025 Existing Heavy Vehicle Percentages and Peak Hour Factors (1)

2025 Existing Heavy Vehicle Percentages and Peak Hour Factors



5 Woodsville Road & US 17	
US 17	
25.0% (0.0%) ↓	2.6% (1.7%) ↓
Woodsville Road	
7.7% (16.7%) ↘	0.0% (5.3%) ↘
0.0% (5.3%) ↘	0.0% (5.7%) ↘
Overall: 0.96 (0.95)	

6 Fields Landing Road & US 17	
US 17	
11.1% (0.0%) ↓	2.7% (1.7%) ↓
Fields Landing Road	
12.5% (0.0%) ↘	2.8% (4.0%) ↘
2.8% (4.0%) ↘	5.1% (1.3%) ↘
Overall: 0.92 (0.96)	

7 Colemans Crossing Avenue & US 17	
US 17	
25.0% (12.5%) ↓	2.5% (1.9%) ↓
Colemans Crossing Avenue	
50.0% (50.0%) ↘	4.4% (1.1%) ↘
Overall: 0.94 (0.95)	

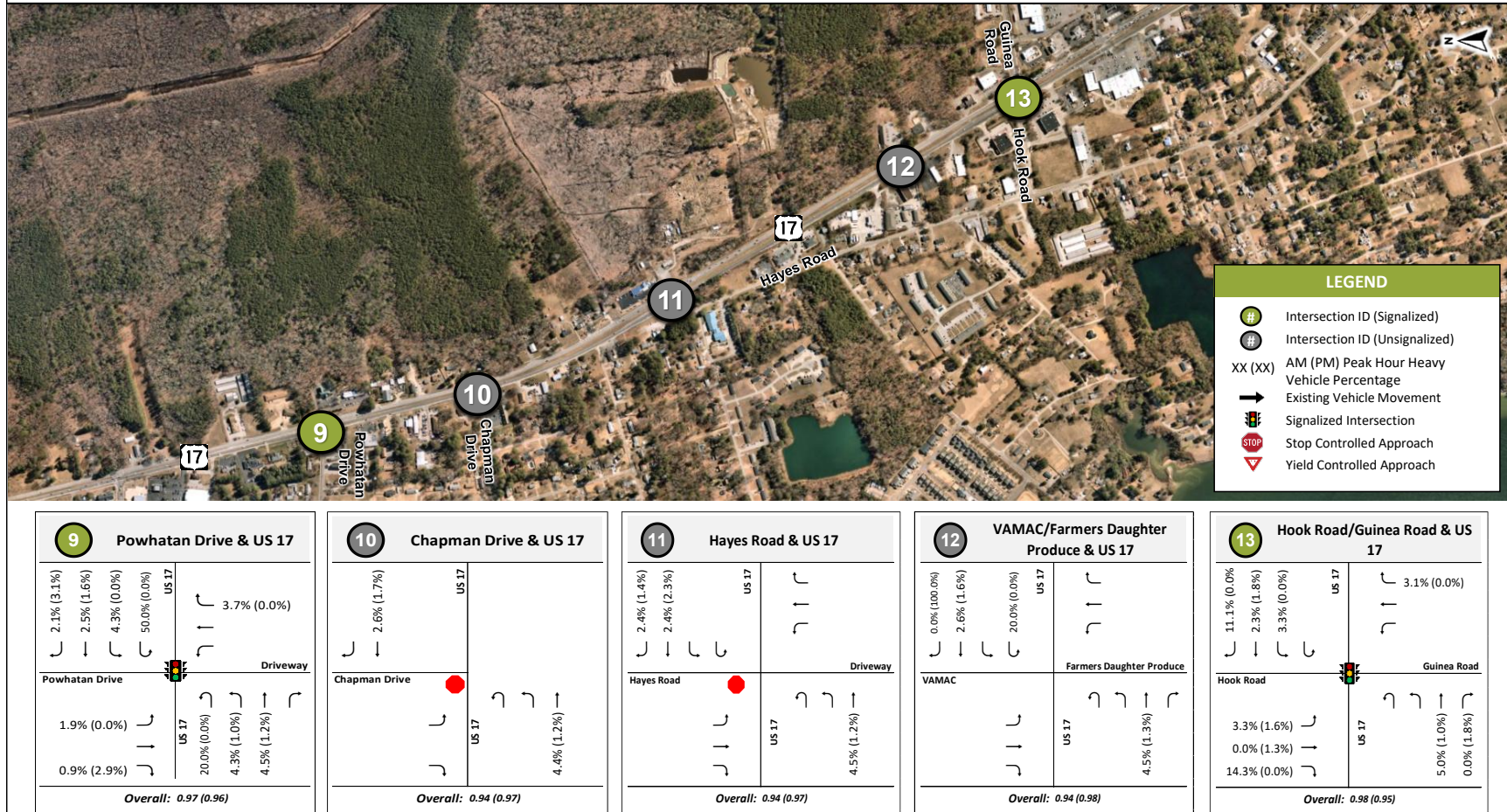
8 Crewe Road & US 17	
US 17	
1.7% (2.6%) ↓	2.8% (1.7%) ↓
Crewe Road	
6.4% (1.3%) ↘	0.0% (3.9%) ↘
0.0% (3.9%) ↘	6.7% (0.0%) ↘
Overall: 0.94 (0.97)	

LEGEND	
	Intersection ID (Signalized)
	Intersection ID (Unsignalized)
XX (XX)	AM (PM) Peak Hour Heavy Vehicle Percentage
	Existing Vehicle Movement
	Signalized Intersection
	Stop Controlled Approach
	Yield Controlled Approach

FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 19: 2025 Existing Heavy Vehicle Percentages and Peak Hour Factors (2)

2025 Existing Heavy Vehicle Percentages and Peak Hour Factors



FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 20: 2025 Existing Heavy Vehicle Percentages and Peak Hour Factors (3)

Traffic Analysis Results

Control delay (seconds per vehicle) and 95th percentile queue length (feet) were selected as measures of effectiveness to quantitatively report the performance of each study intersection. **Table 10** summarizes the preliminary Synchro reports used to determine control delay for each intersection.

The full Synchro reports are included in **Appendix C**. Synchro results for the existing condition models are included in **Table 11** and **Table 12**. Synchro 95th percentile queuing results are shown in **Table 13** and **Table 14**.

Table 10: Synchro Report for Control Delay

Intersection Name	Synchro Report for Control Delay
US Route 17 at White Marsh Shopping Center	HCM 6 th TWSC
US Route 17 at Brays Point Road	HCM 2000 Signalized
US Route 17 at Providence Road	HCM 2000 Signalized
US Route 17 at Habitat for Humanity/Jaak's Auto Sales	HCM 6 th TWSC
US Route 17 at Woodsville Road	HCM 6 th TWSC
US Route 17 at Fields Landing Road	HCM 6 th TWSC
US Route 17 at Colemans Crossing Avenue	HCM 6 th TWSC
US Route 17 at Crewe Road	HCM 2000 Signalized
US Route 17 at Powhatan Drive	HCM 2000 Signalized
US Route 17 at Chapman Drive	HCM 6 th TWSC
US Route 17 at Hayes Road	HCM 6 th TWSC
US Route 17 at VAMAC/Farmers Daughter Produce	HCM 6 th TWSC
US Route 17 at Hook Road/Guinea Road	HCM 2000 Signalized

AM Peak Hour

Control Delay and Level of Service

Under existing conditions, all signalized intersections are projected to operate at an overall LOS C or better; however, all side street approaches operate at LOS E or F. Additionally, the following major street left-turn movements operate at LOS D or below:

- US Route 17 and Crewe Road: northbound left-turn movement (LOS D)
- US Route 17 and Powhatan Drive: northbound/southbound left-turn movement (LOS F/LOS F)
- US Route 17 and Hook Road/Guinea Road: northbound left-turn movement (LOS E)

95th Percentile Queue Length

All turning movement queue lengths are expected to be accommodated within existing storage lanes; however, the following through movement queue lengths are expected to extend longer than the effective storage length of an adjacent turn lane:

- US Route 17 and Brays Point Road: The northbound queue blocks the left turn lane, and the southbound queue blocks the left and right turn lanes
- US Route 17 and Providence Road: The southbound queue blocks the left and right turn lanes

- US Route 17 and Hook Road/Guinea Road: The northbound queue blocks the left turn lane, and the southbound queue blocks the left and right turn lanes.

PM Peak Hour

Control Delay and Level of Service

Under existing conditions, all signalized intersections are projected to operate at an overall LOS B or better, with the exception of US Route 17 and Hook Road/Guinea Road, which operates at LOS D. All side street approaches operate at LOS E or F. The following major street left-turn movements operate at LOS D or below:

- US Route 17 and Brays Point Road: northbound/southbound left-turn movement (LOS E/LOS F)
- US Route 17 and Powhatan Drive: northbound/southbound left-turn movement (LOS F/LOS E)
- US Route 17 and Hook Road/Guinea Road: northbound and southbound left-turn movement (LOS E/LOS E)

95th Percentile Queue Length

The following through movements experience 95th percentile queue lengths longer than the effective storage length of an adjacent turn lane:

- US Route 17 and Brays Point Road: The northbound queue blocks the left turn lane, and the southbound queue blocks the left and right turn lanes
- US Route 17 and Crewe Road: The northbound queue blocks the left-turn lane
- US Route 17 and Hook Road/Guinea Road: The northbound queue blocks the left and right turn lanes.

Additionally, the following movements experience 95th percentile queue lengths longer than the available storage length:

- US Route 17 and Hook Road/Guinea Road: southbound and eastbound left-turn movements, and the westbound right-turn lane

Corridor Wide

The following trends were observed under existing conditions:

AM Peak Hour

- Minor street approaches at stop-controlled intersections generally experience high delay due to high cross street traffic and mainline turning movements
- The highest unsignalized approach delay occurred at the eastbound approach of US Route 17 and Fields Landing Road, with a delay of 123.2 seconds per vehicle due to a high number of southbound U-turn movements
- The highest signalized delay occurred at the eastbound approach of US Route 17 at Providence Road with a delay of 93.3 seconds per vehicle; however, given the mainline (northbound/southbound) phase is 118 seconds, this delay is indicative of vehicles getting through the signal within one cycle.
- The longest queue was the southbound through movement at US Route 17 at Hook Road/Guinea Road at 844 feet. This queue does not block the upstream intersection.

PM Peak Hour

- Minor street approaches at stop-controlled intersections generally experience high delay due to high cross street traffic and mainline turning movements
- The highest unsignalized approach delay occurred at the westbound approach of US Route 17 and VAMAC/The Farmers Daughter Produce with a delay of 382.7 seconds per vehicle
- The highest signalized approach delay occurred at the eastbound approach of US Route 17 at Hook Road/Guinea Road with a delay of 93.4 seconds per vehicle
- The eastbound left at US Route 17 and Providence Road, and the northbound left, westbound right, and the southbound left at US Route 17 and Hook Road/Guinea Road exceed existing turn lane storage
- The longest queue was the northbound through movement at US Route 17 at Hook Road/Guinea Road at 895 feet which spills to the upstream intersection

Table 11: 2025 Existing Conditions Peak Hour Control Delay and LOS (1)

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			AM		PM		AM		PM		AM		PM		AM		PM			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
1	US 17 at White Marsh Shopping Center		White Marsh Shopping Center								US 17				US 17				Intersection	
		Left	33.2	D	36.6	E	-	-	-	-	20.1	C	14.4	B	-	-	-	-	Delay	Delay
		Through	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	16.3	C	13.6	B	-	-	-	-	-	-	-	-	†	†	†	†	LOS	LOS
		Approach	21.1	C	25.1	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	US 17 at Brays Point Road		Brays Point Road								US 17				US 17				Intersection	
		Left	-	-	-	-	S	S	S	S	17.0	B	6.1	A	3.9	A	28.6	C	Delay	Delay
		Through	-	-	-	-	64.7	E	69.4	E	10.0	A	15.7	B	7.3	A	6.1	A	10.7	15.2
		Right	-	-	-	-	62.1	E	68.1	E	4.9	A	29.3	C	3.3	A	3.4	A	LOS	LOS
		Approach	-	-	-	-	62.8	E	68.5	E	10.0	A	16.0	B	7.1	A	8.0	A	B	B
3	US 17 at Providence Road		Providence Road								US 17				US 17				Intersection	
		Left	93.3	F	79.6	E	-	-	-	-	13.1	B	27.3	C	3.1	A	9.5	A	Delay	Delay
		Through	-	-	-	-	-	-	-	-	6.0	A	8.9	A	14.5	B	21.9	C	17.1	17.7
		Right	S	S	S	S	-	-	-	-	-	-	-	-	3.8	A	6.2	A	LOS	LOS
		Approach	93.3	F	79.6	E	-	-	-	-	6.3	A	10.8	B	14.3	B	21.2	C	B	B
4	US 17 at Jaak's Auto Sales/Habitat for Humanity ReStore		Jaak's Auto Sales				Habitat for Humanity ReStore				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	42.5	E	24.6	C	0.0	A	69.4	F	Delay	Delay
		Through	0.0	A	204.7	F	0.0	A	0.0	A	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	S	S	LOS	LOS
		Approach	0.0	A	204.7	F	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-
5	US 17 at Woodsville Road		Woodsville Road								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	15.4	C	17.5	C	-	-	-	-	Delay	Delay
		Through	90.6	F	93.1	F	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S	LOS	LOS
		Approach	90.6	F	93.1	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	US 17 at Fields Landing Road		Fields Landing Road								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	15.7	C	14.7	B	-	-	-	-	Delay	Delay
		Through	123.2	F	160.5	F	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	†	†	†	†	LOS	LOS
		Approach	123.2	F	160.5	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	US 17 at Colemans Crossing Avenue		Colemans Crossing Avenue								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Delay	Delay
		Through	23.8	C	18.1	C	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	†	†	†	†	LOS	LOS
		Approach	23.8	C	18.1	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Denotes the overall intersection is stop controlled and no level of service or delay is reported

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

* Lane group is a shared left/through movement

Table 12: 2025 Existing Conditions Peak Hour Control Delay and LOS (2)

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			AM		PM		AM		PM		AM		PM		AM		PM			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
8	US 17 at Crewe Road		Crewe Road								US 17				US 17				Intersection	
		Left	63.9	E	69.8	E	-	-	-	-	49.6	D	43.1	D	-	-	-	-	Delay	Delay
		Through	-	-	-	-	-	-	-	-	1.3	A	2.0	A	4.4	A	7.1	A	6.4	8.9
		Right	s	s	s	s	-	-	-	-	-	-	-	-	0.2	A	0.3	A	LOS	LOS
		Approach	63.9	E	69.8	E	-	-	-	-	2.8	A	4.5	A	4.3	A	6.3	A	A	A
9	US 17 at Powhatan Drive		Powhatan Road				Powhatan Road				US 17				US 17				Intersection	
		Left	s	s	s	s	s	s	s	s	83.8	F	84.5	F	84.5	F	57.4	E	Delay	Delay
		Through	64.5	E	72.7	E	67.2	E	71.9	E	4.0	A	7.2	A	7.6	A	3.7	A	12.4	11.7
		Right	59.9	E	63.0	E	63.3	E	69.2	E	9.0	A	8.1	A	9.6	A	0.3	A	LOS	LOS
		Approach	61.5	E	68.3	E	65.5	E	70.3	E	6.9	A	11.2	B	8.8	A	3.9	A	B	B
10	US 17 at Chapman Drive		Chapman Drive								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	37.6	E	13.5	B	-	-	-	-	Delay	Delay
		Through	19.3	C	14.1	B	-	-	-	-	†	†	†	†	†	†	†	†	n/a	n/a
		Right	-	-	-	-	-	-	-	-	-	-	-	-	s	s	s	s	LOS	LOS
		Approach	19.3	C	14.1	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	US 17 at Hayes Road		Hayes Road				Driveway				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	26.9	D	12.1	B	-	-	-	-	Delay	Delay
		Through	54.9	F	36.4	E	0.0	A	0.0	A	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	LOS	LOS
		Approach	54.9	F	36.4	E	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-
12	US 17 at VAMAC/The Farmers Daughter Produce		VAMAC				The Farmers Daughter Produce				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	38.4	E	18.1	C	-	-	-	-	Delay	Delay
		Through	0.0	A	192.7	F	42.5	E	382.7	F	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	LOS	LOS
		Approach	0.0	A	192.7	F	42.5	E	382.7	F	-	-	-	-	-	-	-	-	-	-
13	US 17 at Hook Road/Guinea Road		Hook Road				Guinea Road				US 17				US 17				Intersection	
		Left	76.6	E	113.1	F	63.9	E	74.8	E	69.3	E	72.3	E	34.0	C	74.6	E	Delay	Delay
		Through	63.9	E	71.6	E	60.9	E	68.2	E	37.0	D	38.9	D	19.5	B	7.0	A	30.7	40.8
		Right	62.1	E	63.3	E	61.1	E	82.3	F	28.5	C	16.3	B	11.3	B	13.2	B	LOS	LOS
		Approach	71.8	E	93.4	F	61.6	E	79.6	E	37.9	D	38.9	D	20.5	C	23.2	C	C	D

- Denotes the overall intersection is stop controlled and no level of service or delay is reported

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

* Lane group is a shared left/through movement

Table 13: 2025 Existing Conditions Peak Hour 95th Percentile Queues (1)

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue Length (Feet)							
				Eastbound		Westbound		Northbound		Southbound	
				AM	PM	AM	PM	AM	PM	AM	PM
1	US 17 at White Marsh Shopping Center	Unsignalized		White Marsh Shopping Center				US 17		US 17	
			Left	3	23			5	8		
			Through					†	†	†	†
			Right	3	5					†	†
2	US 17 at Brays Point Road	Signal		Brays Points Road				US 17		US 17	
			Left			s	s	m1	m2	21	108
			Through			68	86	284	430	437	333
			Right			23	84	m0	m7	0	0
3	US 17 at Providence Road	Signal		Providence Road				US 17		US 17	
			Left	#270	#190			m22	166	m1	m1
			Through					171	850	544	254
			Right	s	s					m1	8
4	US 17 at Jaak's Auto Sales/Habitat for Humanity ReStore	Unsignalized		Jaak's Auto Sales		Habitat for Humanity ReStore				US 17	
			Left					0	0	0	3
			Through	†	10	†	†	†	†	†	†
			Right					†	†	†	s
5	US 17 at Woodsville Road	Unsignalized		Woodsville Road						US 17	
			Left					3	13		
			Through	60	63			†	†	†	†
			Right							s	s
6	US 17 at Fields Landing Road	Unsignalized		Fields Landing Road						US 17	
			Left					0	8		
			Through	75	68			†	†	†	†
			Right							†	†
7	US 17 at Colemans Crossing Avenue	Unsignalized		Colemans Crossing Avenue						US 17	
			Left								
			Through	3	3			†	†	†	†
			Right							†	†

† - No queue reported. Movement does not have conflicting volumes

s - Lane group is a shared movement

m - Volume for 95th percentile queue is metered by upstream signal

- 95th percentile queue exceeds capacity, queue may be longer

Table 14: 2025 Existing Conditions Peak Hour 95th Percentile Queues (2)

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue Length (Feet)							
				Eastbound		Westbound		Northbound		Southbound	
				AM	PM	AM	PM	AM	PM	AM	PM
8	US 17 at Crewe Road	Signal		Crewe Road						US 17	
			Left	82	137			66	m170		
			Through					6	15	118	95
			Right	s	s					m1	m0
9	US 17 at Powhatan Drive	Signal		Powhatan Road		Powhatan Road				US 17	
			Left	s	s	s	s	m66	m116	m38	m22
			Through	97	140	67	48	88	646	157	68
			Right	38	0	0	0	m0	m0	m0	1
10	US 17 at Chapman Drive	Unsignalized		Chapman Drive				US 17		US 17	
			Left					10	10		
			Through	8	3			†	†	†	†
			Right							s	s
11	US 17 at Hayes Road	Unsignalized		Hayes Road		Driveway		US 17		US 17	
			Left					0	0		
			Through	50	28	†	†	†	†	†	†
			Right					†	†	†	†
12	US 17 at VAMAC/The Farmers Daughter Produce	Unsignalized		VAMAC		The Farmers Daughter Produce		US 17		US 17	
			Left					5	5		
			Through	†	13	3	30	†	†	†	†
			Right					†	†	†	†
13	US 17 at Hook Road/Guinea Road	Signal		Hook Road		Guinea Road		US 17		US 17	
			Left	106	#256	81	116	49	74	m73	#258
			Through	45	138	41	70	337	895	844	70
			Right	0	0	57	#203	0	0	m0	m0

† - No queue reported. Movement does not have conflicting volumes

s - Lane group is a shared movement

m - Volume for 95th percentile queue is metered by upstream signal

- 95th percentile queue exceeds capacity, queue may be longer

1.6.2 Phase 1 Public Outreach

The Phase 1 PublicInput survey was held from May 7, 2025, to May 21, 2025, to collect feedback on existing traffic, safety, transit, and bicycle and pedestrian issues within the study area. The online survey had a total of 686 participants and received 803 comments. Participants ranked reducing traffic congestion and corridor safety/intersection safety as the two most important issues in the study area.

Speeding/aggressive driving and sudden stopping/rear-end crashes were identified as the greatest safety issues. The prevalence of feedback citing concerns for unsafe turning movements and congestion directly informed the development of the corridor improvement concepts. Detailed results from the Phase 1 public outreach efforts can be found in **Appendix C**.

Common themes among written comments included the following:

- Observations of drivers running red lights due to insufficient green time for left turns
- Concerns of higher volume due to the planned Coleman Bridge toll removal
- Aggressive driving
- Desire for more frequent public transportation and more easily accessible schedule information
- A desire for longer turn lanes to allow for safer deceleration
- Disagreement on whether bike infrastructure is appropriate along the US Route 17 corridor
- Congestion, especially early in the morning

1.6.3 No-Build Conditions Traffic Operations Analysis

Traffic operational analyses were conducted to evaluate the overall performance of the study corridor under No-Build (2045) AM and PM peak hour conditions. The intent of the No-Build conditions analysis is to provide a general understanding of the baseline future traffic conditions as a starting point for developing improvement concepts.

No-Build 2045 Traffic Forecasting and Volume Development

The following sources were reviewed to determine the growth rates to apply to existing traffic volumes to forecast future (2045) traffic volumes.

- Hampton Roads Transportation Planning Organization (HRTPO) Travel Demand Model (TDM) Outputs from the HRPTO TDM, which included base year data from 2017 and future year data from 2045, were adjusted using NCHRP-765 methodologies that incorporate project-specific and VDOT project traffic count data to adjust future volume projections. The study team used the adjusted future year (2045) TDM output and existing available count data to develop linear growth rates for the study area.
- Historical traffic count data
Historical traffic count data was sourced from official VDOT historical annual average daily traffic (AADT) counts. The study team identified trends in traffic volume, removed outliers, and performed a linear regression analysis to produce linear growth rates for segments throughout the study area.
- Socioeconomic data

The study team reviewed and compared 2017 and 2045 population and employment data from traffic analysis zones (TAZ) in the HRTPO TDM

- Previous study
The study team reviewed growth rates from the Hayes Royal Farm Traffic Impact Analysis (TIA) and compared them to growth rates from other sources

Table 15 presents the recommended linear growth rates and the growth rates determined from historical traffic volume trends and the HRPTO TDM. Based on VDOT guidance, the study team excluded TDM growth rates for several locations in the study area because the difference between TDM AADT and VDOT historical AADT exceeded +/-30%. The study team and stakeholders agreed upon a linearly applied growth rate of 0.50% for the entire study to align with the HRPTO TDM projections and historical AADT trends.

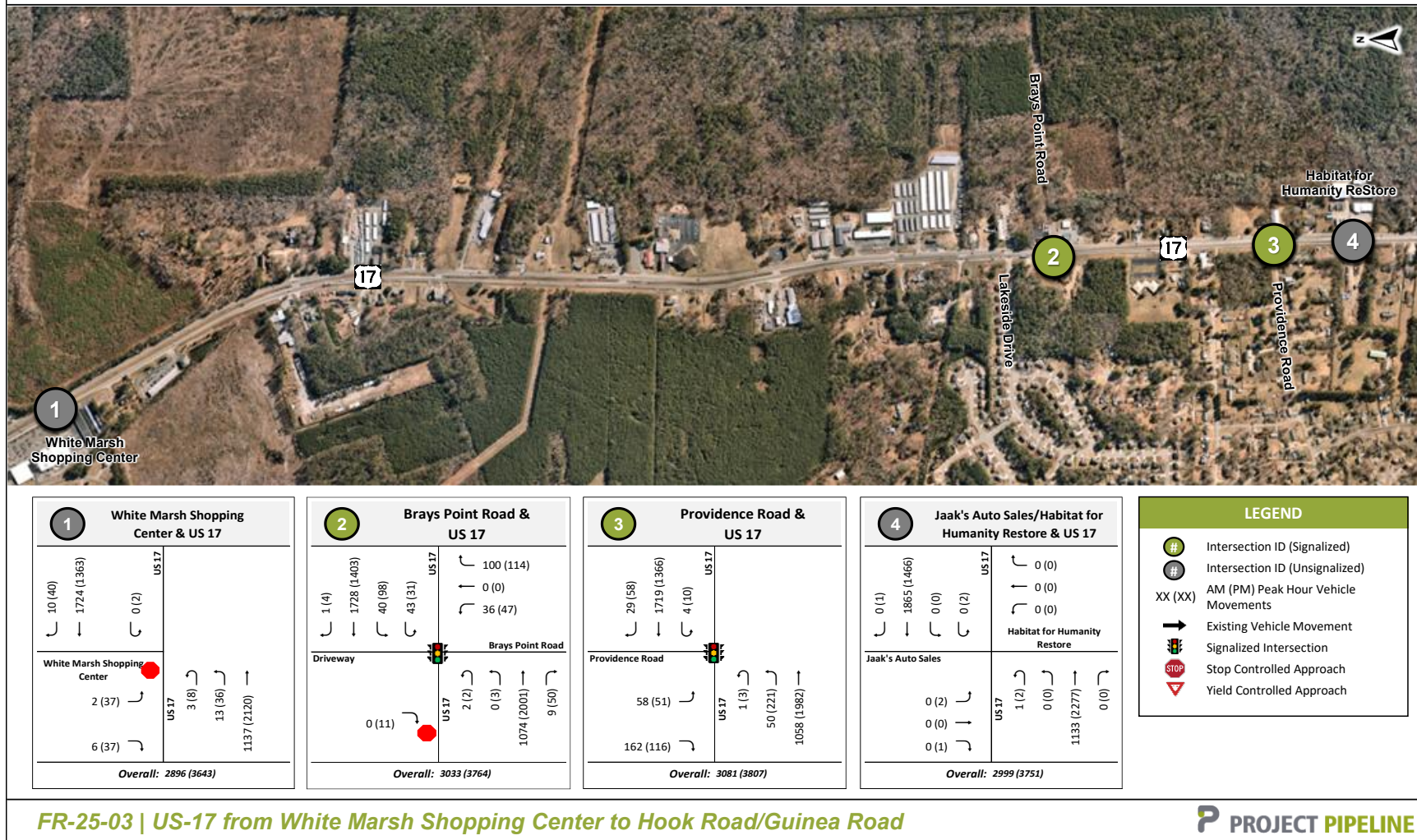
Appendix D includes the full traffic forecasting methodology. The No-Build (2045) AM and PM peak hour volumes are shown in **Figure 21** through **Figure 23**.

Table 15: Linear Growth Rate Development Summary

Segment	Historical Linear Growth Rate	Projected TDM Linear Growth Rate	Previous Study Growth Rate	Recommended Linear Growth Rate
US Route 17 (south of Featherbed Lane to Brays Point Road)	0.50%	0.65%	--	0.50%
US Route 17 (Brays Point Road to Guinea Road)	-0.42%	0.66%	1.00%	0.50%
US Route 17 (south of Guinea Road)	-0.41%	0.50%	--	0.50%
Brays Point Road ¹	-0.41%	--	2.00%	0.50%
Providence Road ¹	0.30%	--	--	0.50%
Woodsville Road	2.63%	--	--	0.50%
Fields Landing Road	1.10%	--	--	0.50%
Crewe Road	-0.18%	--	--	0.50%
Powhatan Drive	-0.45%	0.50%	--	0.50%
Chapman Drive	-1.38%	--	--	0.50%
Hayes Road	-0.99%	0.50%	--	0.50%
Hook Road	-3.58%	--	--	0.50%
Guinea Road ¹	-0.78%	--	--	0.50%

¹The difference in existing year (2017) AADT between VDOT P4P and TDM exceeds 30% for this segment, so the projected TDM linear growth rate was not used for growth rate estimation

2045 No-Build Peak Hour Volumes



FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 21: 2045 No-Build Peak Hour Volumes (1)

2045 No-Build Peak Hour Volumes

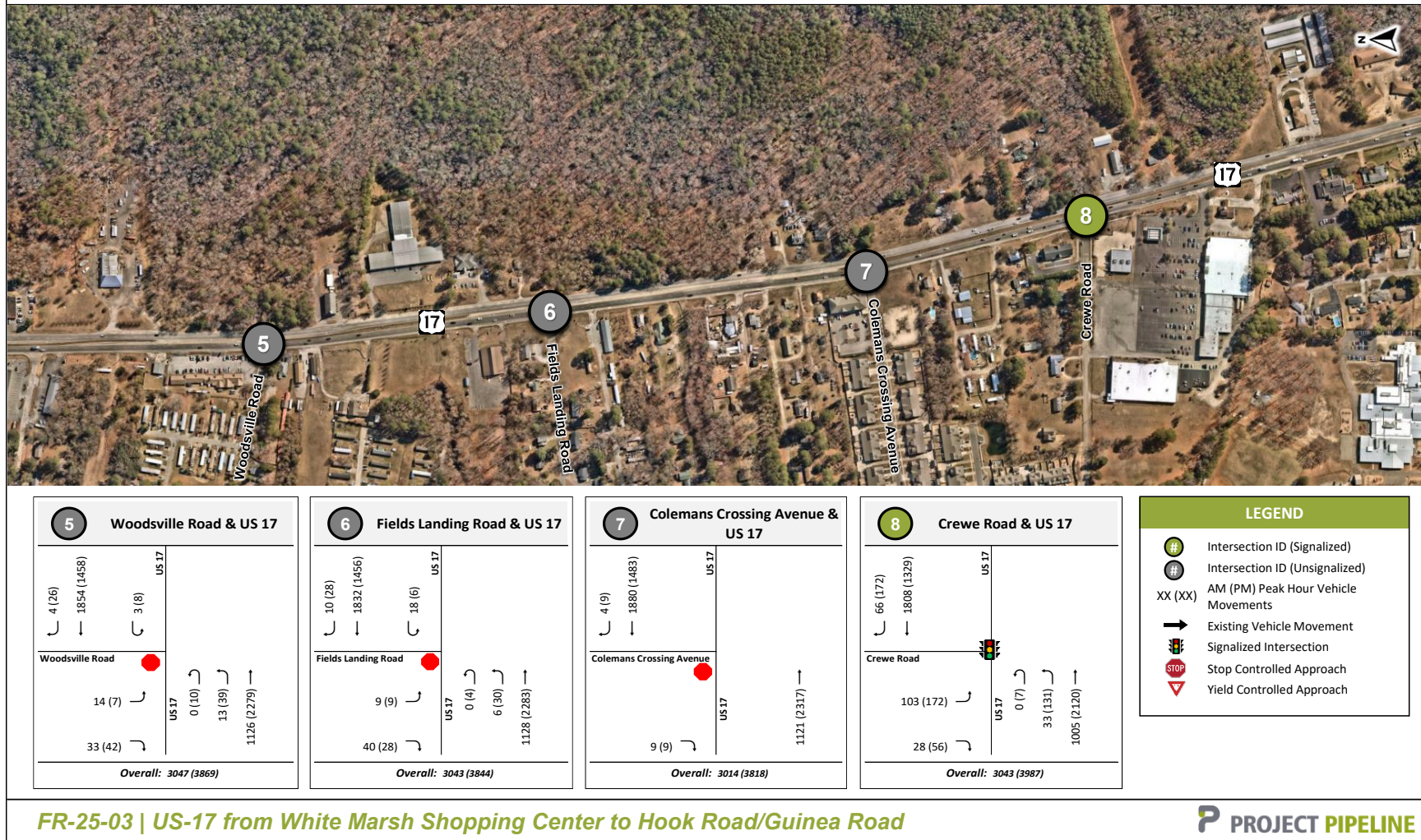
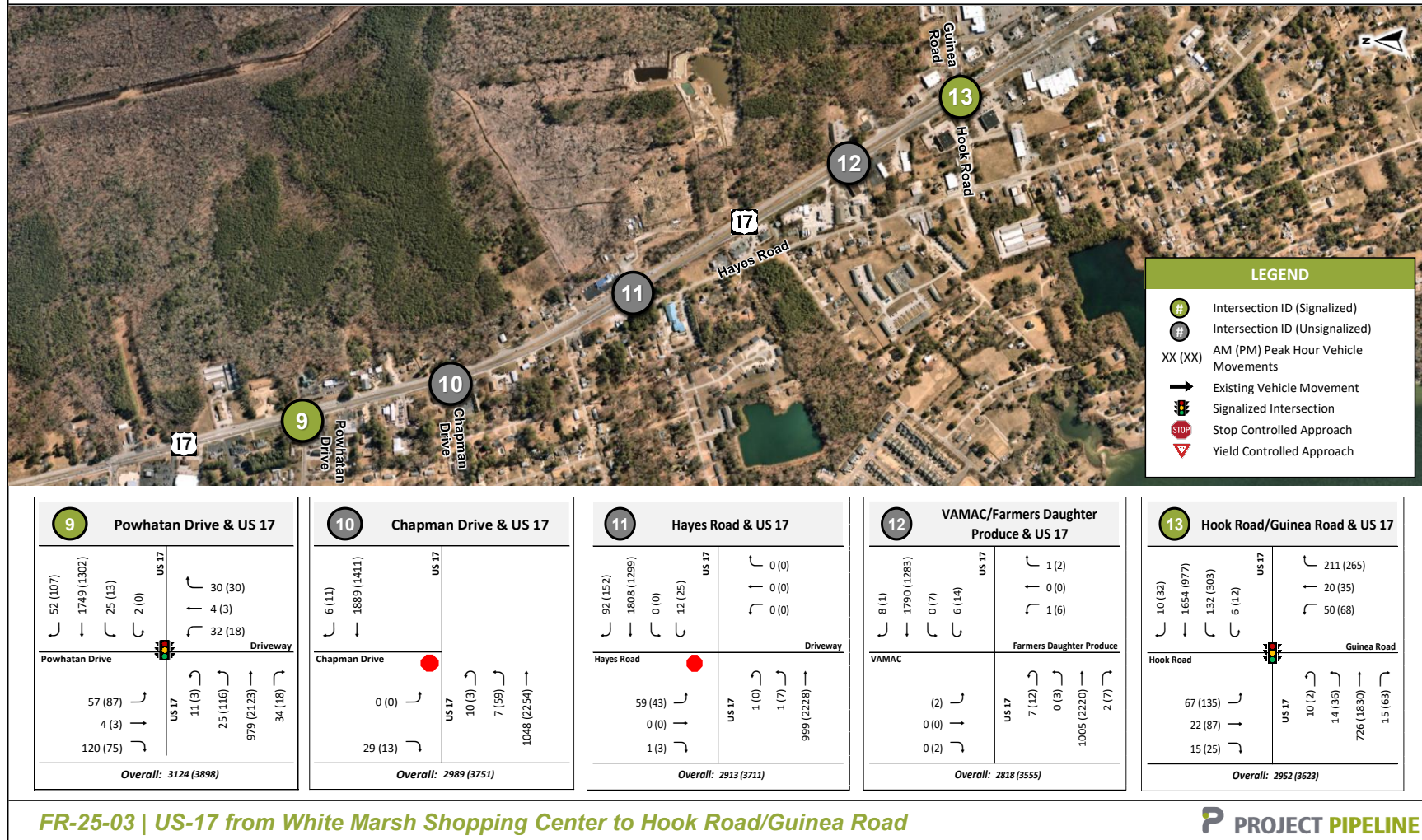


Figure 22: 2045 No-Build Peak Hour Volumes (2)

2045 No-Build Peak Hour Volumes



FR-25-03 | US-17 from White Marsh Shopping Center to Hook Road/Guinea Road

Figure 23: 2045 No-Build Peak Hour Volumes (3)

No-Build Conditions Synchro Analysis

Traffic operational analyses were conducted to evaluate the overall performance of the study intersections under No-Build (2045) conditions. No-Build conditions were modeled using Synchro 11 for the entire study area. The existing conditions Synchro models were used as a basis to develop the No-Build models for the AM and PM peak hour conditions. The models were updated with the projected 2045 No-Build traffic volumes and the planned widening of US Route 17 between Tidemill Road and Guinea Road, which will add a third northbound and southbound through lane at the study area intersection of US Route 17 and Hook Road / Guinea Road. Traffic signal cycle lengths were assumed to be consistent with existing conditions, while splits and offsets were optimized. No-Build inputs and analysis methodologies were applied consistently with *TOSAM*, Version 2.0.

Control delay (seconds per vehicle) and 95th percentile queue length (feet) were selected as measures of effectiveness to quantitatively report the performance of each study intersection. Synchro reports used for control delay were consistent with existing conditions and summarized in **Table 16** through **Table 19**. The full Synchro and reports are included in **Appendix D**.

Similar trends in delay and queuing were observed under No-Build conditions as observed in existing conditions. Under No-Build conditions, all signalized intersections operated at LOS C or better in both AM and PM peak hours. Multiple individual minor street approaches operated at LOS C or worse in both AM and PM peak hours at the unsignalized intersections along US Route 17. The following eastbound minor street approaches operated at LOS F for the AM and PM Peak hours:

- US Route 17 and Providence Road
- US Route 17 and Woodsville Road

AM Peak Hour

Control Delay and Level of Service

Under No-Build conditions, all signalized intersections are projected to operate at an overall LOS C or better; however, all side streets operate LOS F or better. Additionally, the following major street signalized left-turn movements operate at LOS D or below:

- US Route 17 and Crewe Road: northbound left-turn movement (LOS D)
- US Route 17 and Powhatan Drive: northbound left-turn movement (LOS F) and southbound left-turn movement (LOS F)
- US Route 17 and Hook Road/Guinea Road: northbound left-turn movement (LOS E)

95th Percentile Queue Length

All turning movement queue lengths are expected to be accommodated within existing storage lanes; however, the following through movement queue lengths are expected to extend longer than the effective storage length of an adjacent turn lane:

- US Route 17 and Brays Point Road: The southbound through queue is projected to block the left and right turn lanes on the southbound approach
- US Route 17 and Providence Road: The southbound through queue is projected to block the left and right turn lanes

- US Route 17 and Powhatan Drive: The southbound through queue is projected to block the left and right turn lanes on the southbound approach

PM Peak Hour

Control Delay and Level of Service

Under No-Build conditions, all signalized intersections are projected to operate at LOS C or above with the exception of US Route 17 & Hook Road/Guinea Road, and all side streets are projected to operate at LOS F or better. Additionally, the following major street signalized left-turn movements operate at LOS D or below:

- US Route 17 and Powhatan Drive: southbound left-turn movement (LOS E)
- US Route 17 and Hook Road/Guinea Road: southbound left-turn movement (LOS E)

95th Percentile Queue Length

The following through movements experience 95th percentile queue lengths longer than the effective storage length of an adjacent turn lane:

- US Route 17 and Brays Point Road: The southbound queue is projected to block the right-turn lane
- US Route 17 and Crewe Road: The southbound queue is projected to block the right-turn lane
- US Route 17 and Powhatan Drive: The northbound queue is projected to block the left and right turn lanes

Additionally, the following movement experiences a 95th percentile queue length longer than the available storage length:

- US Route 17 and Hook Road/Guinea Road: The eastbound left-turn movement

Table 16: 2045 No-Build Conditions Peak Hour Control Delay and LOS (1)

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			AM		PM		AM		PM		AM		PM		AM		PM			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	US 17 at White Marsh Shopping Center		White Marsh Shopping Center								US 17				US 17				Intersection	
		Left	39.7	E	48.2	E	-	-	-	-	23.6	C	16.3	C	-	-	-	-	Delay	Delay
		Through	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	17.8	C	14.6	B	-	-	-	-	-	-	-	-	†	†	†	†	LOS	LOS
	Approach	23.3	C	31.4	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	US 17 at Brays Point Road		Brays Point Road								US 17				US 17				Intersection	
		Left	-	-	-	-	S	S	S	S	27.6	C	4.5	A	4.3	A	58.4	E	Delay	Delay
		Through	-	-	-	-	64.8	E	70.7	E	12.4	B	10.5	B	8.3	A	6.3	A	12.0	13.1
		Right	-	-	-	-	62.0	E	66.4	E	4.8	A	6.2	A	3.3	A	3.2	A	LOS	LOS
	Approach	-	-	-	-	62.7	E	67.6	E	12.3	B	10.3	B	8.1	A	10.7	B	B	B	
3	US 17 at Providence Road		Providence Road								US 17				US 17				Intersection	
		Left	110.8	F	80.2	F	-	-	-	-	31.7	C	28.1	C	5.8	A	15.5	B	Delay	Delay
		Through	-	-	-	-	-	-	-	-	5.8	A	7.1	A	20.6	C	14.2	B	22.0	14.1
		Right	S	S	S	S	-	-	-	-	-	-	-	-	1.8	A	2.0	A	LOS	LOS
	Approach	110.8	F	80.2	F	-	-	-	-	7.0	A	9.2	A	20.3	C	13.8	B	C	B	
4	US 17 at Jaak's Auto Sales/Habitat for Humanity ReStore		Jaak's Auto Sales				Habitat for Humanity ReStore				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	55.1	F	29.2	D	0.0	A	95.2	F	Delay	Delay
		Through	0.0	A	300.4	F	0.0	A	0.0	A	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	S	S	LOS	LOS
	Approach	0.0	A	300.4	F	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	
5	US 17 at Woodsville Road		Woodsville Road								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	17.7	C	16.4	C	-	-	-	-	Delay	Delay
		Through	288.6	F	375.3	F	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	-	†	†	†	LOS	LOS
	Approach	288.6	F	375.3	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6	US 17 at Fields Landing Road		Fields Landing Road								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Delay	Delay
		Through	27.3	D	19.9	C	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	-	†	†	†	LOS	LOS
	Approach	27.3	D	19.9	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- Denotes the overall intersection is stop controlled and no level of service or delay is reported

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

* Lane group is a shared left/through movement

Table 17: 2045 No-Build Conditions Peak Hour Control Delay and LOS (2)

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			AM		PM		AM		PM		AM		PM		AM		PM			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
7	US 17 at Colemans Crossing Avenue		Colemans Crossing Avenue								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Delay	Delay	
		Through	27.3	D	19.9	C	-	-	-	-	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	-	-	-	-	†	†	†	†	LOS	LOS
		Approach	27.3	D	19.9	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	US 17 at Crewe Road		Crewe Road								US 17				US 17				Intersection	
		Left	63.9	E	71.2	E	-	-	-	-	49.8	D	50.9	D	-	-	-	-	Delay	Delay
		Through	-	-	-	-	-	-	-	-	1.0	A	5.3	A	6.2	A	16.2	B	7.3	14.1
		Right	s	s	s	s	-	-	-	-	-	-	-	-	0.4	A	1.8	A	LOS	LOS
		Approach	63.9	E	71.2	E	-	-	-	-	2.6	A	8.0	A	6.0	A	14.5	B	A	B
9	US 17 at Powhatan Drive		Powhatan Road				Powhatan Road				US 17				US 17				Intersection	
		Left	s	s	s	s	s	s	s	s	87.9	F	93.4	F	82.5	F	59.6	E	Delay	Delay
		Through	64.7	E	80.2	F	67.1	E	72.0	E	5.1	A	14.8	B	9.4	A	6.3	A	13.8	17.2
		Right	59.7	E	63.6	E	63.1	E	69.0	E	9.3	A	7.7	A	10.3	B	0.3	A	LOS	LOS
		Approach	61.4	E	72.7	E	65.3	E	70.2	E	8.1	A	18.8	B	10.5	B	6.3	A	B	B
10	US 17 at Chapman Drive		Chapman Drive								US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	51.4	F	14.9	B	-	-	-	-	Delay	Delay
		Through	22.0	C	15.2	C	-	-	-	-	†	†	†	†	†	†	†	†	n/a	n/a
		Right	-	-	-	-	-	-	-	-	-	-	-	-	s	s	s	s	LOS	LOS
		Approach	22.0	C	15.2	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	US 17 at Hayes Road		Hayes Road				Driveway				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	32.9	D	13.1	B	-	-	-	-	Delay	Delay
		Through	82.1	F	47.3	E	0.0	A	0.0	A	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	LOS	LOS
		Approach	82.1	F	47.3	E	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-
12	US 17 at VAMAC/The Farmers Daughter Produce		VAMAC				The Farmers Daughter Produce				US 17				US 17				Intersection	
		Left	-	-	-	-	-	-	-	-	49.7	E	20.9	C	-	-	-	-	Delay	Delay
		Through	0.0	A	124.8	F	44.6	E	372.4	F	†	†	†	†	†	†	†	†	-	-
		Right	-	-	-	-	-	-	-	-	†	†	†	†	†	†	†	†	LOS	LOS
		Approach	0.0	A	124.8	F	44.6	E	372.4	F	-	-	-	-	-	-	-	-	-	-
13	US 17 at Hook Road/Guinea Road		Hook Road				Guinea Road				US 17				US 17				Intersection	
		Left	81.9	F	100.3	F	63.9	E	93.1	F	69.6	E	72.5	E	27.4	C	66.3	E	Delay	Delay
		Through	64.2	E	68.7	E	60.6	E	71.2	E	31.5	C	27.9	C	5.0	A	4.0	A	21.1	39.7
		Right	62.1	E	61.6	E	60.9	E	164.3	F	26.4	C	16.9	B	11.5	B	13.4	B	LOS	LOS
		Approach	75.4	E	85.3	F	61.4	E	142.2	F	32.6	C	28.4	C	6.8	A	19.1	B	C	D

- Denotes the overall intersection is stop controlled and no level of service or delay is reported

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

* Lane group is a shared left/through movement

Table 18: 2045 No-Build Conditions Peak Hour 95th Percentile Queues (1)

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue Length (Feet)								
				Eastbound		Westbound		Northbound		Southbound		
				AM	PM	AM	PM	AM	PM	AM	PM	
1	US 17 at White Marsh Shopping Center	Signal		White Marsh Shopping Center				US 17		US 17		
				Left	3	30			8	10		
				Through					†	†	†	†
				Right	3	8					†	†
2	US 17 at Brays Point Road	Signal		Brays Points Road		US 17		US 17				
				Left			s	s	m1	m1	23	#166
				Through			71	93	m286	172	526	342
				Right			33	60	m0	m0	0	0
3	US 17 at Providence Road	Signal		Providence Road		US 17		US 17				
				Left	#317	#212			m37	m156	m0	m4
				Through					192	310	473	343
				Right	s	s					m0	0
4	US 17 at Jaak's Auto Sales/Habitat for Humanity ReStore	Unsignalized		Jaak's Auto Sales		Habitat for Humanity ReStore		US 17				
				Left					0	0	0	5
				Through	†	15	†	†	†	†	†	†
				Right					†	†	†	s
5	US 17 at Woodsville Road	Unsignalized		Woodsville Road				US 17				
				Left					3	18		
				Through	88	115			†	†	†	†
				Right							s	s
6	US 17 at Fields Landing Road	Unsignalized		Fields Landing Road				US 17				
				Left					3	8		
				Through	118	103			†	†	†	†
				Right							†	†

† - No queue reported. Movement does not have conflicting volumes

s - Lane group is a shared movement

m - Volume for 95th percentile queue is metered by upstream signal

- 95th percentile queue exceeds capacity, queue may be longer

Table 19: 2045 No-Build Conditions Peak Hour 95th Percentile Queues (2)

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue Length (Feet)							
				Eastbound		Westbound		Northbound		Southbound	
				AM	PM	AM	PM	AM	PM	AM	PM
7	US 17 at Colemans Crossing Avenue	Unsignalized	Colemans Crossing Avenue							US 17	
			Left					†	†	†	†
			Through	5	3						
			Right							†	†
8	US 17 at Crewe Road	Unsignalized	Crewe Road							US 17	
			Left	90	150			71	m175		
			Through					5	53	m131	582
			Right	s	s					m1	m4
9	US 17 at Powhatan Drive	Unsignalized	Powhatan Road							US 17	
			Left	s	s	s	s	m70	m160	m36	m19
			Through	103	#162	70	52	98	m#1293	#620	88
			Right	51	0	0	0	m0	m0	m0	m1
10	US 17 at Chapman Drive	Unsignalized	Chapman Drive							US 17	
			Left					18	13		
			Through	10	3			†	†	†	†
			Right							s	s
11	US 17 at Hayes Road	Unsignalized	Hayes Road							US 17	
			Left					0	0		
			Through	75	38	†	†	†	†	†	†
			Right					†	†	†	†
12	US 17 at VAMAC/The Farmers Daughter Produce	Unsignalized	VAMAC							US 17	
			Left					8	5		
			Through	†	10	3	33	†	†	†	†
			Right					†	†	†	†
13	US 17 at Hook Road/Guinea Road	Unsignalized	Hook Road							US 17	
			Left	114	#263	87	#152	53	79	m64	#274
			Through	49	149	43	75	253	545	234	43
			Right	0	0	79	#279	0	0	m0	m0

† - No queue reported. Movement does not have conflicting volumes

s - Lane group is a shared movement

m - Volume for 95th percentile queue is metered by upstream signal

- 95th percentile queue exceeds capacity, queue may be longer

1.7 Phase 1 Alternatives Development

The study team developed preliminary alternatives in parallel with the high-level needs diagnosis efforts documented in **Chapter 1.5**. The proposed Phase 1 alternatives were developed to meet the following criteria:

- Improve operations at intersections in the study area
- Mitigate safety issues for mainline US Route 17 and for the turning movements to and from mainline US Route 17
- Enhance bike and pedestrian access throughout the study area
- Enhance transit access throughout the study area

1.7.1 Initial Alternatives

The needs evaluation, diagnosis, and initial alternatives were presented at the Needs Evaluation, Diagnosis, and Preliminary Concepts Meeting (SWG Meeting #2), held on June 10, 2025. The study team discussed 22 alternatives for US Route 17 during the meeting, which are summarized in **Table 20**.

Following the meeting, the study team used the Virginia Intersection and Interchange Control Assessment Program (iCAP) Assessment Tool and Virginia Junction Screening Tool (VJuST) to screen intersection alternatives based on impacts to traffic operations, pedestrian accommodations, safety, and cost, following processes outlined in VDOT IIM-TOD-397—Virginia iCAP Policy and Guidance. The Stage 1 iCAP results are summarized in **Section 1.7.2**, and the meeting materials can be found in **Appendix E**.

Bicycle and Pedestrian Concepts

In addition to concepts addressing vehicular operations and safety, the study team reviewed alternatives addressing bicycle and pedestrian access. This included adding a shared use path along US Route 17 and could be included as part of the alternatives chosen to be analyzed further in Phase 2. A shared use path is the most appropriate type of bikeway along US Route 17 based on the average daily traffic and speed limit and would allow for greater bicycle and pedestrian connectivity throughout the area.

Transit and Transportation Demand Management (TDM) Concepts

The study team also reviewed alternatives to improve transit access and TDM within the study area. The study team recommended extending the HRT MAX service from the Guinea Road Park and Ride to Gloucester Courthouse; this concept was advanced to Phase 2. The HRT MAX extension would improve regional mobility by connecting more commuters to major employment destinations.

Table 20: Phase 1 Alternatives (1)

Intersection	Alternative	Description
White Marsh Shopping Center	Median Closure	Close the median at the southern entrance of the White Marsh Shopping Center and convert the southern entrance to right-in/right-out only. Left turns in and out of the shopping center will be accommodated at the Featherbed Lane intersection.
	Directional Median	Install a directional median at the southern entrance of the White Marsh Shopping Center and convert the driveway to left-in/right-in/right-out. Left turns are accommodated at the Featherbed Lane intersection.
Brays Point Road	Continuous Green-T (Link to VDOT Innovative Intersection Website)	Convert the intersection to a Continuous Green-T. Remove the signal for the southbound through movement and re-route northbound left and westbound through movements to the north at Ernest Lane.
	Advanced Dynamic Signal Ahead Warning Sign	Install an advanced dynamic signal ahead warning sign to the north of Brays Point Road to warn southbound vehicles of the upcoming signal at this intersection
	FYA Operation Modification	Modify or remove the flashing yellow arrow phasing
	Access Management	Close the northern driveway on northbound US Route 17 leading to the Exxon in the southeast quadrant of the intersection. Define access to the US Postal Service along southbound US Route 17 in the northwest quadrant.
Providence Road	Eastbound Approach Reconfiguration	Convert the eastbound approach to a through/left-turn lane and right-turn lane
	FYA Operation Modification	Modify or remove the flashing yellow arrow phasing
Woodsville Road	Southbound U-turn Lane Removal	Remove the existing deficient southbound U-turn lane and convert the intersection to left-in/right-in/right-out access only. Reroute eastbound left movements to Fields Landing Road.
	Median Closure	Close the median and reroute northbound left movements to the median opening 400 ft to the north; reroute southbound U-turn and eastbound left movements to Fields Landing Road.
Crewe Road	Continuous Green-T	Convert the intersection to a Continuous Green-T. Remove the signal for the northbound through movement and re-route southbound U-turn movements to the median opening 900 ft to the south.
	FYA Operation Modification	Modify or remove the flashing yellow arrow phasing
Powhatan Drive	Sub-Peak Signal Timing Modification	Modify the signal timings during school dismissal to provide more green time along Powhatan Drive
	Emergency Vehicle Pre-emption	Install emergency vehicle preemption on the eastbound approach.

Table 21: Phase 1 Alternatives (2)

Intersection	Alternative	Description
Hayes Road	Mountable Directional Median	Install a directional median with positive offset left turn lanes. The median would be able to be traversed by vehicles to maintain access for emergency response. Eastbound left turns and through movements are rerouted to the median opening 2,000 ft to the south. Eastbound left turns and through movements are rerouted to the median opening 1,600 ft to the north.
	Emergency Signal	Install an emergency signal that is only activated when emergency vehicles are accessing US Route 17 from Hayes Road
Hook Road/Guinea Road	Westbound Approach Reconfiguration	Convert the westbound approach to a dedicated left turn, a shared left/through, and a dedicated right-turn lane
Corridor Wide	US Route 17 Widening	Widen US Route 17 from 4 lanes (2 lanes in either direction) to 6 lanes (3 lanes in either direction)
	Access Management	Implement access management along the corridor, including closing driveways and closing median openings
Pedestrian/Bike/Transit	Shared Use Path	Add a shared use path to US Route 17, Providence Road, or Hayes Road
	HRT MAX Service Extension	Extend HRT MAX service to Gloucester Courthouse

1.7.2 Phase 1 Alternatives Summary

The Stage 1 iCAP results are summarized in **Table 22** and were presented at the Preliminary Concepts Refinement and Phase 2 Scoping Meeting (SWG Meeting #3), held on July 8, 2025, where the study work group decided which concepts would move forward to Phase 2. In total, the study work group agreed to carry 24 alternatives forward to Phase 2 for further refinement. The 24 alternatives included:

1. Directional medians
2. Continuous Green-Ts
3. Median closures
4. Approach reconfigurations
5. Modifying sub-peak and FYA operations
6. Access management
7. Pedestrian and bike accommodations
8. Improving public transit access

These alternatives were carried forward due to the projected safety and operational improvements. The alternatives at US Route 17 and White Marsh Shopping were not moved forward to Phase 2. VDOT Fredericksburg District decided that the *Route 17 Strategically Targeted Affordable Roadway Solutions (STARS) Study* would analyze this intersection as well as the US Route 17 and Featherbed Lane intersection.

Table 23 summarizes the alternatives considered in Phase 1 and gives the justification of if a concept were to move forward to Phase 2 and **Figure 24** shows the preliminary alternatives graphically categorized by the needs addressed by the alternative. The meeting materials can be found in **Appendix E**.

Table 22: Virginia iCAP Stage 1 Results—Woodsville Road

Metric Weighting (Based on Purpose and Need)		Traffic Operations	Pedestrian	Safety	Stage 1 Cost	Total Possible Score		Alternatives for Stage 2 Analysis	
		Traffic Operations Weight 2	Pedestrian Weight 1	Safety Weight 2	Stage 1 Cost Weight 2				
Alternatives		Traffic Operations Metric MOE Score	Pedestrian Metric MOE Score	Safety Metric MOE Score	Stage 1 Cost Metric MOE Score	Total Stage 1 Score		Selected Alternative for Stage 2 Analysis? (Maximum 5)	Justification*
Existing	Two-Way Stop Control	--	--	--	--				
Alternative 1	Median U-Turn NB-SB	0.0	1.0	1.0	0.5	4 out of 7		Yes	Creates minimal impact on capacity and improves safety.
Alternative 2	Two-Way Stop Control	1.0	0.5	0.3	1.0	5.1 out of 7		No	Compatible with roadway geometry while maintaining capacity and improving safety.
Alternative 3	Restricted Crossing U-Turn NB-SB	0.0	0.5	0.3	0.5	2.1 out of 7		Yes	Maintains the number of conflict points while minimizing impacts to operations and access.

Table 23: Phase 1 Alternatives to Move Forward to Phase 2 (1)

Intersection	Alternative	Move Forward to Phase 2?	Justification
White Marsh Shopping Center	Median Closure	No	Will be covered by the STARS study
	Directional Median	No	Will be covered by the STARS study
Brays Point Road	Continuous Green-T	Yes	Safety and traffic operations improvement
	Advanced Dynamic Signal Ahead Warning Sign	Yes	Safety operations improvement
	FYA Operation Modification	Yes	Safety operations improvement
	Access Management	Yes	Safety operations improvement
Providence Road	Eastbound Approach Reconfiguration	Yes	Safety and traffic operations improvement
	FYA Operation Modification	Yes	Safety operations improvement
Woodsville Road	Southbound U-turn Lane Removal	No	Limited safety and operational improvements
	Median Closure	Yes	Safety and traffic operations improvement
	Directional Median	Yes	Maintains northbound US Route 17 access to Woodsville Road.

Table 24: Phase 1 Alternatives to Move Forward to Phase 2 (2)

Intersection	Alternative	Move Forward to Phase 2?	Justification
Fields Landing Road	Directional Median	Yes	Safety and traffic operations improvement
Crewe Road	Continuous Green-T	Yes	Safety and traffic operations improvement
	Pedestrian Accommodations	Yes	Safety and access improvement
Powhatan Drive	Modify sub-peak signal timings	Yes	Safety and traffic operations improvement
	Pedestrian Accommodations	Yes	Safety and access improvement
Chapman Road	Access Management	Yes	Safety and traffic operations improvement
Hayes Road	Mountable Directional Median	Yes	Safety and traffic operations improvement
	Mountable Directional Median with an Emergency Signal	Yes	Will provide improved access for volunteer emergency personnel to US Route 17
Hook Road/Guinea Road	Westbound Approach Reconfiguration	Yes	Safety and traffic operations improvement
	Implement Concurrent Left-Turn phasing	Yes	Only a signal phasing operation change; no site work needed.
Corridor Wide	Transverse Rumble Strips	No	Upon further inspection, the transverse rumble strips are not an appropriate measure for installation on the multi-lane, signalized arterial
	US Route 17 Widening	No	Upon further inspection, widening is not an appropriate concept to address traffic operations and safety needs
	Access Management	No	Traffic operation does not show improvement
Pedestrian/Bike/Transit	Shared Use Path	Yes	Safety and access improvement
	Pedestrian Infrastructure	Yes	Safety and access improvement
	HRT MAX Service Extension	Yes	Public transit access improvement

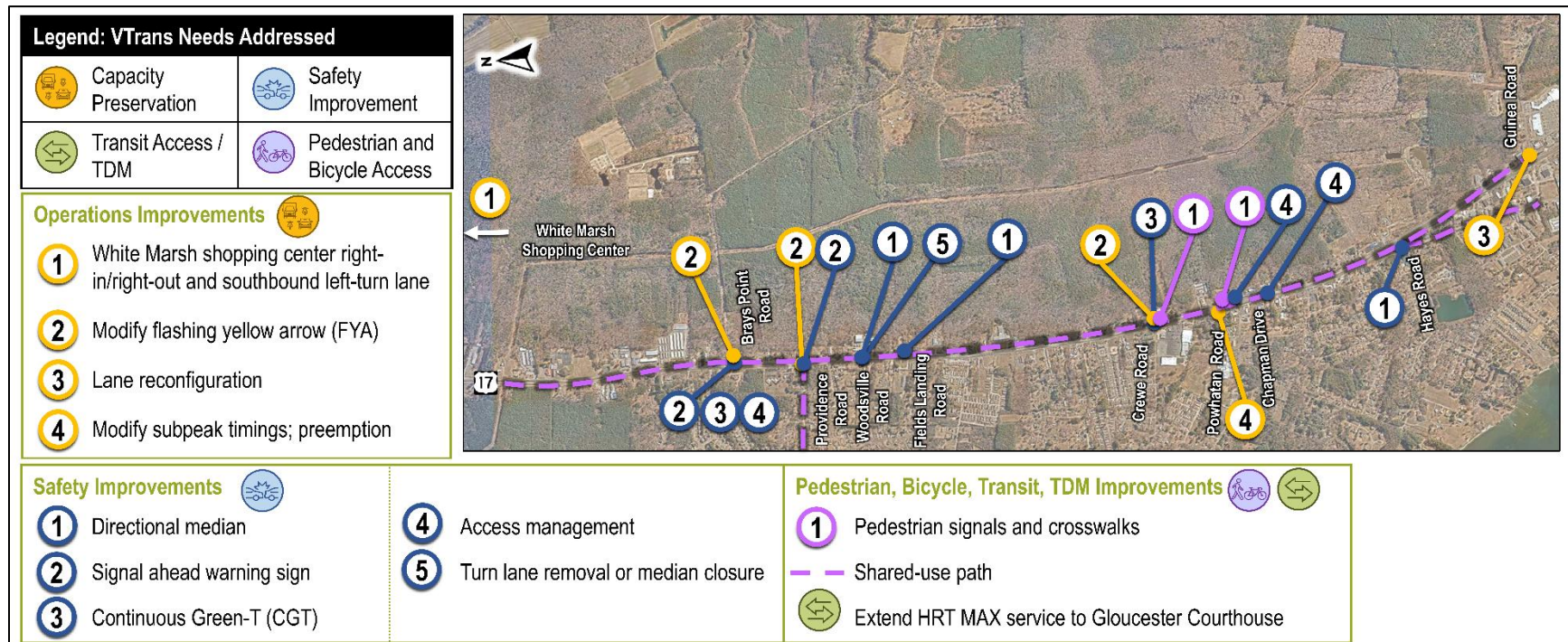


Figure 24: Phase 1 Scoping Level Improvements Alternatives

Chapter 2: Alternatives Refinement

2.1 Alternatives Refinement Overview

The study team refined the alternatives chosen to be carried forward in Phase 2, including concept drawings, cost estimates, and concept screening traffic operations and safety analysis. The primary goal of the Phase 2 alternatives refinement effort was to prepare a refined set of alternatives to present to the public and solicit feedback. The study team compared each alternative across several metrics using the Virginia iCAP Assessment Tool, including traffic operations, safety, pedestrian and bicycle access, and cost, to determine the refined list of alternatives to present to the public.

The Concept Development Update Meeting (SWG Meeting #4) was combined with the Concept Screening Refinements and Results Meeting (SWG Meeting #5) and was held on October 20, 2025, to gather feedback on the draft concept sketches and cost estimates. The Phase 2 Public Engagement Results, Preferred Alternative Selection Meeting, and Phase 3 Scoping Meeting (SWG Meeting #6) was held on December 15, 2025, to review the revised concepts and to share the concept screening results in advance of public outreach. During SWG Meeting #6, the study team discussed each alternative based on impacts to safety, traffic operations, cost, and right-of-way impacts, and chose which concepts to be shared during public outreach. Both presentations, along with the detailed concept sketches, are included in **Appendix E**.

2.2 Phase 2 Alternatives Description

2.2.1 Brays Point Road

Continuous Green-T

The Continuous Green-T concept would remove the signal for the southbound through movements and add an acceleration lane for westbound left-turn movements. The northbound left-turn lane would be removed, and northbound left and westbound through movements would be rerouted to Ernest Lane to the north. The northern driveway along US Route 17 would be closed, and a channelizing island would be added for southbound left and westbound left turning movements. **Figure 25** presents a conceptual sketch of the alternative.



Figure 25: Brays Point Road—Continuous Green-T

Advanced dynamic signal ahead flashers, FYA operation modification, and access management were also considered at this intersection. The advanced dynamic signal ahead flashers would be located north of the intersection for southbound traffic approaching the intersection and coordinated with the signal phasing, and the FYA operation modification would include modifying the mainline US Route 17 left-turn phasing to be protected only during the day (7:00 AM–6:00 PM) and have the FYA operate during the night (6:00 PM–7:00 AM). The access management would include closing the northern driveway along northbound US Route 17 to Exxon.

2.2.2 Providence Road

Eastbound Approach Reconfiguration

The eastbound approach reconfiguration would widen Providence Road to the north to add a dedicated right-turn lane. The new eastbound approach configuration would have a dedicated left-turn lane and a dedicated right-turn lane. **Figure 26** presents a conceptual sketch of the alternative.

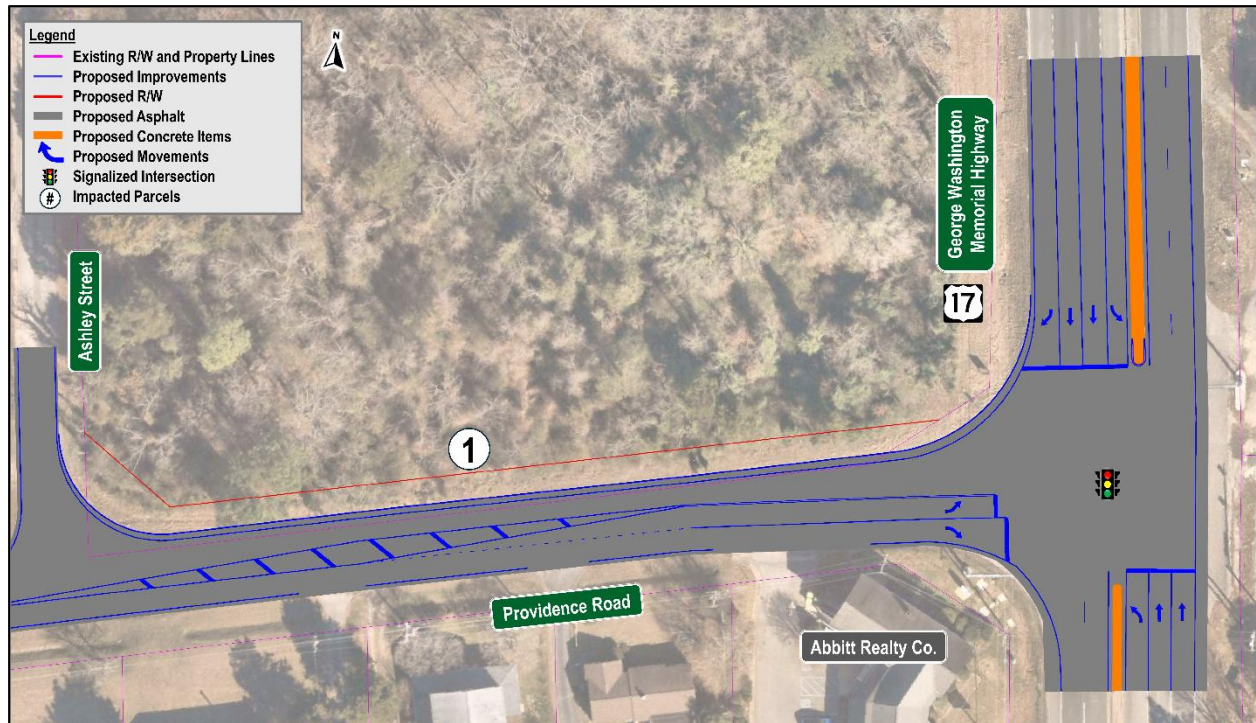


Figure 26: Providence Road—Eastbound Approach Reconfiguration

FYA operation modifications were also considered at this intersection. The FYA operation modification would include modifying the mainline US Route 17 left-turn phasing to be protected only during the day (7:00 AM–6:00 PM) and have the FYA operate during the night (6:00 PM–7:00 AM).

2.2.3 Woodsville Road

Median Closure

The median closure concept would close the median and add a new median opening with a loon 700 feet to the south. Southbound U-turn and eastbound left-turn movements would be rerouted to the proposed median opening. Northbound left turn movements would be rerouted to an existing median opening 400 feet to the north. **Figure 27** presents a conceptual sketch of the alternative

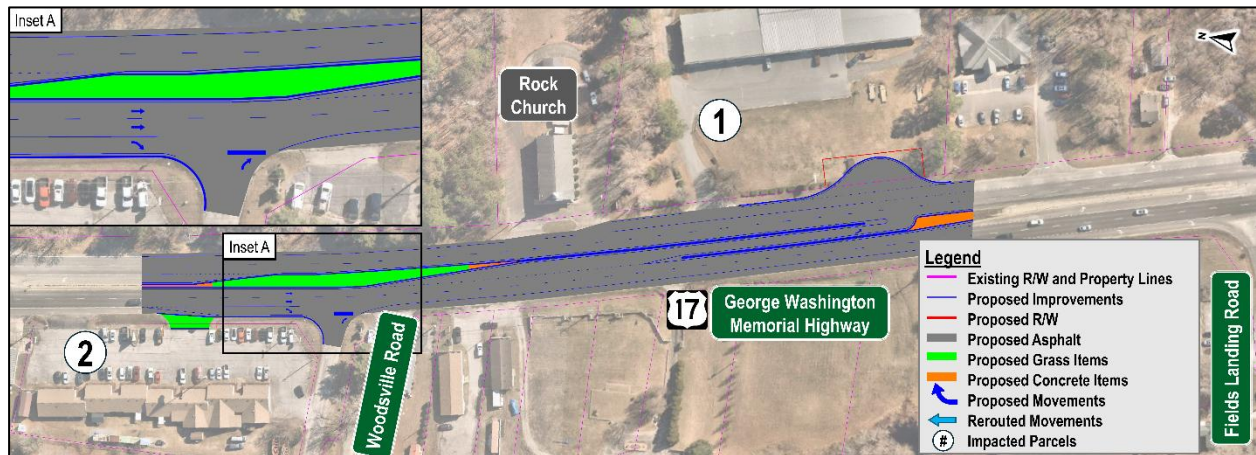


Figure 27: Woodsville Road—Median Closure

Directional Median

A directional median would be added to the median opening, and a new median opening with a loon would be added 700 feet to the south. Southbound U-turn and eastbound left-turn movements would be rerouted to the proposed median opening. **Figure 28** presents a conceptual sketch of the alternative.

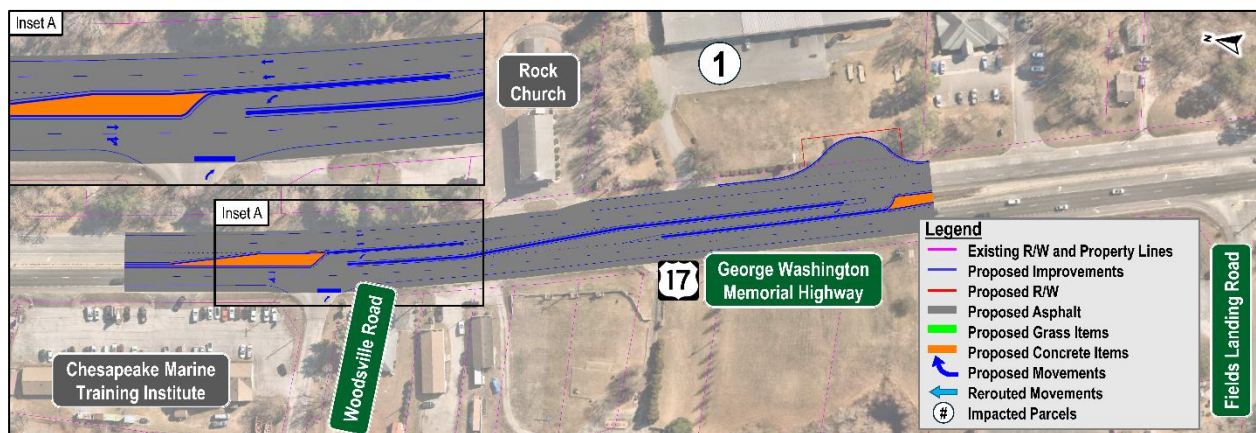


Figure 28: Woodsville Road—Directional Median

2.2.4 Fields Landing Road

Directional Median

The directional median concept would be added to the median opening, and a channelizing island would be added to the eastbound approach. Eastbound left-turn movements would be rerouted to the median opening at E View Road to the south. **Figure 29** presents a conceptual sketch of the alternative.

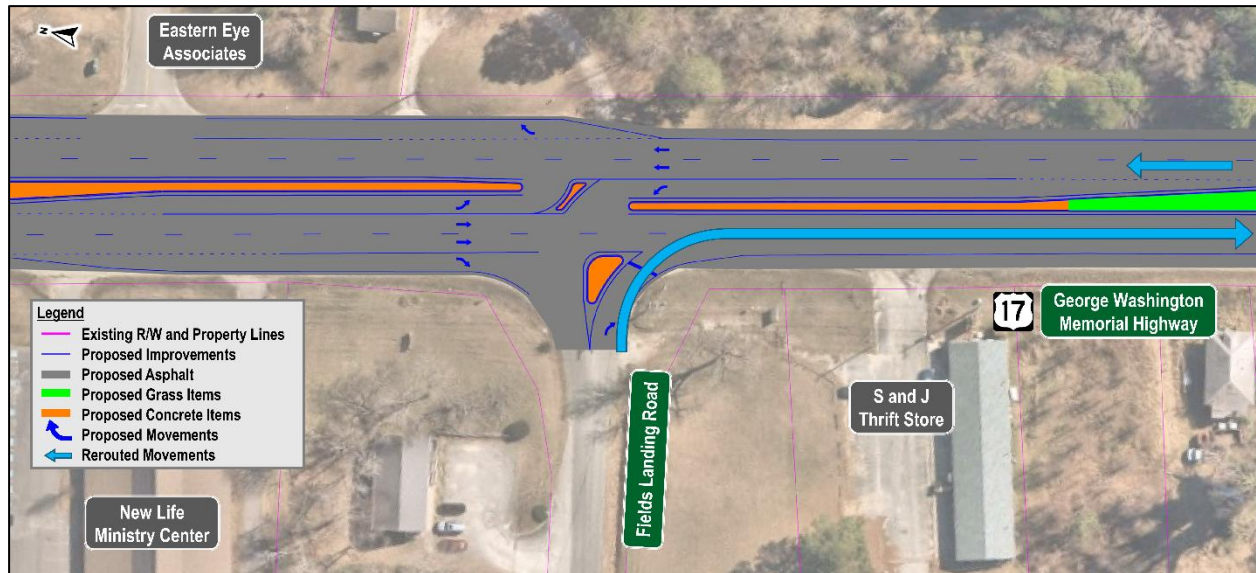


Figure 29: Fields Landing Road—Directional Median

2.2.5 Crewe Road

Continuous Green-T

The Continuous Green-T concept would remove the signal for the northbound through movements and add an acceleration lane for eastbound left-turning movements separated from the northbound through movements by a raised median. The southbound U-turn lane is removed, and U-turn movements would be rerouted to the median opening 900 feet to the south. A channelizing island is added for northbound left and eastbound left turning movements. The eastbound approach is restriped as a dedicated left turn lane and a dedicated right turn lane. **Figure 30** presents a conceptual sketch of the alternative.

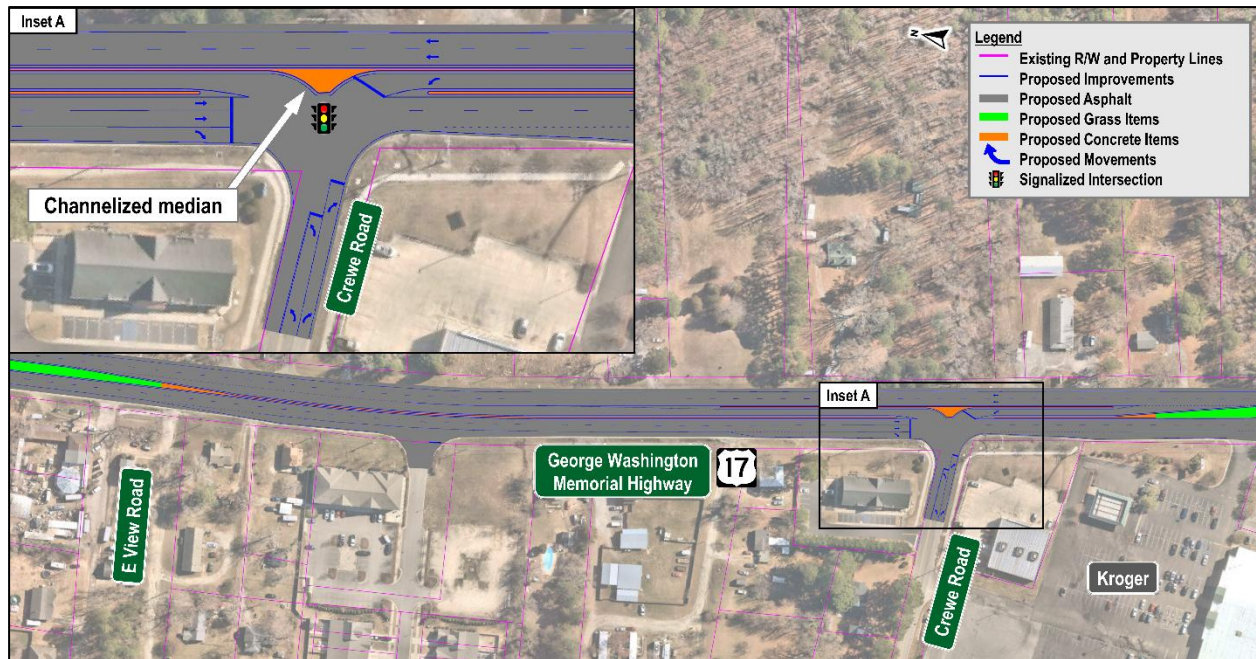


Figure 30: Crewe Road—Continuous Green-T

Pedestrian infrastructure was also considered for this intersection. This infrastructure would include a crosswalk across Crewe Road on the west side of US Route 17 and pedestrian signal heads and curb ramps on the northwest and southwest corners of the intersection.

2.2.6 Hayes Road

Directional Median with Emergency Signal

The directional median concept would be added to the median opening, and a new median opening with a loon would be added 700 feet to the south. Eastbound left turn and through movements would be rerouted to the proposed median opening to the south, and the westbound left turn and through movements would be rerouted to Chapman Drive to the north. A directional median would be added to the median opening at Tyndall Square, converting the access to left-in/right-in/right-out. Eastbound left turn movements from Tyndall Square would be rerouted to the median opening at VAMAC Inc., 1,000 feet to the south. An optional emergency signal is included at the intersection of Hayes Road and US Route 17. This signal would be activated when emergency vehicles are attempting to access US Route 17 from Hayes Road.

Figure 31 presents a conceptual sketch of the alternative.

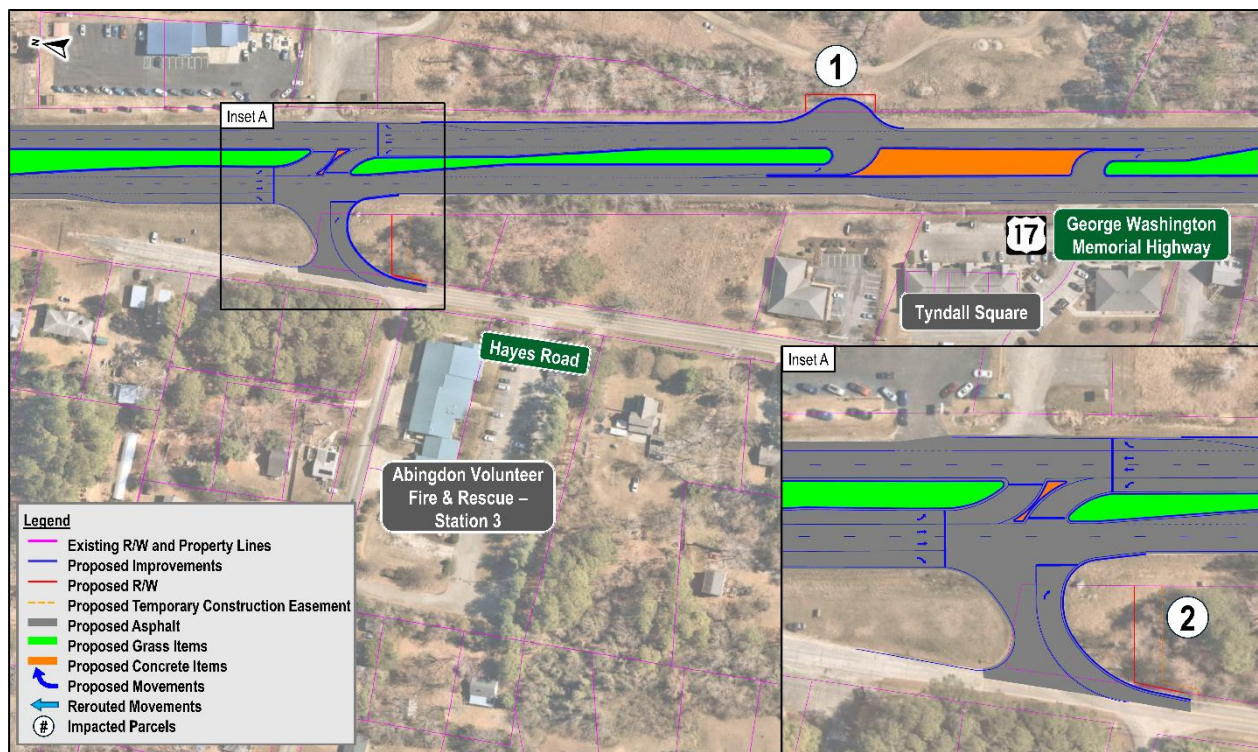


Figure 31: Hayes Road—Directional Median

Hook Road/Guinea Road: Westbound Approach Reconfiguration

The westbound approach reconfiguration concept would restripe the westbound approach as a dedicated left-turn lane, a shared left/through lane, and a dedicated right-turn lane at this intersection. The proposed concept would accommodate larger westbound approach left-turn volumes and is projected to reduce the annual fatal and serious injury crashes at the intersection. The concept was not included in the PublicInput survey.

Concurrent left-turn phasing would modify the existing signal phasing to concurrent left-turns for the side-street movements at this intersection. This concept was not included in the PublicInput survey. **Figure 32** presents a conceptual sketch of the alternative.

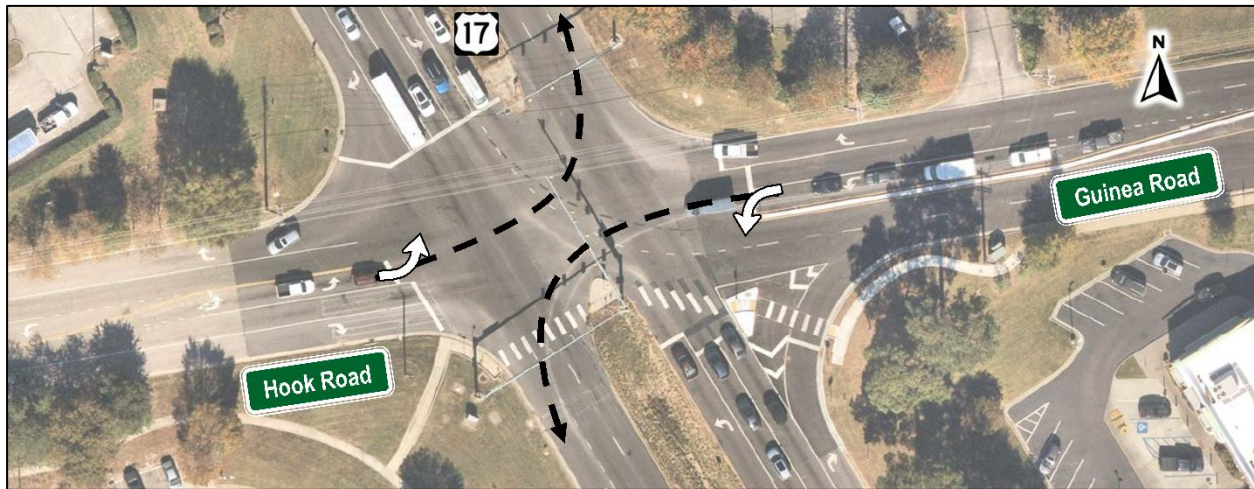


Figure 32: Hook Road/Guinea Road—Concurrent Left-Turn Phasing

Powhatan Drive: Sub-Peak Signal Timing Plan Modifications and Access Management

Sub-peak signal timing plan modifications and access management improvements were considered at this intersection. The signal modifications would include modifying subpeak timing plans during school dismissal and installing emergency vehicle preemption. The proposed signal improvements are projected to improve the side street level of service during school dismissal and would enhance intersection safety and accessibility for emergency vehicles. The access management improvements would close the southern driveway along US Route 17 to Exxon in the northwest quadrant of the intersection. The concept is projected to enhance safety by consolidating redundant access points. Traffic operations analyses were not conducted for this concept, and the concept was not included in the PublicInput survey. **Figure 33** presents a conceptual sketch of the access management alternative.

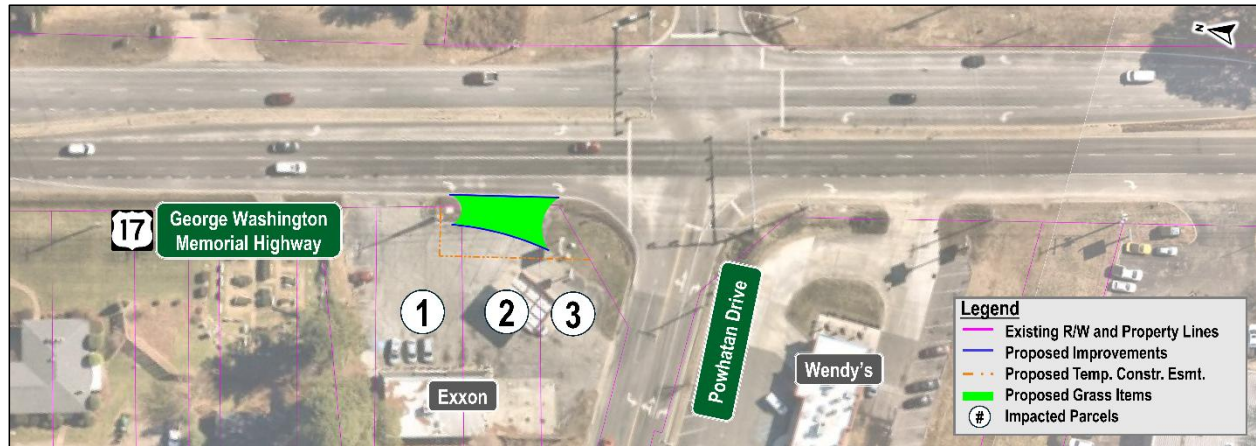


Figure 33: Powhatan Drive—Access Management

Chapman Drive: Access Management

Access management improvements were considered at this intersection. The access management improvements would close the southern driveway along US Route 17 to Nationwide Insurance in the northwest quadrant. The proposed improvement is projected to enhance safety by consolidating redundant access points. Traffic operations analyses were not conducted for this concept, and the concept was not included in the PublicInput survey. **Figure 34** presents a conceptual sketch of the access management alternative.

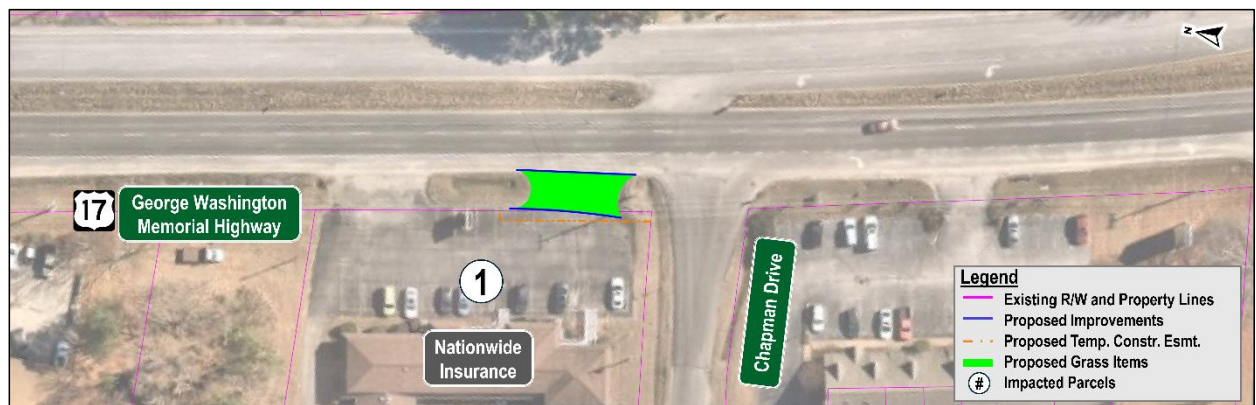


Figure 34 Chapman Drive—Access Management

2.3 Traffic Operations and Safety Results

The study team conducted a screening-level traffic operations and safety analysis to help narrow down the alternatives considered. At intersections where multiple configurations were carried forward to Phase 2, improvement alternatives were further screened to aid in selecting a preferred alternative using the Virginia iCAP Assessment Tool to rank each alternative based on traffic operations, safety, pedestrian accommodations, and cost.

Projected Traffic Operations Results for Alternatives

Intersection operations were evaluated to compare projected operations between the different alternatives using Synchro 11. The study team analyzed AM and PM future year (2045) traffic volumes to evaluate the

operational benefits of the alternatives. Peak hour control delay in seconds per vehicle (s/veh) was used as a measure of effectiveness for the intersection operations analysis. The study team also reviewed if the proposed concepts could accommodate projected 95th percentile queues. The PM peak hour 95th percentile queues for each concept are not projected to extend to upstream intersections. The study team calculated experienced travel time (ETT) following methodologies provided in the HCM 6th Edition for innovative intersection designs that involve diverting traffic movements to other intersections. **Table 25** summarizes the traffic operations results.

Table 25: Traffic Operations Results

Intersection	Alternative	AM Peak Hour Change in Delay (s/veh)	PM Peak Hour Change in Delay (s/veh)
US Route 17 at Brays Point Road	Continuous Green-T*	-3.6	-3.0
	Flashing Yellow Arrow	+1.6	+0.8
US Route 17 at Providence Road	Eastbound Reconfiguration	-2.1	-2.6
	Flashing Yellow Arrow	-2.8	+5.7
US Route 17 at Woodsville Road	Directional Median*	-145.3	-259.6
	Median Closure*	-129.5	-232.5
US Route 17 at Fields Landing Road	Directional Median*	-255.4	-316.6
US Route 17 at Crewe Road	Continuous Green-T	0.0	-4.6
US Route 17 at Hayes Road	Directional Median*	-26.8	+8.3
US Route 17 at Hook Road/Guinea Road	Westbound Reconfiguration	+1.2	-8.7
	Concurrent Left-Turns	+0.7	-7.0

*Concept results include experienced travel time (ETT)

Projected Crash Reduction for Alternatives

The study team reviewed crash modification factors (CMFs) to estimate the potential safety benefits for each alternative. CMFs are used to estimate the projected change in the number of crashes after a specific countermeasure is implemented. They are calculated as the ratio of crashes with the countermeasure to the number of crashes without the countermeasure. A CMF of 1.00 means that there is no expected change, a CMF less than 1.00 means there is an expected reduction in crashes, and a CMF greater than 1.00 means there is an expected increase in crashes (e.g., a CMF of 0.6 means the countermeasure is projected to reduce crashes by 40%). CMFs were selected from the SMART SCALE Round 6 Planning Level CMF List and VDOT's Virginia State Preferred CMF List.

The CMFs selected represent the most applicable treatments for each location based on SMART SCALE and Virginia guidance, as shown in **Table 26**.

The modification of flashing yellow arrow (FYA) operation to protected-only operation is not listed in either CMF source; however, there is a CMF for converting from protected-only to FYA operation for left turns. Therefore, the inverse of this CMF is applied for the conversion of an FYA to a protected left turn (0.41). This CMF was only applied to the crashes that occurred during the time period between 7:00 AM and 6:00 PM, consistent with the recommendation to operate the left-turn phasing as protected only during these hours.

Table 26: CMF and Crash Reduction Summary

Alternative	F+I CMF	Annual Crash Reduction (F+I)
Brays Point Road: Continuous Green-T	0.85	0.42
Brays Point Road: Advanced Activated/Dynamic Flasher Signal Ahead Sign	0.814	0.52
Brays Point Road: Removal of Flashing Yellow Arrow	0.41	0.36
Brays Point Road: Access Management	*	0.00
Providence Road: Add turn lane (existing)	0.97	0.04
Providence Road: Removal of Flashing Yellow Arrow	0.41	0.00^
Woodsville Road: Removal of southbound U-turn lane	*	0.00
Woodsville Road: Convert intersection to right-in/right-out (Closed Median)	0.20	0.32
Woodsville Road: Convert TWSC to unsignalized RCUT	0.37	0.26
Fields Landing Road: Convert TWSC to unsignalized RCUT	0.37	0.62
Crewe Road: Continuous Green-T	0.85	0.78
Crewe Road: Add a high-visibility crosswalk	0.30	0.00^
Powhatan Drive: Access Management	*	0.00
Chapman Drive: Access Management	*	0.00
Hayes Road: Convert TWSC to unsignalized RCUT	0.37	1.14
Hayes Road: Emergency Signal	*	0.00
Guinea Road: Add turn lane (existing)	0.97	0.08

*No CMF exists | ^No applicable crashes in the last five years if data reviewed

2.4 Phase 2 Public Involvement

The Phase 2 PublicInput survey was held from November 10, 2025, to November 26, 2025, to collect feedback on the potential improvements within the study corridor. The PublicInput survey provided the study team with an understanding of how the public viewed each alternative before selecting the preferred alternative. In total, 231 respondents participated in the survey and submitted a total of 99 written comments. **Figure 35** summarizes the average ranking of the alternatives presented in the survey for each intersection. A rating of 5.0 represents a strongly supported concept, and a rating of 1.0 represents a strongly opposed concept.

In general, respondents supported the addition of emergency vehicle preemption, modification to the operation of flashing yellow arrows (FYA), increased enforcement of speeding and red-light-running, and a reduction of the speed limit throughout the corridor. Respondents suggested to consider and identify improvements to intersections with a projected increase in U-turns because of rerouted vehicles.

The study workgroup also held an in-person public information meeting on November 19, 2025, from 5:00–7:00 PM at Gloucester High School to collect additional feedback and input on the potential improvements. In total, 28 community members attended the public information meeting. Feedback gathered during the in-person meeting was consistent with the feedback received from the PublicInput survey.

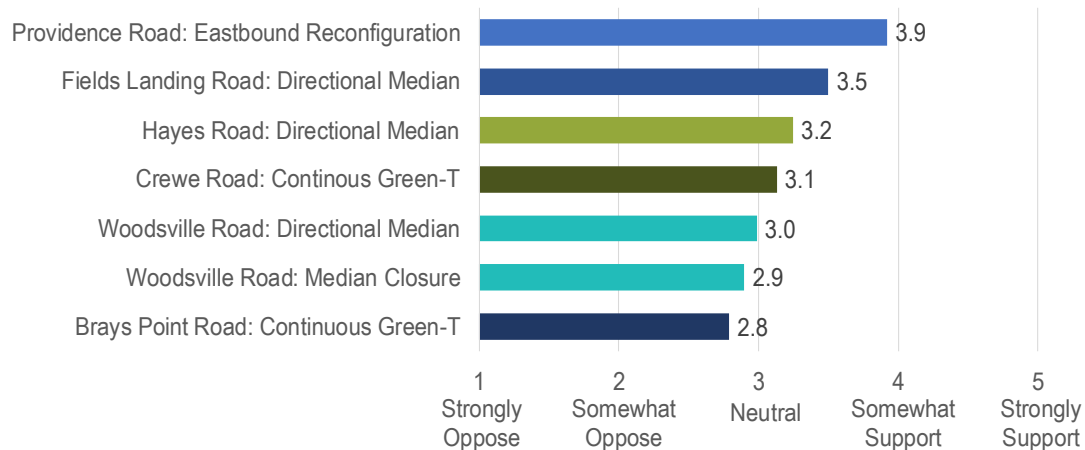


Figure 35: Public Engagement—Average Rating of Alternatives

Table 27 presents public involvement feedback themes associated with the proposed alternatives and **Figure 36** presents the survey feedback for each intersection concept. Detailed survey results are shown in **Appendix E**.

Table 27: Public Involvement Feedback Themes for Proposed Alternatives

Alternative	Public Involvement Feedback Themes
Brays Point Road: Continuous Green-T	Concerns with rerouting traffic to make U-turns, conflicting turns between the southbound U-turn and westbound right-turn, and insufficient gaps to turn onto US Route 17
Brays Point Road: Modification of Flashing Yellow Arrow	Support for removing flashing yellow arrows along the corridor
Providence Road: Add turn lane	Concerns with making northbound U-turns and queuing in the northbound left-turn lane
Providence Road: Modification of Flashing Yellow Arrow	Support for removing flashing yellow arrows along the corridor
Woodsville Road: Median Closure	Concerns with crashes associated with rerouted vehicles making left/U-turns and insufficient gaps to make those movements
Woodsville Road: Directional Median	Concerns with crashes associated with rerouted vehicles making left/U-turns and insufficient gaps to make those movements
Fields Landing Road: Directional Median	Support for the directional median concept at the intersection
Crewe Road: Continuous Green-T	Concerns with crashes associated with rerouted vehicles making left/U-turns and insufficient gaps to make those movements
Hayes Road: Directional Median	Concerns with crashes associated with rerouted vehicles making left/U-turns and insufficient gaps to make those movements
Hayes Road: Emergency Signal	Support for installing an emergency signal

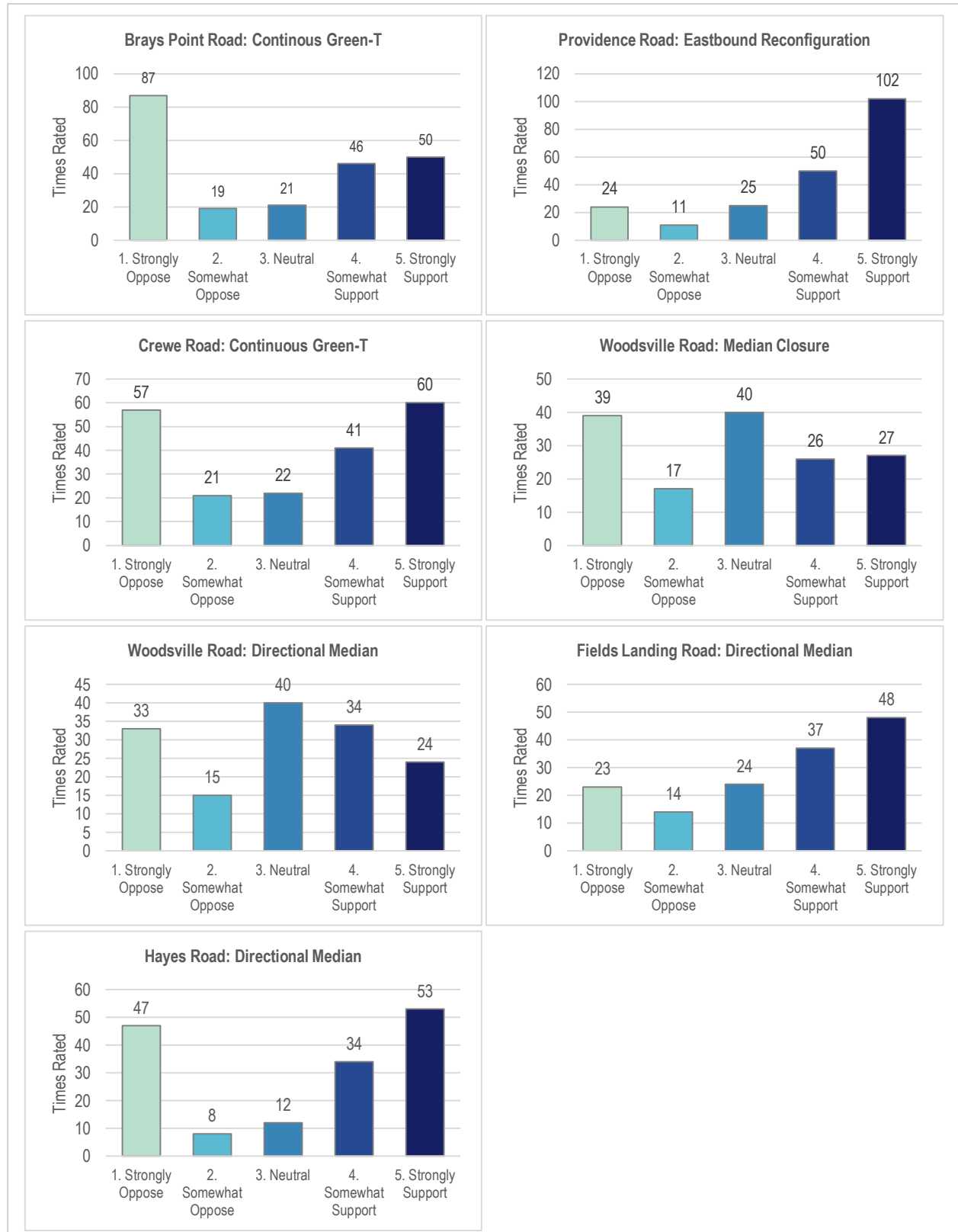


Figure 36: Intersection Survey Responses

2.5 Preferred Alternative Selection

The Phase 2 Public Engagement Results, Preferred Alternative Selection, and Phase 3 Scoping Meeting (SWG Meeting #6) was held on December 15, 2025. The purpose of the meeting was to review the Phase 2 public engagement results, share the construction phase cost estimates, select the preferred alternative, and discuss Phase 3 scoping. During this meeting, Kimley-Horn suggested a set of alternatives to advance towards the development of a preferred alternative, as outlined in **Table 23** from **Chapter 1.7**. The Project Pipeline Program requires that all recommended improvements be categorized into three distinct groups:

- **Short Term Recommendations (State/Local Forces):** This category consists of immediate maintenance and operational improvements that could be implemented through state/local forces. Examples include vegetation management, HSIP systemic-level safety improvements, adjusting signal timings. Some improvements in this category may also be included in the final mid-term investment strategy.
- **Mid-Term Investment Strategy (Preferred Alternative):** This category consists of improvements that are targeted for a funding request/application within the next 12 months. Items in this group will advance to Phase 3 of the Project Pipeline study process for further design and cost refinement. All recommendations in the mid-term investment strategy category will be considered the preferred alternative per SMART SCALE High Priority Program (HPP) policy.
- **Long-Term Investment Vision:** This category includes recommendations that represent a long-term investment vision (beyond 20 years). These improvements are not targeted for funding in near or mid-term but are intended to guide localities in their comprehensive planning efforts, inform land development decisions, and reserve and protect future right-of-way. Recommendations in this category will not advance to Phase 3 of Project Pipeline.

The following section presents the alternatives considered and the rationale for the selection of the preferred alternative(s) throughout the study corridor. The alternative summary tables include traffic operations and safety analysis results, a qualitative assessment of impacts to pedestrian and bike access, and the construction phase cost estimate, iCAP Stage 2 score, and average PublicInput alternative rating, where applicable. Alternatives denoted with the star (★) icon represent the preferred alternative for the intersection. **Appendix F** includes the Phase 2 Preferred Alternative Summary.

US Route 17 and Brays Point Road

Table 28 includes a summary of the alternatives considered at the US Route 17 and Brays Point Road intersection. The study team selected to proceed with the advanced dynamic signal ahead warning sign and the FYA modification alternatives. These short-term, lower-impact improvements are expected to address the safety needs at this intersection more efficiently and at a lower cost compared to the continuous green-T concept. The FYA modification is projected to have a negligible impact on traffic operations in the AM and PM peak hours compared to No-Build conditions. The combined reduction in F+I crashes for these alternatives is .88 crashes per year.

Table 28: US Route 17 and Brays Point Road Alternative Summary

Alternative	Change In Delay from No-Build (+/- s/veh)	Annual F+I Crash Reduction* (14 Existing)	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 8)	PublicInput Rating (Out of 5)
Continuous Green-T	-3.0 (PM peak hour)	0.42	Worse than conventional intersection	\$6.6M – \$8.0M	7	2.8
Signal Ahead Sign ★	None	0.52	Same as conventional intersection	TBD	N/A	N/A
FYA Modification ★	+1.6 (AM peak hour)	0.36 (3 Existing)	Same as conventional intersection	TBD	N/A	N/A

* Based on Crash Modification Factors (CMFs)

US Route 17 and Providence Road

Table 29 includes a summary of the alternatives considered at the US Route 17 and Providence Road intersection. The study team selected to proceed with the eastbound reconfiguration and the FYA modification alternatives, given that they have the potential to address safety needs and are generally supported by the public.

The proposed eastbound reconfiguration is projected to decrease the overall intersection delay by 2.1 s/veh in the AM peak hour and 2.8 s/veh in the PM peak hour compared to No-Build conditions. The reduction in delay can be attributed to the addition of an eastbound exclusive right-turn lane. The FYA modification is projected to increase the overall intersection delay by 6.4 s/veh in the PM peak hour compared to No-Build conditions. This increase can be attributed to the reduction in time when left turns are permitted on US Route 17.

Table 29: US Route 17 and Providence Road Alternative Summary

Alternative	PM Peak Hour Change In Delay from No-Build (+/- s/veh)	Annual F+I Crash Reduction*	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 8)	PublicInput Rating (Out of 5)
Eastbound Reconfiguration ★	-2.6 (PM peak hour)	0.04 (8 Existing)	Same as conventional intersection	\$2.1M – \$2.5M	4.5	3.9
FYA Modification ★	+5.7 (PM peak hour)	0.00 (0 Existing)	Same as conventional intersection	TBD	N/A	N/A

* Based on Crash Modification Factors (CMFs)

US Route 17 and Woodsville Road

Table 30 includes the iCAP Stage 2 summary and **Table 31** includes a summary of the alternatives considered at the US Route 17 and Woodsville Road intersection. The study team recommended to proceed with the directional median alternative, given that the alternative effectively targets the safety needs at the intersection, while maintaining northbound left-turn access to Woodsville Road. Ultimately, the Gloucester County Board of Supervisors did not elect to proceed with the directional median as part of the preferred alternative and it was removed from the Recommended Investment Strategy.

The proposed directional median is projected to decrease the eastbound approach delay by 145.3 s/veh in the AM peak hour and by 259.6 s/veh in the PM peak hour. Overall, the directional median is projected to perform better than the median closure, due to the directional median not requiring the rerouting of the northbound left-turns.

Table 30: Virginia iCAP Stage 2 Results—Woodsville Road

Alternative	Traffic Operations Metric			Pedestrian Metric Score	Safety Metric		Stage 2 Cost Metric		Total Stage 2 Score
	MOE 1 Score	MOE 2 Score	Total Score		Annual F+I Crash Reduction	Score	VJuST-C Cost Estimate	Score	
Median U-Turn NB-SB	0.8		0.8	1.0	0.32	1.0	\$ 3,800,000	0.9	6.4 out of 7
Restricted Crossing U-Turn NB-SB	1.0		1.0	0.5	0.25	0.8	\$ 3,500,000	1.0	6.1 out of 7
Metric Weighting	2			1	2		2		

Table 31: US Route 17 and Woodsville Road Alternative Summary

Alternative	PM Peak Hour Change In Delay from No-Build (+/- s/veh) [^]	Annual F+I Crash Reduction* (2 Existing)	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 7)	PublicInput Rating (Out of 5)
Directional Median	-231.8 (Eastbound) +0.0 (Northbound) +83.6 (Southbound)	0.26	Same as conventional intersection	\$3.2M – \$3.9M	6.1	3.0
Median Closure	-232.5 (Eastbound) +36.8 (Northbound) +66.4 (Southbound)	0.32	Better than conventional intersection	\$3.4M – \$4.2M	6.4	2.9

[^]Experienced Travel Time (ETT) calculated for the proposed concept

* Based on Crash Modification Factors (CMFs)

US Route 17 and Fields Landing Road

Table 32 includes a summary of the alternatives discussed at the US Route 17 and Fields Landing Road intersection. The study team selected to recommended to proceed with the directional median, given that it is projected to effectively target safety needs at the intersection, improve operations, and is supported by the public. Ultimately, the Gloucester County Board of Supervisors did not elect to proceed with the directional median as part of the preferred alternative and it was removed from the Recommended Investment Strategy.

The proposed directional median is projected to decrease the eastbound approach delay by 255.4 s/veh in the AM peak hour and by 316.6 s/veh in the PM peak hour. This reduction in delay can be attributed to drivers not conflicting with both directions of travel on US Route 17 and instead dividing their movement to

a right turn and U-turn interacting with only one direction of travel at each stage. The experienced travel time for the rerouted eastbound left-turn movement is projected to decrease the delay by 221.2 s/veh in the AM peak hour and by 187.6 s/veh in the PM peak hour when compared to No-Build conditions.

Table 32: US Route 17 and Fields Landing Road Alternative Summary

Alternative	PM Peak Hour Change In Delay from No-Build (+/- s/veh) [^]	Annual F+I Crash Reduction* (5 Existing)	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 7)	PublicInput Rating (Out of 5)
Directional Median	-218.5 (Eastbound) -4.2 (Northbound) +15.4 (Southbound)	0.62	Same as conventional intersection	\$1.5M – \$1.9M	6.5	3.5

[^]Experienced Travel Time (ETT) calculated for the proposed concept

* Based on Crash Modification Factors (CMFs)

US Route 17 at Crewe Road

Table 33 includes a summary of the alternatives discussed at the US Route 17 and Crewe Road intersection. The study team selected to proceed with the crosswalk, curb ramp, and pedestrian signal alternatives as part of a long-term recommendation that can be implemented in the future through other projects or funding. The study team did not select to proceed with the continuous green-T alternative, given it is a higher impact improvement that would not cost-effectively target the existing safety need related to left turns from northbound US Route 17 and would prevent the possibility of a future pedestrian crossing of US Route 17 at the intersection. Additionally, the operational benefits of the continuous green-T concept are constrained by the reduced capacity on the eastbound approach. This reduction in capacity would be caused by converting the existing shared left-turn/right-turn lane into a dedicated right-turn lane, as space constraints prevent the inclusion of acceleration lanes for two eastbound left-turn lanes.

Table 33: US Route 17 and Crewe Road Alternative Summary

Alternative	PM Peak Hour Change In Delay from No-Build (+/- s/veh)	Annual F+I Crash Reduction* (26 Existing)	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 7)	PublicInput Rating (Out of 5)
Continuous Green-T	-4.6	0.78	Worse than conventional intersection	\$7.1M – \$10.6M	7	3.1
Crosswalk, Curb Ramp, Pedestrian Signal ★	None	0.00 (0 Existing)	Better than conventional intersection	TBD	N/A	N/A

* Based on Crash Modification Factors (CMFs)

In 2025, VDOT modified the signal phasing at this intersection to be protected only during the day (7:00 AM–6:00 PM) and have the FYA operate during the night (6:00 PM–7:00 AM). The study team recommends for VDOT and Gloucester County to monitor crash data related to northbound left turns during protected and FYA operations. Findings from monitoring safety trends could guide future implementation and operation of FYA along the US Route 17 corridor.

US Route 17 at Powhatan Drive

The study team selected to proceed with the following alternatives as part of short-term and long-term recommendations at US Route 17 and Powhatan Drive:

- Short-Term: Modify Subpeak Timing, Install Emergency Vehicle Preemption
- Long-Term: Access Management

The modification of subpeak timing and installation of emergency vehicle preemption is projected to improve side street operations, while access management is projected to improve safety.

US Route 17 at Chapman Drive

The study team selected to move forward with the access management alternative at US Route 17 and Chapman Drive as a long-term recommendation. The concept could be paired with future improvements at the intersection to improve safety at the intersection.

US Route 17 at Hayes Road

Table 34 includes a summary of the alternatives discussed at the US Route 17 and Hayes Road intersection. The study team recommended to proceed with the directional median alternative given that it is projected to effectively target the safety needs at the intersection. Ultimately, the Gloucester County Board of Supervisors did not elect to proceed with the directional median as part of the preferred alternative and it was removed from the Recommended Investment Strategy. If this concept were to be reconsidered, the study team recommends continuing coordination with Abingdon Volunteer Fire & Rescue department staff to further refine the alternative to include a directional median navigable for emergency services vehicles and emergency signal.

The proposed directional median with the optional emergency signal is projected to decrease the eastbound approach delay by 26.8 s/veh in the AM peak hour and increase the eastbound approach delay by 8.3 s/veh in the PM peak hour compared to No-Build conditions.

Table 34: US Route 17 and Hayes Road Alternative Summary

Alternative	Change In Delay from No-Build (+/- s/veh) [^]	Annual F+I Crash Reduction* (9 Existing)	Pedestrian and Bike	Construction Phase Cost Estimate	iCAP Stage 2 Score (Out of 8)	PublicInput Rating (Out of 5)
Directional Median	+8.3 (Eastbound PM peak hour)	1.14	Better than conventional intersection	\$6.5M – \$7.9M	4.5	3.3

* Based on Crash Modification Factors (CMFs)

[^]Experienced Travel Time (ETT) calculated for the proposed concept

US Route 17 at Hook Road/Guinea Road

At the intersection of US Route 17 and Hook Road/Guinea Road, the proposed westbound reconfiguration is expected to decrease the westbound approach delay by 69.9 s/veh in the PM peak hour. The proposed concurrent left-turns for the eastbound and westbound approaches is expected to decrease the eastbound and westbound approach delay by 19.6 s/veh and 64.5 s/veh, respectively in the PM peak hour.

The study team selected to proceed with the short-term recommendation of the westbound approach reconfiguration alternative. This alternative was chosen due to the projected operational improvements for the westbound approach being better than the projected operations of the concurrent left-turn alternative.

US Route 17 Corridor

Along the US Route 17 corridor, the study team selected to proceed with the following long-term alternatives:

- **Shared Use Path:** A shared use path along US Route 17 can be implemented through proffers, additional funding, or alternative methods in the future as the corridor continues to develop and needs arise.
- **HRT MAX Extension:** Extending the HRT MAX service through the study corridor to Gloucester Courthouse. Additional funding and planning as required, and as needs grow in the study area.

Table 35 shows the intersection and corridor alternatives and their associated investment strategy, and **Figure 37** shows the short-term recommendations, mid-term investment strategy (preferred alternatives), and long-term investment strategy recommendations along the corridor. Bicycle, transit, and pedestrian needs were evaluated as part of the development of intersection and corridor alternatives and have been identified as part of the Long-Term Investment Vision along the corridor. The operational and safety improvements identified as part of the Short-Term Recommendation and Mid-Term Investment Strategy represent the most cost-effective improvements with public and study workgroup support.

Table 35: Recommended Investment Strategy

Intersection	Short-Term Recommendation	Mid-Term Investment Strategy (Preferred Alternative)	Long-Term Investment Vision	Notes
US Route 17 and Brays Point Road	FYA Modification*, Signal Ahead Sign*			Lower-cost improvements for targeted safety benefit
US Route 17 and Providence Road	FYA Modification*	Eastbound Approach Reconfiguration		Highest public support Potential for safety improvement
US Route 17 and Woodsville Road				The study team recommended the Directional Median, which was ultimately not supported by the Gloucester County Board of Supervisors (BOS)
US Route 17 and Fields Landing Road				The study team recommended the Directional Median, which was ultimately not supported by the Gloucester County BOS
US Route 17 and Crewe Road			Pedestrian Improvements*	Consider as part of future projects to connect to the existing sidewalk
US Route 17 and Powhatan Drive	Modify Subpeak Timing*, Emergency Vehicle Preemption*		Access Management*	Subpeak timing plan optimization could improve operations during school dismissal; access management may be included in future projects
US Route 17 and Chapman Drive			Access Management*	Not an immediate need, but may be included in future projects
US Route 17 and Hayes Road				The study team recommended the Directional Median with Emergency Signal, which was ultimately not supported by the Gloucester County BOS
US Route 17 and Hook Road/Guinea Road	Westbound Approach Reconfiguration*			More effective in mitigating observed congestion on westbound approach than concurrent lefts
US Route 17 Corridor			Shared Use Path*, HRT MAX Extension*	Consider as part of future projects connecting with planned shared use path near Guinea Rd

Note: * Cost to be determined |

Legend: **Short-Term Recommendation (Yellow)** | **Mid-Term Investment Strategy (Blue)** | **Long-Term Investment Vision (Pink)**

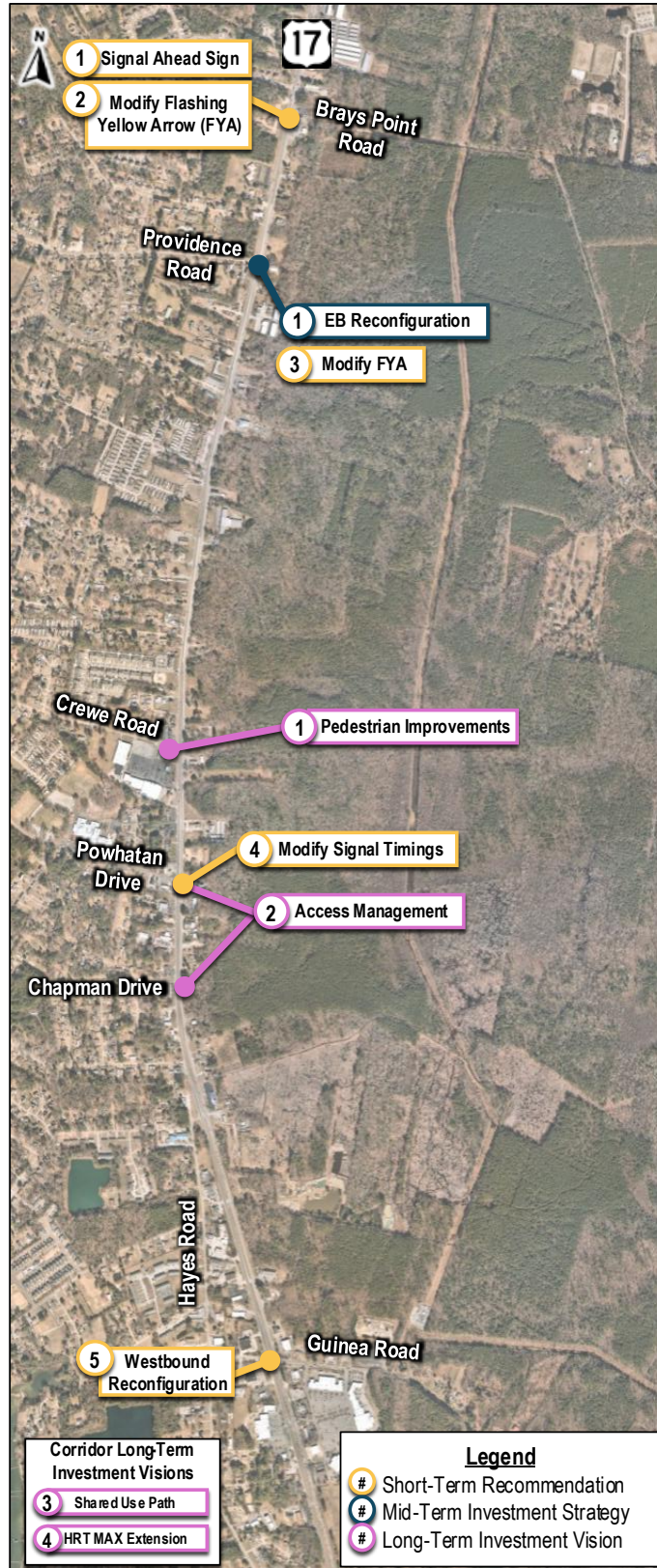


Figure 37: Preferred Alternative Summary

Chapter 3: Preferred Alternative Analysis and Investment Strategy

Phase 3 of the study included a detailed design, cost estimate, risk assessment, and further operations assessment of the selected preferred alternative. As discussed in **Section 2.5**, the SWG recommended proceeding with the following concepts as mid-term priorities:

- Eastbound approach reconfiguration at US Route 17 and Providence Road
- Directional median at US Route 17 & Woodsville Road
- Directional median at US Route 17 & Fields Landing Road
- Directional median with emergency signal at US Route 17 and Hayes Road

The concepts were then shared with Gloucester County's Board of Supervisors on February 17, 2026, to formalize the corridor mid-term priority. The Board of Supervisors decided to only pursue one concept as the mid-term priority (preferred alternative) concept, which was the eastbound approach reconfiguration at US Route 17 and Providence Road. The preferred alternative concept has the following components:

- Widen the eastbound approach to the north to accommodate a dedicated right-turn lane and left turn-lane
- Install a new signal pole with a mast arm and signal heads in the southeast corner
- Install video detection for the northbound, southbound, and eastbound approaches to replace the eastbound approach and mainline left-turn lane loop detection
- Construct a stormwater best management practice (BMP) in the northwest corner
- Remove the existing signal poles and mast arms serving the eastbound approach in the southeast corner

The Phase 3 Preferred Alternative Summary is provided in **Appendix F**. The SWG conducted a field review on March 3, 2026, to document the existing conditions and potential risks for the preferred alternative. The findings of the field review were used to develop the risk register for the preferred alternative, which was presented at the Project Risk Meeting (SWG #7) on March 25, 2026. The meeting materials are provided in **Appendix F**.

3.1 Preferred Alternative Operational Analysis

Once the preferred alternative was selected, the study team conducted Synchro analyses to refine the geometry of the preferred alternative and quantify the anticipated future traffic operations. The Build Synchro models include the anticipated widening of US Route 17 between Tidemill Road and Guinea Road, which will add a third northbound and southbound through lane at the study area intersection of US Route 17 and Hook Road/Guinea Road. Additionally, short-term recommendations, including flashing yellow arrow modifications and the reconfigured westbound approach geometry to accommodate larger left-turn volumes at Hook Road/Guinea Road, were included in the analysis. Traffic signal cycle lengths were assumed to be consistent with No-Build conditions, while splits and offsets were optimized.

Build conditions analyses were conducted for the AM and PM peak periods. **Table 36** through **Table 39** summarize the control delay and 95th percentile queue lengths measures of effectiveness, and compare the Build conditions results against the No-Build conditions results.

During the AM and PM peak hours, the overall delay at the study intersections was comparable to or better than the No-Build conditions. For both peak hours, the overall intersection level of service was maintained or improved. For both peak hours, the northbound and southbound left-turn delay increased at

US Route 17 and Brays Point Road and US Route 17 and Providence Road. This increase in delay can be attributed to the conversion of northbound and southbound left-turn phasing from FYA to protected phasing.

Queue results were comparable to No-Build conditions for most movements at each study intersection. Notably, at the US Route 17 and Providence Road intersection, the eastbound left lane showed a queue reduction of 115 feet compared to the No-Build due to the addition of a dedicated left turn lane. The preferred alternative safety and traffic operational results were presented on June 11, 2026, at the Concept Refinement Meeting (SWG Meeting #8) which was combined with the Final Concept, Cost, and Risk Meeting (SWG Meeting #9). **Appendix F** includes the full Synchro results from the analysis and meeting materials.

Table 36: 2045 Preferred Alternative AM Peak Hour Control Delay

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			No-Build		Build		No-Build		Build		No-Build		Build		No-Build		Build			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	No-Build	Build
2	US 17 at Brays Point Road		Brays Point Road				Brays Point Road				US Route 17				US Route 17				Intersection	
		Left	-	-	-	-	s	s	s	s	27.6	C	74.5	E	4.3	A	66.5	E	Delay	Delay
		Through	-	-	-	-	64.8	E	64.8	E	12.4	B	12.5	B	8.3	A	8.3	A	12.0	13.8
		Right	-	-	-	-	62.0	E	62.0	E	4.8	A	6.4	A	3.3	A	3.3	A	LOS	LOS
		Approach	-	-	-	-	62.7	E	62.7	E	12.3	B	12.5	B	8.1	A	10.9	B	B	B
3	US 17 at Providence Road		Providence Road				Providence Road				US Route 17				US Route 17				Intersection	
		Left	110.8	F	64.0	E	-	-	-	-	31.7	C	51.3	D	5.8	A	92.6	F	Delay	Delay
		Through	-	-	-	-	-	-	-	-	5.8	A	5.3	A	20.6	C	15.1	B	22.0	15.7
		Right	s	s	62.3	E	-	-	-	-	-	-	-	-	1.8	A	3.6	A	LOS	LOS
		Approach	110.8	F	62.7	E	-	-	-	-	7.0	A	7.4	A	20.3	C	15.1	B	C	B
13	US 17 at Hook Road/Guinea Road		Hook Road / Guinea Road				Hook Road / Guinea Road				US Route 17				US Route 17				Intersection	
		Left	81.9	F	67.6	E	63.9	E	64.7	E	69.6	E	85.1	F	27.4	C	84.8	F	Delay	Delay
		Through	64.2	E	61.3	E	60.6	E	64.7	E	31.5	C	16.3	B	5.0	A	4.5	A	21.1	19.5
		Right	62.1	E	59.8	E	60.9	E	62.4	E	26.4	C	13.7	B	11.5	B	11.2	B	LOS	LOS
		Approach	75.4	E	65.1	E	61.4	E	63.0	E	32.6	C	18.4	B	6.8	A	10.7	B	C	B

s Denotes shared movement

- Denotes no Level of Service is reported for this movement

Note that the results for the unsignalized intersections along the corridor are not provided since no preferred alternatives were proposed at these intersections.

Table 37: 2045 Preferred Alternative PM Peak Hour Control Delay

Intersection Number and Description		Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
			No-Build		Build		No-Build		Build		No-Build		Build		No-Build		Build			
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	No-Build	Build
2	US 17 at Brays Point Road		Brays Point Road				Brays Point Road				US Route 17				US Route 17				Intersection	
		Left	-	-	-	-	s		s	s	4.5	A	87.0	F	58.4	E	81.2	F	Delay	Delay
		Through	-	-	-	-	70.7	E	72.3	E	10.5	B	6.0	A	6.3	A	6.0	A	13.1	11.5
		Right	-	-	-	-	66.4	E	67.1	E	6.2	A	0.2	A	3.2	A	3.1	A	LOS	LOS
		Approach	-	-	-	-	67.6	E	68.6	E	10.3	B	6.0	A	10.7	B	12.3	B	B	B
3	US 17 at Providence Road		Providence Road				Providence Road				US Route 17				US Route 17				Intersection	
		Left	80.2	F	70.2	E	-	-	-	-	28.1	C	50.9	D	15.5	B	77.1	E	Delay	Delay
		Through	-	-	-	-	-	-	-	-	7.1	A	6.7	A	14.2	B	22.1	C	14.1	17.7
		Right	s	s	65.2	E	-	-	-	-	-	-	-	-	2.0	A	9.4	A	LOS	LOS
		Approach	80.2	F	66.8	E	-	-	-	-	9.2	A	11.2	B	13.8	B	22.0	C	B	B
13	US 17 at Hook Road/Guinea Road		Hook Road / Guinea Road				Hook Road / Guinea Road				US Route 17				US Route 17				Intersection	
		Left	100.3	F	69.5	E	93.1	F	79.5	E	72.5	E	75.1	E	66.3	E	74.8	E	Delay	Delay
		Through	68.7	E	62.0	E	71.2	E	80.0	E	27.9	C	31.9	C	4.0	A	6.0	A	39.7	34.9
		Right	61.6	E	57.4	E	164.3	F	69.1	E	16.9	B	19.1	B	13.4	B	14.9	B	LOS	LOS
		Approach	85.3	F	65.6	E	142.2	F	72.1	E	28.4	C	32.3	C	19.1	B	22.6	C	D	C

s Denotes shared movement

- Denotes no Level of Service is reported for this movement

Note that the results for the unsignalized intersections along the corridor are not provided since no preferred alternatives were proposed at these intersections.

Table 38: 2045 Preferred Alternative AM Peak Hour 95th Percentile Queues

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue							
				Eastbound		Westbound		Northbound		Southbound	
				No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
2	US 17 at Brays Point Road			Brays Point Road		Brays Point Road		US Route 17		US Route 17	
		Signal	Left	-	-	s	s	m1	m3	23	136
			Through	-	-	71	71	m286	122	526	526
			Right	-	-	33	33	m0	m0	0	0
3	US 17 at Providence Road			Providence Road		Providence Road		US Route 17		US Route 17	
		Signal	Left	#317	100	-	-	m37	m96	m0	m6
			Through	-	-	-	-	192	217	473	274
			Right	s	101	-	-	-	-	m0	m2
13	US 17 at Hook Road/Guinea Road			Hook Road / Guinea Road		Hook Road / Guinea Road		US Route 17		US Route 17	
		Signal	Left	114	108	87	71	53	54	m64	m84
			Through	49	46	43	71	253	171	234	214
			Right	0	0	79	82	0	0	m0	m0

- 95th Percentile volume exceeds capacity, queue may be longer

Table 39: 2045 Preferred Alternative PM Peak Hour 95th Percentile Queues

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue							
				Eastbound		Westbound		Northbound		Southbound	
				No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
2	US 17 at Brays Point Road			Brays Point Road		Brays Point Road		US Route 17		US Route 17	
		Signal	Left	-	-	s	s	m1	m0	#166	#217
			Through	-	-	93	95	172	43	342	324
			Right	-	-	60	61	m0	m0	0	0
3	US 17 at Providence Road			Providence Road		Providence Road		US Route 17		US Route 17	
		Signal	Left	#212	98	-	-	m156	m303	m4	m21
			Through	-	-	-	-	310	457	343	314
			Right	s	65	-	-	-	-	0	14
13	US 17 at Hook Road/Guinea Road			Hook Road / Guinea Road		Hook Road / Guinea Road		US Route 17		US Route 17	
		Signal	Left	#263	200	#152	#112	79	81	#274	#277
			Through	149	136	75	#114	545	645	43	109
			Right	0	0	#279	#126	0	0	m0	m0

- 95th Percentile volume exceeds capacity, queue may be longer

3.2 Conceptual Sketch and Cost Estimates

Appendix F includes the Basis of Design Memo detailing the established project design criteria, field review notes, risk assessment, and assumptions made during the design effort. **Figure 38** presents the preferred alternative conceptual sketch.

An engineer's preliminary opinion of probable cost was created for construction costs, right-of-way acquisition costs, and utility relocation costs for the preferred alternative. These cost opinions established the project budget, in FY2026 dollars, as shown in **Table 40**. Detailed cost estimates are included in **Appendix F**.

Table 40: FY2026 Preferred Alternative Cost Estimate

Phase Description	Cost Estimate (FY 2026)
Preliminary Engineering	\$899,944
Right of Way and Utility Relocation	\$604,380
Construction	\$3,130,215
Total Project Cost Estimate	\$4,634,539

3.3 Schedule Estimates

A schedule estimate was developed for the preferred alternative. **Table 41** summarizes the projected timeframes for the preliminary engineering (PE), right of way (RW), and construction (CN) phases.

Table 41: Schedule Estimate

Preferred Concept	Estimated Schedule by Phase (months)
Preliminary Engineering	24
Right of Way and Utility Relocation	12
Construction	12
Total	48

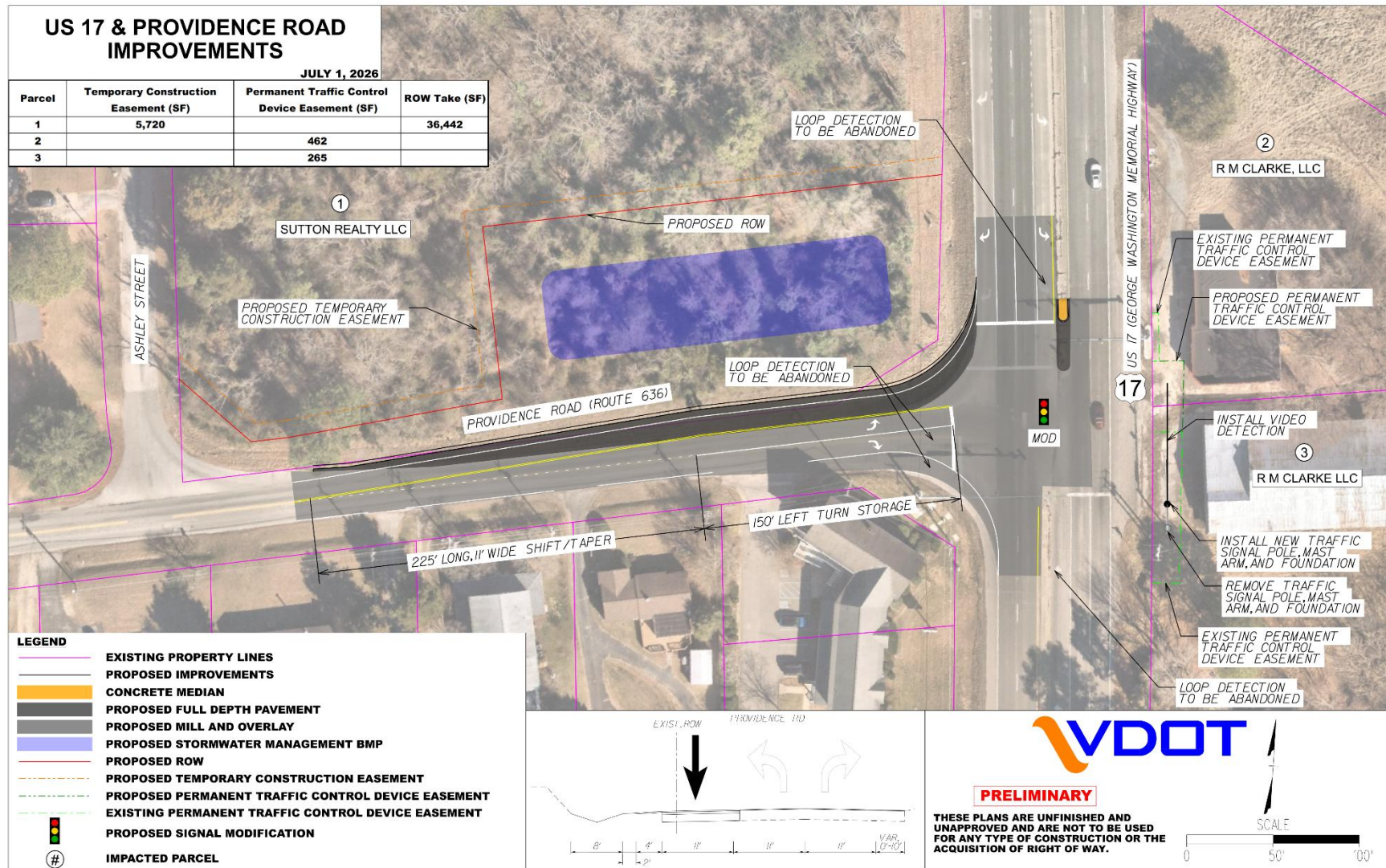


Figure 38: Preferred Alternative Conceptual Sketch

3.4 Project Risks

All projects have risks; however, some projects may have more significant risks than others due to technical complexity, funding, financing, and stakeholder acceptance. Risk management generally involves the process of anticipating what risks a project may face, mitigating them to the extent reasonably possible, and having a plan to react to them if and when they occur. This is recognized in VDOT guidance regarding the analysis of and mitigation of risks.

A project risk meeting (SWG Meeting #7) was held on March 25, 2026. The SWG brought up concerns over the constructability of the proposed curvature on Providence Road. The study team updated the design and met with VDOT on May 11, 2026 to discuss a revised concept. A final concept, cost, and risk meeting (SWG Meeting #9) was held on June 11, 2026, to review the final preferred alternative.

The following is a list of the most notable potential issues that may affect project development, the risks faced by the project, and risk mitigation strategies to be applied to manage and minimize risks throughout project development. **Appendix F** includes the materials from both meetings, the risk analysis matrix with details on the risk assessment, and the mitigation strategy.

Risk/Issue: Roadway Design

The project includes tie-ins along US Route 17 where existing roadway conditions do not meet current VDOT and AASHTO criteria. As design progresses, additional design waivers or exceptions may be required to address these non-standard existing conditions. Development of potential additional design waivers/exceptions will be accounted for in the schedule and cost.

Risk/Issue: Right of Way

The parcel on the northwest corner of US Route 17 and Providence Road will be impacted by the installation of the proposed stormwater management BMP facility, ditch grading, and roadway widening. These improvements may constrain future site plan layouts on the property. To minimize impacts, the BMP is proposed on the east side of the site near the US Route 17 and Providence Road intersection, where access is already restricted by VDOT access management requirements. The BMP is also proposed in a linear configuration along the Providence Road side of the property to further reduce impacts to the developable area.

Risk/Issue: Environmental

Based on the environmental review outlined in **Section 1.5.4**, there are no historical environmental concerns. However, based on the field review, there may be the potential for wetlands to be identified during construction. Additionally, the construction schedule may be impacted by tree clearing time-of-year restrictions. These time-of-year restrictions should be considered in development of the construction schedule. A Programmatic Categorical Exclusion is anticipated by VDOT under the National Environmental Policy Act (NEPA), meaning that the project will not have major effects on the human environment.

Regarding the stormwater BMP, VDOT advised that a Phase I architectural survey is required, and a Phase I archaeology survey is likely to be required. However, in both scenarios it is likely to receive a “No Adverse Effect to Historic Resources” determination from the Virginia Department of Historic Resources (VDHR). Depending on the location of the BMP, a permit may also be required for its planning and construction.

Risk/Issue: Utilities

There were above-ground appurtenances observed during the field visit, signifying the presence of underground utilities including fiber optic communication lines, gas, water, and storm sewer within the proximity of the intersection. Based on the observed above-ground appurtenances and available GIS data, proposed drainage improvements may require the relocation of an existing 10-inch water line and fiber optic communication line along US Route 17 as well as a fire hydrant at the northwest corner of US Route 17 and Providence Road. Extent of utility impacts will need to be evaluated utilizing test holes during detailed design to confirm size, location, and depth of utility to support a drainage plan that mitigates impacts to the existing utilities.

Risk/Issue: Geotechnical

Areas of unsuitable material and high-water table have been assumed and are undefined without a geotechnical report. Additional costs associated with a high-water table are reflected in the stormwater management BMP allowance and hydraulic construction contingency. Unsuitable pavement conditions and subgrades have been assumed and considered in earthwork cost.

Risk/Issue: Drainage

Based on a field review, existing flat grades were observed that may present challenges with ensuring positive drainage to outfall points. It is assumed that storm sewer design will require special design and minimum height structures to outfall. Paved ditches may be required to allow for minimum ditch grades and maintain channel flow. These additional costs for special design structures and paved ditches were considered in the development of hydraulic costs and construction contingency.

Risk/Issue: Construction

The proposed roadway and signal improvements will require short-term lane closures on US Route 17. US Route 17 is a high-speed and high-volume roadway that will require detailed maintenance of traffic plan and coordination with VDOT Fredericksburg District and Gloucester County to limit traffic impacts to appropriate work hours and days to minimize disruption and ensure work zone safety.

Risk/Issue: Public Involvement/Engagement

Risks and issues related to public involvement/engagement are covered in the Right of Way section.

Risk/Issue: Signalized Intersection Pedestrian Features

VDOT IIM-TOD-400: Pedestrian Accommodations at Traffic Signals, “establishes requirements...for the provision of Signalized Intersection Pedestrian Features based on a default assumption that the features will be provided across all approaches of the intersection.” Based on the lack of pedestrian generators and existing sidewalk infrastructure in the project vicinity, new pedestrian features are not proposed at the intersection of US Route 17 and Providence Road. The proposed exceptions have been discussed with the Fredericksburg District Traffic Engineer, and a Traffic Signal Pedestrian Assessment Worksheet and Evaluation Form has been completed and submitted. **Appendix F** includes the completed form.

3.5 Possible Funding Sources

Gloucester County elected to submit the preferred alternative for SMART SCALE funding, which includes the widening of the eastbound approach of US Route 17 and Providence Road. The signal modification will include the removal of the eastbound and northbound approach signal infrastructure, the installation of a new signal pole with dual mast arms for the northbound and eastbound approaches, and the installation of video detection to replace the existing loop detection. A stormwater management BMP is proposed to aid with water runoff. The preferred alternative documentation through this Project Pipeline study can also be leveraged to apply for funding from other sources, such as Revenue Sharing, the Regional Surface Transportation Program (RSTP), federal grants like the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and future rounds of SMART SCALE.

The improvement concepts selected as short-term recommendations and concepts included in the long-term investment vision identified in **Section 2.5** to be completed by others will be funded separately from the SMART SCALE application. **Appendix F** includes the Phase 3 Preferred Alternative Summary.