



PROJECT PIPELINE

**Route 17 (George Washington Highway) /
Route 17 Business (Main Street)**

**Fredericksburg District
Gloucester County
FR-25-02**

**PHASE 3 REPORT
July 2026**

Prepared for



Prepared by



Table of Contents

Chapter 1: Needs Evaluation and Alternatives Development.....	5
1.1 Introduction	6
1.2 Methodology.....	6
1.3 Study Background	8
1.4 VTrans Needs	11
1.5 High-Level Needs Evaluation.....	11
1.5.1. Operations and Access Needs	12
1.5.2. Safety and Reliability Needs	12
1.5.3. Transit and Transportation Demand Management Needs	13
1.5.4. Environmental Considerations	14
1.6 Detailed Needs Validation	21
1.6.1. Existing Conditions Traffic Operations and Safety Analysis	21
1.6.2. Phase 1 Public Outreach	35
1.6.3. No-Build Conditions Traffic Operations Analysis	36
1.7 Phase 1 Alternatives Development.....	44
1.7.1. Initial Alternatives	44
1.7.2. Phase 1 Alternatives Summary	46
Chapter 2: Alternatives Refinement	50
2.1 Alternatives Refinement Overview.....	51
2.2 Phase 2 Alternatives Description	51
2.3 Traffic Operations and Safety Results	61
2.4 Phase 2 Public Involvement.....	62
2.5 Preferred Alternative Selection	65
Chapter 3: Preferred Alternative Analysis and Investment Strategy	71
3.1 Preferred Alternative Safety and Operational Analysis.....	72
3.2 Conceptual Sketches and Cost Estimates	76
3.3 Schedule Estimate	80
3.4 Project Risks	80
3.5 Possible Funding Sources.....	82

List of Figures

Figure 1: Project Pipeline Key Steps.....	6
Figure 2: Study Phase Methods and Solutions	7
Figure 3: Structure of a Technical Team.....	8
Figure 4: Project Study Area	10
Figure 5: High-Level Operations Needs Summary.....	12
Figure 6: High-Level Safety Needs Summary (2020-2024).....	13
Figure 7: Bay Transit Express Popular Destinations.....	14
Figure 8: 2025 Existing Environmental Conditions Map	20
Figure 9: 2025 Existing Lane Configurations.....	26
Figure 10: 2025 Existing AM & PM Peak Hour Volumes	28
Figure 11: 2025 Existing Heavy Vehicle Percentages and Peak Hour Factors	29
Figure 12: Public Input Comment Pins and Themes.....	35
Figure 13: 2045 No-Build Peak Hour Volumes.....	38
Figure 14: Virginia iCAP Stage 1 Results—Route 17 and Belroi Road.....	47
Figure 15: Virginia iCAP Stage 1 Results—Route 17 Business (Main Street) and Belroi Road	47
Figure 16: Phase 1 Scoping Level Improvement Alternatives	49
Figure 17: Phase 2 Alternative—Restripe and Modify Signal Phasing at Hospital Drive / McFadden Way .	52
Figure 18: Phase 2 Alternative—Consolidate Signal Phases at Route 17 Business (Main Street) / Fiddlers Green Road	53
Figure 19: Phase 2 Alternative—Convert Belroi Road to One-Way Eastbound at Belroi Road	54
Figure 20: Phase 2 Alternative—Modify Side Streets and Remove Split Phasing at Belroi Road	55
Figure 21: Phase 2 Alternative—Continuous Green-T and Cul de Sac at Belroi Road	56
Figure 22: Phase 2 Alternative—Convert to Thru-Cut at Route 17 and Belroi Road	57
Figure 23: Phase 2 Alternative—Pedestrian and Bicycle Network Improvements	59
Figure 24: Public Engagement—Average Rating of Alternatives at Hospital Drive / McFadden Way.....	63
Figure 25: Public Engagement—Average Rating of Alternatives at Route 17 Business (Main Street) / Fiddlers Green Road.....	64
Figure 26: Public Engagement—Average Ratings of Alternatives at Belroi Road.....	64
Figure 27: Public Engagement—Average Ratings of Pedestrian and Bicycle Network Improvements	65
Figure 28: Combined Preferred Alternatives Along Route 17	70
Figure 29: Preferred Alternative Conceptual Sketch: Route 17 at Hospital Drive / McFadden Way	77
Figure 30: Preferred Alternative Conceptual Sketch: Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road	78
Figure 31: Preferred Alternative Conceptual Sketch: Route 17 at Belroi Road	79

List of Tables

Table 1: Study Intersections	9
Table 2: VTrans Needs Identified in the Study Area	11
Table 3: Existing Environmental Conditions Summary	16
Table 4: Study Area Crashes by Crash Severity	23
Table 5: Study Area Crashes by Crash Type	24
Table 6: Level of Service Criteria	27
Table 7: Synchro Report for Control Delay	30
Table 8: 2025 Existing Conditions Peak Hour Control Delay and LOS (1)	32
Table 9: 2025 Existing Conditions Peak Hour 95 th Percentile Queues	34
Table 10: Linear Growth Rate Development	37
Table 11: 2045 No-Build Conditions Peak Hour Control Delay and LOS (1)	41
Table 12: 2045 No-Build Conditions Peak Hour 95 th Percentile Queues	43
Table 13: Phase 1 Alternatives	45
Table 14: Phase 1 Alternatives to Move Forward to Phase 2	48
Table 15: Phase 2 Alternatives for Public Outreach	60
Table 16: Virginia iCAP Stage 2 Peak Hour Traffic Operations Results	61
Table 17: CMF and Crash Reduction Summary	62
Table 18: Alternative Selection Summary—PM Peak Hour	67
Table 19: Virginia iCAP Stage 2 Results—Route 17 and Belroi Road	67
Table 20: Preferred Alternative Selection for FR-25-02	69
Table 21: 2045 Preferred Alternative AM Peak Hour Control Delay and LOS	74
Table 22: 2045 Preferred Alternative PM Peak Hour Control Delay and LOS	74
Table 23: 2045 Preferred Alternative AM Peak Hour 95 th Percentile Queues	75
Table 24: 2045 Preferred Alternative PM Peak Hour 95 th Percentile Queues	75
Table 25: FY2026 Preferred Alternative Cost Estimate: Route 17 at Hospital Drive / McFadden Way	76
Table 26: FY2026 Preferred Alternative Cost Estimate: Route 17 at Main Street and Belroi Road	76
Table 27: Schedule Estimate: Route 17 at Hospital Drive / McFadden Way	80
Table 28: Schedule Estimate: Route 17 at Main Street and Belroi Road	80

List of Appendices

Appendix A—Framework Document and Kickoff Meeting
Appendix B—Phase 1 Executive Summary
Appendix C—Existing Conditions Analysis
Appendix D—Volume Balancing and Traffic Forecasting
Appendix E—Concept Development
Appendix F—Preferred Alternative

Chapter 1: Needs Evaluation and Alternatives Development

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. Visit the Project Pipeline webpage for additional information: <https://vapipeline.virginia.gov/>.

This study, entitled FR-25-02 at Route 17 and Route 17 Business (Main Street), evaluates multimodal improvements to address identified needs including capacity preservation, congestion mitigation, safety improvements, pedestrian and bicycle infrastructure along the corridor, transit access, and Transportation Demand Management (TDM). 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.

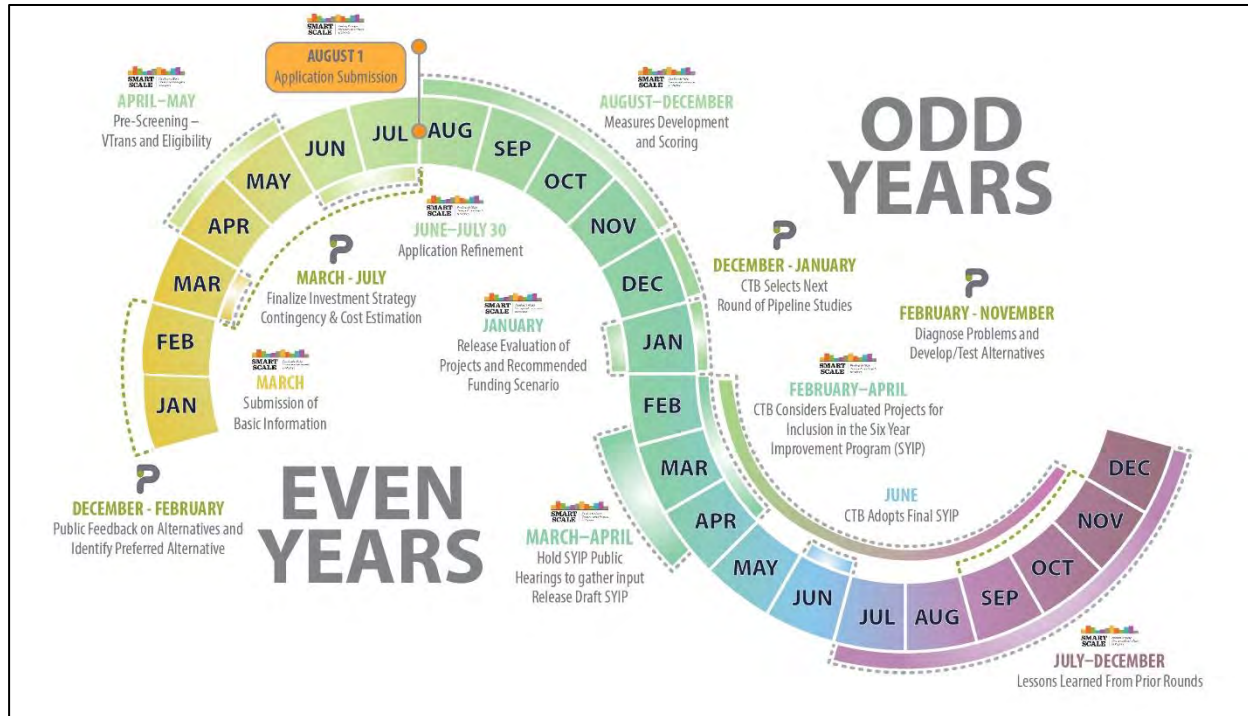


Figure 2: Study Phase Methods and Solutions

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 guide the level of technical team involvement. In general, the technical teams include the Office of Intermodal Planning and Investment (OIPI), 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
- 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**.

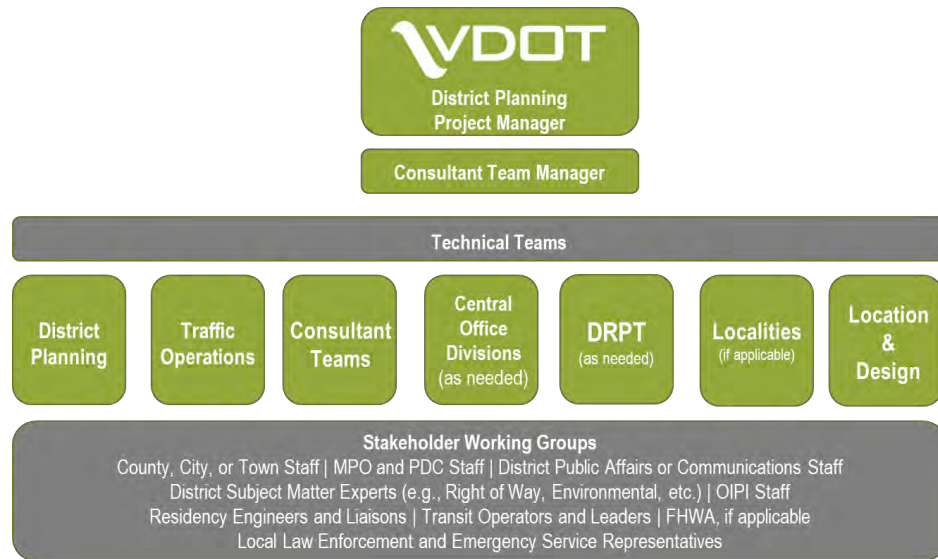


Figure 3: Structure of a Technical Team

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)
- Department of Rail and Public Transportation (DRPT)
- Hampton Roads Transportation Planning Organization (HRTPO)
- Middle Peninsula Planning District Commission (MPPDC)
- Gloucester County
- Bay Transit
- Kimley-Horn

The study area along Route 17 extends from Hospital Drive to Belroi Road. The study area along Route 17 Business extends from Route 17 to Justice Drive. Route 17 is a four-lane, median-divided highway classified as a Principal Arterial. Within the study area, Route 17 has a posted speed limit of 55 miles per hour (mph) south of Belroi Road and 45 mph north of Belroi Road. Route 17 Business is a two-lane undivided roadway classified as a Major Collector. Within the study area, Route 17 Business has a posted speed limit of 35 mph west of Belroi Road and 25 mph east of Belroi Road.

The study area is located within the Gloucester Courthouse area of Gloucester County. Route 17 serves as a major commuter route to/from Newport News, as well as serving as an emergency evacuation route. Route 17 Business creates a bypass loop through the Gloucester Courthouse area and transitions to a minor arterial east of the study area, reconnecting to Route 17 south of the study area. Riverside Walter Reed Hospital is accessed from both Route 17 and Route 17 Business within the study area, with the Route 17

access being the primary entrance for emergency vehicles. Small residential and commercial developments are located west of Route 17 within the study area. Route 17 Business supports a village-like development pattern with local churches, Botetourt Elementary School, residential homes, and County administration buildings including Gloucester County Courthouse. Bay Transit provides on-demand micro-transit service to destinations between the Gloucester Courthouse area and Gloucester Point.

The study area includes three signalized intersections and seven unsignalized intersections. The ten study intersections are shown in **Table 1** and **Figure 4**.

Table 1: Study Intersections

#	Intersection Name	Control Type
1	Route 17 at Hospital Drive / McFadden Way	Signalized
2	Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road	Signalized
3	Route 17 at Belroi Road	Signalized
4	Route 17 Business (Main Street) at Walter Reed Way / Morgan Road	Unsignalized
5	Route 17 Business (Main Street) at Belroi Road Spur	Unsignalized
6	Belroi Road at Belroi Road Spur	Unsignalized
7	Route 17 Business (Main Street) at Belroi Road / Gloucester Town Drive	Unsignalized
8	Route 17 Business (Main Street) at Roaring Springs Road	Unsignalized
9	Route 17 Business (Main Street) at Corr Street	Unsignalized
10	Route 17 Business (Main Street) at Justice Drive	Unsignalized

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 Round 3 Kickoff and Framework Meeting (SWG Meeting #1) was held on April 2, 2025, to provide an overview of the study and obtain feedback on the study's assumptions. The meeting materials are provided 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	High
 Safety Improvement	Medium
 Pedestrian Safety Improvement	Low
 Transportation Demand Management (TDM)	Medium
 Bicycle Access	High
 Transit Access	Low
 Congestion Mitigation	Low

Note: All VTrans needs have been identified as needs and should be evaluated per VTrans methodology, regardless of Priority level (i.e., a “Low” need is still a need).

The Route 17 and Route 17 Business (Main Street) corridors were 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 alternatives development
- 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 Evaluation

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 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

Route 17 is recognized as a VDOT primary evacuation route and Arterial Preservation Network (APN) corridor, which results in a High Capacity Preservation need to maintain roadway capacity and efficient traffic flow. The study area also has a low Congestion Mitigation VTrans need, which is based on the Travel Time Index (TTI) and the proportion of travel taking place during excessively congested conditions. 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 vehicles may begin to experience increased travel times along the corridor.

Route 17 is shown to be a fairly reliable corridor under existing conditions. During weekday afternoons, between 3:00 PM and 6:00 PM, there is moderate congestion with TTI reaching 1.34 in the northbound direction and 1.30 in the southbound direction. Both directions operate with average speeds below the posted speed limit from 7:00 AM to 7:00 PM. Average speeds in the northbound direction drop as low as 37 mph during the PM peak period. **Figure 5** includes additional details from the operations needs diagnosis.

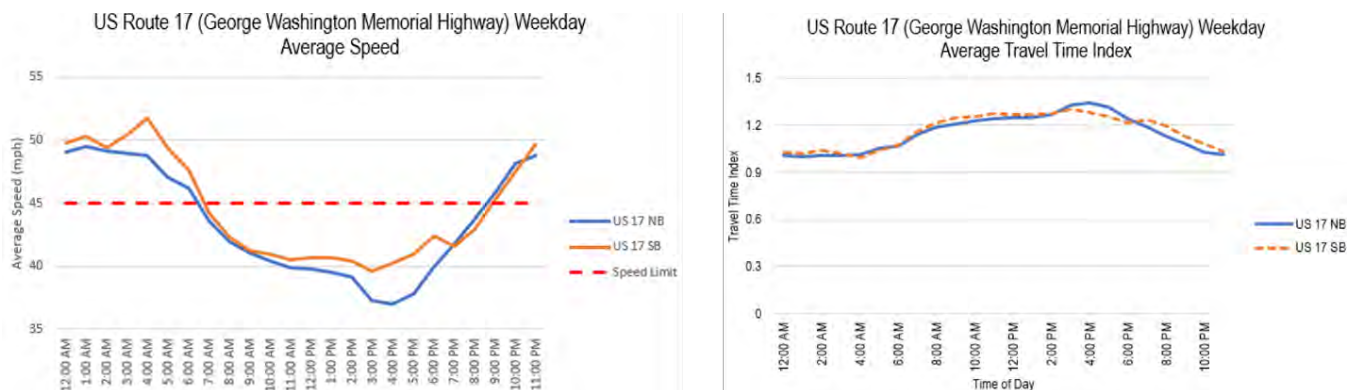


Figure 5: High-Level Operations Needs Summary

The study area also has a High Bicycle Access VTrans need due to its location within the Gloucester Courthouse activity center, which is designated as a VTrans Urban Development Area. Existing bicycle infrastructure was not observed within the study area. Although Pedestrian Access was not an identified VTrans need, VTrans did identify Pedestrian Safety Improvement as a need. The field review confirmed that there are existing gaps in the pedestrian network, which would suggest that there is also a Pedestrian Access need to be addressed in order to improve pedestrian safety. Route 17 currently only provides sidewalk on the west side of the corridor between McFadden Way and Fiddlers Green Road. There are no pedestrian facilities on the north side of Route 17 Business (Main Street) west of Belroi Road, and Belroi Road only provides a short, disconnected segment of sidewalk.

1.5.2. Safety and Reliability Needs

The study area exhibits a Medium VTrans need for Construction District Safety Improvement and Low VTrans need for Statewide Safety Improvement along Route 17 between the intersections at Hospital Drive and

Route 17 Business (Main Street). At the Route 17 intersection with Belroi Road, there are Low Statewide Safety Improvement and Pedestrian Safety Improvement VTrans needs.

The study team reviewed the VDOT crash data from 2020–2024 to identify high-level crash trends in the study area. In total, 59 crashes were reported in the study area including 1 fatality, 33 injury crashes, and 25 crashes involving property damage only (PDO). Most crashes in the study area were either angle (49%) or rear-end (42%) crashes. **Figure 6** shows the geographic distribution, frequency, and type of crashes in the study area.

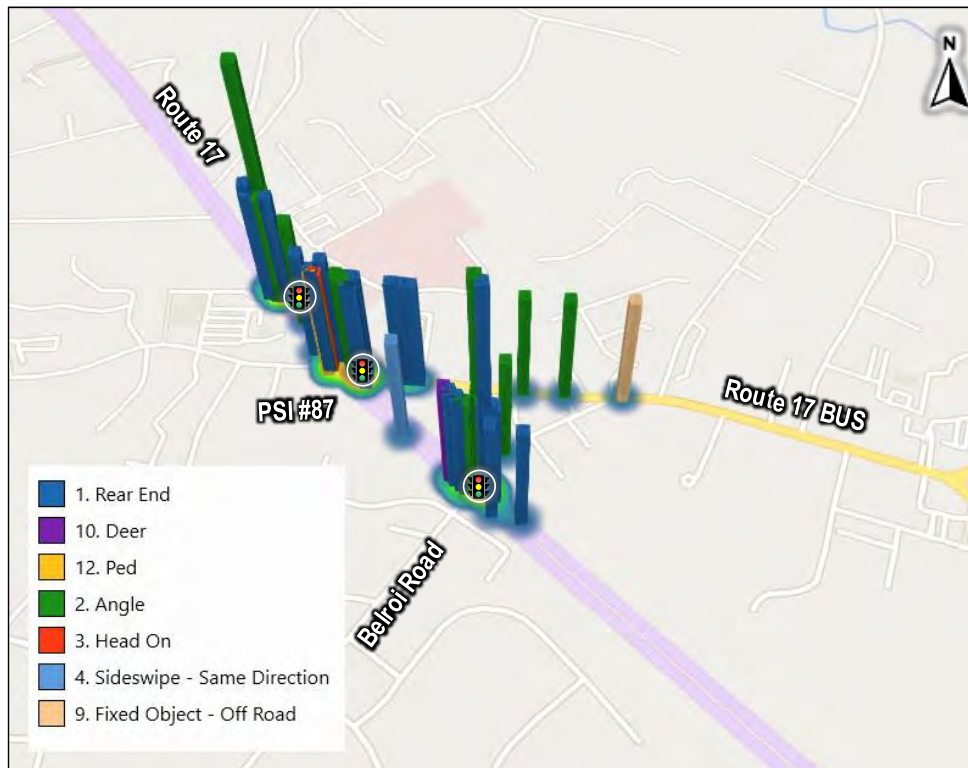


Figure 6: High-Level Safety Needs Summary (2020-2024)

Route 17 within the study area is a VDOT Pedestrian and Bicyclist Safety Action Plan (PBSAP) priority corridor and is in the statewide top 5% of corridors. The intersection of Route 17 at Route 17 Business (Main Street) is ranked as #87 in the VDOT 2019–2023 Potential Safety Improvement (PSI) top 100 intersections for the District. Intersections ranked in the top 100 are considered to have a high number of crashes compared to the rest of the District.

1.5.3. Transit and Transportation Demand Management Needs

The study area has a Low Transit Access VTrans need along the Route 17 corridor. This need is measured by the number of people who can access nearby activity centers (i.e., Gloucester Courthouse) via public transit. The study team reviewed existing transit services within the study area which consists of Bay Transit Express service. There is no local fixed route public transit service along the study corridors. Bay Transit Express is a demand-responsive micro-transit service that operates Monday through Friday from 8:00 AM to 5:00 PM and provides \$1 rides to destinations between the Gloucester Courthouse area and Gloucester

Point. **Figure 7** depicts popular destinations served by Bay Transit Express. Only Destination 1 is located within the study area limits.



Figure 7: Bay Transit Express Popular Destinations

The study area also has a Medium Transportation Demand Management (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. Within the study area, MidPenRideShare provides a free commuter matching service to help coordinate carpools and vanpools to and from the Middle Peninsula. In addition, MidPenRideShare provides a Guaranteed Ride Home service as well as rewards for commuters who log “greener trips.” Standard Transportation Network Companies (TNC) (e.g., Uber, Lyft) are also available.

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 (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.

PROJECT PIPELINE

A summary of the environmental resources that were considered and the source for the data used to evaluate the existing conditions and potential impacts are 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 offices, libraries, social work, food banks, health care, police, fire services, public transportation, and public housing.

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 8**.

Table 3: Existing Environmental Conditions Summary

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 no census block groups with communities of color and one block group with a low-income community (30.66% below HUD 80% AMI and 39.78% below two times the poverty level).
Limited English Proficiency (LEP)	Populations who speak English less than very well within the Census Tract where the study area is located	US Census Bureau People That Speak English Less Than "Very Well" in the United States	Within the study area, two census block groups were identified as having 0.3%-0.4% 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	The segments of Route 17 and Route 17 Business (Main Street) within the study area are part of a thematic driving tour.
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	Several educational institutions are located near the study area including the Botetourt Elementary School. Additionally, there are several places of worship within the study area. The Riverside Walter Reed Hospital is located near the northeast corner of Route 17 and Route 17 Business (Main Street). The Gloucester Volunteer Fire & Rescue Squad is located in the northeast corner of the Main Street and Walker Avenue intersection.
Bike/Pedestrian Facilities	Existing sidewalks, bike paths, and trails.	Gloucester County GIS Data Aerial Imagery Google Maps	There are existing sidewalks within the study area along Route 17 Business (Main Street) and Route 17 north of Main Street. No bike facilities are present within the study area.

Environmental Resource	Description	Source	Existing Resources in Study Area
		VDCR Virginia Outdoor Plan Mapper	
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. The boy scout cabin located at 6361 Main Street is NRHP listed and is located within the project area. The Gloucester Downtown Historic District is located adjacent to the study area to the east.
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 Gloucester County GIS Data VDCR Virginia Outdoor Plan Mapper VDHR V-CRIS	The study area is located immediately adjacent to Gloucester Downtown Historic District. Multiple historic sites are located in the study area and may be subject to Section 4(f).

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	<u>USFWS</u> No critical habitats are located within the study area. Bald and/or golden eagles were noted in the study area. <u>VDWR Databases</u> <u>VDWR VaFWIS</u> - Mabee's Salamander are listed as state threatened. Site observations were identified within a 2-mile search radius. <u>VDWR WERMS</u> - No endangered species observation locations are within the study area. <u>VDWR Bat Consultation Tool</u> - The study area is within the consultation range of the NLEB and tri-colored bat but outside the year-round presence zone, capture area, and hibernacula regulatory buffer for all three bats. <u>USFWS IPaC</u> - NLEB and PESU may occur within the study area and surrounding vicinity. <u>CCB</u> - A nest was identified to the east of the study area between Main Street and 6986 Ware House Road. The 660' buffer does not intersect the study area boundary.
Floodplains	Areas considered at risk for flooding during 100-year and 500-year storms.	Federal Emergency Management Agency (FEMA) Flood Hazard Areas	Portions of the surrounding area are located in Floodway or 500-Year Floodplain areas. The Study Area does not have any floodplains within its limits.
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 around the study area. Beaverdam Swamp is located to the north of the study area, Fox Mill Run is located to the south, and Cranney Creek is located to the west. Portions of the 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.

Environmental Resource	Description	Source	Existing Resources in 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 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	The entire study area is located within prime farmland and a census designated non-urban area, 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 classified as residential. Commercial / industrial zones are located on the west side of Route 17 within the study area and to the east of Route 17 to the north of the study area.

**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.*

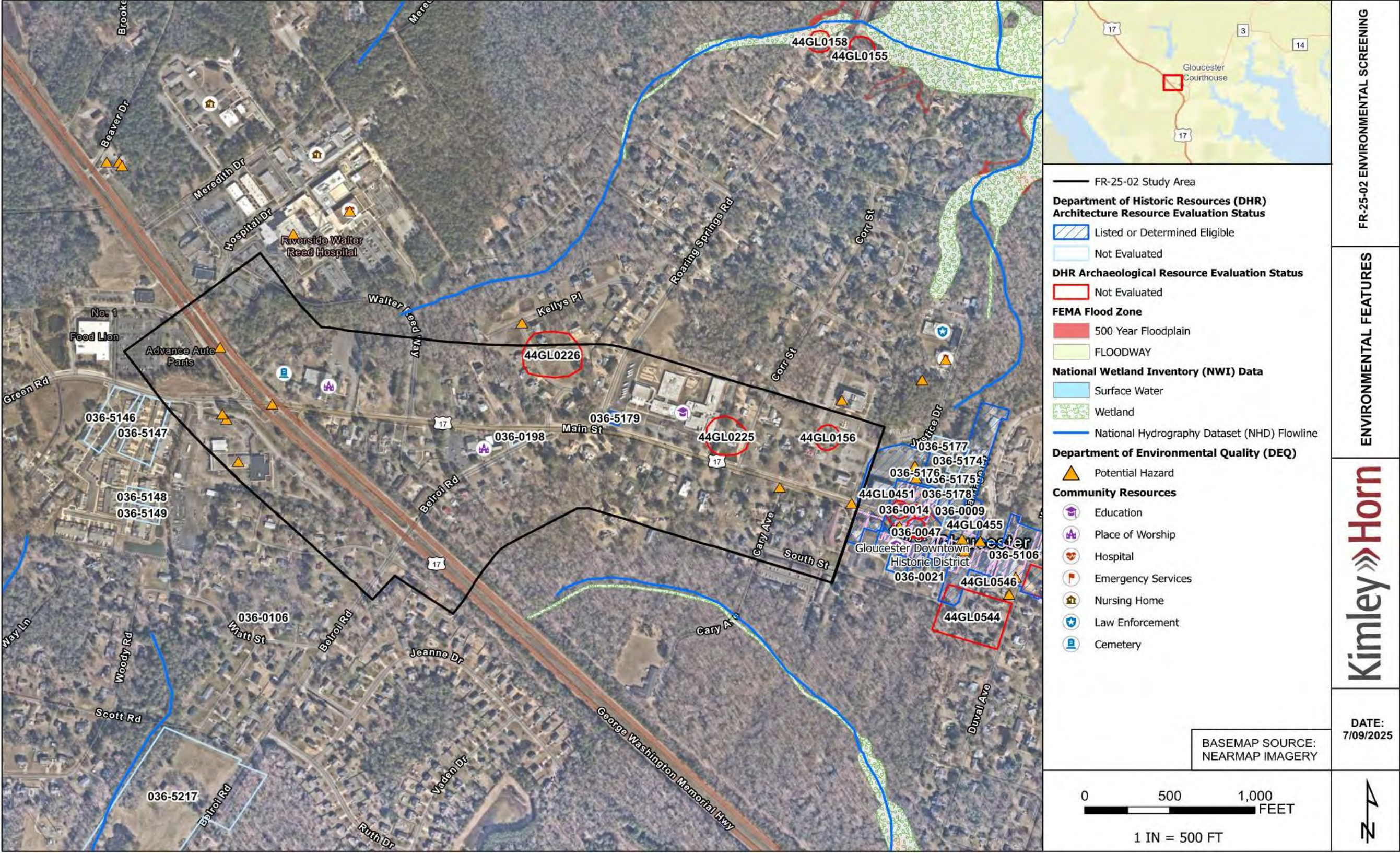


Figure 8: 2025 Existing Environmental Conditions Map

1.6 Detailed Needs Validation

Following the high-level needs diagnosis, 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 anticipated 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 during the Needs Evaluation, Diagnosis, and Preliminary Concepts Meeting (SWG Meeting #2), on June 10, 2025. The meeting materials are 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:

Funded Projects

- UPC 107414: Route 616 (Roaring Springs Road) Pedestrian Improvements
 - Construct new sidewalk along east side of Roaring Springs Road between Main Street and Wyncote Avenue (in vicinity of Botetourt Elementary School)
 - Estimated start date December 2027

Previous Studies

- Round 6 SMART SCALE application: Route 17 and Belroi Road Intersection Improvements
 - Restripe westbound Belroi Road approach to provide a left-turn lane and a shared through/right-turn lane
 - Construct a new right-turn lane on eastbound Belroi Road approach
 - Extend existing left- and right-turn lanes on US Route 17
 - Upgrade existing traffic signal
 - Not selected for funding
- Round 4 SMART SCALE application: Route 17 and Hospital Drive Pedestrian Signal Improvements
 - Install crosswalks, pedestrian signals, and refuge islands
 - Construct a new sidewalk at intersection to tie into proposed Riverside Hospital sidewalk
 - Not selected for funding
- Gloucester County Multimodal Transportation Study, 2022
 - Identified key destinations and desired routes in Gloucester Courthouse area
 - Recommended shared use paths along both sides of Route 17
 - Recommended pedestrian improvements to signalized intersections including crosswalks, pedestrian countdown signals and push buttons, and reduced corner radii

- Gloucester County Transportation Study, 2021 (HRTPO)
 - Identified desired active transportation facilities in Gloucester Courthouse including shared use paths along Belroi Road and a regional trail along Route 17
 - Recommended operational improvements for Route 17, including signal retiming, additional turn bays, and redirecting / prohibiting movements (e.g., RCUT)
- Gloucester County 2016 Comprehensive Plan
- Gloucester County Business 17 Corridor Planning Study, 2013
 - Recommended pedestrian crossing at Route 17 and Hospital Drive signalized intersection
 - Identified need to construct sidewalks along Belroi Road, Main Street, and Route 17
 - Called out need for pedestrian crossing across Route 17 Business (Main Street) at Roaring Springs Road to serve Botetourt Elementary School and at realigned Belroi Road intersection
 - Recommended realigning the Belroi Road approach to Main Street to improve sight distance

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, 59 crashes were reported in the study area, including one fatality. Summaries of crashes in the study area by severity and type are shown in **Table 4** and **Table 5**, 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

Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road

The Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road intersection experienced 17 crashes between 2020 and 2024, including one fatal crash and one pedestrian-involved crash. The fatal crash was an angle crash between a northbound through vehicle and southbound left-turn vehicle who ran the red light. The crash involving a pedestrian occurred when a vehicle entering the intersection struck a pedestrian who was crossing the eastbound approach in the early morning. The pedestrian suffered visible injuries. Of the 17 crashes at the intersection, eight (47%) were angle crashes, with six involving northbound traffic. In addition, there were seven rear-end crashes.

Route 17 and Hospital Drive / McFadden Way

Between 2020 and 2024, 16 crashes occurred at the intersection of Route 17 and Hospital Drive / McFadden Way. The majority of crashes (63%) were angle crashes due to red light running. In addition, there were three congestion-related, rear-end crashes.

Route 17 and Belroi Road

The intersection of Route 17 and Belroi Road experienced 16 total crashes between 2020 and 2024. Of these, nine (56%) were rear end collisions, and seven of those nine involved northbound vehicles. There were five crashes that involved red light running, including an angle crash resulting in serious injury. No crashes were reported at the intersection in 2024.

Table 4: Study Area Crashes by Crash Severity

Intersection	# of Crashes—K	# of Crashes—A	# of Crashes—B	# of Crashes—C	# of Crashes—PDO	Total
Route 17 & Hospital Drive / McFadden Way	0	2	8	0	6	16
Route 17 & Route 17 Business (Main Street) / Fiddlers Green Road	1	3	8	1	4	17
Route 17 & Belroi Road	0	1	5	1	9	16
Route 17 Business (Main Street) & Belroi Road	0	0	0	0	2	2
Belroi Road & Morgan Road	0	0	1	0	0	1
Rest of Route 17 Business (Main Street) Corridor	0	1	2	0	1	4
Rest of Route 17 Corridor	0	0	0	0	3	3
Total	1 (2%)	7 (12%)	24 (41%)	2 (3%)	25 (42%)	59

Table 5: 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	# of Crashes – Total
Route 17 & Hospital Drive / McFadden Way	12	4	0	0	0	0	0	16
Route 17 & Route 17 Business (Main Street) / Fiddlers Green Road	8	7	1	0	0	1	0	17
Route 17 & Belroi Road	6	9	0	0	0	0	1	16
Route 17 Business (Main Street) & Belroi Road	1	0	0	1	0	0	0	2
Belroi Road & Morgan Road	1	0	0	0	0	0	0	1
Rest of Route 17 Business (Main Street) Corridor	1	3	0	0	0	0	0	4
Rest of Route 17 Corridor	0	2	0	0	1	0	0	3
Total	29 (49%)	25 (41%)	1 (2%)	1 (2%)	1 (2%)	1 (2%)	1 (2%)	59

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. The intersection of Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road was identified as a PSI intersection with a ranking of 87 within the Fredericksburg District.

Additionally, Route 17 is a VDOT Pedestrian and Bicyclist 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 storage lengths in the study area are summarized in **Figure 9**.

The following observations were made throughout the study area during the field review:

Route 17 and Hospital Drive / McFadden Way

- Southbound through queue blocks left turn lane storage (PM peak period)
- Lack of pedestrian infrastructure to cross Route 17

Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road

- Eastbound direction has a red right-turn arrow but no supporting signage for “No Right on Red”
- Observed a crash between an eastbound right-turn vehicle and a westbound left-turn vehicle, likely associated with an eastbound right-turn on red (AM peak period)
- Pedestrian crosswalk requires two cycles to cross Route 17

Route 17 and Belroi Road

- Northbound traffic typically travels above speed limit. The speed limit to the south is 55 mph, but it drops to 45 mph just north of the intersection.
- Potential stopping sight distance limitations due to overgrown vegetation for the eastbound right-turn movement (looking left to the north)
- The westbound is striped as a single lane, but it has two detection loops for through / left-turn and right-turn movements
- Northbound left-turn queue consistently exceeds storage and spills back into the adjacent through lane (PM peak period)
- Westbound approach queue extends back to the Church of Saint Therese (PM peak period)

Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive

- Significant stopping sight distance limitations looking east onto Main Street from northbound Belroi Road approach due to private property privacy bushes
- Poor utilization of available “slip lane” to make left-turn movements onto Main Street from Belroi Road

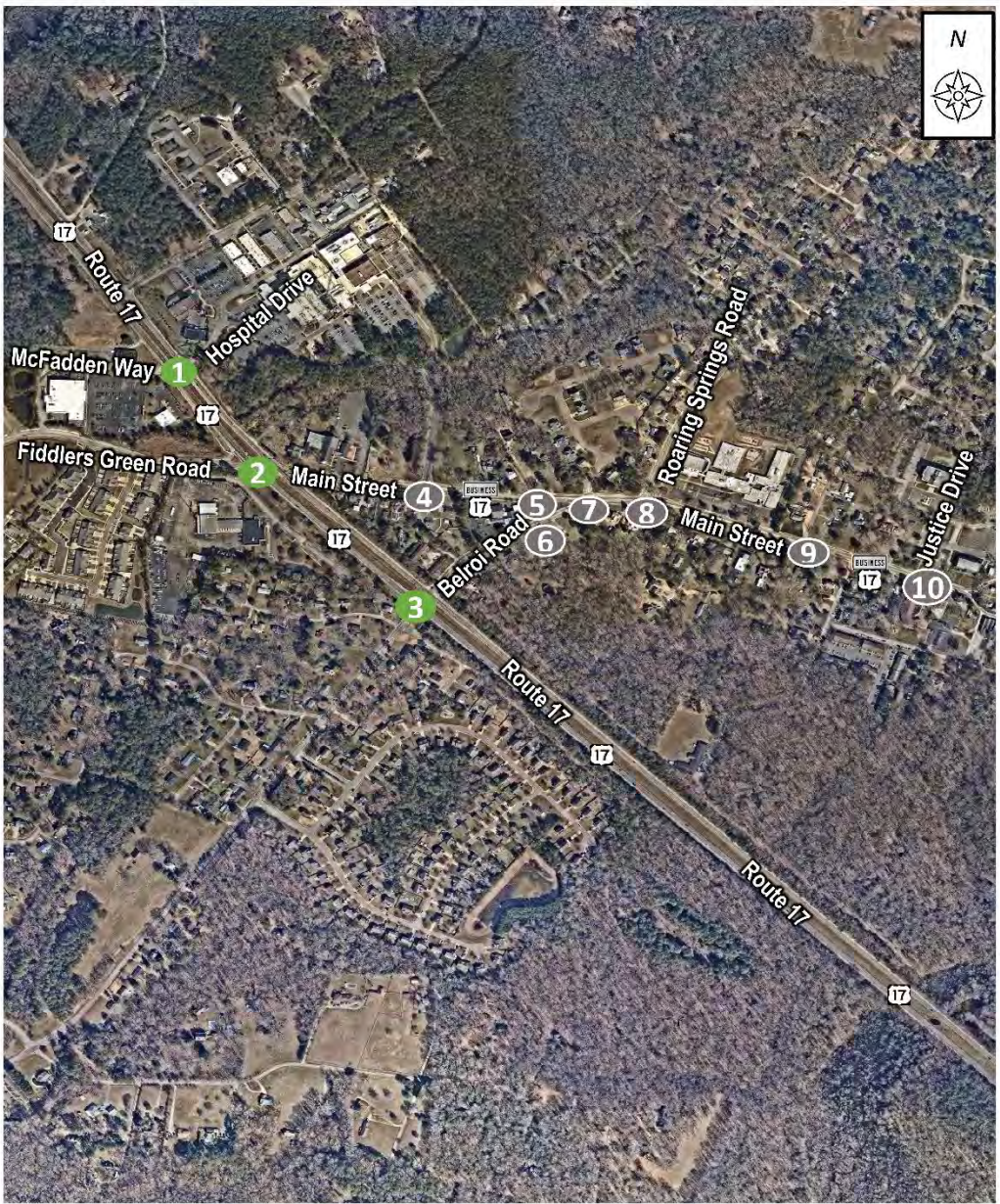
Route 17 Business (Main Street) Corridor

- Extensive queuing in the westbound travel lane of Main Street related to student drop off / pick-up at Botetourt Elementary (AM and PM peak periods)
- One mid-block crosswalk is located in front of Botetourt Elementary, but there are no other crosswalks across Main Street in the study area
- During afternoon student pick-up, vehicles exit the school, turn west, and turn around elsewhere to travel eastbound, rather than turn left out of the school parking lot

Additional Observations in the Study Area

- Bay Transit shuttles are very active within the study area
- Limited pedestrian or bicycle activity observed

2025 Existing Lane Configurations



LEGEND

Intersection ID (Signalized)

Intersection ID (Unsignalized)

S = XX' Effective Storage Length (ft)

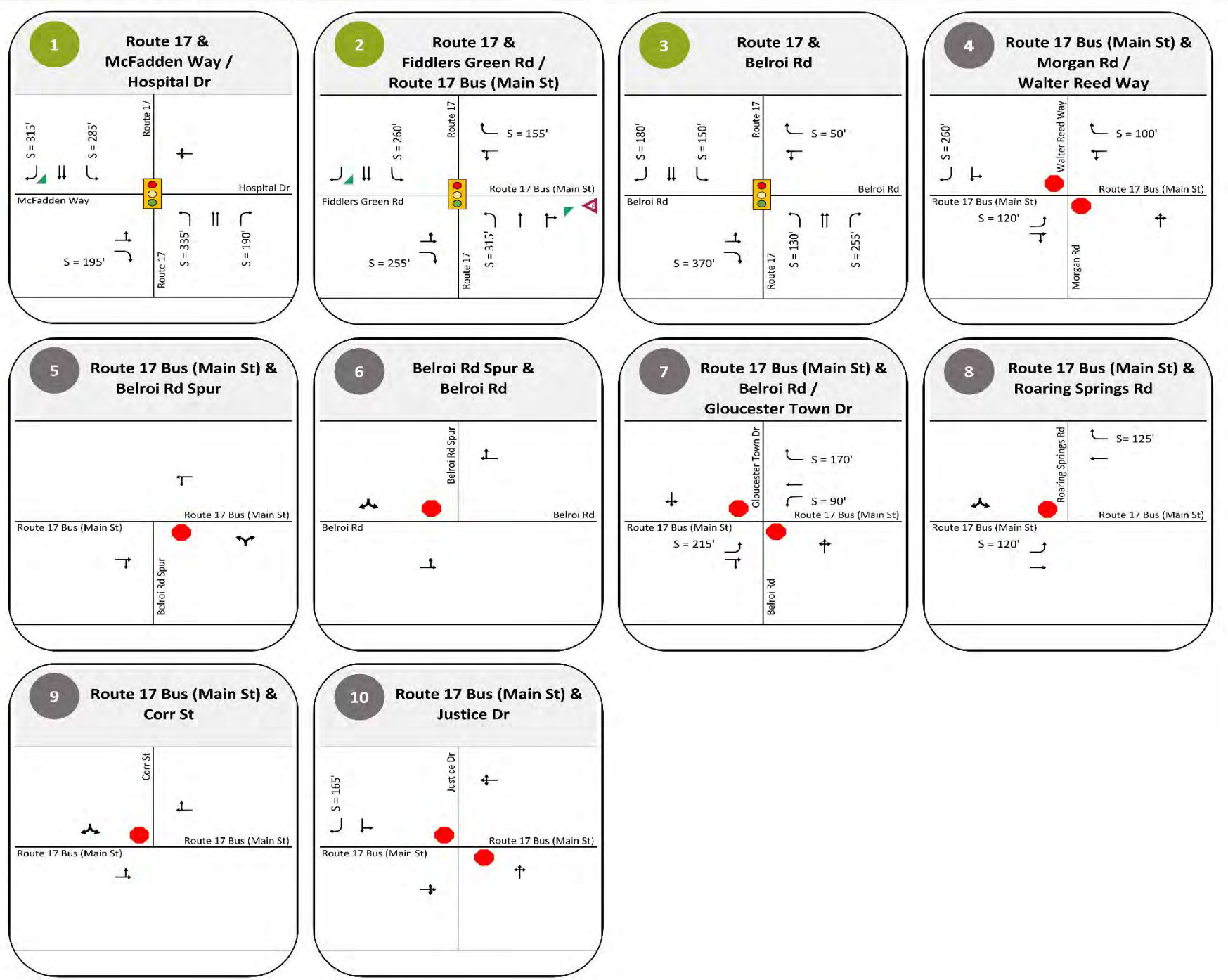
→ Vehicle Movement

Traffic Signal

Stop Sign

Yield Sign

Channelizing Island



FR-25-02 | Route 17 / Route 17 Business (Main Street)

Figure 9: 2025 Existing Lane Configurations

Synchro and SimTraffic 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. Inputs and analysis methodologies were consistent with the VDOT Traffic Operations and Safety Analysis Manual (TOSAM), Version 2.0.

Traffic Data

Vehicle turning movement, pedestrian, and bicycle count data were collected for eight hours at the ten study intersections on Tuesday, April 1st, 2025 from 6:00 AM to 10:00 AM and 2:00 PM to 6:00 PM. The AM and PM peak hours were determined to be 8:45 AM – 9:45 AM and 4:15 PM – 5:15 PM, respectively. In addition, 48-hour average daily traffic count data was collected at two locations along the study corridor on Tuesday, April 1st, 2025, and Wednesday, April 2nd, 2025. Raw traffic data can be found in **Appendix C**.

The study team balanced up existing traffic volumes along the study corridor and throughout the network as a conservative approach. Volume balancing is a process that ensures the number of vehicles exiting an intersection equals the number of vehicles entering the downstream intersection. The resulting balanced volumes were used as existing volumes that formed the basis of this study. The existing volumes are shown in **Figure 10**. Heavy vehicle percentages and peak hour factors are included in **Figure 11**.

Level of Service (LOS) Criteria

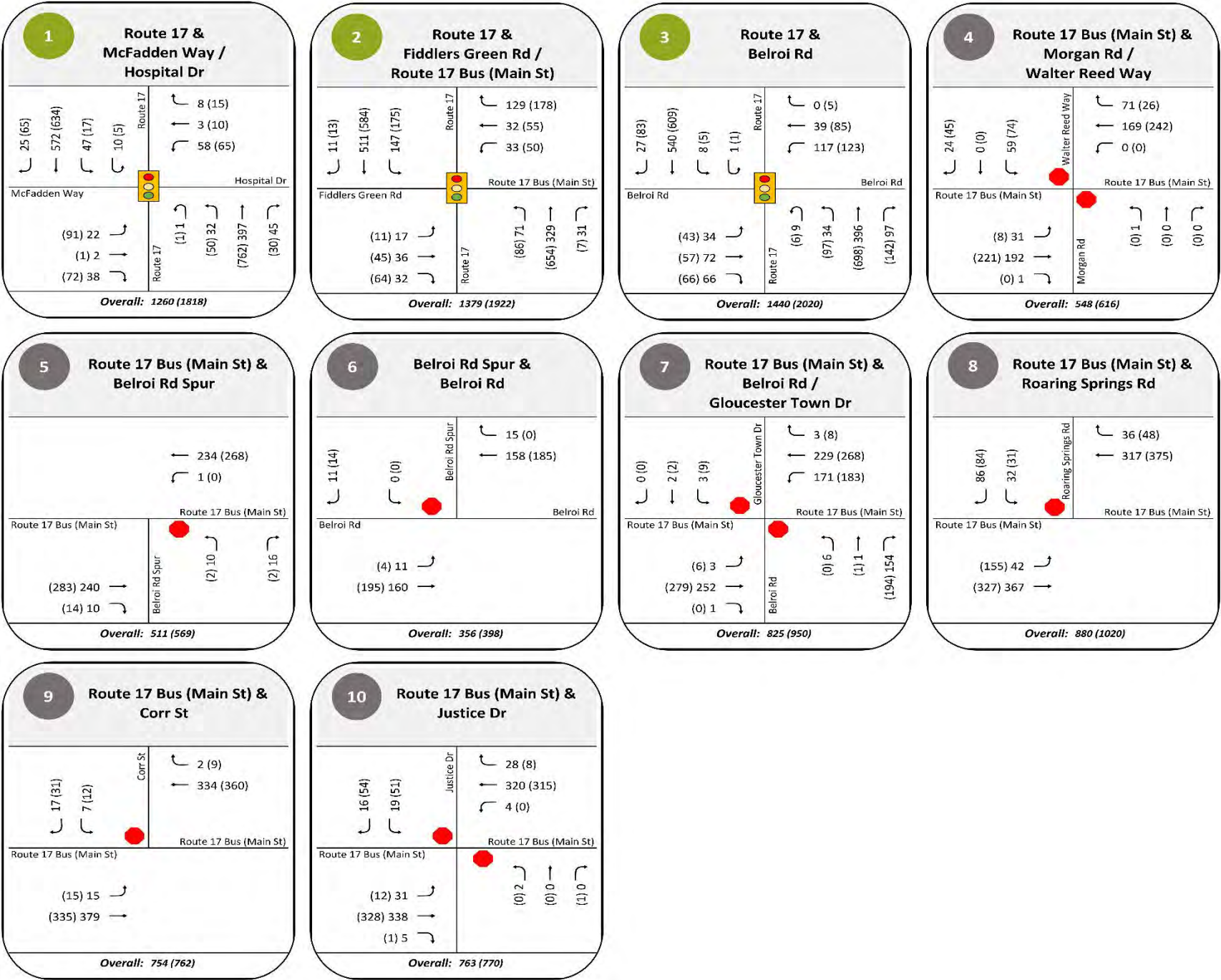
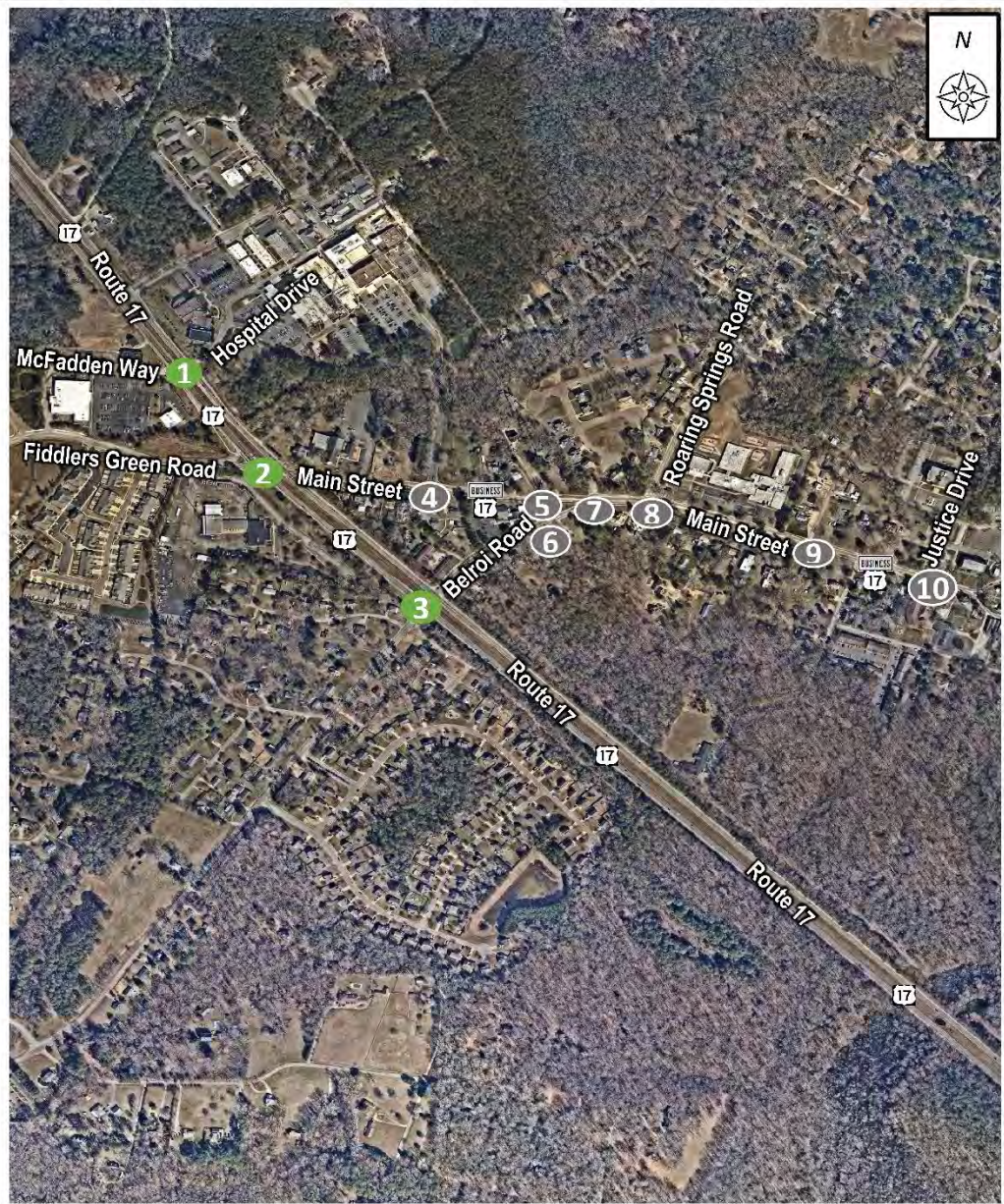
The intersection Level of Service (LOS) is a qualitative measure that describes a driver's perception of the operating conditions. LOS ratings range from A to F. LOS A indicates little or no congestion, and LOS F indicates severe congestion, unstable traffic flow, and/or stop-and-go conditions.

Table 6 summarizes the LOS corresponding to the delay at unsignalized and signalized intersections as specified in the Highway Capacity Manual (HCM). The delay criteria for LOS differ slightly for unsignalized and signalized intersections due to driver expectations and behavior. For signalized intersections, delay is calculated as the lost travel time caused by vehicles waiting at a traffic signal. For unsignalized intersections, delay is calculated by determining the number of gaps that are available in the conflicting traffic stream, since the LOS analysis assumes that traffic on the mainline is not affected by the traffic on the side street.

Table 6: 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 AM & PM Peak Hour Volumes



LEGEND

Intersection ID (Signalized)

Intersection ID (Unsignalized)

XX (XX) AM (PM) Peak Hour Traffic Volumes

Traffic Signal

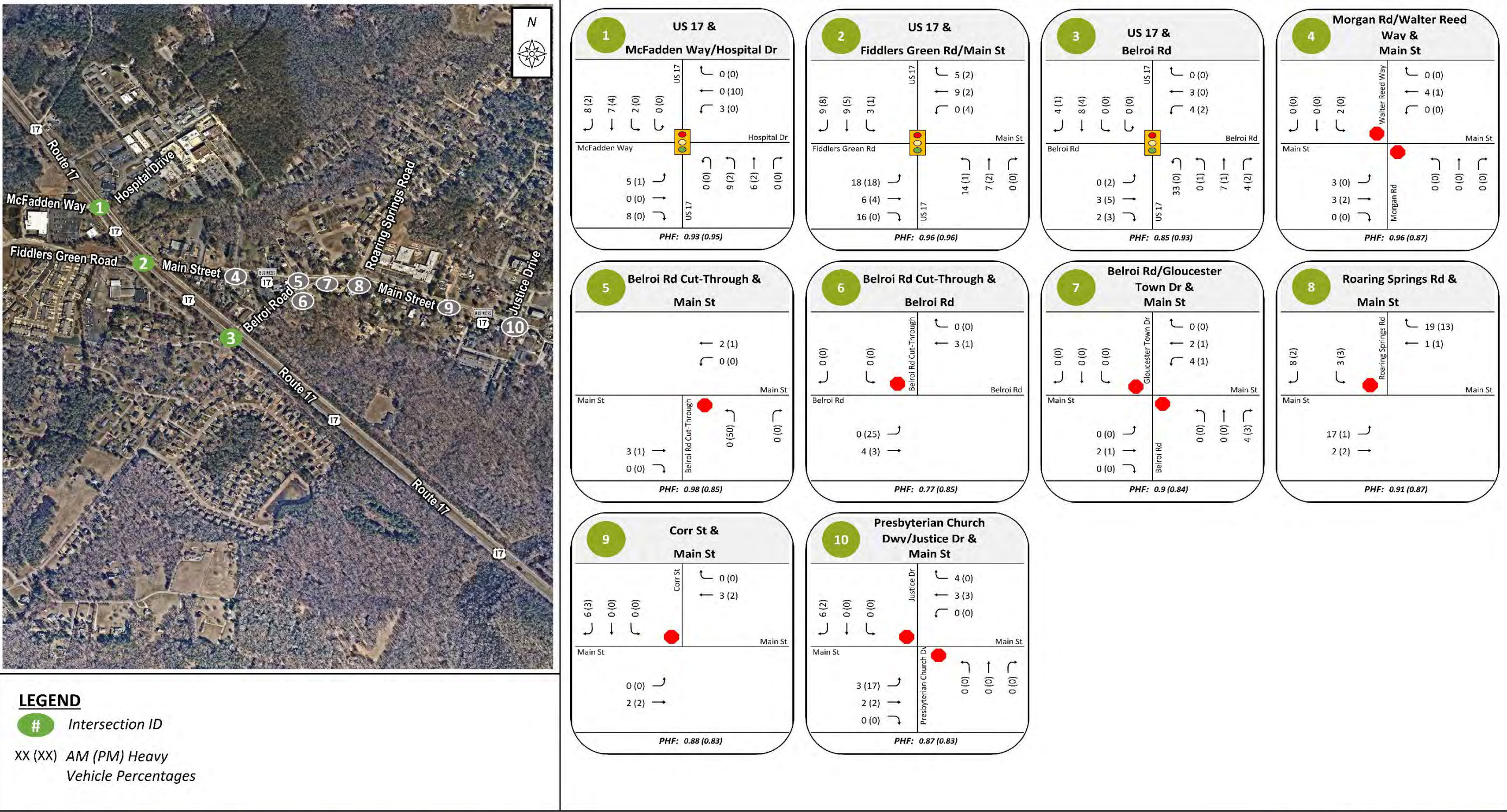
Stop Sign

Vehicle Movement

FR-25-02 | Route 17 / Route 17 Business (Main Street)

Figure 10: 2025 Existing AM & PM Peak Hour Volumes

2025 Existing AM & PM Peak Hour Heavy Vehicle Percentages and Peak Hour Factors



FR-25-02 | Route 17 / Route 17 Business (Main Street)

Figure 11: 2025 Existing Heavy Vehicle Percentages and Peak Hour Factors

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 7** summarizes the preliminary Synchro reports used to determine control delay for each intersection.

Existing conditions Synchro results for control delay and corresponding LOS are summarized in **Table 8**. Synchro results for 95th percentile queue lengths are summarized in **Table 9**. The full Synchro reports are included in **Appendix C**.

Table 7: Synchro Report for Control Delay

Intersection Name	Synchro Report for Control Delay
Route 17 at Hospital Drive / McFadden Way	HCM 2000 Signalized
Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road	HCM 2000 Signalized
Route 17 at Belroi Road	HCM 2000 Signalized
Route 17 Business (Main Street) at Walter Reed Way / Morgan Road	HCM 6th TWSC
Route 17 Business (Main Street) at Belroi Road Spur	HCM 6th TWSC
Belroi Road at Belroi Road Spur	HCM 6th TWSC
Route 17 Business (Main Street) at Belroi Road / Gloucester Town Drive	HCM 6th TWSC
Route 17 Business (Main Street) at Roaring Springs Road	HCM 6th TWSC
Route 17 Business (Main Street) at Corr Street	HCM 6th TWSC
Route 17 Business (Main Street) at Justice Drive	HCM 6th TWSC

AM Peak Hour

Control Delay and Level of Service

Under existing conditions, all three signalized intersections operate at overall LOS C or better with all side street approaches (eastbound and westbound) operating at LOS D. The left-turn movements on Route 17 also operate at LOS D with the following exceptions:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: northbound left-turn movement (LOS F)
- Route 17 and Belroi Road: southbound left-turn movement (LOS E)

For the unsignalized intersections along Route 17 Business (Main Street), all stop-controlled approaches operate at LOS C or better with the exception of the southbound approach at the Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive intersection, which operates at LOS D.

95th Percentile Queue Length

All 95th percentile 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:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: southbound through queue blocks dedicated left-turn lane
- Route 17 and Belroi Road:
 - Westbound approach has slight taper for right-turning vehicles that is blocked by the westbound through / left-turn queue
 - Northbound through queue blocks dedicated left-turn lane

PM Peak Hour

Control Delay and Level of Service

Under existing conditions, all three signalized intersections operate at overall LOS C or better with all side street approaches (eastbound and westbound) operating at LOS D. The following left-turn movements on Route 17 operate with delays equivalent to LOS E or LOS F:

- Route 17 and Hospital Drive / McFadden Way: southbound left-turn movement (LOS E)
- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: northbound (LOS F) and southbound (LOS E) left-turn movements
- Route 17 and Belroi Road: northbound and southbound left-turn movements (LOS E)

For the unsignalized intersections along Route 17 Business (Main Street), all stop-controlled approaches operate at LOS C or better with the exception of the southbound approach at the Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive intersection, which operates at LOS E.

95th Percentile Queue Length

The following movements experience 95th percentile queue lengths that either exceed the available storage length for that movement or extend longer than the effective storage length of an adjacent turn lane:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: southbound left-turn movement queue exceeds available storage length
- Route 17 and Belroi Road:
 - Westbound approach has slight taper for right-turning vehicles that is blocked by the westbound through / left-turn queue
 - Northbound left-turn movement queue exceeds available storage length
 - Northbound through queue blocks dedicated left-turn lane

Table 8: 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	Route 17 & Hospital Dr / McFadden Way		McFadden Way				Hospital Dr				Route 17				Route 17				Intersection	
		Left	50.2	D	51.4	D	52.0	D	52.1	D	39.6	D	20.5	C	51.8	D	56.1	E	Delay	Delay
		Through									10.0	B	6.4	A	12.4	B	21.8	C	17.6	18.6
		Right	47.9	D	45.6	D					5.8	A	6.1	A	0.0	A	0.1	A	LOS	LOS
		Approach	48.8	D	48.8	D	52.0	D	52.1	D	11.6	B	7.3	A	15.4	B	20.8	C	B	B
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd		Fiddlers Green Rd				Main St				Route 17				Route 17				Intersection	
		Left	50.7	D	54.4	D	51.1	D	52.3	D	80.6	F	82.8	F	36.0	D	66.4	E	Delay	Delay
		Through									11.3	B	12.9	B	21.7	C	15.4	B	27.4	27.8
		Right	36.9	D	38.9	D	32.5	C	32.7	C					18.7	B	20.4	C	LOS	LOS
		Approach	45.6	D	46.1	D	38.7	D	40.0	D	22.7	C	21.0	C	24.8	C	27.0	C	C	C
3	Route 17 & Belroi Rd		Belroi Rd				Belroi Rd				Route 17				Route 17				Intersection	
		Left	49.6	D	52.4	D	48.6	D	48.7	D	51.9	D	55.1	E	58.2	E	55.3	E	Delay	Delay
		Through									19.3	B	21.1	C	12.5	B	18.2	B	24.3	27.0
		Right	43.0	D	46.1	D	0.0	A	39.3	D	17.1	B	17.3	B	18.7	B	22.1	C	LOS	LOS
		Approach	47.0	D	49.9	D	48.6	D	48.5	D	21.5	C	24.2	C	13.5	B	18.9	B	C	C
4	Route 17 BUS (Main St) & Walter Reed Way / Morgan Rd		Main St				Main St				Morgan Rd				Walter Reed Way				Intersection	
		Left	7.8	A	7.9	A	0.0*	A	0.0*	A	12.7	B	0.0	A	12.9	B	14.9	B	Delay	Delay
		Through	†	†	†	†	†	†	†	†					-	-				
		Right	†	†	†	†	†	†	†	†					9.3	A	10.0	A	LOS	LOS
		Approach	1.1	A	0.3	A	0.0	A	0.0	A	12.7	B	0.0	A	11.9	B	13.0	B	-	-
5	Route 17 BUS (Main St) & Belroi Rd Spur		Main St				Main St				Belroi Rd Spur								Intersection	
		Left					7.7*	A	0.0*	A	10.6	B	12.6	B					Delay	Delay
		Through	†	†	†	†	0.0	A	†	†									-	-
		Right	†	†	†	†					10.6	B	12.6	B					LOS	LOS
		Approach	0.0	A	0.0	A	0.0	A	0.0	A	10.6	B	12.6	B	-	-				
6	Belroi Rd & Belroi Rd Spur		Belroi Rd				Belroi Rd								Belroi Rd Spur				Intersection	
		Left	7.7*	A	7.9*	A									9.4	A	9.4	A	Delay	Delay
		Through	0.0	A	0.0	A	†	†	†	†					-	-				
		Right					†	†	†	†					9.4	A	9.4	A	LOS	LOS
		Approach	0.5	A	0.2	A	0.0	A	0.0	A	9.4	A	9.4	A	-	-				
7	Route 17 BUS (Main St) & Belroi Rd / Gloucester Town Dr		Main St				Main St				Belroi Rd				Gloucester Town Dr				Intersection	
		Left	7.7	A	7.9	A	8.3	A	8.5	A	12.1	B	12.7	B	26.2	D	45.9	E	Delay	Delay
		Through	†	†	†	†	†	†	†	†					†	-	-			
		Right	†	†	†	†	†	†	†	†					†	LOS	LOS			
		Approach	0.1	A	0.2	A	3.5	A	3.4	A	12.1	B	12.7	B	26.2	D	45.9	E	-	-

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 8: 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	Route 17 BUS (Main St) & Belroi Rd Spur		Main St				Main St								Roaring Springs Rd				Intersection	
		Left	8.4	A	9.0	A									14.2	B	19.8	C	Delay	Delay
		Through	†	†	†	†	†	†	†	†									-	-
		Right					†	†	†	†					14.2	B	19.8	C	LOS	LOS
		Approach	0.9	A	2.9	A	0.0	A	0.0	A					14.2	B	19.8	C	-	-
9	Belroi Rd & Belroi Rd Spur		Main St				Main St								Corr St				Intersection	
		Left	8.1*	A	8.2*	A									12.5	B	13.3	B	Delay	Delay
		Through	0.0	A	0.0	A	†	†	†	†									-	-
		Right													12.5	B	13.3	B	LOS	LOS
		Approach	0.3	A	0.4	A	0.0	A	0.0	A					12.5	B	13.3	B	-	-
10	Route 17 BUS (Main St) & Belroi Rd/Gloucester Town Dr		Main St				Main St				Presbyterian Church Dr				Justice Dr				Intersection	
		Left	8.2*	A	8.3*	A	8.1*	A	0.0*	A									Delay	Delay
		Through	0.0	A	0.0	A	0.0	A	†	†	19.1	C	10.5	B	19.5	C	20.3	C	-	-
		Right													10.7	B	11.0	B	LOS	LOS
		Approach	0.7	A	0.3	A	0.1	A	0.0	A	19.1	C	10.5	B	15.5	C	15.5	C	-	-

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 9: 2025 Existing Conditions Peak Hour 95th Percentile Queues

Intersection Number and Description		Type of Control	Lane Group	Maximum Queue							
				Eastbound		Westbound		Northbound		Southbound	
				AM	PM	AM	PM	AM	PM	AM	PM
1	Route 17 & Hospital Dr/McFadden Way	Signalized		McFadden Way		Hospital Dr		Route 17		Route 17	
			Left	45	120	92	114	34	46	83	43
			Through					95	66	196	273
			Right	0	0			0	m0	0	0
2	Route 17 & Route 17 BUS (Main St)/Fiddlers Green Rd	Signalized		Fiddlers Green Rd		Main St		Route 17		Route 17	
			Left	75	82	86	135	107	#127	#192	#252
			Through					14	21	261	102
			Right	0	13	27	34			0	m0
3	Route 17 & Belroi Rd	Signalized		Belroi Rd		Belroi Rd		Route 17		Route 17	
			Left	131	130	177	226	68	139	m10	m5
			Through					191	321	110	106
			Right	0	0	0	0	5	40	0	0
4	Route 17 BUS (Main St) & Walter Reed Way/Morgan Rd	Unsignalized		Main St		Main St		Morgan Rd		Walter Reed Way	
			Left	3	0	†	†	0	†	10	18
			Through	†	†	†	†			3	5
			Right								
5	Route 17 BUS (Main St) & Belroi Rd Spur	Unsignalized		Main St		Main St		Belroi Rd Spur			
			Left			†	†	3	0		
			Through	†	†						
			Right					3	0		
6	Belroi Rd & Belroi Rd Spur	Unsignalized		Belroi Rd		Belroi Rd				Belroi Rd Spur	
			Left	†	†					3	3
			Through			†	†				
			Right							3	3
7	Route 17 BUS (Main St) & Belroi Rd/Gloucester Town Dr	Unsignalized		Main St		Main St		Belroi Rd		Gloucester Town Dr	
			Left	0	0	13	15	25	38	3	10
			Through	†	†	†	†				
			Right			†	†				
8	Route 17 BUS (Main St) & Roaring Springs Rd	Unsignalized		Main St		Main St				Roaring Springs Rd	
			Left	3	15					25	40
			Through	†	†	†	†				
			Right							25	40
9	Route 17 BUS (Main St) & Corr Street	Unsignalized		Main St		Main St				Corr St	
			Left	0	0					5	10
			Through	†	†	†	†				
			Right							5	10
10	Route 17 BUS (Main St) & Justice Dr	Unsignalized		Main St		Main St		Presbyterian Church Dr		Justice Dr	
			Left	3	0	0	0	0	0	8	20
			Through	†	†	†	†				
			Right							3	8

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

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 Public Input survey was active 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 438 participants and received 656 comments. Participants ranked reducing traffic congestion and pedestrian safety and accessibility as the two most important issues in the study area. Speeding / aggressive driving, a lack of Americans with Disabilities Act (ADA) ramps and accessibility, and insufficient / missing crosswalks and pedestrian signal timing were identified as the greatest safety issues. Detailed results from the Phase 1 public outreach efforts can be found in **Appendix C**.

Common themes among written comments included the following:

- Frequent backups and short turn lanes at key intersections
- Lack of crosswalks, poor visibility, and unsafe walking conditions
- Trends in speeding, red-light running, and distracted driving
- Need for improved circulation for Botetourt Elementary School and concern over existing congestion during arrival and dismissal periods
- Limited ADA-compliant pedestrian and bike access

Participants were asked to drop pins where they have concerns regarding congestion, multimodal access, and safety. The results of this survey are shown in **Figure 12**.

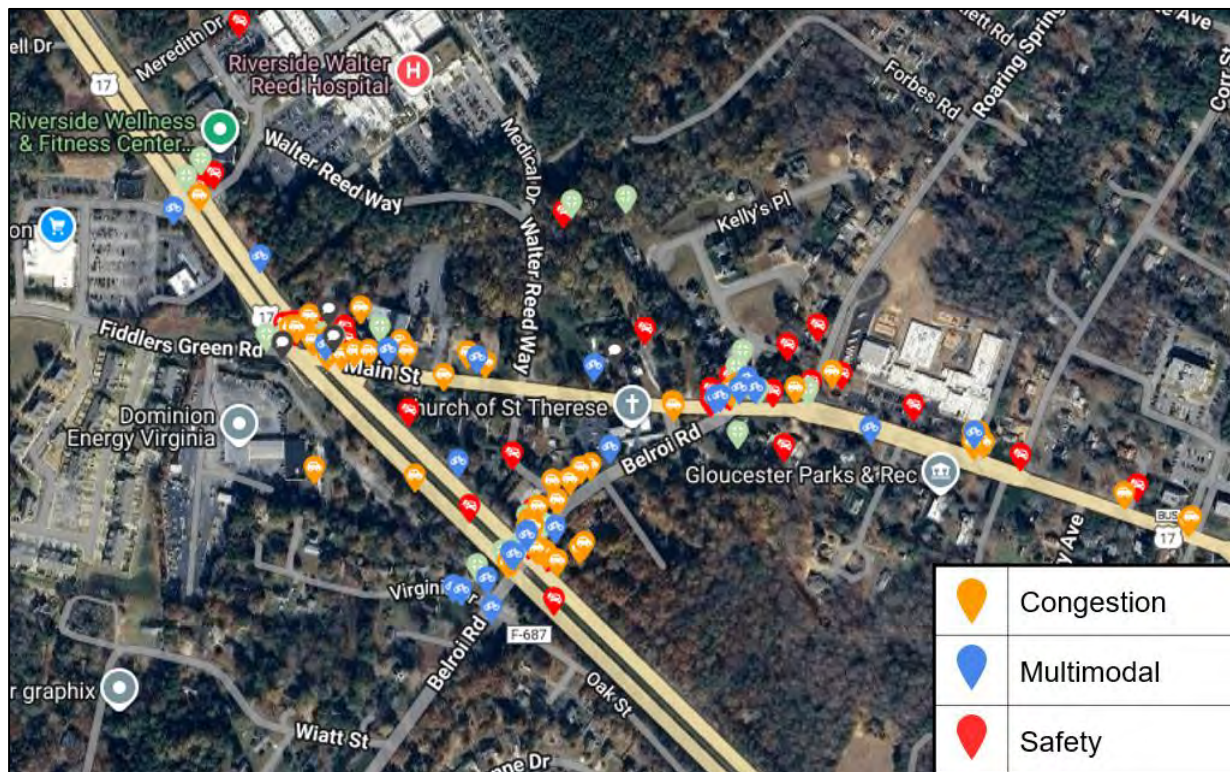


Figure 12: Public Input Comment Pins and Themes

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 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 Hampton Roads Regional 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 traffic volume trends, 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 Gloucester County Business 17 Corridor Planning Study (2013) and compared them to growth rates from the other sources.

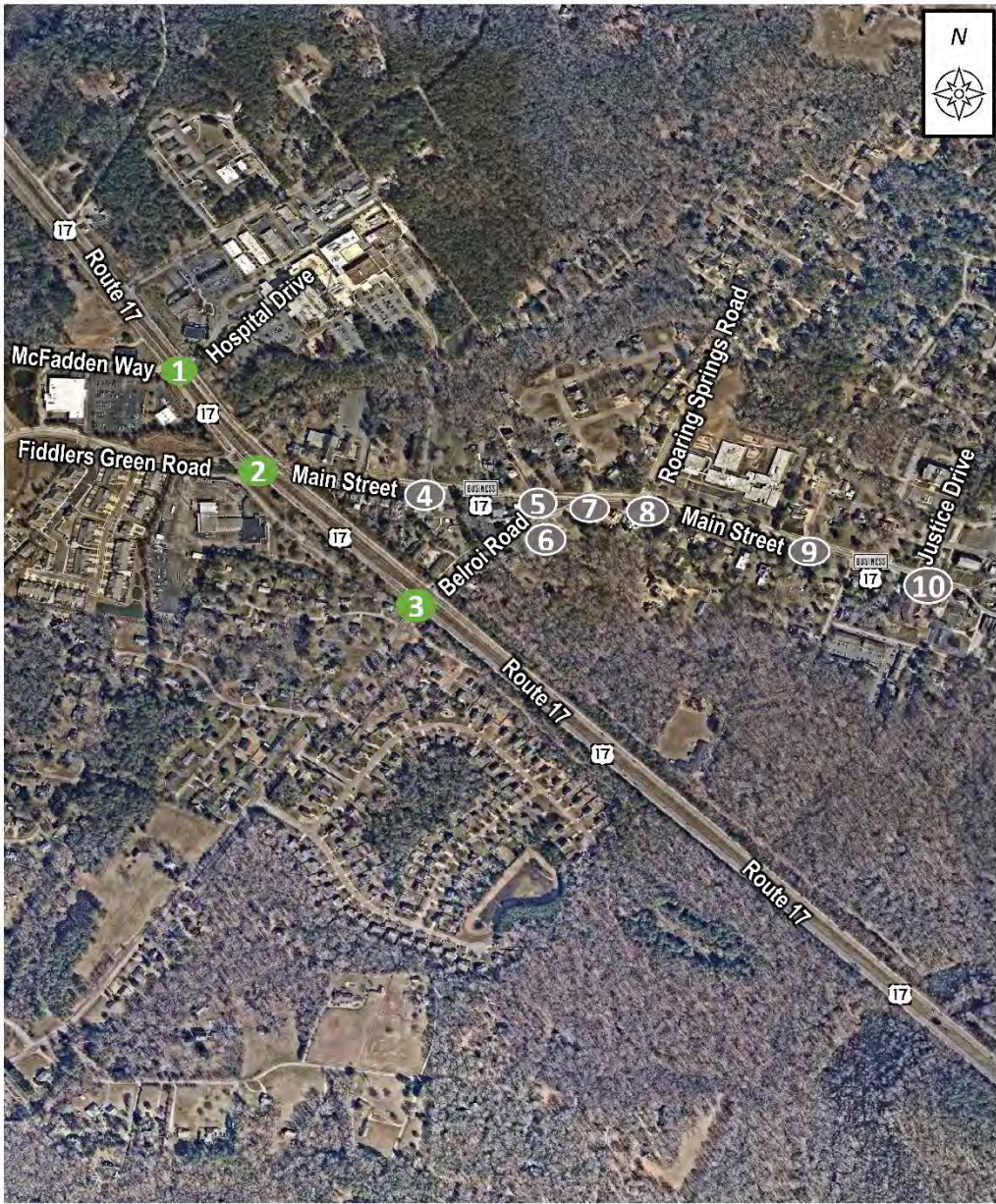
Table 10 presents the recommended linear growth rates, the growth rates determined from historical volume, and the HRPTO TDM. Based on VDOT guidance, TDM growth rates for several locations in the study area were excluded because the percent difference between TDM AADT and VDOT historical AADT was more than +/-30%. The SWG agreed upon a flat growth rate of 0.5% for the entire study area. Traffic forecasting growth rate development was presented in a technical working group (TWG) meeting on May 6, 2025. The full presentation is included in **Appendix D**. The No-Build (2045) AM and PM peak hour volumes are shown in **Figure 13**.

Table 10: Linear Growth Rate Development

ID	Segment	Historical Linear Growth Rate	Projected TDM Linear Growth Rate	Previous Study Growth Rate	Recommended Linear Growth Rate
1	Route 17 north of Route 17 Business (Main Street)	0.20%	0.44%	4.00%	0.50%
2	Route 17 between Route 17 Business (Main Street) and Belroi Road	0.26%	-0.12%	4.00%	0.50%
3	Route 17 south of Belroi Road	0.26 %	0.37%	4.00%	0.50%
4	Fiddlers Green Road west of Route 17 ⁽¹⁾	8.96%	N/A ⁽²⁾	4.00%	0.50%
5	Route 17 Business (Main Street) from Route 17 to Roaring Springs Road	-1.08%	1.95%	4.00%	0.50%
6	Route 17 Business (Main Street) from Roaring Springs Road to east of Justice Drive	-1.15% to -1.08%	0.14%	4.00%	0.50%
7	Belroi Road west of Route 17	0.22%	N/A ⁽²⁾	4.00%	0.50%
8	Belroi Road from Route 17 to Route 17 Business (Main Street)	-0.35%	N/A ⁽²⁾	4.00%	0.50%

- Limited historical AADT data. Historical growth rate represents a 26-year horizon including data from 1997, 2003, 2009, 2015, and 2021.
- The 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 AM & PM Peak Hour Vehicle Volumes



LEGEND

 Intersection ID (Signalized)

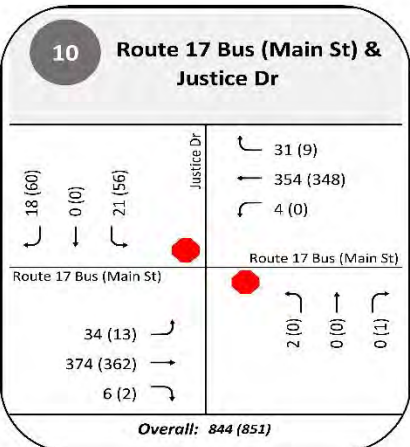
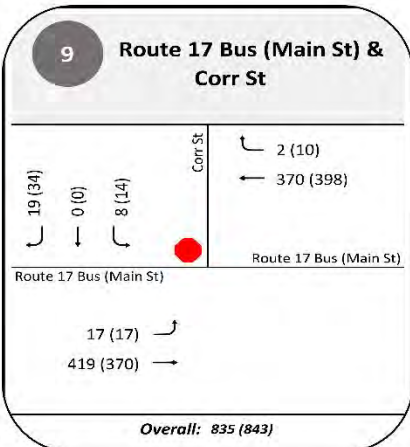
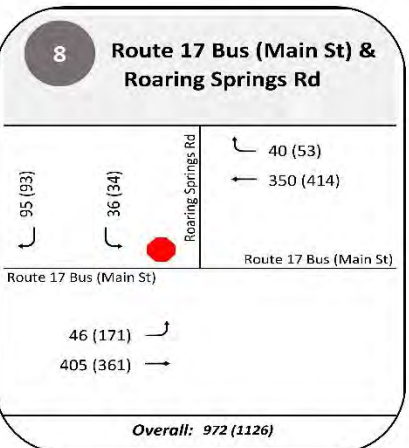
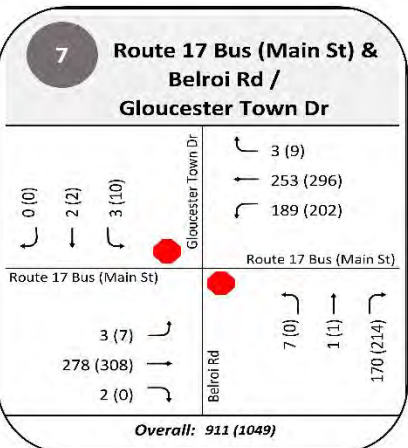
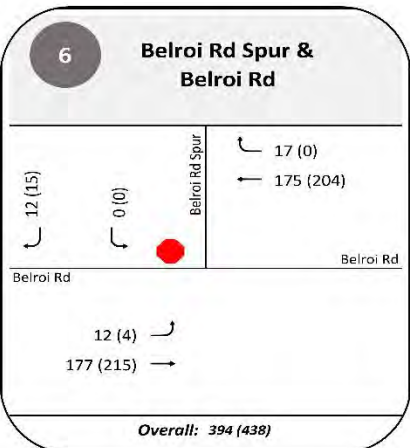
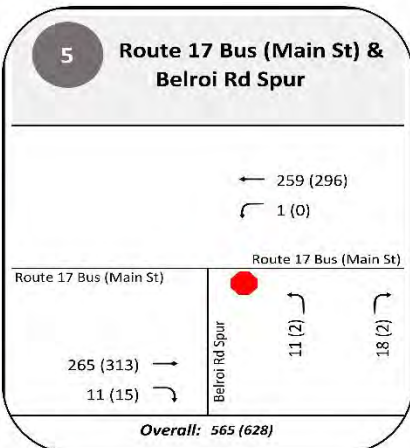
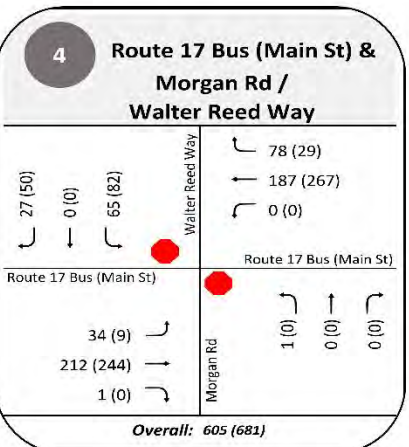
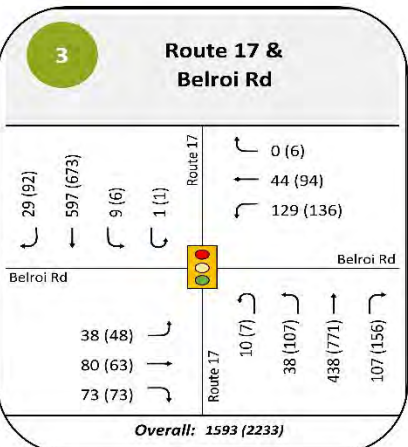
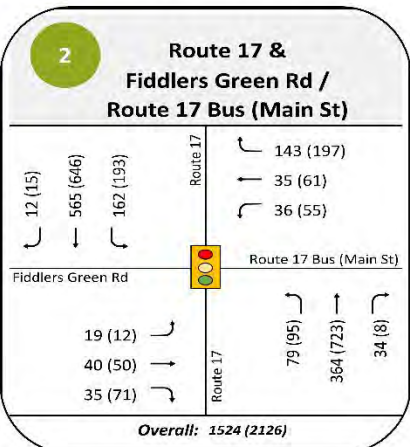
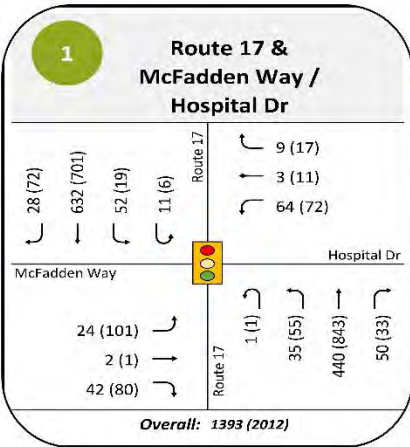
 Intersection ID (Unsignalized)

XX (XX) AM (PM) Peak Hour Traffic Volumes

 Traffic Signal

 Stop Sign

 Vehicle Movement



FR-25-02 | Route 17 / Route 17 Business (Main Street)

Figure 13: 2045 No-Build Peak Hour Volumes

No-Build Conditions Synchro Analysis

Traffic operational analyses were conducted to evaluate the overall performance of the study intersections under No-Build (2045) AM and PM peak hour conditions. The intent of No-Build conditions analyses was to provide a general understanding of the baseline future traffic conditions as a starting point for developing improvement alternatives. 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. 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 the measures of effectiveness to quantitatively report the performance of each study intersection. Synchro reports are included in **Appendix D** and shown in **Table 11** and **Table 12**.

Similar trends in delay and queuing were observed under No-Build conditions as observed in existing conditions. The following trends were observed under No-Build conditions:

AM Peak Hour

Control Delay and Level of Service

Under No-Build conditions, all three signalized intersections continued to operate at overall LOS C or better with all side street approaches (eastbound and westbound) operating at LOS D. The left-turn movements on Route 17 also operate at LOS D with the following exceptions:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: northbound and southbound left-turn movements (LOS E)

For the unsignalized intersections along Route 17 Business (Main Street), all stop-controlled approaches operate at LOS C or better with the exception of the southbound approach at the Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive intersection, which operates at LOS D.

95th Percentile Queue Length

All 95th percentile 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:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: northbound and southbound through queues block dedicated left-turn lane
- Route 17 and Belroi Road
 - Westbound approach has slight taper for right-turning vehicles that is blocked by the westbound through / left-turn queue
 - Northbound through queue blocks dedicated left-turn lane

PM Peak Hour

Control Delay and Level of Service

Under No-Build conditions, all three signalized intersections continued to operate at overall LOS C or better with all side street approaches (eastbound and westbound) operating at LOS D. The following left-turn movements on Route 17 operate with delays equivalent to LOS E or LOS F:

- Route 17 and Hospital Drive / McFadden Way: southbound left-turn movement (LOS E)
- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: northbound (LOS F) and southbound (LOS E) left-turn movements

For the unsignalized intersections along Route 17 Business (Main Street), all stop-controlled approaches operate at LOS C or better with the exception of the southbound approach at the Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive intersection, which operates at LOS F.

95th Percentile Queue Length

The following movements experience 95th percentile queue lengths that either exceed the available storage length for that movement or extend longer than the effective storage length of an adjacent turn lane:

- Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road: southbound left-turn movement queue exceeds available storage length
- Route 17 and Belroi Road
 - Westbound approach has slight taper for right-turning vehicles that is blocked by the westbound through / left-turn queue
 - Northbound left-turn movement queue exceeds available storage length
 - Northbound through queue blocks dedicated left-turn lane

Table 11: 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	AM	PM
1	Route 17 & Hospital Dr / McFadden Way		McFadden Way				Hospital Dr				Route 17				Route 17				Intersection	
		Left	50.2	D	52.4	D	52.9	D	52.5	D	39.5	D	21.3	C	51.7	D	56.2	E	Delay	Delay
		Through									5.0	B	7.0	A	13.1	B	23.3	C	16.2	19.5
		Right	47.8	D	45.6	D					0.4	A	6.2	A	0.0	A	0.1	A	LOS	LOS
		Approach	48.7	D	49.4	D	52.9	D	52.5	D	6.9	A	7.8	A	16.0	B	22.2	C	C	B
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd		Fiddlers Green Rd				Main St				Route 17				Route 17				Intersection	
		Left	50.9	D	54.4	D	51.3	D	54.8	D	66.9	E	81.1	F	72.3	E	75.9	E	Delay	Delay
		Through									11.4	B	13.3	B	15.1	B	14.9	B	28.1	28.6
		Right	35.1	D	38.6	D	32.4	C	32.5	C					20.3	C	20.6	C	LOS	LOS
		Approach	45.1	D	46.0	D	38.7	D	40.8	D	20.6	C	21.1	C	27.7	C	28.7	C	C	C
3	Route 17 & Belroi Rd		Belroi Rd				Belroi Rd				Route 17				Route 17				Intersection	
		Left	49.6	D	53.4	D	51.2	D	50.3	D	51.9	D	54.0	D	40.1	D	49.1	D	Delay	Delay
		Through									20.5	C	22.4	C	10.4	B	14.9	B	24.1	26.2
		Right	42.3	D	45.6	D	0.0	A	38.9	D	17.9	B	18.0	B	19.4	B	9.1	A	LOS	LOS
		Approach	46.8	D	50.3	D	51.2	D	50.0	D	22.6	C	25.2	C	11.3	B	14.5	B	C	C
4	Route 17 BUS (Main St) & Walter Reed Way / Morgan Rd		Main St				Main St				Morgan Rd				Walter Reed Way				Intersection	
		Left	7.9	A	8.0	A	0.0*	A	0.0*	A	13.4	B	0.0	A	13.7	B	16.4	C	Delay	Delay
		Through	†	†	†	†	†	†	†	†									-	-
		Right					†	†	†	†					9.4	A	10.3	B	LOS	LOS
		Approach	1.1	A	0.3	A	0.0	A	0.0	A	13.4	B	0.0	A	12.4	B	14.1	B	-	-
5	Route 17 BUS (Main St) & Belroi Rd Spur		Main St				Main St				Belroi Rd Spur								Intersection	
		Left					7.8*	A	0.0*	A	10.9	B	13.2	B					Delay	Delay
		Through	†	†	†	†	0.0	A	†	†									-	-
		Right									10.9	B	13.2	B					LOS	LOS
		Approach	0.0	A	0.0	A	0.0	A	0.0	A	10.9	B	13.2	B					-	-
6	Belroi Rd & Belroi Rd Spur		Belroi Rd				Belroi Rd								Belroi Rd Spur				Intersection	
		Left	7.7*	A	8.0*	A									9.6	A	9.6	A	Delay	Delay
		Through	0.0	A	0.0	A	†	†	†	†									-	-
		Right													9.6	A	9.6	A	LOS	LOS
		Approach	0.5	A	0.1	A	0.0	A	0.0	A					9.6	A	9.6	A	-	-
7	Route 17 BUS (Main St) & Belroi Rd / Gloucester Town Dr		Main St				Main St				Belroi Rd				Gloucester Town Dr				Intersection	
		Left	7.8	A	8.0	A	8.5	A	8.8	A	13.1	B	13.8	B	31.4	D	64.0	F	Delay	Delay
		Through	†	†	†	†	†	†	†	†									-	-
		Right					†	†	†	†								LOS	LOS	
		Approach	0.1	A	0.2	A	3.6	A	3.5	A	13.1	B	13.8	B	31.4	D	64.0	F	-	-

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 11: 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
8	Route 17 BUS (Main St) & Roaring Springs Rd		Main St				Main St								Roaring Springs Rd				Intersection	
		Left	8.4	A	9.0	A									14.2	B	19.8	C	Delay	Delay
		Through	†	†	†	†	†	†	†	†									-	-
		Right					†	†	†	†					14.2	B	19.8	C	LOS	LOS
		Approach	0.9	A	2.9	A	0.0	A	0.0	A					14.2	B	19.8	C	-	-
9	Route 17 BUS (Main St) & Corr Street		Main St				Main St								Corr St				Intersection	
		Left	8.1*	A	8.2*	A									12.5	B	13.3	B	Delay	Delay
		Through	0.0	A	0.0	A	†	†	†	†									-	-
		Right													12.5	B	13.3	B	LOS	LOS
		Approach	0.3	A	0.4	A	0.0	A	0.0	A					12.5	B	13.3	B	-	-
10	Route 17 BUS (Main St) & Justice Dr		Main St				Main St				Presbyterian Church Dr				Justice Dr				Intersection	
		Left	8.2*	A	8.3*	A	8.1*	A	0.0*	A	19.1	C	10.5	B	19.5	C	20.3	C	Delay	Delay
		Through	0.0	A	0.0	A	0.0	A	†	†					-	-				
		Right													10.7	B	11.0	B	LOS	LOS
		Approach	0.7	A	0.3	A	0.1	A	0.0	A	19.1	C	10.5	B	15.5	C	15.5	C	-	-

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 12: 2045 No-Build Conditions Peak Hour 95th Percentile Queues

Intersection Number and Description		Type of Control	Lane Group	95th Percentile Queue							
				Eastbound		Westbound		Northbound		Southbound	
				AM	PM	AM	PM	AM	PM	AM	PM
1	Route 17 & Hospital Dr / McFadden Way	Signalized		McFadden Way		Hospital Dr		Route 17		Route 17	
			Left					63	m55	89	47
			Through	47	133	99	124	49	87	225	293
			Right	0	0			0	m0	0	0
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd	Signalized		Fiddlers Green Rd		Main St		Route 17		Route 17	
			Left					#140	#148	#241	#289
			Through	80	89	92	150			80	118
			Right	0	19	28	36	18	24	m0	m0
3	Route 17 & Belroi Rd	Signalized		Belroi Rd		Belroi Rd		Route 17		Route 17	
			Left					74	149	m9	m7
			Through	143	144	205	#284	207	330	66	85
			Right	0	0	0	0	13	44	0	0
4	Route 17 BUS (Main St) & Walter Reed Way / Morgan Rd	Unsignalized		Main St		Main St		Morgan Rd		Walter Reed Way	
			Left	3	0	†	†	0	†	13	23
			Through	†	†	†	†			3	8
			Right								
5	Route 17 BUS (Main St) & Belroi Rd Spur	Unsignalized		Main St		Main St		Belroi Rd Spur			
			Left			†	†	3	0		
			Through	†	†						
			Right					3	0		
6	Belroi Rd & Belroi Rd Spur	Unsignalized		Belroi Rd		Belroi Rd				Belroi Rd Spur	
			Left	†	†					3	3
			Through			†	†				
			Right							3	3
7	Route 17 BUS (Main St) & Belroi Rd / Gloucester Town Dr	Unsignalized		Main St		Main St		Belroi Rd		Gloucester Town Dr	
			Left	0	0	15	20				
			Through	†	†	†	†	33	45	3	18
			Right			†	†				
8	Route 17 BUS (Main St) & Roaring Springs Rd	Unsignalized		Main St		Main St				Roaring Springs Rd	
			Left	5	18					33	55
			Through	†	†	†	†				
			Right							33	55
9	Route 17 BUS (Main St) & Corr Street	Unsignalized		Main St		Main St				Corr St	
			Left	3	3					5	13
			Through	†	†	†	†				
			Right							5	13
10	Route 17 BUS (Main St) & Justice Dr	Unsignalized		Main St		Main St		Presbyterian Church Dr		Justice Dr	
			Left	3	0	0	0			8	25
			Through	†	†	†	†	0	0		
			Right							3	10

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

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 **Section 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 Route 17 and for the turning movements to and from mainline Route 17
- Enhance bike and pedestrian access throughout the study area

1.7.1. Initial Alternatives

The needs evaluation, diagnosis, and initial alternatives were presented in the Needs Evaluation, Diagnosis, and Preliminary Concepts Meeting (SWG Meeting #2), held on June 10, 2025. The alternatives for the Route 17 and Route 17 Business (Main Street) study area were presented during the meeting and are summarized in **Table 13**.

Following SWG Meeting #2, the study team used the Virginia Intersection and Interchange Control Assessment Program (iCAP) Assessment Tool and Virginia Junction Screening Tool (VJuST) to screen intersection and interchange 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 the east side of Route 17, adding new sidewalk along the west side of Route 17 and the north side of Belroi Road, and filling in sidewalk gaps on the north side of Main Street. In addition, the concepts included adding or enhancing signalized pedestrian crossings at the Route 17 intersections with Hospital Drive / McFadden Way, Route 17 Business (Main Street), and Belroi Road.

Table 13: Phase 1 Alternatives

Alternative	Description
Route 17 and Hospital Drive / McFadden Way	
Restripe and Remove Split Phasing	Restripe the eastbound approach and convert from split phasing to concurrent, permissive-only phasing. Extend the southbound left-turn lane, install emergency vehicle preemption, and provide signalized pedestrian crossings on the south and west legs.
Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road	
Consolidate Signal Phasing	Redirect westbound left-turn movements to the Route 17 and Belroi Road intersection. Restripe side street approaches and convert from split phasing to concurrent side street phasing. Enhance crosswalk markings. Extend southbound left-turn lane.
Route 17 and Belroi Road	
Restripe and Remove Split Phasing	Construct eastbound right-turn lane and restripe minor approaches to convert from split phasing to concurrent side street phasing. Extend the turn lanes on Route 17.
Continuous Green-T with Cul-de-Sac	Remove the east leg of Belroi Road from the signal by creating a cul-de-sac, and convert the intersection to a Continuous Green-T. Redirect westbound movements to the Route 17 and Route 17 Business (Main Street) intersection. Extend the turn lanes on Route 17.
Thru-Cut	Convert the intersection to a thru-cut by redirecting eastbound and westbound through movements to adjacent intersections. Extend the turn lanes on Route 17.
Convert East Leg to One-Way	Convert the east leg of Belroi Road to one-way eastbound. Redirect westbound movements to the Route 17 and Route 17 Business (Main Street) intersection. Extend the turn lanes on Route 17.
Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive	
Roundabout Alignment 1	Close the existing section of Belroi Road between the spur and Main Street. Reconfigure the Main Street and Belroi Road Spur intersection as a three-legged roundabout, offset from the three-legged intersection with Gloucester Town Drive.
Roundabout Alignment 2	Install a four-legged roundabout at the Main Street and Belroi Road/Gloucester Town Drive intersection. Close the Belroi Road Spur to northbound traffic.
Roundabout Alignment 3	Install a roundabout centered between the existing Belroi Road Spur and Belroi Road. Incorporate Gloucester Town Drive into the roundabout design to allow movements to and from Gloucester Town Drive.
All-Way Stop Control	Install all-way stop control for all four approaches of the intersection.
Pedestrian and Bicycle Network Improvements	Install shared use path along east side of Route 17 and sidewalk along west side of Route 17. Provide signalized pedestrian crossings at all three signalized intersections. Fill in sidewalk gaps along north side of Main Street and provide additional crosswalks along Main Street. Provide sidewalks along north side of Belroi Road.

1.7.2. Phase 1 Alternatives Summary

The Stage 1 iCAP results are summarized in **Figure 14** and **Figure 15** and were presented at the Preliminary Concepts Refinement and Phase 2 Scoping Meeting (SWG Meeting #3), held on July 8, 2025, where the SWG decided which concepts would move forward to Phase 2. In total, the SWG agreed to carry 12 alternatives forward to Phase 2 for further refinement. The 12 alternatives included:

- One concept at Route 17 and Hospital Drive / McFadden Way
- One concept at Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road
- Four concepts at Route 17 and Belroi Road
- Five concepts at Route 17 Business (Main Street) and Belroi Road
- One concept for pedestrian and bicycle network improvements

These alternatives were carried forward due to the projected safety and operational improvements. **Table 14** summarizes the alternatives considered in Phase 1 and gives the justification for a concept to move forward to Phase 2. **Figure 16** shows the preliminary alternatives graphically categorized by the needs addressed by the alternative. The meeting materials can be found in **Appendix E**.

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	Pedestrian Weight	Safety Weight	Stage 1 Cost Weight				
		3	2	3	2	10			
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	Conventional	--	--	--	--				
Alternative 1	Conventional	0.2	0.5	0.0	1.0	3.6 out of 10		Yes	Low cost traffic operations improvement
Alternative 2	Continuous Green-T	1.0	0.0	1.0	0.5	7 out of 10		No	Safety and traffic operations improvement
Alternative 3	Thru-Cut	0.3	0.5	0.6	0.5	4.7 out of 10		No	Safety and traffic operations improvement
Alternative 4	Conventional	0.2	0.5	0.0	1.0	3.6 out of 10		Yes	Low cost traffic operations improvement

Figure 14: Virginia iCAP Stage 1 Results—Route 17 and Belroi Road

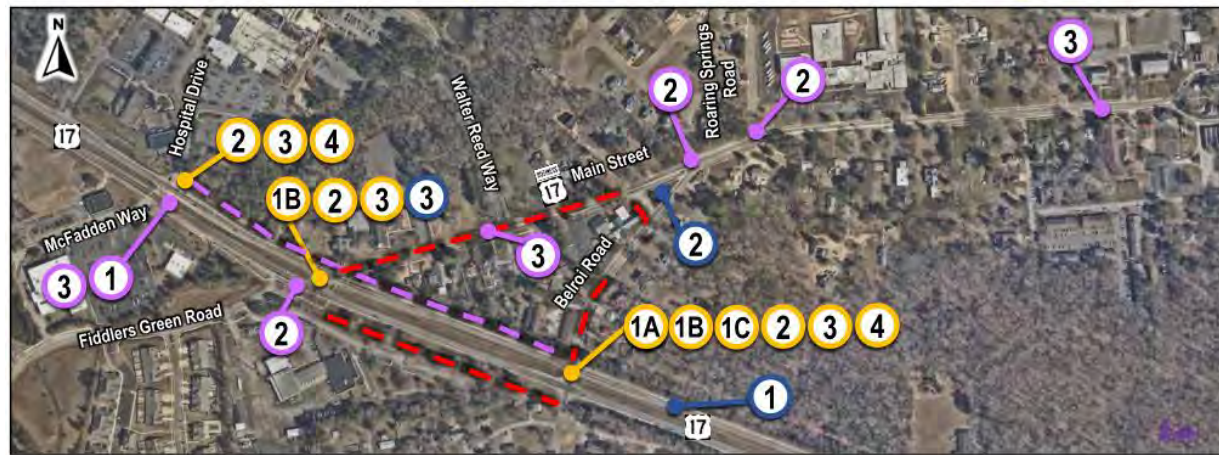
Metric Weighting (Based on Purpose and Need)		Traffic Operations	Pedestrian	Safety	Stage 1 Cost	Total Possible Score		Alternatives for Stage 2 Analysis	
		Traffic Operations Weight	Pedestrian Weight	Safety Weight	Stage 1 Cost Weight				
		2	2	1	2	7			
Alternatives		Traffic Operations Metric MOE Score	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	Roundabout	0.0	0.5	1.0	0.5	3 out of 7		Yes	Traffic operations improvement
Alternative 2	Conventional	0.0	0.5	0.0	1.0	3 out of 7		Yes	Traffic operations improvement

Figure 15: Virginia iCAP Stage 1 Results—Route 17 Business (Main Street) and Belroi Road

Table 14: Phase 1 Alternatives to Move Forward to Phase 2

Alternative	Move Forward to Phase 2?	Justification	VTrans Need Addressed
Route 17 and Hospital Drive / McFadden Way			
Restripe and Remove Split Phasing	Yes	Lower cost option to improve operations	Capacity Preservation
Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road			
Consolidate Signal Phasing	Yes	Lower cost option to improve operations	Capacity Preservation Safety Improvement
Route 17 and Belroi Road			
Restripe and Remove Split Phasing	Yes	Lower cost option to improve operations	Capacity Preservation
Continuous Green-T with Cul-de-Sac	Yes	Addresses Safety and Capacity Preservation needs	Capacity Preservation
Thru-Cut	Yes	Addresses Safety and Capacity Preservation needs	Congestion Mitigation
Convert East Leg to One-Way	Yes	Addresses Safety and Capacity Preservation needs	Capacity Preservation
Route 17 Business (Main Street) and Belroi Road / Gloucester Town Drive			
Roundabout Western Alignment	Yes	Addresses Safety need	Safety Improvement
Roundabout Eastern Alignment	Yes	Addresses Safety need	Safety Improvement
Roundabout Centered Alignment	Yes	Addresses Safety need	Safety Improvement
Realign Intersection	Yes	Addresses Safety need	Safety Improvement
All Way Stop Control	Yes	Addresses Safety need	Safety Improvement
Pedestrian and Bicycle Network Improvements	Yes	Addresses Pedestrian and Bicycle Access and Safety needs	Bicycle Access Pedestrian Safety Improvement

Potential Improvement Concepts



Safety Improvements

- 1** Adjust location of speed limit transition
- 2** Redesign intersection alignment
- 3** Install "No Turn On Red" signs on side street approaches

Pedestrian and Bicycle Improvements

- 1** Add pedestrian signal heads and push buttons
 - 2** Modify existing crosswalk
 - 3** Add new crosswalk
- Proposed shared-use path
--- Proposed sidewalk

Legend: VTrans Needs Addressed

	Capacity Preservation		Pedestrian Access
	Congestion Mitigation		Bicycle Access
	Transit Access		Safety Improvement
	Transportation Demand Management		

Operations Improvements

- 1A** Convert Belroi Road to one-way in eastbound from US 17 to US 17 Business
- 1B** Restrict select turning movements and consolidate signal phases
- 1C** Cul-de-sac Belroi Road
- 2** Signal timing adjustments
- 3** Extend turn-lane storage
- 4** Restripe minor approaches and convert from split phase to concurrent side street operation

Figure 16: Phase 1 Scoping Level Improvement Alternatives

Chapter 2: Alternatives Refinement

2.1 Alternatives Refinement Overview

The study team refined the alternatives 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 Screening Refinements and Results Meeting (SWG Meeting #4) and was held on October 14, 2025, to gather feedback on the draft concept sketches, concept screening results, and cost estimates in advance of public outreach. During SWG Meeting #4, 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. The meeting materials, along with the detailed concept benefits, are included in **Appendix E**.

2.2 Phase 2 Alternatives Description

The following section gives a description of each of the alternatives and provides a conceptual sketch of the alternative.

Route 17 and Hospital Drive / McFadden Way

Restripe and Modify Signal Phasing

This concept would restripe the existing lanes on the eastbound McFadden Way approach and convert the signal operation for the eastbound and westbound approaches from split phasing to concurrent, permissive only phasing. The southbound left-turn lane would be extended, and new signalized pedestrian crossings would be constructed with Americans with Disabilities Act (ADA) ramps, push buttons, and pedestrian signal heads on the south and west legs. A median pedestrian refuge would be provided on the south leg of Route 17 by removing the existing signal pole and guardrail in the median. **Figure 17** presents a conceptual sketch of the alternative. Emergency vehicle preemption was also considered at this intersection.

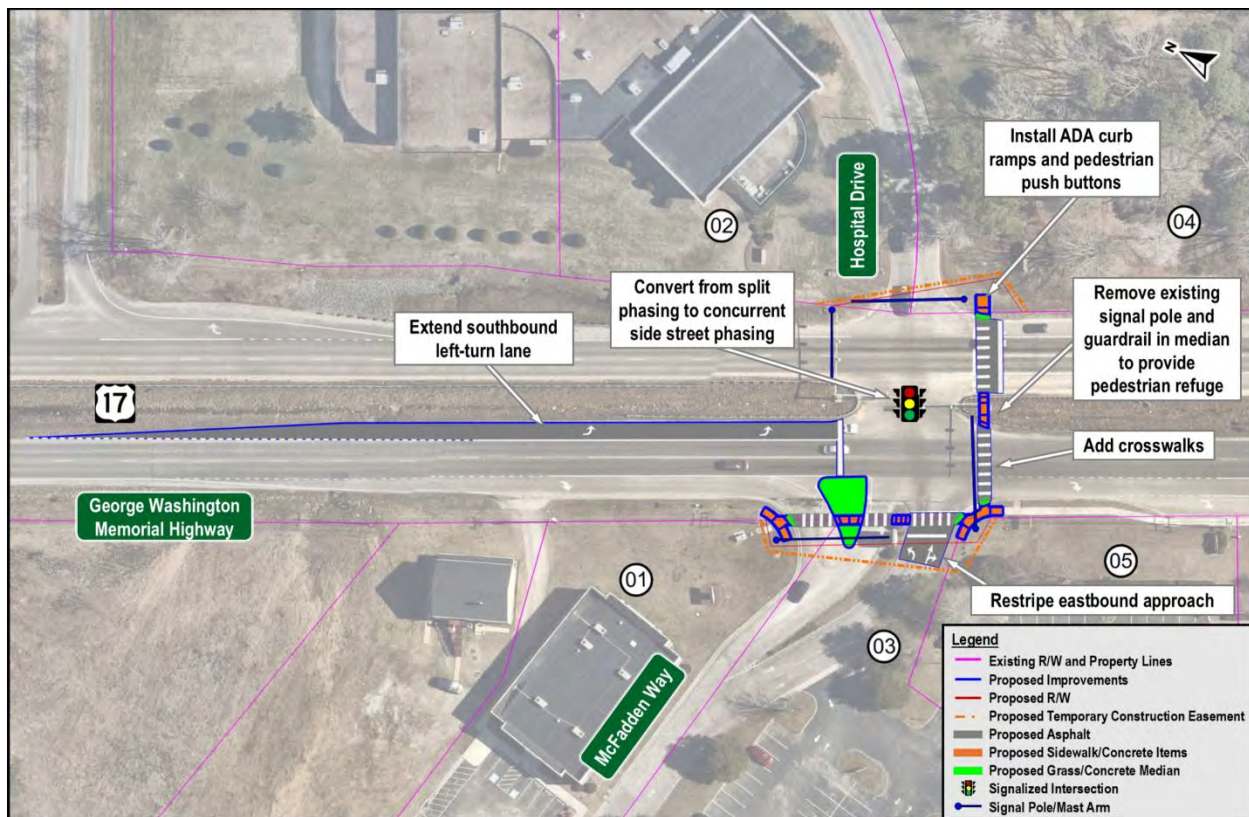


Figure 17: Phase 2 Alternative—Restripe and Modify Signal Phasing at Hospital Drive / McFadden Way

Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road

Consolidate Signal Phases and Extend Southbound Left-Turn Lane

The proposed improvement would consolidate redundant movements at the Route 17 intersections with Route 17 Business (Main Street) and Belroi Road. Westbound left-movements from Route 17 Business (Main Street) onto southbound Route 17 would be redirected to turn left onto Belroi Road first, then complete the westbound left-turn movement at the Route 17 and Belroi Road intersection. Similarly, southbound left-turn movements from Route 17 onto Belroi Road toward Route 17 Business (Main Street) would be redirected to turn left directly onto Route 17 Business (Main Street) from Route 17. These changes would remove the need for a separate left-turn signal for westbound traffic, and the signal phasing would be converted from split phasing to concurrent side street phasing with a leading eastbound left-turn phase. The proposed improvements would also include extending the southbound left-turn lane. **Figure 18** presents a conceptual sketch of the alternative.



Figure 18: Phase 2 Alternative—Consolidate Signal Phases at Route 17 Business (Main Street) / Fiddlers Green Road

Route 17 and Belroi Road

Convert Belroi Road to One-Way Eastbound from Route 17 to Route 17 Business (Main Street)

The proposed alternative would convert Belroi Road to a one-way road in the eastbound direction between Route 17 and Route 17 Business (Main Street). All westbound traffic from Belroi Road would be rerouted along Route 17 Business (Main Street) to the Route 17 intersection. The pavement on Belroi Road approaching Route 17 Business (Main Street) would be restriped to modify the angle at which vehicles approach the intersection. This alternative would also extend turn lanes on Route 17. **Figure 19** presents a conceptual sketch of the alternative.

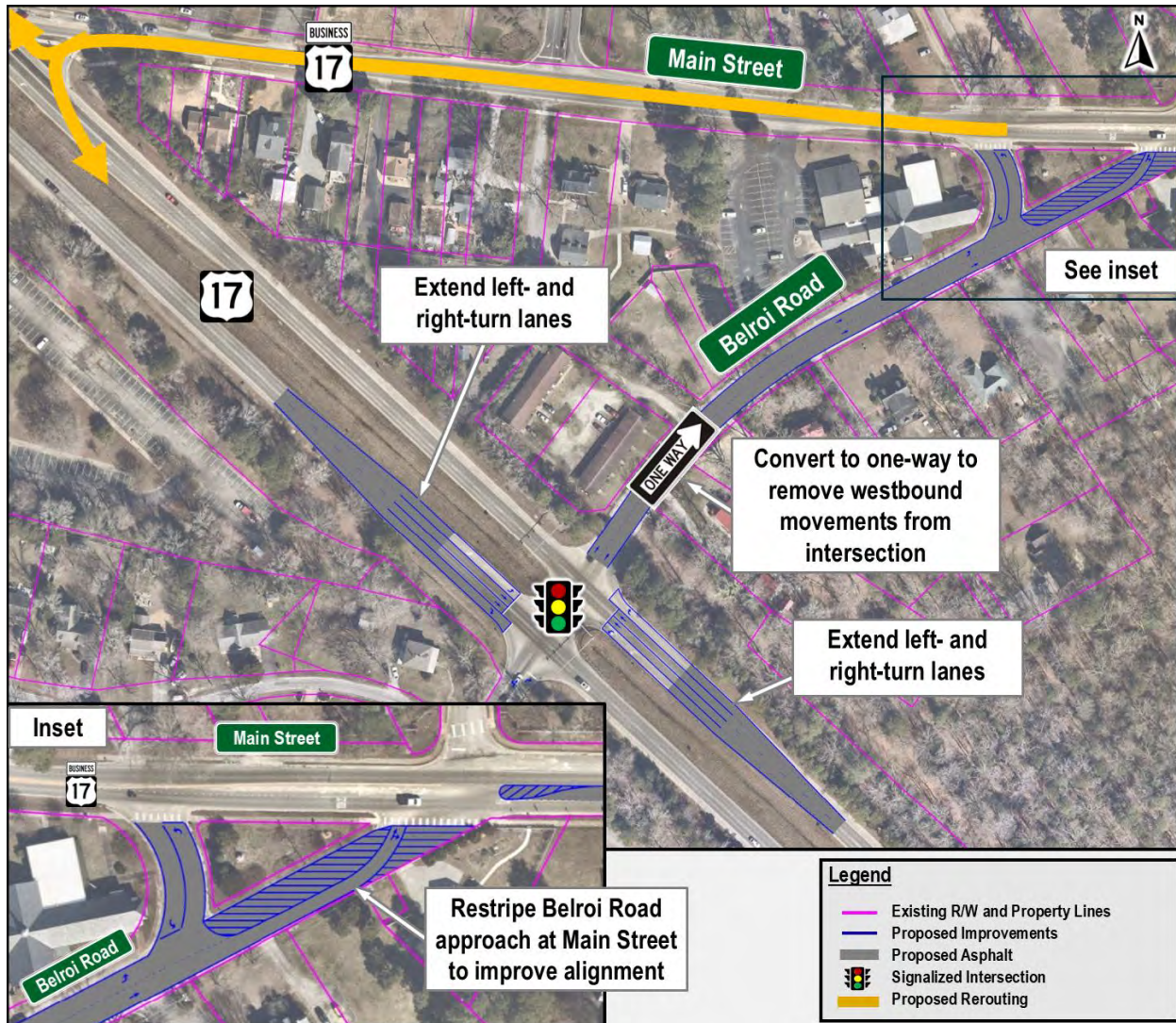


Figure 19: Phase 2 Alternative—Convert Belroi Road to One-Way Eastbound at Belroi Road

Modify Side Streets and Remove Split Phasing

The proposed alternative would construct a new right-turn lane on the eastbound approach and restripe the existing pavement on the westbound approach to provide a dedicated left-turn lane. With the lane reconfiguration on the side streets, the signal phasing would be converted to remove split phasing and allow concurrent left-turn movements followed by concurrent through movements from both sides of Belroi Road. This alternative would also extend the turn lanes on Route 17. **Figure 20** presents a conceptual sketch of the alternative.

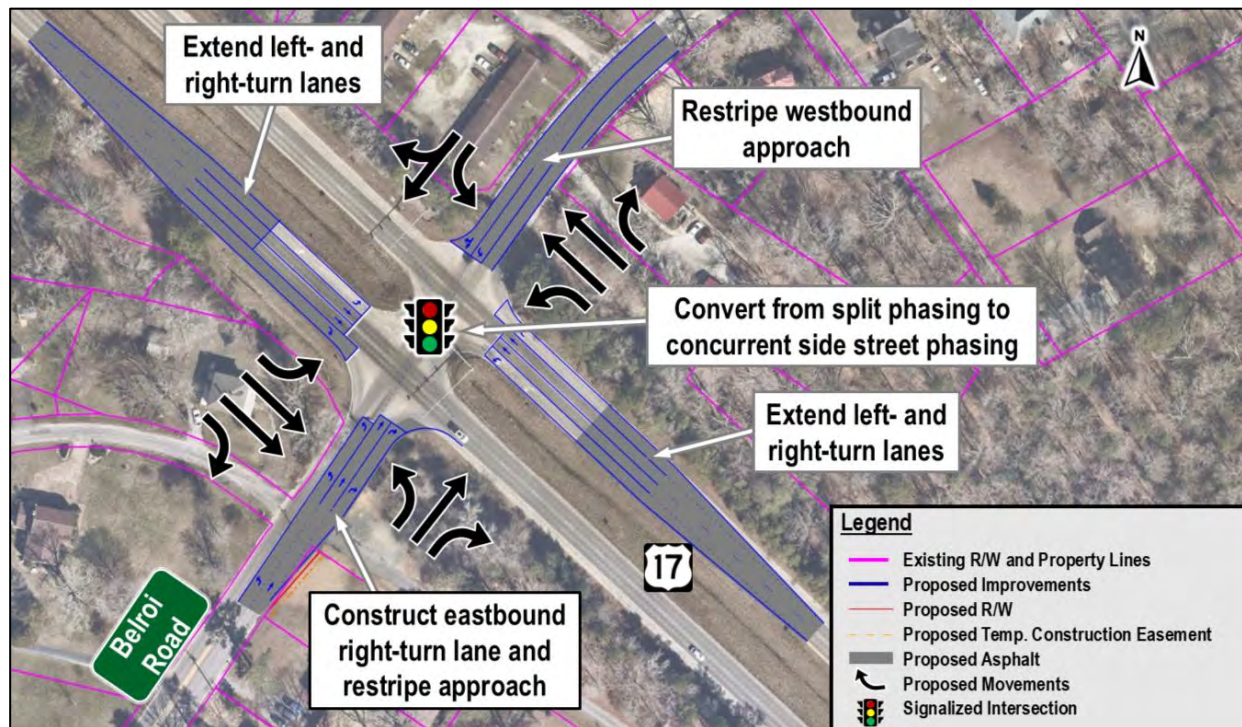


Figure 20: Phase 2 Alternative—Modify Side Streets and Remove Split Phasing at Belroi Road

Create Cul-de-Sac on East Leg of Belroi Road and Convert to Continuous Green-T

The proposed alternative would create a cul-de-sac on the east leg of the intersection to remove the westbound approach from the intersection. All westbound traffic from Belroi Road would be rerouted along Route 17 Business (Main Street) to the Route 17 intersection. An acceleration lane would then be constructed to receive the eastbound left-turn movement, converting the intersection to a signalized Continuous Green-T. This alternative would also extend the turn lanes on Route 17. **Figure 21** presents a conceptual sketch of the alternative.

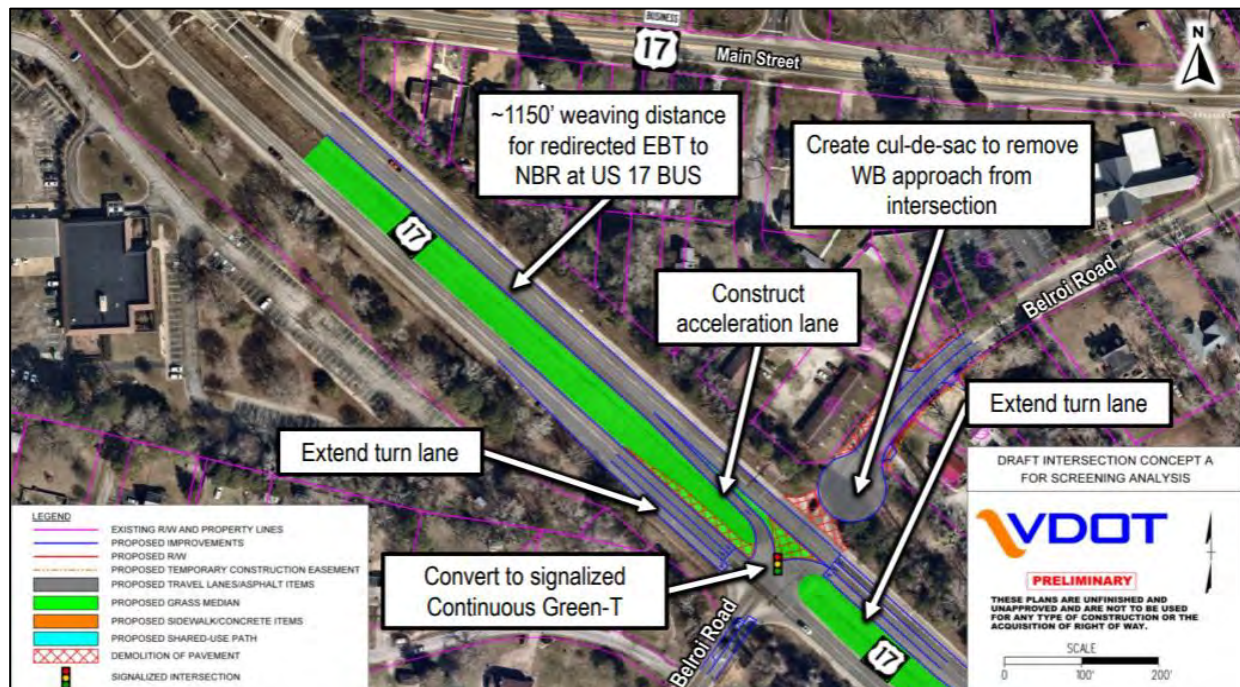


Figure 21: Phase 2 Alternative—Continuous Green-T and Cul de Sac at Belroi Road

During the SWG Meeting #4, Gloucester County indicated that they were not in favor of moving this concept forward for public feedback, due to the less direct route and the additional delay created at the Route 17 and Route 17 Business (Main Street) intersection to serve the additional westbound left-turn volume.

Convert to Thru-Cut

The proposed alternative would convert the intersection to a thru-cut or median U-turn intersection by constructing channelizing islands on the eastbound and westbound approaches of Belroi Road to restrict through movements across Route 17. Eastbound and westbound through movements would primarily be redirected to the Route 17 and Route 17 Business (Main Street) intersection; however, a new median opening would also be constructed along Route 17, south of the Belroi Road intersection, to accommodate U-turn movements. This alternative would also extend the turn lanes on Route 17. **Figure 22** presents a conceptual sketch of the alternative.

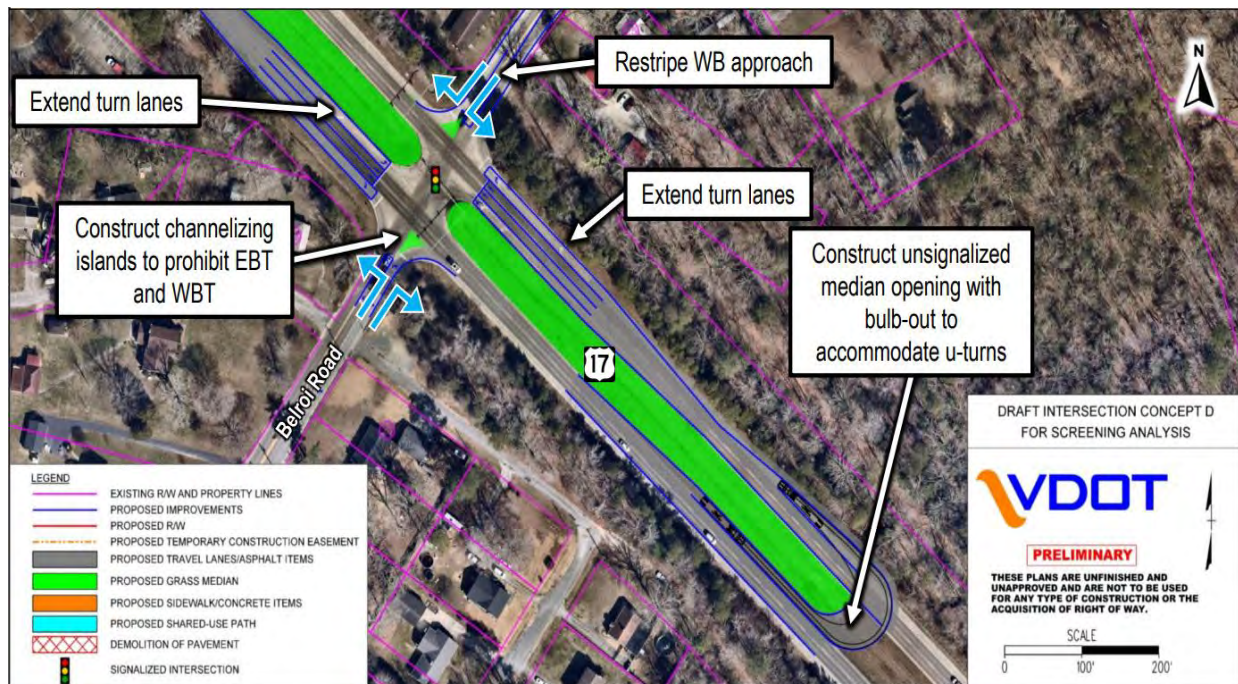


Figure 22: Phase 2 Alternative—Convert to Thru-Cut at Route 17 and Belroi Road

During the SWG Meeting #4, Gloucester County indicated that they were not in favor of moving this concept forward for public feedback, due to similar concerns with the cul-de-sac concept, particularly due to the less direct route and the additional delay created at the Route 17 and Route 17 Business (Main Street) intersection to serve the additional westbound left-turn volume. Gloucester County also expressed concern with the need to reroute school buses destined from the residential area west of Route 17 to Botetourt Elementary School on Route 17 Business (Main Street).

Pedestrian and Bicycle Network Improvements

This concept, shown in **Figure 23**, would construct the following pedestrian and bicycle improvements:

- New sidewalk along the west side of Route 17
- New shared-use path along the east side of Route 17
- New sidewalk along the north side of Route 17 Business (Main Street) to complete an existing gap
- New sidewalk along Belroi Road to provide access from multiple residential neighborhoods to Route 17 Business (Main Street) and the Courthouse area
- New crosswalks with pedestrian signal heads and push buttons at all three signalized intersections along Route 17
- New and enhanced crosswalks along Route 17 Business (Main Street)

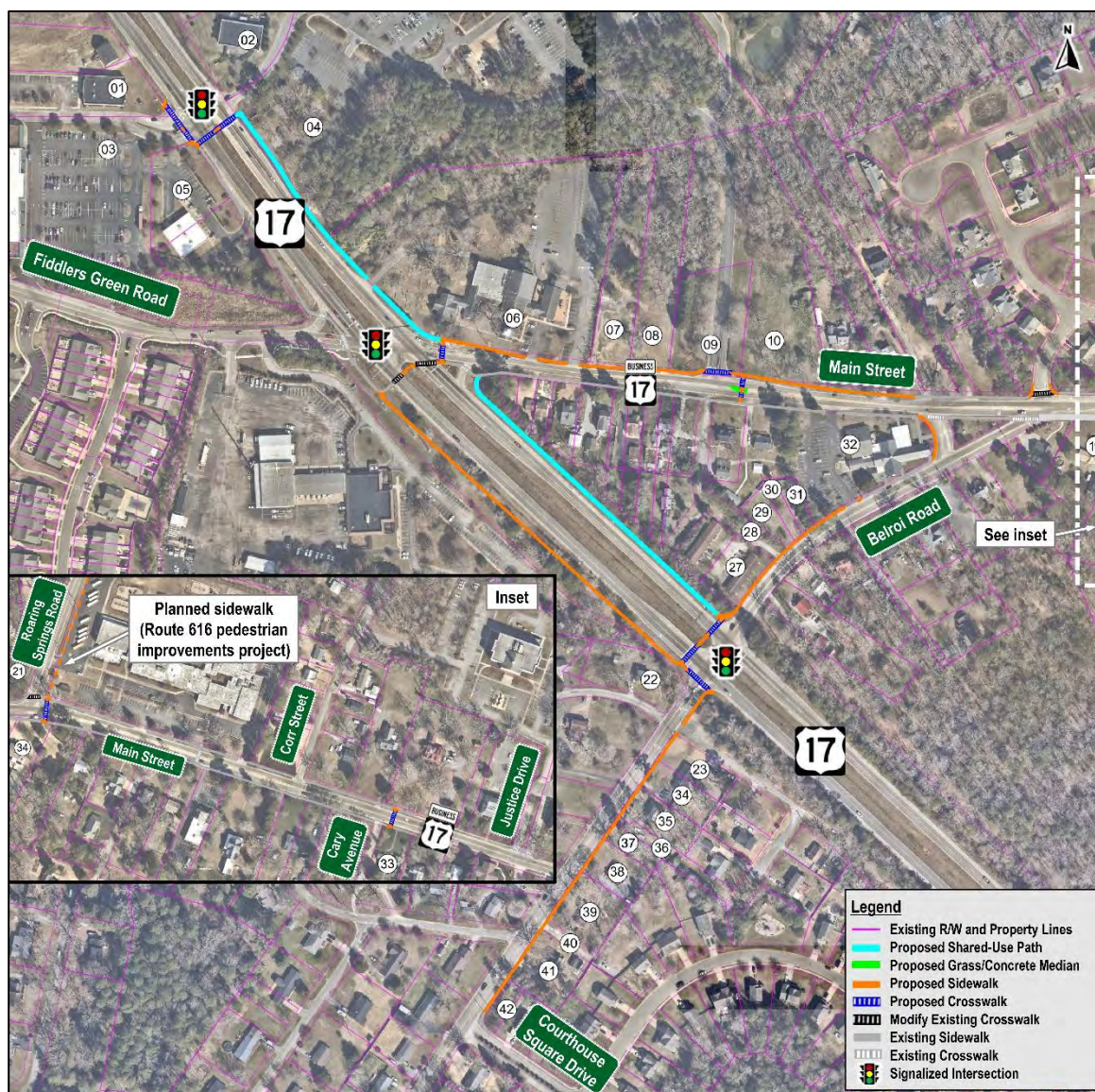


Figure 23: Phase 2 Alternative—Pedestrian and Bicycle Network Improvements

Route 17 Business (Main Street) and Belroi Road

The SWG reviewed and discussed five concepts for the Route 17 Business (Main Street) and Belroi Road intersection: three roundabout concepts with different alignments, an all-way stop control concept with the existing intersection alignment, and an intersection realignment concept with all-way stop control.

Following the completion of SWG Meeting #4, the Gloucester County Board of Supervisors requested to remove the intersection of Route 17 Business (Main Street) and Belroi Road from the study.

As previously noted, the cul-de-sac and thru-cut alternatives at the Route 17 and Belroi Road intersection also were screened out by the SWG. **Table 15** shows the updated Phase 2 alternatives that were carried forward for public outreach based on the discussions from SWG Meeting #4.

Table 15: Phase 2 Alternatives for Public Outreach

Alternative	Description
Route 17 and Hospital Drive / McFadden Way	
Restripe and Remove Split Phasing	Restripe the eastbound approach and convert from split phasing to concurrent, permissive only phasing. In addition, extend the southbound left-turn lane, install emergency vehicle preemption, and provide signalized pedestrian crossings on the south and west legs.
Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road	
Consolidate Signal Phasing	Redirect westbound left-turn movements to the Route 17 and Belroi Road intersection. Restripe side street approaches and convert from split phasing to concurrent side street phasing. Enhance crosswalk markings. Extend southbound left-turn lane.
Route 17 and Belroi Road	
Convert East Leg of Belroi Road to One-Way Eastbound	Convert the east leg of Belroi Road to one-way eastbound. Redirect westbound movements to the Route 17 and Route 17 Business (Main Street) intersection. Extend the turn-lanes on Route 17. Restripe the Belroi Road approach at Route 17 Business (Main Street) to improve alignment and sight distance.
Modify Side Streets and Remove Split Phasing	Construct eastbound right-turn lane, then restripe minor approaches to convert from split phasing to concurrent side street phasing. Extend the turn lanes on Route 17.
Pedestrian and Bicycle Network Improvements	Install shared use path along east side of Route 17 and sidewalk along west side of Route 17. Provide signalized pedestrian crossings at all three signalized intersections. Fill in sidewalk gaps along north side of Main Street and provide additional crosswalks along Main Street. Provide sidewalks along north side of Belroi Road.

2.3 Traffic Operations and Safety Results

The study team conducted a screening-level traffic operations analysis and safety analysis. 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.

Anticipated 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 proposed alternatives. Control delay (seconds per vehicle) and 95th percentile queue length (feet) were used as measures of effectiveness. Experienced Travel Time (ETT) was calculated following methodologies provided in the HCM 6th Edition for innovative intersection designs that involved diverting traffic movements to other intersections. The results were entered into the iCAP Stage 2 Input Worksheet to perform the Stage 2 operational analysis. **Table 16** summarizes the iCAP Stage 2 traffic operations results.

Table 16: Virginia iCAP Stage 2 Peak Hour Traffic Operations Results

Intersection	Alternative	Intersection Delay	Change in Delay
AM Peak Hour			
Hospital Drive	Base Condition	16.2	
	Restripe and Remove Split Phasing	13.2	-3.0
Main Street	Base Condition	28.1	
	Consolidate Signal Phases	25.8	-2.3
Belroi Road	Base Condition	24.1	
	Convert Belroi Road to One-Way Eastbound	13.4	-10.7
	Modify Side Streets and Remove Split Phasing	20.2	-3.9
PM Peak Hour			
Hospital Drive	Base Condition	19.5	
	Restripe and Remove Split Phasing	13.5	-6.0
Main Street	Base Condition	28.6	
	Consolidate Signal Phases	21.3	-7.3
Belroi Road	Base Condition	26.2	
	Convert Belroi Road to One-Way Eastbound	13.3	-12.9
	Modify Side Streets and Remove Split Phasing	21.3	-4.9

Anticipated Crash Reduction for Alternatives

The study team reviewed crash modification factors (CMFs) to determine the potential safety benefits for each alternative. CMFs are used to estimate the expected 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 Planning Level CMF List from Round 6, the Virginia State Preferred CMF List, and the CMF Clearinghouse website. The CMFs selected represent the most applicable treatments for each location based on SMART SCALE and Virginia guidance and were applied to fatal and injury (F+I) crashes within the influence area of each intersection, as shown in **Table 17**.

At the Route 17 intersections with Hospital Drive / McFadden Way and Route 17 Business (Main Street) / Fiddlers Green Road, the proposed alternatives' annual crash reduction was determined by using two CMFs. The first is the CMF for retiming or optimizing signals, and the second is for extending a turn lane. Retiming or optimizing a signal has a CMF of 0.958 and applies to all crash types. Extending a turn lane has a CMF of 0.85 and applies to all crash types. These CMFs were also used to determine the annual crash reduction for the alternative to modify side streets and remove split phasing at the Route 17 and Belroi Road intersection.

At the Route 17 and Belroi Road intersection, the annual crash reduction for the alternative to convert Belroi Road to one-way eastbound was determined by using one CMF. The CMF to convert from two-way to one-way traffic is 0.53 and applies to all crash types.

Table 17: CMF and Crash Reduction Summary

Alternative	F+I Crash CMF	Annual Crash Reduction (F+I)
Restripe and Remove Split Phasing at Route 17 and Hospital Drive / McFadden Way	0.81	0.40
Consolidate Signal Phases at Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road	0.81	0.50
Convert Belroi Road to One-Way Eastbound at Route 17 and Belroi Road	0.53	0.66
Modify Side Streets and Remove Split Phasing at Route 17 and Belroi Road	0.81	0.26

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 survey provided the study team with an understanding of how the public viewed each alternative before selecting any preferred alternative. In total, 121 respondents participated in the survey and submitted a total of 33 written comments.

Figure 24 through **Figure 27** summarize the average ranking for each Phase 2 alternative presented in the survey. 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 more traditional improvements like modifications to

signal phasing and turn lane extensions. Respondents were generally opposed to rerouting vehicles to other intersections.

The study team also held an in-person public information meeting on November 13, 2025, from 5:00–7:00 PM at the Gloucester County Main Library to collect additional general feedback and input on the potential improvements. In total, approximately 40 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 24 summarizes the average ranking for each alternative presented in the survey at the intersection of Route 17 and Hospital Drive / McFadden Way. The alternative to restripe and modify signal phasing received an average rating of 3.6. Of the 116 respondents, 65% were in support of this concept.

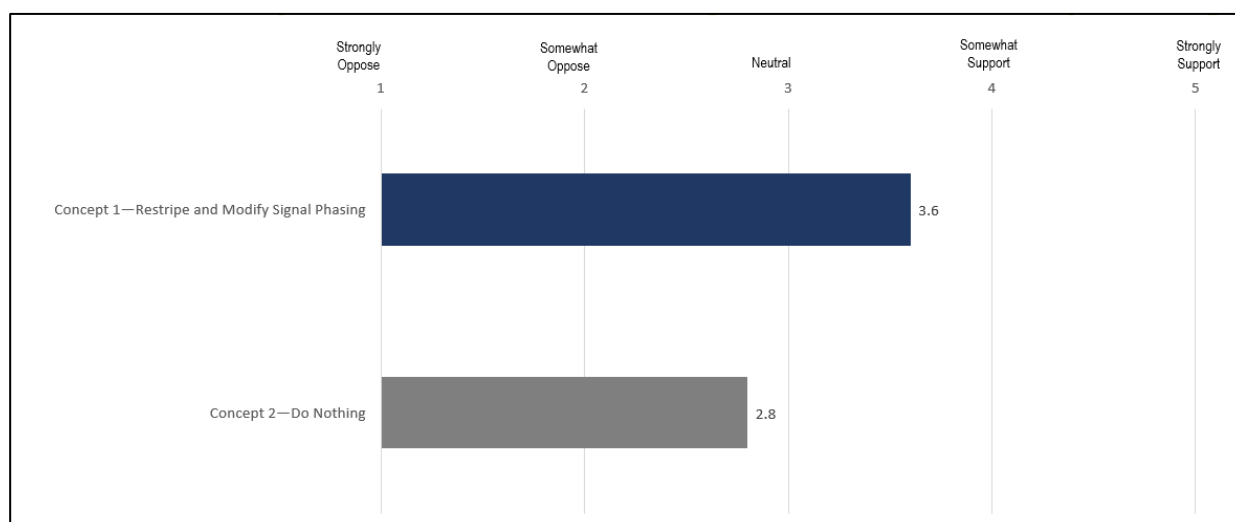


Figure 24: Public Engagement—Average Rating of Alternatives at Hospital Drive / McFadden Way

As shown in **Figure 25**, the survey respondents preferred doing nothing at the intersection of Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road over the alternative to consolidate signal phases, which received an average rating of 2.7. Of the 98 respondents, 41% were in support of this concept.

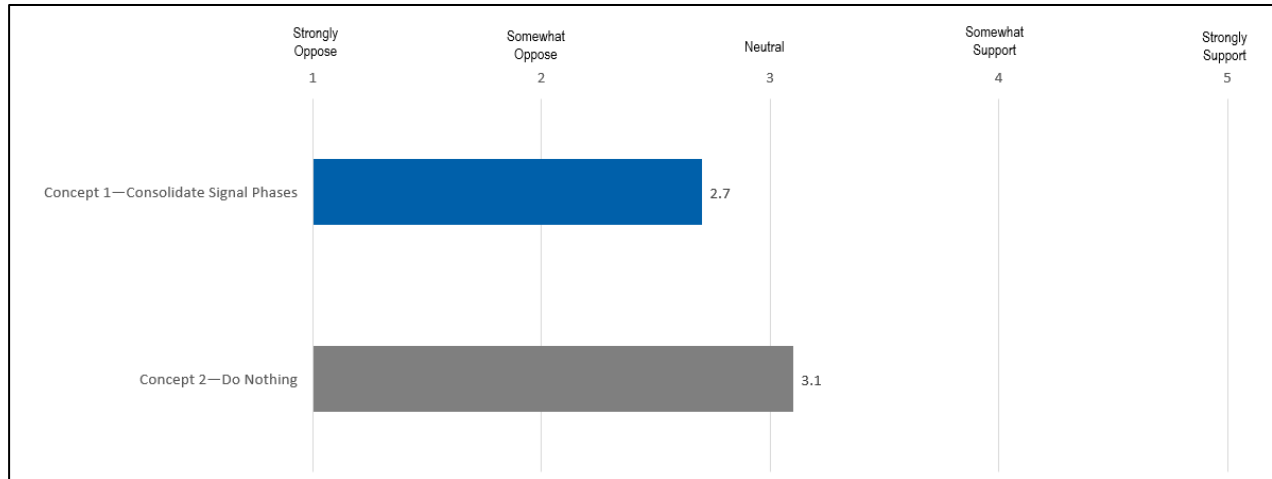


Figure 25: Public Engagement—Average Rating of Alternatives at Route 17 Business (Main Street) / Fiddlers Green Road

As shown in **Figure 26**, the survey respondents preferred the alternative at the intersection of Route 17 and Belroi Road to modify side streets and remove split phasing, which received an average rating of 3.6. Of the 91 respondents, 63% were in support of this concept. This alternative was rated higher than doing nothing, while the respondents preferred the do-nothing alternative over the alternative to convert Belroi Road to one-way eastbound between Route 17 and Route 17 Business (Main Street).

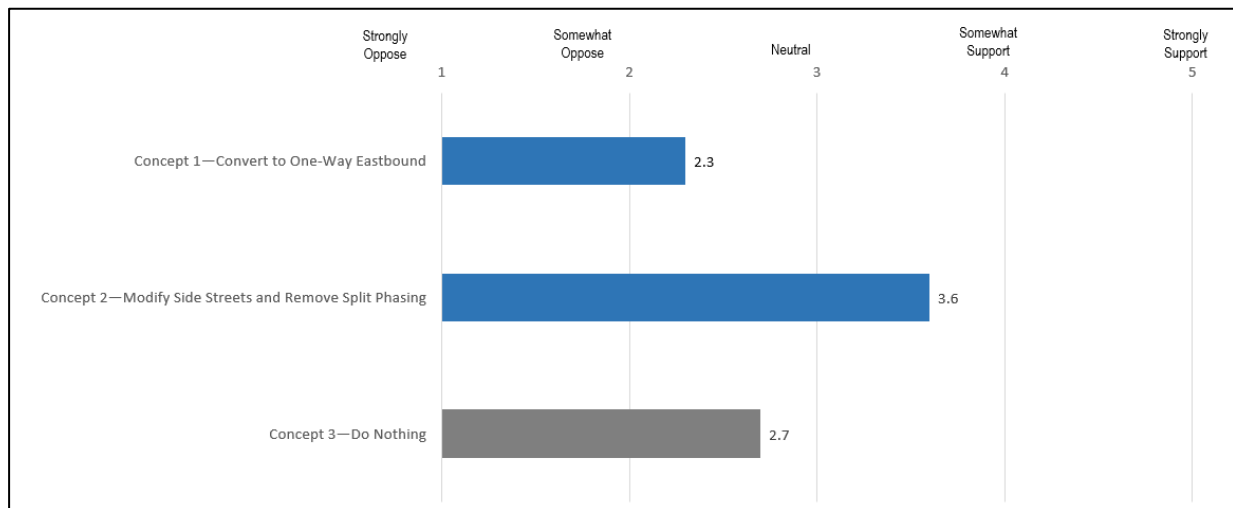


Figure 26: Public Engagement—Average Ratings of Alternatives at Belroi Road

Figure 27 summarizes the average ranking for each pedestrian and bicycle improvement presented in the survey. Overall, the pedestrian and bicycle network improvements concept received an average rating of 3.5, with individual improvements ranging from 3.4 to 3.8. The highest rated improvement was installing new sidewalk on the north side of Main Street, which received an average rating of 3.8.

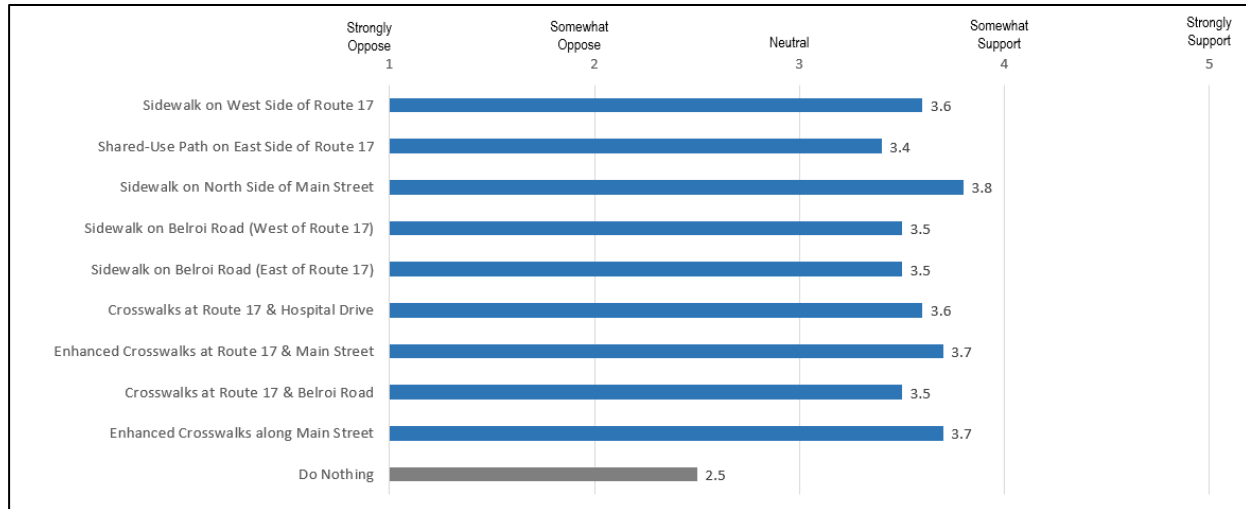


Figure 27: Public Engagement—Average Ratings of Pedestrian and Bicycle Network Improvements

The study team incorporated input from the survey to finalize the preferred alternative. Rankings from the PublicInput survey were generally in line with the preferences of the study work group. Detailed survey results are shown in **Appendix E**.

2.5 Preferred Alternative Selection

The Phase 2 Public Engagement Results, Preferred Alternative Selection, and Phase 3 Scoping Meeting (SWG Meeting #5) was held on December 17, 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 **Chapter 1**. 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 preferred alternative also aligns with key SMART SCALE factor areas by improving safety and operations, enhancing multimodal accessibility, and supporting planned development within the study area, consistent with current SMART SCALE evaluation criteria.

Table 18 summarizes the traffic operations and safety analysis results, a qualitative assessment of impacts to pedestrian and bike access, construction phase cost estimates, iCAP Stage 2 scores, and average PublicInput alternative ratings for each of the alternatives discussed at the three signalized intersections along Route 17. **Table 19** provides the iCAP Stage 2 results for the two alternatives at the intersection of Route 17 and Belroi Road.

Table 18: Alternative Selection Summary—PM Peak Hour

Intersection	Alternative	Change In Delay from No-Build (+/- sec/veh)	Annual F+I Crash Reduction	Pedestrian and Bike	iCAP Stage 2 Score (Out of 10)	PublicInput Rating (Out of 5)
Route 17 and McFadden Way / Hospital Drive	Restripe and Modify Signal Phasing	-5.6	0.40	Same as conventional intersection	9	3.6
Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road	Extend Southbound Left-Turn Lane and Consolidate Signal Phases	-7.3	0.50	Same as conventional intersection	9	2.7
Route 17 and Belroi Road	Convert Belroi Road to One-Way Eastbound	-12.9	0.66	Same as conventional intersection	8.8	2.3
Route 17 and Belroi Road	Modify Side Streets and Remove Split Phasing	-4.9	0.26	Same as conventional intersection	5.7	3.6

Table 19: Virginia iCAP Stage 2 Results—Route 17 and Belroi Road

Alternative	Traffic Operations Metric			Pedestrian Metric Score	Safety Metric		Stage 2	Total Stage 2 Score
	MOE 1 Score	MOE 2 Score	Total Score		Annual F+I Crash Reduction	Score	Score	
Modify Side Streets, Remove Split Phasing	0.5		0.5	0.5	0.26	0.4	1.0	5.7 out of 10
Convert Belroi Road to One-Way Eastbound	1.0		1.0	0.5	0.66	1.0	0.9	8.8 out of 10
Metric Weighting	3			2	3		2	

The SWG selected Modify Side Streets and Remove Split Phasing as the preferred alternative for the Route 17 and Belroi Road intersection. The SWG discussed potential concerns with the One-Way Eastbound alternative and the additional traffic it would add to the Route 17 and Route 17 Business (Main Street) intersection. Following the meeting, Gloucester County decided to amend the preferred alternative at the Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road intersection to include only the extension of the southbound left-turn lane and to maintain existing lanes at the intersection.

During SWG Meeting #5, the study team also reviewed the Pedestrian and Bicycle Network Improvements concept and initially recommended a sidewalk “loop” around the triangle connecting Route 17, Route 17 Business (Main Street), and Belroi Road be included in the preferred alternative. However, the SWG was concerned that the total cost of the improvements would result in a lower benefit-to-cost ratio based on the SMART SCALE scoring criteria. The SWG agreed to shift all pedestrian and bicycle network improvements to the long-term investment vision with the exception of the following:

- Short-Term Recommendations: Enhanced crosswalks at the Route 17 and Route 17 Business (Main Street) / Fiddlers Green Road intersection and along Route 17 Business (Main Street)
- Mid-Term Investment Strategy: New signalized pedestrian crossings at the Route 17 and Hospital Drive / McFadden Way intersection (these are already included in the intersection preferred alternative)

A summary of all preferred alternatives selected to move forward to Phase 3 is shown in **Table 20**. Although not specifically discussed during SWG Meeting #5 several additional short-term recommendations were previously discussed in Phase 1 and are summarized in the table as well. **Figure 28** shows the preferred alternative concept sketch of the combined intersection improvements along the study corridor. The meeting materials can be found in **Appendix E**.

Table 20: Preferred Alternative Selection for FR-25-02

Improvement Concept	Short-Term Recommendation	Mid-Term Investment Strategy (Preferred Alternative)	Long-Term Investment Vision
Route 17 Signalized Intersection Improvements			
Route 17 at Hospital Drive / McFadden Way			
Restripe and Modify Signal Phasing		✓	
Install Emergency Vehicle Preemption	✓		
Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road			
Consolidate Signal Phases			
Extend Southbound Left-Turn Lane		✓	
Install "No Turn on Red" Signs on Side Street Approaches	✓		
Route 17 at Belroi Road			
Modify Side Streets and Remove Split Phasing		✓	
Adjust Speed Limit Transition and Install Signal Ahead Signs	✓		
Pedestrian and Bicycle Network Improvements			
Sidewalk on West Side of Route 17			✓
Shared-Use Path on East Side of Route 17			✓
Sidewalk on North Side of Main Street			✓
Sidewalk on Belroi Road (West of Route 17)			✓
Sidewalk on Belroi Road (East of Route 17)			✓
Crosswalks at Route 17 and Hospital Drive		✓	
Enhanced Crosswalks at Route 17 and Main Street	✓		
Crosswalks at Route 17 and Belroi Road			✓
Enhanced Crosswalks along Main Street	✓		



Figure 28: Combined Preferred Alternatives Along Route 17

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 chose the intersection improvements at the Route 17 intersections with Hospital Drive / McFadden Way, Route 17 Business (Main Street) / Fiddlers Green Road, and Belroi Road as the preferred alternative. The preferred alternative concept has the following components:

Route 17 at Hospital Drive / McFadden Way:

- Extend southbound left-turn lane
- Restripe eastbound approach
- Remove existing signal poles and guardrail in median, modify traffic signal, and convert signal from split phasing to concurrent side street phasing
- Install pedestrian crossings with curb ramps, pedestrian signal heads, push buttons, lighting, and median pedestrian refuges across south leg of Route 17 and west leg of McFadden Way

Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road:

- Extend southbound left-turn lane

Route 17 at Belroi Road:

- Extend southbound and northbound left- and right-turn lanes
- Restripe westbound approach
- Construct eastbound right-turn lane and restripe eastbound approach
- Remove existing signal pole and guardrail in median, modify traffic signal, and convert signal from split phasing to concurrent side street phasing with flashing yellow arrow (FYA) indications for eastbound and westbound left-turn movements

3.1 Preferred Alternative Safety and Operational Analysis

With the selection of a preferred alternative, crash modification factors (CMFs) were revisited for accuracy and applicability. **Table 17** in **Section 2.3** contains the CMFs for each concept initially proposed in Phase 2 that are anticipated to have the most significant reduction of fatal and serious injury crashes. The preferred alternative will utilize the CMFs for retiming or optimizing signals, as well as extending turn lanes. Lane restriping and modifying the side street signal phasing is anticipated to have an annual reduction of 0.4 crashes at the Hospital Drive / McFadden Way intersection and 0.26 crashes at the Belroi Road intersection. By extending the turn lanes, annual crashes are anticipated to be reduced by 0.3 at the Hospital Drive / McFadden Way intersection, 0.4 at the intersection with Route 17 Business (Main Street) / Fiddlers Green Road, and by 0.2 at the intersection with Belroi Road.

In addition, the study team conducted Synchro analyses to refine the geometry of the preferred alternative and quantify the anticipated future traffic operations. The Build Synchro model includes the proposed improvements identified as the preferred alternative. 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 21 through **Table 24** summarize the control delay and 95th percentile queue lengths measures of effectiveness and compare the Build conditions results against the No-Build conditions results. Results for the unsignalized intersections along Main Street were omitted from these tables because no changes are proposed at these intersections with the preferred alternative. Results for these intersections in future conditions can be found in **Table 11** and **Table 12**.

During both the AM and PM peak hours, the overall delay at the signalized intersections was comparable to No-Build conditions, with the overall LOS being maintained between scenarios. Overall intersection delay decreased between 3-6 seconds at the Route 17 intersections with Hospital Drive / McFadden Way and Belroi Road with the preferred alternative improvements. The Route 17 Business (Main Street) / Fiddlers Green Road intersection experienced a minor increase in overall intersection delay by 1-2 seconds due to offset adjustments along the corridor. At the intersection of Route 17 and Hospital Drive / McFadden Way, the westbound approach delay decreased by 4 seconds during the PM peak hour but increased by 4 seconds during the AM peak hour, tipping it just over the threshold for LOS E. The northbound and southbound approach LOS improved during the AM peak hour at the Route 17 and Belroi Road intersection.

No improvements are proposed at the unsignalized intersections along Route 17 Business (Main Street) as part of the preferred alternative. Therefore, there are no changes to delay, LOS, or queuing anticipated between the No-Build and Build scenarios.

Queue results for both the AM and peak hours remain comparable to the No-Build conditions for the majority of study area intersections. Queue results at the Route 17 and Belroi Road intersection showed significant improvements in Build conditions compared to No-Build conditions on the eastbound and westbound approaches as a result of the proposed turn lanes on each approach. All modeled 95th percentile queue lengths will be accommodated within the proposed storage lane lengths.

The preferred alternative traffic operational results were presented at the Concept Refinement Meeting (SWG Meeting #8), which was combined with the Final Concept, Cost, and Risk Meeting (SWG Meeting #9) and was held on June 11, 2026. **Appendix F** includes the full Synchro results from the analysis and meeting materials.

Table 21: 2045 Preferred Alternative AM Peak Hour Control Delay and LOS

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
1	Route 17 & Hospital Dr / McFadden Way		McFadden Way				Hospital Dr				Route 17				Route 17				Intersection	
		Left	50.2	D	47.6	D	52.9	D	56.5	E	39.5	D	52.1	D	51.7	D	D	Delay	Delay	
		Through			45.5	D					5.0	B	3.2	B	13.1	B	7.0	A	16.2	13.2
		Right	47.8	D							0.4	A	0.4	A	0.0	A	0.0	A	LOS	LOS
		Approach	48.7	D	46.3	D	52.9	D	56.5	E	6.9	A	6.3	A	16.0	B	10.6	B	B	B
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd		Fiddlers Green Rd				Main St				Route 17				Route 17				Intersection	
		Left	50.9	D	50.9	D	51.3	D	51.3	D	66.9	E	70.0	E	72.3	E	64.4	E	Delay	Delay
		Through									11.4	B	13.1	B	15.1	B	19.0	B	28.1	29.3
		Right	35.1	D	35.1	D	32.4	C	32.4	C					20.3	C	20.3	C	LOS	LOS
		Approach	45.1	D	45.1	D	38.7	D	38.7	D	20.6	C	22.5	C	27.7	C	29.0	C	C	C
3	Route 17 & Belroi Rd		Belroi Rd				Belroi Rd				Route 17				Route 17				Intersection	
		Left	49.6	D	33.6	C	51.2	D	36.5	D	51.9	D	51.6	D	40.1	D	39.8	D	Delay	Delay
		Through			48.8	D					39.3	D	20.5	C	17.1	B	10.4	B	8.8	A
		Right	42.3	D	44.5	D	0.0	A			17.9	B	15.0	B	19.4	B	16.4	B	LOS	LOS
		Approach	46.8	D	44.1	D	51.2	D	37.2	D	22.6	C	19.5	B	11.3	B	9.6	A	C	C

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 22: 2045 Preferred Alternative PM Peak Hour Control Delay and LOS

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
1	Route 17 & Hospital Dr / McFadden Way		McFadden Way				Hospital Dr				Route 17				Route 17				Intersection	
		Left	52.4	D	52.1	D	52.5	D	48.3	D	21.3	C	30.2	C	56.2	E	56.2	E	Delay	Delay
		Through	45.6	D	42.9	D					7.0	A	2.2	A	23.3	C	13.4	B	19.5	14.0
		Right					6.2	A	7.1	A	0.1	A	0.1	A	LOS	LOS				
		Approach	49.4	D	48.0	D	52.5	D	48.3	D	7.8	A	4.1	A	22.2	C	13.5	B	B	B
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd		Fiddlers Green Rd				Main St				Route 17				Route 17				Intersection	
		Left	54.4	D	54.4	D	54.8	D	54.8	D	81.1	F	78.8	E	75.9	E	76.2	E	Delay	Delay
		Through	38.6	D	38.6	D	32.5	C	32.5	C	13.3	B	18.6	B	14.9	B	16.2	B	28.6	30.8
		Right									20.6	C	20.6	C	LOS	LOS				
		Approach	46.0	D	46.0	D	40.8	D	40.8	D	21.1	C	25.5	C	28.7	C	29.9	C	C	C
3	Route 17 & Belroi Rd		Belroi Rd				Belroi Rd				Route 17				Route 17				Intersection	
		Left	53.4	D	36.1	D	50.3	D	38.7	D	54.0	D	52.3	D	49.1	D	47.1	D	Delay	Delay
		Through			49.9	D			43.9	D	22.4	C	17.3	B	14.9	B	12.0	B	26.2	22.2
		Right	45.6	D	47.0	D	38.9	D			18.0	B	14.0	B	9.1	A	19.2	B	LOS	LOS
		Approach	50.3	D	45.1	D	50.0	D	40.9	D	25.2	C	20.6	C	14.5	B	13.1	B	C	C

- Denotes the intersection is stop controlled and no overall 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 shared with through movement

Table 23: 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
1	Route 17 & Hospital Dr / McFadden Way			McFadden Way		Hospital Dr		Route 17		Route 17	
		Signalized	Left	47	43	99	98	63	66	89	89
			Through		35			49	40	225	164
			Right	0				0	0	0	0
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd			Fiddlers Green Rd		Main St		Route 17		Route 17	
		Signalized	Left	80	80	92	92	#140	#140	#241	#236
			Through					18	19	80	116
			Right	0	0	28	28			m0	0
3	Route 17 & Belroi Rd			Belroi Rd		Belroi Rd		Route 17		Route 17	
		Signalized	Left	143	43	205	115	74	74	m9	m10
			Through		106	60	207	203	66	63	
			Right	0	0		0	0	0	0	

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

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

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

Table 24: 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
1	Route 17 & Hospital Dr / McFadden Way	Signalized	Left Through Right	McFadden Way		Hospital Dr		Route 17		Route 17	
				133	126	124	120	m55	m82	47	47
				0	43			87	46	293	233
				0	43			m0	m0	0	0
2	Route 17 & Route 17 BUS (Main St) / Fiddlers Green Rd	Signalized	Left Through Right	Fiddlers Green Rd		Main St		Route 17		Route 17	
				89	89	150	150	#148	#150	#289	#288
				19	19	36	36	24	36	118	94
				19	19	36	36	24	36	m0	m0
3	Route 17 & Belroi Rd	Signalized	Left Through Right	Belroi Rd		Belroi Rd		Route 17		Route 17	
				144	55	#284	128	149	144	m7	m9
				0	93		120	330	322	85	83
				0	0			0	44	12	0

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

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

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

3.2 Conceptual Sketches 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 29**, **Figure 30**, and **Figure 31** present the preferred alternative conceptual sketches. Gloucester County has elected to submit the preferred alternative for SMART SCALE funding as two separate applications—one for the proposed improvements at the intersection of Route 17 and Hospital Drive / McFadden Way and one for the combined proposed improvements at the Route 17 intersections with Route 17 Business (Main Street) / Fiddlers Green Road and Belroi Road. Cost estimates and schedule estimates below are therefore separated by application.

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 budgets, in FY2026 dollars, as shown in **Table 25**. Detailed cost estimates are included in **Appendix F**.

Table 25: FY2026 Preferred Alternative Cost Estimate: Route 17 at Hospital Drive / McFadden Way

Phase Description	Cost Estimate (FY2026)
Preliminary Engineering	\$749,900
Right-of-Way and Utility Relocation	\$1,059,000
Construction	\$3,332,600
Total Project Budget	\$5,141,500

Table 26: FY2026 Preferred Alternative Cost Estimate: Route 17 at Main Street and Belroi Road

Phase Description	Cost Estimate (FY2026)
Preliminary Engineering	\$1,118,200
Right-of-Way and Utility Relocation	\$640,500
Construction	\$4,970,000
Total Project Budget	\$6,728,700

PREFERRED ALTERNATIVE

RT 17 (GEORGE WASHINGTON MEMORIAL HWY) AT HOSPITAL DR
07/09/2026

Parcel	Temporary Construction Easement (SF)	ROW Take (SF)	Permanent Utility Easement (SF)
1	0	0	1960
2	650	752	2828
3	1062	2364	0
4	770	407	3235
5	0	0	321
6	230	1150	0
7	204	808	0

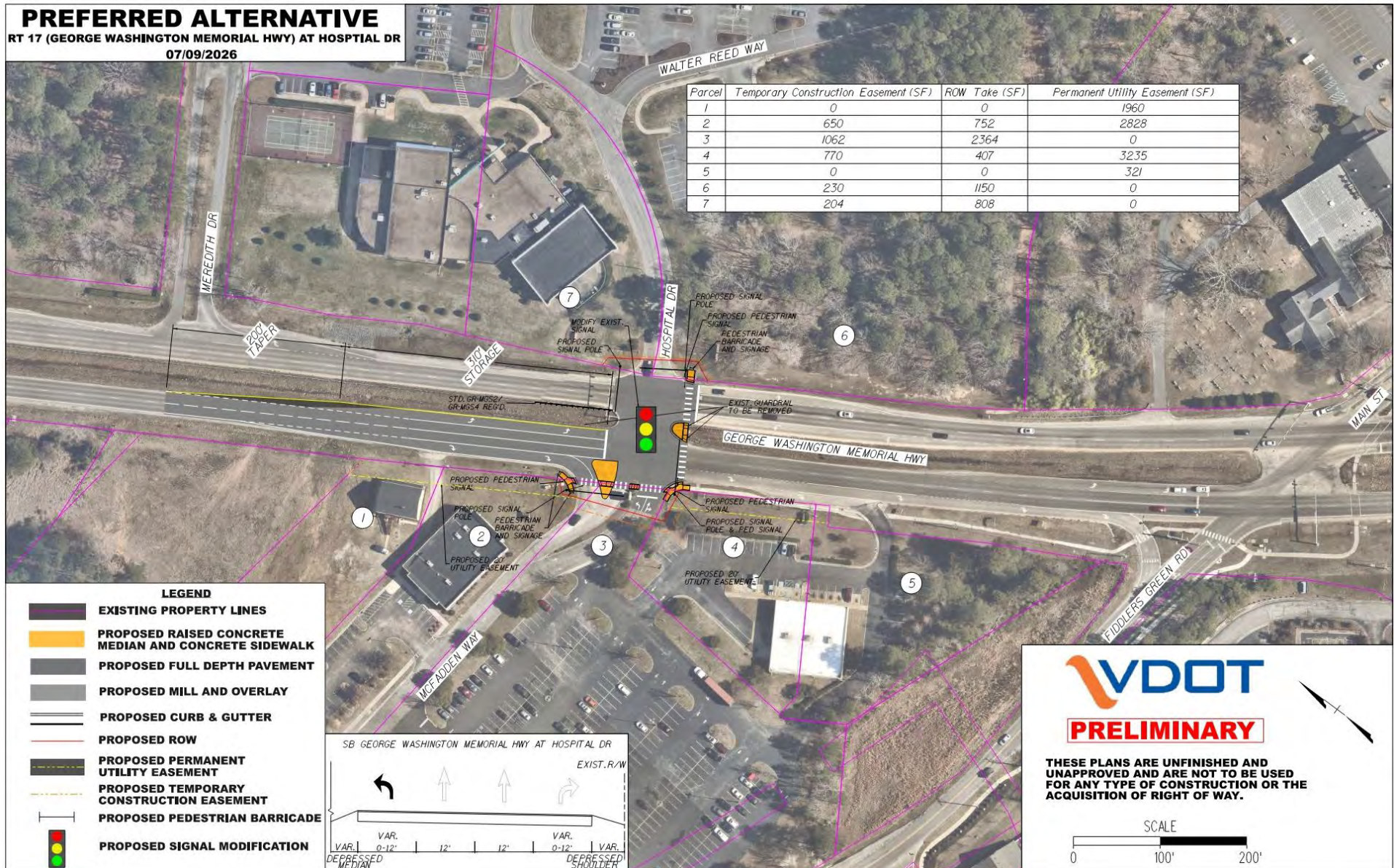


Figure 29: Preferred Alternative Conceptual Sketch: Route 17 at Hospital Drive / McFadden Way

PREFERRED ALTERNATIVE
RT 17 (GEORGE WASHINGTON MEMORIAL HWY) AT MAIN ST
07/09/2026

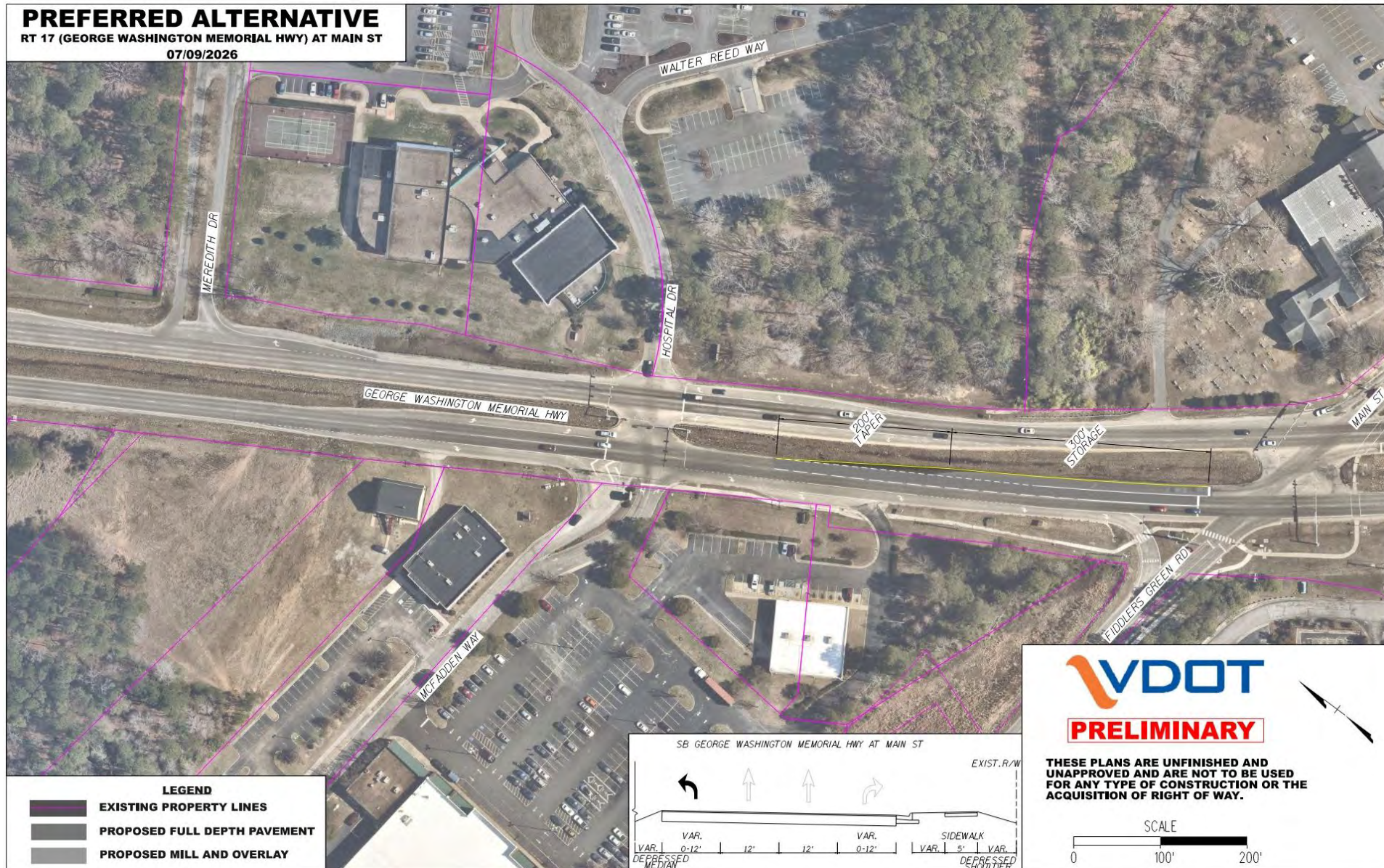


Figure 30: Preferred Alternative Conceptual Sketch: Route 17 at Route 17 Business (Main Street) / Fiddlers Green Road

PREFERRED ALTERNATIVE

RT 17 (GEORGE WASHINGTON MEMORIAL HWY) AT BELROI RD

07/09/2026

Parcel	Temporary Construction Easement (SF)	ROW Take (SF)	Permanent Utility Easement (SF)
8	394	299	1282
9	0	0	1600

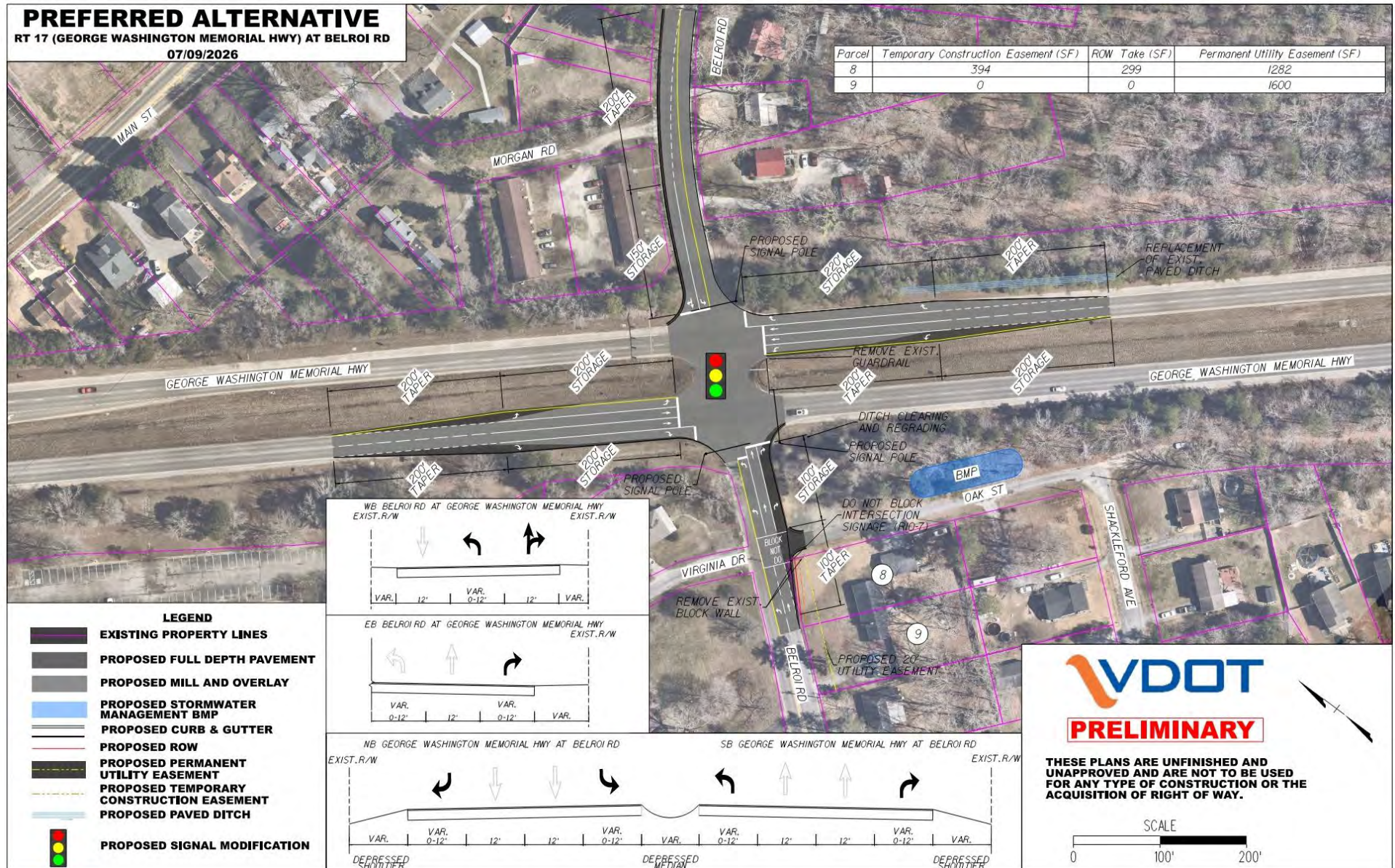


Figure 31: Preferred Alternative Conceptual Sketch: Route 17 at Belroi Road

3.3 Schedule Estimate

A schedule estimate was developed for the preferred alternative. **Table 27** and **Table 28** summarizes the projected timeframes for the preliminary engineering (PE), right-of-way (RW), and construction (CN) phases of both projects.

Table 27: Schedule Estimate: Route 17 at Hospital Drive / McFadden Way

Preferred Concept (all inclusive)	Estimated Schedule by Phase (months)
Preliminary Engineering	30
Right-of-Way and Utility Relocation	12
Construction	27
Total	69

Table 28: Schedule Estimate: Route 17 at Main Street and Belroi Road

Preferred Concept (all inclusive)	Estimated Schedule by Phase (months)
Preliminary Engineering	30
Right-of-Way and Utility Relocation	12
Construction	27
Total	69

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 following is a list of the most notable potential issues that may affect project development, risks faced by the project, and risk mitigation strategies to be applied to manage and minimize risks throughout project development. The preferred alternative safety and traffic operational results were presented at SWG Meeting #9, held on June 11, 2026 to finalize the full package of materials prior to submittal to SMART SCALE. **Appendix F** includes the materials from both meetings, risk analysis matrix with details on the risk assessment, and mitigation strategy.

Risk/Issue: Roadway Design

Potential design waivers/exceptions for existing roadway elements (e.g., cross slope, shoulder width) may be warranted and will be developed as part of the project PE phase. The SS04 Design Waiver/Design Exception Summary Form has been completed for the eastbound right-turn lane taper length along Belroi Road and is included in **Appendix F**. The limits of median guardrail replacement may increase due to age/condition of the existing guardrail beyond the project limits. The guardrail will be evaluated in accordance with IIM-TE-366.4 as part of the project PE phase to determine whether the limits of removal and replacement need to be extended.

Risk/Issue: Right-of-Way

Property acquisition is anticipated from nine (9) parcels (seven (7) along Route 17 and two (2) along Belroi Road) for fee simple right-of-way, permanent utility easements, and temporary construction easements. In addition, the conceptual sketch incorporates a BMP that is located within the existing right-of-way between Route 17 and Oak Street. Additional acquisition may be needed at the intersection of Route 17 and Belroi Road for installation of stormwater management infrastructure beyond what is currently shown. Any additional treatment requirements could be handled via offsite nutrient credits.

Risk/Issue: Environmental

Environmental assessment may identify potential impacts to wetlands and cultural resources within the project area. The PE phase will include the preparation of the NEPA document and associated studies that will reveal any resources requiring avoidance or permitting for impacts.

Risk/Issue: Utilities

There is a potential for unknown subsurface utilities that may conflict with proposed design elements. The PE phase will include test holes to verify utility size, location, and depth, allowing for refinement of the drainage plan or traffic signal improvements to avoid or minimize impacts. Impacts and relocations of overhead power and communication lines have been accounted for in the design and cost estimate. Potential underground utilities along the corridors include additional communications, water, and sanitary sewer which are assumed to be avoided with the design and construction.

Risk/Issue: Geotechnical

The condition of the existing pavement and subgrade is unknown and may require greater reconstruction beyond what is shown. There is potential to discover unsuitable soils or high water table during construction. The geotechnical field investigations and analysis will be performed as part of project PE phase and are accounted for in the cost estimate to identify any areas of concern and to recommend remediation strategies. Allowances for the unknown items and construction contingencies are provided in the CN phase estimate, should unsuitable soils or high groundwater be encountered. Groundwater management measures such as underdrains and drainage layers along with dewatering or design adjustments will be used to control groundwater and preserve subgrade stability. To account for a possible high water table, a special design stormwater BMP also is included in the cost estimate.

Risk/Issue: Drainage

There are constrained areas and flat grades within the existing depressed medians where turn lane lengthening is proposed. These areas may impact ditch flow for adequate water removal. A special design storm sewer and paved ditch solution will be incorporated into the hydraulic design, with these associated costs already accounted for in project cost estimates and contingency. In addition, the existing sedimentation and vegetation in some areas may require additional clearing and excavation. Additional excavation and clearing costs also have already been accounted for in the project cost estimates and contingency.

Risk/Issue: Construction

Because of the high speed and high traffic volume of Route 17, requirements and costs associated with maintenance of traffic will likely pose challenges during the construction phase. Emergency ingress/egress to the hospital may be impacted during lane closures at the Route 17 and Hospital Drive intersection. During the project PE phase, a detailed maintenance of traffic plan will be developed, and coordination with VDOT Fredericksburg District and Gloucester County will be needed to schedule lane closures during appropriate off-peak hours to minimize disruption and maintain safety. In addition, there could be time-of-year restrictions

for clearing trees due to threatened and endangered bat species. Any time-of-year restrictions will be accounted for during the development of the construction schedule, and special provisions will be included in the contract.

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 existing sidewalk infrastructure in the project vicinity, new pedestrian features are proposed for two of the four approaches at the intersection of Route 17 and Hospital Drive / McFadden Way. 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 worksheet.

3.5 Possible Funding Sources

Gloucester County elected to submit the preferred alternative for SMART SCALE funding. They submitted two separate applications—one for the proposed improvements at the intersection of Route 17 and Hospital Drive / McFadden Way and one for the proposed improvements at the Route 17 intersections with Route 17 Business (Main Street) / Fiddlers Green Road and Belroi Road.