

FINAL SUMMARY MEMORANDUM



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TO: CJ Dean, Director of Municipal Services, Town of South Hill, VA
Chad Neese, Planner, Southside PDC

SUBJECT: South Hill Bicycle and Pedestrian Analysis
Summary Memorandum (Memorandum #2)

DATE: May 21, 2024

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Introduction

The purpose of this memorandum is to present the existing conditions observed and provide alternatives for the improvement of two corridors in Mecklenburg County in South Hill, Virginia. Recommended improvements will be prioritized and options for implementation will be assessed based on their alignment with the project's goals. The project goals include improving the overall connectivity of pedestrian and cyclist facilities, providing access to/from commercial businesses, and creating an inclusive roadway corridor that accommodates all users.

The project area includes West Danville Street from Plank Road to South Lunenburg Avenue and North Mecklenburg Avenue from Beaver Creek Drive to Oakley Street, shown in the following figures.

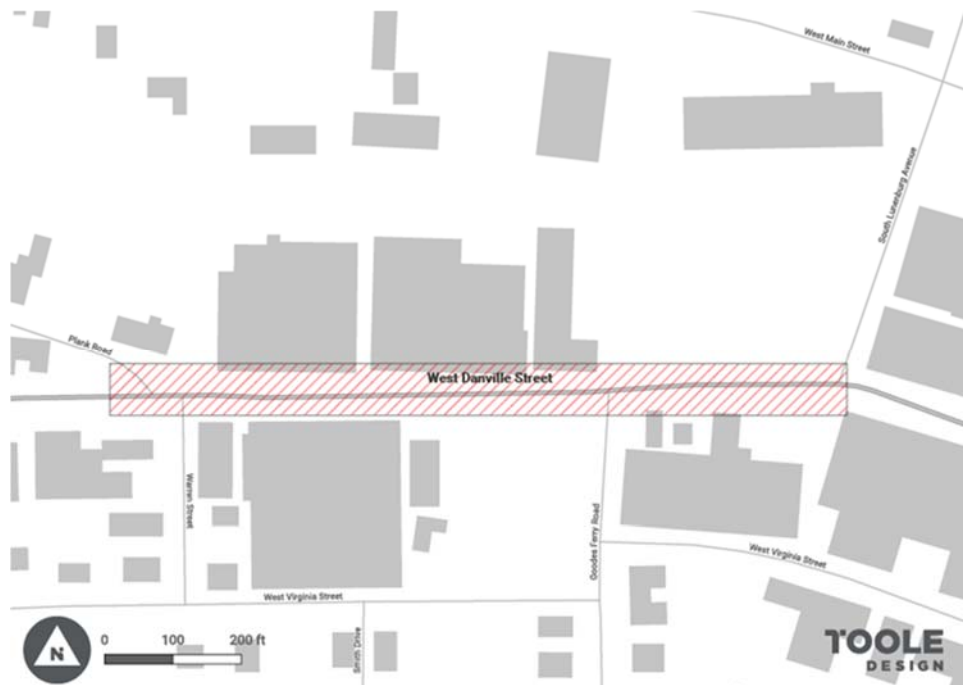


Figure 1: West Danville Street Study Corridor (shown in red)



Figure 2: North Mecklenburg Avenue Study Corridor (shown in red)

After establishing the concerns observed in each corridor as discussed in the existing conditions memorandum, this memorandum will provide suggested alternatives that aim to address the needs for this project. These findings will include:

- **Existing Conditions:** Summary of existing conditions in both corridors and details from the field visit
- **Areas of Concern:** Summary of concern areas in both corridors.
- **Project Goals to Address:** Summary of the major goals to be addressed by this project.
- **Design Guidance:** Summary of the materials referenced to develop recommendations.
- **Recommended Improvements:** Short-term and long-term improvements for each corridor.
- **Evaluation of Options:** Summary of the strengths and weaknesses of each alternative.
- **Next Steps:** Summary of next steps for implementation.

Existing Conditions

A preliminary field visit was conducted on November 8th, 2023, where both corridors were observed in their existing conditions. Details for each area were noted including roadway widths, presence and quality of existing roadway and pedestrian facilities, driver behavior, and pedestrian and bicyclist access to and from various noted and assumed points of interest.

West Danville Street

The West Danville Street Corridor runs southwest from the core of South Hill from its intersection with North Mecklenburg Avenue. The corridor is a 2-lane undivided rural minor arterial roadway. The posted speed limit is 25 mph with no signalized intersections within the project limits, but four stop-controlled side streets which are Plank Road, Warren Street, Goodes Ferry Road, and South Lunenburg Avenue. There is intermittent 8-foot wide on-street parking and varying roadway widths of 15-17 feet wide. The sidewalk varies in width, pinching down to a sub-standard width on the north side in front of the Weed Tiger Garden Center, and widening to 9 feet in other areas. There is a gap in the existing sidewalk on the south side of the road, east of Goodes Ferry Road in front of Jiggets Car Wash. There is one mid-block crossing and two marked intersection crossing locations, with curb ramps present at only some locations. The grade of this section is generally flat and there appears to be minimal natural drainage abilities nor sufficient drainage inlets along the roadway. This corridor has moderate truck traffic entering and exiting the area, as well as local turning truck traffic accessing the Nutrien facilities along this section of the corridor. The context of this area includes mostly commercial facilities and some parking lots, leaving multiple entrances along West Danville Street.

As provided by VDOT, based on GIS analysis this study corridor is within the South Hill Historic Commercial district and has many historic properties in the general area. VDOT's review also identified one DEQ petroleum release site (Taylor Insurance Co) adjacent to the study area and multiple petroleum facilities within and/or adjacent to the study area. Next steps in project development may require further study of environmental resources and risks.

North Mecklenburg Avenue

The North Mecklenburg Avenue corridor runs generally south/southwest from Interstate 85 to the intersection with West Danville Street. The corridor is a 2-lane rural major collector with speed limits ranging from 35-45 mph within the project limits. There is a continuous two-way center left turn lane that opens to a single direction left turn lane in multiple areas with consistent travel lane widths of 10-11 feet. The southern section of the study area near Beaver Creek Drive maintains a 1-foot shoulder on both sides of the roadway which increases to between 4 and 6 feet as North Mecklenburg Avenue approaches the intersection with Union Mill Road and Tunstall Road. There are no sidewalks or bike lanes along this corridor, and it is consistently uncurbed.

There are no major transit stops or connections to other existing bicycle facilities. Utilities and various drainage swale are present along this corridor with a typical distance of 10-15 feet from the edge of the roadway. There is only one signalized intersection within this project area at Tunstall/Union Mill Road leaving all side streets to be stop controlled due to relatively low side street volumes.

Based on VDOT GIS review, multiple streams are present around the study corridor. The GIS review also identified one DEQ petroleum release site (B and J Convenience) and multiple petroleum facilities within and/or adjacent to the study area. Next steps in project development may require further study of environmental resources and risks.

North Mecklenburg Avenue & Tunstall/Union Mill Road

This signalized intersection of Tunstall Road and Union Mill Road with North Mecklenburg Avenue is located near the northern limits of the study area. There are no existing sidewalks or cyclist facilities in this study area nor any that directly intersect with the intersection. There is no pedestrian phase at this intersection and no marked crossing locations. There is a drainage swale that follows the edge of the travel way on both the north and south sides of the roadway on the east side of the intersection. Due to the open section character of the intersection, there are no curb ramps. The west side of the intersection houses an electric vehicle charging station as well as two restaurants, while the east side has a hotel and a truck stop. Each corner of the intersection houses signal equipment for the intersection including mast arms, cabinets, and signage that are all located within 10-15 feet of the edge of the roadway.

Areas of Concern

West Danville Street

The field visit and analysis of the existing conditions within the West Danville Street corridor allowed Toole Design Group to determine key points of concern regarding pedestrian and vehicular conditions. These findings include:

- Inconsistent sidewalk and missing curb and drainage on the southern half of the roadway;
- Numerous driveways meant to accommodate truck traffic;
- A wide cross section encouraging higher speed vehicle traffic;
- Sweeping turn leading to high-speed movements at the intersection of Plank Road; and,
- inconsistent travel lane widths along the corridor.

On the southern portion of West Danville Street, the sidewalk is maintained from the South Lunenburg Avenue intersection, continues west, and stops at the car wash. The car wash sits on the southeast corner of the

intersection of Goodes Ferry Road, where the gap in sidewalk and curb continues. The water from the car wash travels east, eventually reaching the curb due to the natural slope in the pavement but ponds west of the driveway across from South Lunenburg Avenue, just before reaching the next drainage inlet.



Figure 3: West Danville Street – Gap in Sidewalk (Photo: Toole Design)

West Danville Street has several driveways along the north and south side of the roadway, tucked in between street parking stalls. The parking spaces create a natural buffer for pedestrians from the roadway, but parked vehicles could create a blind spot for drivers making turns throughout the corridor. Parking utilization observed was low.

The intersection of West Danville Street and Plank Road is 125 feet wide, effectively creating a right slip lane. Travelling west on West Danville Street, drivers were observed making the right turn on to Plank Road with no reduction in speed. High driver speeds combined with a long crossing distance creates a dangerous scenario for pedestrians as drivers will have less time to stop and decreased visibility of a pedestrian waiting to cross.



Figure 4: West Danville Street & Plank Road Intersection (Photo: Toole Design)

The west portion of West Danville Street near Plank Road has a typical curb to curb width of ~48 feet while the east portion near South Lunenburg Avenue is ~42 feet in width. This results in travel lane widths ranging from 15 to 17 feet, which is significantly wider than typical, and may encourage higher vehicular speeds.

North Mecklenburg Avenue

Along the North Mecklenburg Avenue corridor, there are additional points of concern to note which include:

- An underutilized two-way center left turn lane;
- A lack of curb or shoulder framing the roadway;
- Driving speeds observed higher than posted; and
- Utility poles following closely along the edge of the roadway.

Throughout the section between Beaver Creek Drive and Tunstall/Union Mill Road the demand for left turns is low. In addition to the low AADT of 8700 vehicles per day, the lane is notably underutilized.

The roadway character in this segment is an open section, with no shoulder, leaving only one foot of space between the marked edge of the travel lane and the grass or wooded area adjacent to it. This also leaves minimal width for pedestrians or cyclists to travel through this area safely.



Figure 5: North Mecklenburg Avenue Edge of Roadway (Photo: Toole Design)

The speed limit here ranges from 35 to 45 mph which indicates that separation is needed for the inclusion of pedestrians and cyclists into this space.

When considering possible improvements, it was noted that some utility poles are located within 15 feet of the edge of the travel way. This will constrain the feasibility of adding a shared use path or a sidewalk in the future to VDOT standards with a 10 foot path and an 8 foot buffer. The type of facility to be provided will be limited with a narrower buffer to be provided requiring a VDOT design waiver, or additional funding and coordination to relocate this infrastructure would be required. A narrower buffer would be acceptable as per AASHTO guidelines

North Mecklenburg Avenue & Tunstall/Union Mill Road

This intersection presents different points of concern to note as well as constraints that may require external coordination including:

- Mix of open and closed section;
- A lack of pedestrian or bicyclist facilities;
- A drainage swale on both sides of the roadway east of the signalized intersection; and,
- Short side-street signal phases.

Like the rest of North Mecklenburg Avenue, this intersection is an open section for all but one corner. The northwest corner of the intersection has a section of curb that houses the signal equipment but does not continue past the intersection limits. Combined with the lack of sidewalk, this area does not accommodate pedestrian movement to and from the businesses on either side of this intersection.



Figure 6 : Northwest Corner of North Mecklenburg Avenue and Tunstall/Union Mill Road (Photo: Toole Design)

The east side of the intersection has an open section of land on both sides of North Mecklenburg as well as a drainage swale adjacent to an existing berm slope. Based on information provided on the signal design, right-of-way is available south of the existing swale, but may be insufficient near the corners of the intersection itself. Figures 7 and 8 below display the characteristics of this section as described.



Figure 7 Signal Design Plan showing ROW Availability (Plan by Timmons; provided by South Hill)



Figure 8 : Drainage along North Mecklenburg Avenue (Photo: Toole Design)

The signalized intersection has a protected left turn signal on all legs but does not have any pedestrian-related infrastructure. The side street phases are also shorter than would be necessary for a pedestrian clearance phase. This results in limited crossing times available for pedestrians or cyclists since there is no dedicated phase for them to use. This also limits the existing space available to provide these facilities in the short-term.



Figure 9: Traffic Signal at North Mecklenburg Avenue and Union Mill/Tunstall Road (Photo: Toole Design)

Project Goals to Address

The overarching goal for this project is to implement improvements to the corridor that aim to accommodate pedestrians and cyclists. Pedestrian safety and accessibility become a focal point when discussing any multimodal improvements, which was thoroughly considered when establishing these recommendations. The need for reliable and consistent pedestrian facilities is clear, particularly in areas that can generate a significant number of trips. The North Mecklenburg Avenue intersection, with minimal pedestrian or bicyclist facilities, has many points of interest including several restaurants, a hotel, and a vehicle charging station. This is an explicit area for improvement the project team aims to address within the proposed recommendations. Crash data analysis along the corridor has also indicated the need for increased roadway and pedestrian safety. By implementing the appropriate traffic calming measures in this area as well, an inclusive multimodal network can be achieved by attempting to alter driver behavior through these corridors. The visible needs concluded from the field visit along the West Danville Street Corridor include filling gaps in pedestrian facilities, and overall, altering driver behavior by improving the existing facilities.

Design Guidance

To assess the type and extent of improvements that could be made within each corridor, several resources were referenced to determine the improvements to be made as well as the requirements for additional long-term recommendations. The Virginia Department of Transportation VTrans database, and the Virginia Department of Transportation Traffic Engineering Division's Instructional and Informational Memorandum (TE Memo), the American Association of State and Highway Transportation Officials Bike Guide (AASHTO Bike Guide), and the Federal Highway Administration (FHWA) Bikeway Selection Guide were among the resources corroborated with our findings from the field visit to establish the necessary improvements and provide a baseline for our recommendations.

VTrans Database

The VDOT VTrans database was used to establish context for each corridor in terms of pedestrian facilities and perceived safety in the area. The database provides an interactive map with location-based information regarding the roadway conditions, classifications, pedestrian, and bicycle facilities, needs and priorities, crash information, and many other characteristics. The data obtained as well as the conditions analyzed correspond with the 2021 mid-term needs indicated by VTrans. This information was corroborated with the observed conditions in the field visit.

Walk Score

The interactive map provides a walk score for various segments within each corridor. West Danville Street has a walk score ranging from 51-65 which is classified as somewhat walkable. This aligns with the findings from the field visit due to the gaps in sidewalk and varying width from adequate to inadequate. The North Mecklenburg Avenue Corridor, including the intersection with Tunstall and Union Mill Road has a range of walk scores from 0-13 which falls under the car dependent classification. With the lack of sidewalk throughout this corridor and higher vehicle speeds, these ratings match the conditions observed in the field.

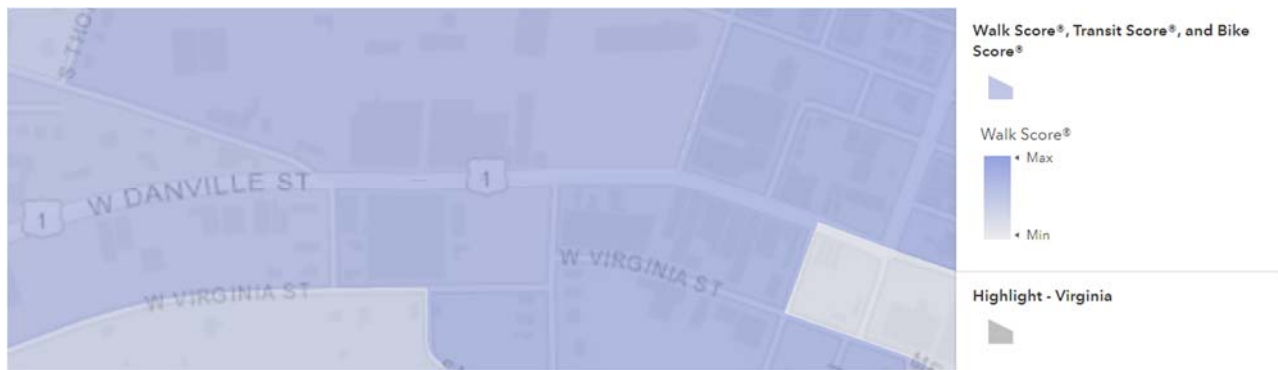


Figure 10: Walk Score – West Danville Street



Figure 11: Walk Score – North Mecklenburg Avenue

Bike Score

The VTrans map produces a similar set of data for reporting the bike scores within each segment. West Danville Street has ratings ranging from 42-53 which is Somewhat Bikeable to Bikeable, while North Mecklenburg has

scores ranging from 15-27 which is Somewhat Bikeable. This emphasizes the concerns observed in the field due to the lack of bike facilities in either area and higher vehicle speeds along North Mecklenburg Avenue.



Figure 12: Bike Score - West Danville Street



Figure 13: Bike Score – North Mecklenburg Avenue

Crash Data

When observing the crash data provided by VTrans, the location, severity, and other contributing factors for each crash are reported. Along West Danville Street, many of these crashes are concentrated at the angled intersection with Plank Road, ranging in severity from property damage only, to severe injury, with angled crashes being the most common crash type. This indicates a need for geometry adjustments at this intersection, which was also noted by Toole Design Group staff due to the length and angle of the approach. This is a similar scenario at the intersection of North Mecklenburg Avenue and Tunstall/Union Mill Road. Angle crashes being the highest collision type in this area indicates the possible need for signal improvements. The crash severity follows a similar pattern along North Mecklenburg Avenue, though the most listed reason in this section for crash type is low visibility. Roadway visibility is a significant component when creating a safe environment for pedestrians and cyclists, which will aid in determining facility types in this corridor.

TE Memo

The TE Memo provides recommendations for implementing marked crosswalks based on Average Daily Traffic, speed limit, and the cross section of the roadway. The Average Annual Daily Traffic was obtained from the VTrans database and utilized to find the most effective solutions applicable to each corridor. Using the speeds, number of lanes, and volumes for each roadway, the TE Memo recognizes the consideration for crosswalks and other pedestrian improvements for uncontrolled areas. This was used as a guide to evaluate the need to an additional midblock crossing at any location within the project area, as well as any improvements to be made.

The West Danville Street corridor has an existing marked mid-block crossing between Plank Road and Goodes Ferry Road. It is currently unsignalized with only minimal signage to accompany it. The TE Memo classifies this roadway as Condition A, indicating it is a candidate for a marked crosswalk alone. This means no addition advanced warning signage nor flashing beacons would be necessary to facilitate a safe crossing based on the speeds and size of the roadway.

The North Mecklenburg Avenue corridor is classified as Condition A where the speed limit is 35 mph and Condition B where the speed limit is 40-45 mph. This indicates it is a potential candidate for a marked crosswalk with warning signage. Since there are not currently any pedestrian or cyclist facilities in this area, the addition of a marked crosswalk would be dependent on the recommended facility types.

AASHTO Bike Guide

The AASHTO bike guide provides recommendations for multimodal improvements in a variety of roadway contexts with a thorough consideration of safety. Once establishing the type of enhancements to be made to the pedestrian and bicycling network, the AASHTO bike guide provides specific criteria for those modifications to meet to yield the best facility, in addition to explaining the reasons behind various design decisions and the considerations when proposing a facility. When evaluating the possible facility types to include along North Mecklenburg Avenue, for example, the options include marked shared lanes, standard bike lanes, separated bike lanes as well as a fully separated shared use path. These options are reduced when considering the speeds vehicles are travelling and the amount of space available for a facility, as each have different recommendations. Shared lanes on a road with slower vehicle travel speeds, wider travel lanes, and less traffic may not pose a safety concern. But for a roadway with higher speeds and constrained travel lane widths, a wider separated bike lane or shared use path would be preferred to increase the separation from motor vehicles.

When considering the safety of these two facility types, a wider buffer space to separate multimodal users from motor vehicles is preferred. According to AASHTO, the paved width for a shared use path ranges from 10-14 feet, depending on use and variety of users, and a 3-5 foot buffer is recommended adjacent to the path as well.

FHWA Bikeway Selection Guide

The Bikeway Selection Guide provides criteria for a desired facility type based on the conditions of the corridor in the field. The guide details the steps and processes to be used when selecting a facility type which is generally reliant on the speed and volume of motor vehicles. Figure 14 below indicates the preferred bikeway type as a separated bike lane or shared use path for both West Danville Street and North Mecklenburg Avenue given the speed limits.

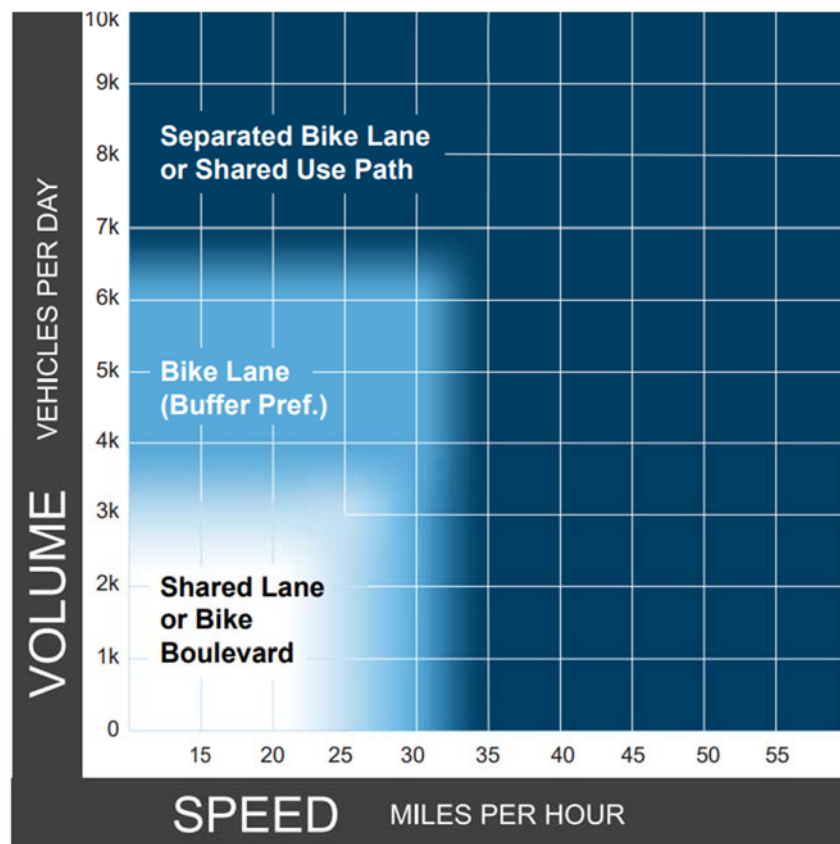


Figure 14: FHWA Bikeway Selection Guide – Preferred Bikeway Type for Urban, Urban Core, Suburban and Rural Town Contexts

Recommended Improvements

Conceptual plans for the recommended improvements were developed and are included the appendix material to this report, and were also provided as separate electronic submittal. Clips of those concept plans are included in this report for reference.

West Danville Street

The issues found and discussed along the West Danville Street corridor can be addressed with short-term or long-term implementation solutions. Based on the need and timeline to be constructed, a recommended short-term solution of high priority addresses the intersection of West Danville Street and Plank Road. The width of this intersection can be greatly reduced to guide vehicles further into the intersection before turning right on Plank Road. This geometry would force drivers to reduce their speed and ultimately will make crossing at this location safer for other roadway users.



Figure 15 Danville Road at Plank Conceptual Design - Short Term

In the short term this realignment can be created with striping and vertical delineation such as flex posts, or for the purposes of accommodating large truck movements for the industrial uses in the area, a modular mountable solution could be utilized. An example of this application is shown below.



Figure 16 Example Mountable Corner Radius Delineation - Bentonville, AK (Photo: Toole Design)

The existing mid-block crossing is also an area where pedestrian visibility can be improved. The mid-block crossing is currently marked and does include gore striping to prevent vehicles from parking within 20 feet of the crosswalk. To reduce the crossing distance and increase visibility of pedestrians waiting to cross, this bump out can be emphasized by including a taper and adding flex posts or other vertical delineation to increase the visibility of someone attempting to cross.

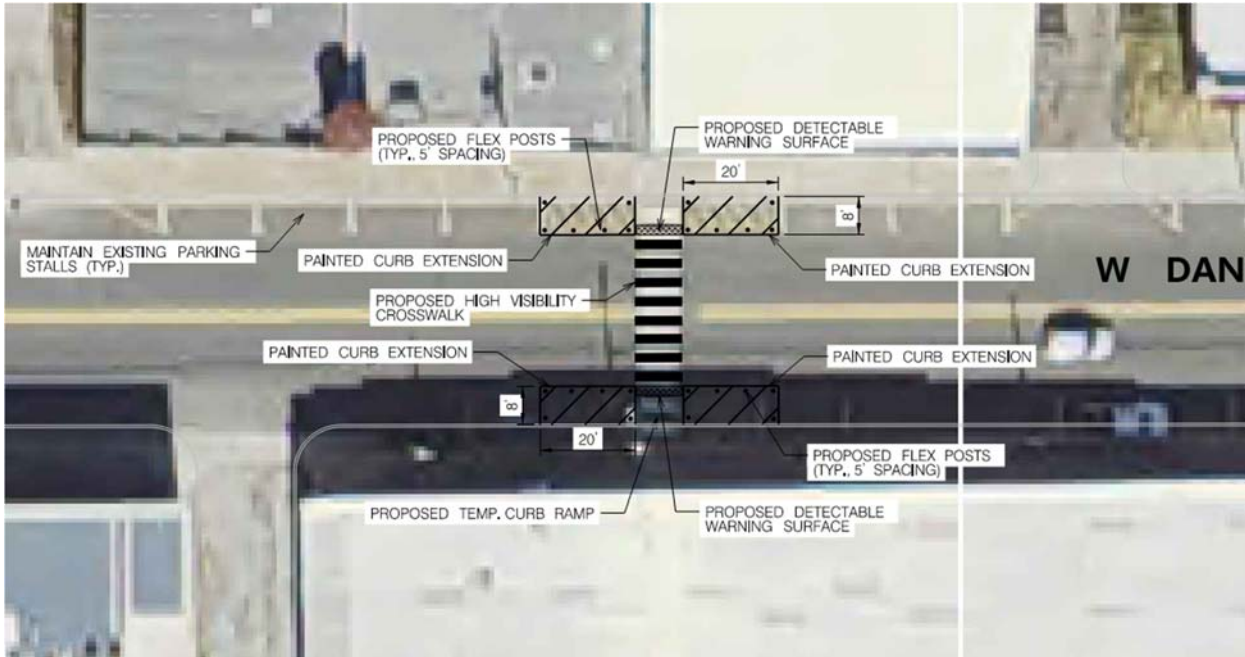


Figure 17 Mid Block Crossing at W. Danville Street - Conceptual Design - Short Term

It was also noted that the southern portion of West Danville Street has a gap in sidewalk adjacent to the car wash near Goodes Ferry Road. The edge of the roadway can be delineated in the short-term using pavement markings combined with curb stop or other modular vertical elements create a street level walking lane to close the sidewalk gap.

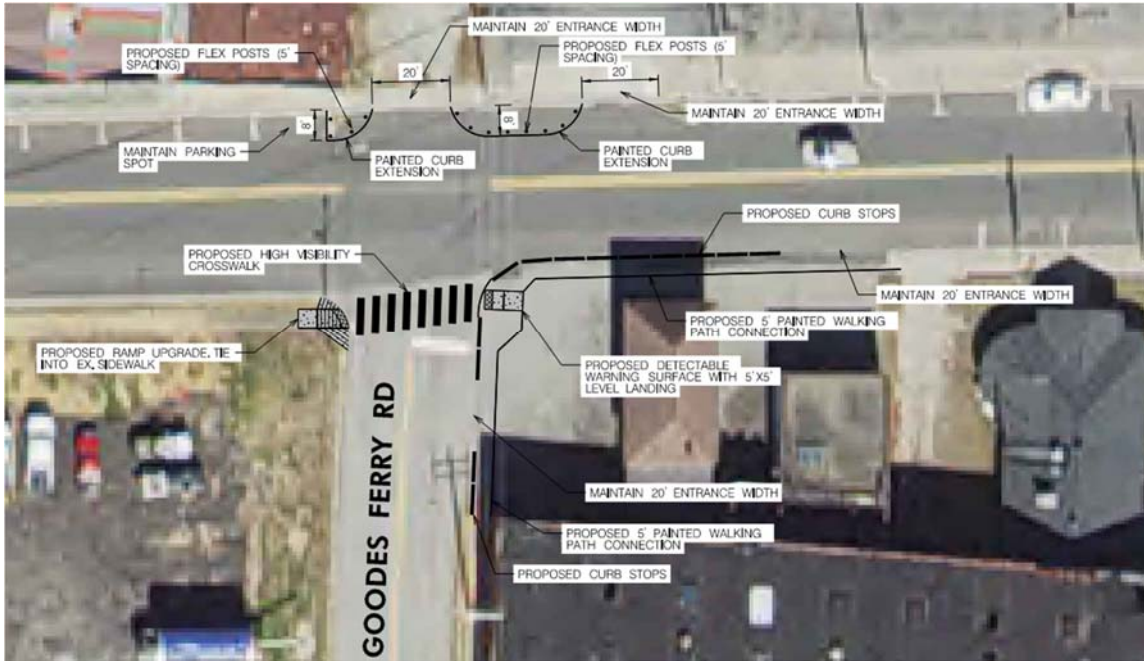


Figure 18 Goodes Ferry/Car Wash at W. Danville - Conceptual Recommendation - Short Term

This treatment has been used recently on SR 654 in South Boston, VA as shown below. A variety of options could be used for delineation of this type of facility, including different modular bolt down materials, standard flex posts or, for low speed facilities, just paint. More decorative elements such as planters could also be utilized. Examples of these alternatives are shown below.



Figure 20 Walking Lane Example, S Boston, VA (Photo: Google StreetView)



Figure 19 Example Walking Lanes - Clockwise from top left - Silver Spring, MD (Photo: Toole Design), Portland, OR (Photo: Jonathan Maus/Bike Portland), Idaho Springs, CO (Google), Atlanta, GA (Google)

Additionally, the sidewalk at the north side of the street across from Goode’s Ferry Road is narrower than standard, with two consecutive wide driveways and utility poles further limiting the walkable area. In order to provide a buffer to pedestrians using this narrowed facility, limit turn speeds for those using the driveways, and help further visually narrow the roadway through this wider section to help encourage lower speeds, short-term curb extensions are recommended in this location as shown in Figure 18.



Figure 21: West Danville Street – Conceptual Recommendation- Short-Term

The roadway width for this section of the roadway ranges from 42 to 48 feet which results in varying travel lane widths with wide open lanes that encourage high motor vehicle speeds. A long-term solution should address and remedy this to create a consistent width. By moving the southern curb line north, consistent travel lane widths can be achieved while also creating space for a sidewalk or path with an adequate buffer from the roadway through the section. In conjunction with addressing this, adding consistent curb provides the opportunity to address drainage issues near the industrial loading driveways and near the car wash. While continuing the curb in the section where it is currently missing, additional drainage inlets should be considered to prevent the pooling of water. The long term recommendation is shown below. It also incorporates permanent versions of the turn radius adjustment at Plank Road, the curb extensions at the mid-block crosswalk, and widening of the sidewalk with a rebuild of the driveway aprons across from Goodes Ferry Road.



Figure 22: West Danville Street – Conceptual Recommendation – Long Term

North Mecklenburg Avenue

The North Mecklenburg Avenue corridor has a constrained width making it challenging to accommodate pedestrians or cyclists in this area with a short-term implementation. There is a one-foot shoulder with two 10-foot lanes and one 10-foot two-way center left turn lane consistently from Beaver Creek Drive to the Tunstall and Union Mill Road. Given the speeds and volumes on this section of roadway, creating a safe facility in this area for pedestrians and cyclists would require separation as outlined in the FHWA *Bikeway Section Guide*. The Active Transportation Plan was developed by VDOT, the Southside Planning District (SPDC), and local government forces to encourage human powered transportation. The studies taken to determine the number of people walking and biking showed a decrease since 2020, and the Walking Dashboard showed the highest reasons were a lack of sidewalks and the speed of traffic.

Though existing pedestrian and bicycle volumes as observed in this corridor are low, that would be expected given the lack of space for them to travel. This does not mean that the addition of a facility along this corridor would not be used by the community. A wide facility with proper separation would especially target the “interested but concerned” group of cyclists. A bicycle connection along this section would fill in what is currently a road separation within the existing paved width would be limited as shown in the cross sections below. Reallocating the adjacent green space to serve as a shared use path with an adequate buffer would provide an adequate comfortable facility but would have driveway impacts and may have utility and right-of-way impacts. In the short-term, the lanes could be restriped to remove the two-way center left turn lane to include standard bike lanes on either side. This option would remove the one-foot shoulder and provide a one-foot buffer between the bike lane and the adjacent travel lane on either side. The minimum standard bike lane width is 5 feet which would be met, but the one-foot buffer along with the higher roadway speeds for the corridor would not be ideal to provide an all ages and abilities facility. It would however be a significant improvement from the current shared lane condition, and narrowing the vehicular traveled way may result in lower vehicular speeds.



Figure 23 : N Mecklenburg Ave Standard Bike Lane Option

Alternatively, a minimum width two-way facility could be provided on one side of the roadway, with a 3-foot buffer that provides space for flex posts or other vertical delineation; however, this would be harder to maintain with limited access for snow/leaf removal and other maintenance and would require more detailed design at commercial access points and intersections along this section of roadway. Both the standard bike lane option and the two-way facility would largely target the more fearless group of cyclists because they are more confident cycling near other vehicles and require less operating space. These options would not attract all ages and abilities of cyclists that want more multimodal facilities.



Figure 24 : N Mecklenburg Ave Two-Way Option

In the long-term, a full redesign of this corridor could provide sufficient vertical and horizontal separation for multimodal roadway users. The south side of the roadway appears to have fewer conflict points and crossings, as well as a larger distance between the edge of the roadway and the utility poles. The removal of the two-way center left turn lane would allow the relocation of that space including the removal of around 8 feet of asphalt. A 5 foot buffer from the roadway, a 3 foot buffer from utility poles, and a 10 foot shared use path can be achieved while maintaining a 2 foot shoulder on the outside of either lane. This option would provide decent separation from the roadway and allow less experienced cyclists to feel comfortable on this facility.



Figure 25: N Mecklenburg Avenue – Shared Use Path Option

North Mecklenburg Avenue & Tunstall/Union Mill Road

A goal for this area is to provide a connection from the hotel and truck stop on the southeast side of the study area, to the vehicle charging station and restaurants on the northwest side of the study area. This request was made by the public through the Active Transportation Plan. Since this area currently does not have any pedestrian or cyclist infrastructure and is an open section roadway with additional available right-of-way as shown in the intersection construction document below, a shared use path would provide the desired connection with relative ease of construction not requiring significant changes to existing drainage. The path would begin on the south side of North Mecklenburg Avenue and cross at the intersection to the north side to provide access to the charging station and the two restaurants. The path on the south side of the roadway would be located outside of the existing drainage swale that runs along the south side of North Mecklenburg. Existing grades on the berm south of the roadway and fiber vaults and signal equipment at the corners of Union Mill Road/Tunstall Road would require further coordination to finalize the design and impacts.



Figure 26: North Mecklenburg Avenue & Tunstall/Union Mill Road -Conceptual Recommendation - Shared Use Path



Figure 27 Union Mill and Tunstall Signal Plans Showing ROW (Plans by Timmons Group, provided by South Hill)

Evaluation of Options

Recommended Alternatives Matrix

Each focus area within the project limits presents various options for implementing the recommended solutions. The factors by which these options can be assessed were summarized in the matrix shown below. This matrix aims to simplify the selection of an alternative by summarizing important factors for each recommendation and provides prioritization based on those factors as well as input from town of South Hill. The ratings assessed by Toole Design are approximate and do not indicate definitive answers regarding the performance of each alternative. Further study and design would be required for all conceptual recommendations.

Summary Criteria	West Danville Street		North Mecklenburg Avenue		N. Mecklenburg at Tunstall Ave
	Short-Term	Long-Term	Short-Term	Long-Term	Add Shared Use Path & Sidewalk
	Flex Post Curb Extensions	Shifting Curb Line	Restriping for Bike Lane	Add Shared Use Path	
Prioritization	High	Medium	Medium	Low	High
Construction Type	Quick Build	Full Construction	Quick Build	Construction	Construction
Safety & Comfort Improvements	Some	Great	Limited	Some	Great
Connectivity Improvements	Some	Great	Some	Great	Great
Parking Impacts	Some	Some	None	None	None
Traffic Operations	None	None	Some	Some	Some
Planning Level Cost	\$	\$\$\$	\$	\$\$\$	\$\$

Legend/Key			
Construction Type	Quick Build	Retrofit	Construction
Prioritization	High	Medium	Low
Safety & Comfort Improvements	Great	Fair	Limited
Connectivity Improvements	Great	Fair	Limited
Parking Impacts	None	Some	Significant
Traffic Operations	None	Some	Significant
Planning Level Cost	\$	\$\$	\$\$\$

Table 1 : Summary Recommendation Matrix

Cost Estimate

One of the many factors that is considered in the evaluation of each alternative is the cost estimated to implement each option. This may indicate the needs for outside funding or eliminate certain options altogether depending on the needs of the client and the town. The planning level cost estimate evaluated for each alternative was developed using the Pre-Quantity Tool provided by VDOT. This spreadsheet has various tabs for each discipline that would be involved in completing the improvements. Information regarding drainage, utilities, in-plan utilities, earthwork, and environmental infrastructure was not included in the cost estimate as it will require a more detailed understanding of the existing conditions which was not investigated in the scope of this project. It should be noted that though these items are not quantified within the estimates themselves, there may be significant costs associated with these disciplines which is currently unknown. In addition to many sections that will not be included in the estimate, various contingencies and assumptions were made using the information provided which should be considered when reviewing the costs for each option. A summary of the findings for each alternative is shown below and is included in depth within Appendix D.

Location	Level Of Construction	Highest Contributing Discipline	Cost of Discipline	CN Estimate Total Cost
West Danville Street	Short Term	Traffic/MOT	\$30,000	\$89,000
West Danville Street	Long Term	Hydraulics	\$1,101,000	\$2,833,000
North Mecklenburg & Tunstall	Short Term	Traffic	\$470,000	\$1,318,000

Appendices

Appendix A : TE Memo

452 Table 2. Recommendations for Considering Marked Crosswalks and Other Needed
 453 Pedestrian Improvements Across Uncontrolled Approaches

Roadway Configuration	Roadway ADT and Speed Limit															
	1,500 to 9,000 VPD				9,000 to 12,000 VPD				12,000 to 15,000 VPD				More than 15,000 VPD			
	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH
2 Lanes (undivided two-way street or two-lane one-way street)	A	A	B	B	A	A	B	B	A	A	B	B	B	B	B	C
3 Lanes with refuge island OR 2 Lanes with raised median*	A	A	B	B	A	B	B	B	A	A	B	B	B	B	B	C
3 Lanes (center turn lane)	A	A	B	B	A	B	B	B	A	B	B	C	B	C	C	C
4 Lanes (two-way street with no median)	A	B	C	C	B	B	C	C	B	C	C	D	C	C	C	D
5 Lanes with refuge island OR 4 lanes with raised median*	A	A	B	B	A	B	B	C	B	B	C	C	B	B	C	D
5 Lanes (center turn lane)	A	B	C	C	B	B	C	C	C	C	C	D	C	C	C	D
6 Lanes (two-way street with* or without median)	A	B	D	D	B	B	D	D	D	D	D	D	D	D	D	D

454 Source: Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline Highways (Michigan Department of
 455 Transportation, 2014)

Condition A	Candidate site for marked crosswalk alone (standard if speed limit is 30 MPH or less, high-visibility if speed limit is 35 MPH or greater). Evaluate need for advance signing
Condition B	Potential candidate site for marked crosswalk. Location should be monitored & consideration given to providing a high-visibility crosswalk and/or warning signs (see Section 7.2)
Condition C	Marked crosswalks alone are insufficient. The crosswalk shall use a high-visibility pattern and other improvements (warning signs and/or geometric/ traffic calming improvements) (see Section 7.2) <u>will likely be necessary.</u>
Condition D	Marked crosswalks <u>shall not</u> be installed

Appendix B: West Danville Street Conceptual Recommendations



Appendix C: N Mecklenburg Intersection Conceptual Recommendations



Appendix D: PQT Cost Estimate Spreadsheet

Appendix E: Recommendations Matrix & Summary of Options

Project Area	Solution Type	Improvements	Materials Used	Issues Addressed	Comments/Notes
West Danville Street	Short-Term	Curb Extensions, Curb Stops, Pavement Markings	Flex Posts, Paint, Curb Stops	Driver Behavior, Connectivity	
	Long-Term	Shift Curb Line, Widen Sidewalk & Provide Buffer, Curb Extensions	Concrete, Paint, Landscaping	Safety, Connectivity, & Driver Behavior	
North Mecklenburg Avenue	Short-Term	Lane Removal Restriping, and Add Bike Lane or Shoulder	Paint, Flex Post/Curb Stops	Connectivity, Driver Behavior	
	Long-Term	Add Off Road Shared Use Path on one side of the road	Asphalt, Paint, Signage	Safety, Connectivity, & Driver Behavior	
North Mecklenburg Avenue & Union Mill/Tunstall Road	Short-Term	N/A	N/A	N/A	No proposed short term solution that addresses project goals or issues
	Long-Term	Mix of Sidewalk and Shared Use Path to provide access across the intersection	Asphalt, paint, Concrete, Traffic Signal Modifications	Safety, Connectivity, & Driver Behavior	

Summary Criteria	West Danville Street		North Mecklenburg Avenue		N. Mecklenburg at Tunstall Ave
	Short-Term	Long-Term	Short-Term	Long-Term	
	Flex Post Curb Extensions	Shifting Curb Line	Restriping for Bike Lane	Add Shared Use Path	Add Shared Use Path & Sidewalk
Prioritization	High	Medium	Medium	Low	High
Construction Type	Quick Build	Full Construction	Quick Build	Construction	Construction
Safety & Comfort Improvements	Some	Great	Limited	Some	Great
Connectivity Improvements	Some	Great	Some	Great	Great
Parking Impacts	Some	Some	None	None	None
Traffic Operations	None	None	Some	Some	Some
Planning Level Cost	\$	\$\$\$	\$	\$\$\$	\$\$

Legend/Key			
Construction Type	Quick Build	Retrofit	Construction
Prioritization	High	Medium	Low
Safety & Comfort Improvements	Great	Fair	Limited
Connectivity Improvements	Great	Fair	Limited
Parking Impacts	None	Some	Significant
Traffic Operations	None	Some	Significant
Planning Level Cost	\$	\$\$	\$\$\$