

# MANDATORY REFERRAL NO. 2025004 – CARROLL AVENUE SEPARATED BIKE LANES



## Description

This is a Mandatory Referral review for the Montgomery County Department of Transportation proposal to construct separated bike lanes on Carroll Avenue between Piney Branch Road and Merrimac Drive.

No. MR2025004

MCPB

2425 Reddie Drive

Item 6

Floor 14

10/31/2024

Wheaton, MD 20902

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#### LOCATION

Carroll Avenue between Piney Branch Road and Merrimac Drive

#### MASTER PLANS

*Pedestrian Master Plan (2023), Bicycle Master Plan (2018), Master Plan of Highways and Transitways (2018), Long Branch Sector Plan (2013), Takoma-Langley Crossroads Sector Plan (2012)*

#### APPLICANT

Montgomery County Department of Transportation

#### ACCEPTANCE DATE

August 28, 2024

#### REVIEW BASIS

Md. Land Use Article, Section 20-301, et seq.

## Summary

- This is a Montgomery County Department of Transportation project to construct separated bike lanes on Carroll Avenue.
- The proposed project is funded as part of the Purple Line Bicycle-Pedestrian Priority Area Improvements (FY 24 CIP P502004) and is within half a mile of the two Purple Line stations, Piney Branch Road and Takoma-Langley.
- Montgomery Planning Staff recommends approval of the Mandatory Referral with comments and transmittal of comments to the Montgomery County Department of Transportation.
- The Planning Board review of a Mandatory Referral is pursuant to the Land Use Article of the Maryland Annotated Code, Section 20-301, et seq.

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## SECTION 1 – RECOMMENDATIONS

Planning Staff recommends transmittal of the following comments to the Montgomery County Department of Transportation:

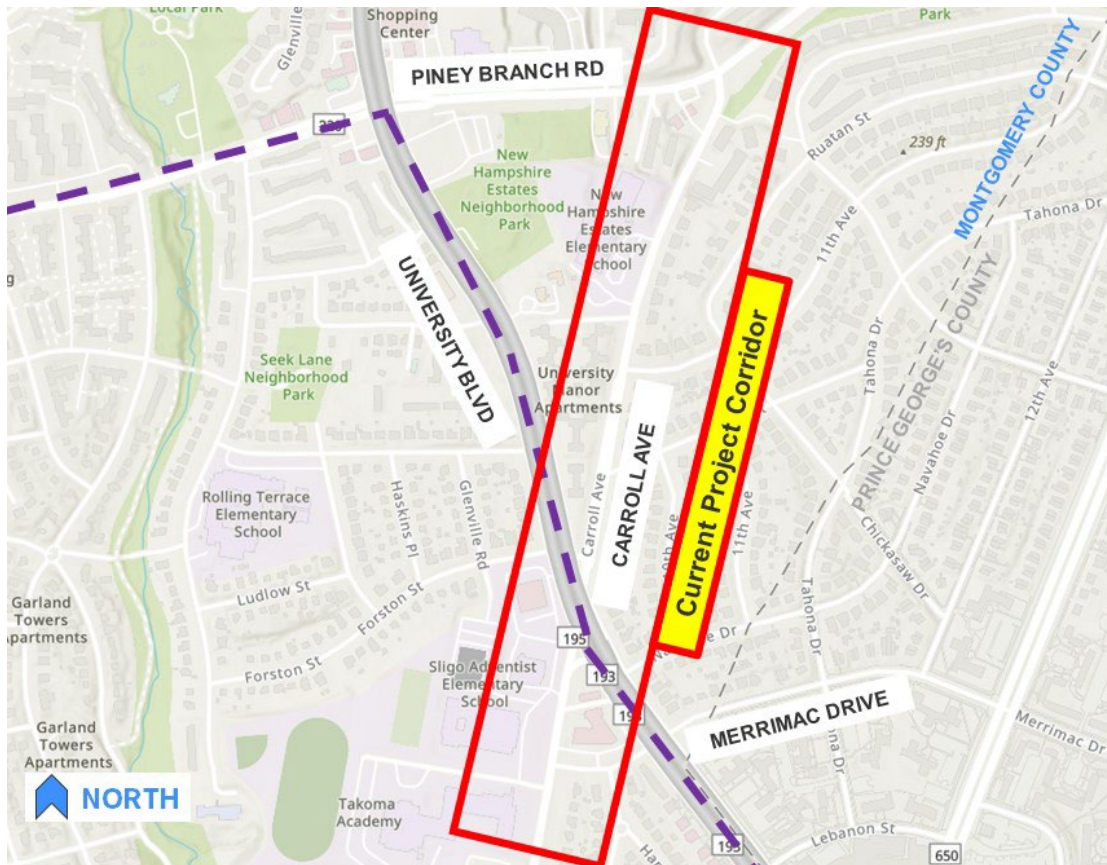
1. Replace proposed continental crosswalks with ladder crosswalks, provide tactile warning surfaces in all curb ramps, and provide directional crosswalks at all legs of an intersection.
2. Tighten curb radii to 15 feet and provide protected intersections with corner islands as described in the *2024 Complete Streets Design Guide*.
3. Reconfigure the intersection and crossings at Merrimac Drive and Carroll Avenue to improve bicycle and pedestrian safety, visibility, and connectivity.
4. Close the two existing driveway curb cuts to the Falcon Fuel gas station (925 University Blvd E, Silver Spring, MD 20903) that are closest to University Boulevard.
5. Install concrete protection curbs instead of temporary flexposts between the separated bike lanes and vehicle lanes, where possible.
6. Construct two-way, protected bicycle crossings across University Boulevard to reduce bicycle travel time and extend medians to improve safety.
7. Construct a curb extension at the southeast corner of Piney Branch Road and Carroll Avenue, at Station 39+00, to improve how the two-way separated bike lanes transition to and from the sidewalk.
8. Submit a 22A-9 plan to Montgomery Planning for review and prior to issuance of Sediment Control Plan of the project.
9. Use planting techniques that maximize soil volumes per tree and increase tree survivability in streets, sidewalks, and on redevelopment projects.
10. Stormwater treatment should meet or exceed minimum standards and include application of environmental site design (ESD) to minimize impervious areas.
11. Increase tree canopy coverage with native species.

## SECTION 2 – PROJECT DESCRIPTION

### Project Description

The Montgomery County Department of Transportation (MCDOT) proposes to construct two-way and one-way separated bike lanes on Carroll Avenue between Merrimac Drive and Piney Branch Road. The total project length is approximately half a mile and is identified in Figure 1 below.

Figure 1: Project Area Map



There are two distinct sections of the project along Carroll Avenue—south of University Boulevard and north of University Boulevard. South of University Boulevard, the Applicant proposes one-way separated bike lanes on either side of the road, in the direction of vehicle traffic, and each lane will be 5 feet wide. North of University Boulevard, the Applicant proposes two-way separated bicycle lanes on the east side of the road that will be between 8 feet and 10 feet wide. MCDOT will be reducing vehicle lanes and making improvements to sidewalks and designated on-street parking as part of the project. Figure 2 and Figure 3 show a sample of the typical roadway cross sections proposed for both distinct sections of Carroll Avenue. Complete engineering drawings for the project are in *Attachment A*.



Figure 2: Carroll Avenue Roadway Cross Section (Merrimac Drive to University Boulevard, facing north)

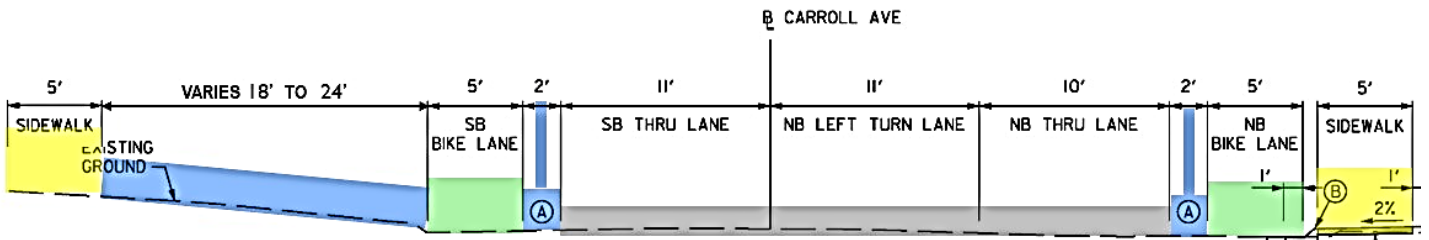
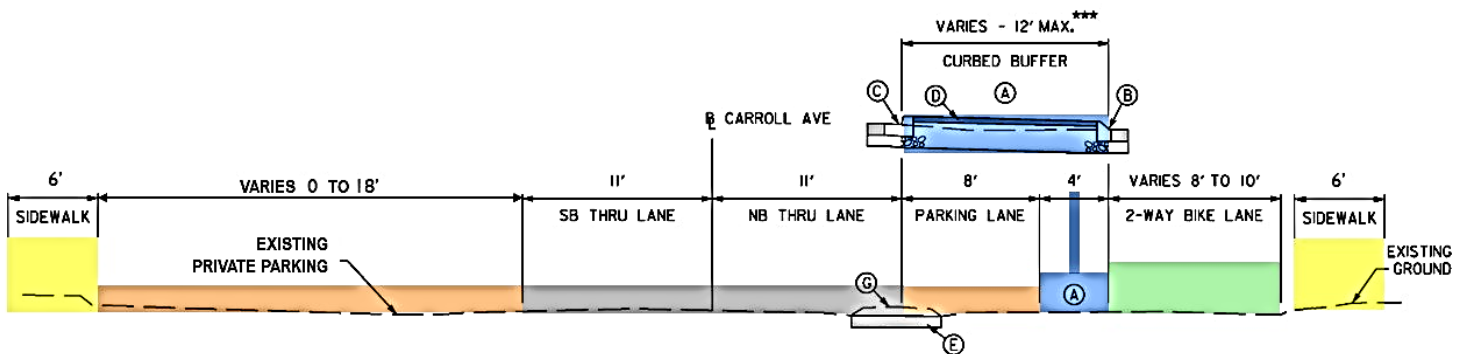


Figure 3: Carroll Avenue Roadway Cross Section (University Boulevard to Piney Branch Road, facing north)

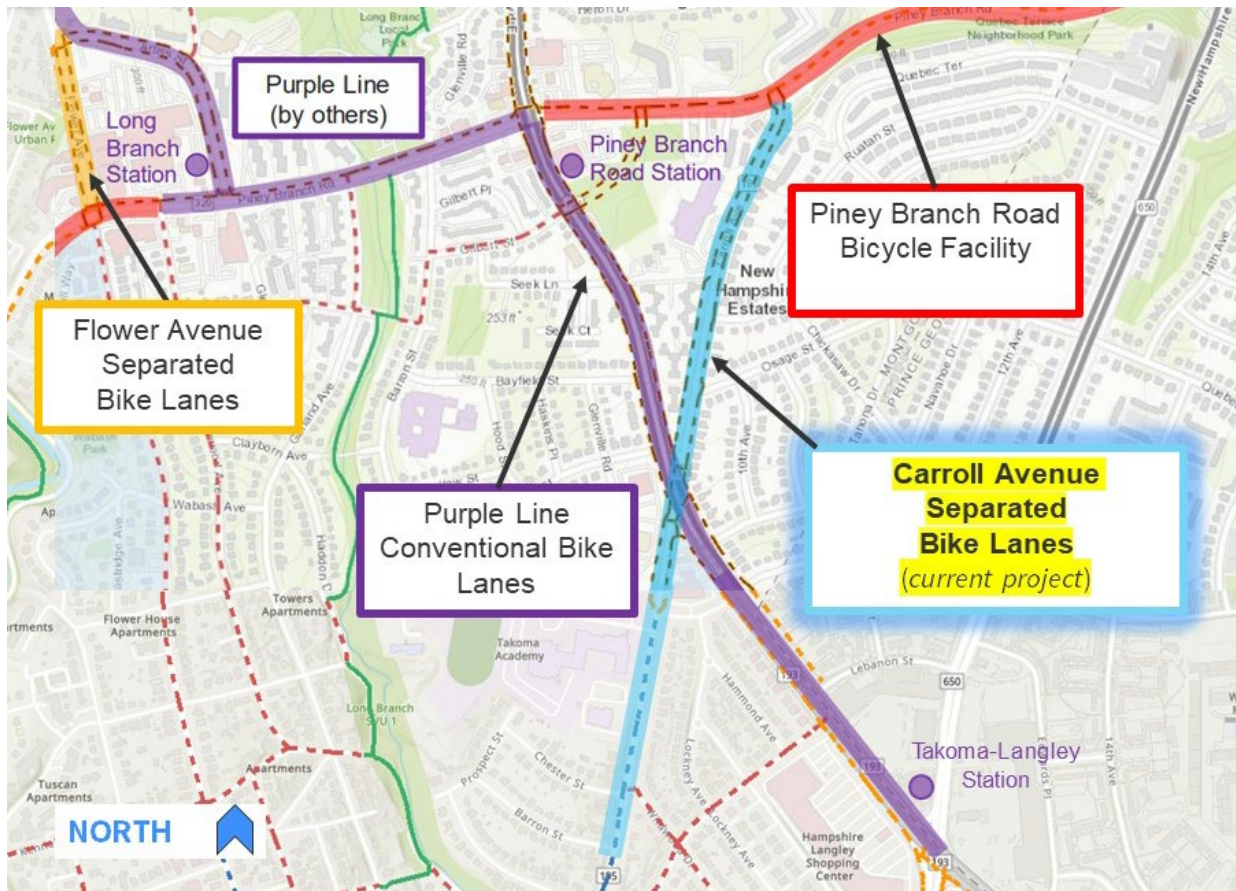


## Background

The Carroll Avenue separated bike lanes are recommended in the 2018 *Bicycle Master Plan*. The proposed project is within a half mile of two future Purple Line stations: Piney Branch Road and Takoma-Langley (on the county’s border with Prince George’s County). The project will make it easier and safer for people to walk or bike to the Purple Line stations, existing local businesses, and nearby community facilities. It will also provide safer pedestrian and bike crossings across University Boulevard (MD 193). The bikeway is funded for design and construction through the Purple Line Bicycle and Pedestrian Priority Area (BIPPA) program in the current FY 24 Capital Improvement Program.

For bicyclists continuing beyond the project area, existing conditions require transitioning to riding in the street. However, in the future, the Carroll Avenue bike lanes will be part of a larger bicycle network, with bikeways along Piney Branch Road, Arliss Street, University Boulevard, and Flower Avenue. Figure 4 from MCDOT, outlines the nearby bikeways that are currently in the design or construction phase. The Planning Board reviewed the Flower Avenue Separated Bike Lane project on June 20, 2024. A previous Planning Board reviewed the Purple Line Conventional Bike Lanes as part of the Purple Line Mandatory Referral on March 20, 2014.

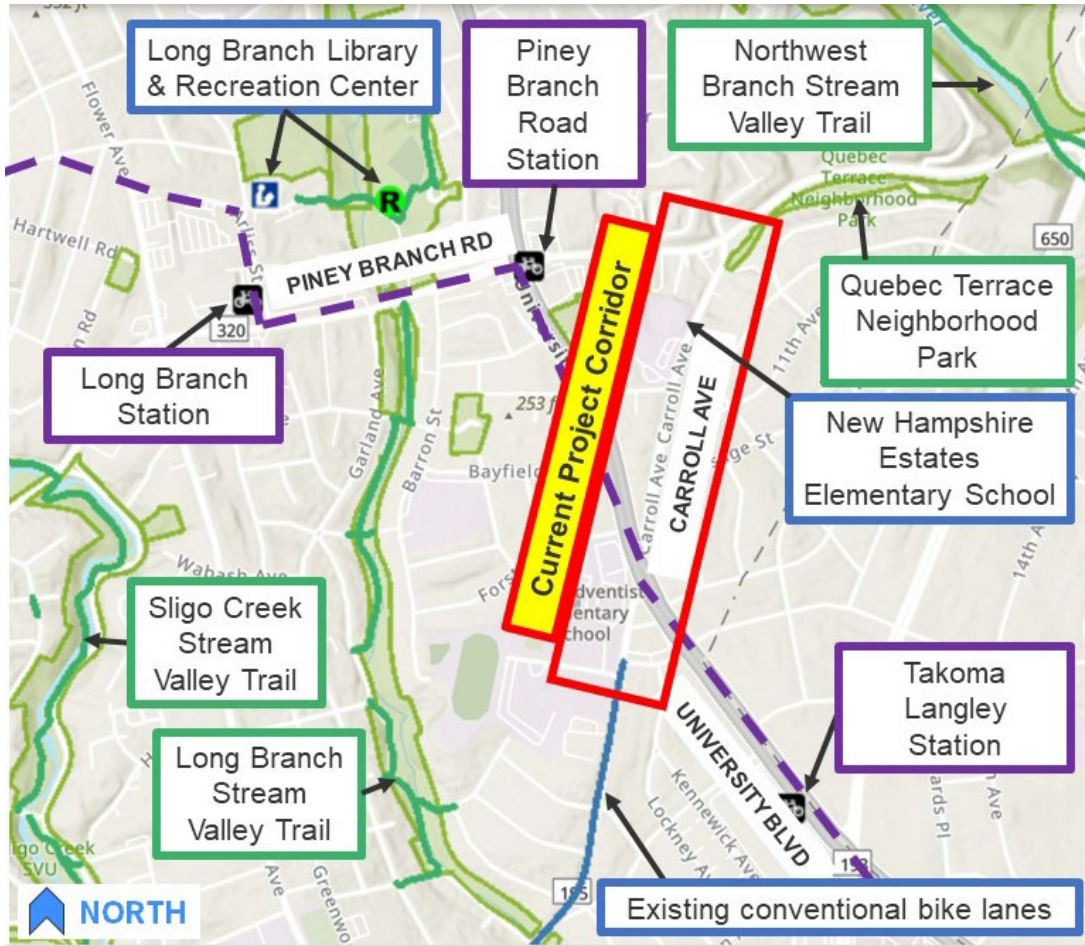
Figure 4: Nearby Planned Bikeway Network



## Surrounding Neighborhood

The surrounding neighborhood, shown in Figure 5, includes single-family homes, duplexes, garden apartments, and retail, service, and dining establishments with street-facing parking lots. Nearby parks include Quebec Terrace Neighborhood Park, New Hampshire Estates Neighborhood Park, the Northwest Branch Trail, and the Long Branch Trail. Quebec Terrace Neighborhood Park fronts the project area directly, and it provides public open space and a children’s playground. Trees within this park help with shading and cooling the neighborhood and provide some stormwater value. The proposed project will not reduce these benefits. Schools along the project frontage include New Hampshire Estates Elementary School, and two private schools: Takoma Academy and Sligo Adventist School.

Figure 5: Adjacent Transportation Connections and Destinations



There is regular public transportation service in the vicinity, including local WMATA and Ride-On buses, as well as future MTA Purple Line. Carroll Avenue (MD 195) is a state highway and intersects two other state highways: Piney Branch Road (MD 320) and University Boulevard (MD 193). The posted speed limit on Carroll Avenue south of University Boulevard is 30 miles per hour and 25 miles per hour north of University Boulevard.

There is existing on-street parking and narrow sidewalks along the corridor. Walking conditions on Carroll Avenue in the project area range from “very comfortable” to “undesirable” (Pedestrian Level of Comfort 1 to 4)<sup>1</sup>. In some segments, existing sidewalks benefit from wide street buffers from vehicle traffic. In other sections, there are no existing sidewalks. Bicycling conditions range from “low stress” to “high stress” (Bicycle Level of Traffic Stress 2 to 4)<sup>2</sup>. There are no existing bicycle facilities on Carroll

<sup>1</sup> Pedestrian Level of Comfort Scores include the following: 1 = very comfortable; 2 = somewhat comfortable; 3 = uncomfortable; 4 = undesirable

<sup>2</sup> Bicycle Level of Traffic Stress Scores include the following: 1 = very low stress; 2 = low stress; 3 = moderate high stress; 4 = high stress; 5 = very high stress



Avenue in the project area, and bicycling gets more stressful south of University Boulevard, where there are higher vehicle traffic volumes and speeds.

Between 2015 and 2023, there were 256 collisions within the project area.<sup>3</sup> Seventy occurred at the University Boulevard intersection and 75 crashes were at Piney Branch Road intersection (with one severe vehicle collision). Fourteen collisions involved pedestrians; one was severe, one was fatal, and both occurred near the University Boulevard intersection. Two crashes involved bicycles.

## SECTION 3 – MANDATORY REFERRAL ANALYSIS

### Mandatory Referral Uniform Standards Compliance

Mandatory Referral review is guided by the *Montgomery Planning Mandatory Referral Review Uniform Standards* (December 2022), and the authority granted through the Maryland Land Use Article, Section 20-301, et.seq. Subject to Sections 20-303 and 20-304 of this subtitle, a public board, public body, or public official may not conduct any of the following activities in the regional district unless the proposed location, character, grade, and extent of the activity is referred to and approved by the Commission:

- (1) acquiring or selling land;
- (2) locating, constructing or authorizing:
  - a. a road;
  - b. a park;
  - c. any other public way or ground;
  - d. a public building or structure, including a federal building or structure; or
  - e. a publicly owned or privately owned public utility; or
- (3) changing the use of or widening, narrowing, extending, relocating, vacating, or abandoning any facility listed in item (2) of this section.

As described in the Uniform Standards, the Planning Board considers all relevant land use and planning aspects of the proposal including, but not limited to, the aspects outlined below. Not all these aspects apply to mandatory referrals for public transportation projects. Where relevant, the project is consistent with the aspects of the Uniform Standards listed below, and reasoning is provided.

- (1) Consistency with the County’s General Plan, functional plans, approved and adopted area master plans, and any associated design guidelines.**

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<sup>3</sup> Source: Montgomery County Interactive Crash Map (2023).  
<https://mcplanning.maps.arcgis.com/apps/webappviewer/index.html?id=3bec8ba90fca4cc182cc042ed38af0e7>

The proposed project is overall consistent with the general plan, *Thrive Montgomery 2050*, all relevant master plans and design guidance. Detailed evaluation is provided in the “Master Plan Consistency” and “Design Guidelines and Best Practices” sections of this report.

**(2) Consistency with the intent and the requirements of the zone in which it is located.**

The proposed project is consistent with the existing commercial and residential zones, which includes a mix of CRT, R-10, R-30, R-40 and R-60. It will improve safety and access to the existing land uses and support future development consistent with the zoning.

**(3) Compatibility of the proposed project with the surrounding neighborhood and properties, including but not limited to its size, shape, scale, height, arrangement, design of structure(s), massing, setback(s), site layout, and location(s) of parking.**

The design and layout of the proposed project is compatible with the surrounding neighborhood and will improve travel conditions to the standard outlined in master plans for the area. The improvements are transportation related in the right of way and do not create new structures or massing that would impact the neighborhoods.

**(4) Adequacy, safety, and efficiency of open spaces, landscaping, and pedestrian and vehicular circulation systems.**

The entire project aims to improve safety and efficiency of the transportation network in the project area.

**(5) Approval of NRI/FSD and a preliminary SWM Concept Plan and compliance with the Forest Conservation law (Chapters 19 and 22A of the Montgomery County Code).**

The project meets these requirements. A forest conservation exemption was confirmed under Section 22A-5(e) as a “county and municipal highway project.” The stormwater management concept for the project was approved by the Department of Permitting Services (DPS). Detailed evaluation is provided in the “Environment” section of this report.

**(6) Planning Board review of a Preliminary or a Final Water Quality Plan if the project is located in a Special Protection Area. In addition, for a Water Quality Plan on public property, the Board must determine if the plan meets any additional applicable standards for Special Protection Areas.**

The project is not located in a Special Protection Area.

**(7) Determination if needed as a park use if the proposal is for disposition of a surplus public school or other publicly-owned property.**

The project does not involve disposition of a publicly-owned property.

**(8) Consideration of alternatives or mitigation measures for the project if the proposal is inconsistent with the General Plan or other plans and policies for the area, or has discernible negative impacts on the surrounding neighborhood, the transportation network, the environment, historic resources (including burial sites), or other resources.**

The project is consistent with all plans and policies for the area.

## Transportation

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### MASTER PLAN CONSISTENCY

The proposed bikeway is consistent with *Thrive Montgomery 2050*, the *Pedestrian Master Plan* (2023), the *Bicycle Master Plan* (2018), the *Master Plan of Highways and Transitways* (2018), the *Long Branch Sector Plan* (2013), and the *Takoma-Langley Crossroads Sector Plan* (2012).

The 2013 *Long Branch Sector Plan* calls for conventional bike lanes between Merrimac Drive and Piney Branch Road. The 2018 *Bicycle Master Plan* upgrades this recommendation to one-way separated bike lanes on both sides of the road from Merrimac Drive to Piney Branch Road. The proposed project includes one-way separated facilities south of University Boulevard. North of University Boulevard, the project proposes two-way separated bike lanes on the east side of the road because of conflict with existing perpendicular parking on the west side. Overall, the proposed project accomplishes the vision outlined in the *Bicycle Master Plan*.

Chapter 49 of the County Code and the 2018 *Master Plan of Highways and Transitways* provides two different roadway classifications for Carroll Avenue. Between Piney Branch Road and University Boulevard, Carroll Avenue is a Neighborhood Connector with a 70-foot right-of-way and a 20 mile per hour target speed. Between University Boulevard and Merrimac Drive, it is a Town Center Street with a 90-foot right-of-way and a 25 mile per hour target speed. The proposed project conforms with the prescribed right-of-way widths and target vehicle speeds.

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### DESIGN GUIDELINES AND BEST PRACTICES

#### Complete Streets Design Guide

The Neighborhood Connector and Town Center Street classifications have associated design guidance in the *Complete Streets Design Guide* (CSDG). This guidance includes minimum and preferred facility widths and spacing for protected crossings. Table 1 and Table 2 compare the proposed project to both CSDG standards and existing conditions.

Table 1: CSDG Neighborhood Connector Compliance

<b>Piney Branch Road to University Boulevard</b>	<b>Existing (ft)</b>	<b>Proposed (ft)</b>	<b>CSDG (ft)</b>
Sidewalk (west)	4 to 7	4 to 5	6
Ped/Bike Buffer (west)	N/A	N/A	2 to 6
Separated Bike Lane (west)	N/A	N/A	5 to 6 (one way)
Street Buffer (west)	0 to 18	0 to 18	6
Parking Lane (west)	7	N/A	8
Parking Lane (east)	7	8	8
Street Buffer (east)	5	2 to 12	6
Separated Bike Lane (east)	N/A	8 to 10 (two way)	5 to 6 (one way)
Ped/Bike Buffer (east)	N/A	0 to 5	2 to 6
Sidewalk (east)	4	5 to 6	6

Table 2: CSDG Town Center Street Compliance

<b>University Boulevard to Merrimac Drive</b>	<b>Existing (ft)</b>	<b>Proposed (ft)</b>	<b>CSDG (ft)</b>
Sidewalk (west)	5 to 6	5 to 6	8 to 10
Ped/Bike Buffer (west)	N/A	18 to 24	2 to 6
Separated Bike Lane (west)	N/A	5 (one way)	5 to 6.5 (one way)
Street Buffer (west)	18 to 24	2	6
Street Buffer (east)	N/A	2	6
Separated Bike Lane (east)	N/A	5 (one way)	5 to 6.5 (one way)
Ped/Bike Buffer (east)	N/A	0	2 to 6
Sidewalk (east)	N/A	5	8 to 10

Overall, sidewalk widths in the proposed project are narrower than what is recommended in the *Complete Streets Design Guide*, and, in some places, there remain no street buffers between the sidewalks and the roadway. The proposed separated bike lanes meet the minimum recommended widths. Even though the proposed pedestrian and bicycle facilities do not always achieve the CSDG standards, the project will improve pedestrian and bicyclist safety and comfort, as shown in the next section.

Beyond facility width recommendations, the CSDG also provides guidance for protected intersection spacing. For Town Center Streets, the maximum spacing for protected crossings and the minimum spacing for signalized intersections is 400 feet. The distance between Merrimac Drive and University Boulevard is about 550 feet, slightly greater than recommended. For Neighborhood Connectors, protected crossings should be 600-1,200 feet apart, and signalized intersections should, at minimum, be 1,300 feet apart. The distance between signalized intersections at University Boulevard and Piney Branch Road is about 2,200 feet, which is greater than the recommended spacing. The project will add a raised crosswalk to the protected intersection in front of New Hampshire Estates Elementary School, 1,550 feet north of University Boulevard and 550 feet south of Piney Branch Road—which is slightly greater than CSDG guidance. While no additional protected intersections are provided, new raised



crossings will be located at Osage Street and 11<sup>th</sup> Avenue; each of these are about 400 to 550 feet apart.

### Pedestrian Level of Comfort and Bicycle Level of Traffic Stress

With the proposed design and traffic calming treatments, the Pedestrian Level of Comfort (PLOC) and Bicycle Level of Traffic Stress (BLTS) scores generally improve from existing levels. As discussed in “Section 2 – Project Description,” PLOC scores range from one (1), meaning “very comfortable” and four (4), meaning “undesirable.” BLTS scores range from one (1), “very low stress,” to five (5), “very high stress.” Scores exceeding PLOC 2 or BLTS 2 should be avoided. The tables below (Table 3 and Table 4) summarize the changes with the proposed project.

Table 3: Summary of the Change in PLOC from Existing to Proposed Conditions

Street Location	Existing PLOC (west)	Proposed PLOC (west)	Existing PLOC (east)	Proposed PLOC (east)
Merrimac Drive to University Boulevard	1	1	4	2
University Boulevard to 200’ north of 11 <sup>th</sup> Avenue	1	1	2	1
200’ north of 11 <sup>th</sup> Avenue to 200’ south of Piney Branch Road	2	3	1	1
200’ south of Piney Branch Road to Piney Branch Road	3	3	3	3

Table 4: Summary of the Change in BLTS from Existing to Proposed Conditions

Street Location	Existing BLTS (west)	Proposed BLTS (west)	Existing BLTS (east)	Proposed BLTS (east)
Merrimac Drive to University Boulevard	3	2	3	2
University Boulevard to 200’ north of 11 <sup>th</sup> Avenue	3	N/A	2.5	2
200’ north of 11 <sup>th</sup> Avenue to 200’ south of Piney Branch Road	3	N/A	2.5	2
200’ south of Piney Branch Road to Piney Branch Road	3	N/A	3	2

Where the bike lanes will be constructed, PLOC and BLTS scores improve to PLOC 2 and BLTS 2 or better. To accommodate the bicycle lanes on the north portion of Carroll Avenue, in front of New Hampshire Estates Elementary School, the curb will be shifted closer to steep grades on the edge of the road. As a result, the street buffer will be removed on the west side of the road, increasing pedestrian stress from PLOC 2 to PLOC 3. Finally, there are some sections of the project that the Applicant is proposing to leave unchanged, especially the sidewalks on Carroll Avenue closest to Piney Branch Road, which will retain PLOC 3.

## Environment

The project conforms to the Planning Board-approved Environmental Guidelines for Environmental Management of Development in Montgomery County.

The property is located within the Sligo Creek Watershed, which is a Use I watershed.<sup>4</sup> There are no stream buffers, wetlands, or 100-year floodplains on-site. The soils on the property are classified as urban land and are not considered highly erodible or sensitive. There are no known rare, threatened, or endangered species on the Property.

Any environmental impacts have been minimized to the greatest extent possible but are necessary and unavoidable to achieve the design standards of the proposed bikeway. The following sections evaluate project compliance with forest conservation and stormwater management regulations.

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## FOREST CONSERVATION

The project is subject to Chapter 22A, Montgomery County Forest Conservation Law, but exempt from Article II and from the submission of a forest conservation plan under Section 22A-5(e) as a “county and municipal highway project.” Therefore, a Forest Conservation Exemption request was granted under Section 22A-5(e) by NRI/FSD 42024072E on May 23, 2024. While the project is exempt from Article II of the Forest Conservation Law, the Applicant is still required under Section 22A-9 of the County Code to prepare a plan that demonstrates:

- a) General.
  - a. This Section applies to construction of a highway by the County or a municipality as part of an approved Capital Improvements Program project.
  - b. The construction should minimize forest removal, land disturbance, and loss of significant, specimen, or champion trees to the extent possible while balancing other design, construction, and environmental standards. The constructing agency must make a reasonable effort to minimize land disturbance to avoid the cutting or clearing of trees and other woody plants.
- b) If the forest to be cut or cleared for a County highway project equals or exceeds 20,000 square feet, the constructing agency must reforest a suitable area at the rate of one acre of protected reforestation for each acre of forest cleared.
- c) Reforestation for County highway projects must meet the standards in subsections 22A-12(e), (g) and (h).
- d) Any mitigation requirement for loss of significant, specimen, or champion trees must be based on the size and character of the tree.

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<sup>4</sup> Use I: WATER CONTACT RECREATION, AND PROTECTION OF NONTIDAL WARMWATER AQUATIC LIFE

*Waters that are suitable for: water contact sports; play and leisure time activities where the human body may come in direct contact with the surface water; fishing; the growth and propagation of fish (other than trout); other aquatic life, and wildlife; agricultural water supply, and industrial water supply.*

The exemption includes a required a 22A-9 plan . Because the project under review is only at the 35% design stage, the Tree Save Plan is preliminary. MCDOT will submit a Final Tree Save Plan to Planning Staff for review and approval during the final (100%) design phase of the project. A final Tree Save Plan must be submitted and approved by Planning Staff prior to clearing, grading, or demolition for each phase of construction, whichever comes first.

## **Mitigation**

Under Section 22A-9 of the County Code, mitigation is required for the removal of significant and specimen trees. One (1) significant tree being removed from the right-of-way equals 26 inches of diameter at breast height (DBH). Mitigation should be at a rate that approximates the form and function of the trees removed—in this case, as new street trees. Therefore, Planning Staff recommend that replacement occur at a ratio of approximately one-inch caliper for every four inches DBH removed and that each tree replanted is at least three-inch caliper in size or larger. The 26 inches of DBH removed will be mitigated by the Applicant with 6.5 caliper-inches of trees.

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## **STORMWATER MANAGEMENT**

The stormwater management concept for the project was approved by the Department of Permitting Services (DPS) on October 10, 2024. The Applicant requested a waiver in-lieu of meeting required stormwater management goals. The following items will need to be addressed during the detailed sediment control/stormwater management plan stage:

- a) A detailed review of the stormwater management computations will occur at the time of detailed plan review.
- b) An engineered sediment control plan must be submitted for this project.
- c) Provide documentation from SHA that the downstream storm drain is adequate.
- d) Permission must be obtained for proposed location of work on private property.

## **Historic Preservation**

The proposal will not have a direct impact on any historic resources, and a Historic Area Work Permit is not required.

## **Parkland**

The proposal will not have a direct impact on any park resources, and a Park Construction Permit is not required.

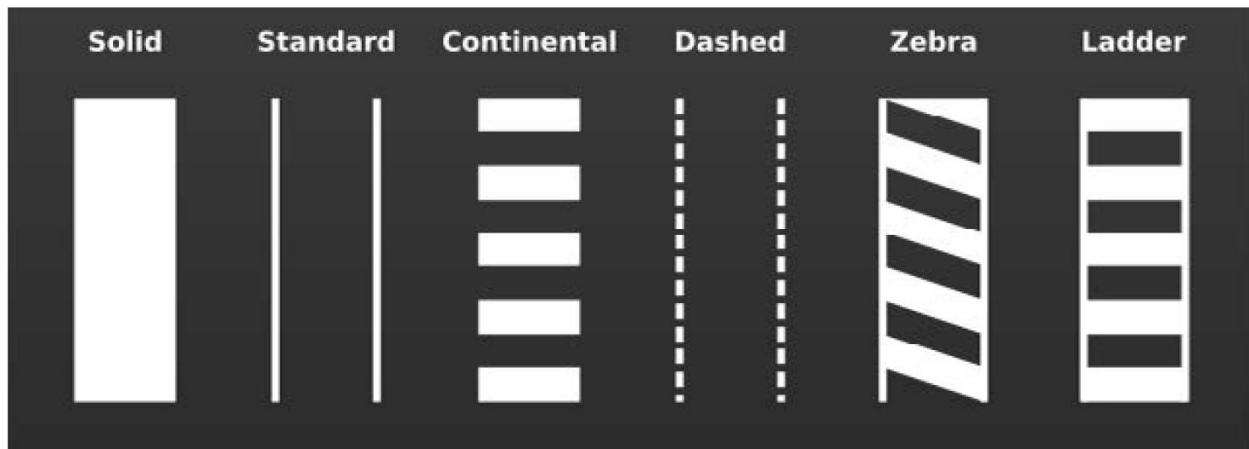
## SECTION 4 – RECOMMENDED COMMENTS

The following comments aim to improve the safety, design, and environmental quality of the proposed project. Carroll Avenue runs north-south. However, all engineering drawings for this project are oriented so that Carroll Avenue is horizontal on each page; north is on the right of each page. This flipped orientation is referenced throughout this section.

1. **Replace proposed continental crosswalks with ladder crosswalks, provide tactile warning surfaces in all curb ramps, and provide directional crosswalks at all legs of an intersection.**

The Applicant proposes to construct continental crosswalks. However, the *Pedestrian Master Plan* (2023) recommends to “establish ladder-style, high-visibility crosswalks as the default crosswalk design in Montgomery County... because it incorporates the parallel lines of the standard-style crosswalk that pedestrians with low vision find helpful for maintaining the correct heading in the crosswalk.” Figure 6 illustrates different marked crosswalks—continental, zebra, and ladder designs are classified as “high-visibility.” The *Complete Streets Design Guide* states that “Ladder crosswalks are the primary types of crosswalk markings used at intersections and uncontrolled crossings in Montgomery County,” though it also notes that “continental-style crosswalks are an accepted alternative design but is recommended only for crossings with low motor vehicle volumes and speeds as well as low volumes of crossing pedestrians and bicyclists.”

Figure 6: Different Marked Crosswalk Designs



The *Pedestrian Master Plan* recommends crosswalks be provided at all intersection legs, and the *Complete Streets Design Guide* states that “the preferred standard is two perpendicular curb ramps per corner, each aligning with desired paths of travel.” Figure 7 and Figure 8 show specific curb ramps that are missing tactile warning surfaces as red stars. These include the following locations: curb ramps at Stations 13+50, 14+00, 34+50, 35+00, 38+00, 38+50 and the east side of Carroll Avenue between University Boulevard and Merrimac Drive.



Figure 7: Curb Ramps Missing Tactile Warning Surfaces Between Merrimac Drive and University Boulevard

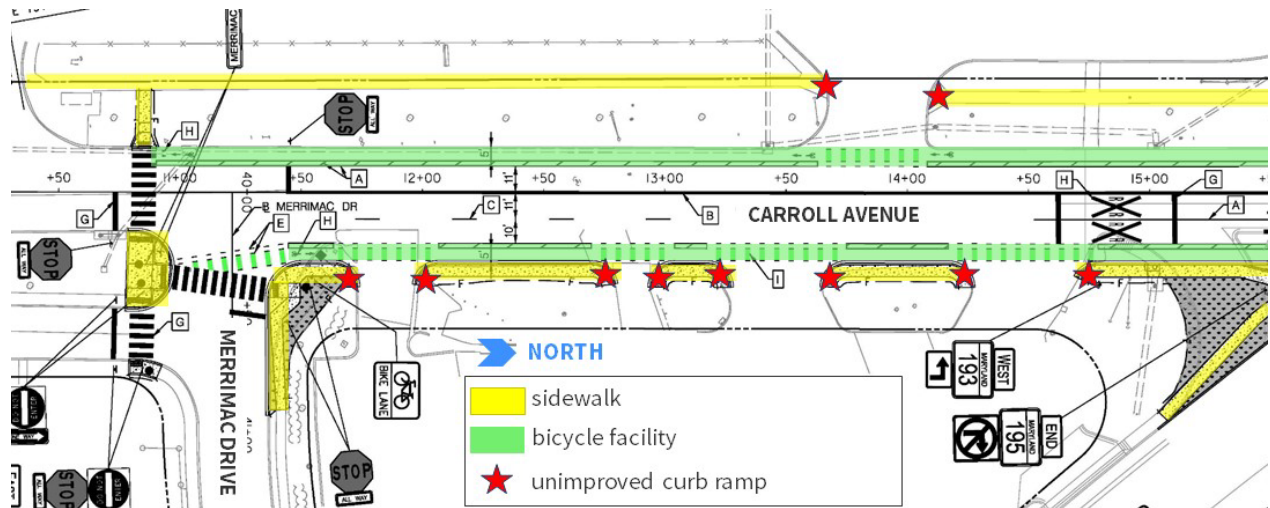
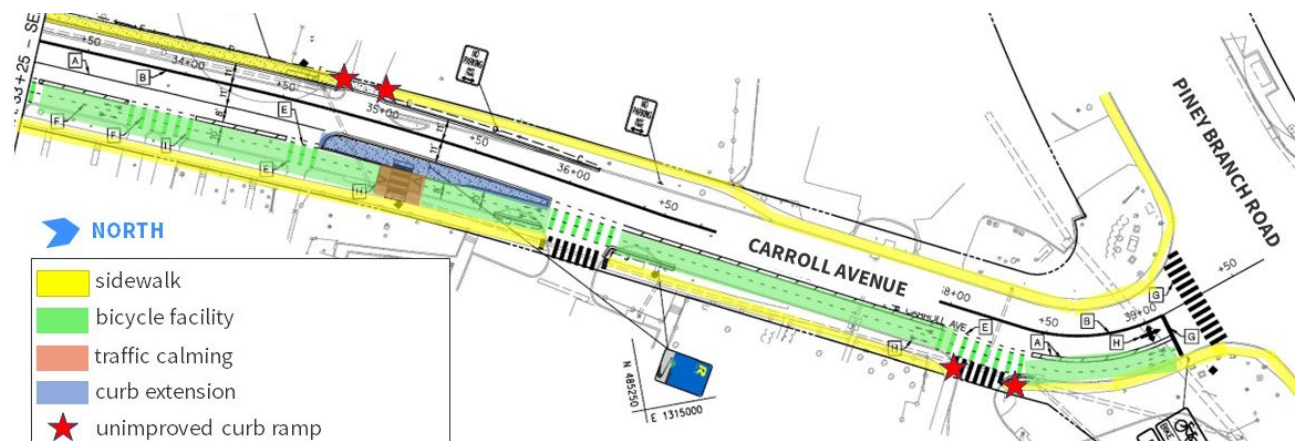
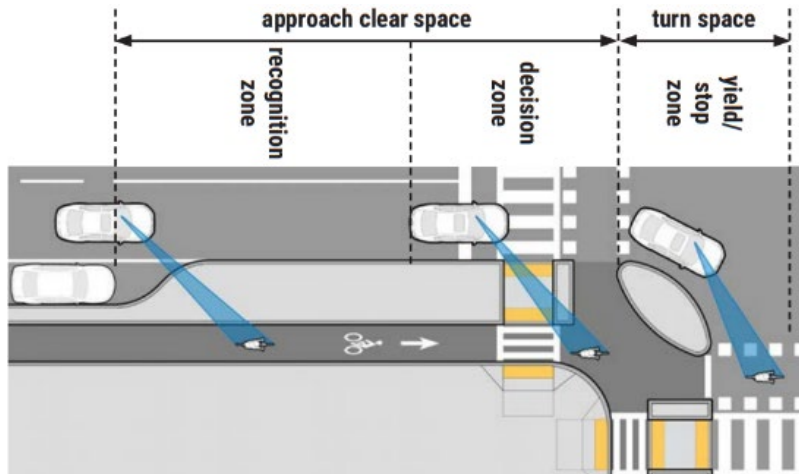


Figure 8: Curb Ramps Missing Tactile Warning Surfaces Near Piney Branch Road



- Tighten curb radii to 15 feet and provide protected intersections with corner islands as described in the 2024 Complete Streets Design Guide.** Guidance for turning radii includes that “designers should assume a maximum 10 miles per hour turning speed for passenger cars and a 5 miles per hour for all other vehicles.” Providing tight turning radii is essential to reducing the turning speed of motor vehicles, improving visibility among motorists, pedestrians, and bicyclists, and reducing the likelihood and severity of collisions between roadway users. Additionally, smaller curb radii shorten pedestrian street crossings, which reduce exposure to conflict and make it easier to provide directional curb ramps to better guide pedestrians in the crosswalk. Per the CSDG, a protected intersection “provides a physical barrier between bicycles and motor vehicles within the intersection.” Figure 9 demonstrates the benefits of protected intersections with smaller turning radii.

Figure 9: Tighter Curb Radii and Corner Island Visibility Illustration



- 3. Reconfigure the intersection and crossings at Merrimac Drive and Carroll Avenue to improve bicycle and pedestrian safety, visibility, and connectivity.** Figure 10 shows the Applicant’s proposed design for this intersection. As illustrated in Figure 11, Staff recommend adding a bicycle turning box to allow cyclists riding southbound on Carroll Avenue to safely turn left onto Merrimac Drive. Staff also recommend extending the median between Carroll Avenue and the service road to provide more space for cyclists and pedestrians and clear sight lines for vehicles. This also ensures that vehicles turning left from the service road onto Merrimac Drive enter the road further behind the stop bar at the Merrimac Drive/Carroll Avenue intersection. Finally, per the *Pedestrian Master Plan (2023)* and “Recommendation 1” in this report, the Applicant should construct an additional ladder-style pedestrian crossing over Carroll Avenue on the north side of Merrimac Drive and reconfigure all other crossings to be as perpendicular as possible.

Figure 10: Applicant-Proposed Configuration of Merrimac Drive and Carroll Avenue Intersection

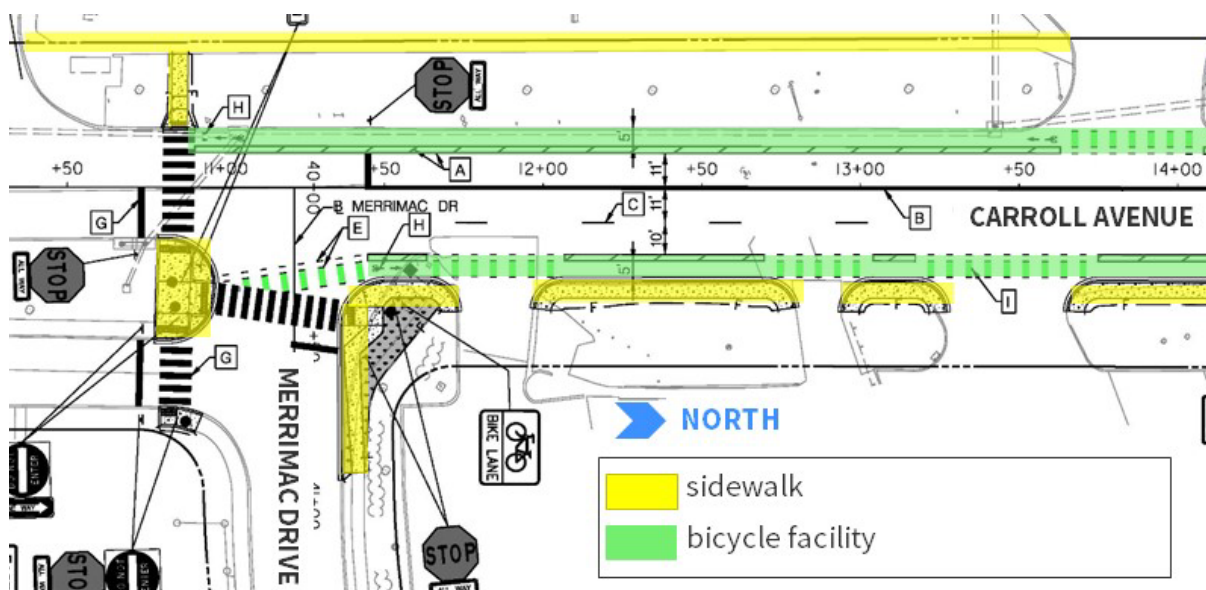
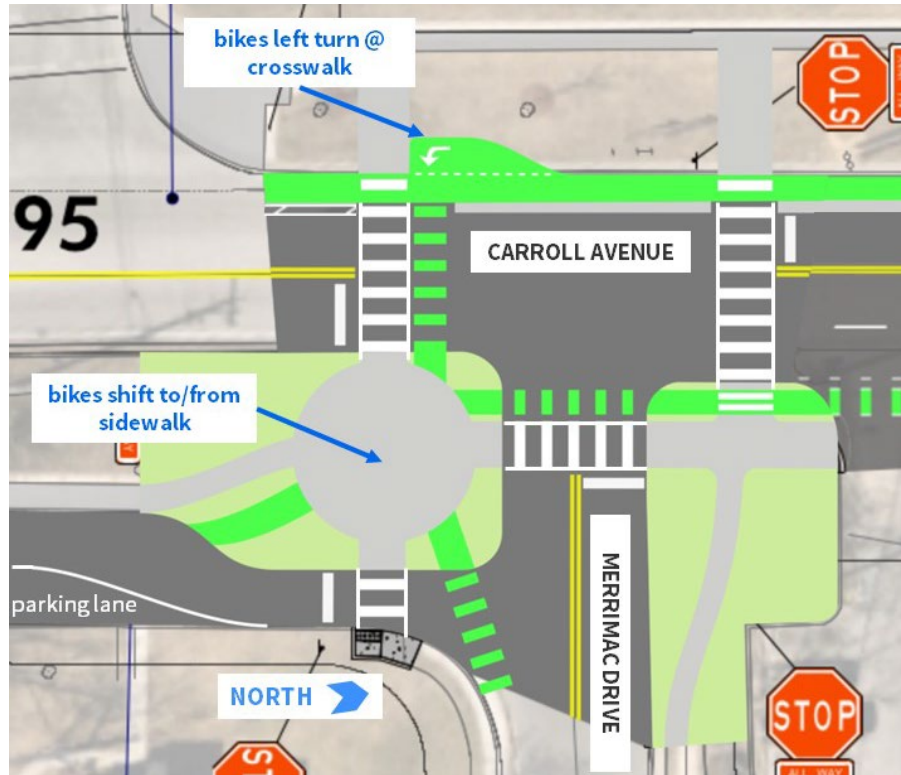


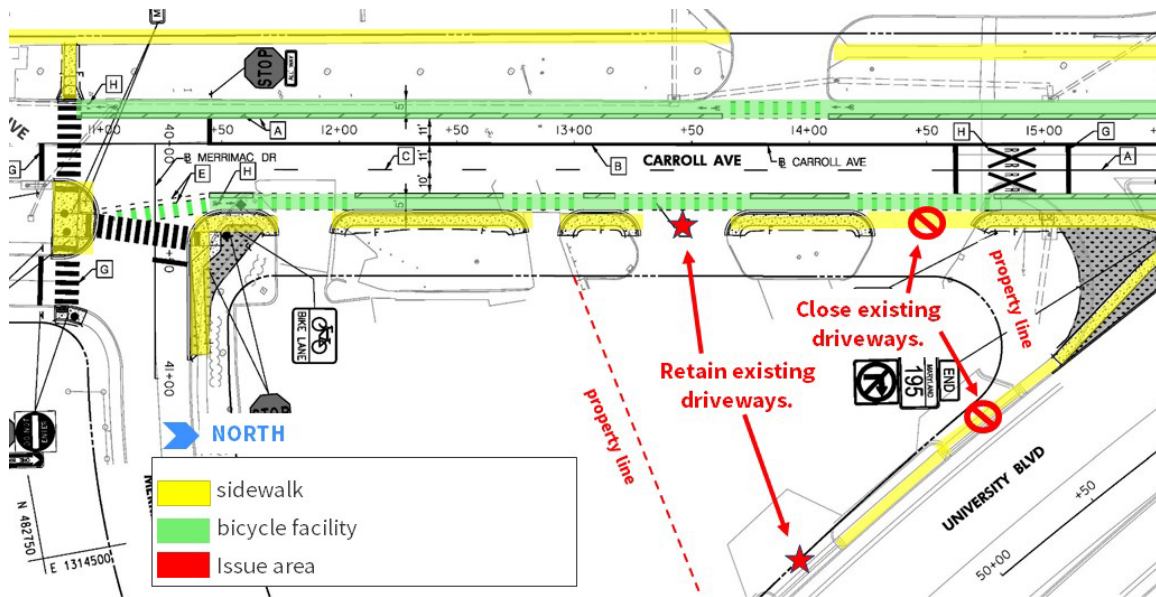
Figure 11: Staff-Recommended Configuration of Merrimac Drive and Carroll Avenue Intersection



4. **Close the two existing driveway curb cuts to the Falcon Fuel gas station that are closest to University Boulevard.** The *Complete Streets Design Guide* recommends that “reducing or consolidating driveways can help create a pedestrian and bicycle-oriented environment with continuous sidewalks and bikeways, street trees, lighting, and on-street parking.” As shown in Figure 12, the existing gas station at 925 University Blvd E, Silver Spring, MD 20903 currently has four curb cuts, two of which are within 100 feet of the University Boulevard and Carroll Avenue intersection. Given that the proposed project will remove the existing slip-lane for right turns from Carroll Avenue onto University Boulevard and divert right turning traffic onto Merrimac Drive, it’s likely that drivers use the gas station curb cuts as a cut-through from northbound Carroll Avenue to eastbound University Boulevard. To reduce this behavior and reduce conflict points with pedestrians and cyclists on Carroll Avenue, the Applicant should work with the property owner of Falcon Fuel to close two of the four curb cuts.

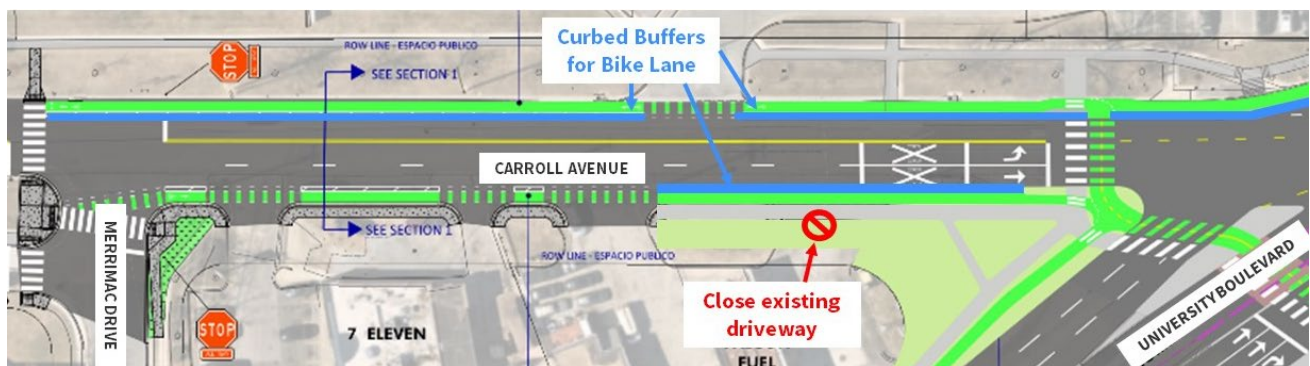


Figure 12: Falcon Fuel Driveways and Closure Recommendations



- 5. Install concrete protection curbs instead of temporary flexposts between the separated bike lanes and vehicle lanes, where possible.** Install concrete protection for the bike lane while still providing adequate turning radii to allow safe movement for vehicles at driveways. Figure 13 demonstrates possible locations for concrete protection curbs (shown in blue) between University Boulevard and Merrimac Drive, where there is a long stretch of roadway without driveways. Falcon Fuel driveway closures from Recommendation 3 could provide additional space for concrete buffers. Additional opportunities for concrete protection curbs should be considered in similar sections with few driveways.

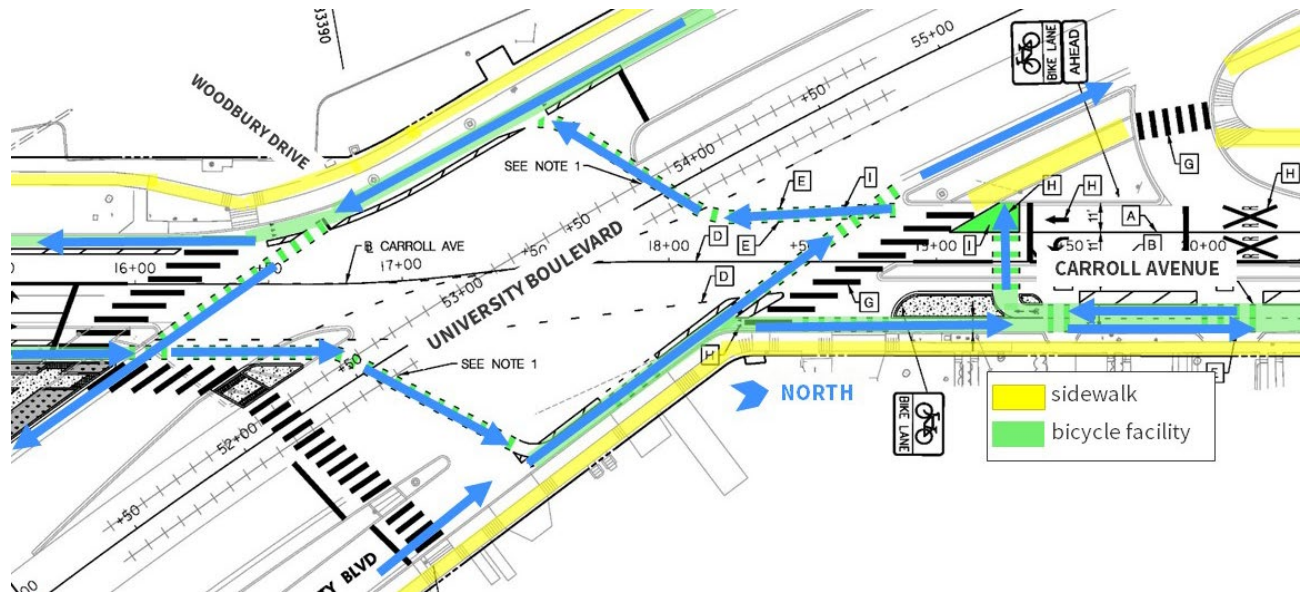
Figure 13: Recommended Concrete Protection Curbs between Merrimac Drive and University Boulevard



- 6. Consider constructing two-way, protected bicycle crossings across University Boulevard to reduce bicycle travel time and extend medians to improve safety.** The proposed design will construct one-way crossings in the direction of vehicle traffic to connect Carroll Avenue across University Boulevard, shown in Figure 14. With such a large, signalized intersection, bicyclists will have to complete two or three crossings to make left turns.



Figure 14: Proposed Configuration of University Boulevard/Carroll Avenue Intersection with Bicycle Movements

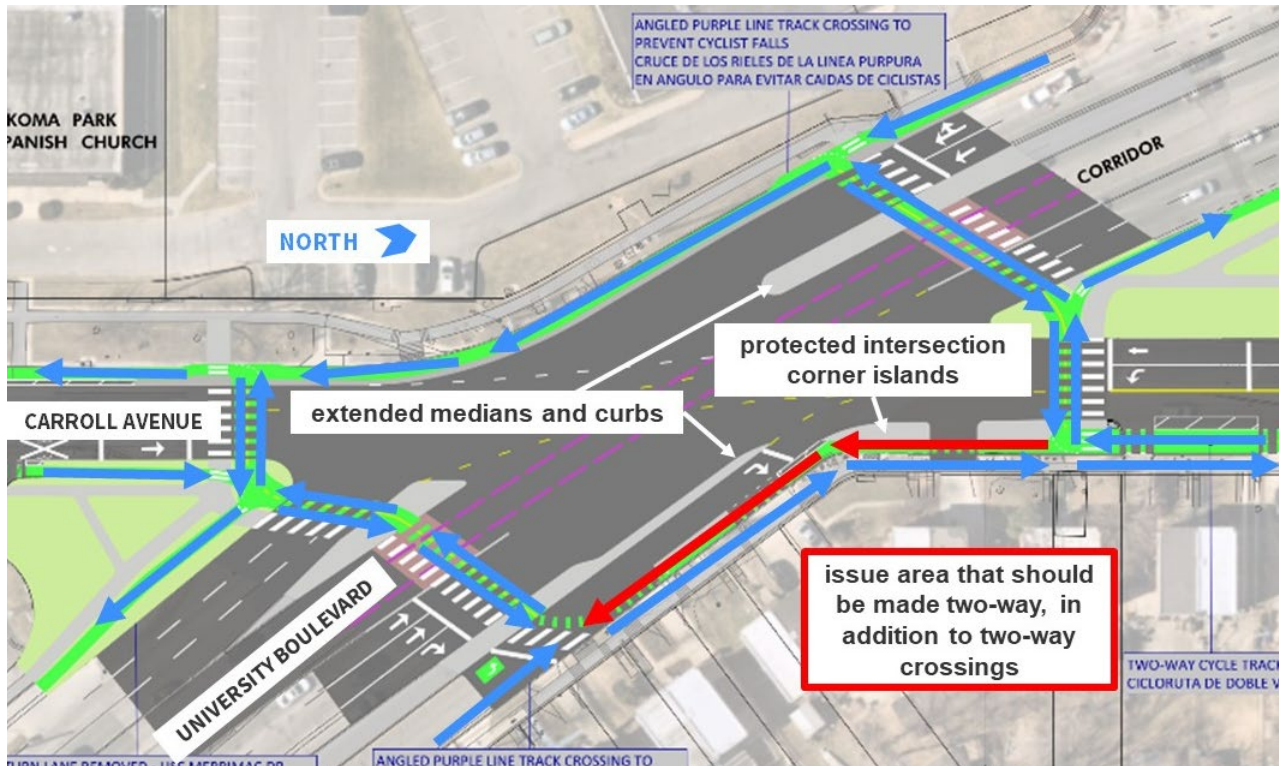


Providing two-way, protected crossings would reduce the distance that cyclists must travel while improving wayfinding and visibility. Figure 15 shows an existing intersection in Antwerp, Belgium that includes a median-running light rail line with two-way, protected bicycle crossings. Figure 16 shows a possible, two-way crossing configuration for the Carroll Avenue and University Boulevard intersection that involves extending curbed medians and a barrier for the University Boulevard Service Road on the northeast side of the intersection (shown in the bottom left corner in Figure 16). In addition to two-way crossings, the section of bike lanes on the northeast corner of the intersection should be made two-way, shown with red arrows in Figure 16. This will create the shortest and safest paths for cyclists and eliminate any wrong-way movements in the bike lane.

Figure 15: Intersection Design in Antwerp, Belgium with Two-Way Bicycle Crossings and Corner Islands



Figure 16: Possible Design of University Boulevard and Carroll Avenue with Two-Way Bicycle Crossings

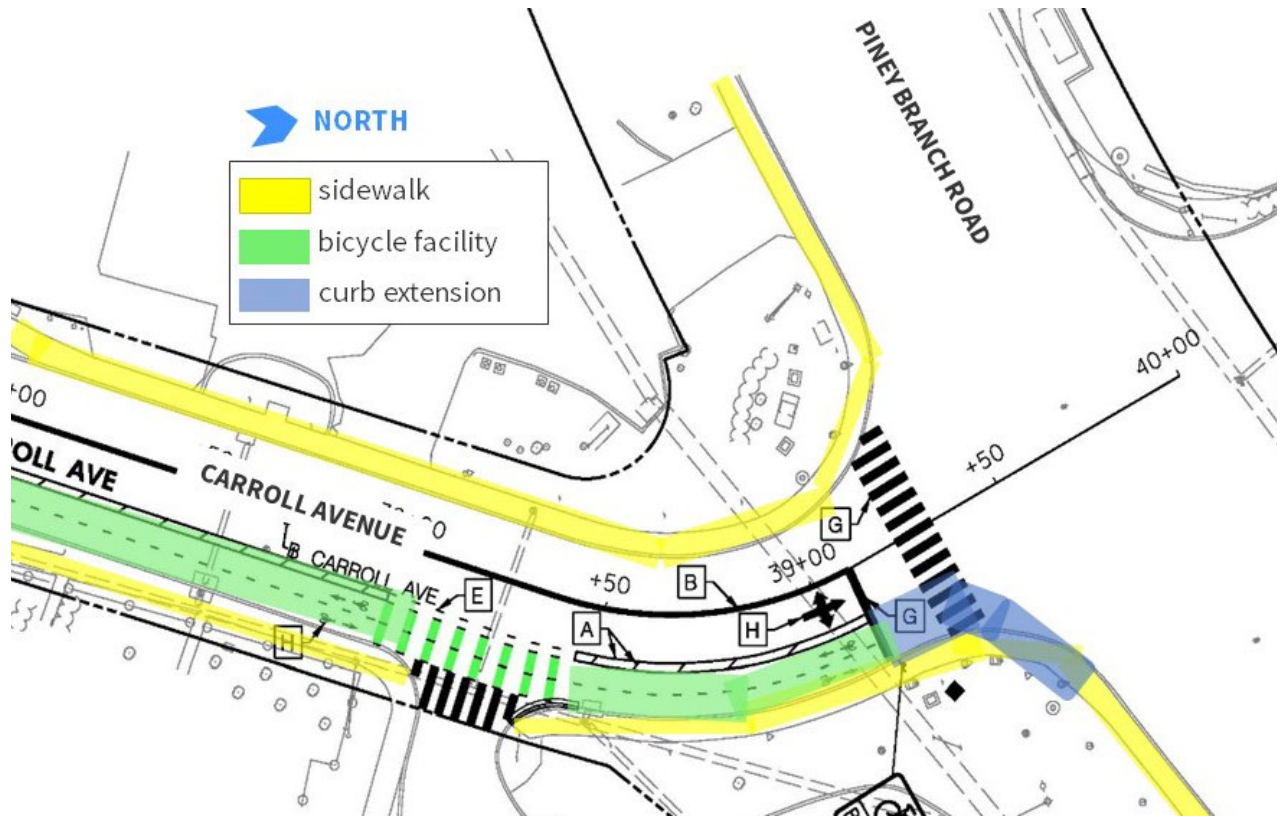


7. **Construct a curb extension at the southeast corner of Piney Branch Road and Carroll Avenue, at Station 39+00, to improve how the two-way separated bike lanes transition to and from the sidewalk.** Since there are no existing bicycle facilities on Piney Branch Road, bicyclists will



need to transition either to the roadway or the sidewalk. In addition, vehicles turning right from Carroll Avenue onto Piney Branch Road may encroach into the bicycle lane if there is no physical barrier preventing that movement. A curb extension with sidewalk access, shown in blue in Figure 17, would provide a solution to both challenges.

Figure 17: Recommended Curb Extension with Sidewalk Access at Piney Branch Road and Carroll Avenue



8. **Submit a Final Tree Save Plan to Montgomery Planning for review and approval during the final (100%) design phase of the project.** A final Tree Save Plan must be submitted and approved by Planning Staff prior to clearing, grading, or demolition, whichever comes first, for each phase of construction. The forest conservation inspector can require mitigation for heavily impacted significant and specimen trees which have died due to construction activities.
9. **Use planting techniques that maximize soil volumes per tree and increase tree survivability in streets, sidewalks, and on redevelopment projects.** This can include interconnected tree panels and tree pits.
10. **Stormwater treatment should meet or exceed minimum standards and include application of environmental site design (ESD) to minimize impervious areas.** This can include porous pavers/concrete or other pervious materials, as well as harvested rainwater. Controlling stormwater runoff through treatment and reduced impervious cover will improve water quality and increase habitat in aquatic diversity while improving quality of place.

11. **Increase tree canopy coverage with native species.** Per the *Takoma-Langley Crossroads Sector Plan* (2012), increase canopy and subcanopy tree cover to between 25 and 35 percent for commercial areas by planting native, drought tolerant species within open spaces, along stream valley buffers, within parks, along streets, and if practical, within stormwater facilities. Native tree species are recommended for any landscape trees, per *Takoma-Langley Crossroads Sector Plan* (2012) . Refer to the *Montgomery County Tree Manual* for details.

## SECTION 5 – COMMUNITY OUTREACH

The Applicant, MCDOT, held public community meetings on March 7, 2023 and December 5, 2023. After Planning Staff accepted the Mandatory Referral for review on August 28, 2024, Planning Staff notified local civic and homeowners’ associations and other interested parties of this proposal. As of the date of this report, Planning Staff have received no comments on this project from the public.

## SECTION 6 – CONCLUSION

Planning Staff recommends approval and transmittal of comments to the Montgomery County Department of Transportation.

## SECTION 7 – ATTACHMENTS

Attachment A: Corridor Engineering Drawings