

# Preliminary Planning Report

MD 28 / MD 198 SEGMENT D

(OLD COLUMBIA PIKE TO US 29A)



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# EXECUTIVE SUMMARY

The Maryland Department of Transportation State Highway Administration (MDOT SHA) has completed preliminary planning with analysis of traffic, safety, preliminary planning engineering, and preliminary environmental assessments along MD 198 within the Burtonville Commercial Area (Segment D). MDOT SHA received funding through the 2020 State Legislature Special Fund appropriation<sup>1</sup> to advance preliminary planning for Segment D beyond the planning efforts summarized in the *January 2021 MD 28/MD 198 Corridor Improvement Study Recommendations* report. This additional and refined analyses will inform and streamline the subsequent project development phases (i.e., Preliminary Design and Environmental Approvals).

Within the 10.6 mile MD 28/MD 198 Corridor Study, Segment D is the 0.3-mile segment of the MD 28/MD 198 corridor from the Old Columbia Pike intersection to the US 29A

intersection in Burtonville (see **FIGURE 1-1**). This portion of MD 198 in Burtonville is a residential and commercial area characterized as “Suburban” in MDOT SHA’s *Context Driven: Access & Mobility For All Users 1.0 Guide*.

The purpose of the refined preliminary planning analysis is to assess potential strategies within Segment D to improve local safety and operations for pedestrians, bicyclists, and motorists; to manage access; and to preserve the quality of life while considering local planning visions and state growth policies.

The need for transportation improvements within Segment D is shown by gaps in multi-modal connectivity, congestion during the morning (AM) and afternoon (PM) peak periods, and certain types of crash rates that are higher than the statewide average.

The needs analysis focused on the following three goals:

- » **Goal 1:** Improve Multi-Modal Connectivity, Accessibility, and Congestion through management of turning queues and intersection delays, and provision of bicycle and pedestrian accommodations.
- » **Goal 2:** Improve Roadway Safety by reducing crash rates and by balancing local community access with mobility.
- » **Goal 3:** Ensure a State of Good Repair for Fixed Assets through management of pavement conditions and drainage facilities.

This report helps streamline the preliminary design phase by identifying impacts based on detailed topographic and building surveys (Pages 24-36) and streamlining environmental approvals based on updated environmental inventories (See Page 38).

<sup>1</sup> The Joint Chairmen’s Report – Operating Budget, April 2020 appropriated funding for preliminary planning on “Safety, Congestion Relief, and Community Enhancement” for MD 28/MD 198 within Segment D





The analyses provided in this report are the results of a collaborative effort between MDOT SHA, Montgomery County, the Maryland-National Capital Park and Planning Commission (M-NCPPC), and incorporating information from the Burtonsville Crossroads Neighborhood Plan, Fairland Master Plan, and Montgomery County Bicycle Master Plan (Page 34). The report also includes updated **traffic and safety analyses**, considerations for a **state of good repair**, refined preliminary **planning engineering analyses**, and preliminary **environmental assessments**.

**Traffic and Safety Analysis:** MDOT SHA analyzed Existing (2019), No-Build (2045), and Build (2045) traffic operation and safety conditions based on Goals 1 and 2. The Measures of Effectiveness (MOE) of these goals include Pedestrian-Route-Directness (PRD), Bicycle Level of Traffic Stress (LTS), AM and PM peak period vehicle queues, intersection Level of Service (LOS), and Crash Rates.

**State of Good Repair:** MDOT SHA analyzed existing fixed asset conditions based on Goal 3. The MOE of this goal include Pavement Life Extension (Year) and pipe and outfall condition (Rating).

**Planning & Engineering Analysis:** In analyzing proposed geometric improvements, MDOT SHA considered two mainline strategies: 1) a four-lane raised median divided typical section, and 2) a five-lane roadway including a center two-way left turn lane typical section. Both strategies include wide/bikeable shoulders, sidewalks, shared-use paths, and a reconfiguration of the Old Columbia Pike/MD 198 intersection. The reconfigured intersection improvements include additional turn lanes along the western and southern legs and increased queuing storage for left turning vehicles from MD 198 westbound. In addition, accommodations for turning vehicles along MD 198 at the entrance to the Burtonsville Town Square were evaluated along with the signalization of this intersection. Installation of the four-lane typical section strategy is contingent upon implementation of the Montgomery County Burtonsville Access Road (BAR), which is listed in Montgomery County's Capital Improvements Program (FY2021-2026). The BAR would provide alternative access to properties along the north side of MD 198, consistent with the 2012 Burtonsville Crossroads Neighborhood

*Plan.* The BAR improvements could include access consolidation for businesses along MD 198, improving operations and safety.

The proposed concepts include improved safety, multimodal-connectivity, accessibility, and congestion. Improvements such as sidewalks, bikeable shoulders, and shared-use paths are compatible with local master plans.

The results of the detailed refinements of the proposed strategies include:

- » Updated roadway typical sections to meet current design criteria.
- » Preliminary planning level stormwater management.
- » Updated planning level design, right-of-way (RW), and construction cost estimates.

**Environmental Inventory:** The preliminary environmental inventories indicate minimal potential impacts to natural resources within the study area of Segment D. The natural resources present in the area include streams and wetlands, highly erodible soils,

watersheds, and significant trees. No rare, threatened, or endangered species were identified within the study area. A cemetery is located west of Old Columbia Pike and unrecorded architectural resources and Santini Local Park are also in the area of potential effects. MDOT SHA would need to conduct a detailed study during the design phase to identify natural, cultural, or socioeconomic impacts within the study area and area of potential effects. Segment D is entirely within a state Priority Funding Area.

In addition to MDOT SHA policies and guidelines and community needs, the results presented in this report consider recommendations from the 2012 Burtonsville Crossroads Neighborhood Plan, the 2018 Montgomery County Bicycle Master Plan, and the 1997 Fairland Master Plan, as appropriate, in refining the proposed strategies. Recommendations carried through from the above plans include numbers of lanes, typical section features, intersection configurations, access points, and types of bicycle and pedestrian facilities.

This report summarizes the benefits of the proposed strategies within the Burtonsville

Commercial Area as shown in items 1 through 6 on the following pages. The four-lane and five-lane strategies meet the goals identified in this report, as follows:

1. Enhance pedestrian experience by bridging the gaps that exist along non-continuous sidewalks, missing crosswalks, and paths (improved existing PRD to less than 1.5 for travel patterns over 500 feet in distance).



CLOSING GAPS IN THE SIDEWALK NETWORK WILL IMPROVE ACCESS AND SAFETY FOR PEDESTRIANS.



- 2. Enhance bicycle connectivity to existing bicycle routes and potential generators by accommodating bicycle accessibility along MD 198 (improved existing LTS from a maximum of 3.0 in both directions between Old Columbia Pike and US 29A to be under 3.0 in both directions and 2.5 in at least one direction).
- 3. Reduce AM and PM peak period westbound and northbound vehicle queues by increasing turning bay capacity at the MD 198/Old Columbia Pike intersection (improved vehicle storage space and queues so that all queues in 2045 with the strategies are contained within the designed turn lane storage).



- 4. Improve AM and PM peak period operations by improving the LOS at the MD 198/Old Columbia Pike intersection (improved AM peak LOS [worst case] from LOS D with 54 seconds of average vehicle delay in the 2045 No-Build condition to LOS C with 33 seconds of average vehicle delay in 2045).
- 5. Reduce crash rates along this segment through enhancements to the typical section. These could include narrower lanes and improving vehicular queuing.
- 6. Update fixed assets (i.e., pavement and drainage infrastructure) along Segment D of MD 198.

These preliminary planning analyses have been conducted in partnership with Montgomery County and M-NCPPC. Both strategies are compatible with the County’s master plans where feasible. While the five-lane roadway strategy serves as a step forward in addressing the need within the Burtonsville Commercial Area, implementation of the four-lane roadway with median strategy is most consistent with local master plans, which include the construction of the County’s BAR. These results serve as a baseline for



streamlined future project development analyses and provide detailed information to help MDOT SHA understand funding needs for subsequent project phases. To advance project development, MDOT SHA will need to identify future funding for preliminary engineering, final design, RW acquisition, utility relocation, and construction. It is estimated that these total costs would range from \$32M to \$37M based on current year costs.



# STUDY BACKGROUND

**Overview:** The Maryland Department of Transportation State Highway Administration (MDOT SHA) has completed preliminary planning with analysis of traffic, safety, preliminary planning engineering, and preliminary environmental assessments along MD 198 within the Burtonsville Commercial Area (Segment D). MDOT SHA received funding through the 2020 State Legislature Special Fund<sup>2</sup>, to advance preliminary planning for Segment D beyond the planning efforts summarized in the *January 2021 MD28/MD 198 Corridor Improvement Study Recommendations* report. This additional and refined analyses will inform the subsequent project development phases (i.e., Preliminary Design and Environmental Approvals).

This report presents findings based on the review and analysis of existing and future non-vehicular and vehicular transportation and

operational needs (listed in the next section of this report) within Segment D. These refined results will streamline subsequent project development phases, including required approvals from regulatory agencies, detailed design, RW acquisition, and construction. MDOT SHA, in partnership with Montgomery County and M-NCPPC, would need to identify funding to complete these next steps.

**Area Context:** The transportation and environmental characteristics of this segment include a residential area south of MD 198, commercial strips adjacent to MD 198 with off-street parking, the Burtonsville Town Square, the Burtonsville Office Park, a park and ride lot, and the Burtonsville Elementary School north of MD 198. There are also multiple community facilities scattered north and south of MD 198. The area context meets the criteria of Suburban Context, as defined in the MDOT

*SHA's Context Driven: Access & Mobility For All Users 1.0 Guide.* The lack of adequate pedestrian and bicycle facilities within Segment D discourages non-automobile trips. Based on the current setting and planned developments, this area could grow, increasing non-motorized travel demands.

**Limits:** Segment D is a 0.3-mile section of MD 198 from the Old Columbia Pike intersection to the US 29A intersection in Montgomery County (**FIGURE 2-1**). This segment is part of the 10.6-mile-long MD 28/MD 198 Corridor Improvement Study, the findings of which were included in the *January 2021 MD 28/MD 198 Corridor Improvement Study Recommendations* report. The Corridor Study included five segments of MD 28/MD 198 (A through E) from east of MD 97 to west of I-95. This report focus on Segment D.

FIGURE 2-1

SEGMENT D LOCATION MAP



<sup>2</sup> The Joint Chairmen's Report – Operating Budget, April 2020 appropriated funding for preliminary planning on "Safety, Congestion Relief, and Community Enhancement" for MD 28/MD 198 within Segment D.



# NEEDS ASSESSMENT

The results of the needs assessment presented in this section include the purpose and need as well as the goals and objectives for the preliminary planning analyses in the Burtonsville area.

**Purpose of Analyses:** The purpose of these preliminary planning analyses is to identify opportunities for potential improvements for safety and operations for pedestrians, bicyclists, and motorists, and manage access. Throughout this planning effort MDOT SHA has considered quality of life, local planning visions, and state growth policies.

**Need for Improvements:** The need for transportation improvements is evidenced by high crash rates, multi-modal connection gaps, and congestion during the morning (AM) and afternoon (PM) peak periods. The multi-modal connections needed include accommodations for pedestrians and bicyclists such as bike lanes, sidewalks, and shared-use paths.

**Goals and Objectives:** MDOT SHA has developed three goals with associated objectives to address the needs described above. These goals take into account input from M-NCPPC and Montgomery County.

- » **Goal 1: Improve Multi-Modal Connectivity, Accessibility and Congestion.** Achievement of this goal is evaluated by studying the following objectives:
  - **Objective 1-1:** Improve Pedestrian Access and Mobility
  - **Objective 1-2:** Reduce Bicyclist Level of Stress
  - **Objective 1-3:** Reduce Peak Period Vehicle Queues
  - **Objective 1-4:** Improve Vehicular Level of Service
- » **Goal 2: Improve Roadway Safety.**
  - **Objective 2-1** Achievement of this goal is assessed by reviewing

existing crash data and the estimating the benefits of the proposed strategies on the overall safety in the roadway segment.

- » **Goal 3: Ensure a State of Good Repair for Fixed Assets.** This goal includes:
  - **Objective 3-1:** providing and maintaining pavement conditions in a state of good repair
  - **Objective 3-2:** Providing and maintaining sufficient drainage facilities

MDOT SHA evaluated the proposed MD 198 mainline and intersection improvements and their effectiveness in meeting the goals and objectives. The following sections summarize the results of the refined preliminary planning engineering analysis and the preliminary environmental inventory, conclusions, and next steps.



OLD COLUMBIA PIKE / SPENCERVILLE ROAD AT THE ENTRANCE TO BURTONSVILLE ELEMENTARY.



# GOALS & OBJECTIVES EVALUATION

## GOAL #1: Improve Multi-Modal Connectivity, Accessibility, and Congestion

» **Goal 1:** *Improve Multi-Modal Connectivity, Accessibility, and Congestion.*

This section includes a discussion of existing traffic, various traffic analyses for the two strategies, and an evaluation of how well the strategies address the needs of pedestrians and bicyclists, reduce vehicle queuing and delay, and improve LOS. The results presented in this section show how the improvements address the goals and needs in Segment D.

» **Traffic Operations Background Mainline Strategies:** MDOT SHA has completed a traffic operations analysis of existing (2019) and forecasted (2045) future traffic operations on MD 198 within Segment D. The proposed strategies considered in this analysis consist of two mainline MD 198 strategies: a four-lane divided roadway with a

raised median, and a five-lane roadway with a center two-way left-turn lane. Implementing the four-lane divided strategy is contingent upon Montgomery County’s construction of the Burtonsville Access Road (BAR)<sup>3</sup>. The BAR is a two-lane roadway approximately 1,000 feet long between MD 198 and the existing Burtonsville Elementary School access road. The BAR would assist in fulfilling the access management goals for MD 198 in the 2012 Burtonsville Neighborhood Crossroads Plan. These goals include reducing access points along MD 198, providing safer local circulation for drivers and providing secondary access to the school for safety and efficient student drop off/pick up.

**Intersection Improvements:** MDOT SHA proposes geometric improvements at the MD 198/Old Columbia Pike intersection to address traffic operation needs. To assess

the impacts of the proposed improvements from a roadway network perspective, a traffic analysis was also conducted at the two MD 198 intersections with the Burtonsville Town Square entrance and US 29A.

### » Traffic Volumes

Existing, future no-build, and future build conditions used 2019 and forecasted 2045 volumes in the traffic analyses at the three intersections. **FIGURE 3-1** shows the approximate locations for average daily traffic (ADT) volumes, and **TABLE 3-1** provides the ADTs at these locations for existing and future conditions. The future year ADTs were calculated using existing traffic count data with forecasted traffic volumes. The 2045 forecasted traffic volumes were developed using the Washington, D.C., area regional travel demand model and information from

nearby development proposals. MDOT SHA anticipates that the proposed strategies will add some traffic to Segment D due to improved intersection operations. In addition, the proposed BAR changes ADTs within Segment D as it affects traffic patterns due to changes in access to adjacent properties.

Of note, **TABLE 3-1** indicates some locations where the four-lane divided strategy has higher projected 2045 volumes than the five-lane and no-build conditions. The four-lane divided strategy removes several turning conflicts allowing more vehicles to travel through the area. The addition of the BAR provides increased vehicular circulation and connectivity for motorists within the Burtonsville Commercial Area.

Traffic operations under Goal 1 were analyzed based on the objectives listed in the Needs Assessment. For the purpose of this study, MDOT SHA assumes that the entrance to

**FIGURE 3-1**  
ADT VOLUME LOCATIONS

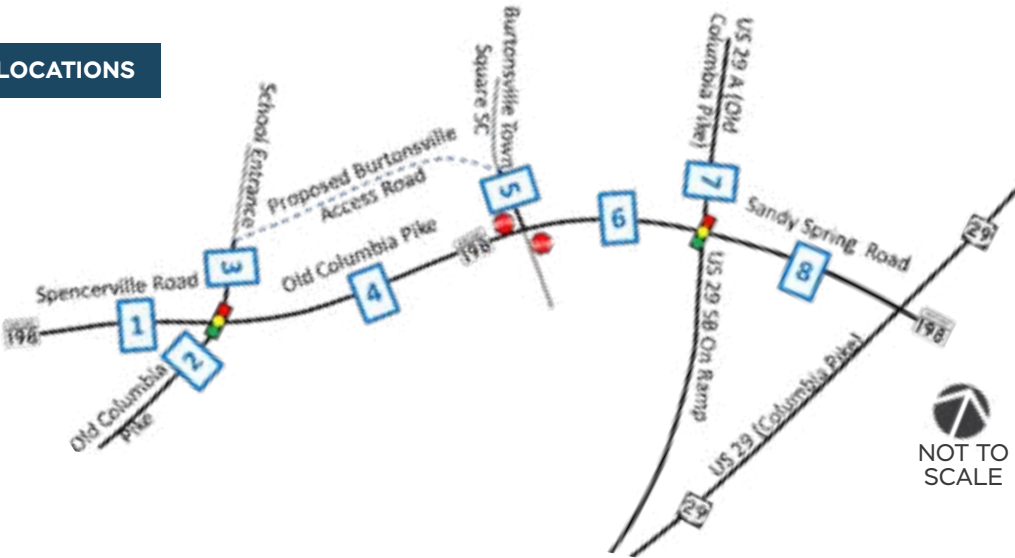


TABLE 3-1: ADT VOLUME SUMMARY (VEHICLES PER DAY)				
Location	2019 Existing	2045 Conditions		
		No-Build	Five-Lane Strategy	Four-Lane Strategy with BAR
1	23,600	29,100	29,400	29,400
2	10,500	15,100	15,400	15,400
3	1,200	1,600	1,600	6,300*
4	30,200	39,100	39,700	45,700
5	4,700	5,000	5,000	6,400
6	29,500	38,400	39,000	42,000
7	15,000	20,000	20,300	20,300
8	35,000	47,100	47,400	47,400

\*The substantial increase at Location 3 is due to diversion from the BAR



the Burtonsville Town Square, which is now controlled by a stop sign, is anticipated to be signalized by 2045. This is the baseline condition to which the Build conditions were compared.

Objective 1-1: Improve Pedestrian Access and Mobility

The MOE for Objective 1-1 is Pedestrian-Route-Directness (PRD). MDOT SHA has identified a target PRD score of 1.5 or less for all routes greater than 500 feet between major Burtonsville pedestrian generators.

**Existing and 2045 No-Build Conditions:** Destinations referenced by numerals in this section can be found on the map (FIGURE 3-2). There are no continuous formal pedestrian pathways in the Burtonsville Commercial Area. A sidewalk exists along

the north side of MD 198 east of the entrance to the Burtonsville Town. Existing pedestrian volumes indicate a presence of moderate pedestrian activity along Segment D which is anticipated to grow with the construction of proposed developments.

**PRD Analysis:** In analyzing the PRD, MDOT SHA considered the following pedestrian generators within the Burtonsville area: (1) Burtonsville Elementary School, (2) park and ride lot, (3) Burtonsville Town Square, (4) Burtonsville Office Park, (5) western residential

TABLE 3-2: PRD SCORE RANGES

Pedestrian Generators	Description: Origin to Destination	PRD		
		2019 Existing and 2045 No-Build Conditions	Montgomery County Master Plans	2045 Five-Lane and Four Lane Build Conditions
Elementary School	Residential Area to Elementary School	NA	1.3 - 1.5	1.2 - 1.5
Park & ride	Residential & Small Businesses to Park & Ride	1.5 or greater	1.2 - 1.3	1.2 - 1.4
Burtonsville Town Square	Residential & Small Businesses to Burtonsville Town Square	1.3 or greater	1.1 - 1.4	1.1 - 1.5
Burtonsville Office Park	Residential & Small Businesses to Burtonsville Office Park	1.2 or greater	1.2 - 1.5	1.2 - 1.5
Small Business	Residential Area to Small Businesses	1.8 or greater	1.1 - 1.5	1.1 - 1.5

PRD ANALYSIS INPUT SUMMARY

Facility	Location	Existing	2045 No-Build	2045 Five-Lane Build	2045 Four-Lane Build
Continuous Sidewalk	North Side	No	No	Yes	Yes
	South Side	No	No	No	No
Continuous Shared-Use Path	North Side	No	No	No	No
	South Side	No	No	Yes	Yes

FIGURE 3-2

MAP OF ORIGIN-DESTINATION TRIP GENERATORS



area, (6) small businesses identified as letters A-T, and (7) residential area to the east. This analysis is based on existing, 2045 No-Build, and 2045 Build conditions.

Scores for the Origin-Destination (O-D) pairs are indicated in TABLE 3-2. If there is no

sidewalk available, the PRD is classified as not applicable because there is no formal walking route. The analysis expects that pedestrians would only cross roadways at marked crosswalks at signalized intersections, and assumes the MD 198/Burtonsville Town Square entrance would be signalized by 2045.

**Analysis Results:** The PRD analysis shows that implementing a continuous sidewalk and shared-use path within Segment D will increase pedestrian mobility within the Burtonsville area, and thus meet Objective 1. Results also show that the PRD score is similar for both strategies and aligns with the *Burtonsville Crossroads*



Neighborhood Plan, the Montgomery County Bicycle Master Plan, and the Fairland Master Plan.

Objective 1-2: Reduce Bicycle Level of Traffic Stress (LTS)

The MOE for this objective consists of ensuring a LTS of 3.0 or less in both directions through Segment D with one direction maintaining a LTS of 2.5 or less.

**Existing and No-Build Conditions:** There are no continuous separated shared-use paths, bike lanes, or bike lanes/shoulders in Segment D. The existing LTS within this segment varies from 1 (low stress) to 4 (high stress). The existing physical conditions of MD 198 in Segment D will generally be

The Bicycle Level of Traffic Stress (LTS) rating illustrates the level of discomfort experienced by bicyclists riding close to vehicular traffic with values ranging from 0 (no stress) to 5 (very-high stress).

maintained in the 2045 No-Build condition. Based on the proposed development within the Burtonsville area, the existing Burtonsville Town Square/MD 198 is assumed to be signalized by 2045. This intersection currently operates with a stop sign.

**LTS Analysis:** In analyzing the LTS, MDOT SHA considered existing speed, traffic volumes, and features of the proposed strategies such as the number of lanes and driveways and buffers from traffic. The LTS analysis followed the methodology used in the Montgomery County Bicycle Master Plan,<sup>4</sup> which defines seven stress levels ranging from 0 (None) to 5 (Very High). **TABLE 3-3** summarizes the LTS analysis results for the 2019 existing, 2045 No-Build, and 2045 Build conditions.

<sup>4</sup> Approved and Adopted, December 2018, Appendix D: Level of Traffic Stress Methodology

**FIGURE 3-3** shows the locations for assessing the LTS labeled A through F. Under the 2045 No-Build condition, the LTS in location B will increase from 2 to 3 due to a turn lane being installed at the proposed signal, which is expected to eliminate the existing median. The existing LTS in location D is 4. While the eastern Segment D limit is US 29A, MDOT SHA included locations C and D during the LTS analysis to show connectivity to adjacent areas.

**Analysis Results:** The analysis results show that implementing the proposed strategies will improve the existing and No-Build LTS along Segment D, thus meeting Objective 1-2. The proposed implementation strategies remove the existing gaps in bicycle amenities by including continuous bikeable facilities on the north and south sides of MD 198 within the Burtonsville Commercial Area.

FIGURE 3-3

LOCATION OF LTS ANALYSIS

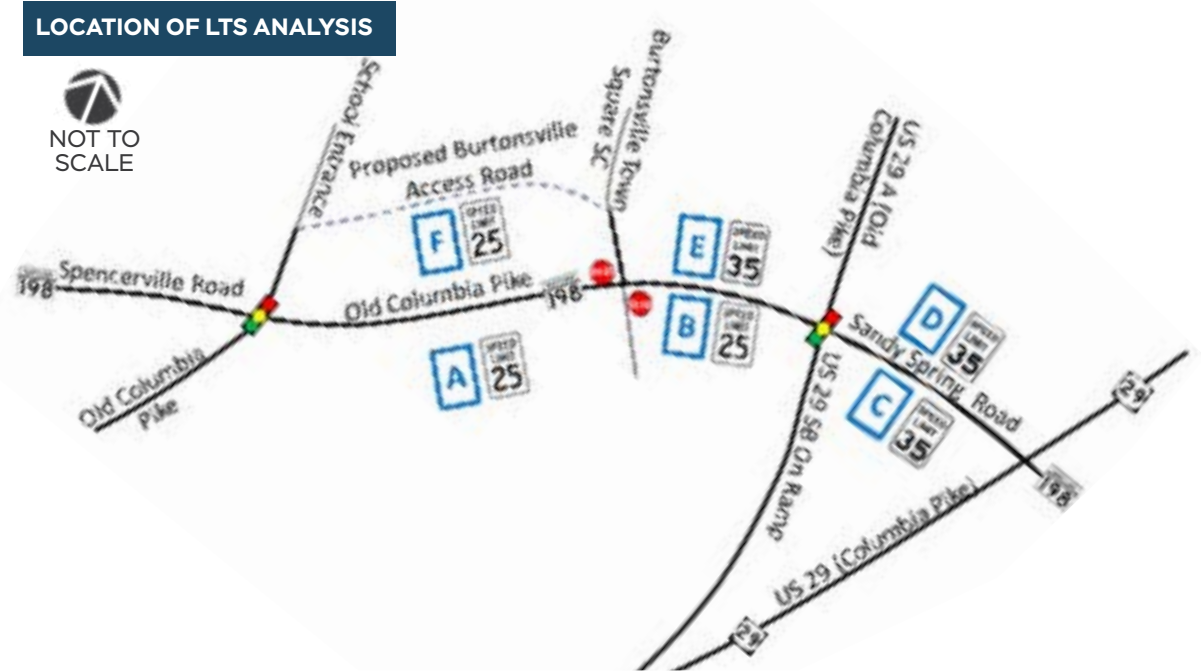


TABLE 3-3: LTS ANALYSIS RESULTS

Direction	Location	2019 Existing	2045 No-Build	2045 Five-Lane	2045 Four-Lane
EB	A	3	3	2	1
	B	2	3	1	1
	C*	1	1	1	1
WB	D*	4	4	4	4
	E	4	4	2	2
	F	3	3	2.5	2

\*These locations are not in study area.



Objective 1-3: Reduce peak Period Vehicle Queues

The MOE for this objective consists of managing the AM and PM peak period vehicle queues so that projected queues are contained within the turning bays at the MD 198/Old Columbia Pike intersection from MD 198 westbound and Old Columbia Pike northbound, respectively.

**Existing and No-Build Conditions:** At the MD 198 and Old Columbia Pike intersection, the current peak queues for the westbound (AM and PM) and northbound (AM only) left-turns exceed the existing vehicle storage length. In the 2045 No-Build condition, the westbound and northbound queues are forecasted to further exceed the storage lengths in both peak periods. **TABLE 3-4**

provides the measurements of the storage and the existing and projected queue lengths.

**Queue Analysis:** Traffic simulation models were developed to assess proposed lane utilization and traffic volumes for the different build conditions. The five-lane and four-lane strategies include two westbound left-turn lanes at the MD 198/Old Columbia Pike intersection to accommodate heavy turning volumes. The analysis also included a future traffic signal at the MD 198 and Burtonsville Town Square intersection.

**Analysis Results:** Based on the queue analysis results, the proposed two left-turn lanes from MD 198 westbound increase storage for both strategies sufficient to contain projected

future traffic queues, thus meeting Objective 1-3.

Objective 1-4: Improve Vehicular Level of Service (LOS)

This objective consists of ensuring all signalized intersections operate at a minimum overall intersection LOS E during the peak hours by 2045. This equates to an average overall delay not exceeding 80 seconds per vehicle at signalized intersections.

**Existing and No-Build Conditions:** The two signalized intersections of MD 198 at Old Columbia Pike and at US 29A currently operate at LOS C. A signal is anticipated to be installed at the MD 198 and Burtonsville Town Square intersection with the existing lane geometrics in the No-Build condition

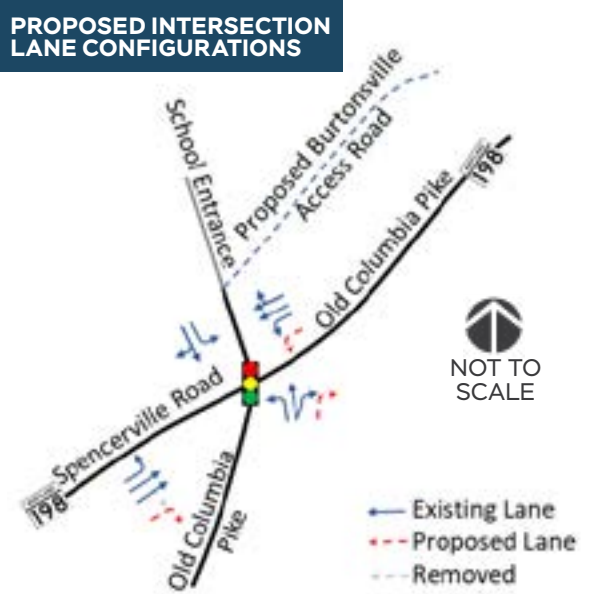
prior to 2045, as noted earlier. **FIGURE 3-4** shows the proposed lane configuration at the Old Columbia Pike/MD 198 intersections.

**LOS Analysis:** Traffic simulation models were developed to assess proposed traffic lane arrangements and forecasted volumes for the different conditions. Intersection LOS analyses were performed using the Highway Capacity Manual methodology. **TABLE 3-5** shows the LOS and delays for both strategies.

The analysis also included a future traffic signal at the MD 198 and Burtonsville Town Square intersection.

**Analysis Results:** The forecasted vehicle delays at all three MD 198 intersections in Segment D result in operations at a LOS D or better in the 2045 No Build, 2045 Five-Lane and 2045 Four-Lane Build conditions, thus meeting Objective 1-4.

FIGURE 3-4



Vehicle queues represent the length of stopped traffic waiting in a roadway lane to enter an intersection.

TABLE 3-4: QUEUES FOR MD 198 AT OLD COLUMBIA PIKE

Storage (ft)	Location	2019 Existing		2045 No-Build		2045 Five-Lane Build		2045 Four-Lane Build	
	Westbound Left Turn	150				375			
	Northbound Left Turn	180				330			
Queues (ft)		AM		PM		AM		PM	
	Westbound Left Turn	383	264	944	637	359	104	373	108
	Northbound Left Turn	189	101	390	138	315	108	329	92

Vehicle Level of Service represents the quality of traffic flow with a letter grade ranging from 'A' (free flow conditions) to 'F' (congested conditions with frequent failure of the intersection to clear traffic).

TABLE 3-5: LOS AND DELAY (SECONDS)

Intersections	2019 Existing		2045 No-Build		2045 Five-Lane Build		2045 Four-Lane Build	
	AM		PM		AM		PM	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
MD 198 at S Old Columbia Pike	C	27	C	20	D	54	C	26
MD 198 at Burtonsville Square	Unsignalized				B	15	C	21
MD 198 at US 29 SB Ramps	C	27	C	31	B	19	C	30



# GOALS & OBJECTIVES EVALUATION

## GOAL #2: Improve Roadway Safety

» **Goal 2:** *Improve roadway safety by reducing crash rates, balancing local community access and mobility.*

This section evaluates roadway safety by comparing existing roadway conditions within Segment D with forecasted results with implementation of the proposed strategies. The results show that these strategies will generally achieve the safety goal and objectives for Segment D.

### Objective 2-1: Traffic Safety

*The MOE for this objective is the crash rate. The intent of this objective is to reduce the overall crash rate along MD 198 between Old Columbia Pike and the US 29 southbound ramp intersection so that the rate is no longer significantly higher than the statewide average for similarly designed highways.*

**Existing Conditions:** The commercial character of the Burtonsville segment of MD

198 presents several safety and operational challenges given the existing geometry and access needs. Approximately 75 police-reported crashes occurred in this section over three years between January 2017 and December 2019. The most frequent crash types included angle, left-turn, sideswipe, and rear end. A main factor influencing these conflicts is multiple turn movements on a heavily-traveled roadway without turning lanes.

The rates of total, injury, left-turn, angle, and truck-related crashes were shown to be higher than statewide average rates of crashes per miles driven on MD 198. There were no reported fatalities or pedestrian-or bicycle-related crashes reported along the roadway segment during the study period. The relative location of the crashes along MD 198 is shown in the crash “heat map” in

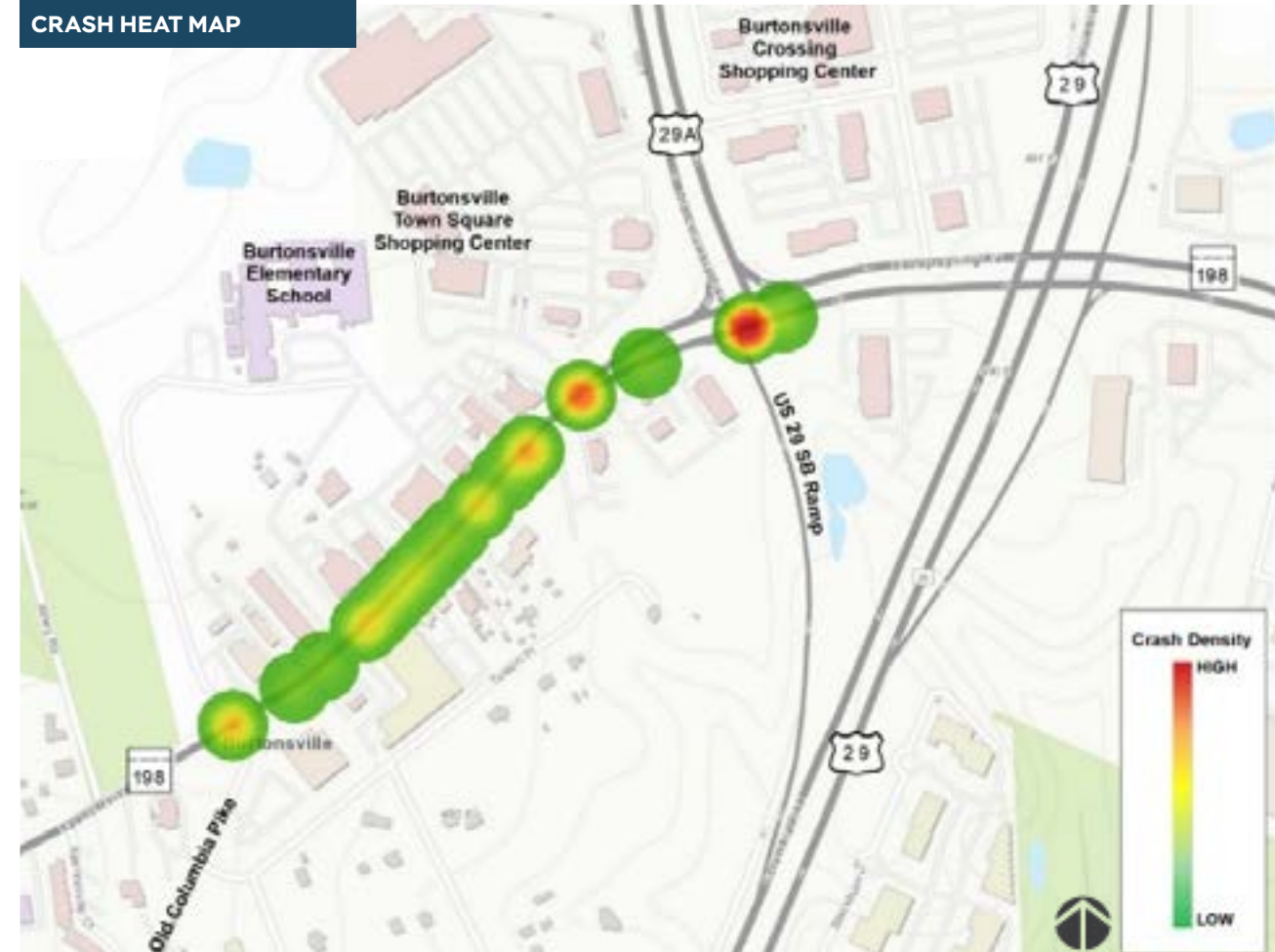
**FIGURE 3-5.** The map indicates that the

locations with the largest concentration of crashes were around the US 29A intersection (mostly angle and rear end crashes) and the entrance to the Burtonsville Town Square shopping center (mostly angle crashes). These locations have relatively high volumes of turning and stopping vehicles.

**Analysis Results:** The analysis results show that both the four-lane and five-lane strategies reduce the predicted crash rate. Results of the analysis show that the five-lane strategy provides the higher rate reduction of the two strategies. Under this strategy, vehicles turning left have a higher likelihood of completely clearing the through lanes via the center-two-way-left-turn lane, because it provides more storage for turning vehicles. However, the proposed four-lane strategy provides sufficient storage to accommodate future queues and therefore reduces the crash rate.

**FIGURE 3-5**

**CRASH HEAT MAP**





# GOALS & OBJECTIVES EVALUATION

## GOAL #3: Ensure a State of Good Repair

» **Goal 3:** *Ensure a state of good repair for fixed assets through management of pavement conditions and drainage facilities.*

**Objective 3-1: Provide a long-lasting pavement in good condition.**

*This objective sets a target of providing at least twelve years of pavement life.*

**Required Analysis:** As part of the recommended strategies for this segment of MD 198, the roadway pavement surface would be replaced either by milling and resurfacing or by installing new full-depth pavement. During the final design phase, the proposed pavement section will be designed based on geotechnical and vehicle axle loading data and guidance from the pavement material section of MDOT SHA to provide a twelve year life extension. In addition, the pavement material, particularly the wearing course, will be selected to meet performance targets for pavement roughness, cracking, rutting, and skid resistance.

**Analysis Results:** The existing MD 198 pavement within Burtonsville is in very good structural and good functional condition. However, the existing roughness and skid resistance show that the wearing course may need rehabilitation. During the final design, MDOT SHA will ensure that the analysis results reflect Objective 3-1 based on the most up-to-date MOEs.

**Objective 3-2: Provide and maintain an appropriate drainage system, including pipe and outfall.**

*The MOE for this objective consists of providing a minimum pipe and outfall condition rating of 2, on a scale of 1 to 5, with 1 being the best for all drainage assets.*

**Required Analysis:** During the final design phase of the recommended strategy, detailed storm drain design will occur to determine the appropriate placement of storm drain inlets along the relocated curb and gutter of MD 198. As part of that future design effort, the appropriately sized closed drainage system will be designed and any existing pipes to

remain will be video inspected. Existing outfalls and the receiving channel will be inspected as well. The inspection will identify underperforming or aging facilities, including drainage outfalls and receiving channels, that need to be replaced to ensure the drainage infrastructure along this segment of MD 198 is adequate.

**Analysis Results:** The current efforts are preliminary, so there are no analysis results that measure the effectiveness of the minimum pipe and outfall. Visual inspections were performed to identify areas where stormwater collects. These areas include: a low point just to the west of the McDonald's where runoff flows to a curb opening; a storm drain within the MD 198/US 29 Southbound Ramp intersection; and a storm drain just west of the Old Columbia Pike/ MD 198 intersection. These areas will be the focus for further minimum pipe and outfall effectiveness determinations. During the final design phase, MDOT SHA will ensure that the analysis results reflect Objective 3-2 based on the most up-to-date MOE's.



MD 198 LOOKING WEST NEAR THE BURTONSVILLE VILLAGE CENTER.



# REFINED ALTERNATIVES PLANNING & ENGINEERING ANALYSIS

MDOT SHA has completed refined preliminary planning engineering analyses along Segment D building upon previous planning and project development efforts, as summarized in the *January 2021 Corridor Improvement Study Recommendations* report. The analyses includes new topographical mapping, utility designation surveys, and the refinement of preliminary designs for the mainline and intersection improvements. Where feasible, MDOT SHA incorporated improvements listed in the local master plans. This section summarizes existing conditions, design considerations, and improvement analyses. This includes stormwater management (SWM), RW impacts, and cost estimates. To tie the recommended strategies to the existing roadway west of Segment D, the engineering analysis extends slightly beyond the Segment D limits.

**Existing Conditions:** MD 198 within Segment D is a closed section four-lane undivided roadway. The roadway consists of four 12-foot-wide lanes with no shoulders. There are multiple access points to businesses on both sides of MD 198

within Segment D. There are intermittent, non-continuous sidewalks and no facilities for bicyclists.

**Design Considerations:** The refined engineering analysis considered the following guidelines for the improvements:

- » MDOT SHA's Fall 2020 *Context Driven: Access & Mobility for All Users 1.0 Guide*
- » American Association of State Highway and Transportation Officials (AASHTO) 2018 *Policy on Geometric Design of Highways and Streets*
- » MDOT SHA's January 2015 *Bicycle Policy & Design Guidelines*
- » MDOT SHA's June 2010 *Accessibility Guidelines for Pedestrian Facilities along State Highways*
- » Maryland Department of the Environment's (MDE) May 2009 *Maryland Stormwater Design Manual*
- » MDOT SHA's October 2017 *Sediment and Stormwater Guidelines and Procedures*

- » Montgomery County Master Plans such as the Fairland Master Plan, Montgomery County Bicycle Master Plan and Burtonsville Crossroads Neighborhood Plan

**Improvement Analysis:** The Planning and Engineering Analysis section includes the following:

- » Four-lane divided roadway (Mainline)
- » Five-lane roadway with center two-way left-turn lane (Mainline)
- » Old Columbia Pike/MD 198 Intersection
- » Pedestrian and Bicycle Accommodations
- » Montgomery County Master Plans
- » Stormwater Management
- » RW Impacts and Cost Estimates

The proposed wide bikeable shoulders, continuous sidewalks, a shared-use path, and intersection improvements are compatible with both mainline strategies.

WIDE DRIVEWAYS CAN BE A CONFLICT FOR NON-MOTORIZED CIRCULATION.



EXISTING RETAINING WALLS WILL NEED TO BE MODIFIED TO CONSTRUCT A NEW SIDEPATH. NEW RETAINING WALLS MAY BE NEEDED TO MITIGATE EXISTING GRADES.



EXISTING SIGNAGE AND UTILITIES WILL NEED TO BE RELOCATED.



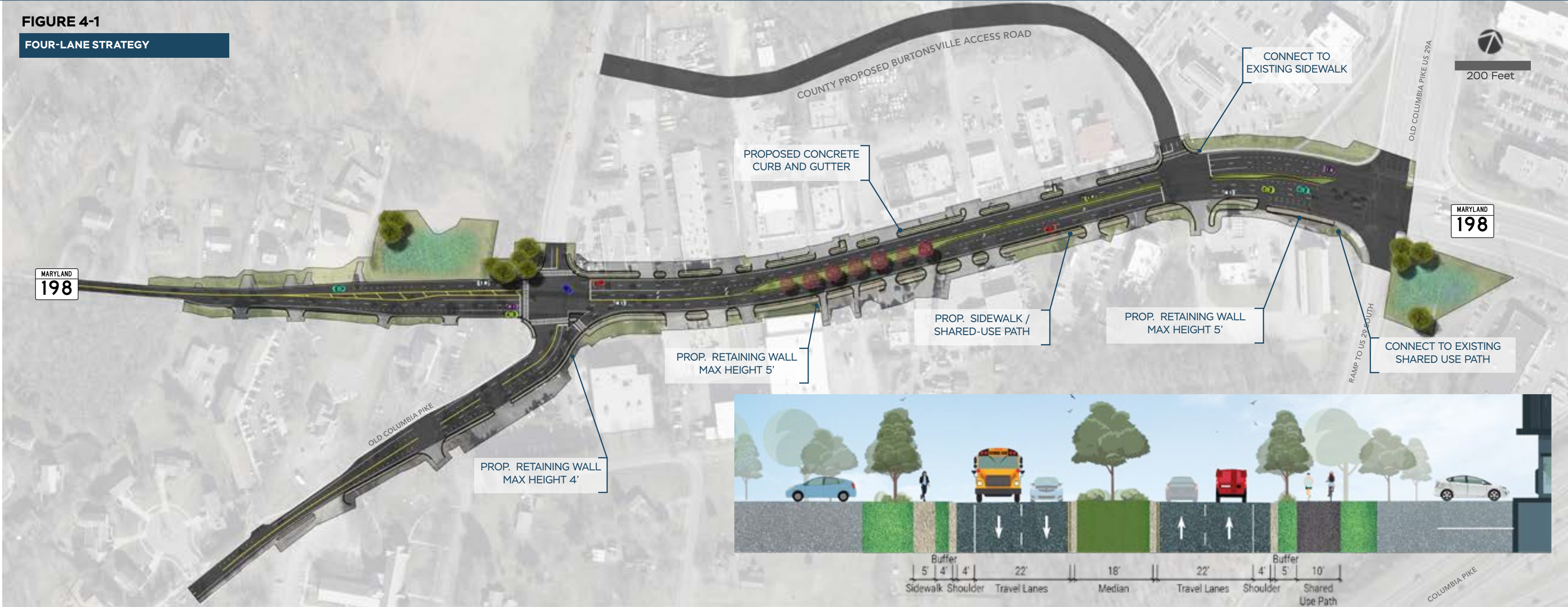
CURRENTLY, THERE ARE MINIMAL PEDESTRIAN CROSSINGS THROUGHOUT THE CORRIDOR. THE NEW DESIGN PROPOSES A CROSSWALK AT BURTONSVILLE TOWN SQUARE TO CONNECT THE NEW SIDE PATH TO A HIGH ACTIVITY CENTER.



» **Four-Lane Strategy (FIGURE 4-1)**

The four-lane strategy is the most consistent with local master plan recommendations. The proposed improvements would be accommodated within a 102-foot-wide right-of-way and include a raised planted median, travel lanes, a sidewalk, a shared-use path, and buffer space. The curb face-to-curb face width is 74 feet as shown in the typical section in **FIGURE 4-1**. The implementation of this strategy is contingent upon Montgomery County’s construction of the BAR. The BAR would provide alternate access to the properties along the north side of MD 198, consistent with the *2012 Burtonsville Crossroads Neighborhood Plan* and offer opportunities for access consolidation along the north side of MD 198. Montgomery County initiated design of the BAR in the Summer of 2021. Currently, the County has programmed \$4.9 million for construction beginning in FY 2025 (in addition to \$4.6 million programmed for planning, design, and RW acquisition).

**FIGURE 4-1**  
**FOUR-LANE STRATEGY**





To minimize property impacts, MDOT SHA proposes three retaining walls on the south side of MD 198. These features are consistent with the local master plans (see **TABLE 4-2**).

**Median:** The proposed 18-foot planted median provides several benefits. These benefits include reducing the need for SWM, providing space for street tree planting, serving as a traffic calming measure, and improving safety by reducing the numbers of conflicts from left turning vehicles and discouraging pedestrian mid-block crossings. The median is consistent with the *Burtonsville Crossroads Neighborhood Plan* and the *Fairland Master Plan*.

**Lane Widths:** The proposed 11-foot travel lanes in each direction include a one-foot offset to the median, consistent with AASHTO guidelines. This lane width is consistent with the *Burtonsville Crossroads Neighborhood Plan* and is a reduction of one foot from the existing lane widths.

To address multi-modal connectivity and accessibility needs within Segment D as described in Goal 1, MDOT SHA proposes bicycle-compatible shoulders along both sides of MD 198, a shared-use path to the south, and a sidewalk to the north. For safety and comfort, the shared-use path

and sidewalk are offset from the edge of the roadway.

**Shoulders:** The proposed four-foot shoulders and one-foot curb face offsets in each direction will accommodate on-road bicycle use in the same direction of travel as adjacent vehicular traffic and will connect to the existing eastbound striped bike lane approaching the intersection with US 29A. This will provide continuous bicycle facilities along Segment D and is consistent with the *Burtonsville Crossroads Neighborhood Plan*.



THE PROPOSED SIDEWALK ON THE NORTH SIDE OF MD 198 WILL BEGIN AT THIS CORNER CLOSING A PEDESTRIAN GAP FROM BURTONSVILLE TOWN SQUARE, ACROSS THE BAR, AND WEST TO SMALL BUSINESSES AND RESIDENTIAL AREAS.



» **Five-Lane Strategy** (FIGURE 4-2)

Since the four-lane strategy requires implementation of the BAR, this interim strategy was developed in the event traffic operational needs would warrant a more immediate solution. The strategy consists of a closed section five-lane roadway with a 16-foot center two-way left-turn lane. The two-way left-turn lane would separate two 12-foot travel lanes in each direction, along with the shoulder, bicycle, and pedestrian features described for the Four-Lane Strategy. Both mainline strategies have the same footprint and curb-face to curb-face distance. **FIGURE 4-2** displays the overall proposed five-lane strategy. The five-lane strategy was considered as an option in the event that the BAR is not constructed.

Existing access to properties along Segment D is maintained with these strategies.

**FIGURE 4-2**  
**FIVE-LANE STRATEGY**





» Intersection Improvements

MDOT SHA proposes the following improvements at the Old Columbia Pike/MD 198 intersection to address traffic operations and safety concerns as described in Goals 1 and 2. All intersection improvements are compatible with the proposed four-lane and five-lane strategies and include:

- » Adding a second left turn lane from WB MD 198.
- » Extending the left turn lane and providing a second right turn lane at the northbound approach.
- » Converting the shared right-through lanes to through lanes and adding a separate right turn lane on the eastbound approach.

These improvements increase storage for turning vehicles and improve operations at the intersections and safety within Segment D. MDOT SHA would also extend the turning lane storage at the MD 198/Burtonsville Town Square entrance, which is the eastern limit of the County’s planned BAR. **TABLE 4-1** summarizes these vehicle storage modifications.

TABLE 4-1: INTERSECTION IMPROVEMENTS				
	Approach Movement	Existing Storage	2045 Predicted 95 Percent Queue	Proposed Storage
MD 198 at Old Columbia Pike	Westbound left	150 ft	375 ft	375 ft
	Northbound left	180 ft	330 ft	330 ft
	Northbound right	90 ft	165 ft	260 ft
	Eastbound right	0 ft	140 ft	280 ft*
MD 198 at Burtonsville Town Square entrance	Eastbound left	150 ft	385 ft	480 ft*
Note: Storage distances more than predicted queues may be refined during future project phases.				

» Pedestrian and Bicycle Accommodations (FIGURE 4-3)

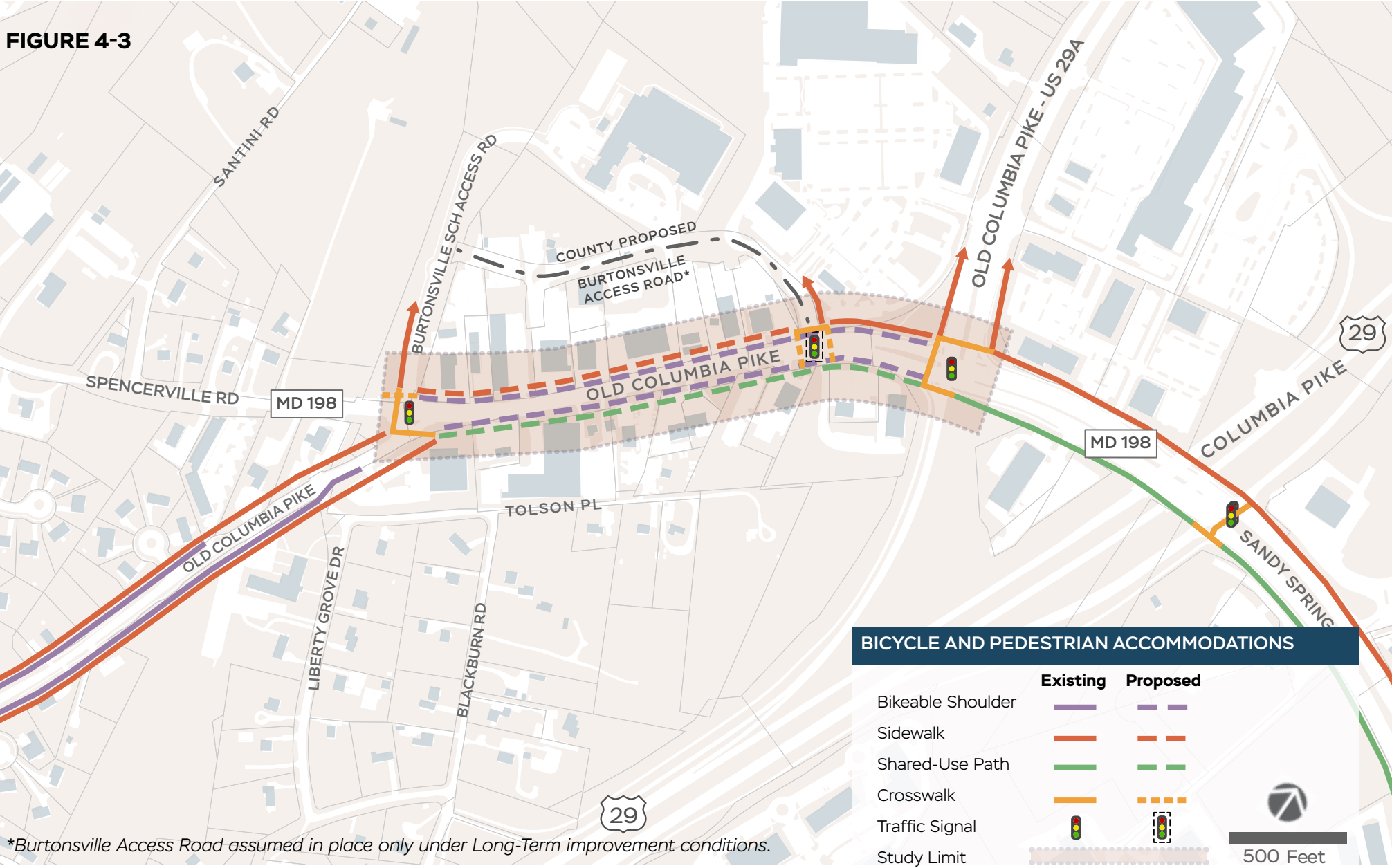
**Sidewalk:** The proposed improvements include a five-foot sidewalk for pedestrians along the north side of MD 198. The width of the sidewalk is consistent with MDOT SHA guidelines for this type of feature along state roadways. This sidewalk provides a continuous pedestrian connection within Segment D consistent with the *Burtonsville Crossroads Neighborhood Plan*.

**Traffic Signal:** MDOT SHA anticipates that traffic will continue to grow with development in the area and implementation of the BAR. Traffic signal control is anticipated to be placed along MD 198 at the entrance to the Burtonsville Town Square by 2024.

**Shared-Use Path:** The proposed improvements include a 10-foot-wide shared-use path along the south side of MD 198. The width of the path is consistent with MDOT SHA guidelines for this type of feature along state roadways. The proposed path provides a continuous pedestrian and bicycle facility in Segment D and is consistent with the *Burtonsville Crossroads Neighborhood Plan* and the *Fairland Master Plan*. It is also consistent with the proposed and existing locations of a shared-use path in the adjacent Segments C and E on the south side of MD 198.

**Sidewalk and Shared-Use Path Offset:** The proposed four-foot offset to the sidewalk and five-foot offset to the shared-use path follow MDOT SHA Context Driven, and AASHTO guidelines. The offsets also provide space

FIGURE 4-3





for roadway signage. This feature contributes to the comfort of the users of the sidewalk and the path and is consistent with the *Burtonsville Crossroads Neighborhood Plan*.

**Crosswalk:** MDOT SHA proposes crosswalks along MD 198 at the Burtonsville Town Square entrance and at Old Columbia Pike to

enhance other existing crosswalks for bicycle and pedestrian circulation.

**Bikeable Shoulder:** MDOT SHA proposes four-foot-wide shoulders with a one-foot offset to the curb in each direction of travel to accommodate on-road bicyclist use as discussed in the *Burtonsville Crossroads Neighborhood Plan*, connecting to the

existing bikeable shoulder approaching the intersection at US 29A.

**Montgomery County Local Plan Coordination:** MDOT SHA incorporated several recommendations from local master plans (**TABLE 4-2** and as summarized on page 35) to guide the refined preliminary planning engineering analysis. Lane widths, buffers

TABLE 4-2: MDOT SHA STRATEGY AND MASTER PLANS FEATURES COMPARISON						
	MDOT SHA			MASTER PLANS		
Roadway Features	Existing Condition	Five- Lane	Four- Lane	Burtonsville Crossroads <sup>1</sup> Neighborhood Plan	2018 Bicycle Master Plan	Fairland Master Plan
Median Width	n/a	n/a	18	17	n/a	16-20
Lane Width	12	12	11	11/11.5	n/a	n/a
Shoulder Width <sup>2</sup>	n/a	4	4	4.5	n/a	n/a
Offset from road edge to sidewalk/shared-use path	n/a	4/5	4/5	6.5/6.5	n/a / 3-6	n/a
Two-Way Separated Bike Lane	n/a	n/a	n/a	n/a	8’ width along north side of road	n/a
Typical Section Width	48	74	74	73	n/a	n/a <sup>3</sup>
Sidewalk Width	n/a	5	5	5	n/a	n/a <sup>4</sup>
Shared-Use Path	n/a	10’/South	10’/South	Y	n/a	Y
ROW width /Curb Face To Curb	varies	102 / 74	102 / 74	120 /Varies	n/a	120 / Varies
1 Plan calls for Mod 2004.10 design standard, table reflects MC-2004.10A standard detail features 2 Excludes a 1-foot gutter pan				3 Four travel lanes with selected turning lanes 4 Sidewalk on the north side of MD 198 from Old Columbia Pike to US 29		

MDOT SHA SEGMENT D IMPROVEMENTS MASTER PLAN	
<b>PEDESTRIAN CONNECTIONS</b>	
<b>1997 Fairland Master Plan</b>	
• Sidewalk on north side of MD 198 from Old Columbia Pike to US 29	<b>INCLUDED</b>
• Class I Bikeway (off-street paved path)	<b>INCLUDED</b>
<b>2012 Burtonsville Crossroads Neighborhood Plan</b>	
• Continuous sidewalk along north side of MD 198	<b>INCLUDED</b>
<b>BICYCLE PROVISIONS</b>	
<b>1997 Fairland Master Plan</b>	
• Class I Bikeway (off-street paved path)	<b>INCLUDED</b>
<b>2012 Burtonsville Crossroads Neighborhood Plan</b>	
• Bikeway along south side of MD 198 east of Old Columbia Pike	<b>INCLUDED</b>
• Roadway Standard Mod. 2004.10 reflects on-road bike lanes on each side of road	<b>INCLUDED</b>
<b>2018 County Bicycle Master Plan</b>	
• Sidepath (paved off-road facility) along south side of MD 198	<b>INCLUDED</b>
• Separated Bike Lanes (two-way on-road facility) along north side of MD 198	<b>NOT INCLUDED**</b>
<small>**Not included due to lack of connection to existing provisions beyond segment limits</small>	

between the roadway, sidewalks, shared-use paths, and shoulder widths are all consistent with the *Burtonsville Crossroads Neighborhood Plan*. In addition, MDOT SHA’s proposed median width for the four-lane divided strategy aligns with the *Burtonsville Crossroads Neighborhood Plan* and the *Fairland Master Plan*. Table 4-2 compares existing and proposed roadway features to the local master plans.

MDOT SHA proposes on-road, bicycle-compatible shoulders on both sides and a shared-use path on the southern side of MD 198 to provide connectivity for bicyclists and pedestrians. The shared-use path is a recommendation from the *Burtonsville Crossroads Neighborhood Plan* and the *Fairland Master Plan*, and the bicycle-compatible shoulder is a recommendation in the *Burtonsville Crossroads Neighborhood Plan*. The proposed shared-use path would connect to an existing shared-use path east of the US 29A intersection.

The implementation of the shared-use path meets both Objective 1-1, Improve Pedestrian Access and Mobility and Objective 1-2, Reduce Bicycle Level of Stress. East of this intersection, and under separate efforts, MDOT SHA is designing a shared-use path that would extend from US 29 east to the MD 198 intersection at Dino Drive, which will further enhance Segment D’s multi-modal connectivity beyond the Burtonsville area. This path would also connect to that proposed on the south side of MD 198 in Segment C to avoid historic property impacts in that area.

A continuous shared-use path on the south side of MD 198 and bicycle compatible shoulders provides improved access and mobility in the area (Objective 1-1). The 2018 Montgomery County Bicycle Master Plan recommends a two-way separated bike lane along the northern side of MD 198 between US 29 and Old Columbia Pike. During the final design phase, MDOT SHA will reevaluate the feasibility and compliance of the two-way bicycle lane with the most up-to-date access control requirements and connectivity, both in Segment D and east and west of this study corridor.



» Stormwater Management

MD 198 is the boundary of two watersheds: the Patuxent River watershed to the north and the Washington Metropolitan watershed to the south. In evaluating the SWM needs for the two strategies, MDOT SHA considered the five-lane (including a center two-way left-turn lane) strategy since it will result in more impervious surface treatment than the four-lane with the planted median option and provide a more conservative scenario. Based on the installation of the five-lane strategy, the total impervious surfaces to the north of MD 198 would increase from 1.7 acres to 13.0 acres, while the total impervious surfaces to the south would decrease from 15.0 acres to 14.7 acres.

**Patuxent River Watershed:** In the Patuxent River watershed north of Segment D, a potential location for a new SWM facility was identified on M-NCPPC property west of the access roadway to the Burtonsville Elementary School in an undeveloped portion of Santini Local Park along MD 198. The parcel is relatively flat, open, and located at the primary low point in the roadway profile. There is adequate space for a facility to provide both qualitative and quantitative

treatment. Coordination with M-NCPPC to allow the use of the property would be necessary. Measures such as incorporating park facilities and landscaping into the facility layout and stabilization of existing eroded channels in the park could provide incentives for use. If the M-NCPPC property cannot be used, finding options for providing required stormwater treatment on-site would be challenging and further evaluation would be required during the design phase since areas to the east are already heavily developed. West of Old Columbia Pike, several residential and commercial properties have open areas along MD 198 that could be evaluated for SWM needs. There are potential offsite SWM locations to the north of Segment D owned by the Montgomery County Board of Education and the Burtonsville Volunteer Fire Department.

**Washington Metropolitan Watershed:** SWM may not be needed in the Washington Metropolitan watershed south of Segment D, since the project will decrease the amount of impervious surface. However, if it is needed, the proposed potential SWM location is an existing micropool extended detention pond located in the southeast quadrant of the MD

198 intersection with US 29A. This facility could be retrofitted to provide additional qualitative and quantitative treatment for the required SWM needs. If a retrofit is not practical, there are options for a facility north of this detention pond in an open area within MDOT SHA RW. The closed drainage system to this site would need to be modified to address the SWM needs from Segment D to the south. Water quality bank debits are not an option in this watershed due to the current negative balance.

Given the limited option for SWM areas, additional measures such as underground storage, Water Quality Bank Debits in the Patuxent River watershed, and filter inlets would be explored during the design phase to meet SWM requirements.

» RW Impacts and Cost Estimate

Based on the engineering undertaken during the refined preliminary planning analyses, MDOT SHA has identified anticipated property acquisition needs and costs for the two strategies. A revised proposed limit of disturbance (LOD) was established and would be the same for either of the two strategies.

The anticipated property acquisition needs have been developed by calculating the area between the existing public roadway RW and the proposed LOD. Estimated costs have been determined using a detailed engineering major quantities methodology. These results are shown in **TABLE 4-3**.

TABLE 4-3: SUMMARY OF IMPACTS AND COSTS (2021)					
STRATEGY	RW(ACRES)	RWCOST(\$M)	DESIGNCOST(\$M)	CONSTRUCTIONCOST(\$M)	TOTALCOST(\$M)
Five-Lane	4	\$12	\$4 to \$5	\$16 to \$18	\$32 to \$35
Four-Lane			\$4 to \$5	\$17 to \$19	\$33 to \$36



THE PROPOSED SHARED USE PATH WILL CREATE A PEDESTRIAN AND BICYCLE CONNECTION TO THE EXISTING FACILITY ALONG THE SOUTH SIDE OF MD 198, CLOSING A GAP FOR LOCAL AND AREA-WIDE ACCESS TO BUSINESSES AND RESIDENTIAL AREAS.



# PRELIMINARY ENVIRONMENTAL INVENTORY

MDOT SHA completed an environmental inventory to verify the resources within Segment D (**TABLE 5-1**) based on previous planning efforts, desktop-level reviews of online records and mapping from regulatory agencies, and field surveys. Regulatory agencies include the United States Geological Survey (USGS), United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Maryland Department of Natural Resources (DNR),

Maryland Department of the Environment (MDE), Environmental Protection Agency (EPA), United States Army Corps of Engineers (USACE), United States Fish and Wildlife Service (USFWS), Maryland Historical Trust (MHT); MDOT SHA-Geographic Information System (GIS) Cultural Resources Database, Medusa, Maryland's Cultural Resource Information System, and Watershed Resources Registry (WRR).

When the project has proceeded to the design phase, MDOT SHA will quantify impacts to the resources resulting from the two strategies and develop appropriate mitigation measures in collaboration with the permitting and regulatory agencies. **TABLE 5-1** summarizes the inventoried resources. The early identification of these resources will streamline future agency coordination and analysis.

**TABLE 5-1: SUMMARY OF ENVIRONMENTAL INVENTORY**

RESOURCES	WITHIN SEGMENT D?	NOTE
<b>Natural</b>		
Streams	Yes (1)	
Wetland	Yes (2)	
Wet Swale	Yes (1)	
Concrete Lined Drainage Ditch	Yes (1)	
Watershed	Yes (2)	See SWM Section
Specimen and/or Significant Trees	Yes (Several)	
Rare, Threatened and Endangered Species	No	
<b>Cultural</b>		
Historic Standing Structures	Yes (12 unrecorded architectural resources)	
Archaeology	Yes (1-Merson Cemetery – may require archaeological monitoring)	Outside of Segment D, potential impact due to proposed improvement tie-in to the west
Parks and Recreational Areas	Yes (1-Santini Local Park)	Impacted for ties-in and SWM needs west of Segment D
<b>Socioeconomic</b>	Minority and low-income populations (73%) and Speaking other than English (50%), Population below poverty line (4.85%), multiple community facilities	Segment D is entirely within a Priority Funding Area



# CONCLUSION AND NEXT STEPS

MDOT SHA has finalized refined preliminary planning for Segment D along MD 198 in the Burtonsville Commercial Area. The needs in Segment D include: improving multi-modal connectivity, accessibility, and congestion through management of vehicle turning queues, reducing intersection delays, providing continuous bicycle and pedestrian accommodations, improving roadway safety by reducing anticipated crash rates and balancing local community access with mobility. **TABLE 6-1** summarizes the mainline features of the proposed strategies.

Current mainline strategies include a four-lane roadway with a raised median and a five-lane roadway with a center two-way left turn lane, coupled with improvements to the Old Columbia Pike/ MD 198 intersection. The refined preliminary planning engineering analysis results show that implementing either of these strategies would address relevant goals and objectives, although the four-lane strategy is most consistent with local master plans. **TABLE 6-1** summarizes

how each strategy (four lane and five lane) addresses the needs in Segment D.

When funding is identified and available, next steps include:

- » Conducting additional public and stakeholder engagement.
- » Completing planning and preliminary engineering.
- » Completing the environmental documentation and analysis required under the National Environmental Policy Act.
- » Obtaining the required regulatory agency approvals.
- » Conducting final design.
- » Purchasing RW and constructing the project.

These preliminary planning analyses have been conducted in partnership with

Montgomery County and M-NCPPC. Where feasible and seeking to minimize impacts, both strategies are compatible with the County's master plans. While the five-lane roadway strategy serves as a step forward in addressing the need within the Burtonsville Commercial Area, implementation of the four-lane roadway with median strategy is most consistent with local master plans, which include Montgomery County's construction of the BAR.

MDOT SHA will rely on continued partnering with Montgomery County and M-NCPPC, as the four-lane strategy is contingent upon the County's construction of the BAR. The BAR will reduce the number of vehicles on MD 198 traveling to and from properties on the northern side of MD 198, and improve operations and safety for all roadway users by reducing conflicts with bikeable shoulders, sidewalks, crosswalks, shared-use path, and through traffic.

TABLE 6-1: SUMMARY OF MAINLINE IMPLEMENTATION STRATEGY FEATURES

	FOUR-LANE RAISED MEDIAN	FIVE-LANE WITH CENTER TURN LANE
Maintain Existing Access to Businesses North of MD 198	Yes (MD 198 WB Only)	Yes
Allow for Potential Access Consolidation North of MD 198	Yes (with Installation of BAR)	Limited
Maintain Existing Access to Parcels South of MD 198	Yes (MD 198 EB Only)	Yes
Provides Turning Bay Storage for U-Turns and Access to Properties South on MD 198 from MD 198 WB	Yes	Not needed
Provide Pedestrian and Bicycle Accommodations Consistent with the Fairland and Burtonsville Crossroads Neighborhood Plans	Yes	Yes
Provide Separate Lane for Left Turning Vehicles?	Only at Intersections	Yes
Contingent upon BAR Construction?	Yes	No
More Acceptable to Business Owners?	No	Yes
Provide Refuge for Pedestrians Crossing MD 198	Yes	No
Consistent with Burtonsville Crossroads Neighborhood Plan	Yes	No
Reduce SWM Needs?	Yes, if Median is Considered Pervious	No
Most Likely to Slow Down Traffic	Yes	No
Consistent with Recent MDOT SHA Improvements East of Segment D Limit?	Yes	Yes



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