

Subject: Public Hearings--Supplemental appropriations to the FY20 Capital Budget and amendments to the FY19-24 Capital Improvements Program (CIP) – Bus Rapid Transit: MD 355, \$3,000,000 (development impact taxes) and Bus Rapid Transit: Veirs Mill Road, \$1,000,000 (development impact taxes)

Analyst: Glenn Orlin, Deputy Director

Committee: N/A

Keywords: : #MoCoBRT; Search terms: transit, funding, Veirs Mill Road, MD 355

EXPECTED ATTENDEES: Public Hearing signups.

COMMITTEE RECOMMENDED CHANGES: N/A

ISSUES

This public hearing has two purposes:

(1) to receive testimony as to which alternative concept should be the preferred concept for the MD 355 Bus Rapid Transit line; and

(2) to receive testimony as to which project (or both) should be funded for preliminary engineering starting in FY20.

This report contains:

Staff Report to the Council

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Attachments to Full Staff Report to the Council

© 1-28

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MEMORANDUM

July 11, 2019

TO: County Council

FROM: Glenn Orlin, Deputy Director

SUBJECT: Supplemental appropriations to the FY20 Capital Budget and amendments to the FY19-24 Capital Improvements Program (CIP) – Bus Rapid Transit: MD 355, \$3,000,000 (development impact taxes) and Bus Rapid Transit: Veirs Mill Road, \$1,000,000 (development impact taxes)¹

PURPOSE: Public Hearings

On June 20 the Executive transmitted these two supplemental appropriation requests and CIP amendments that, in each case, would fund preliminary engineering work beginning in FY20. The Executive's transmittal memo is on ©1, the supplemental appropriation and CIP amendment requests are on ©3-8. The Transportation and Environment (T&E) Committee's review is tentatively scheduled on July 25, and Council action on July 30.²

Background. The Council selected a preferred concept for the master-planned Veirs Mill Road (MD 586) Bus Rapid Transit (BRT) line in June 2017 (i.e., two years ago). In the CIP approved last year the Council funded \$3 million for preliminary engineering (Current Revenue) in FY23-24 and \$4 million for final design (GO Bonds) in FY24-25. At a February 2019 Transportation and Environment (T&E) Committee meeting, Councilmember Riemer recommended accelerating the funding schedule for preliminary engineering and final design by 3 years: preliminary engineering in FY20-21 and final design in FY21-22. At that meeting, the Department of Transportation (DOT) staff urged the T&E Committee to wait until there was a preferred concept for MD 355 Bus Rapid Transit (BRT), which they said should be ready by June or July 2019, at which point the Council could decide which (or both) BRT project(s) should be funded for preliminary engineering in FY20. Mr. Riemer concurred with Messrs. Hucker and Glass that this approach made sense.

¹ Key words: #MoCoBRT; Search terms: transit, funding, Veirs Mill Road, MD 355.

² Although the funding sources identified would be development (i.e., transportation) impact taxes, the net effect will be to reduce the General Obligation (G.O.) bond capital reserve in FY20; if either or both appropriations are approved, the Office of Management and Budget (OMB) will substitute an equivalent amount of G.O. bond funding for impact taxes in one or more other transportation projects. The starting G.O. bond reserve for FY20 is \$11,982,000.

In his Recommended CIP amendments from this past January, the County Executive had proposed \$500,000 for preliminary engineering for MD 355 BRT. Given the summer time-frame for the MD 355 BRT and/or Veirs Mill BRT decision, Council staff noted that the request was premature. The T&E Committee agreed, as did the Council, and so the \$500,000 was not included in the Amended FY19-24 CIP approved this past May.

DOT has completed its multi-year study to define the MD 355 BRT alternatives. DOT staff has already briefed the City Councils of Rockville and Gaithersburg. They are briefing the Planning Board on the evening of July 11, at which point the Board is expected to make a recommendation on a preferred concept, and which project (MD 355 BRT or Veirs Mill Road BRT, or both) should proceed immediately to preliminary engineering. The Draft MD 355 BRT Corridor Study (June 2019) is here: https://www.ridetheflash.com/wp-content/uploads/2019/06/DRAFT_355BRT_Corridor_Summary_Report.pdf. The Executive Summary of the study report is on ©1-21.

The preferred concept for the Veirs Mill Road BRT selected by the Council in June 2017 was Alternative 2.5, which would create queue jumps at the 12 BRT stops between Rockville and Wheaton. The full MD 586 BRT Corridor Study (July 2018) is here: https://www.ridetheflash.com/wp-content/uploads/2019/01/MD586_BRT-Report.pdf. The Executive Summary of the study report is on ©22-28.

The Council's public hearing on July 16 has two purposes: (1) to receive testimony as to which alternative concept should be the preferred concept for the MD 355 BRT; and (2) to receive testimony as to which project (or both) should be funded for preliminary engineering starting in FY20. Since there are no funds budgeted in FY20 to carry either project forward into preliminary engineering, a Council decision on July 30 will allow DOT to proceed with one (or both) studies without further delay. However, after the T&E Committee and Council reviews on July 25 and 30, if the Council feels that it needs more time to deliberate, these decisions would be postponed until mid-to-late September, after the summer recess.

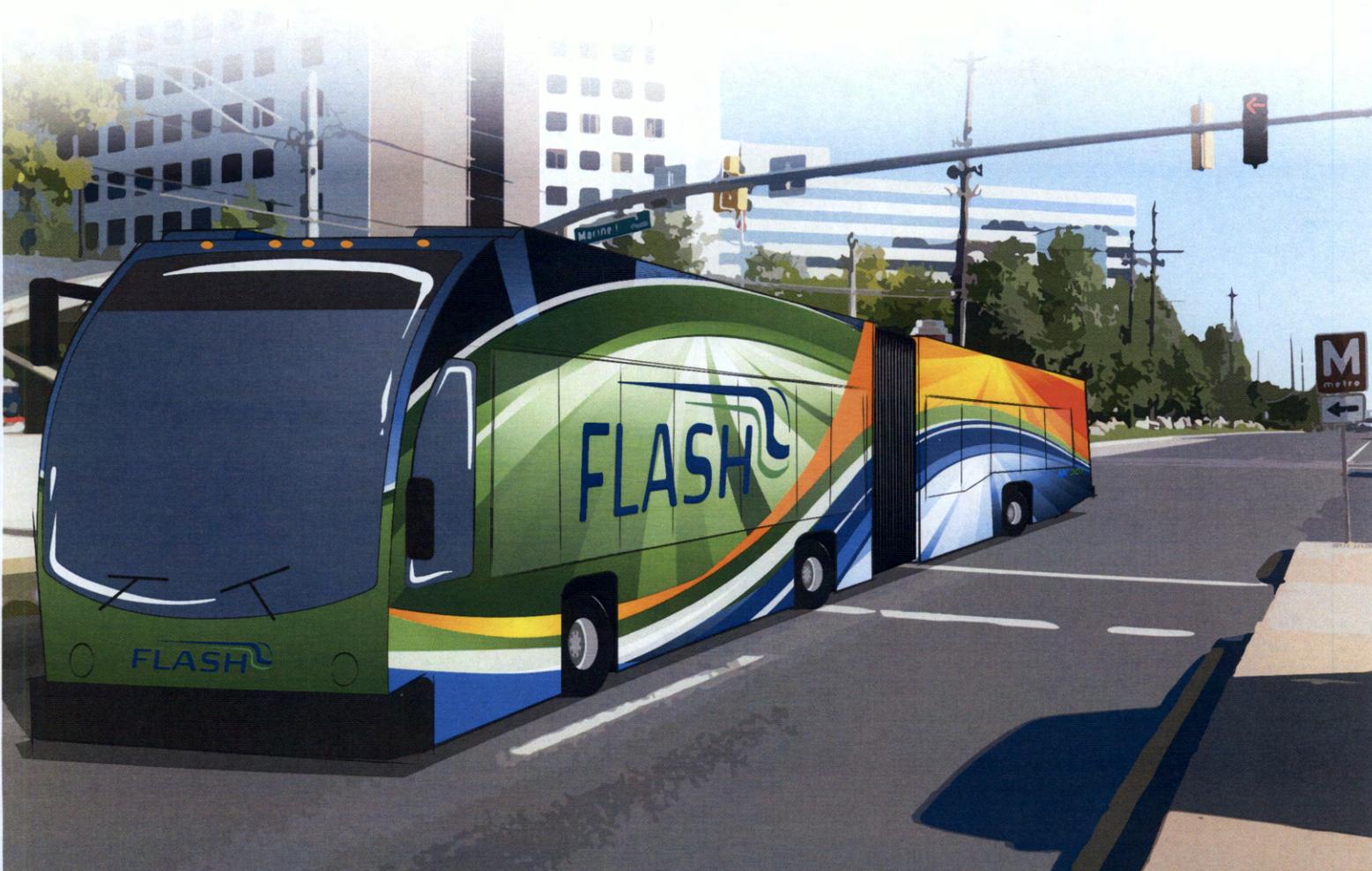
GetOnBoardBRT MD 355

BUS RAPID TRANSIT IN MONTGOMERY COUNTY

Corridor Summary Report

June 2019

Executive Summary



MC DOT
Montgomery County
Department of Transportation



RideTheFlash.com

PREFACE

This *Corridor Summary Report* documents Phase 2 of the MD 355 Bus Rapid Transit (BRT) Planning Study. The project is evaluating detailed alternatives for providing enhanced transit service along MD 355 from Bethesda to Clarksburg in Montgomery County, Maryland. In order to evaluate and compare the alternatives in terms reliability, effectiveness, and cost, key factors were developed and analyzed. These factors included: design criteria, traffic modeling, ridership forecasting, and service planning; siting and evaluating station locations; analyzing and documenting environmental features; and sharing this information and requesting feedback through an extensive public involvement program. The culmination of these detailed evaluations was used to quantitatively measure the effectiveness of each of the alternatives to help identify a Recommended Alternative to carry forward into design and construction. The *Corridor Summary Report* documents the process and products that were undertaken to develop the information necessary to complete this phase of the study.



Rapid: Features like limited stops, off-board fare collection, dedicated lanes (where feasible), and level-boarding through all doors make for a faster ride.



Reliable: You'll never wait long and you'll see real-time travel information on message boards at the station so you'll know exactly when the next BRT arrives.



Relaxing: Avoid the stress associated with driving: use Wi-Fi on-board to be more productive, read a book, or simply use the time to rest.

WHAT IS BUS RAPID TRANSIT (BRT)?

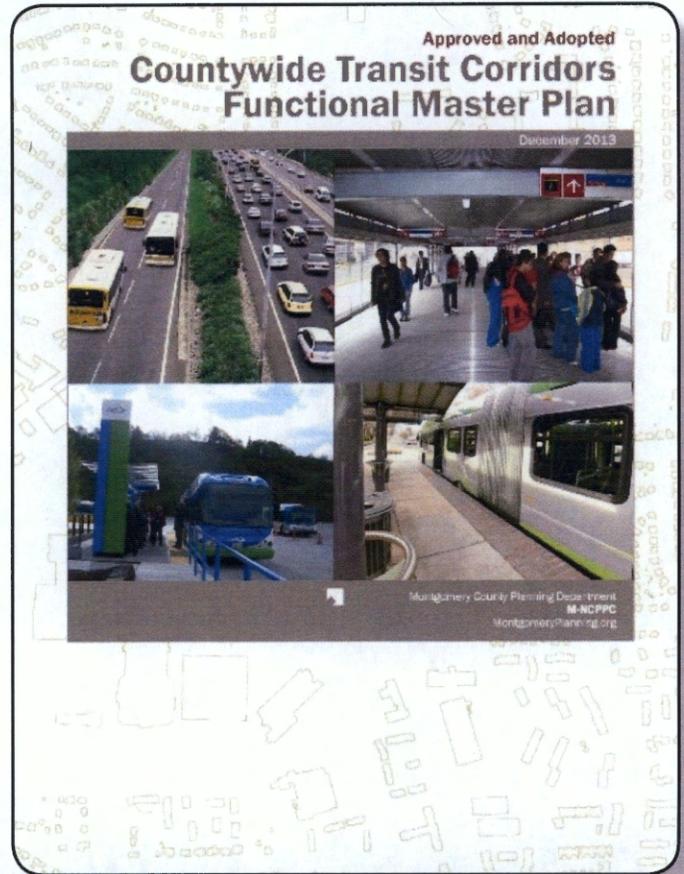
Montgomery County is studying options for a new BRT service along MD 355 called FLASH. BRT is a bus-based rapid transit system with features that improve reliability and capacity, so you can get where you need to go quickly.

MD 355 FLASH Features:

- Frequent, reliable service which means you will never wait long for a bus
- Dedicated lanes, where feasible, to separate buses from traffic, keeping your ride reliable and on-time
- New, enhanced vehicles that include free wi-fi and USB charging ports so you can listen to podcasts, surf the web, or begin your workday during your commute. On-board bike storage lets you bring bicycles right onto the vehicle
- New, comfortable stations that include features to improve efficiency and reliability. BRT stations have SmarTrip-compatible off-board fare collection machines where you pay your fare before the BRT arrives. Real-time transit information screens let you know when the next BRT vehicle is arriving
- Level boarding through all doors, allowing for easy boarding and alighting for all riders, including those with wheelchairs or strollers
- Community-friendly design with enhanced pedestrian and bicycle facilities
- Vehicles equipped with Transit Signal Priority, or TSP, a technology that allows them to communicate with traffic signals to get a little extra green when certain conditions are met
- Uniquely branded FLASH vehicles that look and feel different from local buses

WHAT IS THE HISTORY OF THE MD 355 BRT PLANNING STUDY?

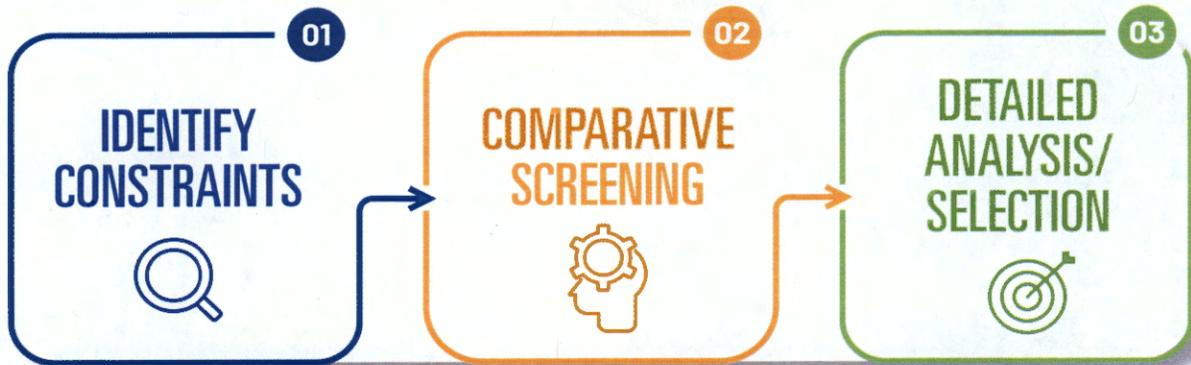
Montgomery County first proposed BRT as the most appropriate mode for improving transit in the MD 355 corridor as part of the 1993 Strategic Transit Plan. In 2011, MCDOT completed the Countywide BRT Study which identified BRT as the preferred mode of transit due to its ability to provide better service to existing transit passengers and attract potential new riders. BRT can provide a fast, convenient, and reliable alternative to driving on congested roadways, and a bus can carry more people in the same space as a car. Acting upon the findings from the 2011 Countywide BRT Study, the Maryland-National Capital Park and Planning Commission (M-NCPPC) developed the Countywide Transit Corridors Functional Master Plan, which was approved and adopted by the Montgomery County Council in December 2013.



The *Functional Master Plan* proposes the development of a BRT network throughout Montgomery County to support mobility, land use, and economic development goals. To ensure network integrity and achieve the County's vision, it recommends and provides the basis for right-of-way reservations required to accommodate BRT along with the allocation of space for vehicular traffic, pedestrians and bicycles in individual transit corridors. The Functional Master Plan contains recommendations for ten BRT corridors in the County, including along MD 355. The first BRT corridor in the county is being implemented along US 29 and will be open in 2020.

WHAT IS THE MD 355 BRT PLANNING STUDY PROCESS?

The MD 355 BRT Corridor Planning Study utilized the recommendations from the Countywide Transit Corridors Functional Master Plan to help inform the three-step process developed to recommend an alternative:



Step 1 - Identify Constraints (Complete): This process included data collection of existing transit operations, traffic volumes, crash statistics, environmental information, and aerial mapping. This information was used to prepare a Draft Preliminary Purpose and Need document, which is discussed in more detail in **Chapter 2**.

Step 2 - Comparative Screening (Complete): Using the information developed in Step 1, a set of Conceptual Alternatives was developed for testing purposes. The analysis performed during this step was used to screen out elements that showed the least benefit, to improve the alternatives, and to develop a refined set of alternatives that would be analyzed in further detail during the next step. This work was completed by the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) in Phase 1 of the MD 355 BRT Corridor Study.

Step 3 - Detailed Analysis / Selection (Current Phase): This is the current step in the corridor planning process, called Phase 2 of the MD 355 BRT Planning Study. It builds upon the Conceptual Alternatives developed in Phase 1, refining and analyzing alternatives in further detail. Additional engineering was done for each Build Alternative to better identify constraints and potential impacts. The traffic and travel demand modeling were refined to reflect the latest design and operating assumptions. Station locations were examined through a two-step process to further assess their viability. The result is a set of detailed measures providing quantitative results for comparison of the alternatives against themselves.

This *Corridor Summary Report* represents the culmination of Step 3 and presents the results and the findings of the analysis of each alternative. This report will document the County Council's selection of a Recommended Alternative, which will be the basis of detailed design. The outcomes of the study can be used in the future for final design and environmental analysis and documentation.

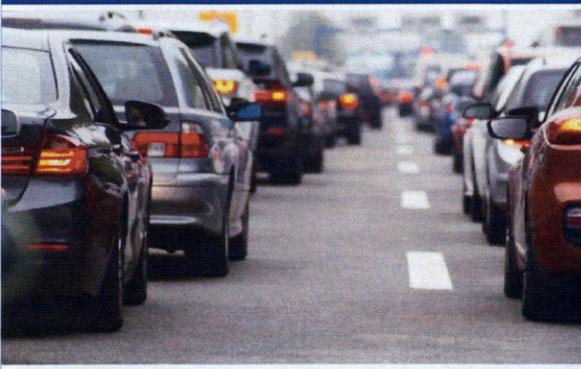
WHY ARE WE DOING THE MD 355 BRT PLANNING STUDY?

The purpose of the project is to provide a new transit service with greater travel speed and frequency along MD 355 between Bethesda and Clarksburg that will help accomplish the following:

- Enhance transit connectivity and multimodal integration along the corridor as part of a coordinated regional transit network;
- Improve the ability for buses to move along the corridor (bus mobility) with increased operational efficiency, on-time performance/reliability, and travel times;
- Address current and future bus ridership demands;
- Attract new riders and provide improved service options for existing riders as an alternative to congested automobile travel through the corridor;
- Support approved Master Planned residential and commercial growth along the corridor;
- Improve transit access to major employment and activity centers;
- Achieve Master Planned non-auto driver modal share;
- Provide a sustainable and cost-effective transit service; and
- Improve the safety of travel for all modes along the corridor.

BRT ON MD 355 WILL HELP ADDRESS:

MOBILITY ALONG CORRIDOR



Traffic delay and poor transit reliability are significant challenges for travelers along the corridor today and this is likely to worsen in the future.

Traffic congestion is a major issue on MD 355, with slow peak period and peak direction travel speeds and multiple failing intersections and roadway segments. Future traffic projections show that the significant growth in population and employment along the MD 355 Corridor will further degrade traffic conditions. This congestion is a contributing factor affecting the reliability of existing transit service. BRT on MD 355 would increase the efficiency with which the roadway space is used, allowing more people to traverse the corridor in a reliable, affordable, and safe way.

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HIGH TRANSIT DEMAND ALONG COORIDOR

The MD 355 corridor has some of the highest ridership bus routes in the Ride On system. However, the on-time performance of Ride On and Metrobus routes (at 72 percent and 77 percent, respectively) suffers due to congestion. BRT priority treatments would significantly improve the speed and reliability of bus service along the corridor.



GROWTH (POPULATION AND ECONOMIC)



Montgomery County is the most populous county in Maryland with over 300,000 people living in the study area and home to over 280,000 jobs. Increases in both population and jobs within the study area are expected to outpace growth in the county overall, with areas of concentrated growth forecast to occur in the segment north of I-495 (Capital Beltway) through Rockville to Gaithersburg.

BRT along MD 355 will accommodate this growth by providing an option for people to get around aside from driving a car. BRT can also support the growth of pedestrian-friendly places, reducing the need to drive.

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THE FOLLOWING GOALS AND OBJECTIVES WERE DEVELOPED TO ASSESS THE ABILITY OF EACH ALTERNATIVE TO MEET THE PURPOSE AND NEED OF THE MD 355 BRT PLANNING STUDY:

PROJECT GOALS			
			
PROVIDE AN APPEALING, FUNCTIONAL, AND HIGH QUALITY TRANSIT SERVICE	IMPROVE MOBILITY OPPORTUNITIES, ACCESSIBILITY, AND TRANSPORTATION CHOICES FOR ALL	SUPPORT MASTER PLAN DEVELOPMENT	SUPPORT SUSTAINABLE AND COST-EFFECTIVE TRANSPORTATION SOLUTIONS
<ul style="list-style-type: none"> Reduce travel times Increase service reliability Increase ridership Be a user-friendly route Complement Metrorail and local bus service 	<ul style="list-style-type: none"> Improve access to jobs and other destinations Minimize traffic impacts and use roadway space efficiently Improve bicycle and pedestrian facilities Improve service and increase transit options for everyone 	<ul style="list-style-type: none"> Improve transit service to existing and planned developments Locate stations to support walkability 	<ul style="list-style-type: none"> Minimize environmental, cultural, and property impacts Use practical design to minimize capital and operating costs

WHAT ARE THE ALTERNATIVES FOR THE MD 355 BRT PLANNING STUDY?

Four Build Alternatives plus the No-Build Alternative were initially identified for analysis:

- TSM Alternative**
- Alternative A (mixed traffic)**
- Alternative B (mostly median-running)**
- Alternative C (mostly curb-running)**

Following the completion of the alternatives analysis, an additional alternative, **Alternative B Modified**, was developed in an attempt to reduce costs and right-of-way needs. More detailed information can be found in **Chapter 3** of this *Corridor Summary Report* and in the *Alternatives Technical Report*.

ALIGNMENT SEGMENTS

MD 355 is a roadway that changes character as it transitions from the urban setting of downtown Bethesda to the exurban setting in Clarksburg. The roadway was divided into seven segments because of this varying character in an effort to provide for the different design types. The seven segments are described in the table below and shown in the following map. Segments may be referenced when describing the alternative results.

Segment	Geographic Description
7	Clarksburg to Middlebrook Road
6	Middlebrook Road to MD 124
5	MD 124 to Summit Avenue
4	Summit Avenue to College Parkway
3	College Parkway to Dodge Street
2	Dodge Street to Grosvenor Metrorail
1	Grosvenor Metrorail to Bethesda Metrorail



PROPOSED MD 355 BRT CORRIDOR

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ALTERNATIVES

NO-BUILD ALTERNATIVE:

- Ride On extRa service, including Transit Signal Priority (TSP), as implemented in October 2017
- As the baseline for comparison, the No-Build Alternative includes no improvements beyond existing services and projects in the Financially Constrained Long-Range Transportation Plan

TRANSPORTATION SYSTEMS MANAGEMENT (TSM) ALTERNATIVE:

- Ride On extRa service extended south to Bethesda and north to Clarksburg
- Extension of TSP introduced as part of the Ride On extRa service
- Travels in mixed traffic

Alternatives A, B, B Modified and C all include BRT features such as: **TSP** in additional locations (see descriptions on following board), **off-board fare collection**, **level boarding**, **new BRT vehicles**, **upgraded stations** and **FLASH branding**.

ALTERNATIVE A

- Mixed traffic and queue jumps

ALTERNATIVE B

- Mostly Median-Running and dedicated lanes where feasible

ALTERNATIVE B MODIFIED

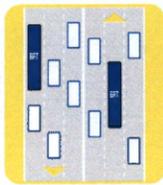
- Mostly Median-Running dedicated lanes where feasible
- Segments 4, 5, and 6 would include a single, one-way peak period median busway

ALTERNATIVE C

- Mostly Curb-Running dedicated lanes where feasible and queue jumps

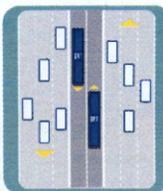
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The MD 355 BRT Project may employ a variety of treatments along the length of the corridor to best fit within the surrounding area. Some of the options under consideration are described below.



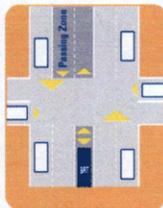
MIXED TRAFFIC

The BRT would travel with general traffic. It would not have lanes dedicated for its use.



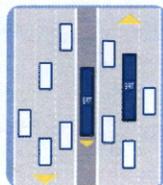
TWO MEDIAN BRT LANES

Two lanes located in the center of the roadway would be dedicated for use by the BRT, and may be physically separated from traffic by a raised curb or median. Median BRT lanes would minimize conflicts with general traffic and allow the BRT to operate faster and more reliably. However, the BRT lanes would interact with other traffic at intersecting cross streets. To avoid conflicts, general traffic could only make left turns at signalized intersections.



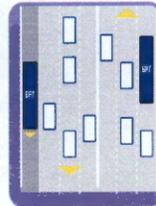
ONE MEDIAN BRT LANE (REVERSIBLE OR BI-DIRECTIONAL)

This configuration could allow for two different types of operations: bi-directional or reversible direction operations. With reversible operations, the direction of the BRT in the one median lane would vary depending on the time of day. BRT vehicles traveling in the peak direction would use the median BRT lane and BRT vehicles traveling in the non-peak direction would be in mixed traffic. In bi-directional operations, BRT vehicles traveling in both directions would share a single dedicated lane in the center of the roadway.



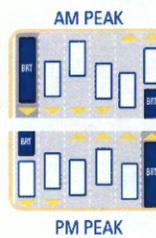
ONE MEDIAN BRT LANE (FIXED)

In fixed-direction operations, a single median BRT lane would be used solely by the southbound BRT at all times of the day. The northbound BRT would travel in mixed traffic.



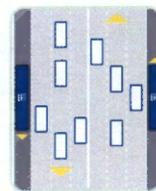
ONE CURB BRT LANE (FIXED SOUTHBOUND)

The lane adjacent to the curb along southbound MD 355 would be used exclusively by the BRT, local buses and right-turning vehicles. BRT vehicles heading northbound on MD 355 would travel with general traffic.



ONE CURB BRT LANE (PEAK DIRECTION ONLY)

A curb BRT lane would be created by re-purposing the peak direction curb lane to accommodate BRT buses, local buses, and right-turning vehicles. The two center general traffic lanes would have a reversible operation with different AM/PM lane configurations. BRT vehicles heading in the off-peak direction would travel with general traffic.



TWO CURB BRT LANES

The two lanes adjacent to the curb (one on each side of the roadway) would be used exclusively by the BRT, local buses and right-turning vehicles.



TRANSIT SIGNAL PRIORITY

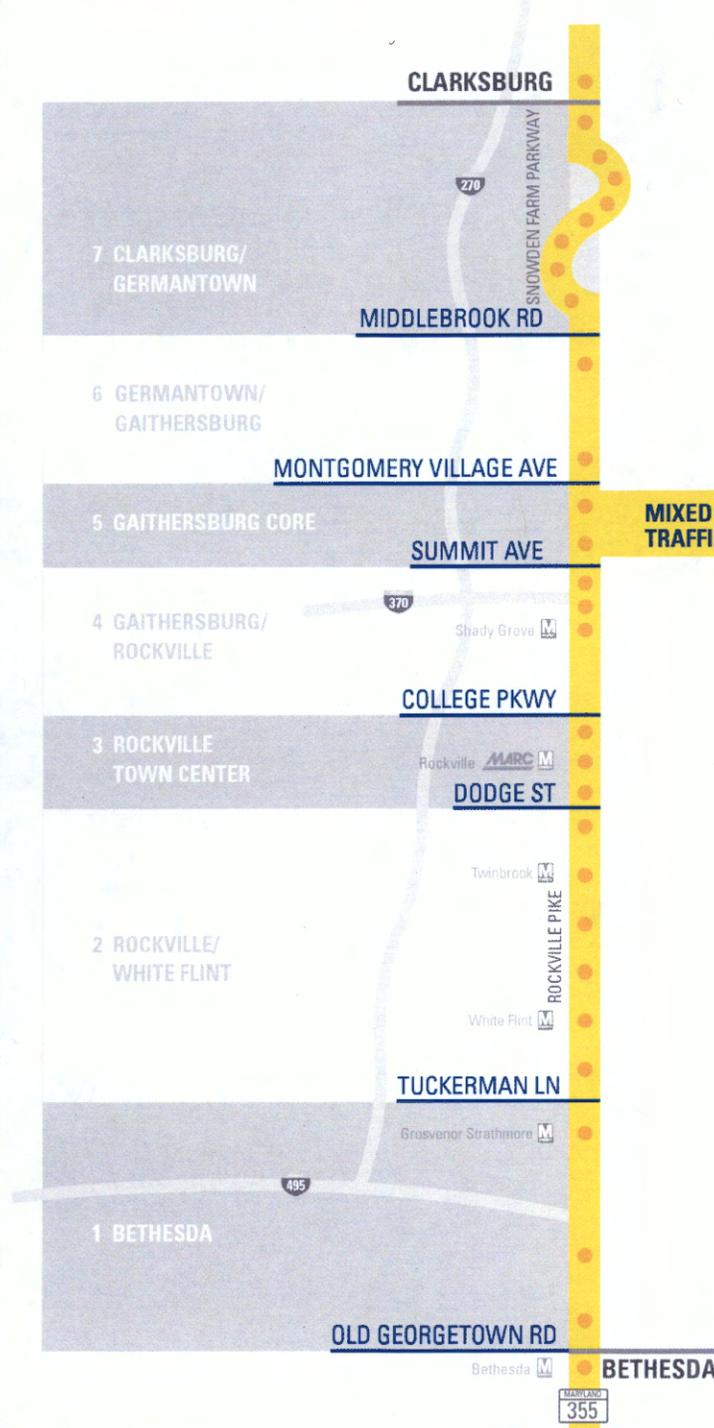
Transit Signal Priority (TSP) would give priority to BRT vehicles when certain conditions are met by either extending a green light or shortening a red light to allow an approaching BRT to pass through the intersection. TSP was implemented on the MD 355 corridor between the Lakeforest Transit Center and Medical Center as part of the new Ride On extRa service in October 2017.



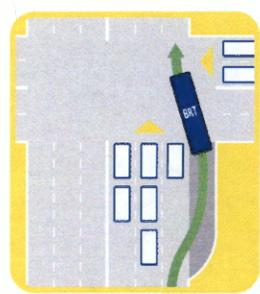
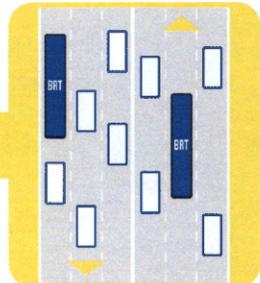
QUEUE JUMP

A queue jump is a short section of roadway widening on an approach to an intersection designated for exclusive use of the BRT. A queue jump allows BRT vehicles to bypass congestion or delays at intersections. In most applications, queue jumps are used in conjunction with TSP to allow vehicles to enter an intersection with a special signal ahead of other vehicles.

Alternative A - BRT with Queue Jumps



- Off-board fare collection
- Level boarding
- New BRT vehicles
- Upgraded stations
- FLASH branding
- Transit Signal priority
- Pedestrian and bike improvements
- Queue jumps

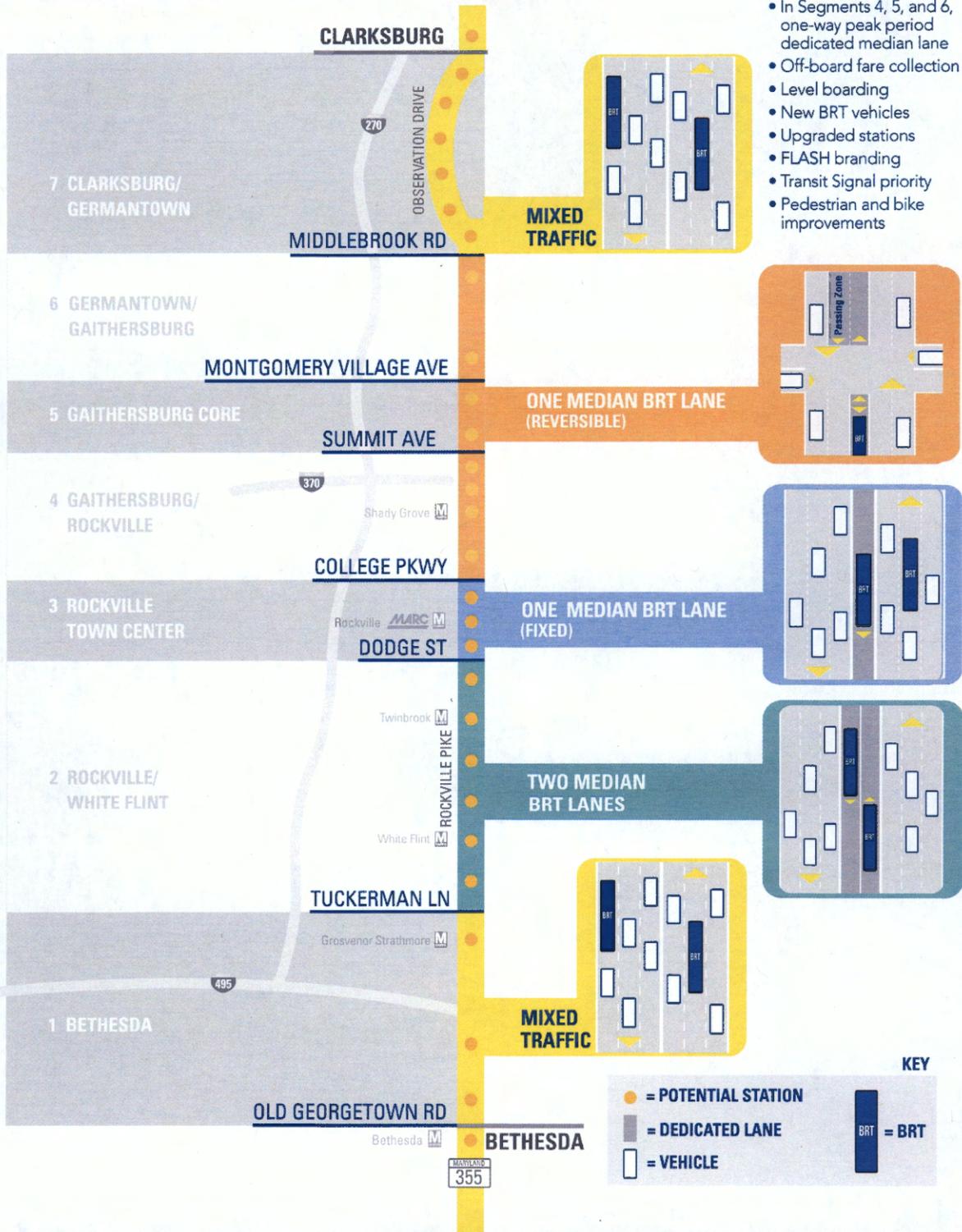


KEY

- = POTENTIAL STATION
- = VEHICLE
- = BRT

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Alternative B Modified - One BRT Median Lane

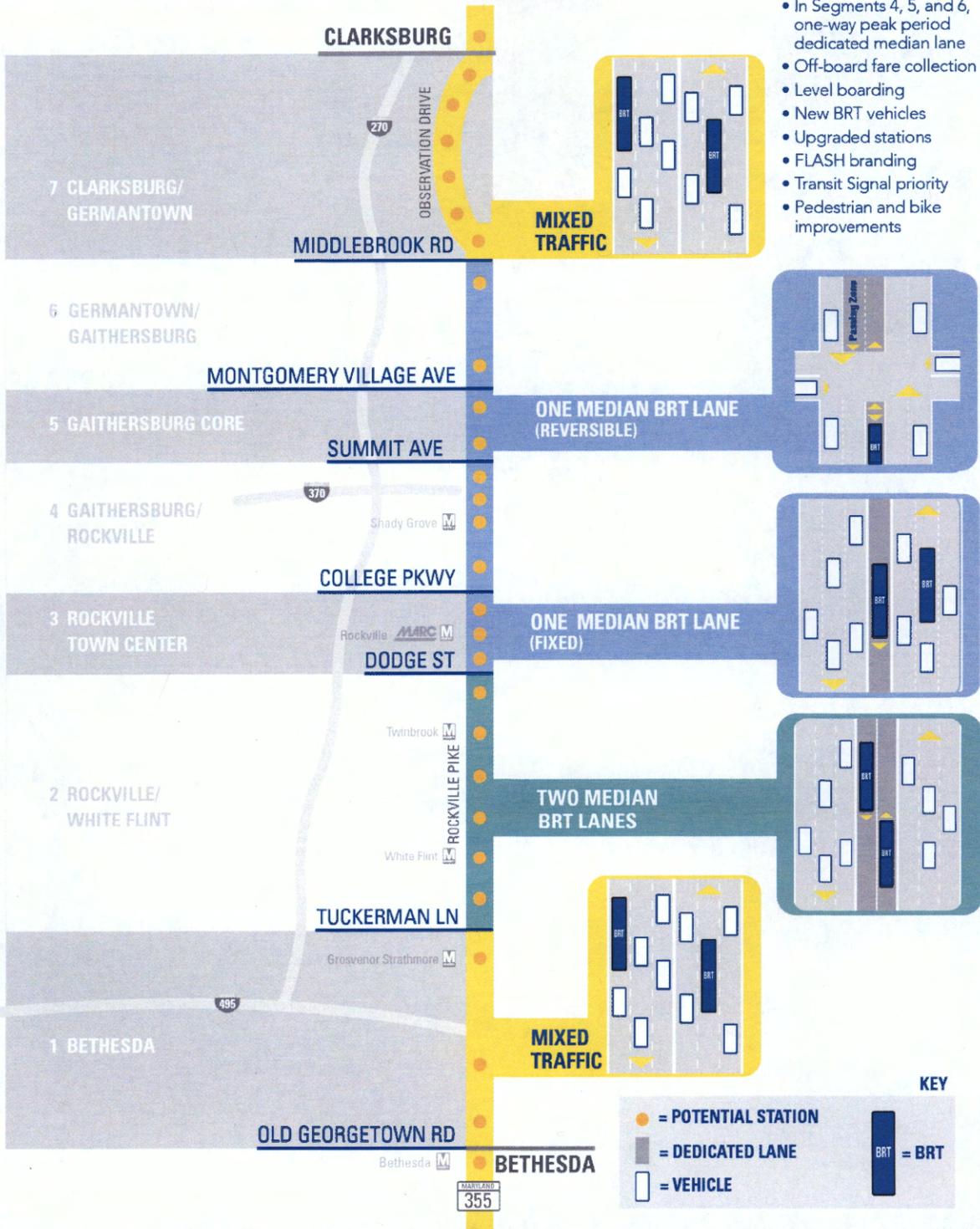


- Dedicated median lanes, where feasible
- In Segments 4, 5, and 6, one-way peak period dedicated median lane
- Off-board fare collection
- Level boarding
- New BRT vehicles
- Upgraded stations
- FLASH branding
- Transit Signal priority
- Pedestrian and bike improvements

KEY

- = POTENTIAL STATION
- = DEDICATED LANE
- = VEHICLE
- BRT = BRT

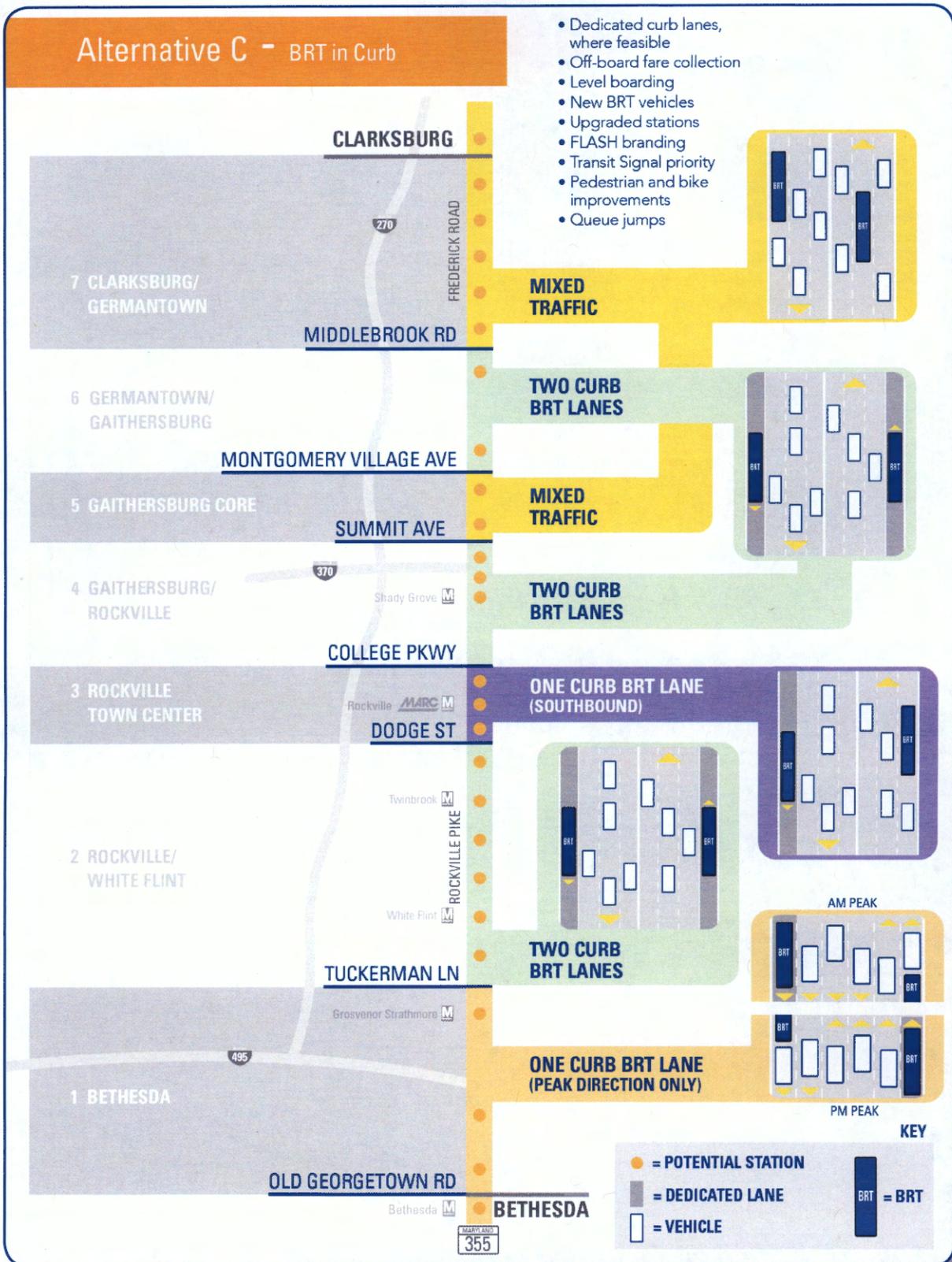
Alternative B Modified - One BRT Median Lane



- Dedicated median lanes, where feasible
- In Segments 4, 5, and 6, one-way peak period dedicated median lane
- Off-board fare collection
- Level boarding
- New BRT vehicles
- Upgraded stations
- FLASH branding
- Transit Signal priority
- Pedestrian and bike improvements

KEY

- = POTENTIAL STATION
- = DEDICATED LANE
- = VEHICLE
- BRT = BRT

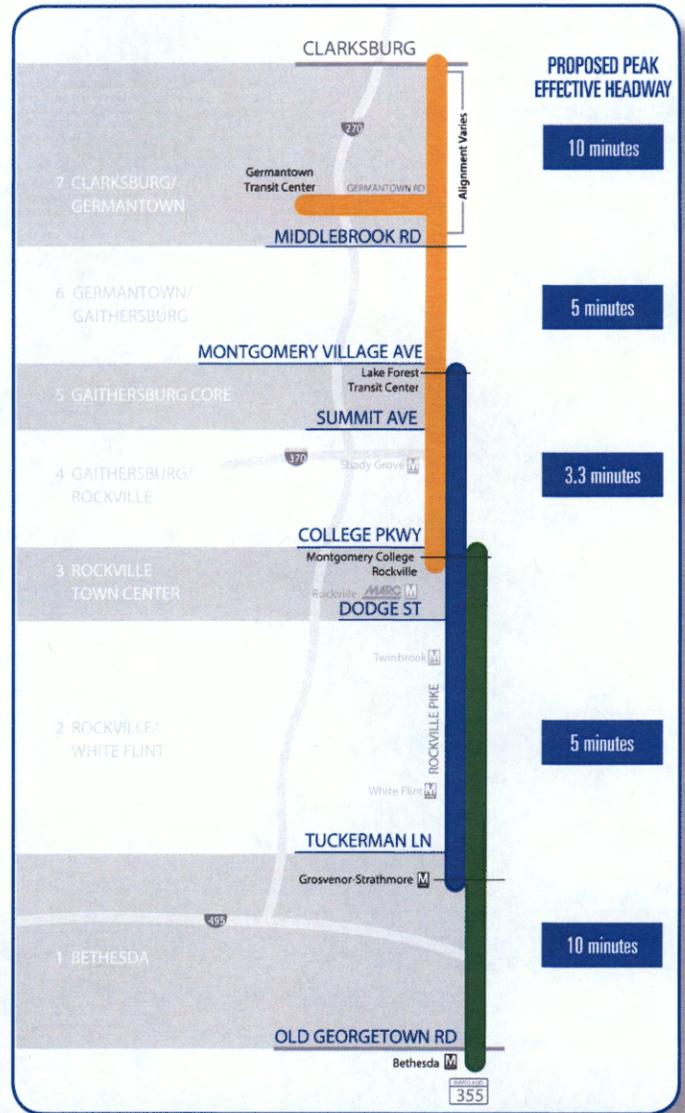


How Will the BRT Operate?

There are four route patterns proposed for the proposed BRT service:

- FLASH 1C: Clarksburg to Montgomery College - Rockville
- FLASH 1G: Germantown to Montgomery College - Rockville
- FLASH 2: Lakeforest Transit Center to Grosvenor Metro
- FLASH 3: Montgomery College - Rockville to Bethesda

The BRT would operate from 4:15 AM - 1:45 AM daily, and each service pattern would operate every ten minutes during the peak period, which is defined as between 6:00 AM to 9:00 PM. Where the route patterns overlap, the effective headways (or time between buses) are shorter.



WHERE ARE THE BRT STATIONS?

As part of Phase 2 of the MD 355 BRT Planning Study, a comprehensive assessment of potential station locations was performed that included two levels of station screening to evaluate the station options and ultimately determine a set of recommended stations to carry forward in the Alternatives.

A number of future “infill” stations were also identified that may become suitable after the initial launch of BRT service. A list of all of the station locations can be found in *Section 3.9* and more detail on the station selection process can be found in the *Station Screening Report*.

STATION SCREENING PROCESS

MCDOT has completed a two-level screening of potential station locations.





HOW DO THE MD 355 BRT ALTERNATIVES COMPARE?

The goals and objectives outlined above and in **Chapter 2** of this *Corridor Summary Report* were further developed into a set of criteria called Measures of Effectiveness (MOEs) to evaluate the alternatives. The team assessed MOEs for each alternative. These assessments will inform the selection of a Recommended Alternative and the ultimate development of a recommended phasing and implementation plan.



PROVIDE AN APPEALING, FUNCTIONAL AND HIGH QUALITY TRANSIT SERVICE

All the BRT alternatives would generate high ridership compared to the No-Build and TSM Alternatives. Alternatives B and B Modified display the highest ridership, approximately doubling the No-Build Alternative. It should be noted that approximately 50% of the ridership would occur in the off-peak period, showing there is a high-demand for frequent, all-day service.

Transit travel times between key origins and destinations would improve under the BRT alternatives when compared to the No-Build and TSM Alternatives. This will make it easier and more convenient for people to use transit after BRT is implemented.

Alternatives B and C would provide the greatest travel time savings, due to the addition of dedicated transit lanes. Alternatives B and C would also offer better overall reliability. Under variable traffic conditions such as construction, car breakdowns, and vehicle crashes, Alternative B should perform more reliably due to its physical separation from traffic.

Alternatives B and C would provide greater travel time savings than Alternative A, due to dedicated transit lanes



IMPROVE MOBILITY OPPORTUNITIES, ACCESSIBILITY AND TRANSPORTATION CHOICES FOR ALL

All the BRT Alternatives - Alternatives A, B, B Modified, and C - would improve access to and from housing, jobs, and activity centers for everyone, including key demographic groups.

Each of the BRT Alternatives would meet the project goal of providing improved access or increased transit options.

Traffic congestion is projected to get worse in 2040 regardless of which alternative is chosen and roadway congestion was found to be similar across all alternatives. Average delay per person would increase slightly (30 seconds or less) between the No-Build Alternative and the BRT Alternatives. Overall, the BRT Alternatives meet the project's objective of balancing the mobility needs of all users of the corridor.

More people from key demographic groups will have increased access to their destinations under the BRT Alternatives





SUPPORT MASTER PLAN DEVELOPMENT



SUPPORT SUSTAINABLE AND COST-EFFECTIVE TRANSPORTATION SOLUTIONS

The BRT Alternatives would support the growth of pedestrian-friendly places and advance the goals of the multiple jurisdictions and the Master and Sector Planned areas that span the corridor. Plans for areas along the MD 355 corridor propose enhanced transit to support their mobility, land use, and economic development goals.

BRT stations are proposed near existing or future land uses that are supportive of transit (including a mix of uses, high density, activity centers, or walkability) and would help accommodate redevelopment opportunities.

ENVIRONMENTAL AND CULTURAL RESOURCES

Conceptual design of all alternatives sought to minimize impacts and right-of-way needs. Preliminary impacts to the natural environment and cultural or man-made resources were identified as minimal. There are no anticipated impacts to forests or streams in the area, and minimal potential impacts to wetlands, floodplains, and endangered species. For cultural impacts, sites were identified that will require a more detailed assessment as design advances to determine the site-specific impacts.

WETLANDS

MINIMAL IMPACTS
Less than one acre impacted under all alternatives

FORESTS

NO IMPACTS

ARCHITECTURAL SITES

30 sites require additional assessment

STREAMS

NO IMPACTS

ENDANGERED SPECIES

MINIMAL IMPACTS
TSM & Alternative C - NO IMPACTS
Alternatives A & B - one potentially impacted area.

ARCHAEOLOGICAL SITES

TSM Alternative - No Impacts
Alternative A: 10 sites, 9.3 acres of intact soil
Alternative B: 1 site, 29.5 acres of intact soil
Alternative C: 3 sites, 16.7 acres of intact soil

FLOODPLAINS

MINIMAL IMPACTS
Less than one acre impacted under all alternatives

PARKS

MINIMAL IMPACTS
Less than one acre of park land impacted in all alternatives

HAZARDOUS MATERIALS

170 - 174 Locations
Require additional assessment under TSM and Alternatives A, B, & C

RIGHT-OF-WAY NEEDS

Each of the Build Alternatives would require some degree of right-of-way in certain locations beyond what currently exists. Most of the right-of-way needs would be along the roadway frontage of properties along MD 355. As design advances, further avoidance and minimization strategies to reduce right-of-way needs will be investigated.

The conceptual design would fit within the right-of-way set aside in the various master plans. However, much of this right-of-way is not currently dedicated for transportation use. As properties come before the Planning Board and other jurisdictions for redevelopment, the County will work with applicants to address master planned right-of-way needs.

RIGHT-OF-WAY NEEDS BY ALTERNATIVE	
TSM	<1 ACRE
Alternative A	13 ACRES
Alternative B	61 ACRES
Alternative B Modified	54 ACRES
Alternative C	39 ACRES

COST

The Build Alternatives have a range of costs based on both the level of infrastructure investment and the location along the corridor.

TOTAL CAPITAL COSTS					
ALTERNATIVE	TSM	A Mixed Traffic	B Median	B Mod. Median	C Curb
CAPITAL COSTS	\$5M	\$141M	\$849M	\$784M	\$497M
BUSES	\$10M	\$43M	\$37M	\$37M	\$37M
TOTAL COSTS	\$15M	\$184M	\$886M	\$820M	\$534M

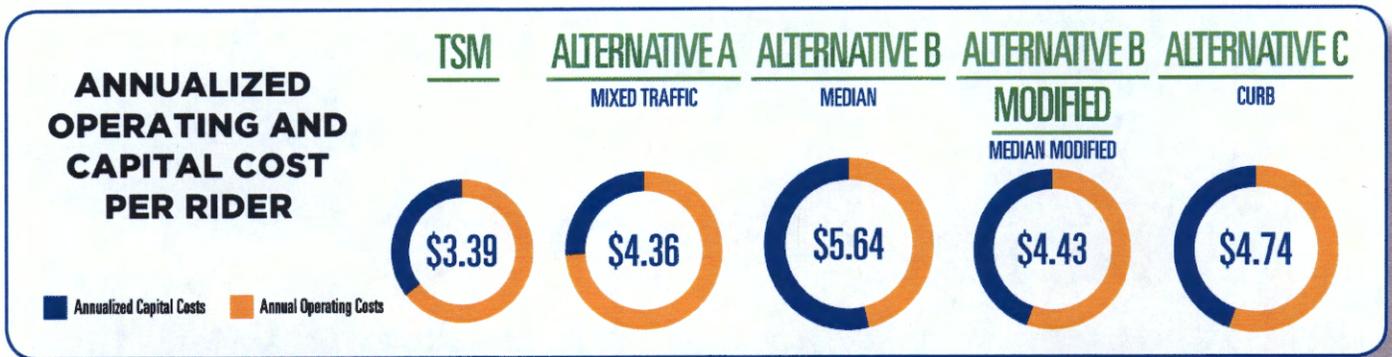
Alternative B would be the most expensive because it contains the most roadway widening, right-of-way needs, and impacts to existing utilities and infrastructure. Alternative B would also provide the greatest separation of the BRT from general purpose traffic and roadway congestion, which would result in increased reliability, travel times, and the highest ridership of any alternative.

When compared with Alternative B, Alternative B Modified would reduce the overall project cost by \$65M. The single lane reversible guideway would provide separation from mixed traffic for BRT vehicles in the peak direction in Segments 4 through 6, thus providing similar reliability, travel times, and ridership as Alternative B in those Segments.

Alternative C would include roadway widening and costs to provide a dedicated curb-running transit guideway that could be shared by BRT and local bus service. The overall cost for Alternative C is lower than Alternative B, but it would not provide full separation for the BRT from traffic needing to use the curb lane to turn right at intersections or driveways. This lack of physical separation would likely not provide the same reliability as Alternative B.

Alternative A would be the least expensive BRT Alternative because it would operate in mixed traffic and only require roadway widening at queue jump locations. However, because the BRT would operate in mixed traffic, Alternative A would experience longer travel times and less reliability than Alternatives B, B Modified, and C.

Annualized capital and operating costs per annual rider were developed for each Build Alternative based on FTA guidelines that account for the typical life span of different project components. The annualization of capital and operating costs provides the best cost comparison for the alternatives because it combines operational costs, capital costs, and ridership. This comparison appears to support the selection of a BRT Alternative.



WHAT ARE THE NEXT STEPS FOR THE MD 355 BRT?

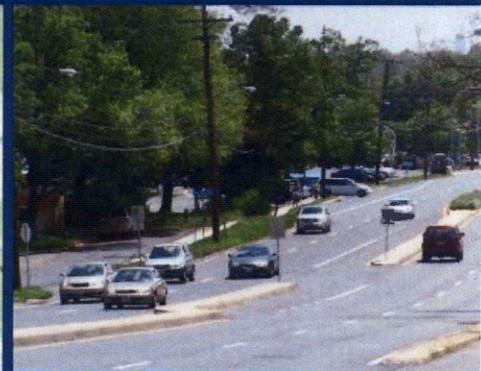
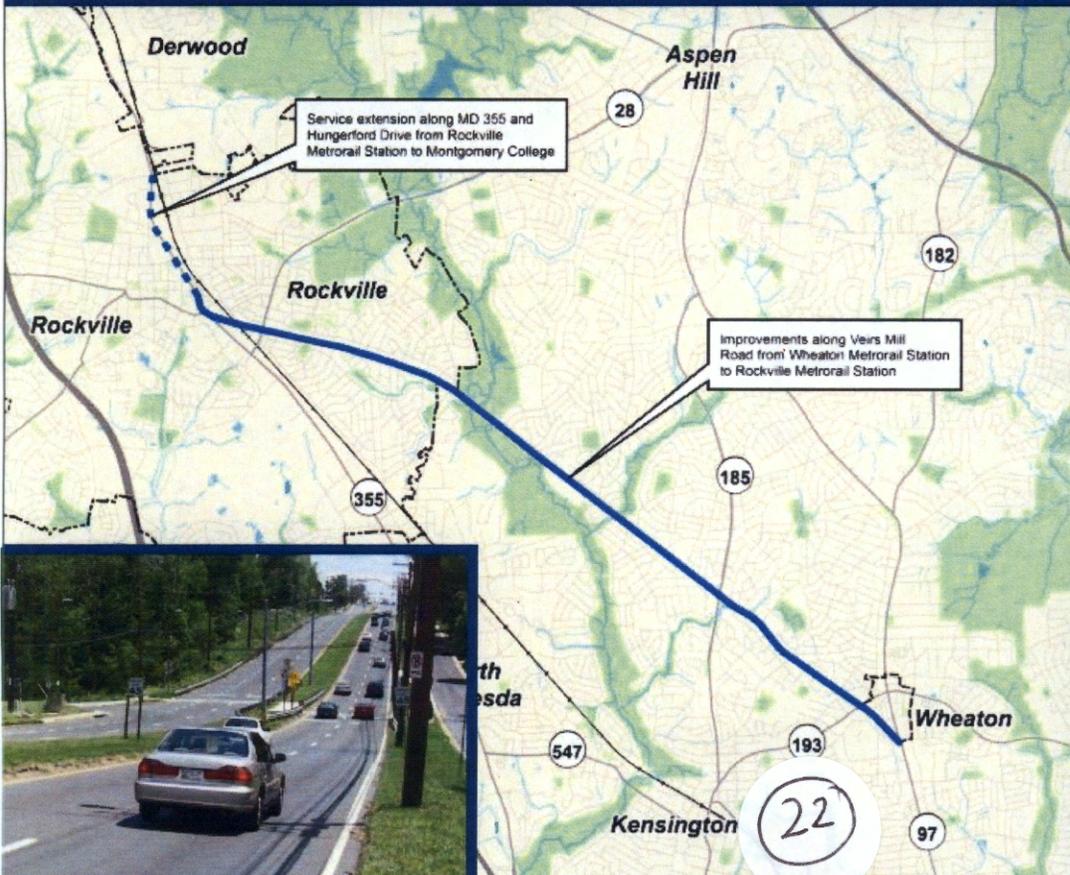
Following the selection of a Recommended Alternative, the MD 355 BRT project would move into Preliminary Engineering, which includes surveys; additional, more detailed traffic studies; final environmental documentation; development of final concepts; and a detailed scope, schedule, and cost estimate for construction. The project would then move into final design and ultimately construction. All of these steps are contingent on available funding. Given the length of the corridor and varying characteristics of the existing conditions, it is anticipated that the Recommended Alternative would be implemented in stages.

Public involvement has and will continue to play an important role in the planning and design of BRT on MD 355. Public involvement for the project in Phase 2 included a series of Community Updates, Public Open Houses, and Community Advisory Committee (CAC) meetings which was a continuation of the public outreach that began in Phase 1. In addition, www.RidetheFLASH.com is available to inform the public about BRT and keep them up-to-date on project information. As the project progresses through preliminary engineering and final design, public involvement and opportunities to provide input will continue.

FINAL Corridor Study Report

MD 586 / Veirs Mill Road Bus Rapid Transit Study

July 2018



EXECUTIVE SUMMARY

The proposed MD 586/Veirs Mill Road Bus Rapid Transit (BRT) Corridor Study extends approximately 6.4 miles from the Rockville Metrorail Station to the Wheaton Metrorail Station in Montgomery County, Maryland. This study also includes bus service improvements in mixed traffic along MD 355 from the Rockville Metrorail Station to Montgomery College, a distance of approximately 1.2 miles. The technical analyses for this study were completed by the Maryland Department of Transportation State Highway Administration (MDOT SHA) in close coordination with the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) and the Montgomery County Department of Transportation (MCDOT). The alternatives evaluation was originally presented in the Draft Corridor Study Report (CSR), which was published on September 6, 2016 and was open for public review and comment through October 14, 2016. This Final CSR documents the evaluation of alternatives and selection of a recommended alternative to provide new BRT service along MD 586/Veirs Mill Road.

BRT was identified as a potential solution for this transit-dependent area and congested corridor because it would increase transit reliability and opportunities for low-income and minority populations, as well as provide access to a larger supply of affordable housing. Additionally, enhanced transit access could play an integral role in revitalizing the adjacent neighborhoods, relieving congestion, supporting land conservation, and improving safety for bicyclists and pedestrians. It is expected that BRT improvements would increase the mobility, safety, and sustainability of the study corridor.

A federal lead agency has not been identified for this project as of the date of this CSR; however, federal funding may be required to implement the proposed improvements. Federal funding would require compliance with the National Environmental Policy Act (NEPA) and implementing regulations, as outlined in the Council of Environmental Quality (CEQ) 40 Code of Federal Regulations (CFR), Part 1500-1508. Anticipating that a federal funding source will be identified, the CSR that follows was written to inform future NEPA document(s) and implementing regulations.

PURPOSE AND NEED

The purpose of the MD 586/Veirs Mill Road BRT Corridor Study was to evaluate a new, higher-speed, higher-frequency, premium transit bus service along Veirs Mill Road between the Rockville Metrorail Station and the Wheaton Metrorail Station.

Transportation data, planned developments, and feedback from individual citizens and community groups was obtained during the project scoping to identify the following needs for the project:

- 1. System Connectivity:** A high-quality, east-west transit connection is not currently available between the Rockville Metrorail Station and the Wheaton Metrorail Station.
- 2. Mobility:** The Veirs Mill Road corridor is characterized by traffic congestion that hinders bus mobility (speed and reliability), resulting in unpredictable service and travel times.
- 3. Transit Demand/Attractiveness:** The current transit service does not meet existing demand; this coupled with reliability issues (adherence to schedule, bus bunching, and

slow travel times), reduces serviceability for individuals who rely on public transit as their primary mode of transportation. In addition, issues associated with current bus service do not make buses attractive to individuals who have access to alternate modes of transportation.

- 4. Livability:** Transit improvements are needed throughout the Veirs Mill Road corridor to create a more reliable, integrated and accessible transportation network that enhances choices for transportation users; provides easy access to affordable housing, employment, and other destinations; and promotes positive effects on the surrounding community.

ALTERNATIVES

Ten conceptual alternatives were developed for the study corridor by combining transit service options and runningway options. These conceptual alternatives were evaluated based on feasibility within the study corridor and expected right-of-way (ROW) and traffic impacts. Three build alternatives and the No-Build Alternative were retained for detailed study. MDOT SHA developed detailed alignments for each of the three retained build alternatives so that the costs and impacts of each alternative could be evaluated. Input from the public and key stakeholders, such as the City of Rockville, the Maryland-National Capital Park and Planning Commission (M-NCPPC), and the Washington Metropolitan Area Transit Authority (WMATA), was used to develop the alternatives. A detailed plan of each of the retained build alternatives, including the proposed limits of disturbance (LOD), is provided in **Appendix A**.

Alternative 1 – No-Build Alternative: Alternative 1 would not involve improvements to infrastructure or bus service along the Veirs Mill Road study corridor beyond those improvements already planned and programmed. The existing lane configurations and bus services would remain the same in the 2040 design year. The No-Build Alternative does not address the purpose and need for the project; however, it serves as a baseline for comparing the impacts and improvements associated with the build alternatives.

Alternative 2 – Transportation System Management (TSM) with Intersection Queue Jumps and Enhanced Bus Service: Alternative 2 would consist of minor infrastructure improvements at select intersections and the implementation of a limited-stop, enhanced bus service, similar to the proposed WMATA Q9 route. The minor infrastructure improvements would include enhanced bus stops with features such as shelters, real-time information, off-board fare collection, installation of transit signal priority (TSP), and widening for the installation of queue jumps. The proposed enhanced bus service would include 12-minute headways in the peak period and 15-minute headways in the off-peak period.

Alternative 3 – New Bus Rapid Transit Service in Dedicated Curb Lanes (where feasible): Alternative 3 would consist of widening or repurposing the existing travel lanes and shoulders along Veirs Mill Road to provide dedicated, curb-running bus lanes and a new BRT service. The dedicated lanes would be provided for the BRT service in areas where the improvements would result in minor ROW impacts and would improve bus service by increasing the travel speeds. The proposed BRT service would include six-minute headways in the peak period and ten-minute headways in the off-peak period.

Alternative 5B – New Bus Rapid Transit Service in the Median, via One Dedicated Bi-directional Lane or in Two Lanes (where feasible): Alternative 5B would implement new BRT service in a dedicated, bi-directional median lane or in two dedicated median lanes from MD 28 to Newport Mill Road. In the bi-directional median lane segments, BRT buses would operate in both directions in a single-lane operation. Eastbound and westbound vehicles would alternate when using the lane. Transit vehicles traveling in opposite directions would pass each other at stations where the bi-directional travel lanes would widen to two lanes. A two-lane, dedicated median section would be provided, where feasible. Generally, the dedicated lanes would be created by pavement widening to the outside and shifting the existing vehicular travel lanes out to allow the BRT to fit within the median. The number of existing travel lanes would be maintained. The proposed BRT service would include six-minute headways in the peak period and ten-minute headways in the off-peak period.

ALTERNATIVES COMPARISON

The 2040 transit and traffic modeling results showed that there are transit ridership and travel time benefits associated with all three build alternatives, as compared to the No-Build. For example, all three build alternatives would increase the transit ridership in the corridor and reduce transit travel time. However, the difference in transit travel times among the build alternatives was minor. The build alternatives would have a wide range of costs and property impacts. A comparative summary of transit and traffic operations, costs, and environmental impacts associated with the No-Build and three build alternatives is described below.

- The projected 2040 daily BRT boardings for the build alternatives would range from 2,600 to 7,300 passengers. The projected 2040 daily transit boardings in the corridor for the build alternatives would range from 33,400 to 35,300 passengers.
- In general, each of the build alternatives would improve travel times for cars and trucks traveling along MD 586, as compared to the No-Build while increasing delays for cars and trucks on side streets accessing MD 586.
- For the build alternatives, the number of miles of level of service (LOS) E or F along the corridor would range from 3.2 to 3.5 in the AM peak hour and from 3.8 to 4.2 in the PM peak hour, all of which are less than or equal to the No-Build distances of 3.5 miles in the AM peak hour and 5.8 miles in the PM peak hour.
- All three build alternatives would result in four or five intersections operating at LOS E or F in both the AM and PM peak hours.
- The cost to purchase the required ROW for the build alternatives would range from \$6.2M to \$35.4M and the amount of ROW required for the build alternatives would range from 0.7 acres to 6.7 acres.
- The cost of engineering and construction for the build alternatives would range from \$23.2M to \$236.9M and the total capital cost, including ROW and vehicles, would range from \$34.8M to \$288.8M.
- The annual operating costs of the build alternatives would range from \$3.1M to \$4.8M.

- The number of properties impacted by the build alternatives would range from 27 to 217. The number of residential relocations would range from four to 17 households and the number of business displacements would range from one to three. The residential relocations for Alternative 5B are presented as a range; the final locations of bus station locations would be determined following the identification of a recommended alternative.
- The number of public parks impacted by the build alternatives would range from one to five and the acreage would range from 0.2 acres to 1.6 acres.
- The number of public facilities impacted by the build alternatives would range from zero to three.
- The number of historic structures impacted by the build alternatives would range from zero to four. No archaeological sites would be impacted.
- The number of stream crossings impacted by the build alternatives would range from zero to ten. The 100-year floodplain impacts would range from zero to 0.3 acres. The wetland impacts would range from zero to less than 0.1 acres. The forest impacts would range from 0.8 acres to 3.1 acres. The Green Infrastructure impact would range from less than 0.1 acres to 1.7 acres.
- The transit provider would complete service equity and fare equity analyses no less than six months before the beginning of revenue operations that will indicate whether adverse impacts and/or benefits of BRT will be “equal” for EJ populations when compared to non-EJ populations.

ADDITIONAL ANALYSIS

On December 1, 2016, the results of the alternatives comparison were presented to the Transportation, Infrastructure, Energy, and Environment (T&E) Committee of the Montgomery County Council. The T&E Committee members were not in favor of Alternative 5B due to the high cost and lack of travel time benefit, as compared to the other build alternatives. The Committee was interested in understanding why the projected travel times for Alternatives 2 and 3 were similar to each other, despite the differences in dedicated lanes and infrastructure improvements included in each alternative. The Committee asked for additional analyses to determine how a new alternative would operate that combined the infrastructure improvements of Alternative 2 with the service improvements of Alternative 3. A description of this new alternative, Alternative 2.5 is provided below.

Alternative 2.5 – New BRT Service with Intersection Queue Jumps: In general, Alternative 2.5 would include the roadway improvements from Alternative 2 and the bus service improvements from Alternative 3. The minor roadway improvements would require widening for the installation of queue jumps at select intersections. Alternative 2.5 would use the same 12 station locations that were assumed for Alternatives 2 and 3 and new BRT stations would be constructed at each of the 12 station locations. **Appendix A4** provides detailed plans of the queue jump locations. The proposed BRT service would include six-minute headways in the peak period and ten-minute headways in the off-peak period.

Between December 2016 and May 2017, an additional traffic analysis was conducted for Alternative 2.5 and cost estimates were developed. Alternative 2.5 would incorporate the many of the same roadway improvements as Alternative 2; therefore, its footprint and environmental impacts would be similar to Alternative 2. Alternative 2.5 would incorporate the same transit service improvements as Alternative 3; therefore, the ridership forecast would be similar to Alternative 3. In summary, compared to Alternatives 2 and 3, the Alternative 2.5 metrics are as follows:

- **Daily BRT Boardings:** Provides 2.5 times more boardings than Alternative 2 and a similar number to Alternative 3.
- **Peak Hour Transit Person Travel Time Savings:** Provides a greater savings by serving more riders than Alternative 2. Provides slightly less savings in the eastbound direction and equal savings in the westbound direction than Alternative 3.
- **BRT Travel Times:** Provides slightly higher BRT travel times than Alternative 2 (except for along eastbound in the AM peak hour), due to higher ridership. Provides higher BRT travel times than Alternative 3 eastbound (up to two minutes) and equal BRT travel times in the westbound direction.
- **Cost:** Requires \$44.3M more to design and construct than Alternative 2 and \$68.8M less to design and construct than Alternative 3.

PUBLIC AND STAKEHOLDER INPUT

MCDOT has maintained and regularly updated the county BRT Project website to provide the public with information about the MD 586/ Veirs Mill Road BRT Corridor Study (<https://www.montgomerycountymd.gov/brt/>). Project newsletters and Public Open House/Workshops were also used to engage the public with the planning process in May 2012, November 2013, and September 2016.

Additionally, a Corridor Advisory Committee (CAC) was convened for the MD 586/Veirs Mill BRT Corridor Study. The CAC gives community residents and business owners/operators the opportunity to provide comments and make recommendations to the study team throughout the planning process. Nine CAC meetings were held between February 2015 and June 2017.

In addition to the ongoing stakeholder outreach that occurred during the development of the alternatives, stakeholder coordination meetings were held after the Draft CSR was published in September 2016 to understand the positions of key agency and municipal stakeholders. The project team met with staff from M-NCPPC, the City of Rockville, and WMATA to review the Draft CSR and discuss which alternative each stakeholder would like to see move forward as the recommended alternative. The Montgomery County Planning Board of M-NCPPC and the City of Rockville provided letters to the County Council expressing their preference for Alternative 3 and WMATA provided a letter to MDOT SHA also expressing their preference for Alternative 3 as the recommended alternative. Those letters are included in **Appendix F**.

RECOMMENDED ALTERNATIVE AND NEXT STEPS

On May 3, 2017, the T&E Committee voted to select Alternative 2.5 as their recommended alternative. On June 13, 2017, the County Council voted to adopt a resolution formally selecting Alternative 2.5 as their recommended alternative, with Alternative 3 retained as the master plan option. This recommendation was further documented by letter addressed to MDOT Secretary Pete Rahn, dated June 15, 2017, and signed by County Council President Roger Berliner (**Appendix G**). The County Executive concurrently selected Alternative 2.5 as the recommended alternative, with Alternative 3 retained as the master plan option, by letter dated July 10, 2017 (**Appendix G**).

Alternative 2.5 addresses the purpose and need for the project by providing high-quality BRT service with improved speed and reliability. Transit travel time will be reduced up to 13.2 minutes (33 percent) relative to the No-Build 2040 travel time. The \$79.1M cost for Alternative 2.5 is less than the dedicated lane alternatives (3 and 5B), while the projected ridership is higher than Alternative 2. Retaining Alternative 3 as the master plan option acknowledges that dedicated curb lanes may be justified along MD 586 at some point in the future as traffic congestion and transit ridership continue to grow, and as Montgomery County builds the BRT network. It would also allow the County to require ROW dedication from developers to be consistent with the master plan recommendation, Alternative 3.

The next steps for the MD 586 BRT project include refining the recommended alternative by adjusting the station and queue jump locations to further maximize operations while reducing project costs and impacts. Station locations may be shifted from near-side to far-side and vice versa and queue jump locations may be refined based on how the BRT is expected to operate near each intersection. Further engineering refinements of Alternative 2.5 would include more detailed stormwater management design and minimizing utility and ROW impacts. Additional ridership modeling may also be performed to refine the projected ridership for Alternative 2.5.

There is not currently any funding available to advance the project. Once a funding source is identified, the appropriate environmental documentation should be completed for Alternative 2.5. Environmental documentation would include supplemental Section 106 coordination and impact analysis of natural features, and socio-economic factors such as potential impacts to communities, indirect and cumulative impacts, and additional related outreach. While this study did not complete detailed environmental impacts on Alternative 2.5, the analyses that were conducted on Alternatives 2 and 3 could be used as a starting point, depending on how soon the project moves into the environmental document phase. Additionally, the following detailed environmental analyses were not completed for Alternatives 2 and 3 and would need to be completed for Alternative 2.5 following the identification of a funding source: a detailed noise analysis, an air quality conformity determination, a Section 4(f) evaluation, and a wetland delineation.