AGENDA ITEMS #3&4
July 30, 2019

Subject: Action--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: T&E**
Keywords: : #MoCoBRT; Search terms: transit, funding, Veirs Mill Road, MD 355	

EXPECTED ATTENDEES:

Chris Conklin, Transportation Policy Officer, Department of Transportation (DOT)
Joana Conklin, Manager, Rapid Transit System Development, DOT
Corey Pitts, Rapid Transit System Development, DOT
Brady Goldsmith, Senior Budget Analyst, Office of Management and Budget (OMB)

COMMITTEE RECOMMENDATIONS (3-0):

- Do not select a preferred alternative for MD 355 BRT now; concur with the Executive's approach to solicit concepts from the private sector.
- Concur with the Executive's recommended appropriation and amendment for the Bus Rapid Transit: MD 355 project on ©F-H.
- Approve an appropriation and amendment to the Bus Rapid Transit: Veirs Mill Road project shown on ©106-107, which would fund $1 million in FY20 and $2 million in FY21, and appropriate the full $3 million, funded with development impact tax revenue. Delete the G.O. Bond funding for final design in FY24 ($1 million) and "Beyond 6 Years" ($3 million).

This report contains:

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AGENDA ITEMS #3&4
July 30, 2019
Action

MEMORANDUM

July 26, 2019

TO: County Council

FROM: Glenn Orlin, Deputy Director

SUBJECT: Selection of preferred alternative for Bus Rapid Transit [BRT]: MD 355 project and 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: Action

T&E Committee *(and Council staff)* **recommendations (3-0):**

- **Do not select a preferred alternative for MD 355 BRT now; concur with the Executive's approach to solicit concepts from the private sector.**
- **Concur with the Executive's recommended appropriation and amendment for the Bus Rapid Transit: MD 355 project on ©F-H.**
- **Approve an appropriation and amendment to the Bus Rapid Transit: Veirs Mill Road project shown on ©106-107, which would fund $1 million in FY20 and $2 million in FY21, and appropriate the full $3 million, funded with development impact tax revenue. Delete the G.O. Bond funding for final design in FY24 ($1 million) and "Beyond 6 Years" ($3 million).**

* * *

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 ©A-B, the appropriation and CIP amendment requests are on ©C-H.[2] *This worksession has two purposes: (1) potentially to decide which alternative concept should be*

[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

the preferred concept for the MD 355 BRT; and (2) to decide 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 the Department of Transportation (DOT) to proceed with one (or both) studies without further delay.

Those anticipated to attend the worksession are:

Emil Wolanin, Deputy Director for Operations, Department of Transportation (DOT)
Chris Conklin, Transportation Policy Officer, DOT
Joana Conklin, Manager, Rapid Transit System Development, DOT
Corey Pitts, Rapid Transit System Development, DOT
Brady Goldsmith, Senior Budget Analyst, Office of Management and Budget (OMB)
David Anspacher, Planning Supervisor, Functional Planning & Policy, M-NCPPC

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, DOT staff urged the T&E Committee to wait until there was a preferred concept for MD 355 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.

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 briefed the City Councils of Rockville and Gaithersburg, as well as the Planning Board. 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; see summary 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; see summary on ©22-28.

MD 355 alternatives. DOT has divided the 22-mile corridor into seven segments between Bethesda and Clarksburg (see ©8). Because of extremely long distance, to facilitate on-time

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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.

performance DOT would split the line into four separate routes: between the Clarksburg Outlets and Montgomery College-Rockville; between the Germantown Town Center and Montgomery College-Rockville; between the Lake Forest Transit Center and the Grosvenor-Strathmore Metro Station; and between Montgomery College-Rockville and the Bethesda Metro Station (see ©15). Therefore, a passenger boarding at one of these stations could reach any station along the line with no more than one transfer.

DOT's study identifies five alternatives:

- *Transportation Systems Management (TSM).* The current Ride On extRa service runs every 10 minutes during weekday rush hours between the Lake Forest Transit Center and the Medical Center Metro Station, making limited stops. There is also transit signal priority (TSP) at certain intersections. The buses have a low floor for quicker boarding and alighting, and feature free WiFi access, USB charging ports, information displays, and extra padding on the seats. The TSM alternative would extend this route north to Clarksburg and south to the Bethesda Metro Station (introducing TSP in the extended segments) and to operate normal all-day service hours.

Under the following alternatives, on weekdays the BRT buses would run every 10 minutes during rush hours and every 15 minutes midday and at night, and every 15 minutes on weekends. The span of service on weekdays would begin between 4:15am and 5:00am (depending on the route) and end between midnight and 1:30am. On Saturdays they would run from 5:00am until as late as 1:45am, and on Sundays from 5:00 am until as late as 1:30am.

- *Alternative A* (©11). This alternative, as well as B, B Modified, and C, would feature off-board fare collection and level boarding to further hasten boarding and alighting. Alternative A would have the buses run in mixed traffic, except that there would be queue jump lanes at 13 intersections in the northbound direction and at 8 intersections in the southbound direction. This alternative is similar to the preferred alternative selected for the Veirs Mill Road BRT.

Under the following alternatives, the median and curb bus lanes would be added to the current road cross-section; that is, existing travel lanes would not be repurposed to create the bus lanes.

- *Alternative B* (©12) This alternative would have:
  - two median bus lanes between Middlebrook Road and Montgomery Village Avenue;
  - one reversible median bus lane (southbound in the morning, northbound in the evening) between Montgomery Village Avenue and Summit Avenue;
  - two median bus lanes between Summit Avenue and College Parkway;
  - one southbound-only median bus lane between Summit Avenue and Dodge Street; and
  - two median bus lanes between Dodge Street and Tuckerman Lane.

  Between Clarksburg and Middlebrook Road and between Tuckerman Lane and the Bethesda Metro Station, the line would run in mixed traffic.

- *Alternative B Modified* (©13). This alternative is the same as Alternative B, except that the entire segment between Middlebrook Road and College Parkway would have one reversible median bus lane (southbound in the morning, northbound in the evening).

- *Alternative C* (©14). This alternative would have:
  - two curb bus lanes between Middlebrook Road and Montgomery Village Avenue;
  - two curb bus lanes between Summit Avenue and College Parkway;
  - one southbound-only curb bus lane between Summit Avenue and Dodge Street; and
  - two curb bus lanes between Dodge Street and Tuckerman Lane.

  Alternative C would have queue jump lanes at the same intersections where they are proposed under Alternative A. Between Clarksburg and Middlebrook Road, between Montgomery Village Avenue and Summit Avenue, and between Tuckerman Lane and the Bethesda Metro Station, the line would run in mixed traffic.

Hearing testimony and correspondence re MD 355 BRT alternatives. The Planning Board recommends Alternative B. However, the Board would prefer that there be one or two dedicated transit lanes between Tuckerman Lane and Downtown Bethesda. It also recommends studying the repurposing of existing lanes where that would not result in excessive delays, and that an integrated service plan be developed that would allow some bus routes that circulate though other areas to use the bus lanes. The Board's letter is on ©29-30, and the Planning staff's report is on ©31-71.

The City of Rockville also recommends Alternative B, although within its boundary it would be supportive of Alternative B Modified (one reversible median bus lane) north of College Parkway should the impact of two additional lanes prove too impactive (©72-73). The Mayor and Council of the City of Gaithersburg supports Alternative C (©108-109).

The Coalition for Smarter Growth (CSG) supports Alternative B, plus one or two curb lanes south of Tuckerman Lane to Bethesda. Like the Planning Board, CSG supports evaluating repurposing existing travel lanes where feasible to create the dedicated bus lanes, as well as an integrated service plan (©74-75). The White Flint Partnership recommends either Alternative B or B Modified through White Flint (©76); similarly, the White Flint Partnership supports Alternative B (©77). The Sierra Club supports a BRT line with dedicated lanes, but it does not express a preference among Alternatives B, B Modified, and C (©78-79). Peter Katz advocates developing an integrated service plan that likely would increase the utility and ridership and utility of the BRT line, a point with which the Planning Board and CSG concurs (©80-84). The League of Women Voters, the TAME Coalition, the Faith Alliance for Climate Solutions, and three individuals testified or corresponded in support of a MD 355 BRT line, but without a preference among the alternatives (©85-91).

Analysis. The Executive Summary of DOT's report and the Planning staff's report describe the differing costs, benefits, and impacts of the alternatives. Key cost and impact comparisons are:

	Residential Impacts	**Commercial Impacts**	**Park/Wetland Impacts (acres)**	**Capital Cost**
TSM	0.2 acres; 0 displaced	0.2 acres; 0 displaced	none/none	$15.6M
Alt. A	3.9 acres; 0 displaced	8.5 acres; 0 displaced	0.08/none	$185.0M
Alt. B	17.1 acres; 4 displaced	43.8 acres; 24 displaced	1.08/0.15	$886.0M
Alt. B Mod.	53.6 acres/26 displaced*		**	$821.0M
Alt. C	11.8 acres; 1 displaced	26.8 acres; 11 displaced	0.94/0.08	$534.0M

* The study report does not distinguish between commercial and residential impacts for Alt. B Modified.

** No information, but likely to be the same or slightly less than for Alt. B.

The Year 2040 forecasts to date show the Alternatives B, B Modified, and C show very little improvement to transit ridership in the corridor, compared to Alternative A. The transit mode share for trips originating or destined to the corridor are virtually identical among the alternatives. Alternatives A and C would have the same number of new transit riders (8,900 per weekday), while Alternative B would have only 6% more (9,400). BRT ridership to corridor activity centers undergoing development or redevelopment—Germantown, Shady Grove, Twinbrook, and White Flint—would be virtually identical in each case whether the BRT be Alternative A, B, B Modified, or C. While BRT would provide a better service than existing bus service along MD 355 (see ©92-96), the total transit ridership in the corridor is forecast to be remarkably similar across the alternatives. The total projected weekday boardings are:

	BRT	Metrorail	Local Bus	Total
No Build	-	60,400	14,000	75,300
TSM	-	60,100	23,000	83,100
Alt. A	25,000	59,700	2,700	87,400
Alt. B*	30,000	59,700	2,200	91,900
Alt. C	27,800	59,700	1,900	89,400

* The study does not report the ridership for Alt. B Modified, but it is likely to be only slightly less than Alt. B.

These results are similar to those found in the Veirs Mill Road BRT study; while BRT Alternative 2.5 (the preferred option, running in mixed traffic with queue jumpers, similar to Alternative A) and Alternative 3 (continuous curbside bus lanes, similar to Alternative C) were projected to carry significant ridership, they did so mainly by diverting riders from the local bus service; the net increase in total ridership was very small. This was explained by the fact that there is very little additional development in the Veirs Mill Corridor. That is certainly not the case, however, for the MD 355 corridor.

Furthermore, an effect of implementing BRT in the corridor is to marginally increase the commute time for drivers and passengers in autos. Even though none of the alternatives reduce the number of general traffic lanes, changes in intersection signal timing needed to implement TSP, as well as other design features, would result in some additional vehicle delay compared to the No Build alternative. In four instances during morning rush hours, and in 12 instances during evening rush hours, the delay would push an intersection's level of service into the E or F range. See ©96-103.

Based strictly on these forecasts, Alternative A would appear to be the most cost-effective option, given that it would deliver most of the improved ridership at one-third the cost of Alternative C and one-fifth the cost of Alternative B. However, there are three ways in which the ridership may be underestimated:

- The BRT alternatives have been studied as stand-alone projects; they do not assume interconnectivity with other planned BRT lines. To some degree that is appropriate, since there is no guarantee that most of the other BRT lines will come to fruition by 2040. However, assuming that the Veirs Mill BRT will proceed with preliminary engineering, the next forecast should assume both lines in the modeled transportation network. This should result in some increase in the ridership of both lines.

- One advantage that BRT has over rail transit is its ability to accommodate buses that can both operate on local streets and run in the busway, thus eliminating a transfer in many cases. The time to make a transfer has a much bigger effect on transit ridership than in-vehicle travel time; in transportation demand models, every minute involved with a transfer is weighted 2.5-to-3 times a minute of in-vehicle time. As the Planning Board, CSG, and Mr. Katz advocate, operating service that would have some existing (or reformulated) bus routes use the bus lanes, along with the FLASH buses, should result in a significant bump in ridership.
- Traffic and ridership forecasts assume "normal" conditions: good weather and no unanticipated delays, except that which would be caused by regular congestion. However, an advantage of a bus running in a busway is that it would normally not experience delays that are non-recurring: accidents, roadwork, and vehicle breakdowns, etc. Reliability is a major factor in one's choice of travel mode. The next forecast should try to find an accepted means to factor in reliability.

Council staff does not yet have a recommendation as to which alternative to carry through to completion in preliminary engineering. The next step should be to conduct a new ridership forecast of the alternatives, assuming: (1) both BRT lines in the same modeled network; (2) additional bus routes that would use both BRT lines, along with the FLASH buses; and (3) an accepted means of factoring in reliability. Once the results are analyzed, the Council should then decide on a preferred alternative.

DOT staff noted that the Executive also does not have a recommendation for a selected alternative at this time. He has asked DOT staff to evaluate solicit expressions of interest from the private sector to determine its concepts for improve transit travel time and increasing ridership in the MD 355 Corridor. The solicitation will go out later this summer, and responses are anticipated in the fall.

Supplemental appropriations and CIP amendments. Much of the public hearing testimony and correspondence noted earlier support funding preliminary engineering for both BRT lines. In addition, the Council received testimony from the Sierra Club and Ethan Goffman supporting the Veirs Mill Road BRT (see ©104-105).

The cost of preliminary engineering is considerably more than the $1 million for the Veirs Mill Road BRT and $3 million for the MD 355 BRT proposed by the Executive for FY20. In the Approved CIP, the estimated cost of preliminary engineering for the Veirs Mill Road BRT was $3 million over two fiscal years. DOT staff indicate that this is still a good estimate. However, the Executive's recommendation literally would introduce a 3-year gap between the first and second year of work.

Council staff recommendation: Approve the amendment to the Bus Rapid Transit: Veirs Mill Road project shown on ©106-107, which would fund $1 million in FY20 and $2 million in FY21, and to appropriate the full $3 million. This would assure that preliminary engineering for the Veirs Mill Road BRT would proceed without an artificial break. The $2 million in FY21 would be funded with development impact tax revenue, and OMB and Finance should substitute $2 million of G.O. bond funding for impact taxes for FY21 in one or more other transportation projects. The G.O. Bond reserve for FY21 is $15,827,000; this would reduce it to $13,827,000.

Council staff) recommendation: On ©106 delete the G.O. Bond funding for final design in FY24 ($1 million) and "Beyond 6 Years" ($3 million). Final design consists of creating construction drawings and soliciting permits, work that should not be budgeted until the construction itself is budgeted, too. Furthermore, if the project were to be built with Federal or State aid, there would be the opportunity to fund final design with non-County revenue. Finally, the Executive's recommendation would leave a 3-year gap between preliminary engineering and the start of design.

The preliminary engineering cost for the MD 355 BRT, considering the line's length and complexity, will cost considerably more than $3 million and should take at least three years to complete. There are still enough questions about the scope of the first phase that $3 million is all that is prudent to approve at this time. DOT staff indicate that it can craft work orders that would logically stay within the $3 million limit. *Council staff recommendation: Concur with the Executive's recommendations for the Bus Rapid Transit: MD 355 project on ©F-H.*

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OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Marc Elrich
County Executive

MEMORANDUM

June 19, 2019

TO: Nancy Navarro, President, Montgomery County Council

FROM: Marc Elrich, County Executive

SUBJECT: Supplemental Appropriations #CS-20MCG-01 and #CS-20MCG-02 to the FY20 Capital Improvements Program (CIP)
Montgomery County Government
Department of Transportation
Bus Rapid Transit (BRT): Veirs Mill Road (P501913), $1,000,000 and Bus Rapid Transit: MD 355, $3,000,000

I am recommending supplemental appropriations to the FY20 Capital Improvements Program for the Bus Rapid Transit: Veirs Mill Road (P501913) project in the amount of $1,000,000 and a new project for Bus Rapid Transit on MD 355 (P502005) in the amount of $3,000,000.

The Veirs Mill Road project is currently in the approved FY19-24 CIP with funding for design beginning in FY23. This supplemental appropriation request would accelerate the Design phase of the project by moving $1,000,000 of design funding from FY23 to FY20. This will allow Design to commence three years earlier than currently programmed. The project will transform mobility options along the corridor between Rockville/Montgomery College and Wheaton with the implementation of a 7-mile premium, limited-stop service consistent with the Recommended Alternative approved by the County Council in 2017.

The MD 355 project is currently wrapping up the Planning phase, with a decision on the Recommended Alternative expected in July 2019. This packet includes a new PDF for the project that will begin Design in FY20, so that work can continue immediately following the selection of a Recommended Alternative.

These increases are needed to begin the Design phase for both projects. The recommended amendment is consistent with the criteria for amending the CIP because the project must be amended to implement policy decisions.

(A)

I recommend that the County Council approve an FY20 supplemental appropriation to the Bus Rapid Transit: Veirs Mill Road project in the amount $1,000,000, and an FY20 supplemental appropriation to the Bus Rapid Transit: MD 355 project in the amount of $3,000,000 and specify the source of funds as Impact Tax.

I appreciate your prompt consideration of this action.

ME:bg

c: Al R. Roshdieh, Director, Montgomery County Department of Transportation
Richard S. Madaleno, Director, Office of Management and Budget

Attachment: Supplemental Appropriations #CS-20MCG-01 and #CS-20MCG-02

Resolution No: _____
Introduced: _____
Adopted: _____

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: Council President at the Request of the County Executive

SUBJECT: Supplemental Appropriation #CS-20MCG-01 to the FY20 Capital Improvements Program
Montgomery County Government
Department of Transportation
Bus Rapid Transit (BRT): Veirs Mill Road (P501913), $1,000,000

Background

1. Section 307 of the Montgomery County Charter provides that any supplemental appropriation shall be recommended by the County Executive who shall specify the source of funds to finance it. The Council shall hold a public hearing on each proposed supplemental appropriation after at least one week's notice. A supplemental appropriation that would comply with, avail the County of, or put into effect a grant or a Federal, State or County law or regulation, or one that is approved after January 1 of any fiscal year, requires an affirmative vote of five Councilmembers. A supplemental appropriation for any other purpose that is approved before January 1 of any fiscal year requires an affirmative vote of six Councilmembers. The Council may, in a single action, approve more than one supplemental appropriation. The Executive may disapprove or reduce a supplemental appropriation, and the Council may reapprove the appropriation, as if it were an item in the annual budget.

2. The County Executive has requested the following FY20 Capital Improvement Program appropriation increase for project Bus Rapid Transit: Veirs Mill Road (P501913):

Project Name	Project Number	Cost Element	Amount	Source of Funds
Bus Rapid Transit: Veirs Mill Road	501913	PDS	$1,000,000	Impact Tax

(C)

3. This increase is needed to begin the Design phase. The recommended amendment is consistent with the criteria for amending the CIP because the project must be amended to implement policy decisions.

4. The County Executive recommends an amendment to the FY19-24 Capital Improvements Program and a supplemental appropriation in the amount of $1,000,000 for Bus Rapid Transit: Veirs Mill Road (No. 501913) and specifies that the source of funds will be Impact Tax.

5. Notice of public hearing was given, and a public hearing was held.

Action

The County Council for Montgomery County, Maryland, approves the following action:

A supplemental appropriation to the FY20 Capital Improvements Program project P501913, Bus Rapid Transit: Veirs Mill Road is approved as follows:

Project Name	Project Number	Cost Element	Amount	Source of Funds
Bus Rapid Transit: Veirs Mill Road	501913	PDS	$1,000,000	Impact Tax

This is a correct copy of Council action.

Megan Davey Limarzi, Esq.
Clerk of the Council

(D)

Bus Rapid Transit: Veirs Mill Road
(P501913)

Category	Transportation	**Date Last Modified**	05/29/18
SubCategory	Mass Transit (MCG)	**Administering Agency**	Transportation
Planning Area	Kensington-Wheaton	**Status**	Planning Stage

	Total	Thru FY18	Rem FY18	Total 6 Years	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	Beyond 6 Years
EXPENDITURE SCHEDULE ($000s)									1,000		
Planning, Design and Supervision	7,000	-	-	4,000	-	1,000	-	-	~~2,000~~	2,000	3,000
TOTAL EXPENDITURES	**7,000**	-	-	**4,000**	-	-	-	-	**~~2,000~~**	**2,000**	**3,000**
									1,000		
FUNDING SCHEDULE ($000s) Impact Tax						1,000					
Current Revenue: Mass Transit	3,000	-	-	3,000	-	-	-	-	~~2,000~~	1,000	-
G.O. Bonds	4,000	-	-	1,000	-	-	-	-	1,000	1,000	3,000
TOTAL FUNDING SOURCES	**7,000**	-	-	**4,000**	-	-	-	-	**~~2,000~~**	**2,000**	**3,000**
									1,000		

APPROPRIATION AND EXPENDITURE DATA ($000s)			
Appropriation FY 20 Request	-	Year First Appropriation	
Cumulative Appropriation	-	Last FY's Cost Estimate	7,000
Expenditure / Encumbrances	-		
Unencumbered Balance	-	Supplemental Appropriation Request	1,000

PROJECT DESCRIPTION

This project will design and construct a new Bus Rapid Transit (BRT) line on Veirs Mill Road (MD 586) between the Wheaton and Rockville Metrorail Stations. Planning conducted by the Maryland Department of Transportation State Highway Administration (MDOT SHA) resulted in a Recommended Alternative in late 2017. The recommended alternative includes queue jumps for use by BRT and other buses at congested intersections along the corridor, new BRT stations with level boarding and off-board payment, Transit Signal Priority, purchase of new 60-foot articulated vehicles, and other associated pedestrian and bicycle improvements along the corridor. The study retains curbside dedicated lanes as the long-term BRT alternative for Veirs Mill Road.

LOCATION

Veirs Mill Road

ESTIMATED SCHEDULE

Project planning was completed in FY18. Design will begin in FY~~20~~ 20, ~~and is anticipated to be complete in FY25.~~ A more detailed schedule for completion of design, including construction costs and a financing plan will be developed as part of the FY21-26 budget.

PROJECT JUSTIFICATION

The project will transform mobility options with the implementation of a 7-mile, premium, branded, limited-stop BRT service along Veirs Mill Road. This new service will improve transit travel time and increase opportunity for a broad range of users, including a significant number of minority and low-income riders living along a highly congested corridor. The project will improve passenger transit mobility by connecting riders to high density housing and employment centers.

Plans & Studies: MCDOT Countywide Bus Rapid Transit Study, Final Report (July 2011); County Executive's Transit Task Force (May 2012); Countywide Transit Corridors Functional Master Plan (November 2013); Maryland Department of Transportation/Maryland State Highway Administration MD 586/Veirs Mill Road Draft Corridor Planning Study (September 2016); Veirs Mill Master Plan (April 2019)

OTHER

The County programmed funds for the Maryland Department of Transportation (MDOT) to conduct planning for the Veirs Mill Road BRT in the State Transportation Participation project, PDF #500722.

DISCLOSURES

A pedestrian impact analysis will be performed during design or is in progress.

COORDINATION

Maryland Department of Transportation, Washington Metropolitan Area Transit Authority, Maryland-National Capital Park and Planning Commission, City of

Resolution No: _____
Introduced: _____
Adopted: _____

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: Council President at the Request of the County Executive

SUBJECT: Supplemental Appropriation #CS-20MCG-02 to the FY20 Capital Improvements Program
Montgomery County Government
Department of Transportation
Bus Rapid Transit (BRT): MD 355, $3,000,000

Background

1. Section 307 of the Montgomery County Charter provides that any supplemental appropriation shall be recommended by the County Executive who shall specify the source of funds to finance it. The Council shall hold a public hearing on each proposed supplemental appropriation after at least one week's notice. A supplemental appropriation that would comply with, avail the County of, or put into effect a grant or a Federal, State or County law or regulation, or one that is approved after January 1 of any fiscal year, requires an affirmative vote of five Councilmembers. A supplemental appropriation for any other purpose that is approved before January 1 of any fiscal year requires an affirmative vote of six Councilmembers. The Council may, in a single action, approve more than one supplemental appropriation. The Executive may disapprove or reduce a supplemental appropriation, and the Council may reapprove the appropriation, as if it were an item in the annual budget.

2. The County Executive has requested the following FY20 Capital Improvement Program appropriation for project Bus Rapid Transit: MD355:

Project Name	Project Number	Cost Element	Amount	Source of Funds
Bus Rapid Transit: MD 355	502005	PDS	$3,000,000	Impact Tax

(F)

3. This increase is needed to begin the Design phase. The recommended amendment is consistent with the criteria for amending the CIP because the project must be amended to implement policy decisions.

4. The County Executive recommends an amendment to the FY19-24 Capital Improvements Program and a supplemental appropriation in the amount of $3,000,000 for Bus Rapid Transit: MD 355 (No. 501913) and specifies that the source of funds will be Impact Tax.

5. Notice of public hearing was given, and a public hearing was held.

Action

The County Council for Montgomery County, Maryland, approves the following action:

A supplemental appropriation for the FY20 Capital Improvements Program project P502005 Bus Rapid Transit: MD 355 is approved as follows:

Project Name	Project Number	Cost Element	Amount	Source of Funds
Bus Rapid Transit: MD 355	502005	PDS	$3,000,000	Impact Tax

This is a correct copy of Council action.

Megan Davey Limarzi, Esq.
Clerk of the Council

Bus Rapid Transit: MD 355
(P502005)

Category	Transportation	**Date Last Modified**	06/17/19
SubCategory	Mass Transit (MCG)	**Administering Agency**	Transportation
Planning Area	Bethesda-Chevy Chase and Vicinity	**Status**	Planning Stage

	Total	Thru FY18	Rem FY18	Total 6 Years	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	Beyond 6 Years
EXPENDITURE SCHEDULE ($000s)											
Planning, Design and Supervision	3,000	-	-	3,000	-	3,000	-	-	-	-	-
TOTAL EXPENDITURES	**3,000**	**-**	**-**	**3,000**	**-**	**3,000**	**-**	**-**	**-**	**-**	**-**
FUNDING SCHEDULE ($000s)											
Impact Tax	3,000	-	-	3,000	-	3,000	-	-	-	-	-
TOTAL FUNDING SOURCES	**3,000**	**-**	**-**	**3,000**	**-**	**3,000**	**-**	**-**	**-**	**-**	**-**

APPROPRIATION AND EXPENDITURE DATA ($000s)

Appropriation FY 20 Request	-	Year First Appropriation	
Cumulative Appropriation	-	Last FY's Cost Estimate	-
Expenditure / Encumbrances	-	Supplemental Appropriation Request	3,000
Unencumbered Balance	-		

PROJECT DESCRIPTION

This project will design and construct a new Bus Rapid Transit (BRT) line on MD355 between Clarkburg and Bethesda. Planning conducted by the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) resulted in several Alternatives Retained for Detailed Study in 2017. In 2019, MCDOT completed the planning phase and a Recommended Alternative was selected. The recommended alternative includes dedicated BRT lanes, new BRT stations with level boarding and off-board payment, Transit Signal Priority, purchase of new 60-foot articulated vehicles, and other associated pedestrian and bicycle improvements along the corridor.

LOCATION

MD 355 between Clarksburg and Bethesda

ESTIMATED SCHEDULE

Project planning was completed in FY19. Design will begin in FY20 and a more detailed schedule for completion of design, including construction costs and a financing plan, will be submitted as part of the FY21 - FY26 budget.

PROJECT JUSTIFICATION

The project will transform mobility options with the implementation of a 22-mile, premium, branded, limited-stop BRT service along MD355 between Clarksburg and Bethesda. This new service will improve transit travel time and increase opportunity for a broad range of users along a highly congested corridor. The project will improve passenger transit mobility by connecting riders to high density housing and employment centers.

DISCLOSURES

A pedestrian impact analysis will be performed during design or is in progress.

COORDINATION

Maryland Department of Transportation, Washington Metropolitan Area Transit Authority, Maryland-National Capital Park and Planning Commission, City of Rockville, City of Gaithersburg

(H)

GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

MD 355

Corridor Summary Report

June 2019

Executive Summary

MONTGOMERY COUNTY MARYLAND

MCDOT
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.

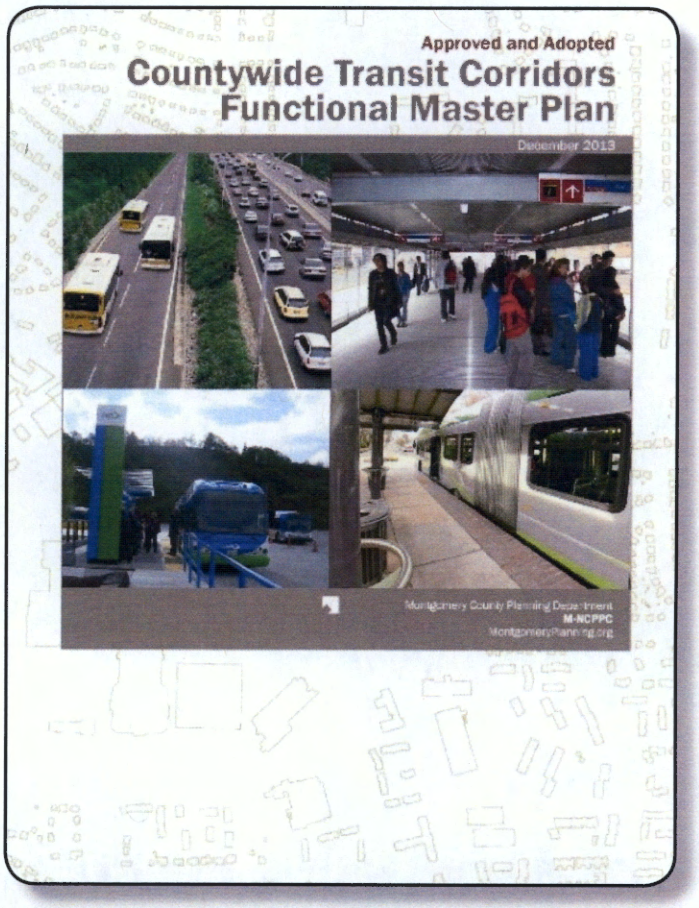
MD 355 FLASH Features:

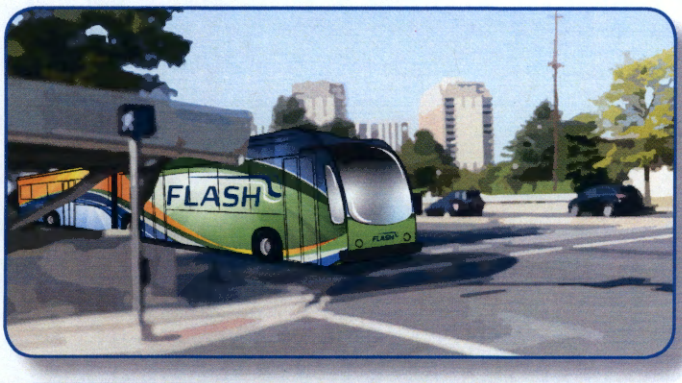
- Frequent, reliable service which means you will never wait long for a bus
- Dedicated lanes, where feasible, to separate buses from traffic, keeping your ride reliable and on-time
- New, enhanced vehicles that include free wi-fi and USB charging ports so you can listen to podcasts, surf the web, or 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

(2)

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.



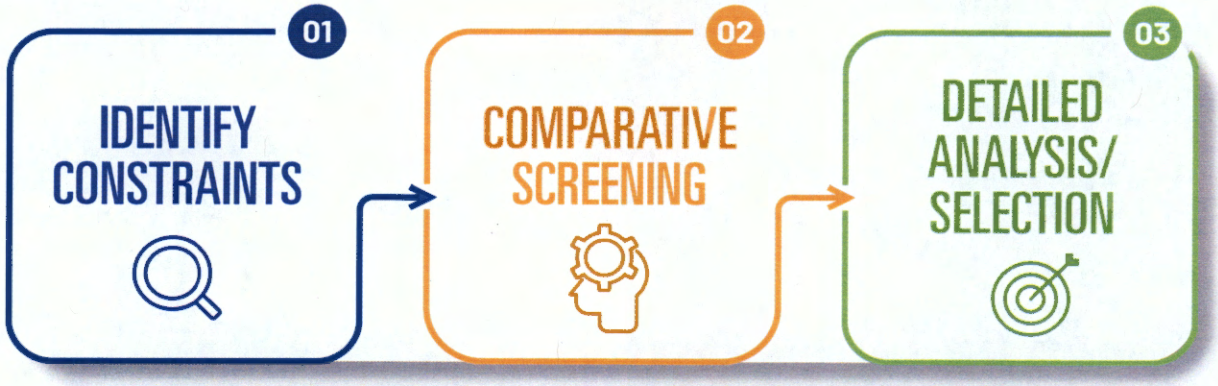


The *Functional Master Plan* proposes the development of a BRT network throughout Montgomery County to support mobility, land use, and economic development goals. To ensure network integrity and achieve the County's vision, it recommends and provides the basis for right-of-way reservations required to 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.

3

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.

(4)

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.

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.

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

- Reduce travel times
- Increase service reliability
- Increase ridership
- Be a user-friendly route
- Complement Metrorail and local bus service

IMPROVE MOBILITY OPPORTUNITIES, ACCESSIBILITY, AND TRANSPORTATION CHOICES FOR ALL

- 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

SUPPORT MASTER PLAN DEVELOPMENT

- Improve transit service to existing and planned developments
- Locate stations to support walkability

SUPPORT SUSTAINABLE AND COST-EFFECTIVE TRANSPORTATION SOLUTIONS

- 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:

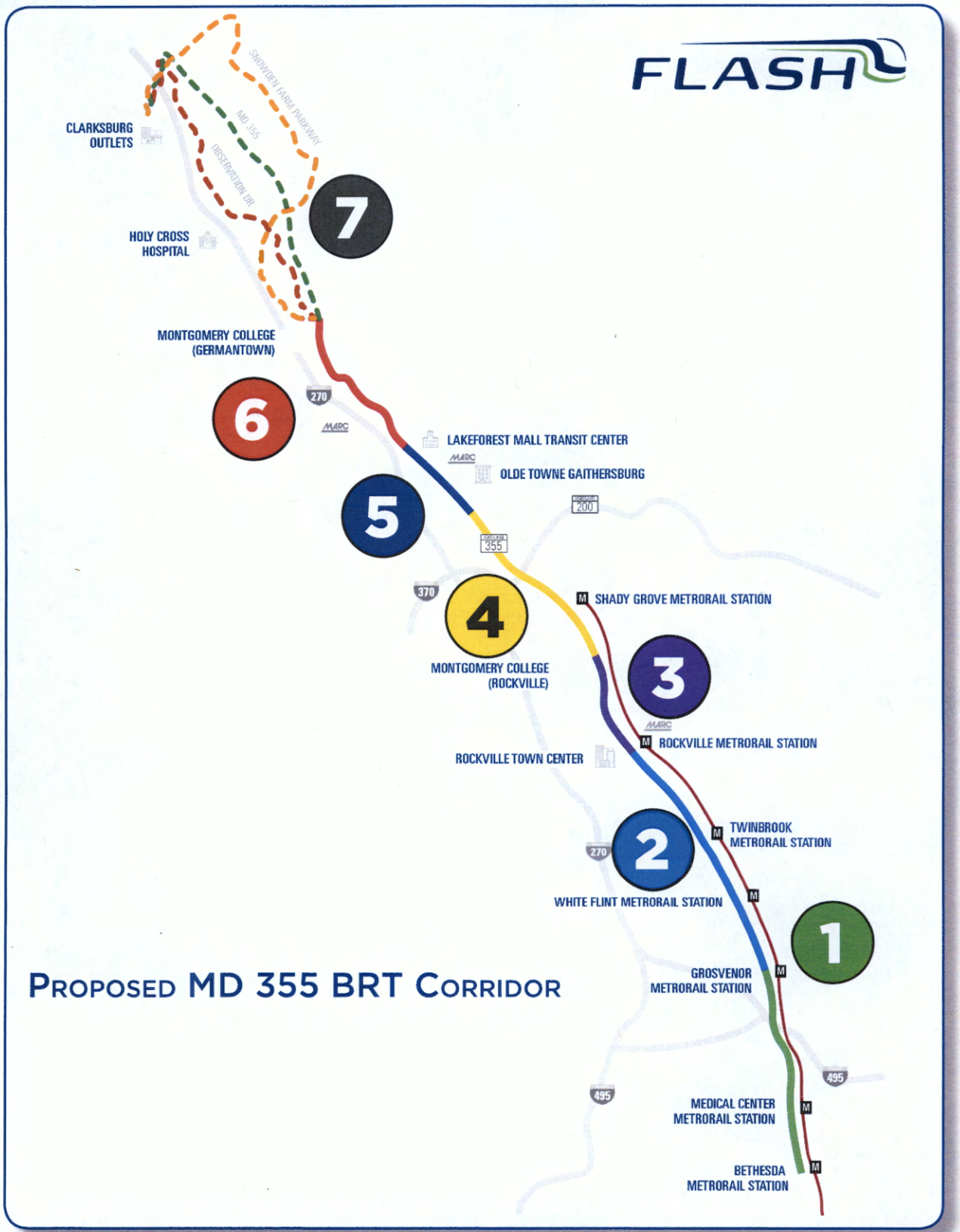
- **TSM Alternative**
- **Alternative A (mixed traffic)**
- **Alternative B (mostly median-running)**
- **Alternative C (mostly curb-running)**

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 thats 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


FLASH
CLARKSBURG OUTLETS
SNOWDEN FARM PARKWAY
MD 355
OBSERVATION DR
7
HOLY CROSS HOSPITAL
MONTGOMERY COLLEGE (GERMANTOWN)
6
270
MARC
LAKEFOREST MALL TRANSIT CENTER
MARC
OLDE TOWNE GAITHERSBURG
5
200
355
370
4
SHADY GROVE METRORAIL STATION
MONTGOMERY COLLEGE (ROCKVILLE)
3
MARC
ROCKVILLE METRORAIL STATION
ROCKVILLE TOWN CENTER
TWINBROOK METRORAIL STATION
270
2
WHITE FLINT METRORAIL STATION
1
GROSVENOR METRORAIL STATION
495
495
MEDICAL CENTER METRORAIL STATION
BETHESDA METRORAIL STATION
PROPOSED MD 355 BRT CORRIDOR

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

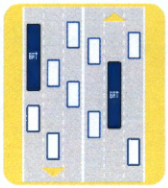
- Mostly Median-Running dedicated lanes where feasible
- Segments 4, 5, and 6 would include a single, one-way peak period median busway

ALTERNATIVE C

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

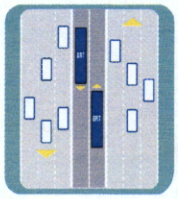
9

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.



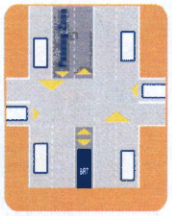
MIXED TRAFFIC

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



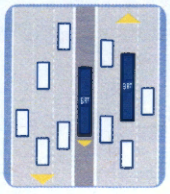
TWO MEDIAN BRT LANES

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.



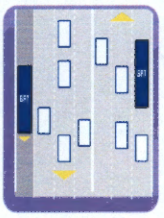
ONE MEDIAN BRT LANE (REVERSIBLE OR BI-DIRECTIONAL)

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.



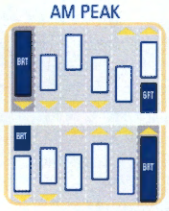
ONE MEDIAN BRT LANE (FIXED)

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.



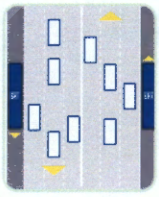
ONE CURB BRT LANE (FIXED SOUTHBOUND)

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.

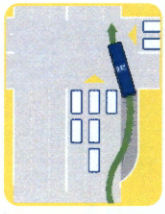


TWO CURB BRT LANES

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

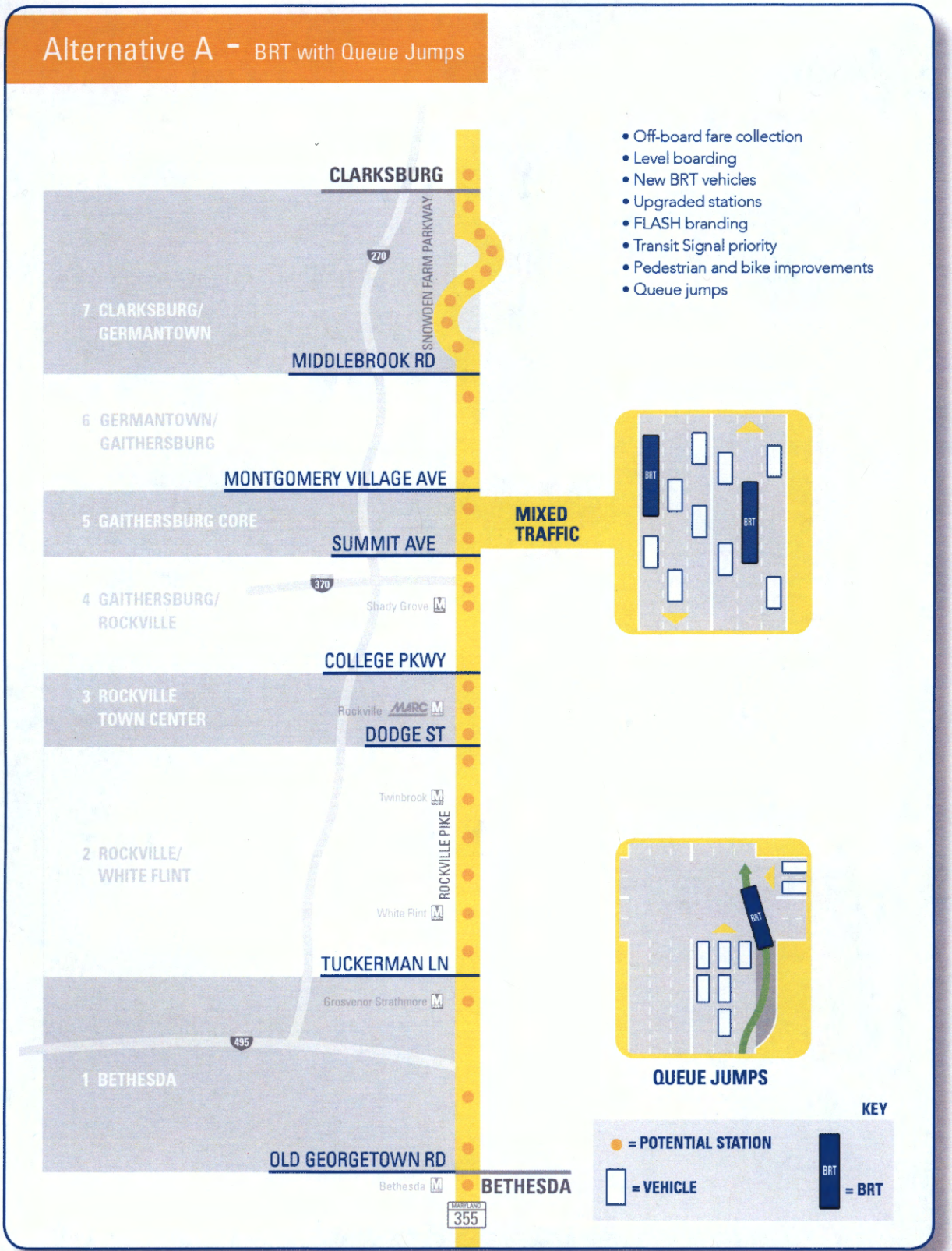
Transit Signal Priority (TSP) would give priority to BRT vehicles when certain conditions are met by either extending a green light or shortening a red light to allow an approaching BRT to pass through the intersection. TSP was implemented on the MD 355 corridor between the Lakeforest Transit Center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

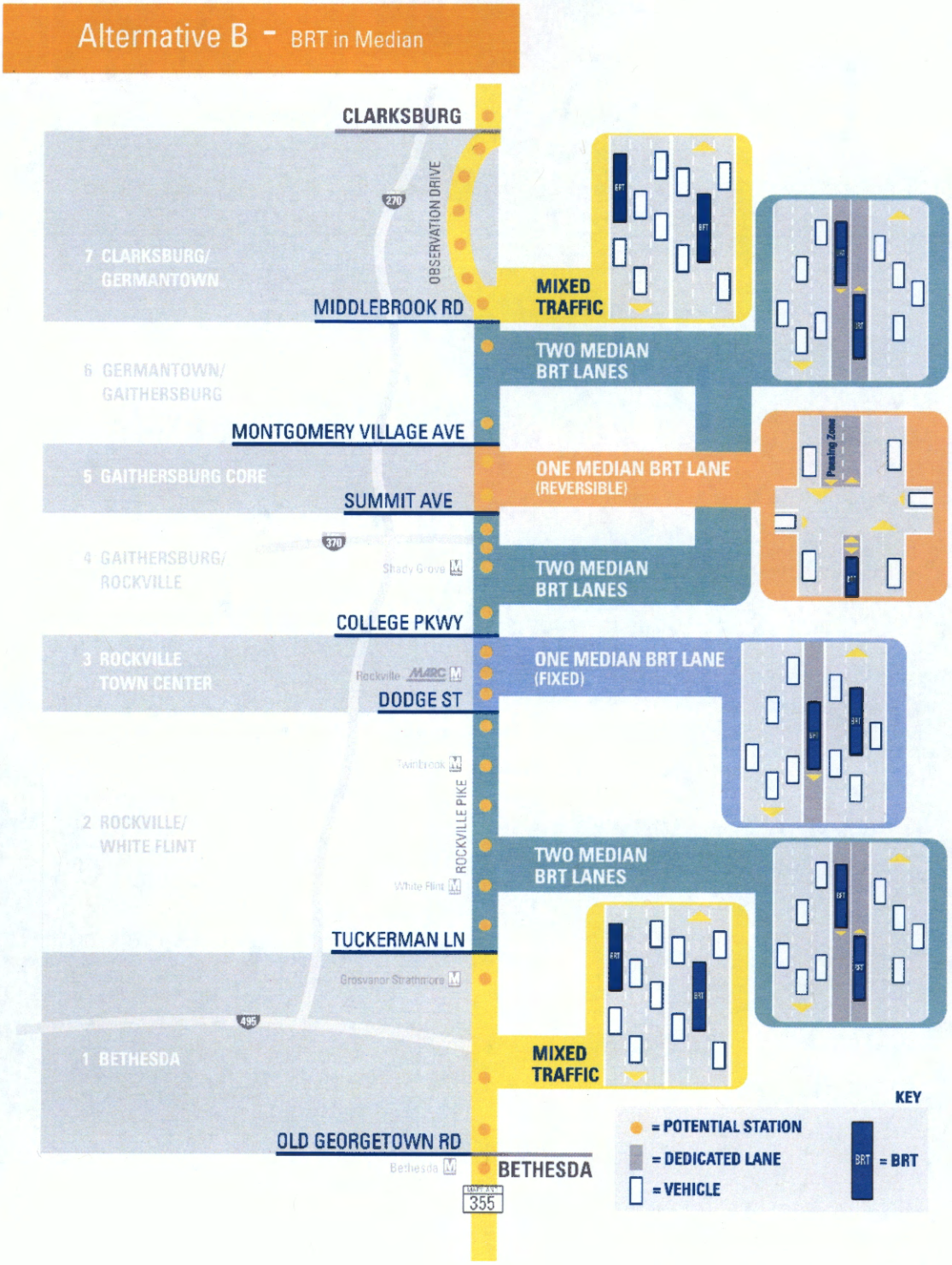


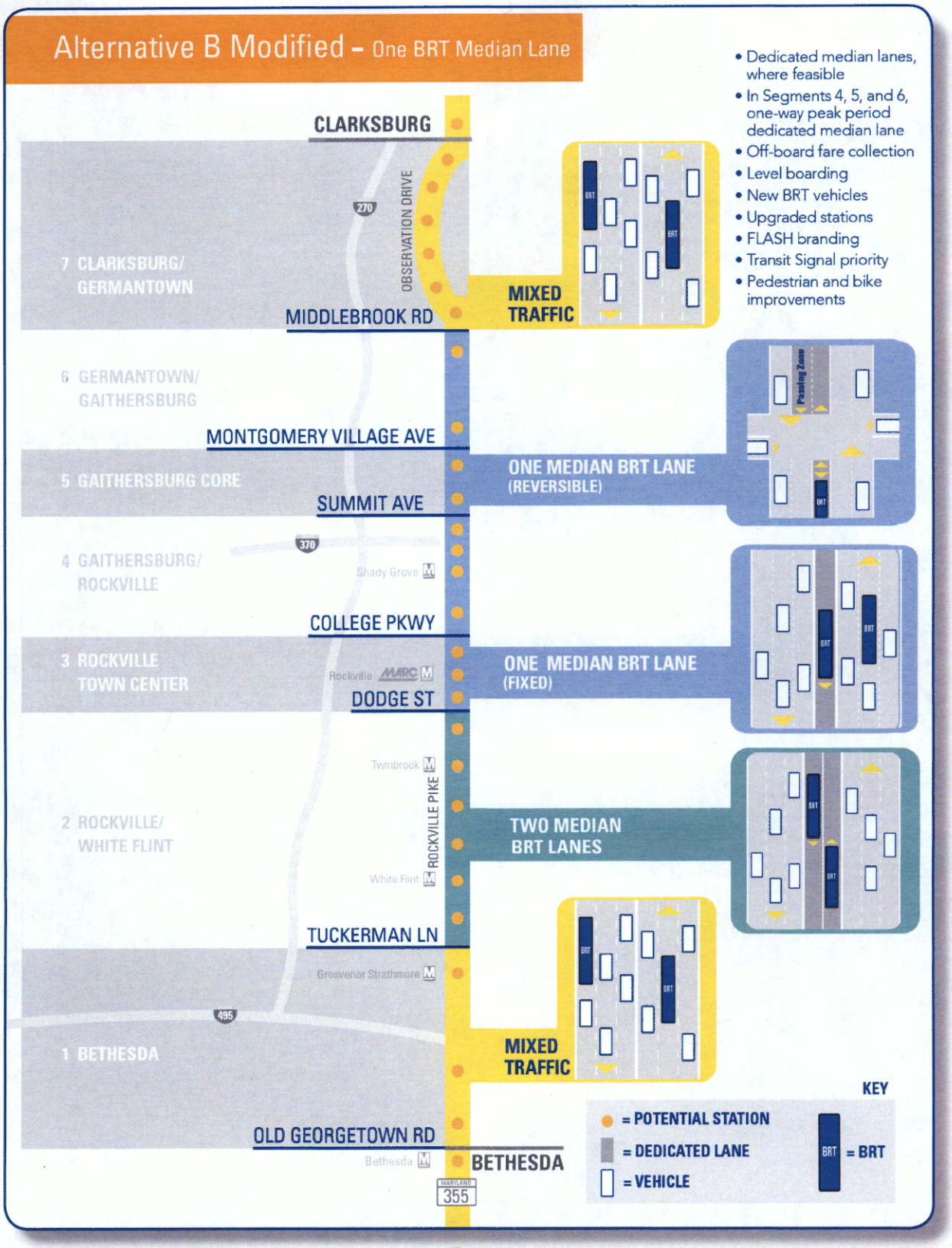
QUEUE JUMP

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




Alternative B - BRT in Median
CLARKSBURG
OBSERVATION DRIVE
270
7 CLARKSBURG/ GERMANTOWN
MIDDLEBROOK RD
MIXED TRAFFIC
TWO MEDIAN BRT LANES
6 GERMANTOWN/ GAITHERSBURG
MONTGOMERY VILLAGE AVE
5 GAITHERSBURG CORE
ONE MEDIAN BRT LANE (REVERSIBLE)
Passing Zone
SUMMIT AVE
370
4 GAITHERSBURG/ ROCKVILLE
Shady Grove
TWO MEDIAN BRT LANES
COLLEGE PKWY
3 ROCKVILLE TOWN CENTER
Rockville MARC
ONE MEDIAN BRT LANE (FIXED)
DODGE ST
Twinbrook
ROCKVILLE PIKE
2 ROCKVILLE/ WHITE FLINT
White Flint
TWO MEDIAN BRT LANES
TUCKERMAN LN
Grosvanor Strathmore
495
1 BETHESDA
MIXED TRAFFIC
OLD GEORGETOWN RD
Bethesda
BETHESDA
MARYLAND 355
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
CLARKSBURG
OBSERVATION DRIVE
270
7 CLARKSBURG/ GERMANTOWN
MIDDLEBROOK RD
MIXED TRAFFIC
BRT
6 GERMANTOWN/ GAITHERSBURG
MONTGOMERY VILLAGE AVE
5 GAITHERSBURG CORE
SUMMIT AVE
ONE MEDIAN BRT LANE (REVERSIBLE)
Passing Zone
370
4 GAITHERSBURG/ ROCKVILLE
Shady Grove
COLLEGE PKWY
3 ROCKVILLE TOWN CENTER
Rockville MARC
DODGE ST
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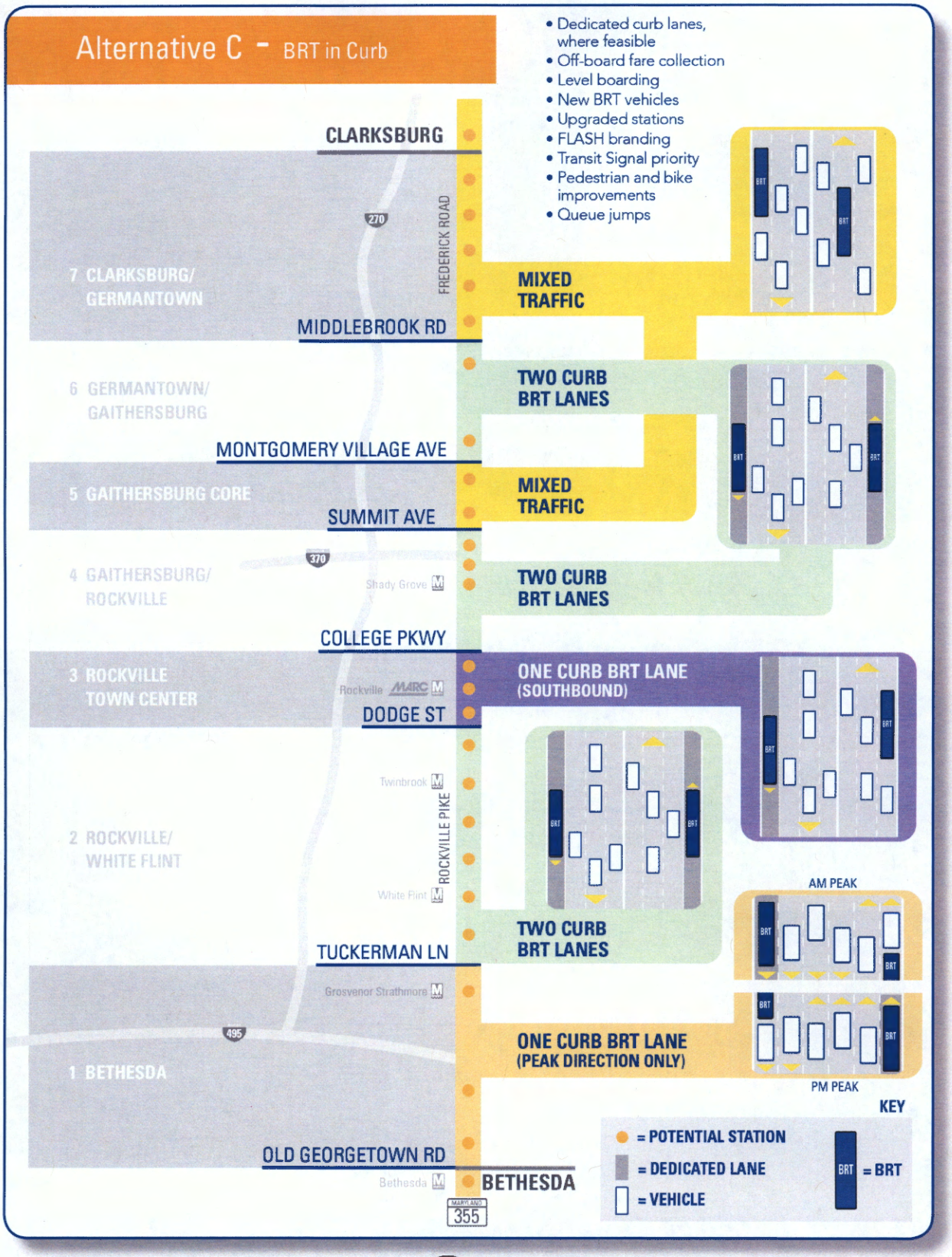
Twinbrook
ROCKVILLE PIKE
2 ROCKVILLE/ WHITE FLINT
White Flint
TWO MEDIAN BRT LANES
TUCKERMAN LN
Grosvenor Strathmore
495
1 BETHESDA
MIXED TRAFFIC
OLD GEORGETOWN RD
Bethesda
BETHESDA
MARYLAND 355
KEY
= POTENTIAL STATION
= DEDICATED LANE
= VEHICLE
BRT = BRT

13

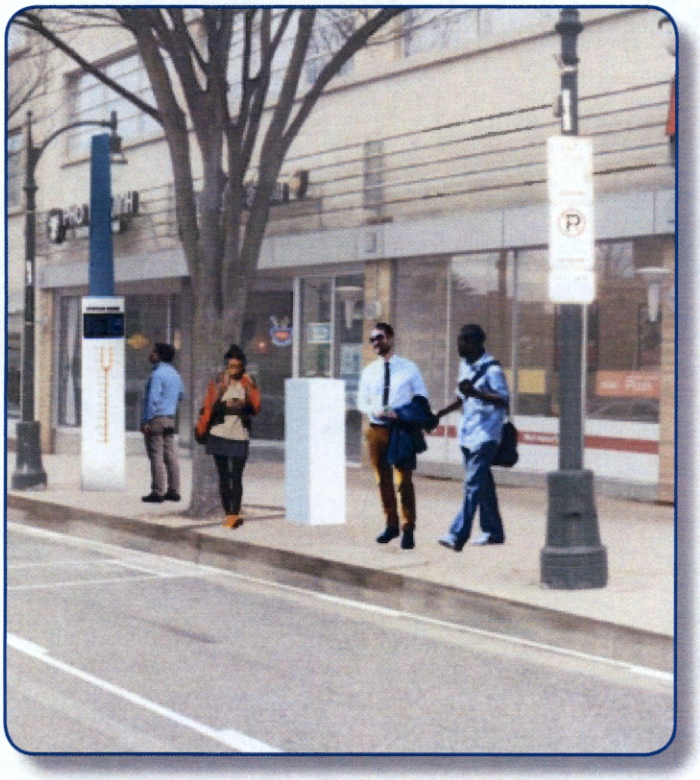

Alternative C - BRT in Curb
• Dedicated curb lanes, where feasible
• Off-board fare collection
• Level boarding
• New BRT vehicles
• Upgraded stations
• FLASH branding
• Transit Signal priority
• Pedestrian and bike improvements
• Queue jumps
CLARKSBURG
7 CLARKSBURG/ GERMANTOWN
270
FREDERICK ROAD
MIXED TRAFFIC
MIDDLEBROOK RD
6 GERMANTOWN/ GAITHERSBURG
TWO CURB BRT LANES
MONTGOMERY VILLAGE AVE
5 GAITHERSBURG CORE
MIXED TRAFFIC
SUMMIT AVE
370
4 GAITHERSBURG/ ROCKVILLE
Shady Grove
TWO CURB BRT LANES
COLLEGE PKWY
3 ROCKVILLE TOWN CENTER
Rockville MARC
ONE CURB BRT LANE (SOUTHBOUND)
DODGE ST
Twinbrook
ROCKVILLE PIKE
2 ROCKVILLE/ WHITE FLINT
White Flint
AM PEAK
TWO CURB BRT LANES
TUCKERMAN LN
Grosvenor Strathmore
495
ONE CURB BRT LANE (PEAK DIRECTION ONLY)
1 BETHESDA
PM PEAK
KEY
= POTENTIAL STATION
= DEDICATED LANE
= VEHICLE
BRT = BRT
OLD GEORGETOWN RD
Bethesda
BETHESDA
MARYLAND 355

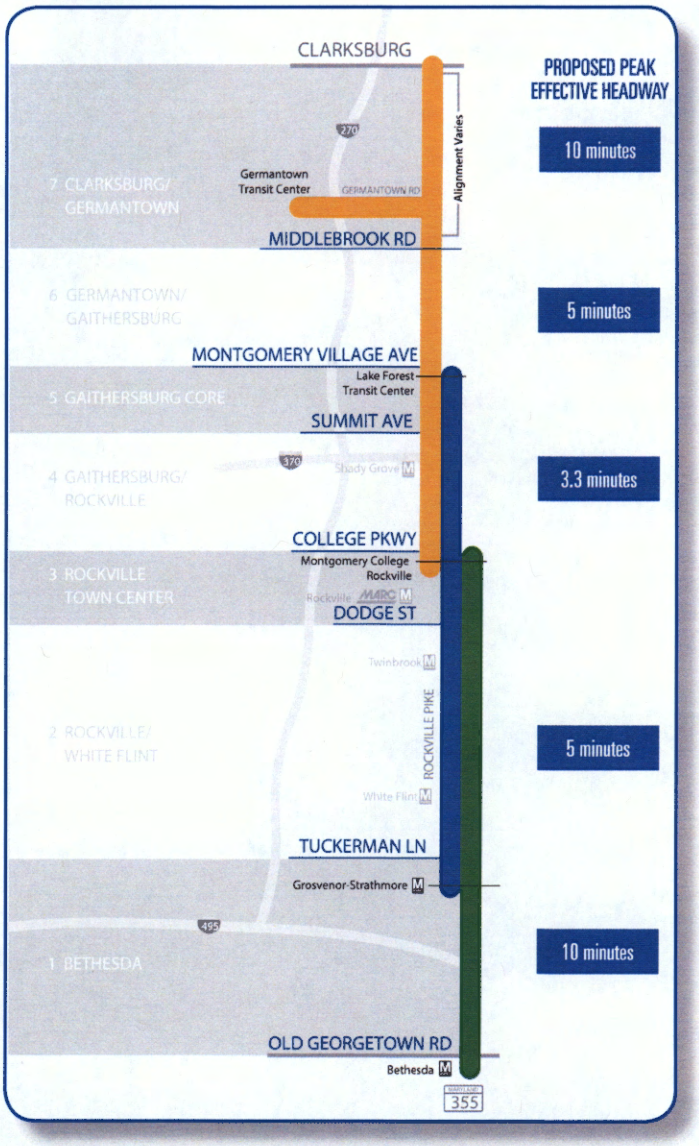
How Will the BRT Operate?

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*.

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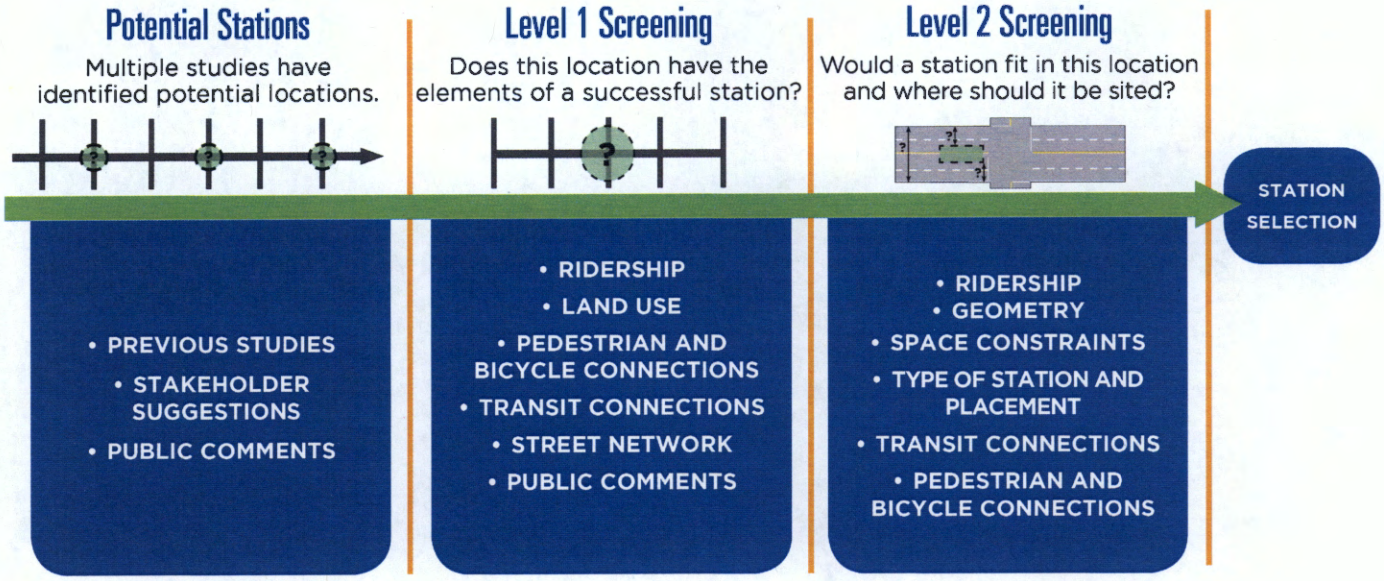
STATION SCREENING PROCESS

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




MARYLAND 355
GERMANTOWN/ GAITHERSBURG
270
GAITHERSBURG
370
GAITHERSBURG/ ROCKVILLE
ROCKVILLE TOWN CENTER
ROCKVILLE/ WHITE FLINT
495
BETHESDA
Shady Grove
Twinbrook
White Flint
Grosvenor-Strathmore
Bethesda
MARC
Gunners Branch Rd
Professional Dr
Watkins Mill Rd
Lakeforest Transit Center
Lakeforest Blvd
Chestnut St/ Walker Ave
Cedar Ave/ Fulks Corner Ave
Education Blvd
Shady Grove Metro
Indianola Dr
College Pkwy
Montomery College Rockville
Future Dawson Ave
Rockville Metro Station
Mt. Vernon Pl
Edmonston Dr
Templeton Pl
Halpine Rd
Bou Ave
White Flint Metro
Security Ln
Grosvenor Metro
Pooks Hill Rd
Cedar Ln
Medical Center Metro
Cordell Ave
Bethesda Metro (South Entrance)
BETHESDA
MARYLAND 355
CLARKSBURG
GERMANTOWN
OBSERVATION DRIVE
Clarksburg Outlets
Gateway Center Dr
Observation Dr/ COMSAT
Observation Dr/ Shawnee Ln
Observation Dr/ Milestone Center
Observation Dr/ Shakespeare Blvd
Montgomery College-Germantown Campus
Holy Cross Hospital
MARYLAND 355
Clarksburg Outlets
Redgrave Pl
Foreman Blvd
Shakespeare Blvd
Oxbridge Dr
SNOWDEN FARM PARKWAY
Clarksburg Outlets
Gateway Center Dr
Stringtown Rd/ St. Clair Rd
Stringtown Rd/ Rainbow Arch Dr
Snowden Farm Pkwy/ Newcut Rd
Milestone
Shakespeare Blvd/ Amber Ridge Dr
Seneca Meadow Office Park
Montgomery College-Germantown Campus
Holy Cross Hospital
Future In-fill Station
Proposed Station
FLASH

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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

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SUPPORT MASTER PLAN DEVELOPMENT

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.

SUPPORT SUSTAINABLE AND COST-EFFECTIVE TRANSPORTATION SOLUTIONS

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.

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

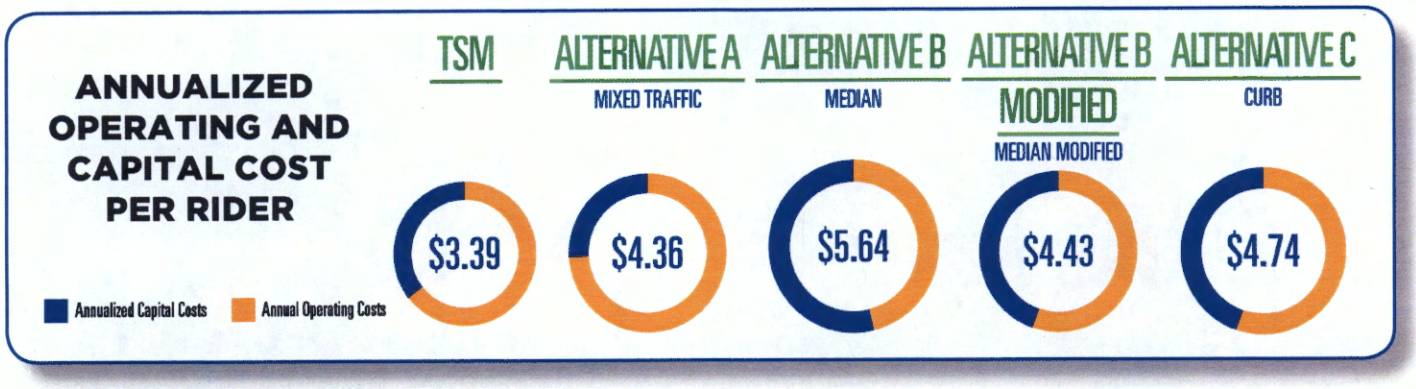
Alternative B would be the most expensive because it contains the most roadway widening, right-of-way needs, and impacts to existing utilities and infrastructure. Alternative B would also provide the greatest separation of the BRT from general purpose traffic and roadway congestion, which would result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

MARYLAND DEPARTMENT OF TRANSPORTATION

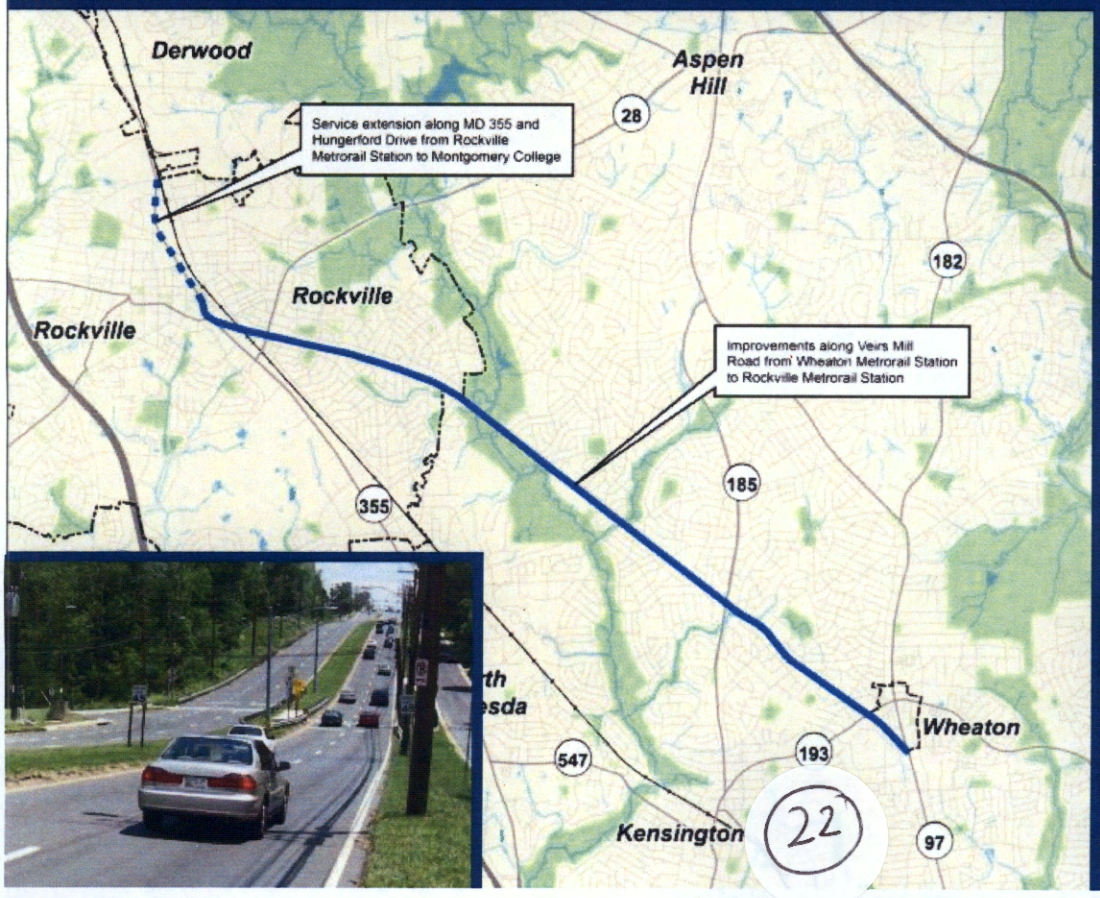
MCDOT
Montgomery County Department of Transportation

Montgomery County
RAPID TRANSIT
MD 586

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.

MONTGOMERY COUNTY PLANNING BOARD
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

OFFICE OF THE CHAIR

July 17, 2019

Councilmember Tom Hucker
Chair – Transportation, Infrastructure, Energy & Environment Committee (T&E)
Council Office Building
100 Maryland Avenue, 6th Floor
Rockville, Maryland 20850

Re: Draft MD 355 Road Bus Rapid Transit Corridor Study

Dear Councilmember Hucker:

On July 11, 2019, the Montgomery County Planning Board reviewed the Draft MD 355 Road Bus Rapid Transit Corridor Study. During the meeting the Planning Board provided the following comments:

1. Advance Alternative B, Median Transitway, as the preferred alternative.
2. Consider increasing the use of two-lane median transitways, especially south of Shady Grove Metrorail Station and include dedicated transit lanes in Downtown Bethesda.
3. Advance preliminary engineering for both the Veirs Mill Road BRT project and the entire MD 355 BRT project concurrently.
4. Prioritize construction of the entire Veirs Mill Road BRT project and the MD 355 BRT project between the Clarksburg Outlets and the Rockville Metrorail Station (including the spur to Germantown) but consider finer grained construction phasing south of Rockville to potentially implement BRT on smaller segments of MD 355.
5. Proceed with the Snowden Farm Parkway alignment in Segment 7.
6. Concur with the recommended station locations and phasing.
7. Conduct additional traffic evaluation and mitigation to determine the feasibility of converting general purpose traffic lanes to transit only lanes to reduce the cost and impacts of the project without creating excessive traffic delay.
8. Develop and implement interim improvements to Rockville Pike in White Flint to spur redevelopment and property dedication.
9. Identify a transit service plan for bus rapid transit along the MD 355 corridor that integrates existing local bus service.

(29)

8787 Georgia Avenue, Silver Spring, Maryland 20910 Phone: 301.495.4605 Fax: 301.495.1320
www.montgomeryplanningboard.org E-Mail: mcp-chair@mncppc-mc.org

It is my understanding the T&E Committee is scheduled to be briefed on the Study on July 25, 2019. Planning staff will be available at that briefing to further expand on the Planning Board's recommendations if needed. In the interim, if you have any questions or comments concerning the Board's review, please do not hesitate to contact David Anspacher at 301-495-2191.

Sincerely,

Casey Anderson
Chair

CA:DA:aj

cc:
Al Roshdieh, Montgomery County Department of Transportation
Glenn Orlin, Montgomery County Council
Joanna Conklin, Montgomery County Department of Transportation
Corey Pitts, Montgomery County Department of Transportation
Jason Sartori, Montgomery Planning
David Anspacher, Montgomery Planning

MCPB
Item No. 14
Date: 07-11-2019

MD 355 Bus Rapid Transit Corridor Planning Study Phase 2

DA David Anspacher, Supervisor, david.anspacher@montgomeryplanning.org, 301-495-2191
Jason Sartori, Acting Chief, jason.sartori@montgomeryplanning.org, 301-495-2172

Completed: 07/03/2019

RECOMMENDATIONS

Transmit the following comments to the Montgomery County Transportation, Energy and Environment (T&E) Committee and the Montgomery County Department of Transportation:

1. Advance Alternative B, Median Transitway, as the preferred alternative and seek to increase the use of two-lane median transitways, especially south of Shady Grove Metrorail Station.
2. Construct the MD 355 BRT project in two phases:
    a. Phase 1: Clarksburg Outlets to Rockville Metrorail Station, including the spur to Germantown.
    b. Phase 2: Rockville Metrorail Station to Downtown Bethesda.
3. Advance preliminary engineering for both the Veirs Mill Road BRT project and the MD 355 BRT project concurrently. Prioritize construction of the entire Veirs Mill Road BRT project and Phase 1 of the MD 355 BRT project.
4. Proceed with the Snowden Farm Parkway alignment in Segment 7.
5. Concur with the recommended station location and phasing.
6. Conduct additional traffic evaluation and mitigation to determine whether it is feasible to convert general purpose traffic lanes to transit only lanes to reduce the cost and impacts of the project without creating excessive traffic delay.
7. Develop and implement interim improvements to Rockville Pike in White Flint to spur redevelopment and property dedication.

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TABLE OF CONTENTS

1. SUMMARY

The *Draft MD 355 BRT Corridor Planning Study* report (Attachment A) evaluates enhanced transit service along MD 355, between Clarksburg and Downtown Bethesda, a distance of 22 miles. This study was funded by Montgomery County and conducted by the Montgomery County Department of Transportation (MCDOT).

The report is scheduled to be reviewed by the County Council T&E Committee on July 25, 2019 and by the full County Council on July 30, 2019, during which time the Council will consider which project alternative to advance and whether to provide funding for MCDOT to begin preliminary engineering on that alternative. Preliminary engineering would conduct the following tasks:

- Develop more detailed engineering on the Preferred Alternative
- Conduct surveys
- Evaluate right-of-way requirements
- Prepare detailed traffic studies
- Conduct environmental assessments
- Develop detailed project scope, schedule and cost estimate

Upon completion of preliminary engineering, the project will undergo final design and ultimately construction. Construction funding is typically not identified until after preliminary engineering is completed.

2. WHAT IS BUS RAPID TRANSIT?

Bus Rapid Transit, or BRT, is a high-quality and high-capacity bus-based transit system that delivers reliable, comfortable, convenient and branded transit service. Because BRT contains features similar to light rail or the Metrorail system, it is more reliable, comfortable and convenient than local bus services and can avoid the causes of delay that slow Metrobus and RideOn and the reliability issues that make these bus services often less desirable than Metrorail.

Internationally, BRT is a proven high-quality transit service that offers the benefits of light rail at far less cost. In the United States the record of BRT is mixed. This is because BRT is often compromised to reduce impacts to traffic and private property and to reduce costs. To achieve the full promise of BRT service, each of the four performance characteristics described below must be met:

1. **Reliability**. High-quality BRT service makes travel predictable. This is the main advantage of BRT service over travel by private vehicle and is critical to encouraging motorists to switch to transit. The main feature that achieves reliability is the dedicated transitway. Dedicated transitways are bus-only lanes that ensure that bus travel times are predictable from day to day by reducing the impacts of non-recurring congestion (congestion that cannot be anticipated because it is caused by irregular incidents such as road work, collisions and vehicle breakdowns). Median transit lanes are by far the most effective means to ensure reliable transit travel.

2. **Comfort**. High-quality BRT service includes amenities that reduce the stresses of travel and enables people to use their time more productively. Features that create a high-quality level of comfort include:

    - Premium transit vehicles
    - Enhanced stations
    - Real time information
    - Off-board fare collection
    - WiFi

3. **Convenience**: High-quality BRT service transports passengers to places quickly and provides Metrorail-like service frequency so that passengers do not have to consult a schedule; upon arrival at the station they can expect the BRT vehicle to arrive within a few minutes. Features that create a BRT level of convenience include:

    - Dedicated transitways
    - Transit signal priority
    - Queue jumps
    - Frequent / all-day transit service
    - Off-board fare collection
    - Level boarding

4. **Branded**: High-quality BRT creates a distinctive transit service – much like Metrorail – that is recognized and distinguished as reliable, comfortable and convenient. Distinctive features include:

    - Dedicated transitways
    - Premium transit vehicles
    - Enhanced stations
    - Frequent / all-day transit service

A glossary of various BRT components is provided on page 32 of this staff report.

3. STUDY DESCRIPTION

The purpose of the *Draft MD 355 BRT Corridor Planning Study* report is to provide a new transit service with higher speed and frequency along MD 355 between Clarksburg and Bethesda. The need of the study is described in the project's four goals:

- Goal 1: Provide an appealing, functional and high-quality transit service.
- Goal 2: Improve mobility opportunities, accessibility and transportation choices.
- Goal 3: Support planned development.
- Goal 4: Support sustainable and cost-effective transportation solutions.

3.1. Service Plan

The study identified four BRT routes that would operate along MD 355. These routes partially overlap to minimize the need to transfer between routes. The four routes are shown in Figure 1 and are listed below:

- FLASH 1C: Clarksburg to Montgomery College / Rockville Campus
- FLASH 1G: Germantown Transit Center to Montgomery College / Rockville Campus
- FLASH 2: Lakeforest Transit Center to Grosvenor Metrorail Station
- FLASH 3: Montgomery College / College Campus to Bethesda Metrorail Station

The service frequency and span of service for each route is shown in Table 1:

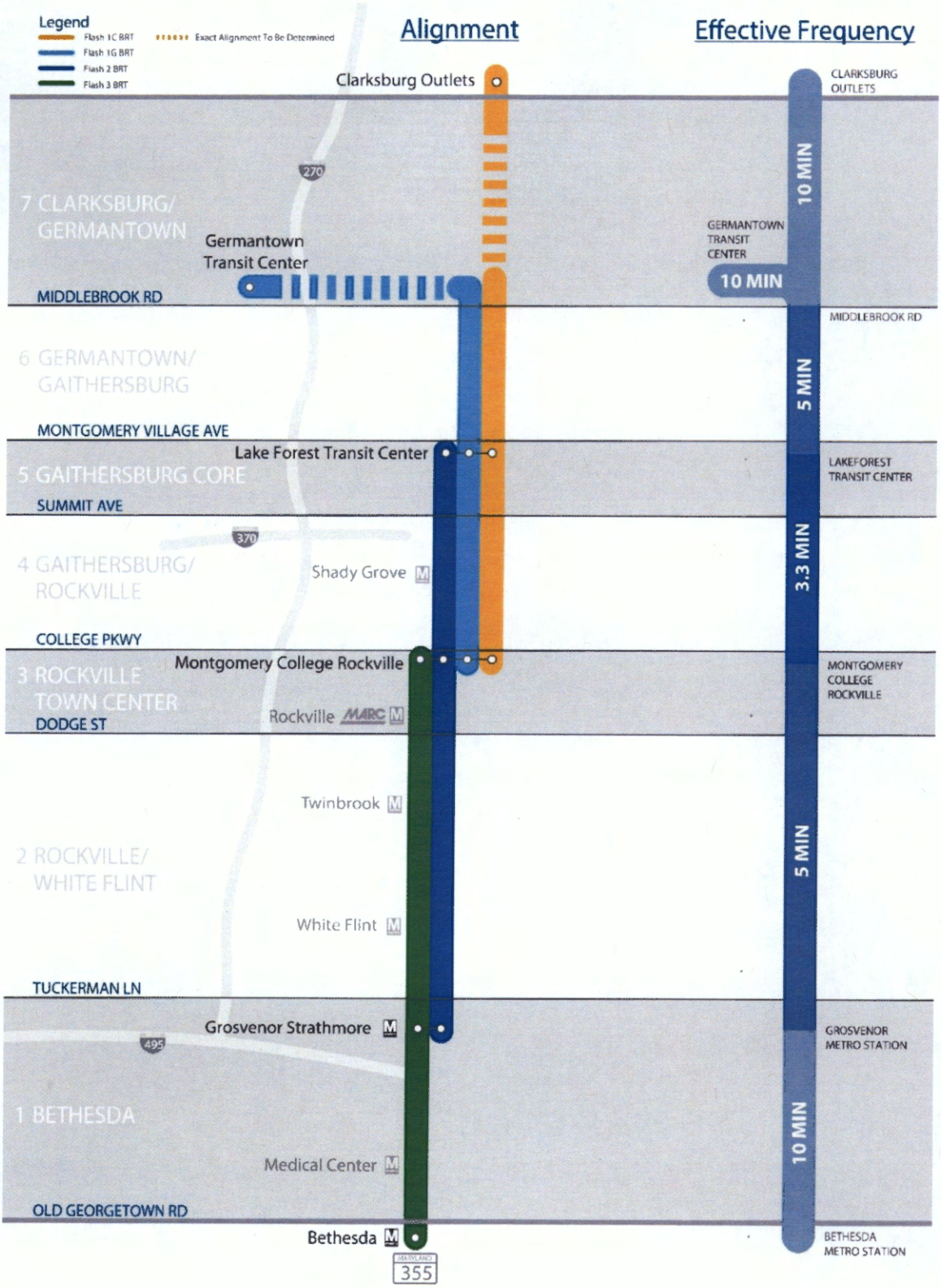
Table 1: Preliminary Service Frequency and Span of Service

Route	Weekday		Weekend		
	Headway	Span of Service	Headway	Span of Service	
				Saturday	Sunday
FLASH 1C	10 min (peak) 15 min (off-peak)	4:15 AM – 12:00 AM	15 min	5:00 AM – 12:00 AM	5:00 AM – 12:00 AM
FLASH 1G		4:15 AM – 1:45 AM		5:00 AM – 1:45 AM	5:00 AM – 1:30 AM
FLASH 2		4:15 AM – 1:45 AM		5:00 AM – 1:45 AM	5:00 AM – 1:30 AM
FLASH 3		5:00 AM – 1:45 AM		5:00 AM – 1:00 AM	5:00 AM – 1:30 AM

All routes would deviate from MD 355 to stop at Montgomery College / Rockville Campus, Shady Grove Metrorail Station and the Lake Forest Transit Center. One route would deviate from MD 355 to stop at the Germantown Transit Center. Due to overlapping routes, the effective arrival frequency (or headway) varies from 3.3 minutes to 10 minutes. Figure 1 shows the effective arrival frequency during peak periods for each route.

(35)

Figure 1: BRT Routes and Effective Arrival Frequencies



3.2. Project Segmentation

Due to the existing conditions that vary along MD 355 as the roadway transitions from an urban environment in downtown Bethesda to an exurban setting in Clarksburg, the corridor was divided into seven segments. The segments are primarily geographically based and each has its own set of characteristics, opportunities, challenges and constraints. The seven segments are shown in Table 2:

Table 2: Project Segments

Segment	Area	From	To
Segment 1	Bethesda Area	Bethesda Metrorail Station	Grosvenor Metrorail Station
Segment 2	White Flint and Twinbrook	Grosvenor Metrorail Station	Dodge Street
Segment 3	Rockville Town Center	Dodge Street	College Parkway
Segment 4	Shady Grove	College Parkway	Summit Ave
Segment 5	Gaithersburg Core	Summit Ave	MD 124 / Montgomery Village Ave
Segment 6	Gaithersburg & Germantown	MD 124 / Montgomery Village Ave	Middlebrook Rd
Segment 7	Clarksburg	Middlebrook Rd	Clarksburg Outlets

3.3. Description of Alternatives

Six alternatives were evaluated as part of this project. Five alternatives, including the No-Build Alternative, were fully evaluated as part of this study. An additional alternative, Alternative B Modified, was added near the conclusion of the process to minimize cost and impacts to private property of Alternative B. This alternative was not fully evaluated but was deemed feasible by the project team.

The six alternatives are described below. The four BRT alternatives are shown in Attachment B. An online map is available that shows the alignment, station locations and limit of disturbance for each of the BRT alternatives here: https://bit.ly/2ZVyNC8.

A note on terminology:

- Build Alternatives: includes Transportation System Management, Alternatives A, B, B Modified and C.
- BRT Alternatives: includes Alternatives A, B, B Modified and C.

3.3.1. No-Build Alternative

This alternative includes no additional infrastructure or operational improvements other than those already planned and programmed. This includes the existing Ride On extRa service launched in October 2017 from the Medical Center Metro Station to Lakeforest Transit Center. This service includes transit

signal priority (TSP) at key locations along the route. The No Build Alternative does not address the purpose and need of the project, but it serves as a baseline for comparing the improvements and impacts associated with the Build Alternatives.

3.3.2. Transportation System Management (TSM)

This alternative includes operational improvements to optimize bus service on MD 355 but does not include costly infrastructure improvements. It extends the existing Ride On extRa service, which currently exists between the Medical Center Metro Station and the Lakeforest Transit Center, south to the Bethesda Metrorail Station and north to Clarksburg. Additional transit signal priority is provided along the route.

3.3.3. Alternative A: Mixed Traffic

This alternative operates in existing general purpose traffic lanes from the Bethesda Metrorail Station to Clarksburg along MD 355. It includes the following features to provide a comfortable, convenient and branded service: premium transit vehicles, enhanced stations, real time information, off-board fare collection, queue jumps, frequent / all-day transit service and level boarding.

3.3.4. Alternative B: Median Transitway

The main difference with Alternative A is that this alternative travels in a dedicated median transitway where feasible as shown in Attachment B and described below. All existing general purpose traffic lanes would be maintained but would be narrowed where a transitway is provided to minimize roadway widening. The transitway alignment for each segment is as follows:

- Two-Way Median Transitway: Segments 2, 4 and 6
- One-Way Median Transitway: Segments 3 and 5
- Mixed Traffic: Segments 1 and 7

An example of a two-way median transitway

This alternative includes the same features as Alternative A to provide a comfortable, convenient and branded service.

3.3.5. Alternative B Modified: Median Transitway

The main difference with Alternative B is that the median transitway in this alternative is largely one lane to reduce costs and impacts to private property as shown in Attachment B and described below. All existing general purpose traffic lanes would be maintained but would be narrowed where a transitway is provided to minimize roadway widening. The transitway alignment for each segment is as follows:

- Two-Way Median Transitway: Segment 2
- One-Way Median Transitway: Segments 3, 4, 5 and 6
- Mixed Traffic: Segments 1 and 7

This alternative includes the same features as Alternative A to provide a comfortable, convenient and branded service.

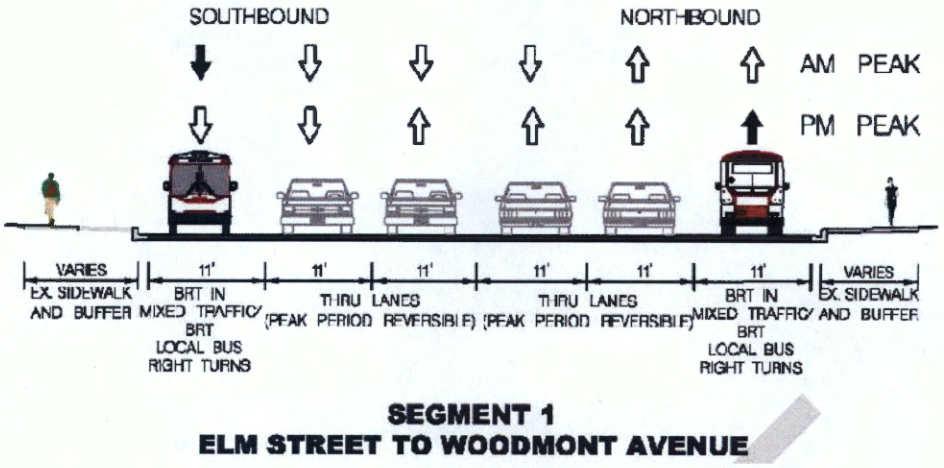
3.3.6. Alternative C: Curb Lane Transitway

The main difference with Alternative A is that this alternative largely travels in dedicated curb lanes shared with local transit service and right turning vehicles. All existing travel lanes would be maintained but would be narrowed where a transitway is provided to minimize roadway widening. The transitway alignment for each segment is as follows:

- Two Curb Lanes: Segments 2, 4 and 6

An example of a curb lane transitway

- One Curb Lane:
    - Segment 1: Space for the curb lane would be gained by replacing the existing landscaped median with a reversible traffic lane, much like is in operation on US 29 and MD 97 in Silver Spring. This would enable the southbound curb lane to operate as BRT in the morning and northbound curb lane to operate as BRT in in the evening (shown by the black arrows), while preserving six lanes for traffic (shown by the white arrows), which would also be used by the off-peak BRT vehicles. See image below.



- Segment 3: The curb lane would be fixed in the southbound direction. Northbound BRT vehicles would operate in the general traffic lanes.

- Mixed Traffic: Segments 5 and 7

This alternative includes the same features as Alternative A to provide a comfortable, convenient and branded service.

3.4. Segment 7 Alignments

One complication to the study is that the build alternatives (Alternative A, Alternative B, and Alternative C) are assigned a different alignment in Segment 7, making comparisons among alternatives somewhat more difficult. The Segment 7 alignments are shown in Attachment C and include:

- MD 355
- Observation Drive
- Snowden Farm Parkway

4. PREVIOUS STUDIES

Several plans and studies have been conducted in support of bus rapid transit on MD 355:

- *The Countywide Transit Corridors Functional Master Plan* (2013) is the guiding policy document for BRT in Montgomery County. This plan identifies 10 bus rapid transit corridors and includes recommendations for master-planned rights of way, station locations, recommendations for dedicated transit lanes and the number of additional lanes that can be added to the road to provide dedicated bus lanes.
- *The City of Rockville Bus Rapid Transit Town Center Integration Study (2015)* evaluated approaches for incorporating BRT in the constrained area of Rockville Town Center.
- *The City of Gaithersburg MD 355 Bus Rapid Transit Study* (2015) recommended a mix of two lane and one lane transitways through portions of the City.
- *The MD 355 Bus Rapid Transit Corridor Planning Study Conceptual Alternatives Report* (2017) contained six conceptual alternatives, including four BRT alternatives. This study was prepared by the Maryland State Highway Administration with the Montgomery County Department of Transportation and was a precursor to the *Draft MD 355 BRT Corridor Planning Study* report.

5. MASTER PLAN CONSISTENCY

The *Countywide Transit Corridors Functional Master Plan* (2013), as modified by the *Bethesda Downtown Plan* (2017), divides MD 355 into two segments: MD 355 South, extending from the planned Bethesda Metrorail Station entrance at Elm St to Rockville Metrorail Station, and MD 355 North, from Rockville Metrorail Station to Clarksburg Town Center. The master plan allowed for the extension of MD 355 South to Friendship Heights should the District of Columbia move forward with BRT service along Wisconsin Avenue. Table 3 indicates whether each segment in each alternative is consistent with the master plan. Where they are not consistent, the reason is noted. As the alignments for Segment 7 vary for each alternative, it is not possible to determine master plan consistency at the stage.

Table 3: Master Plan Consistency for Transitway Segment

Segment	Alternative B: Median Transitway	Alternative B Modified: Median Transitway	Alternative C: Curb Lane Transitway
1. Bethesda	Lacks dedicated transitway.	Lacks dedicated transitway.	Yes
2. White Flint & Twinbrook	Yes	Yes	Yes
3. Rockville Town Center	Yes	Yes	Yes
4. Shady Grove	# of lanes exceeds recommendation.	Yes	Yes
5. Gaithersburg Core	Yes	Yes	Lacks dedicated transitway.
6. Gaithersburg & Germantown	# of lanes exceeds recommendation.	Yes	# of lanes exceeds recommendation.

A complete analysis of master plan consistency for transitways is provided in Attachment D.

The *Countywide Transit Corridors Functional Master Plan* also provides recommendations on station locations. These station locations were included largely to allow the Planning Board to require additional property dedication for transit stations as part of development approvals, if needed. The plan recognizes that the master-planned station locations may need to be modified during the facility planning process. Page 22 states: "...station locations are subject to modification during these more detailed planning and engineering phases of project development and implementation..." Page 35 states: "...the specific location of the station...should be determined during facility planning. The number of stations may also be increased or decreased during facility planning." A complete analysis of master plan consistency for stations is provided in Attachment E.

Most stations that are recommended in the *Countywide Transit Corridors Functional Master Plan* are recommended to be constructed as part of the MD 355 BRT project with a few exceptions:

- MD 355 & Shady Grove Road: This station was relocated to Westland Drive.
- MD 355 & Gude Drive: This station was relocated to College Parkway.
- MD 355 & Pooks Hill Road: This station is proposed as a future station location.
- MD 355 & Cedar Lane: This station is proposed as a future station location.

Additionally, as the alignments for Segment 7 vary for each alternative, it is not possible to determine master plan consistency at this stage.

6. STUDY SHORTCOMINGS

There are two significant shortcomings with this study that influence the analysis and staff recommendations:

First, the recommendations in the *Countywide Transit Corridors Functional Master Plan* were developed based on ridership forecasts for a network of bus rapid transit corridors. In conformance with standard procedures, the transit ridership forecasts in the *Draft MD 355 BRT Corridor Planning Study* report did not evaluate how ridership would change if additional BRT corridors were in existence because at the time the analysis was conducted, these BRT corridors were not included in the region's Constrained Long-Range Plan (CLRP). As several BRT corridors are now included in the CLRP, including the Veirs Mill Road BRT, this will likely increase BRT ridership on MD 355, especially to the north of Veirs Mill Road.

Second, travel demand models are developed to make comparisons among alternatives during "normal" conditions. They are unable to capture the differences between alternatives due to non-recurring congestion (congestion that cannot be anticipated because it is caused by irregular incidents such as road work, collisions and vehicle breakdowns). This is a major shortcoming of the study as travel time reliability is the major benefit that median transitways offer over travel by private vehicle. Therefore, the difference between the ridership forecasts for Alternative B and Alternative B Modified compared with the Transportation System Management, Alternative A and Alternative C is likely to be greater than the analysis shows.

7. COMPARISON OF ALTERNATIVES

While numerous metrics were evaluated as part of the *Draft MD 355 BRT Corridor Planning Study* report for each of the alternatives, the following provides only those metrics that show a meaningful differentiation among the Build Alternatives:

- Project Benefits
  - Ridership
  - Travel Time
  - Travel Time Reliability
- Project Impacts
  - Potential Private Property Impacts
  - Public Park Impacts
  - Wetland Impacts
- Projects Costs
  - Capital Costs
  - Annualized Costs per Rider

These metrics are discussed in the sections below.

Please note: staff believes that the analysis in the *Draft MD 355 BRT Corridor Planning Study report* conveys a higher level of precision than the tools that generate them are able to provide. Staff would encourage the Planning Board not to wrestle too much with the intricacies of the ridership, travel time and traffic analyses, but rather to draw general conclusions from the analysis. In staff's opinion, these general conclusions are that:

- Median transitways and curb lanes provide faster <u>average</u> travel times for BRT than travel in mixed traffic.
- Median transitways offer substantially greater travel time reliability than curb lane transitways and mixed traffic.
- Therefore, median transitways will attract greater ridership than curb lanes, which will generate greater ridership that mixed traffic.

Nevertheless, the analysis as presented in the report is described below.

7.1. Project Benefits

As noted at the beginning of the staff report, four performance characteristics must be met to achieve the full promise of BRT service:

- Reliability: High-quality BRT service makes travel predictable. This is the main advantage of BRT service over travel by private vehicle and is critical to encouraging motorists to switch to transit.
- Comfort: High-quality BRT service includes amenities that reduce the stresses of travel and enables people to use their time more productively.

- Convenience: High-quality BRT service transports passengers to places quickly and provides Metrorail-like service frequency so that passengers do not have to consult a schedule; upon arrival at the station they can expect the BRT vehicle to arrive within a few minutes.
- Branded: High-quality BRT creates a distinctive transit service – much like Metrorail – that is recognized as reliable, comfortable and convenient.

Staff's evaluation of each of these performance characteristics is shown in Figure 2. Overall, Alternative B provides the high-quality BRT service, followed by Alternative B Modified. Alternative C provides mediocre BRT service.

Figure 2: Evaluation of Alternatives

Performance Characteristics	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative B Modified: Median Transitway	Alternative C: Curb Lane Transitway
Reliability	○	○	●	◑	○
Comfort	◔	●	●	●	●
Convenience	○	◔	●	◕	◔
Branding	○	○	●	◕	◔
Overall	○	◔	●	◕	◑

● = Best
○ = Worst

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7.1.1. Ridership

Figure 3 shows projected average daily boardings in 2040 for weekdays, Saturdays and Sundays. The key finding is that Alternative B would have the highest bus ridership of all the alternatives. This generally reflects the higher travel speeds associated with the median guideway, which makes the service more attractive to potential riders.

Figure 3: Projected Average Daily Boardings (2040)

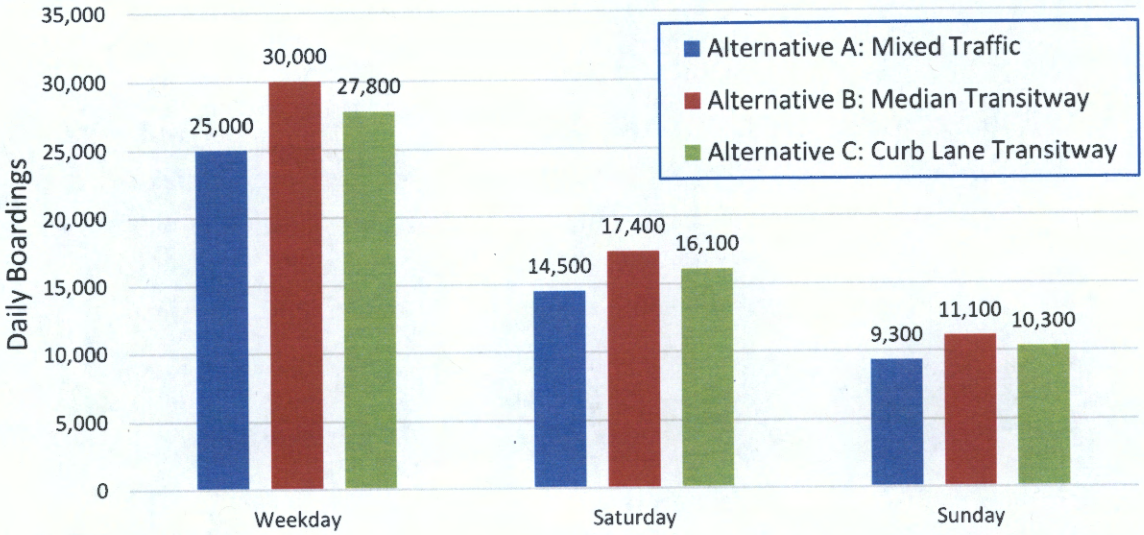

Figure 4 shows projected average weekday boardings in 2040 for local bus, Metrorail and BRT. The key findings are that:

- All three BRT Alternatives (Alternatives A, B, and C) would have higher total bus ridership than the TSM Alternative. The different priority treatments (dedicated lanes, signal priority, queue jumps) provided under the BRT Alternatives would result in faster travel times, which support higher ridership.
- The improved attractiveness of BRT compared to local bus would result in about 95 percent of local bus passengers shifting to the new BRT service. This would occur under each of the BRT Alternatives.
- BRT service on MD 355 would have little impact on Metrorail ridership, indicating that BRT addresses the needs of a different travel market than Metrorail.

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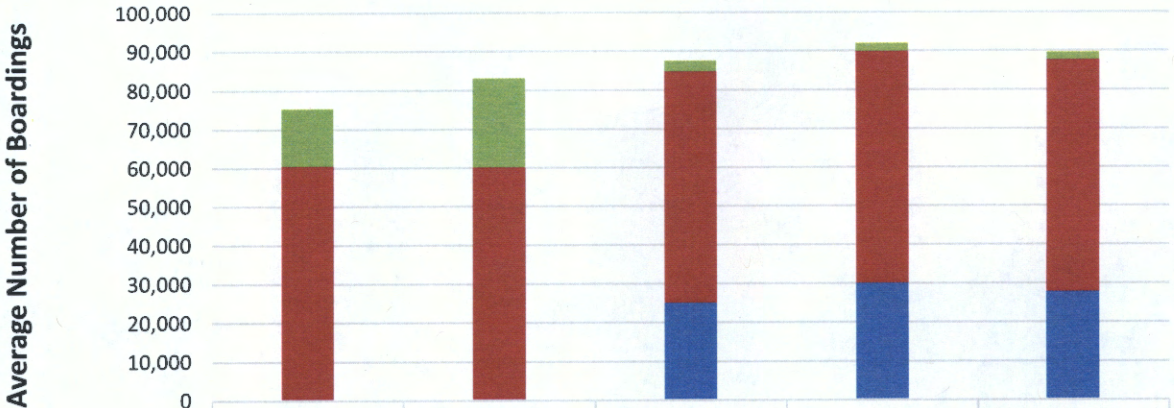
Figure 4: Projected Average Weekday Boardings for the MD 355 Corridor (2040)



	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
Local Bus	14,900	23,000	2,700	2,200	1,900
Metrorail	60,400	60,100	59,700	59,700	59,700
Bus Rapid Transit	0	0	25,000	30,000	27,800

Figure 5 shows projected average weekday boardings in 2040 for each segment. The key findings are that:

- The segment with the most boardings for all three BRT Alternatives is Segment 2, which runs between the Grosvenor Metrorail station and Dodge Street, and includes the White Flint area. This finding is not surprising given the future land use changes resulting in a more highly developed segment.
- The segment with the second highest boardings is Segment 4, which runs between College Parkway at the north end of Rockville Town Center and Summit Avenue in City of Gaithersburg. This segment includes the Shady Grove Metrorail Station and the southern end of the City of Gaithersburg.
- The segment with the third highest boardings is Segment 5, which runs from Summit Avenue to Christopher Avenue. This segment is completely within the City of Gaithersburg.
- Segment 7, which starts at Middlebrook Road at its southern end, has different alignments under each BRT Alternative. Boardings under each alternative, regardless of alignment, would be generally comparable across each alternative.

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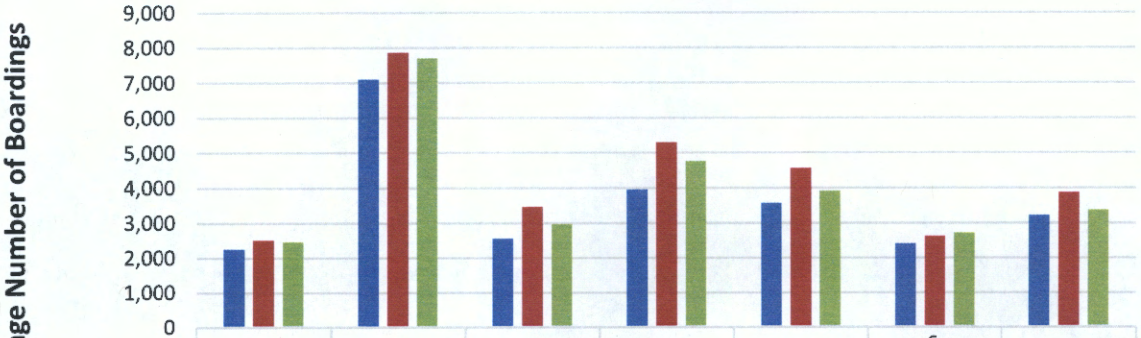
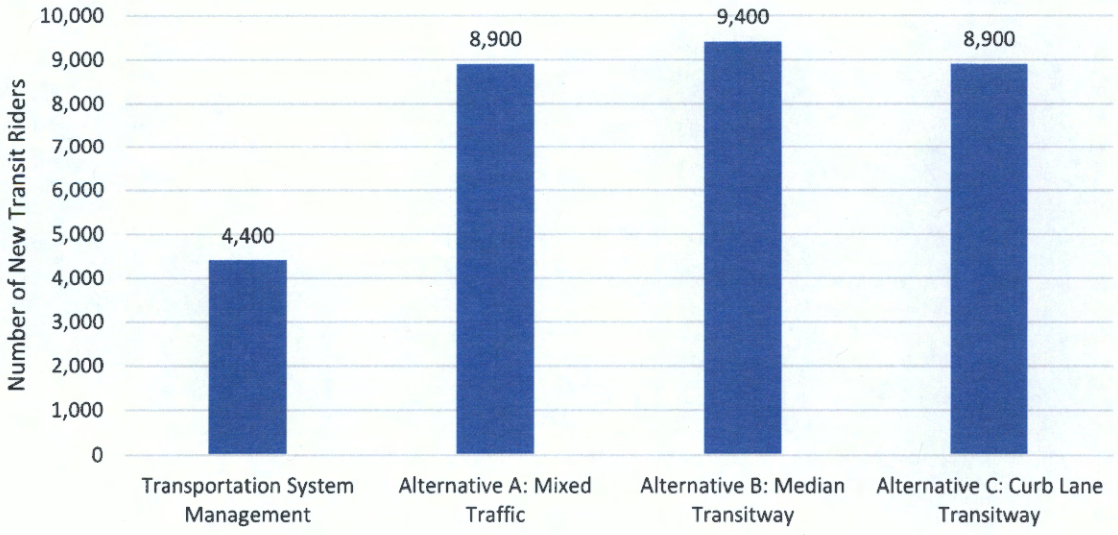
Figure 5: Projected Average Daily Boardings by Segment (2040)



	1. Bethesda	2. White Flint & Twinbrook	3. Rockville Town Center	4. Shady Grove	5. Gaithersburg Core	6. Gaithersburg & Germantown	7. Clarksburg
Alt A: Mixed Traffic	2,250	7,100	2,550	3,950	3,550	2,400	3,200
Alt B: Median	2,500	7,850	3,450	5,300	4,550	2,600	3,850
Alt C: Curb Lane	2,450	7,700	2,950	4,750	3,900	2,700	3,350

BRT service provides benefits for both existing and new transit riders. Figure 6 compares the projected number of new transit riders that would result due to implementation of transit improvements, representing the number of cars that would be removed from the road. New transit riders are riders who utilized a non-transit mode in the No-Build Alternative who would now utilize transit to make their trip. Alternative B would result in the highest number of new transit riders at 9,400, followed by both Alternatives A and C, at 8,900. New riders on all three BRT Alternatives would exceed the new riders generated by the TSM Alternative.

Figure 6: Projected Number of New Transit Riders



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7.1.2. Travel Time

Table 4 shows the transit travel time between key origin-destination pairs within the corridor during peak periods. In nearly all instances across all BRT Alternatives, transit travel times would be improved based on the combination of improved BRT frequencies and improved trip travel times.

Table 4: Peak Period Transit Travel Time (in Minutes) by Alternative for Select Origin-Destination Pairs in 2040

Origin	Destination	No Build	TSM	Alt A: Mixed Traffic	Alt B: Median Transitway	Alt C: Curb Lane Transitway	Notes
Germantown	Shady Grove	44	42	40	33	35	Bus Only
Lakeforest	Rockville	43	43	38	29	31	Bus Only
Lakeforest	Bethesda	53	53	46	42	43	Bus to Metro
White Flint	Bethesda	30	26	23	21	23	Bus Only
Rockville	Bethesda	57	42	40	36	39	Bus Only

* Note: Origin-destination pairs originating in Clarksburg have been removed from this analysis. This is because the build alternatives reflect different alignments in Clarksburg, making comparisons difficult.

Table 5 compares BRT travel time to auto travel time to determine the extent to which BRT travel time is competitive with the auto. In general, Alternative B and Alternative C provide the greatest time-competitiveness.

Table 5: BRT Travel Times Compared to Auto Travel Times in 2040 (Minutes)

Origin/ Destination	No Build	TSM Alternative		Alternative A (Mixed Traffic)		Alternative B (Median)		Alternative C (Curb Lanes)	
	Auto	Auto	Ride On extRa	Auto	BRT	Auto	BRT	Auto	BRT
AM Peak Southbound									
Gaithersburg to Bethesda	47	51	73	46	71	54	61	46	58
AM Peak Northbound									
Bethesda to Gaithersburg	45	41	69	40	63	41	65	43	67
PM Peak Southbound									
Gaithersburg to Bethesda	46	45	67	46	70	49	62	51	61
PM Peak Northbound									
Bethesda to Gaithersburg	67	65	86	60	82	73	77	70	79

7.1.3. Travel Time Reliability

As noted previously, travel demand models are developed to make comparisons among alternatives during "normal" conditions. They are unable to capture the differences between alternatives due to non-recurring congestion (congestion that cannot be anticipated because it is caused by irregular incidents such as road work, collisions and vehicle breakdowns). But anecdotally we know the importance of reliability. WMATA's Metrorail service became somewhat less reliable over the years and people began to abandon it.

To draw conclusions about how non-recurring congestion will affect future transit travel times and therefore ridership projections, staff evaluated average travel times in 2018 using INRIX data for all vehicles[1]. While this analysis serves as a proxy for transit travel time reliability in 2040, it is reasonable to assume that if non-recurring congestion is affecting vehicles today, it is only going to get worse in the future.

As an example of the non-recurring congestion issue on MD 355, Figure 7 and Figure 8 show the extent to which travel time is unreliable between Clarksburg and Rockville. In these figures, the dark line represents average travel times between Clarksburg and Rockville in the southbound direction (Figure 7) and the northbound direction (Figure 8). The dashed line at the top of the figures shows how much additional travel time one has to plan for to be on time 95 percent of the time. For example, Figure 7 shows that at 8:00 am the average travel time in the southbound direction is about 31 minutes, but to ensure an on-time arrival 95 percent of the time, one needs to give themselves 52 minutes to make the trip. Similarly, Figure 8 shows that at 5:00 pm the average travel time in the northbound direction is 34 minutes, but to ensure an on-time arrival 95 percent of the time, one needs to give themselves 55 minutes to make the trip. In short, in both directions rush-hour travelers need to give themselves an extra 21 minutes to arrive on time.

Alternative B (median transitway) and to a somewhat lesser extent Alternative B Modified will largely be shielded from the effects of non-recurring congestion, since these alternatives are separated from the roadway by a concrete median. Alternative A (mixed traffic) and to a slightly lesser extent Alternative C (curb lane transitway), will be greatly impacted by non-recurring congestion, because private vehicles are likely to encroach into the transit lanes during heavily congestion conditions.

[1] INRIX collects anonymized data on actual congestion from millions of trips everyday.

Figure 7: Average Southbound Travel Times between Clarksburg and Rockville (2018)

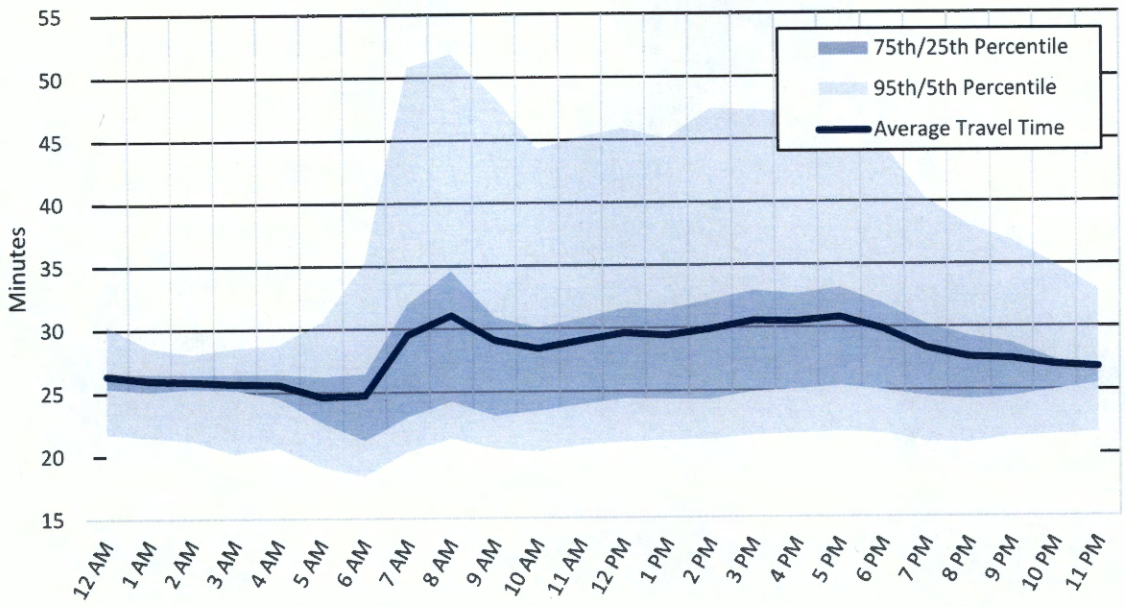
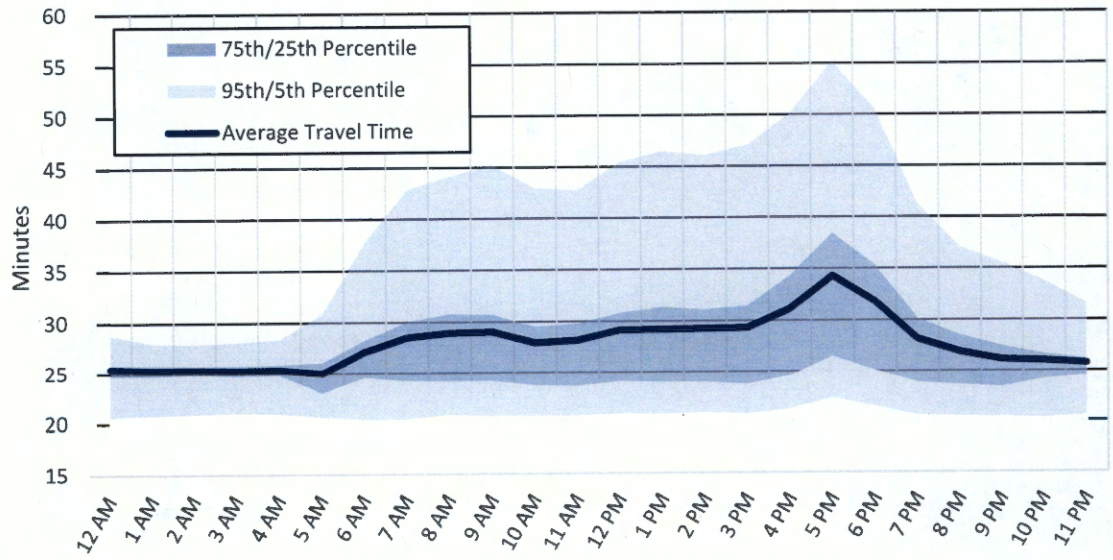


Figure 8: Average Northbound Travel Times between Rockville and Clarksburg (2018)



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7.2. Project Impacts

Project impacts that provide meaningful differentiation among alternatives include traffic impacts, private property impacts, public park impacts and wetland impacts. At this phase in the MD 355 BRT Planning Study, project impacts are still preliminary. As the project progresses, further avoidance and minimization efforts will be investigated to reduce impacts.

7.2.1. Traffic Impacts

Table 6 compares the traffic impacts of each alternative. Overall, the four Build Alternatives would increase delay for people traveling in private vehicle compared to the No-Build Alternative. This is offset by the travel time improvements for transit passengers such that the average person delay only increases slightly for the Build Alternatives. There are a number of reasons for reduction in automobile travel times, including:

- Signal timing adjustments to accommodate exclusive transit phases.
- Signal timing adjustments to accommodate a longer pedestrian crossing to accommodate dedicated transit lanes.
- Transit-only phases to accommodate vehicles entering and exiting the median guideway.

Table 6: Traffic Impacts in 2040

Metric	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
Miles of LOS E or F in AM (Northbound)	2.6	2.7	2.7	3.0	3.2
Miles of LOS E or F in AM (Southbound)	7.6	9.4	8.1	8.4	5.9
Miles of LOS E or F in PM (Northbound)	8.4	8.1	7.2	9.4	8.8
Miles of LOS E or F in PM (Southbound)	5.0	5.5	6.4	5.5	5.7
# of Intersections with LOS E or F (AM/PM)*	16/14	17/14	13/14	20/24	15/23
Average Minutes of Person Travel Delay (AM/PM)	3.0/3.0	3.0/3.0	3.0/3.6	3.6/3.6	3.6/3.6

* Excludes Segment 7

7.2.2. Private Property Impacts

In most locations, the Build Alternatives would fit within the right-of-way recommended in the Master Plan of Highways and Transitways. However, much of this right-of-way is not currently dedicated for transportation use. As properties are approved by the Planning Board and other jurisdictions for development or redevelopment, the expectation is that they will dedicate to the master planned right-of-way, reducing impacts to private property.

Construction of the Build Alternatives would have a range of impacts on corridor properties, with varying impacts on corridor parcels, parking areas and access. Right-of-way requirements would also likely involve displacement of existing residential and commercial properties for implementation of Alternative B and Alternative C.

Right-of-way requirements that would result from the project alternatives are summarized in Table 7. The total number of potential displacements that would result from the alternatives is included in Table 8.

Table 7: Potential Right-of-Way Requirements (Acres)

Right-of-Way Requirements	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
Residential	0.0	0.2	3.9	17.1	11.8
Commercial	0.0	0.2	8.5	43.8	26.8
Total Impact	0.0	0.4	12.4	60.8	38.6

Table 8: Potential Displacements

Impacts	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
Residential Displacements	0	0	0	4	1
Commercial Displacements	0	0	0	24	11
Total Displacements	0	0	0	28	12

7.2.3. Public Park Impacts

Table 9 shows the acres of public parkland within the project limit of disturbance. Alternative A would have a minor impact to parks, and Alternatives B and C would have modest impacts to local parks, affecting about one acre each. These impacts would need to be further assessed during the next phase of design to determine the actual impact and identify potential mitigation.

Table 9: Acres of Public Parkland within the Project Limit of Disturbance

Impact	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
Potential Park Impacts	0	0	0.08	1.08	0.94

7.2.4. Wetland Impacts

No impacts to wetland resources are anticipated with implementation of the No-Build and TSM Alternatives as no physical changes or improvements would be constructed. Under the Build Alternatives, wetlands may be permanently impacted through encroachment of construction and temporarily from construction activities in the vicinity of wetland resources, as shown in Table 10. Table 10 also summarizes the Build Alternative impacts to floodplain resources.

Table 10: Wetland Impacts

Impact	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
DNR Wetland Impacts (Acres)	0	0	0	0.15	0.08
Floodplain Impacts (Acres)	0	0	0	0.73	0.57

7.2.5. Historic Impacts

For the Build Alternatives, direct and indirect impacts to cultural resources would include partial right-of-way impacts affecting historic resource properties and/or structures and potential access or visual effects (direct effects) for architectural properties (see Table 11 and Table 12). This number is subject to revisions based on additional pending archaeological investigations and architectural survey work that the next draft report should address. The area of potential effect may also be subject to revision given recent federal guidance and this may result in additional survey work and an expanded list of affected resources.

Table 11: Potential Number of Historic Architectural Properties Directly Impacted by Each Alternative

	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
# of Property Impacts	0	0	24	24	28
# of NRHP Eligible Property Impacts	0	0	0	0	0

Table 12: Potential Number of Historic Architectural Properties Indirectly Impacted by Each Alternative

	No Build	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative C: Curb Lane Transitway
# of Property Impacts	0	0	27	26	30
# of NRHP Eligible Property Impacts	0	0	0	0	0

7.3. Project Costs

7.3.1. Capital Costs

Table 13 shows the capital cost per segment and the total cost for each alternative. Costs in Segment 2 (White Flint and Twinbrook) represent roughly 40 percent of the costs of the BRT alternatives (Alternatives A, B, B Modified and C), largely due to the high cost of property acquisition in this area. Right-of-way acquisition represents roughly 20 percent of the total cost of the BRT alternatives (Alternatives A, B, B Modified and C).

Table 13: Capital Cost per Segment (millions $)

Segment	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative B: Modified Transitway	Alternative C: Curb Lane Transitway
1. Bethesda	$0.7	$18.0	$19.0	$19.0	$37.0
2. White Flint & Twinbrook	$0.9	$50.0	$346.0	$346.0	$190.0
3. Rockville Town Center	$0.2	$11.0	$92.0	$92.0	$65.0
4. Shady Grove	$0.3	$26.0	$170.0	$141.0	$123.0
5. Gaithersburg Core	$0.5	$9.0	$86.0	$80.0	$10.0
6. Gaithersburg & Germantown	$1.0	$9.0	$121.0	$91.0	$59.0
7. Clarksburg	$2.0	$19.0	$15.0	$15.0	$13.0
Vehicles	$10.0	$43.0	$37.0	$37.0	$37.0
Total	**$15.6**	**$185.0**	**$886.0**	**$821.0**	**$534.0**

7.3.2. Annualized Costs per Rider

Annualized cost per rider is a measure of cost-effectiveness that divides annualized capital and operating costs by the number of riders per year. Annualized costs per rider were developed for each Build Alternative based on FTA guidelines for the typical lifespan of different project components and are shown in Table 14. While capital and operating costs are high for the BRT alternatives overall, the annualized costs per rider for Alternatives B Modified and C are comparable to each other, though Alternative B is higher.

Table 14: Annualized Capital and Operating Costs per Annual Rider

	Transportation System Management	Alternative A: Mixed Traffic	Alternative B: Median Transitway	Alternative B Modified: Median Transitway	Alternative C: Curb Lane Transitway
Annual Capital & Operating Costs	$12,900,000	$33,800,000	$52,300,000	$41,100,000	$40,900,000
Annual BRT Riders	3,820,000	7,700,000	9,280,000	9,280,000	8,630,000
Total Annualized Cost per Rider	$3.38	$4.39	$5.64	$4.43	$4.74

8. THE WHITE FLINT DILEMMA

The cost of right-of-way acquisition in Segment 2 (White Flint and Twinbrook) is estimated to be about $184 million for Alternative B and Alternative B Modified and $99 million for Alternative C, or over 20 percent of the total cost of each alternative. This presents Montgomery County with a dilemma. Due to these high costs, there is an incentive for Montgomery County to delay implementation of BRT in Segment 2 in the hope that redevelopment and the resulting right-of-way dedication will reduce the cost and impacts of property acquisition. However, due to current market conditions, property owns have indicated that they are unlikely to move forward with redevelopment until MD 355 is transformed from the unenticing auto-centric highway that it is today into an appealing multimodal boulevard as envisioned in the White Flint Sector Plan.

A View of MD 355 in White Flint

9. STAFF RECOMMENDATIONS

1. Advance Alternative B, Median Transitway, as the preferred alternative and seek to increase the use of two-lane median transitways, especially south of Shady Grove Metrorail Station.

Staff recommends implementing BRT on MD 355 with a dedicated median transitway. Median transitways provide the highest ridership of all the Build Alternatives and offer travel times that are a substantial improvement over the TSM Alternative. Perhaps most importantly median transitways are the only alternative that provides a high level of travel time reliability. Since reliability is the main advantage of BRT service over travel by private vehicle, it is critical to encouraging motorists to switch to transit. While this alternative will have the greatest impacts to private property, historic resources, environmental resources and park land, at this stage the amount of impacts is rough and as the project progresses, further avoidance and minimization efforts will be investigated to reduce impacts.

Furthermore, staff recommends seeking opportunities to increase the amount of two-lane median transitways, especially to the south of the Shady Grove Metrorail Station, where the directional split of travel on MD 355 tends to have a greater balance due to the commercial nature of the corridor.

Staff strongly recommends against Alternative C. While curb lane transitways can be an appealing option because they take up less space and therefore cost less and have fewer impacts to adjacent properties than median transitways, travel times are slower and they will suffer from poor travel time reliability. This is because:

- Much of the MD 355 corridor is lined with commercial properties, so the number of right turning vehicles using the curb lanes could severely limit the functionality of the curb lane transitway.
- When heavy congestion occurs, other vehicles are more likely to encroach onto the curb lane transitway.

Bus Only Lanes on 9th Street in Washington DC are regularly used by other vehicles

Contrary to the findings of the *Draft MD 355 BRT Corridor Planning Study* report, it is staff's opinion that the actual ridership for this alternative would be substantially less than Alternative B because it will be impacted by non-recurring congestion. People who have the ability to choose to drive tend to avoid unreliable transit services. While Alternative C would improve travel time by local bus, this benefit is greatly outweighed by the unreliability of the service, as 95 percent of local bus patrons would choose to switch to BRT.

2. **Construct the MD 355 BRT project in two phases:**

    a. **Phase 1: Clarksburg Outlets to Rockville Metrorail Station, including the spur to Germantown.**
    b. **Phase 2: Rockville Metrorail Station to Downtown Bethesda.**

As the cost of the MD 355 BRT project is high, staff recommends dividing it into two phases. Phase 1 would connect the Clarksburg Outlets to the Rockville Metrorail Station and should be prioritized because high-quality transit does not exist north of Shady Grove and because this is the lowest cost section of the corridor. It would also connect to the planned Veirs Mill Road BRT, which is likely to increase the ridership of both routes.

Phase 2 would connect the Rockville Metrorail Station to the Bethesda Metrorail Station. This phase should be constructed last because it has the highest cost, of which right-of-way acquisition in Segment 2 (White Flint / Twinbrook) accounts for about 20 percent of the total cost of the MD 355 BRT. Leaving this section of the MD 355 BRT until last has the benefits of potentially reducing the costs of property acquisition, should redevelopment and property dedication occur on Segment 2. This could also have the benefit of providing property owners with greater certainty that the BRT project will be forward in the White Flint area.

3. **Advance preliminary engineering for both the Veirs Mill Road BRT project and the MD 355 BRT project concurrently. Prioritize construction of the entire Veirs Mill Road BRT project and Phase 1 of the MD 355 BRT project.**

Both the Veirs Mill Road corridor and Phase 1 of the MD 355 corridor have high existing transit demand but lack high-quality transit.

4. **Proceed with the Snowden Farm Parkway alignment in Segment 7.**

Staff recommends initially implementing the MD 355 BRT project along the Snowden Farm Parkway alignment instead of the MD 355 alignment or the Observation Drive alignment. While this is inconsistent with the *2013 Countywide Transit Corridors Functional Master Plan*, which recommends that the BRT project travel along MD 355 to Redgrave Place, there are several reasons why MCDOT should move forward with the BRT project on Snowden Farm Parkway:

- Much of the existing Clarksburg development is focused on Snowden Farm Parkway, so the Snowden Farm Parkway alignment would better serve existing land use.

- Snowden Farm Parkway has been largely completed since the *Countywide Transit Corridors Functional Master Plan* was approved.
- The BRT project on MD 355 would impact the Clarksburg Master Plan Historic District and National Register District. (Note that any alterations to the roadway or adjacent properties required by lane widening or station construction within the historic district boundaries would require an Historic Area Work Permit (HAWP) and approval by the Historic Preservation Commission (HPC)).
- Constructing the transitway along Snowden Farm Parkway does not preclude the other alignments in the future.
- Observation Drive remains incomplete between Waters Discovery Lane and Stringtown Road.

5. **Concur with the recommended station location and phasing.**

While MCDOT recommends delaying two stations (Pooks Hill Road, Cedar Lane) and relocating two stations (Gude Drive, Shady Grove Road), their rationale is sound.

6. **Conduct additional traffic evaluation and mitigation to determine whether it is feasible to convert general purpose traffic lanes to transit only lanes to reduce the cost and impacts of the project without creating excessive traffic delay.**

Converting general purpose traffic lanes to transit only lanes can reduce the cost and property impacts of implementing BRT. As an example, the Purple Line project originally proposed adding a two-lane median transitway on University Boulevard between Piney Branch Road and Adelphi Road in Prince George's County while preserving six general traffic lanes. After detailed traffic analysis, the project team and the Maryland State Highway Administration determined that they could reduce the cost and impacts of the Purple line project to private property on University Boulevard by converting two existing general purpose traffic lanes to a two-lane median transitway and by making additional traffic improvements on other nearby roads, including New Hampshire Avenue.

7. **Develop and implement interim improvements to Rockville Pike in White Flint to spur redevelopment and property dedication.**

Due to the high cost of right-of-way acquisition in Segment 2 (White Flint and Twinbrook), staff believes it would be unwise to implement BRT in this area until additional property dedication occurs. Understanding that current market conditions make redevelopment (and therefore property dedication) unlikely without transforming MD 355 from an auto-centric highway to a multimodal boulevard, staff recommends developing an innovative and exciting program of improvements to spur redevelopment by improving multimodal connections and implementing placemaking activities that create a buzz for Rockville Pike, including:

- White Flint Circulator Bus
- Streetscape Enhancements
- Off-Peak Parking

- Additional Protected Pedestrian Crossings
- Sidewalk Improvements along MD 355
- Bikeway Improvements on Side Streets

These improvements will be further considered as part of the White Flint Sector Plan's Metrorail Station Area study, which the Planning Department is scheduled to begin in the current fiscal year.

10. GLOSSARY OF BRT COMPONENTS

This section of the staff report provides a description of several BRT components, including transitway types, operational improvements and station enhancements.

10.1. Transitway Types

Transit service can be provided via a variety of transitway types: a dedicated two-lane median transitway, a dedicated one-lane median transitway (to accommodate transit service in one direction or in both directions), dedicated curb lanes transitway, or running in mixed traffic. The transitways can be mixed and matched along the corridor to provide the best solution within the existing constraints and needs of the area. These transitway types are described in more detail below.

10.1.1. Dedicated Two-Lane Median Transitway

Two lanes located in the center of the roadway that are dedicated for use by the BRT vehicle and may be physically separated from traffic by a raised curb or median. Median BRT lanes minimize conflicts with general purpose traffic lanes and allow the BRT vehicle to travel with faster speeds and greater travel time reliability. To avoid conflicts with BRT vehicles, general traffic is only permitted to make left turns at signalized intersections. Two-lane median transitways require the most space and are therefore the most costly and impactful to implement. An example of a two-lane median transitway is the Metroway on US 1 in Alexandria.

The Metroway BRT Service Operates in a Two-Lane Median Transitway

10.1.2. Dedicated One-Lane Median Transitway

Multiple types of BRT operations are being considered utilizing a single BRT lane, including: bi-directional, fixed direction, and reversible transit operations.

In bi-directional operations, BRT vehicles traveling in both directions share a single dedicated lane in the center of the roadway. Since the BRT vehicles travel within this one lane in both directions, passing zones are created, generally at station locations, so BRT vehicles moving in opposite directions do not conflict with each other.

In fixed-direction operations, a single median BRT lane is used solely by the BRT vehicles in one direction. The BRT vehicles travel in general purpose traffic lanes in the other direction.

In reversible-direction operations, the direction of the BRT vehicle in the one-lane median varies depending on the time of day. BRT vehicles traveling in the peak direction use the median BRT lane and BRT vehicles traveling in the non-peak direction use the general traffic lanes. An example of a one-lane median transitway is the Emerald Express in Eugene, Oregon.

One-lane median transitways are most appropriate on roadways where the directional split of travel varies by the time of day. In the peak direction it provides fast speeds and reliability but is less costly and impactful than two-lane median transitways. On roads where the directional split of travel is balanced, one-lane median transitway result in slower speeds and less travel time reliability for the direction of travel that uses general traffic lanes.

A One-Lane Median Transitway in Eugene, Oregon

10.1.3. Dedicated Curb Lanes Transitway

The lanes adjacent to the curb are used exclusively by the BRT vehicle, local buses, and right-turning vehicles. The roadway surface may be painted or otherwise marked to reinforce the lane designation. Similar to the median guideways, multiple types of dedicated curb lane operations are being considered including two lanes (one on each side of the roadway), and one curb BRT lane in locations where existing constraints make additional widening impactive and where off-peak BRT vehicles can efficiently operate in mixed traffic. This transitway is less costly and impactful than the two-lane and one-lane median transitways, but speed and travel time reliability will suffer due to right turning vehicles and non-recurring congestion. An example of a curb lane transitway is in Washington, DC.

Curb Lane Transitway in Washington, DC

10.1.4. Mixed Traffic

The BRT vehicle travels in the same lanes as traffic. It would not have lanes dedicated for its use.

10.2. Operational Improvements

10.2.1. Transit Signal Priority

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

10.2.2. Queue Jumps

Queue jumps are a short section of widened roadway or an existing right turn lane to allow BRT vehicles to bypass congestion or delays at intersections. In most applications, queue jumps are used in conjunction with TSP to provide a lane and dedicated BRT signal that allows BRT vehicles to enter an intersection and "jump" ahead of the other vehicles stopped at the light. In some locations where constraints allow, the roadway is widened to provide a receiving lane that allows the BRT vehicle to merge into traffic beyond the signal. This is beneficial if there is no "BRT Only" signal phase.

10.3. Transit Vehicles

10.3.1. Premium Transit Vehicles

BRT vehicles offer a higher quality of service than typical transit vehicles.

The BRT Vehicle for the Metroway in Northern Virginia

10.3.2. Level Boarding

Like Metrorail, BRT services provides level boardings, which allows persons with mobility challenges to board the BRT vehicle more easily.

Level Boardings on the Emerald Express in Eugene, Oregon

10.4. Station Enhancements

10.4.1. Enhanced Stations

BRT services include enhanced stations with weather protection, seating, lighting, off-board fare collection, real time information displays, landscaping/hardscaping and bicycle accommodations.

An Enhanced Station on the Metroway in Crystal City, Virginia

10.4.2. Off-Board Fare Collection

Like Metrorail, BRT services collect fares from passengers before they board the vehicle, to reduce travel time delay.

Off-Board Fare Collection in Toronto, Canada

11. PUBLIC OUTREACH

Public involvement for this project included a series of Community Updates, Public Open Houses (winter 2018 and summer 2019), and Community Advisory Committee (CAC) meetings. These efforts were a continuation of the public outreach that were conducted as part of an earlier phase, which included ten CAC meetings and two rounds of open houses. In addition, a new user-friendly website, www.RidetheFLASH.com, was created to educate the public about BRT and keep them up-to-date on project information.

In addition, the City of Rockville Mayor and Council and the City of Gaithersburg Mayor and City Council received briefings on the study on June 19, 2019 and June 10, 2019, respectively.

12. ATTACHMENTS

Attachment A: Draft MD 355 BRT Corridor Planning Study Phase 2 Report

Attachment B: BRT Alternative Descriptions

Attachment C: Segment 7 Alignments

Attachment D: Master Plan Consistency for Transitways

Attachment E: Master Plan Consistency for Station Locations

Attachment F: Additional Comments Transmitted by the M-NCPPC

Attachment F: Additional Comments on MD 355 Bus Rapid Transit Corridor Planning Study Phase 2
July 3, 2019

This documents includes staff-level comments to be transmitted to MCDOT.

Historic Preservation

The Cultural and Historic Resources Report is in draft form and Historic Preservation staff will send comments directly to MCDOT on technical corrections separately. For the purposes of evaluating the findings of the draft report as they relate to cultural resources impacts for the BRT project as presented, staff has the following comments:

- The March 2019 DC Circuit Court opinion in *National Parks Conservation Association v. Semonite* has determined that adverse effects now include visual, auditory and other environmental effects as "direct" whereas previous practice has been to generally classify these as "indirect" effects. See: https://www.achp.gov/sites/default/files/2019-06/NPCA%20v%20Semonite.pdf
- For the purposes of defining the area of potential effect (APE), this case may expand the APE beyond the initial study boundary. Further consultation with Maryland Historical Trust (MHT) is needed to determine if the existing APE is adequate in light of this recent determination.
- The report did not reference or examine the information regarding the County's list of Burial Sites that is available via the Planning Department's website and through the Historic Preservation (HP) program office. This information should be examined to see if any burial sites are located within the project APE.
- At the time this report was written, MCDOT has undertaken significant archaeological studies within the boundaries of the Clarksburg Historic District. The findings of this study, including MHT comments and findings regarding National Register-eligible archaeological sites, should be included in this report and factored into findings of adverse effect for the project.
- The Alternative C alignment (Chapter 3, page 57) that routes BRT south on MD 355 through the Clarksburg Master Plan Historic District should be excluded from further study. Any alterations within the Master Plan Historic District boundaries must receive an Historic Area Work Permit (HAWP) from the Historic Preservation Commission (HPC) and comply with Chapter 24A and the Sec. of the Interior's Standards for Rehabilitation. The rural character of this District has been largely retained despite several major infrastructure projects within and adjacent to its boundaries. Alterative C has the potential to create serious adverse effects to this District. Other alignments for Segment 7 exist that would entirely avoid the Clarksburg Historic District. These alternatives should be further explored.

Transportation

- Two-stage crossings of MD 355 are not recommended

Environmental and Parkland

- The proposed alternatives that would require widening existing roadways adjacent to environmentally constrained areas with high natural and cultural resource value must employ avoidance and minimization measures and consider repurposing traffic lanes for a median transitway to reduce the costs and impacts to environmental resources and parkland (as well as residential and commercial properties).
- In particular, stream valley crossings should minimize any reduction in floodplain storage capacity. Adding fill in floodplains should be avoided.

Attachment F: Additional Comments on MD 355 Bus Rapid Transit Corridor Planning Study Phase 2
July 3, 2019

- The preliminary natural resources analysis indicates that habitat for Forest Interior Dwelling Species (FIDS) may be present within the study area of the preferred option. Due to concern for declining populations of FIDS, additional study should be undertaken during the early design phase to more definitively ascertain FIDS habitat areas, and to use design features that avoid and minimize impacts to FIDS habitat.
- Alignment refinements, construction options (including retaining walls and other approaches for reducing impacts), and operational alternatives should all be considered early in the design phase to maximize the effectiveness of the measures and reduce costs of construction.
- Segment 1: Mixed traffic alternative preferred to reduce impacts to Rock Creek SVU3 between Tuckerman Ln South and Pooks Hill Rd. Significant impacts to the Rock Creek floodplain are likely should additional widening be necessary through this section. The historical Linden Oak tree adjacent to the intersection of Rockville Pike and Beach Dr is a County Champion in the Register of Champion Trees and would be impacted by any widening of the roadway in this area. Avoidance measures must be implemented in this area.
- Segment 7 / Snowden Farm Parkway Alignment: Of the alternatives provided for Segment 7, this is preferable, but not without impacts to natural resources. The alignment passes by Ridge Road Recreational Park and Seneca Crossing Local Park, both of which contain forested habitat immediately adjacent to the existing ROW. Little Seneca Greenway Stream Valley Park would also be impacted by any significant widening of Snowden's Farm Parkway. No further widening of this portion of the Segment would be supported. Any alternative that is chosen through this segment needs to minimize impacts in this environmentally constrained reach.
- Segment 7 / Observation Drive Alignment: This option would have significant impacts to natural resources in Little Seneca Greenway SVP and North Germantown Greenway SVP. The road has not been built through either of these stream valleys and any roadway construction would fragment existing forest, impact the floodplain, and inhibit wildlife uses of this critical corridor. This option is not supported for this project.
- Segment 7 / MD 355 Alignment: This option is not supported due to impacts to the Historic District and Dowden's Ordinary Special Park as well as the potential natural resource impacts to Ridge Road Recreational Park, Little Seneca Greenway SVP and North Germantown Greenway SVP.
- Any impacts to Parkland would be subject to the Policy for Parks, which states that any approved non-park-use of parkland is must take every measure to avoid, then minimize impacts. Unavoidable impacts must be mitigated at an equal or greater natural, cultural and/or historical value.
- Any work that impacts Parkland is subject to approval of a Park Construction Permit prior to construction on Parkland.
- Once an Alternative is selected, Parks will provide additional detailed comment about suitable connections between BRT stops and Parks and the Park trail network.
- Reduce impacts to existing trees within the Limits of Disturbance and protect the critical root zones of adjacent trees.
- Provide supplemental and mitigation canopy tree planting along the BRT alignment. Where plantings are feasible, canopy tree spacing should be 35-feet on center but no less than 40-feet predicated on a minimum soil volume of 800-1,000.

- Stormwater Management proposed within the ROW and offsite must not be located where there are existing, healthy and beneficial trees and/or forest cover.
- Stream valley crossing impacts should minimized. Crossings must not reduce floodplain storage capacity. All crossings must support and not inhibit the crossing of all aquatic, amphibian, or mammalian wildlife species, and they must replicate the natural hydrology of the existing streams.

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July 15, 2019

The Honorable Nancy Navarro
Council President, Montgomery County Council
Council Office Building
100 Maryland Avenue, 6th Floor
Rockville, MD 20850

Dear Council President Navarro,

Thank you for allowing the City of Rockville to provide comments on the Planned Bus Rapid Transit (BRT) for the MD 355 corridor. We recognize and appreciate the significant effort of both the Maryland Department of Transportation (MDOT) and the Montgomery County Department of Transportation (MCDOT) that thus far have gone into this work. We offer our comments in order to help to transform the MD 355 corridor, and more importantly the portion within the City of Rockville, into an attractive, walkable and transit friendly corridor surrounded with numerous commercial, residential, and civic land uses and activities.

The Rockville Mayor and Council are pleased to support the proposed Alternative B, as the preferred option for the planned MD 355 BRT and urge the council to advance the project to the next phase to provide preliminary engineering funding in Fiscal Year 2020 for the MD 355 BRT project.

The Rockville Mayor and Council also encourage the County Council to allocate additional needed funds required for the implementation of the already selected BRT option for the MD 586 (Veirs Mill) corridor in the upcoming budget for FY 2020 and beyond.

The proposed Alternative B, or the two dedicated lanes located in the center of the existing roadway and separated from other travel lanes by a raised curb or median, conforms to the City's adopted Rockville Pike Neighborhood Plan. This alternative is also projected to provide the greatest transit benefit to the City residents and business. It should be noted that actual right of way lines for these alternatives are not available at this time. As the project moves forward and impacts to properties are mitigated to the maximum practicable extent, the City would support reducing Alternative B to one lane north of College Parkway, if the impact of two BRT lanes prove too impactive on those properties.

We urge you to direct the MCDOT to continue to work with the Mayor and Council to identify the best design and station locations that would achieve our mutual goals of reducing traffic and enhancing mobility options along this

important corridor and protecting our residents and business's quality of life by minimizing any potential impact.

Sincerely,

Bridget Donnell Newton, Mayor

Beryl L. Feinberg, Councilmember

Virginia D. Onley, Councilmember

Mark Pierzchala, Councilmember

Coalition for Smarter Growth
DC • MD • VA

July 12, 2019

Montgomery County Council
Council Office Building
100 Maryland Ave.
Rockville, MD 20850

Supplemental appropriation and amendment to FY20 Capital Budget and FY19-24 CIP - $3,000,000 for Bus Rapid Transit: MD 355 (Support), and
Supplemental appropriation and amendment to FY20 Capital Budget and FY19-24 CIP - $1,000,000 for Bus Rapid Transit: Veirs Mill Corridor (Support)

Testimony for July 16, 2019

Jane Lyons, Maryland Advocacy Manager

President Navarro and Councilmembers, thank you for the opportunity to speak today. I am here on behalf of the Coalition for Smarter Growth, the leading organization in the D.C. region advocating for walkable, inclusive, transit-oriented communities. We support a robust bus rapid transit system on MD 355 and in the Veirs Mill corridor.

For MD 355, we urge the Council to recommend Alternative B, dedicated median BRT lanes, and to incorporate Alternative C, dedicated curb BRT lanes, in the southernmost segment in Bethesda. Median bus lanes are the gold standard for BRT, producing the highest ridership, frequency, and reliability. These are the characteristics that will make BRT a choice mode for current transit riders and attract new riders.

Given the high ridership projections, economic development potential, and the long-standing support from community groups and business leaders, we believe that Segment 2 (White Flint/Twinbrook) should be included in the first construction phase, followed quickly by the segments north of Shady Grove. Prioritizing White Flint and Twinbrook will serve the most riders, as well as help spur anticipated investment and business development greatly needed by the county that will not occur without significant transit upgrades.

However, Alternative B does not offer dedicated BRT lanes south of Tuckerman Lane to the Bethesda Metro station (Segment 1). We prefer all-day dedicated curb lanes in both directions for this section but would accept the Alternative C recommendation for a peak direction only lane – as an initial phase. High-quality bus transit access to the job centers located along this corridor is critical. Any segment with dedicated curb lanes will require regular enforcement to ensure that cars do not use the lanes and slow down BRT service.

Regarding the alignment of northernmost segment through Clarksburg, we recommend the Snowden Farm Parkway alignment since it is the only option that does not require a road extension or widening, has the most potential for transit-oriented development, and is the only option that offers access to a grocery store.

In addition to favoring median BRT lanes, we strongly encourage and prefer the conversion of existing travel lanes to BRT to save time and right-of way-acquisition costs. We also concur with the Planning Board recommendation to initiate further service planning and network redesign for effective integration of BRT and local service. Effectively integrating BRT with local service will help to maximize ridership, accessibility, and affordability.

The county should also plan for improved bicycle and pedestrian infrastructure near BRT stations. Pending construction of the BRT, the county must continue to invest in streetscape enhancements, off-peak street

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parking, safer pedestrian crossings, and sidewalk and bikeway improvements along MD 355. These are urgent and necessary in order to meet mobility, Vision Zero, emission reduction, and economic development goals.

Finally, we strongly urge that preliminary engineering advance concurrently for both the entire Veirs Mill BRT project and MD 355 BRT. The Veirs Mill corridor has the highest ridership of any bus route in the state of Maryland, and current transit service does not meet the high demand. There is an equity and social mobility issue at stake – nearly 10 percent of the corridor lives below the poverty line, 22 percent do not speak English proficiently, and half of households have one or fewer cars. Veirs Mill BRT is an important step towards bridging the east-west economic divide, and should not be delayed any longer.

In fact, given the urgency to change course and fight climate change, the county and state should place both the entire 355 and Veirs Mill BRT projects on a fast track.

Thank you for your time.

Orlin, Glenn

From: Downie, Brian <Brian.Downie@bfsaulco.com>
Sent: Tuesday, July 16, 2019 3:25 PM
To: Navarro's Office, Councilmember; Katz's Office, Councilmember; Albornoz's Office, Councilmember; Friedson's Office, Councilmember; Glass's Office, Councilmember; Hucker's Office, Councilmember; Jawando's Office, Councilmember; Riemer's Office, Councilmember; Rice's Office, Councilmember
Cc: Orlin, Glenn; Roshdieh, Al; Conklin, Joana; Pitts, Corey; Stuart Miller; Jay Brinson (jbrinson@federalrealty.com); Eddie Meder; Amy Ginsburg (amy.ginsburg@whiteflint.org)
Subject: Public Hearing - July 16, 2019 Agenda (Item #11) - Supplemental Appropriation and Authorization, $3,000,000 for Bus Rapid Transit: MD 355

[EXTERNAL EMAIL]

Dear Council President Navarro and Councilmembers:

The White Flint Partnership respectfully submits this written testimony in connection with this evening's public hearing on a proposed Supplemental Appropriation of $3,000,000 to initiate preliminary engineering of the MD 355 BRT. The Partnership has reviewed MCDOT's MD 355 Corridor Report in the packet. We very much appreciate MCDOT's extensive efforts in evaluating detailed alternatives for enhanced transit service between Bethesda and Clarksburg.

For the MD 355 BRT, the Partnership strongly urges the Council to adopt an alternative that would implement the two-lane median transitway through the White Flint/Pike District area. MCDOT's report includes two alternatives, Alternative B and Alternative B Modified, that would implement this two-lane median transitway, so the Partnership supports both Alternative B and Alternative B Modified.

In addition, the Partnership fully supports the request Supplemental Appropriation of $3,000,000 to begin preliminary engineering. MD 355 BRT is a very large undertaking. Now that the alternatives have been identified, it's extremely important that the project advance right away to preliminary engineering (and not be placed on the shelf).

The Partnership continues its efforts to implement the vision of the White Flint and White Flint 2 Sector Plans. The two-lane median transitway is an essential component of that vision for transforming Rockville Pike. Indeed, the White Flint Special Tax District was agreed upon and structured with the clear understanding that this two-lane median transitway would be built. We very much appreciate the County's support for all of the private sector's efforts to date in the White Flint/Pike District area, and we respectfully request Council's continued support as set forth above.

Thank you very much for your consideration.

White Flint Partnership

Brian Downie
Senior Vice President, Development
Saul Centers, Inc.
7501 Wisconsin Avenue, Suite 1500E | Bethesda, MD 20814
Phone: 301.986.6122
Brian.Downie@bfsaulco.com | www.saulcenters.com

Saul Centers

76

Friends of White Flint

3

County Council Testimony on BRT on Route 355

July 16, 2019

I'm speaking on behalf of Friends of White Flint, a nonprofit organization composed of residents, businesses, and property owners, all dedicated to turning the White Flint/Pike District area into a walkable, transit-oriented, vibrant community.

First, we strongly urge the Council to appropriate the money that would allow MCDOT to move forward with the design of BRT. BRT on Route 355 is essential to fulfilling the promise of the White Flint Sector Plan. As a county, we have talked about Route 355 BRT for a decade, and it is time for action and implementation.

Second, we strongly advocate that you choose Alternative B, which is BRT in the median, wherever possible, including in the White Flint segment.

Third, the White Flint section has the highest levels of projected ridership and broad-based community support. This segment should absolutely be built first – so many site plans, residents, and businesses are counting on it. Only construction of the White Flint segment will do more than increase the numbers and comfort of riders; building median BRT on the southern portion of Route 355 will spur tremendous economic development, development that is unlikely to happen without the long-promised BRT system, development the county very much needs.

Fourth, BRT by itself is not enough. BRT is a critical tool, but it is only part of the solution. BRT must be part of a revitalized Route 355, turning it into a grand boulevard featuring broad sidewalks, separated bike lanes, and trees.

Finally, first and last mile access must go hand-in-hand with funding, designing, and building bus rapid transit. The county cannot simply build BRT and hope they will come; construction of easy-to-use, safe pedestrian paths and bikeways in the neighborhoods that abut Route 355 must be a formal part of this project from the start.

Together, Bus Rapid Transit, First and Last Mile Access, and a Rockville Pike Grand Boulevard can transform the White Flint/Pike District area, and we urge the Council to move forward with this appropriation so we can encourage redevelopment, offer residents a viable and dynamic transit option, and inspire businesses to locate in the Pike District.

(77)

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SIERRA CLUB
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Montgomery County Group

Testimony on Route 355 Bus Rapid Transit
Delivered by Dave Sears, Chair, MoCo Sierra Club group
Delivered to Montgomery County Council
July 16, 2019

Good evening President Navarro and Council members!

I am here to speak in support of funding the full $3 million in the CIP to enable the expeditious design and implementation of BRT on Route 355.

I am also here to remind you that the important middle name here is RAPID. To assure that we are not deceiving riders, we must build BRT in dedicated lanes, so that the buses can be truly rapid.

Let me explain the Sierra Club's rationale for our strong support of BRT on 355, as well as on Veirs Mill and Route 29 – and on several other major roads throughout the county.

Sierra Club's highest priority is addressing climate change – and reducing Greenhouse Gas emissions.

In this county, transportation is the number two contributor to GHG emissions.

In spite of what you might have heard from Gov Hogan, the way forward is NOT to build more lanes for cars. Rather, to address climate change – and to address traffic congestion -- we need to work hard to give residents and workers more and better opportunities to get where they want and need to go without getting in the car and driving. Given human nature, folks are not going to get out of their cars unless we can provide other options to get places in a safe, efficient, and comfortable manner. A comprehensive approach will upgrade our county (and regional) transportation system in terms of transit, bicycling, and walking.

BRT can – and should – be part of the equation.

A few minutes ago you heard my colleague Tina Slater (who is our Transportation Chair) urging you to move forward quickly with BRT on Veirs Mill Rd.

Likewise, it is critical to also provide the $3 million in CIP funding for BRT on Route 355. We need to move on the design and implementation of both these routes simultaneously.

And let me remind you that evidence from across the country and around the world concludes clearly that if BRT is going to be successful, it needs to be RAPID. And to be rapid, the buses cannot run in mixed traffic. BRT MUST run in dedicated lanes. Therefore, as you choose among the several design options for BRT on 355, we urge you to mix and match the options to enable the fastest possible speed for the buses. In brief, this means dedicated median lanes for the most part, with some reliance on dedicated curb lanes.

One quick last word on the importance of dedicated lanes – Bogota Colombia is generally recognized as home to the world's most successful BRT. In Bogota, their guiding principle is "the only way we can guarantee the rapid movement of our riders is by moving them in dedicated lanes."

BRT is not (of course) a stand-alone entity, but is part of an improving county-wide transportation system. Thus, BRT's interface with other elements of the full system must be as seamless as possible, in order to maximize convenience for its riders. Many BRT riders will want to arrive at a BRT station via Metrobus, Ride-on buses, or walking or biking; let's be sure the design of 355 BRT (and all other BRT routes) enables riders to quickly and safely switch to (or from) the BRT.

In sum, pls fully fund the $3 million for BRT on 355. And be sure that BRT runs in dedicated lanes so that it is truly rapid -- and will therefore be an attractive option for many current automobile drivers.

A first rate BRT will be a two-fer – enabling us to address climate change AND increase our quality of life -- by giving our residents and workers more options beyond the current "stuck in traffic" option!

[Contact – Dave Sears at davidwsears@aol.com]

Testimony of Peter Katz on the Supplemental Appropriation & Amendment to FY20 Capital & FY19-24 CIP, $3,000000 for Bus Rapid Transit (BRT) MD 355

July 16, 2019

(Due to a schedule conflict, I'm unable to attend tonight's hearing; Had I been able to attend, these would have been my spoken remarks.)

My name is Peter Katz; I'm here today representing myself; by way of credentials I am...

- A member of the 355 BRT CAC (Citizen's Advisory Committee)
- CEO of a newly-formed nonprofit in the transportation space called GoTRANS (website is not yet up and running)

In the past, I was:

- Founding director of the Congress for the New Urbanism https://www.cnu.org/, a nearly 30-year old organization advocating for better community planning;
- Author of *The New Urbanism*, McGraw-Hill https://books.google.com/books/about/The_New_Urbanism_Toward_an_Architecture.html?id=NbOtNFc5Y90C published in 1993; still in print;
- Worked as a municipal planner in 3 diverse US municipalities (CA, FL and VA); in Sarasota, FL., from 2008-2011, I was head planner with responsibility for the County's proposed BRT system (US DOT Small Starts program)

Opening Statement:

I believe that Montgomery County deserves a world-class BRT system on 355 that will get high ridership due to its fast, efficient service.

Unfortunately, based on my understanding of what's been proposed, that's not what we're going to get here in MoCo; I fear the county is going to spend a lot of money on a

glorified, snazzily branded bus system, with a few superficial features that's BRT in name only, because *it will be too slow and inefficient* to attract riders who now rely primarily on their private cars for daily travel.

Specifically, my issue is that staff and consultants have been thinking about the BRT as a light-rail line that happens to be on rubber tires. They see the line as a discrete corridor where every connection to a local bus line is an intermodal connection; Such a connection is where you get off the local bus, go through a fare gate or turnstile into the station, pay a new fare or use a transfer, then wait until the vehicle comes and board it. In many situations, you have just missed the vehicle because it's difficult for drivers to time connections with vehicles they can't see. The research shows that, when forced to make intermodal connections, riders are 40% less likely to continue their journey.

The alternative to the approach that Montgomery County is taking, and what I recommned, is also the approach that's considered to be the state-of-the-art globally. It's called "network planning" for BRT, or the "thick pipe" approach. In that approach, a majority of connections to and between local buses are seamless! This publication from the US Department of Transportation describes the approach in detail: https://nbrti.org/wp-content/uploads/2017/05/BRT-Network-Planning-Study-Final-Report.pdf

Let me set a little context for the points I'm about to make:

- The two biggest BRT systems in the US carry just 10K (Eugene) and 15K (Cleveland) passengers per day. Those are the systems that we were asked to study when we first were briefed to serve on the Committee.

- The biggest BRT system in the world, in Bogota, carries 2.2 million people per day. Think about that difference; The largest system in the US is less than 7% of the size of Bogota's system, in terms of passengers carried. Many systems in Asia and Latin America carry between 1 and 2 million passengers per day.

- The Bogota system was opened in 2000, so it's less than 20 years old. The design concepts that underlie BRT were developed very recently; New techniques for

speeding up BRT are being introduced every year. Here in the US, with such tiny systems, we're scrambling to catch up to the rest of the world.

Communities in the US often choose BRT because it's a low-cost alternative to light rail, but that thinking fails to consider many of BRT's great benefits; I'm referring mostly to BRT's ability to run in areas that are a random patchwork of low- and high-density—exactly what we have here in Montgomery County.

As I said before, there is a lot of learning taking place internationally. One of the big "aha moments" was in Brisbane, Australia, a first-world city like many in the US; Actually Brisbane looks much like San Diego, a fairly low density city.

Designers of the Brisbane BRT, initially conceived of their system, too, as a standalone corridor, and in so doing, were struggling to figure out how to quickly unload a 60-person local bus and get passengers onto a BRT vehicle just as quickly. Nothing seemed to work until they stumbled on the idea of taking that fully loaded bus and just putting the whole thing into the "BRT pipe." That was a breakthrough. As a result, planners there changed their approach to bring many of the local buses into the pipe where they could run express for a few stops, and then pop out of the pipe and run local again. Transfers happen seamlessly, across a platform, or from your bus to the one in front or behind you on the platform. It's easy for drivers to time connections because they can see the other buses as they approach the station.

Today, the Brisbane BRT is one of the most successful anywhere in the world; You can get across the region far faster on their BRT system than by car; as a result, it's getting ridership that's off the charts.

When you look at the support materials provided to you for this meeting, you'll see no visuals showing an existing Metro or Ride-On bus line. It's as if they don't exist. All the focus is on cutting a minute or two from a segment by using a median vs. curb running approach within the corridor; this seems crazy to me when there's a far greater opportunity for time savings with by looking at the service plan; by that I mean, how the BRT connects with local bus lines.

(82)

In the US, most consultants look at service planning AFTER they make infrastructure decisions like the ones your being asked to make tonight. Internationally, consultants do the opposite, looking first at service planning.

We are fortunate, however, to have a service plan for this very corridor, done back in 2012, that looked at exactly the approach I'm advocating. This 2012 report by a highly respect group called ITDP, paid for by The Rockefeller Foundation, http://www.scale-it-back.com/files/ITDP_-_MCDOT_Demand_and_Service_Planning_Report.pdf looks in detail at the 25+ local bus lines that cross 355 and consider three alternative service plans. Their preferred plan (A) with seamless connections cuts a full third more time off another plan (B) with intermodal connections. The latter seems close to what county staff is currently proposing for the 355 BRT.

Closing Statement:

I urge decisionmakers to focus on service planning before deciding on the infrastructure questions that are before us. The county should do an update to the 2012 ITDP plan at an estimated cost of $10-30,000 and use that valuable information to refine its approach BEFORE making the decisions you're being asked to make tonight!

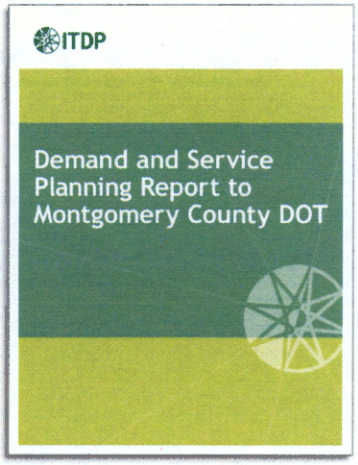
Three minutes gives me little time to cover the many advantages of the approach I'm suggesting. I've provided links to two reports by international BRT experts, both are described at a bit more length on the final page of this document:

- The previously mentioned ITDP study
- Another from US DOT that looks at the lessons of the Brisbane system.

Both of the above relate to the specific issues I'm raising and both staff and decision-makers would do well to study them.

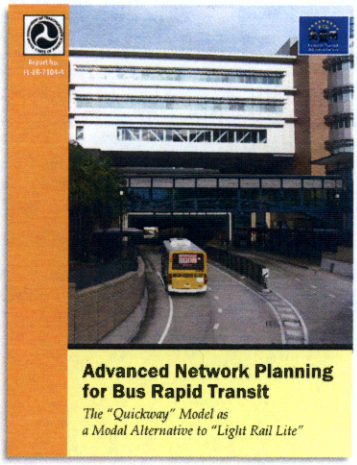
Thank you for your time, and I am available if you have questions (contact info on next page).

(83)



http://www.scale-it-back.com/files/ITDP_-_MCDOT_Demand_and_Service_Planning_Report.pdf

ITDP Demand and Service Planning Study for Montgomery County
December 2012
58 pages



https://nbrti.org/wp-content/uploads/2017/05/BRT-Network-Planning-Study-Final-Report.pdf

Advanced Network Planning for Bus Rapid Transit: The "Quickway" Model as a Modal Alternative to "Light Rail Lite" February 2008
116 pages

Peter Katz, Consultant
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Kensington, MD 20895
202.486.7160
Katzoid@Earthlink.net

Contact P. Katz by e-mail to provide PDF files upon request

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LWV LEAGUE OF WOMEN VOTERS®

July 15, 2019

Montgomery County Council

In re: Public Testimony July 16, 2019 hearing - Supplemental appropriation and amendment to FY20 Capital Budget and FY19-24 CIP-$3,000,000 for Bus Rapid Transit: MD 35 and amendment to FY20 Capital Budget and FY19-24 CIP-$1,000,000 for Bus Rapid Transit: Veirs Mill Corridor

LWVMC position: Support
The League of Women Voters of Montgomery County (LWVMC) supports the inclusion of more mobility and reliability on both Hwy 355 and Veirs Mill Road as part of the Bus Rapid Transit (BRT) system.

Here are some questions that residents should be asking:

- What kind of BRT system will people want to ride?
  - One that will be the fastest and most convenient.
- Will the county provide more information to make decisions about the BRT system?
  - Yes. There are still unknowns about the Route 355 and Veirs Mill Road corridor.
- Are there more areas where a dedicated lane can be implemented?
  - We don't know for sure, but dedicated lanes mean faster travel and should be implemented.
- Could BRT on Route 355 and Veirs Mill Road be more efficient with more dedicated lanes?
  - Research points to dedicated lanes for both numbers of riders and speed of travel. We support transit with dedicated lanes when possible.
- Could median busways be implemented in any areas?
  - It's a consideration. Are MDOT, County Council and the County Executive considering? Let's get the most ridership and the fastest speed. Lanes in the middle or lanes by sidewalks may both be utilized.
- Has the public been involved in developing both BRT systems?
  - Yes -- and more public meetings will be scheduled

Obviously, there are still some questions to be answered. Consequently, LWVMC supports a transparent and open process for planned BRT with emphasis on dedicated lanes of travel. Funds may be part of the plan to help answer questions that have not been fully investigated. More information will help the county to make the most informed decisions possible for this BRT corridor. We support improved mobility for the county through transit.

Sincerely,

Kathy McGuire and Diane Hibino, presidents

(85)

League of Women Voters of Montgomery County, Maryland, Inc., 12216 Parklawn Dr., Suite 105, Rockville, MD 20852
Tel.: 301-984-9585 * Fax: 301-984-9586 * Email: lwvmc@erols.com * Web: lwvmocomd.org

Montgomery County Council Public Hearing:
Supplemental Appropriation & Amendment
to FY20 Capital & FY19-24 CIP
for Bus Rapid Transit (BRT) MD 355
July 16, 2019

The TAME Coalition is united in our support for funding and building Bus Rapid Transit on State Route 355. TAME has advocated for BRT as one of several transit alternatives to Mid-County Highway Extended (known as M-83). We are very hopeful for this project to be funded in the upcounty to help in relieving traffic congestion for our communities.

Four years ago, MCDOT presented a transit-alternative Supplimental Report to their earlier Mid-County Study Report. The TAME Coalition continues to support MCDOT's Scenario #1 of their Supplimental Report - building BRT on 355 combined with intersection improvements. This scenario meets the Purpose/ Need of the MCS; and, it meets LEDPA (Least Environmentally Damaging Practicable Alternative), which requires addressing environmental justice for minority populations and low-income populations in the study area (EO12898).

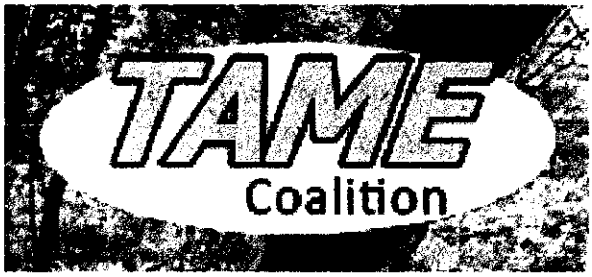
Funding and Building BRT on 355 will:

- Accomodate planned land use and future growth in area master plans for Clarksburg, Germantown, Gaithersburg and Montgomery Village
- Provide upgraded traffic signalization in coordination with the County's Bicycle and Pedestrian Master Plan
- Reduce strains on daily commutes by giving more transit alternatives to the residents

- have Focal Point be on Level of Service (LOS) addressing the number of PEOPLE moved vs. the number of VEHICLES moved
- address the Climate Emergency which we are living in - Imagine how we might respond if we considered climate change a true emergency, as serious as the Great Depression or World War II, or global warming. What might we do? Would we place a moratorium on all new road construction, including roads like M-83 that don't even exist which would take down high bio-dense forests? Would we require all new building construction be zero-net energy design before issuing building permits? We are all inclined to think that climate change is not all that serious, that it won't affect us in our lifetime. My daughter and her friends think differently. They have made a pact to not birth children until they know that change will secure their existence. Montgomery County needs to step up to the plate and commit to funding and building BRT as aiding in reversing climate change. We need to have BRT be the model which shows others we are serious in reversing climate change.

Respectfully submitted,

Margaret Schoap
The Coalition for Transit Alternative to Mid-County Highway Extended (TAME)
www.tamecoalition.org
tamecoalition@gmail.com



TYPE TO ENTER A CAPTION.

Testimony on BRT by Gerald Ehrenstein on behalf of MC-FACS

I am testifying on behalf of the Montgomery County Faith Alliance for Climate Solutions (MC-FACS). Our group is currently composed of about 40 congregations representing, in alphabetical order, Buddhist, Catholic, Hindu, Humanist, Islamic, Jewish, Protestant, Sikh, Society of Friends, and Unitarian Universalist traditions. What brings us together is our love for the Earth and its people and our awareness that there is a climate crisis, and that it is our moral obligation to future generations to act to minimize the damage that climate change causes.

The most direct approach is to minimize the emission of greenhouse gases. There are many ways to do this, but tonight I want to focus on the specific plans for BRT on the Route 355 and Veirs Mill Corridors. There is a very significant reduction in greenhouse gases when an individual uses public transit rather than a passenger car. A study by SAIC concluded that reducing the daily single-occupant car use with public transit can reduce a household's overall carbon footprint between 25-30%. The cost-benefit for BRT is especially favorable.

In considering whether to proceed with BRT, it is prudent to consider the big picture. What are the pluses and minuses of BRT other than its impact on climate change?

In our view, there are several important additional pluses. Taking cars off the road also will reduce air pollution and will reduce traffic congestion. These are both particularly important in a metropolitan area that is experiencing significant population growth. Reducing traffic congestion will not only save time, but will reduce the amount of idling, thus resulting in further fuel savings and consequent further reduction in greenhouse gas emissions.

MC-FACS is also concerned with another moral issue - the significant income inequality in our country that continues to get worse. There are many reasons for this, but one reason is that poor people often do not have adequate transportation to take advantage of opportunities for better jobs. We need more and better public transportation, and BRT is an effective way to provide it.

The only minus that we are aware of is the cost. However, considering the many pluses of BRT, the cost-benefit is extremely favorable.

In summary, BRT addresses several of our County's most serious problems. It can reduce greenhouse gas emission, reduce air pollution, reduce traffic congestion, and also promote economic advancement. It is a very good investment.

1) PH 7-16-19
BRT - VEIRS MILL

2) PH 7-16-19
BRT - RT 355

7/9/2019

NAN
CC
CO

Stuart Simon
4833 Chevy Chase Dr
Chevy Chase, 20815

To Hans Riemer,

Dear Councilman,

I understand there is an upcoming hearing & vote on expanding BRT to Rte. 355 & Veirs Mill corridors. I urge to support the implementation, and not just the planning, for this much needed planned expansion as soon as possible.

Given the concensus over reducing climate greenhouse gas emissions, improving air quality and addressing social equity in the transport sector this is an ideal triple play.

Stu Simon

Co-Chair
Adat Shalom Climate Action
stucpic@gmail.com

AMNESTY INTERNATIONAL
Stu Simon
4833 Chevy Chase Dr
Chevy Chase, MD 20815

PH 7-16-19
BRT - VEIRS MILL

NAM
CC
CO

July 9, 2019

Dear Councilmember Riemer,

I am writing in support of the Bus Rapid Transit (BRT) plan for Wisconsin Avenue and Veirs Mill Road. As a frequent commuter along Wisconsin Ave, I see the congestion firsthand caused by a gap in public transit, and BRT would significantly alleviate the overcrowding of our main roads. It would also lead to improved air quality, and fewer emissions especially if we use electric buses. I urge you to support rapid implementation of BRT lines and allocate sufficient funding to ensure their success.

Thank you for your time and attention!

Best,

Rachel Dick
301-204-2391, rachel.m.dick@me.com
5126 Worthington Drive, Bethesda, MD 20816

(10)

1) PH 7-16-19
BRT - VEIRS MILL

2) PH 7-16-19
BRT - RT 355

7/9/19

MAN
cc
CO

Dear Councilmember Riemer:

I write in strong support of hasty implementation of BRT on Wisconsin Ave/ Rockville Pike and Veirs Mill Rd. BRT will lessen congestion, decrease air pollution, ~~[redacted]~~ decrease emissions of carbon dioxide, ~~[redacted]~~ and improve transportation options of your Montgomery constituents. I urge that you work to soon implement these two proposed BRT routes.

My best regards,
Kenneth Cantor
Silver Spring, MD

Kenneth Cantor
708 Bonifant St.
Silver Spring, MD
20910

Alternative	AM	PM
Alternative C	3.6	3.6

3.5 BRT Travel Times Compared to Local Bus Travel Times

Tables 3-4 through 3-7 lay out data comparing BRT travel times to local bus travel times by time of day, direction and alignment segment. Conclusions for each Direction/Time of Day table follow each Table.

Prior to the discussion of travel time findings, it is important to reiterate the point made in **Section 3.2** regarding non-recurring congestion relative to the travel time comparisons between BRT and local bus in this section as well as the comparisons between BRT and auto travel times in **Section 3.6**. The data presented in the tables is for "normal" conditions and does not account for potential non-recurring incidents that can impact traffic operations on a one-time basis. As noted in **Section 3.2**, the dedicated transit lanes separated from general traffic under Alternative B has the greatest potential to mitigate the impacts of these non-recurring incidents.

Table 3-4: BRT Travel Times Compared to Local Bus Travel Times - AM Peak Southbound, Peak Direction

			No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Local Bus	RO Extra	Local Bus	RO Extra	Local Bus	BRT	Local Bus	BRT	Local Bus	BRT
7-6	Ridge Road	Watkins Mill Road	---	---	---	15.3	-	21.0	-	15.8	-	15.2
6-5	Watkins Mill Road	Chestnut Street	---	---	---	11.9	14.4	13.2	16.1	13.3	14.5	12.9
5-4	Chestnut Street	Shady Grove Road	9.9	13.5	13.3	10.5	12.9	9.6	13.8	7.1	11.7	7.1
4-3	Shady Grove Road	Washington Street	18.8	23.0	14.3	15.5	21.5	15.9	23.6	12.7	15.4	12.5
3-2	Washington Street	Twinbrook Parkway	20.0	17.0	21.2	15.2	21.5	15.5	24.0	12.4	18.2	11.5
2-1	Twinbrook Parkway	Cedar Lane	17.2	16.2	19.6	19.5	20.1	17.0	20.9	15.6	18.7	14.4

The data in **Table 3-4** show that BRT travel times would be lower than local bus travel times in each BRT alternative and would also be lower when compared to the No-Build Alternative local bus travel times. In addition, BRT would have lower travel times than Ride On extRa under the No-Build Alternative and TSM Alternatives in all but a few instances. This data shows that BRT meets the goal of providing a travel time premium relative to local bus as well as Ride On extRa service.

It should also be noted that in most instances local bus travel times under BRT Alternatives A and B would increase relative to local bus travel times under the No-Build Alternative. This increase in travel time under Alternative A is likely the result of more transit vehicles running in the curb lane under mixed traffic operations, thus impacting local bus operations. Under Alternative B, the increase in local bus travel times is most likely the result of the impacts of BRT priority on general traffic operations, which

also impact local buses running in mixed traffic. In the case of Alternative C, local bus travel times would actually decrease relative to the No-Build Alternative, most likely as a result of the dedicated transit lane provided in Alternative C, which benefits local bus in addition to BRT.

Table 3-5: BRT Travel Times Compared to Local Bus Travel Times - AM Peak Northbound, Off-Peak Direction

			No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Local Bus	RO Extra	Local Bus	RO Extra	Local Bus	BRT	Local Bus	BRT	Local Bus	BRT
1-2	Cedar Lane	Twinbrook Parkway	20.5	16.7	7.6	4.7	8.5	5.0	8.1	4.9	13.0	7.0
2-3	Twinbrook Parkway	Washington Street	14.9	12.3	21.2	17.4	20.6	13.5	23.2	16.3	19.7	13.5
3-4	Washington Street	Shady Grove Road	17.4	25.3	10.1	10.5	17.7	10.6	18.2	10.3	18.0	10.8
4-5	Shady Grove Road	Chestnut Street	9.5	5.4	14.4	18.3	15.0	14.2	13.5	12.4	13.7	17.0
5-6	Chestnut Street	Watkins Mill Road	---	---	9.3	5.5	10.6	5.5	12.6	6.1	10.7	5.5
6-7	Watkins Mill Road	Ridge Road	---	---	---	13.1	12.5	13.9	12.3	14.8	12.5	13.2

The same patterns seen in the AM peak southbound direction generally hold true for the AM peak northbound direction. Specifically, BRT travel times would generally be less than local bus travel times in each BRT alternative and are also less than No-Build Alternative local bus travel times. In addition, local bus travel times under the BRT alternatives would generally increase relative to No-Build Alternative local bus travel times.

Table 3-6: BRT Travel Times Compared to Local Bus Travel Times - PM Peak Northbound, Peak Direction

			No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Local Bus	RO Extra	Local Bus	RO Extra	Local Bus	BRT	Local Bus	BRT	Local Bus	BRT
1-2	Cedar Lane	Twinbrook Parkway	6.9	---	6.8	6.3	9.2	6.5	9.4	7.3	7.3	6.0
2-3	Twinbrook Parkway	Washington Street	30.4	24.9	30.1	25.0	29.1	24.2	32.3	18.9	26.1	22.0
3-4	Washington Street	Shady Grove Road	21.1	19.2	17.8	17.4	18.8	13.7	23.1	14.4	18.5	12.0
4-5	Shady Grove Road	Chestnut Street	15.1	18.6	14.5	14.2	16.1	13.5	18.8	12.6	15.7	16.0
5-6	Chestnut Street	Watkins Mill Road	10.4	6.3	10.3	6.6	11.6	6.8	12.9	6.5	12.0	6.8
6-7	Watkins Mill Road	Ridge Road	---	---	---	16.6	13.1	17.7	13.2	17.3	13.1	15.7

The same general patterns apparent in the AM peak as shown in **Tables 3-4 and 3-5** are also present in the PM peak northbound direction.

Table 3-7: BRT Travel Times Compared to Local Bus Travel Times - PM Peak Southbound, Off-Peak Direction

			No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Local Bus	RO Extra	Local Bus	RO Extra	Local Bus	BRT	Local Bus	BRT	Local Bus	BRT
7-6	Ridge Road	Watkins Mill Road	---	---	---	12.2	-	19.1	-	16.4	-	11.7
6-5	Watkins Mill Road	Chestnut Street	---	---	---	12.2	18.2	13.0	13.9	12.4	18.4	12.6
5-4	Chestnut Street	Shady Grove Road	10.6	5.6	10.6	7.1	11.4	7.2	10.9	6.9	11.2	7.1
4-3	Shady Grove Road	Washington Street	10.6	15.0	11.7	15.1	19.3	16.2	28.5	13.6	16.3	11.4
3-2	Washington Street	Twinbrook Parkway	18.2	16.1	18.2	13.2	19.3	12.8	23.4	9.3	18.8	11.0
2-1	Twinbrook Parkway	Cedar Lane	21.0	16.5	20.6	15.8	21.9	16.2	21.6	15.7	19.9	14.3

The data in **Table 3-7** for the PM southbound direction follow the same general patterns as is present during other parts of the day and in different directions as highlighted in **Tables 3-4, 3-5, and 3-6**.

3.6 BRT Travel Times Compared to Automobile Travel Times

Tables 3-8 through 3-11 lay out data comparing BRT travel times to automobile travel times by time of day, direction and alignment segment. Conclusions for each Direction/Time of Day table follow each Table.

Table 3-8: BRT Travel Times Compared to Auto Travel Times - AM Peak Southbound, Peak Direction

			No-Build Alternative	TSM Alternative	Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Automobile	Automobile	Auto	BRT	Auto	BRT	Auto	BRT
7-6	Ridge Road	Watkins Mill Road	11.4	12.0	12.5	21.0	16.2	15.8	13.4	15.2
6-5	Watkins Mill Road	Chestnut Street	3.7	3.7	3.8	13.2	4.5	13.3	4.0	12.9
5-4	Chestnut Street	Shady Grove Road	8.5	8.3	6.9	9.6	8.0	7.1	6.7	7.1
4-3	Shady Grove Road	Washington Street	11.6	11.9	10.2	15.9	12.6	12.7	11.3	12.5
3-2	Washington Street	Twinbrook Parkway	10.5	11.6	11.7	15.5	13.8	12.4	12.1	11.5
2-1	Twinbrook Parkway	Cedar Lane	12.8	15.5	12.9	17.0	15.2	15.6	11.7	14.4

Two general patterns are present in the auto versus BRT travel time data displayed in **Table 3-8**. The first is that in most instances BRT travel times are higher than auto travel time, meaning that even with priority treatments, the auto would still provide a more time-competitive trip than BRT. The smallest difference between auto and BRT travel times would occur under Alternative B, which makes sense given that Alternative B provides the highest level of transit separation from traffic delays/incidents. It is important to note that the times shows in **Tables 3-8 through 3-11** are modeled results and do not account for non-recurring congestion and corridor variability. During these events the corridor travel times would be more impacted for autos, the TSM Alternative, Alternative A, and Alternative C compared to Alternative B.

The second general trend is that auto travel times would increase under the BRT alternatives relative to the No-Build Alternative. This increase reflects the fact that the priority treatments installed as part of the BRT alternatives would have negative impacts on corridor traffic operations. The greatest impact to auto travel times would occur under Alternative B.

Table 3-9: BRT Travel Times Compared to Auto Travel Times - AM Peak Northbound, Off-Peak Direction

			No-Build Alternative	TSM Alternative	Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Automobile	Automobile	Auto	BRT	Auto	BRT	Auto	BRT
1-2	Cedar Lane	Twinbrook Parkway	12.5	12.5	12.4	13.5	12.4	16.3	12.8	13.5
2-3	Twinbrook Parkway	Washington Street	8.2	8.0	8.1	10.6	8.7	10.3	8.6	10.8
3-4	Washington Street	Shady Grove Road	7.6	7.7	7.7	14.2	7.4	12.4	7.6	17.0
4-5	Shady Grove Road	Chestnut Street	3.9	4.2	4.0	5.5	4.3	6.1	4.0	5.5
5-6	Chestnut Street	Watkins Mill Road	4.3	4.5	4.5	13.9	4.5	14.8	4.5	13.2
6-7	Watkins Mill Road	Ridge Road	7.1	7.2	7.0	20.8	7.5	17.9	7.5	9.5

The same general trends displayed in **Table 3-9** for the AM peak southbound direction also occur in the AM peak northbound direction, though the increase in auto travel times under the BRT alternatives compared to the No-Build Alternative is not as pronounced in the off-peak direction.

Table 3-10: BRT Travel Times Compared to Auto Travel Times - PM Peak Northbound, Peak Direction

			No-Build Alternative	TSM Alternative	Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Automobile	Automobile	Auto	BRT	Auto	BRT	Auto	BRT
1-2	Cedar Lane	Twinbrook Parkway	21.3	21.0	21.7	24.2	24.0	18.9	23.2	22.0
2-3	Twinbrook Parkway	Washington Street	15.2	14.7	10.4	13.7	15.4	14.4	15.8	12.0

			No-Build Alternative	TSM Alternative	Alternative A		Alternative B		Alternative C	
3-4	Washington Street	Shady Grove Road	10.6	10.4	9.1	13.5	12.9	12.6	8.8	16.0
4-5	Shady Grove Road	Chestnut Street	5.0	5.1	5.1	6.8	6.0	6.5	5.0	6.8
5-6	Chestnut Street	Watkins Mill Road	7.8	8.3	8.3	17.7	8.0	17.3	10.6	15.7
6-7	Watkins Mill Road	Ridge Road	9.1	8.7	9.0	22.0	8.3	15.9	10.9	13.0

The same patterns occur in the PM northbound direction as in both directions in the AM peak. One exception is at the southern end of the alignment in Alternatives B and C, where BRT travel times would be lower than auto travel times. The lower BRT travel times in this portion of the alignment are likely due to the benefit to BRT of dedicated guideway while autos are in heavily congested mixed traffic.

Table 3-11: BRT Travel Times Compared to Auto Travel Times - PM Peak Southbound, Off-Peak Direction

			No-Build Alternative	TSM Alternative	Alternative A		Alternative B		Alternative C	
Segment	Segment Mid-Points		Automobile	Automobile	Auto	BRT	Auto	BRT	Auto	BRT
7-6	Ridge Road	Watkins Mill Road	9.5	9.4	9.2	19.1	10.0	16.4	8.9	11.7
6-5	Watkins Mill Road	Chestnut Street	5.1	5.2	5.1	13.0	4.8	12.4	4.9	12.6
5-4	Chestnut Street	Shady Grove Road	5.0	5.1	5.2	7.2	5.2	6.9	5.2	7.1
4-3	Shady Grove Road	Washington Street	6.5	6.5	6.9	16.2	8.4	13.6	6.8	11.4
3-2	Washington Street	Twinbrook Parkway	10.3	10.4	10.6	12.8	11.5	9.3	12.8	11.0
2-1	Twinbrook Parkway	Cedar Lane	15.0	14.4	15.3	16.2	15.3	15.7	17.6	14.3

The same general patterns seen in the previous tables are also present for the data displayed in **Table 3-11**, specifically BRT travel times that would be generally higher than auto travel times and an increase in auto travel times in the BRT alternatives when compared to the No-Build Alternative. The pattern of lower BRT travel times at the southern end of the alignment under Alternative B and C that occurred in the PM northbound direction also occurs here in the PM off-peak direction. The reasons for this, as described for the PM northbound direction, also apply here.

3.7 Intersection Level of Service

This section outlines intersection Level of Service and delay under the No-Build Alternative, TSM Alternative, and BRT alternatives, and is another way of assessing the impact of providing BRT priority on general traffic operations.

Two sets of data are presented. The first is Level of Service (LOS) and delay for the AM peak period for each of the signalized intersections along the MD 355, Observation Drive, and Snowden Farm Parkway alignments. This is provided in **Table 3-12**. The second set of data, provided in **Table 3-13**, is comparable data for the PM peak period.

The key findings from the data presented in **Table 3-12** (AM peak) are as follows:

- In most instances an intersection operating at LOS of E or F in the AM peak under the BRT alternatives would also operate at LOS E or F in the No-Build Alternative.
    - However, there are four instances where the Build Alternative would result in an intersection falling to LOS E or F from a non-failing intersection in the No-Build. Three of these intersections occur under Alternative B. The first, **Tuckerman Lane,** occurs because there is a transition into, or out of, a median dedicated lane, thus requiring the addition of a transit-only signal phase to the signal cycle, thus impacting general traffic operations. The decline at the other two intersections, **Professional Drive and Spectrum Avenue,** is the result of a change at Watkins Mill Road, which is south of these two intersections. Specifically, the northbound left turn at Watkins Mill is protected-permissive in the No-Build, meaning there is a protected left turn signal, but vehicles can also make left turns when there is a break in southbound traffic during the through green phase. This allows for more vehicles to make the left turn outside the protected phase. Under Alternative B, the permissive left turn is removed because it could result in conflicts/accidents between left-turning autos and the median BRT. The removal of the permissive left means that more time must be given to the protected left turn phase for northbound left turning vehicles. This additional time for the protected left must be taken from other phases of the cycle, including the southbound through movement. This shorter southbound through-phase results in fewer autos getting through during each signal cycle, therefore leading to longer queues that back into Spectrum Avenue and Professional Drive, thus resulting in the fall into LOS F. These findings point to the consideration of adding a second left turn lane at Watkins Mill Road, which would help clear the intersection with less time given to the protected left signal phase, thus mitigating the issues noted above. This improvement will be modeled in the next project phase in order to assess the effectiveness of dual left turn lanes.
    - The fourth instance of an intersection falling to LOS F in the Build Alternative during the AM peak would be at **South Drive** in Bethesda under Alternative C. In this instance the intersection falls to a LOS E. This decay is likely a result of the repurposing of the southbound curb lane under Alternative C as well as fallout from failing operations at Jones Bridge Road.

It should be noted that each of the intersections that degrade to failing (in both AM and PM peak) will be evaluated in the next work phase to determine if refinements can be made to mitigate some of the traffic impacts.

The data in **Table 3-13**, representing PM peak LOS and delay show the same general trends as the AM peak, though more intersections would fall to LOS E or F when compared to the No-Build Alternative. These intersections, from north to south, include:

- **Redgrave Place and MD 355 and Stringtown Road and MD 355**: Under Alternative C, the decline in intersection operations at these two adjacent intersections would be caused by the northbound queues originating from the Clarksburg Road and MD 355 intersection. MD 355 would attract more traffic in Alternative C due to future road widening by others in Segment 7. However, the intersection of Clarksburg Road is not capable of handling the additional trips; therefore, the northbound queues would extend to Redgrave Place and Stringtown Road (note: this only happens in Alternative C because only in this alternative does BRT run through these intersections).
- **Gunners Branch and MD 335**: Under Alternative C, the decline in intersection operations at this intersection would be caused by extra delays at Middlebrook Road. The signal timing would be adjusted at Middlebrook Road and MD 355 to accommodate a longer pedestrian crossing at Middlebrook Road due to road widening to accommodate the dedicated transit lanes. The reduced timing for the northbound approach at Middlebrook Road would impact the traffic operations at the Gunners Branch Road intersection.
- **Christopher Avenue and MD 355**: Under Alternatives B and C, the decline in intersection operations at this intersection would be related to the traffic operation at Watkins Mill Road and MD 355.
- **King Farm Boulevard and MD 355 and Redland Road and MD 355**: Under Alternative B, the decline in intersection operations at these two adjacent intersections would be related to transit-only phases to accommodate vehicles turning into and out of the median guideway in order to access the Shady Grove Metrorail station.
- **Watkins Pond Boulevard and MD 355**: Under Alternative B, the decline in intersection operations at this intersection would be caused by signal timing adjustments to accommodate an exclusive transit phase at Redland Road and King Farm Boulevard. The northbound queues would extend from the two impacted intersections to the Watkins Pond Boulevard intersection and increase the delays at this intersection.
- **Gude Drive and MD 355**: Under Alternative C, the decline in intersection operations at this intersection would be caused by signal timing adjustments to accommodate a longer pedestrian crossing time.
- **Congressional Lane and MD 355 and Halpine Road and MD 355**: Under Alternatives B and C, the decline in intersection operations at these two adjacent intersections would be related to signal retiming to provide sufficient crossing time for passengers accessing the Twinbrook Metro Station.
- **Old Georgetown Road and MD 355**: Under Alternatives B, the slight decline in intersection operations at this intersection would be related to protected left turns necessary in Alternative B as compared to protected-permissive left turns in other scenarios.
- **Marinelli Road and MD 355**: Under Alternative B, the decline in intersection operations at this intersection would be related to the required signal timing adjustments to accommodate increased pedestrian volumes accessing the median BRT station here.
- **Edson Lane and MD 355**: Under Alternative C, the decline in intersection operations at this intersection would be caused by the northbound queues from the Nicholson Lane and southbound queues from MD 547. The signal timing at Nicholson Lane and MD 547 would be adjusted to provide sufficient crossing time for pedestrians.

- **Grosvenor Lane and MD 355**: Under Alternatives B and C, the decline in intersection operations at this intersection would be caused by delays and queues at adjacent intersections. In Alternative B, the intersection would be impacted by the Tuckerman Lane intersection which would have an exclusive transit phase. In Alternative C, the intersection would be impacted by MD 547 which would be signal re-timed to provide sufficient crossing time for pedestrians.
- **Jones Bridge Road and MD 355**: Under Alternatives A and C, the decline in intersection operations at this intersection would be caused by necessary signal timing adjustments to accommodate curb lane operations in each alternative. This would include re-timing under Alternative C to accommodate the PM peak northbound lane repurposing to provide a dedicated transit lane during in the PM peak direction.

Note: Red cells in **Tables 3-12 and 3-13** represent intersections that are operating at LOS F. Gold colored cells represent intersections that are operating at LOS E.

Table 3-12: AM Peak Intersection LOS, By Alternative

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Clarksburg Road and MD 355	45.7	D	46.5	D	n/a	n/a	n/a	n/a	48.0	D
2	Spire Street and MD 355	29.9	D	31.7	D	n/a	n/a	n/a	n/a	23.3	C
3	Redgrave Place and MD 355	13.6	B	13.6	B	n/a	n/a	n/a	n/a	15.2	C
4	Stringtown Road and MD 355	35.9	D	36.5	D	n/a	n/a	n/a	n/a	38.6	D
5	Shawnee Lane and MD 355	78.4	F	92.2	F	n/a	n/a	n/a	n/a	53.8	F
6	Foreman Blvd and MD 355	39.5	D	45.5	D	n/a	n/a	n/a	n/a	19.1	B
7	Little Seneca Parkway and MD 355	81.0	F	84.5	F	n/a	n/a	n/a	n/a	31.7	C
8	W Old Baltimore Road and MD 355	47.8	D	50.2	D	n/a	n/a	n/a	n/a	18.1	B
9	Brink Road and MD 355	15.1	B	15.8	B	n/a	n/a	n/a	n/a	6.6	A
10	MD 27 and MD 355	42.5	D	42.6	D	43.7	D	n/a	n/a	42.1	D
11	Henderson Corner Road and MD 355	17.9	B	17.9	B	21.9	C	n/a	n/a	15.2	B
12	Milestone Center and MD 355	2.3	A	2.3	A	2.7	A	n/a	n/a	2.2	A
13	Shakespeare Blvd and MD 355	14.1	B	14.3	B	12.0	B	n/a	n/a	13.6	B
110	Observation Drive T Intersection	n/a	n/a	n/a	n/a	n/a	n/a	35.1	E	n/a	n/a
111	Observation Drive and Boland Farm	n/a	n/a	n/a	n/a	n/a	n/a	30.7	D	n/a	n/a
112	Observation Drive and Ridge Road	n/a	n/a	n/a	n/a	n/a	n/a	56.3	E	n/a	n/a
113	Observation Drive and Milestone Center	n/a	n/a	n/a	n/a	n/a	n/a	120.2	F	n/a	n/a
114	Observation Drive and Dorsey Mill Road	n/a	n/a	n/a	n/a	n/a	n/a	42.1	D	n/a	n/a
115	Observation Drive and Water Discovery Lane	n/a	n/a	n/a	n/a	n/a	n/a	10.7	B	n/a	n/a
116	Observation Drive and W Old Baltimore Road	n/a	n/a	n/a	n/a	n/a	n/a	30.9	C	n/a	n/a
117	Observation Drive and Little Seneca Parkway	n/a	n/a	n/a	n/a	n/a	n/a	43.3	D	n/a	n/a
118	Observation Drive and Shawnee Lane	n/a	n/a	n/a	n/a	n/a	n/a	19.2	B	n/a	n/a
14	Amber Ridge Cir and Shakespeare Blvd	10.9	B	n/a	n/a	11.0	B	n/a	n/a	n/a	n/a
15	Observation Drive and Shakespeare Blvd	21.8	C	n/a	n/a	21.8	C	17.0	B	n/a	n/a
16	Germantown Road and MD 355	46.3	D	46.7	D	n/a	n/a	n/a	n/a	34.8	C
17	Observation Drive and Germantown Road	16.8	B	16.9	B	n/a	n/a	25.5	C	n/a	n/a
18	Seneca Meadows Parkway and	6.7	A	6.7	A	7.2	A	n/a	n/a	n/a	n/a

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
	Germantown Road										
19	Middlebrook Road and MD 355	65.1	E	64.0	E	64.9	E	69.1	E	84.4	F
20	Observation Drive and Middlebrook Road	5.2	A	5.2	A	6.2	A	9.2	A	n/a	n/a
21	Gunners Branch Road and MD 355	10.9	B	10.8	B	10.3	B	18.6	B	9.4	A
22	Plummer Drive and MD 355	10.0	A	10.3	B	10.0	A	13.4	B	10.5	B
23	Professional Drive and MD 355	19.7	B	25.2	C	37.2	D	87.9	F	29.4	C
24	Spectrum Avenue and MD 355	32.3	C	44.0	D	58.0	E	88.9	F	52.2	D
25	Watkins Mill Road and MD 355	138.2	F	135.4	F	137.1	F	142.5	F	136.8	F
26	Christopher Avenue and MD 355	10.8	B	9.2	A	9.9	A	17.7	B	8.3	A
27	Lockheed Martin and MD 355	8.5	A	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28	MD 124 and MD 355	41.1	D	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29	Perry Parkway and MD 355	30.7	C	30.7	C	31.5	C	35.9	D	31.8	C
30	Odendhal Avenue and MD 355	29.1	C	27.4	C	23.9	C	32.1	C	26.0	C
31	Chestnut Street and MD 355	10.7	B	10.3	B	10.4	B	22.8	C	10.5	B
32	Cedar Avenue and MD 355	21.0	C	22.4	C	19.7	C	3.2	A	19.6	C
33	S Summit Avenue and MD 355	21.7	C	26.3	C	21.3	C	35.2	D	20.8	C
34	Education Blvd and MD 355	10.0	A	10.1	B	7.6	A	13.7	B	7.2	A
35	E Deer Park Drive and MD 355	31.7	C	31.1	C	23.9	C	31.7	C	21.5	C
36	S Westland Drive and MD 355	66.3	E	63.2	E	45.5	D	57.0	E	43.7	D
37	O'Neill Drive and MD 355	62.1	E	64.2	E	59.0	E	60.5	E	57.5	E
38	Shady Grove Road and MD 355	91.8	F	83.2	F	87.5	F	83.1	F	78.0	E
39	Ridgemont Avenue and MD 355	37.6	D	37.6	D	38.7	D	51.5	D	29.4	C
40	King Farm Blvd and MD 355	48.4	D	48.8	D	51.3	D	52.1	D	43.9	D
41	Redland Road and MD 355	58.5	E	60.6	E	54.0	D	69.9	E	52.9	D
42	Somerville Drive and Redland Road	15.4	B	24.2	C	22.0	C	16.4	B	17.8	B
43	Redland Ext and Redland Road	44.6	D	46.6	D	45.0	D	45.1	D	45.3	D
44	Watkins Pond Blvd and MD 355	61.1	E	57.8	E	27.9	C	78.7	E	49.7	D
45	Rockville Corporate Ctr and MD 355	51.8	D	50.8	D	3.5	A	39.8	D	49.7	D
46	E Gude Drive and MD 355	126.7	F	123.7	F	110.7	F	112.2	F	127.6	F
47	College Parkway and MD 355	10.7	B	10.4	B	17.2	B	13.2	B	8.8	A
48	N Campus Drive and MD 355	19.0	B	19.4	B	26.3	C	21.7	C	12.4	B
60	Mannakee Street and MD 355	61.0	E	59.4	E	61.5	E	43.5	D	62.6	E
61	Frederick Avenue and MD 355	25.0	C	26.5	C	29.3	C	17.7	B	35.3	D
62	N Washington Street and MD 355	27.4	C	28.8	C	34.8	C	41.7	D	41.5	D
63	Hungerford Plaza and MD 355	18.6	B	38.7	D	54.8	D	51.0	D	65.3	E
64	Beall Avenue and MD 355	34.0	C	47.8	D	53.3	D	49.2	D	57.6	E
65	E Middle Lane and MD 355	50.1	D	55.4	E	56.9	E	59.5	E	59.7	E
66	Monroe Place and MD 355	15.5	B	13.8	B	13.9	B	15.7	B	13.7	B
67	MD 28 and MD 355	33.6	C	31.3	C	28.7	C	45.8	D	28.1	C
68	Dodge Street and MD 355	22.5	C	21.8	C	17.9	B	37.0	D	17.4	B
69	Wootton Parkway and MD 355	98.5	F	97.8	F	91.4	F	103.8	F	85.5	F
70	Edmonston Drive and MD 355	37.6	D	40.6	D	37.8	D	39.0	D	39.7	D
71	Country Club Road and MD 355	8.2	A	7.7	A	7.9	A	8.6	A	9.2	A
72	Templeton Place and MD 355	9.0	A	8.9	A	9.4	A	23.4	C	10.9	B
73	Congressional Lane and MD 355	17.3	B	17.1	B	17.8	B	26.9	C	25.2	C
74	Halpine Road and MD 355	18.0	B	18.5	B	18.2	B	39.8	D	18.5	B
77	Bouic Avenue and MD 355	2.8	A	3.4	A	3.4	A	n/a	n/a	1.6	A
78	Twinbrook Parkway and MD 355	21.7	C	21.1	C	22.0	C	33.2	C	20.9	C
79	Federal Plaza and MD 355	5.3	A	5.2	A	5.9	A	12.6	B	5.5	A
80	Bou Avenue and MD 355	50.2	D	32.9	C	34.0	C	45.5	D	30.6	C
81	Hubbard Drive and MD 355	8.2	A	8.7	A	9.3	A	13.4	B	8.5	A

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
82	Montrose Road and Towne Road	20.6	C	20.6	C	20.6	C	20.8	C	20.5	C
83	Montrose Parkway and MD355 Ramp	37.0	D	37.0	D	37.0	D	36.9	D	36.9	D
84	Mid-Pike Plaza and MD 355	21.9	C	25.3	C	23.9	C	18.9	B	18.1	B
85	Old Georgetown Road and MD 355	38.3	D	38.2	D	39.2	D	46.5	D	40.1	D
86	Marinelli Road and MD 355	53.1	D	53.9	D	53.2	D	47.9	D	53.9	D
87	Nicholson Lane and MD 355	66.7	E	66.8	E	65.8	E	68.7	E	69.0	E
88	Security Lane and MD 355	12.9	B	12.7	B	13.4	B	28.2	C	14.4	B
89	Edson Lane and MD 355	15.4	B	15.2	B	15.5	B	18.0	B	18.2	B
90	MD 547 and MD 355	57.2	E	56.7	E	57.8	E	79.9	E	58.5	E
91	Tuckerman Lane and MD 355 (North)	51.5	D	50.0	D	49.2	D	89.9	F	52.0	D
92	Music Center and Tuckerman Lane	8.2	A	n/a	n/a	8.4	A	8.8	A	8.4	A
93	Strathmore Park Court and Tuckerman Lane	16.9	C	n/a	n/a	16.9	C	16.9	C	16.9	C
94	Tuckerman Lane and MD 355 (South)	7.3	A	22.9	C	7.1	A	10.2	B	7.1	A
95	Grosvenor Lane and MD 355	23.9	C	35.0	C	23.1	C	23.0	C	22.8	C
96	Pooks Hill Road and MD 355	69.1	E	79.8	E	71.4	E	57.9	E	41.2	D
97	Alta Vista Road and MD 355	15.1	B	35.5	D	13.6	B	12.9	B	12.3	B
98	Cedar Lane and MD 355	51.9	D	48.3	D	40.4	D	38.2	D	52.2	D
99	Wood Road and MD 355	19.8	B	13.1	B	11.9	B	11.9	B	20.1	C
100	Wilson Drive and MD 355	23.7	C	12.8	B	11.9	B	12.0	B	24.6	C
101	South Drive and MD 355	51.8	D	39.1	D	40.5	D	40.5	D	71.4	E
102	Jones Bridge Road and MD 355	90.7	F	90.2	F	80.4	F	82.0	F	100.0	F
103	Woodmont Avenue and MD 355	11.8	B	11.8	B	11.4	B	13.0	B	23.1	C
104	Rosedale Avenue and MD 355	18.4	B	18.8	B	18.8	B	18.7	B	26.6	C
105	Cordell Avenue and MD 355	4.6	A	4.8	A	5.1	A	4.9	A	4.7	A
106	Cheltenham Drive and MD 355	9.2	A	9.5	A	9.5	A	10.0	A	9.3	A
107	East-West Highway and MD 355	41.6	D	41.3	D	40.4	D	37.4	D	41.0	D
108	Montgomery Avenue and MD 355	29.5	C	32.2	C	33.2	C	32.5	C	14.4	B

Table 3-13: PM Peak Intersection LOS, By Alternative

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Clarksburg Road and MD 355	68.7	E	68.3	E	n/a	n/a	n/a	n/a	93.9	F
2	Spire Street and MD 355	26.0	D	24.5	C	n/a	n/a	n/a	n/a	29.1	D
3	Redgrave Place and MD 355	21.9	C	22.6	C	n/a	n/a	n/a	n/a	81.9	F
4	Stringtown Road and MD 355	47.4	D	48.9	D	n/a	n/a	n/a	n/a	81.1	F
5	Shawnee Lane and MD 355	29.1	D	26.7	D	n/a	n/a	n/a	n/a	28.6	D
6	Foreman Blvd and MD 355	10.2	B	11.0	B	n/a	n/a	n/a	n/a	7.1	A
7	Little Seneca Parkway and MD 355	31.1	C	30.9	C	n/a	n/a	n/a	n/a	20.8	C
8	W Old Baltimore Road and MD 355	22.1	C	24.9	C	n/a	n/a	n/a	n/a	13.4	B
9	Brink Road and MD 355	52.4	D	54.6	D	n/a	n/a	n/a	n/a	18.0	B
10	MD 27 and MD 355	52.4	D	50.9	D	52.2	D	n/a	n/a	46.8	D
11	Henderson Corner Road and MD 355	34.8	C	35.8	D	35.3	D	n/a	n/a	35.2	D
12	Milestone Center and MD 355	9.5	A	9.6	A	8.7	A	n/a	n/a	10.5	B
13	Shakespeare Blvd and MD 355	16.0	B	16.2	B	23.9	C	n/a	n/a	13.5	B
110	Observation Drive T Intersection	n/a	n/a	n/a	n/a	n/a	n/a	14.2	B	n/a	n/a
111	Observation Drive and Boland Farm	n/a	n/a	n/a	n/a	n/a	n/a	45.4	E	n/a	n/a
112	Observation Drive and Ridge Road	n/a	n/a	n/a	n/a	n/a	n/a	59.4	E	n/a	n/a
113	Observation Drive and Milestone	n/a	n/a	n/a	n/a	n/a	n/a	35.8	D	n/a	n/a

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
	Center										
114	Observation Drive and Dorsey Mill Road	n/a	n/a	n/a	n/a	n/a	n/a	17.8	B	n/a	n/a
115	Observation Drive and Water Discovery Lane	n/a	n/a	n/a	n/a	n/a	n/a	9.5	A	n/a	n/a
116	Observation Drive and W Old Baltimore Road	n/a	n/a	n/a	n/a	n/a	n/a	23.1	C	n/a	n/a
117	Observation Drive and Little Seneca Parkway	n/a	n/a	n/a	n/a	n/a	n/a	38.0	D	n/a	n/a
118	Observation Drive and Shawnee Lane	n/a	n/a	n/a	n/a	n/a	n/a	22.1	C	n/a	n/a
119	Observation Drive and Stringtown Road	n/a	n/a	n/a	n/a	n/a	n/a	60.3	E	n/a	n/a
14	Amber Ridge Cir and Shakespeare Blvd	25.5	D	n/a	n/a	25.5	D	n/a	n/a	n/a	n/a
15	Observation Drive and Shakespeare Blvd	33.3	C	n/a	n/a	33.1	C	28.9	C	n/a	n/a
16	Germantown Road and MD 355	54.0	D	52.4	D	n/a	n/a	n/a	n/a	43.1	D
17	Observation Drive and Germantown Road	32.1	C	32.3	C	n/a	n/a	38.5	D	n/a	n/a
18	Seneca Meadows Parkway and Germantown Road	26.7	C	26.4	C	29.4	C	n/a	n/a	n/a	n/a
19	Middlebrook Road and MD 355	74.2	E	93.9	F	99.0	F	61.6	E	75.7	E
20	Observation Drive and Middlebrook Road	8.4	A	32.0	C	30.0	C	8.7	A	n/a	n/a
21	Gunners Branch Road and MD 355	33.0	C	32.3	C	36.3	D	44.1	D	61.6	E
22	Plummer Drive and MD 355	6.7	A	6.6	A	6.5	A	13.0	B	12.2	B
23	Professional Drive and MD 355	16.1	B	15.8	B	16.2	B	22.2	C	16.5	B
24	Spectrum Avenue and MD 355	9.8	A	9.5	A	10.1	B	13.8	B	8.9	A
25	Watkins Mill Road and MD 355	151.6	F	152.2	F	156.1	F	167.5	F	142.8	F
26	Christopher Avenue and MD 355	45.7	D	50.3	D	48.1	D	75.3	E	61.3	E
27	Lockheed Martin and MD 355	13.2	B	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28	MD 124 and MD 355	80.8	F	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29	Perry Parkway and MD 355	51.8	D	51.5	D	52.9	D	49.1	D	57.5	E
30	Odendhal Avenue and MD 355	32.4	C	32.4	C	33.2	C	38.9	D	33.8	C
31	Chestnut Street and MD 355	19.1	B	19.2	B	18.6	B	16.4	B	18.6	B
32	Cedar Avenue and MD 355	22.9	C	23.3	C	23.9	C	9.9	A	22.4	C
33	S Summit Avenue and MD 355	23.1	C	23.1	C	24.4	C	27.7	C	25.9	C
34	Education Blvd and MD 355	12.7	B	12.7	B	12.7	B	19.1	B	13.4	B
35	E Deer Park Drive and MD 355	24.0	C	23.4	C	24.3	C	32.6	C	23.5	C
36	S Westland Drive and MD 355	23.7	C	23.0	C	24.3	C	30.1	C	24.1	C
37	O'Neill Drive and MD 355	12.9	B	12.7	B	12.4	B	16.9	B	12.6	B
38	Shady Grove Road and MD 355	116.9	F	115.4	F	108.8	F	97.7	F	115.1	F
39	Ridgemont Avenue and MD 355	23.8	C	25.2	C	15.7	B	14.9	B	13.6	B
40	King Farm Blvd and MD 355	37.7	D	38.2	D	31.1	C	66.6	E	34.2	C
41	Redland Road and MD 355	61.2	E	62.4	E	48.8	D	110.5	F	54.2	D
42	Somerville Drive and Redland Road	15.9	B	15.9	B	15.8	B	21.4	C	14.9	B
43	Redland Ext and Redland Road	24.1	C	24.0	C	24.6	C	19.5	B	20.0	B
44	Watkins Pond Blvd and MD 355	23.9	C	22.2	C	21.2	C	64.7	E	19.8	B
45	Rockville Corporate Ctr and MD 355	3.8	A	3.4	A	3.3	A	24.8	C	3.0	A
46	E Gude Drive and MD 355	51.1	D	49.2	D	48.7	D	55.0	D	66.5	E
47	College Parkway and MD 355	9.6	A	9.4	A	9.4	A	10.6	B	9.3	A
48	N Campus Drive and MD 355	16.4	B	14.9	B	15.3	B	14.9	B	13.4	B
60	Mannakee Street and MD 355	21.7	C	16.6	B	25.8	C	14.5	B	14.2	B
61	Frederick Avenue and MD 355	9.3	A	9.2	A	8.4	A	8.1	A	10.4	B

	Intersection	No-Build Alternative		TSM Alternative		Alternative A		Alternative B		Alternative C	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
62	N Washington Street and MD 355	31.1	C	31.0	C	32.0	C	45.4	D	30.2	C
63	Hungerford Plaza and MD 355	10.1	B	11.6	B	12.1	B	10.8	B	9.0	A
64	Beall Avenue and MD 355	21.7	C	22.5	C	23.1	C	18.2	B	28.0	C
65	E Middle Lane and MD 355	69.1	E	69.6	E	61.0	E	56.3	E	71.6	E
66	Monroe Place and MD 355	33.0	C	32.0	C	18.8	B	21.4	C	24.1	C
67	MD 28 and MD 355	48.4	D	48.3	D	38.1	D	39.7	D	42.2	D
68	Dodge Street and MD 355	29.7	C	27.1	C	13.0	B	20.7	C	19.5	B
69	Wootton Parkway and MD 355	75.7	E	75.4	E	67.8	E	90.4	F	94.1	F
70	Edmonston Drive and MD 355	77.8	E	77.3	E	69.3	E	69.9	E	97.3	F
71	Country Club Road and MD 355	29.0	C	24.2	C	9.5	A	32.3	C	36.6	D
72	Templeton Place and MD 355	20.0	B	17.5	B	8.7	A	31.7	C	26.0	C
73	Congressional Lane and MD 355	52.5	D	51.3	D	46.2	D	85.9	F	70.2	E
74	Halpine Road and MD 355	36.6	D	37.2	D	31.9	C	74.2	E	36.2	D
77	Bouic Avenue and MD 355	19.4	C	18.4	C	14.1	B	n/a	n/a	7.3	A
78	Twinbrook Parkway and MD 355	32.4	C	32.1	C	31.0	C	54.8	D	34.6	C
79	Federal Plaza and MD 355	19.3	B	20.4	C	19.7	B	21.5	C	19.4	B
80	Bou Avenue and MD 355	40.1	D	40.5	D	43.2	D	44.0	D	36.2	D
81	Hubbard Drive and MD 355	52.8	D	50.8	D	53.4	D	44.1	D	47.0	D
82	Montrose Road and Towne Road	19.4	B	19.4	B	19.1	B	19.3	B	19.3	B
83	Montrose Parkway and MD355 Ramp	34.5	C	34.5	C	34.5	C	34.5	C	37.4	D
84	Mid-Pike Plaza and MD 355	46.7	D	41.3	D	44.2	D	35.4	D	39.2	D
85	Old Georgetown Road and MD 355	54.9	D	51.4	D	56.4	E	63.4	E	59.8	E
86	Marinelli Road and MD 355	46.4	D	43.5	D	43.2	D	85.2	F	47.7	D
87	Nicholson Lane and MD 355	113.5	F	113.4	F	111.8	F	68.5	E	108.7	F
88	Security Lane and MD 355	41.5	D	39.5	D	47.4	D	36.8	D	47.9	D
89	Edson Lane and MD 355	46.2	D	44.6	D	54.9	D	29.8	C	65.5	E
90	MD 547 and MD 355	89.1	F	88.5	F	91.5	F	92.1	F	97.2	F
91	Tuckerman Lane and MD 355 (North)	94.5	F	94.6	F	97.8	F	124.0	F	102.6	F
92	Music Center and Tuckerman Lane	20.4	C	n/a	n/a	17.4	B	15.4	B	17.0	B
93	Strathmore Park Court and Tuckerman Lane	20.6	C	n/a	n/a	20.6	C	20.3	C	19.4	C
94	Tuckerman Lane and MD 355 (South)	18.6	B	17.7	B	17.9	B	34.3	C	26.8	C
95	Grosvenor Lane and MD 355	40.2	D	38.7	D	38.8	D	70.0	E	55.2	E
96	Pooks Hill Road and MD 355	21.2	C	21.0	C	21.1	C	20.5	C	34.7	C
97	Alta Vista Road and MD 355	12.7	B	12.1	B	12.4	B	12.8	B	26.3	C
98	Cedar Lane and MD 355	64.1	E	63.6	E	64.4	E	70.1	E	83.2	F
99	Wood Road and MD 355	35.0	C	35.1	D	35.0	C	41.4	D	49.6	D
100	Wilson Drive and MD 355	20.2	C	20.0	B	19.9	B	34.2	C	47.5	D
101	South Drive and MD 355	21.0	C	20.4	C	21.0	C	22.9	C	28.7	C
102	Jones Bridge Road and MD 355	42.8	D	42.5	D	56.0	E	47.7	D	63.9	E
103	Woodmont Avenue and MD 355	22.6	C	22.4	C	22.5	C	21.4	C	29.6	C
104	Rosedale Avenue and MD 355	22.2	C	22.3	C	22.1	C	22.0	C	21.5	C
105	Cordell Avenue and MD 355	5.5	A	7.1	A	6.2	A	4.8	A	5.3	A
106	Cheltenham Drive and MD 355	20.3	C	29.6	C	24.8	C	20.9	C	15.5	B
107	East-West Highway and MD 355	80.0	E	85.8	F	78.0	E	85.8	F	58.8	E
108	Montgomery Avenue and MD 355	52.0	D	56.2	E	59.5	E	67.6	E	37.4	D

Sierra Club testimony to MoCo Council

Veirs Mill Corridor BRT Preliminary Engineering

July 16, 2019

Good evening, I'm Tina Slater, Montgomery County Sierra Club Transportation Lead. Sierra Club supports FY20 funding for preliminary engineering of both the Veirs Mill Corridor BRT and the 355 BRT. My remarks will address the Veirs Mill Road plan.

The approved Veirs Mill Road (VMR) Corridor Master Plan seeks to establish VMR as multi-modal complete street for people who walk, bicycle, take transit and drive motor vehicles. VMR is an important corridor in the county, as it provides a direct connection between the commercial centers of Rockville and Wheaton, connecting two ends of WMATA's Red Line; it also provides one of the few East-West connections in the southern part of the county.

Among the reasons we urge pushing forward with this project is Climate Change. We want to increase transit ridership and reduce transit travel time, thereby attracting more riders and enticing people out of their cars. Queue jumps at busy intersections and transit signal priority (TSP) will reduce the bus travel time 33% over the current trip time. This is a very transit-dependent area, with lots of affordable housing. BRT transit will increase transit reliability for the residents and employees of the plan area.

Another vital part of the plan is improving safety for bicyclists and pedestrians. We need this, as there have been multiple fatalities and many roadway injuries along this corridor. Please construct all sidewalks and interim bikeways (many on existing adjacent roadways), as well as protected intersections to provide safe access to BRT stations.

Finally, to improve compliance with the existing Bus/Right Turn Only lanes, painting the lane to denote Bus Only, plus enforcing right turns by mounting cameras on buses, could assist in enforcement --- much like cameras on school buses have done.

We hope you will fund preliminary engineering of this plan in FY20.

Thank you for the opportunity to comment.

Tina Slater, MoCo Sierra Club Transportation Lead
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Ethan Goffman

Veirs Mill BRT Testimony

More than a decade ago, Marc Elrich proposed a bus rapid transit network that would revolutionize transit in Montgomery County. We now have a less ambitious version of that plan, with only three routes, yet the county has been able to fund just one of them.

More than three years ago, I served on a citizen's advisory committee for the Veirs Mill BRT. We ultimately decided on a more modest version of the BRT, at least initially, that would get much of the bang of the more ambitious plans at greatly reduced cost. The hope was that the plan would quickly be funded, would be successful, and would lead to more ambitious efforts.

Today, this affordable version of a key part of the stripped-down BRT plan remains unfunded. Montgomery County seems intent on proving itself the Paralysis by Analysis County that makes bold plans but never quite gets around to implementing them. Meanwhile, the Amazon Headquarters have gone to Arlington, Virginia, which has spent decades actually implementing easily accessed public transit and smart growth. Indeed, every dollar invested in public transit provides nearly $4 in economic growth according to the American Public Transit Association. We are missing out on an economic opportunity.

Economic benefits are not the main reason I'm testifying today, though. I'm testifying because Earth as a habitable planet for humans is threatened by climate change and other environmental dangers. Funding BRT is one tangible way to get people out of cars and lessen congestion, to help attain the narrow window scientists warn us we have for drastically reducing emissions. With transportation now the number one cause of emissions in the United States, Montgomery County has a moral obligation to lead with innovative projects. We need to fund BRT now.

Funding BRT is also a social good. Many young people cannot drive, and many seniors cannot do so safely but feel they have no choice. Low-income people must spend hours on their daily bus commutes. And we are in the middle of a surge in pedestrian and bicycle deaths worsened by the large number of cars on our roads. Driving should not be the only viable option for so many people. BRT will allow families with three cars to downsize to two and families with two to go down to one.

I know that the county is short on funds, but failing to invest in our future will only worsen our tax base. Furthermore, solo car trips cause many problems that the wider community pays for, such as pollution, congestion, and accidents, while parking enjoys enormous hidden subsidies. A modest fee on even one of these areas, such as parking, would more than pay for itself in the social and environmental benefits BRT provides.

If the Veirs Mill BRT is the success I believe it will be, I hope that improvements quickly follow, including a full dedicated lane treatment. Building mini-smart-growth communities around key BRT stops will add density and riders and provide an alternative to the sprawl development that always means more and longer car trips. And the county should seriously think about extending the Veirs Mill BRT line to Silver Spring, which will bring in a whole new set of riders and connect the BRT network to the Purple Line.

Thank you very much!

(105)

Bus Rapid Transit: Veirs Mill Road
(P501913)

Category	Transportation	**Date Last Modified**	05/29/18
SubCategory	Mass Transit (MCG)	**Administering Agency**	Transportation
Planning Area	Kensington-Wheaton	**Status**	Planning Stage

EXPENDITURE SCHEDULE ($000s)

Cost Elements	Total	Thru FY17	Est FY18	Total 6 Years	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	Beyond 6 Years
Planning, Design and Supervision	3000 ~~7,000~~	-	-	3000 ~~4,000~~	-	1000	2000	-	~~2,000~~	~~2,000~~	~~3,000~~
TOTAL EXPENDITURES	**~~7,000~~** 3000	-	-	**~~4,000~~** 3000	-	1000	2000	-	**~~2,000~~**	**~~2,000~~**	**~~3,000~~**

FUNDING SCHEDULE ($000s)

Funding Source	Total	Thru FY17	Est FY18	Total 6 Years	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	Beyond 6 Years
~~G.O. Bonds~~ Impact Taxes	3000 ~~4,000~~	-	-	3000 ~~1,000~~	-	1000	2000	-	-	~~1,000~~	~~3,000~~
~~Current Revenue: Mass Transit~~	~~3,000~~	-	-	~~2,000~~	-	-	-	-	~~2,000~~	~~1,000~~	-
TOTAL FUNDING SOURCES	**~~7,000~~** 3000	-	-	**~~4,000~~** 3000	-	1000	200	-	**~~2,000~~**	**~~2,000~~**	**~~3,000~~**

APPROPRIATION AND EXPENDITURE DATA ($000s)

Appropriation FY 19 Request	-	Year First Appropriation		
Appropriation FY 20 Request	-	Last FY's Cost Estimate	7000	-
Cumulative Appropriation	-	Supplemented Appropriation FY 20	3000	
Expenditure / Encumbrances	-			
Unencumbered Balance	-			

PROJECT DESCRIPTION

This project will design and construct a new Bus Rapid Transit (BRT) line on Veirs Mill Road (MD 586) between the Wheaton and Rockville Metrorail Stations. Planning conducted by the Maryland Department of Transportation State Highway Administration (MDOT SHA) resulted in a Recommended Alternative in late 2017. The recommended alternative includes queue jumps for use by BRT and other buses at congested intersections along the corridor, new BRT stations with level boarding and off-board payment, Transit Signal Priority, purchase of new 60-foot articulated vehicles, and other associated pedestrian and bicycle improvements along the corridor. The study retains curbside dedicated lanes as the long-term BRT alternative for Veirs Mill Road.

LOCATION

Veirs Mill Road

ESTIMATED SCHEDULE

Project planning was completed in FY18. ~~Design~~ Preliminary engineering will begin in FY20 and is anticipated to be complete in FY21.

PROJECT JUSTIFICATION

The project will transform mobility options with the implementation of a 7-mile, premium, branded, limited-stop BRT service along Veirs Mill Road. This new service will improve transit travel time and increase opportunity for a broad range of users, including a significant number of minority and low-income riders living along a highly congested corridor. The project will improve passenger transit mobility by connecting riders to high density housing and employment centers.

Plans & Studies: MCDOT Countywide Bus Rapid Transit Study, Final Report (July 2011); County Executive's Transit Task Force (May 2012); Countywide Transit Corridors Functional Master Plan (November 2013); Maryland Department of Transportation/Maryland State Highway Administration MD 586/Veirs Mill Road Draft Corridor Planning Study (September 2016); Veirs Mill Corridor Master Plan (April 2019).

OTHER

The County programmed funds for the Maryland Department of Transportation (MDOT) to conduct planning for the Veirs Mill Road BRT in the State Transportation Participation project, PDF #500722.

DISCLOSURES

A pedestrian impact analysis will be performed during design or is in progress.

COORDINATION

Maryland Department of Transportation, Washington Metropolitan Area Transit Authority, Maryland-National Capital Park and Planning Commission, City of Rockville

Gaithersburg
A CHARACTER COUNTS! CITY

July 23, 2019

The Honorable Marc Elrich
Montgomery County Executive
Executive Office Building
101 Monroe Street, 2nd Floor
Rockville, Maryland 20850

The Honorable Nancy Navarro
Montgomery County Council President
Council Office Building
100 Maryland Avenue, 6th Floor
Rockville, Maryland 20850

Re: BRT Preferred Concept

Dear County Executive Elrich and Council President Navarro:

We appreciate the opportunity to provide our comments regarding the preferred concept for the MD 355 Bus Rapid Transit (BRT) and the proposed appropriation/CIP amendments to carry the project to the next stage.

The City of Gaithersburg has long supported connective Bus Rapid Transit (BRT) lines that expand travel options for its residents and workers. Following the inclusion of support of a MD 355 BRT line in the City's 2009 Transportation Element and the request in 2013 that the County Council make MD 355 a priority corridor for BRT, the City, in 2015, commissioned a study to review the feasibility of BRT alternatives along Frederick Avenue (MD 355). Additionally, in 2017 we hosted an interjurisdictional meeting with the County and City of Rockville where we received an update from MD Transit Administration.

The City supports the recommendation of the County staff to fund the next phase of preliminary engineering for BRT. If the Council is facing a choice on which project to fund, the City is strongly supportive of funding MD 355, rather than 586/ Viers Mill. The MD 355 BRT would have, as documented, a greater positive economic impact and better serve the needs of City and upcounty residents who do not have the benefits of close connectivity to Metro. Additionally with regards to the preferred alignment for MD 355, the City has performed a detailed analysis of the various concepts for this project as presented by County staff. Gaithersburg would like to express our strong support of BRT Alternative C for its reduced costs and right-of-way needs.

While Alternative B/B modified (median) and Alternative C (curbside) perform better than Alternative A, there is no substantial difference between either. Each has its merits and drawbacks, which cancel each other out overall. Data shows similar ridership, average person delay, travel time, accessibility and estimated modal shift. However, comparisons for the cost and right-of-way need show clearer distinctions with further analysis. Every Alternative needs some level of right-of-way, but Alternative C minimizes impacts when compared to Alternative B/B modified. Alternative B/B modified shows the highest number of parcel impacts because of increased

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infrastructure needed to implement the dedicated median lanes. Given the relationship between costs and right-of-way needs and acquisitions in this project, Alternative B/B modified is understandably the most expensive alternative. The City believes that benefits associated with Alternative B/B modified do not justify its financial and land impact costs.

We look forward to working with Montgomery County as the BRT planning process moves to the next phase and respectfully request that the City continues to be included in the process.

Feel free to contact me if you should have any questions.

Sincerely,

Jud Ashman, Mayor
City of Gaithersburg