

## 1. BACKGROUND

There is a considerable amount of available information on the history of and issues surrounding the Purple Line. As a result, this staff memo provides only a brief overview of the project background. References are provided for readers interested in learning more about how the Purple Line project planning has evolved.

### Purpose and Need

The description of the Purpose and Need for the Purple Line is presented in Chapter 1 of the AA/DEIS and states in part:

*“The purpose of the proposed project is to provide faster, more direct, and more reliable East-West transit service in the Purple Line corridor, which would connect the four major activity centers, including the Metrorail services located there, to each other, and with the communities located between them.<sup>1</sup> The existing and expected future roadway congestion in the corridor will have an increasingly detrimental effect on the travel times and reliability of East-West bus transit services in the corridor. The proposed Purple Line corridor and transit improvements are intended to improve travel times and reliability by providing more direct services that will operate on dedicated and exclusive lanes and guideways.”*

The need to improve East-West travel in general is also specifically noted in the County’s General Plan.<sup>2</sup> There are other transportation related goals, objectives, and strategies in the General Plan that are consistent with the Purple Line project purpose. Examples include:

- Give priority to establishing exclusive travelways for transit and high occupancy vehicles serving the Urban Ring and Corridor.
- Make transit use more price and time-competitive with auto use.
- Encourage regional, state, and federal agencies to implement transportation system improvements consistent with County goals, including accessibility to other jurisdictions.

The Purple Line is about more than transportation—the project helps us carry out other important County strategies as outlined in the General Plan. Examples include:

- Integrate housing with employment and transportation centers and include appropriate community services and facilities, especially in transit stop locations.
- Encourage development of affordable, higher density housing in the vicinity of transit stations.
- Concentrate employment activities where there is adequate infrastructure, with an emphasis on sufficient public transportation.

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<sup>1</sup> The four major activities as noted in the AA/DEIS include Bethesda, Silver Spring, University of Maryland – College Park, and New Carrollton.

<sup>2</sup> See *General Plan Refinement of the Goals and Objectives for Montgomery County, December 1993*, page 63.

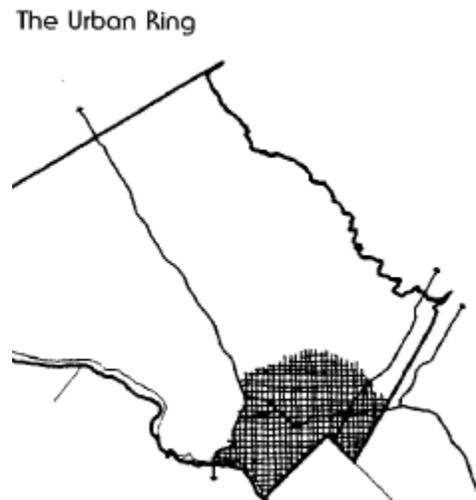
- Designate the highest density and the most flexible zoning in transit station locales to attract development.

Finally, it important to note the role of the Purple Line in meeting General Plan objectives related to the County’s Urban Ring. Selected narrative taken from the Plan’s vision for the Urban Ring includes the following (emphasis added):

*“The General Plan Refinement foresees continued growth and intensification where appropriate in centers in the Urban Ring. **The Refinement does not recommend uniform high density throughout the Urban Ring. Suburban densities will be found within many areas of the Urban Ring outside centers.** Since growth will include both infill and redevelopment, the Refinement stresses the need for compatibility with existing communities. The Refinement also expects Montgomery County to avoid creation or perpetuation of abandoned or blighted areas, through appropriate zoning, designation of transition areas, and public investment. **It designates the Urban Ring as a high priority for location for new infrastructure to accommodate new growth and redevelopment and to support existing development.**”*

*“While encouraging continued growth in the Urban Ring, the General Plan Refinement seeks to preserve the flourishing neighborhoods already located there. The Refinement encourages the County to protect these areas from the encroachment of non-conforming land uses, through traffic, and excessive noise. **It seeks to maintain and reinforce the many desirable features that are common to the Urban Ring.**”*

In summary, the Purple Line represents a significant re-investment in the infrastructure of the down-County area. It helps set the stage to continue growing smart while remaining economically competitive in the area where our communities and facilities are the most established and are closest to the region’s core. In that regard, staff has found it useful when considering the project’s technical aspects to pause and imagine how the General Plan goals and objectives for much of the Urban Ring might be met without a Purple Line. It would be difficult – maybe impossible.



### Project History

The Purple Line project history is documented in Section 1.1 of the AA/DEIS. There is also additional historical background and context provided in the *Purple Line Functional Master Plan Purpose and Outreach Report*.<sup>3</sup> The most significant historical aspects of the project include the following.

<sup>3</sup> The Purpose and Outreach Report can be accessed through the following link:  
<http://www.mcparkandplanning.org/planning/viewer.shtm#http://www.mcparkandplanning.org/Transportation/projects/documents/FINALPURPOSEANDOUTREACHREPORT010808.pdf>

- Montgomery County adopted the Georgetown Branch Master Plan Amendment in November 1986. The plan included a trolley line that operated between Bethesda and Silver Spring along the Georgetown Branch right-of-way from Bethesda to the Metropolitan Branch right-of-way.
- In 1988, Montgomery County purchased the surface easement within the railroad right-of-way (the Georgetown Branch) for the segment of the Purple Line between Bethesda and Silver Spring.
- The Purple Line, in one form or another, has been the subject of a number of studies dating back to 1986.

### Master Planning and Development Review Context

As noted above, the Purple Line between Bethesda and Silver Spring is the subject of one specific adopted Master Plan—the *Georgetown Branch Master Plan Amendment* (1986, amended 1990). It is also included in other master plans (1986 and later) that address areas along the corridor between Bethesda and Silver Spring.

The Purple Line east of the Silver Spring Transit Center (SSTC) is not included in any adopted master plan. One objective of including the development of a Purple Line Functional Master Plan in both our FY-09 and FY-10 work programs is to establish the alignment from Bethesda to the Takoma/Langley Crossroads area, thereby guiding subsequent master planning efforts.

Development activity between Bethesda and Silver Spring has continued to be reviewed in the context of the *Georgetown Branch Master Plan Amendment* and the alternatives under consideration in this current AA/DEIS, as have development applications for sites east of the SSTC.

Additional information on the Purple Line and related master plans is available in the *Purple Line Functional Master Plan Purpose and Outreach Report* noted above and in the supporting staff memorandum from the Vision Division that is included as an Appendix to this staff memo.<sup>4</sup>



### General Description of The Purple Line

The Purple Line is envisioned as a Bus Rapid Transit (or BRT as depicted on the left in Los Angeles) or Light Rail Transit (or LRT as shown below in Houston) line that would operate between Bethesda and New Carrollton via Silver Spring, the Takoma/Langley Crossroads area, and the University of Maryland at College Park.

<sup>4</sup> See pages 7 and 8 of the Purpose and Outreach Report.



The service plan concept calls for six minute service during peak periods. The service would operate on weekdays and weekends on a schedule similar to Metrorail. There is a relatively detailed description of the service area’s setting, the existing transit service, and other important aspects of the current conditions in Chapter 1 of the AA/DEIS.

Staff has identified the following factors as the most important to consider regarding the setting and purpose of the Purple Line:

- The Purple Line provides travel options by more efficiently connecting relatively dense mixed use places and by connecting other major transportation facilities—Metrorail, the Capital Crescent, Georgetown Branch, and Metropolitan Branch Trails, regional and local bus service, MARC commuter service, inter-city bus, and Amtrak—with one another.

FIGURE 1 – Metrorail System and the Purple Line



- The fact that the Purple Line connects various segments of the Metrorail system cannot be overemphasized. The ridership forecasts in the AA/DEIS indicate 40-45% of total weekday ridership (depending upon the alternative under consideration) will be from passengers transferring from Metrorail.

- The Purple Line’s interface with Metrorail is frequent and the locations of shared stations have strategic implications. Bethesda and Silver Spring are within the turnback segments—where peak period frequencies are every two to three minutes. Silver Spring, Long Branch, and Takoma/Langley are the focus of redevelopment opportunities. The State’s flagship university is in College Park. New Carrollton is an end of the line Metrorail station. The Purple Line’s connections with Metrorail are more than that of a

feeder line--it is designed to function as part of the Metrorail system. This is an important consideration when staff examines the issue of capacity later in this memorandum.

Alternatives Not Retained For Detailed Study

The Purple Line AA/DEIS includes an evaluation of eight alternatives—six of which are “build alternatives” that represent capital improvements for a transitway, vehicles, and other support components. Several additional alternatives were identified in the early study stages but were not retained for detailed study in the AA/DEIS because they either did not meet the study Purpose and Need or because their costs or impacts were considered prohibitive.

*Metrorail or Purple Line Loop*

This heavy rail loop alignment would have begun at the Medical Center Metrorail Station and extended north under the Capital Beltway and then east on the north side of the Beltway where it would cross the Beltway and enter the CSX corridor and continue to the SSTC. This potential alignment was examined by the Planning Board in January 2003. The Planning Board voted at that time that the alternative not be included in subsequent studies examining alternative alignments based on its costs, environmental factors, and the adverse impact on Metrorail service frequencies north of the Medical Center and Silver Spring stations.

Some members of the Planning Board’s Purple Line Functional Master Plan Advisory Group (MPAG) expressed concern that the Purple Line Loop needed to be reconsidered in light of the relocation of the Walter Reed Army Hospital to the National Naval Medical Center in Bethesda. The staff discussed this issue with the MPAG and we find the costs are simply prohibitive for a circumferential connector. Table 1 compares the capital costs on a per mile basis for selected applicable project segments<sup>5</sup>:

**Table 1 – Capital Cost Comparison**

Project	Segment	Mode	Cost Per Mile (Millions)	\$ Year
WMATA Largo Extension	Addison Road to Largo Town Center	Heavy Rail	\$140.0	2004
WMATA Dulles Extension	East Falls Church to Wiehle Avenue	Heavy Rail	\$178.0	2008
Purple Line Loop	Silver Spring to Medical Center	Heavy Rail	\$143.3	2002
Miami Metro Extension	MLK Station to Broward County Line	Heavy Rail	\$144.4	2009

<sup>5</sup> The Miami project is included because it, along with the Dulles project, is one of the more recent heavy rail projects.

Project	Segment	Mode	Cost Per Mile (Millions)	\$ Year
Inner Purple Line	Bethesda to Silver Spring	Light Rail	\$84.3	2002
Purple Line	Bethesda to New Carrollton	Light Rail – Medium	\$76.3	2007
Corridor Cities Transitway	Shady Grove to COMSAT	Light Rail	\$57.0	2007

Source: FTA Annual New Starts Reports, Purple Line AA/DEIS and Corridor Cities Transitway Alternative Analysis/Environmental Assessment (AA/EA) Preliminary Estimates and staff reports.

### *LRT on Jones Bridge Road*

LRT on Jones Bridge Road was dropped from consideration because of its high construction costs and its inability to achieve travel time savings, both relative to the Georgetown Branch right-of-way. Instead, Jones Bridge Road was examined as a potential alignment for the lower investment BRT alternative.<sup>6</sup>

### *BRT and LRT on Brookville Road*

An alignment on Brookville Road for either mode was dropped from further consideration because of potential traffic conflicts and issues related to the layout of the planned maintenance and storage facility on Brookville Road.

### *16<sup>th</sup> Street to East West Highway to Colesville Road (BRT Only)*

This Low Investment BRT option was dropped from further consideration because the travel times along 16<sup>th</sup> Street and Colesville Road were significantly worse than using Spring Street and 2<sup>nd</sup> Avenue to get to the SSTC.



<sup>6</sup> This alternative became the focus of an analysis carried out by Sam Schwartz Engineering, a consulting firm retained by the Town of Chevy Chase. A review of issues raised by this analysis is presented later in this memo.

*BRT and LRT from CSX at Spring Street to 2<sup>nd</sup> Avenue to Wayne Avenue*

An LRT option was considered that would have left the CSX right-of-way and used Wayne Avenue to access the SSTC—similar to the Low Investment BRT alternative that ultimately was evaluated. This LRT option required an aerial crossing of Colesville Road because the LRT could not use 2<sup>nd</sup> Avenue due to steep grades. There were other problems related to costs and traffic impacts and it was decided to drop this alternative from further consideration.

A BRT option that used an aerial crossing of Colesville Road was also dropped because of high costs and impacts to adjacent properties.

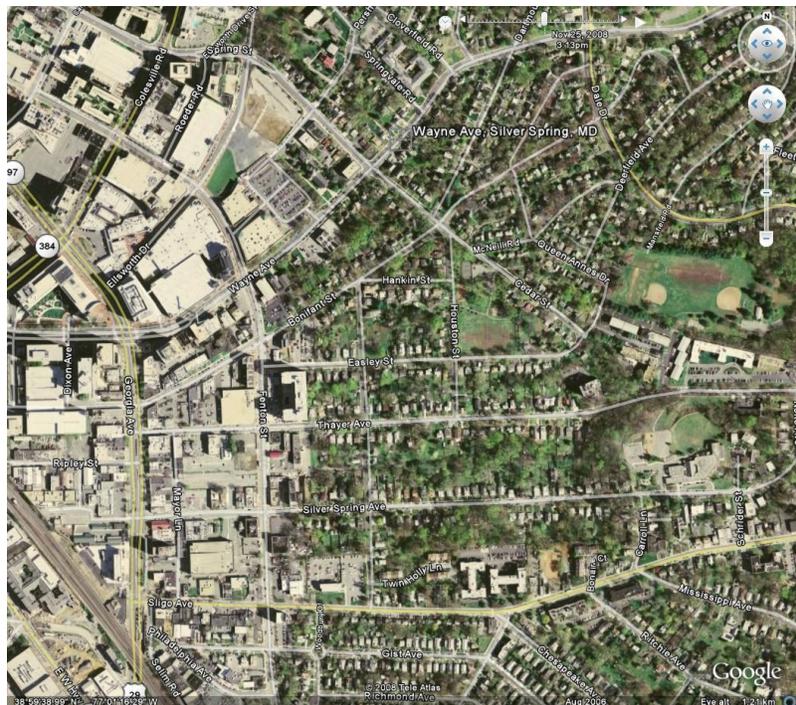
*Tunnel from Sligo Avenue and Piney Branch Road Directly to Takoma/Langley Crossroads*

This alignment would have gone down Sligo Avenue to Piney Branch Road, then entered a tunnel and surfaced near the intersection of University Boulevard and Anne Street. The alignment was dropped because it would have added a significant amount of capital cost to the project.

*Sligo Avenue In East Silver Spring—Either At-Grade or in Tunnel*

These alignments were dropped because of the potential impacts on traffic flow, small businesses, and residences. Wayne Avenue was thought to be a better alternative because it is wider for any at-grade application and in the case of a tunnel application, would result in shorter tunnels when compared to Sligo Avenue.

*Colesville Road and University Boulevard —Via Four Corners*



Colesville Road access to and from the SSTC, and as far north as the Four Corners junction with University Boulevard, was dropped from further consideration because of traffic flow impacts on this heavily traveled road, right-of-way limitations, and increased distance and therefore, travel times.

### *Longer Tunnels under Wayne Avenue*

Because of community concerns related to an at-grade alignment on Wayne Avenue, the MTA examined two alternatives.

One alternative consisted of tunnel that would extend from the SSTC below Sligo Creek, eventually surfacing on Piney Branch Road near Barron Street. This alternative was viewed as too expensive, lacking any significant travel time advantage, and dependent on underground stations that would further increase costs.

The MTA also considered a shorter tunnel that would have extended from the SSTC to a point near Mansfield Road. This tunnel was rejected by the MTA as having adverse impacts on residences on the south side of Wayne Avenue, requiring property acquisitions from the front yards of residences near the tunnel portal, and generating additional cost and no travel time benefits. The MTA also notes in the AA/DEIS that “the high cost of the underground stations weighed against their inclusion, but if underground stations were not included in these alignments the communities would not benefit from the project and ridership would be lower.”<sup>7</sup>

The MTA analyzed this tunnel extension without the results of a computer model that would forecast ridership. When a tunnel (i.e., to a point just east of Cedar Street) was later included in a model analysis and paired with a less capital intensive alternative, the results indicated ridership would actually increase even though there were fewer stations. The ridership increase was likely attributable to the shorter travel times resulting from the tunnel alignment and the absence of the station stops. The stations that were not included were located on Wayne Avenue—one at Dale Drive and one at the proposed library site at Fenton Street. Additional discussion of the issue of this longer tunnel on Wayne Avenue is presented in a later section of this memo.

### Existing Transit Service in the Purple Line Corridor

There is currently a considerable amount of bus service in the corridor. While there is no single route that serves the entire length from Bethesda to New Carrollton, there are some routes that might compare with the objectives and scope of the Purple Line, especially the Montgomery County segment of the Purple Line.

#### *Metrobus Routes J1, J2, and J3*

This line provides frequent (with six to seven minute headways) peak hour service between Montgomery Mall and the Silver Spring Metrorail Station via either the Bethesda Metrorail Station or the Medical Center Metrorail Station.

#### *Metrobus Route J4*

This route comes closest to covering the entire segment of the Purple Line. It operates in peak periods only between the Bethesda and the College Park Metrorail Stations providing limited

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<sup>7</sup> See page 2-4 and 2-5 of the AA/DEIS for a discussion of the longer tunnels under Wayne Avenue.

stop service on a 20-minute frequency. Improvements to this route form the basis for the Transportation Systems Management Alternative (TSM) discussed later in this memo.

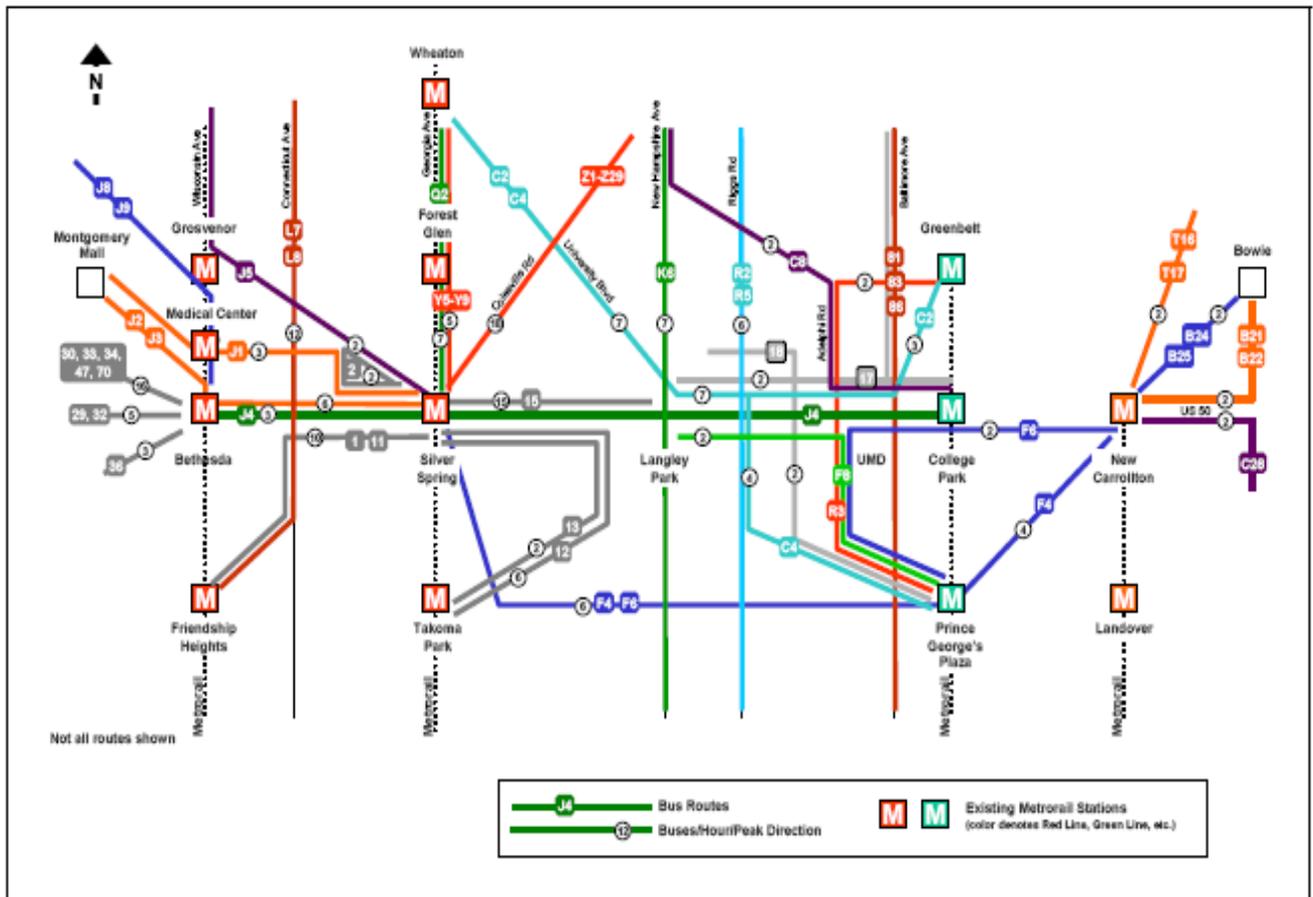
*Metrobus Route F4 and F6*

This line provides service primarily between Silver Spring and New Carrollton via Prince George’s Plaza on a 15-minute frequency during peak periods.

*Ride On Route 15*

This route provides service between Silver Spring and the Takoma/Langley Crossroads area every four minutes during the peak period in the peak direction. The route alignment is essentially the same as one of the alternative alignments for the Purple Line.

FIGURE 2 – Purple Line Corridor Bus Service



The various bus routes and their respective connections with the Metrorail system is depicted in the diagram above that is taken from the AA/DEIS. The table below shows service frequencies and estimates of average weekday ridership.

TABLE 2 – Existing Bus Service

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday	Average Daily Riders
WMATA J1	Montgomery Mall-Medical Center – Silver Spring Metro	--	20	--	20	---	--	--	6,600
WMATA J2	Montgomery Mall – Bethesda – Silver Spring Metro	20	17	20	24	15	20	25	
WMATA J3	Montgomery Mall – Bethesda – Silver Spring Metro	--	17	--	24	--	--	--	
WMATA J4	Bethesda Metro – Silver Spring – College Park Metro	--	20	--	20	--	--	--	1,000
WMATA C2	Wheaton Metro – Greenbelt Metro	--	22	30	16	--	30	--	5,200
WMATA C4	Twinbrook Metro – Prince George’s Plaza Metro	10	22	30	16	30	30	16	7,800
WMATA F4	Silver Spring – New Carrollton	12	12	40	15	--	30	60	4,600
WMATA F6	Silver Spring – New Carrollton	--	20	40	30	--	--	--	3,100
Ride On 15	Silver Spring Metro – Langley Park	15	4	12	4	30	12	15	7,200
TheBus 17	Langley Park – UM-College Park Metro	45	45	45	45	--	--	--	40
UM Shuttle 111	UM – Silver Spring Metro	--	35	75	45	30	--	--	500
UM Shuttle 104	UM – College Park Metro	8	8	12	8	20	20	20	2,500

These bus routes provide connections to the Metrorail system. A profile of the Metrorail service frequencies and average weekday boardings at selected stations is provided below.

TABLE 3 – Existing Metrorail Service

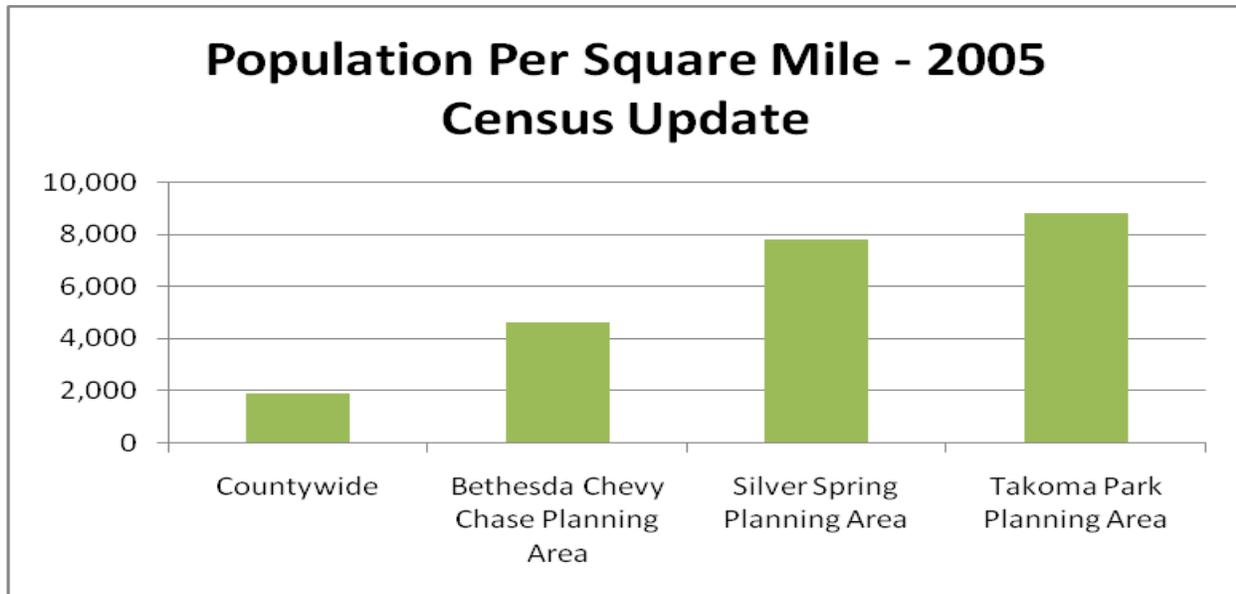
Metrorail Line	Shady Grove	Medical Center	Bethesda	Silver Spring	Glenmont	New Carrollton	UMD College Park
Weekday Peak Period Service Frequency (min.)							
Red Line	6	3	3	3	6		
Orange Line						6	
Green Line							6
Weekday Mid-Day Period Service Frequency (min.)							
Red Line	12	6	6	6	12		
Orange Line						12	
Green Line							12
Average Weekday Boardings At Metrorail Station							
FY 2008	14,182	5,174	10,511	14,476	6,004	10,444	4,727

Profile of the Service Area

The 2005 Census Update provides a quick overview of the planning areas served by the Purple Line and the planning areas compared with the County overall:

In general, the planning areas served by the Purple Line have a greater population density than the County overall.

FIGURE 3 – Population Density



A higher percentage of residents commute by transit and the travel times by transit are shorter when compared to the County overall.

FIGURE 4 How We Get To Work

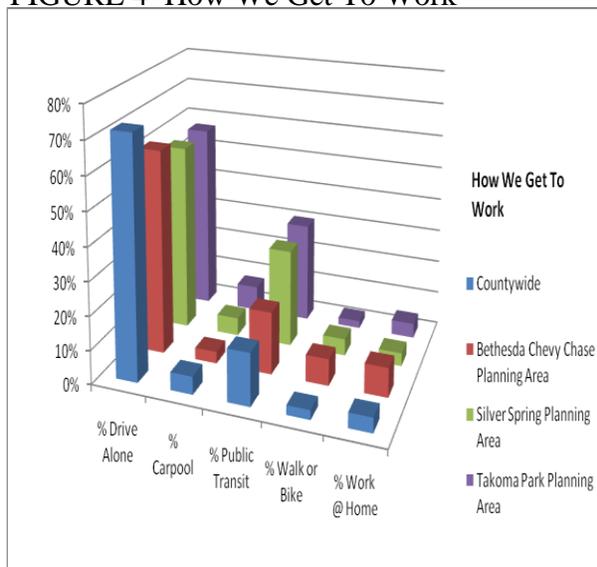
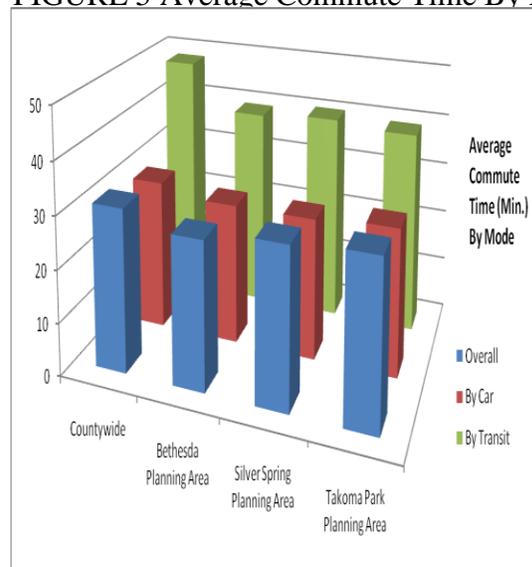


FIGURE 5 Average Commute Time By Mode



## Forecasted Growth

As previously noted, one of the tenets of the General Plan is to direct growth toward existing and planned transit station areas so that the county can continue to slow the overall growth of single-occupant auto trips, particularly within the urban ring. It is also important to preserve existing neighborhoods. One way to measure the extent to which we are accomplishing these sometimes competing objectives is to examine forecast housing and job densities.

The most commonly used geographic area is the traffic analysis zone (TAZ). One of the first issues raised by the MPAG was the examination of the forecasted development along the Purple Line corridor. The densities, along with a reference map are charted below.

FIGURE 6 Transportation Analysis Zones

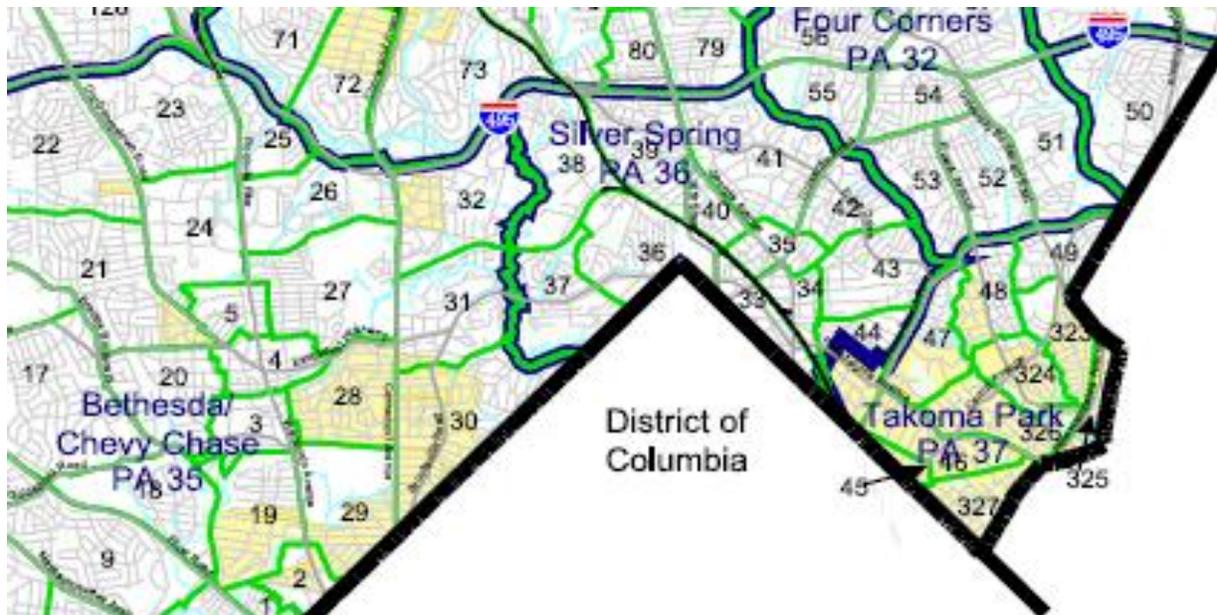


TABLE 4 – Forecasted Household Density

Description	TAZ	Households / Acre 2005	Households / Acre 2030	% Increase	% Annual Increase
NIH / Natonal Library of Medicine	24	1	1	1%	0.04%
Bethesda CBD	5	21	48	133%	5.33%
Bethesda CBD	4	16	30	89%	3.55%
Bethesda CBD	3	18	28	61%	2.44%
National Naval Medical / USUHS	26	0	0	34%	1.35%
West Chevy Chase Heights / Columbia CC	27	4	4	8%	0.33%
Tow n of Chevy Chase	28	3	4	15%	0.61%
North Chevy Chase / Audubon Society	32	2	2	2%	0.07%
Master Plan Alignmnet East of Conn Ave.	31	2	2	0%	0.00%
Walter Reed Annex Area	38	0	1	253%	10.11%
Lyttonsville Area	37	3	3	1%	0.03%
Woodside - North Side of CSX	30	3	3	1%	0.04%
Rosemary Hills - South Side of CSX	36	11	11	1%	0.03%
Woodside - Betw een 16th St & Georgia Avenue	40	3	3	10%	0.40%
Silver Spring CBD - Betw een Wayne Ave & Spring St.	35	18	37	100%	4.01%
Silver Spring CBD - Betw een E/W Highway ay and Fenton St.	34	4	39	784%	31.36%
Silver Spring CBD - Betw een DC Line and CSX	33	19	38	96%	3.84%
East Silver Spring - N of Wayne Ave - Woodside Park	42	5	5	0%	0.00%
East Silver Spring - Betw een Sligo Ave. & Wayne Ave.	43	6	7	17%	0.67%
East Silver Spring / Takoma Park - South of Sligo Ave & West of Piney Br	44	5	5	5%	0.18%
Highland View	53	9	10	9%	0.36%
Long Branch / Brookside Forest	52	5	5	0%	0.02%
Long Branch / Rolling Terrace	48	12	13	6%	0.22%
Takoma Park - Betw een Maple Ave and Piney Branch Rd.	47	5	7	45%	1.81%
New Hampshire Estates	49	8	8	0%	0.02%
Takoma Park - Betw een New Hampshire Ave and Carroll Avenue	323	3	3	0%	0.00%
Takoma Park - East of New Hampshire Avenue	325	6	6	5%	0.20%

TABLE 5 – Forecasted Job Density

Description	TAZ	Jobs / Acre 2005	Jobs / Acre 2030	% Increase	% Annual Increase
NIH / Natonal Library of Medicine	24	50	61	22%	0.89%
Bethesda CBD	5	62	68	10%	0.39%
Bethesda CBD	4	137	158	15%	0.61%
Bethesda CBD	3	76	87	15%	0.62%
National Naval Medical / USUHS	26	25	32	31%	1.23%
West Chevy Chase Heights / Columbia CC	27	3	3	22%	0.88%
Tow n of Chevy Chase	28	1	1	5%	0.21%
North Chevy Chase / Audubon Society	32	1	2	72%	2.89%
Master Plan Alignmnet East of Conn Ave.	31	2	3	5%	0.20%
Walter Reed Annex Area	38	9	11	17%	0.68%
Lyttonsville Area	37	1	1	0%	0.00%
Woodside - North Side of CSX	30	1	1	5%	0.18%
Rosemary Hills - South Side of CSX	36	2	2	15%	0.59%
Woodside - Betw een 16th St & Georgia Avenue	40	0	0	106%	4.24%
Silver Spring CBD - Betw een Wayne Ave & Spring St.	35	121	143	19%	0.75%
Silver Spring CBD - Betw een E/W Highw ay and Fenton St.	34	85	94	11%	0.43%
Silver Spring CBD - Betw een DC Line and CSX	33	47	56	21%	0.82%
East Silver Spring - N of Wayne Ave - Woodside Park	42	2	2	10%	0.41%
East Silver Spring - Betw een Sligo Ave. & Wayne Ave.	43	2	2	14%	0.57%
East Silver Spring / Takoma Park - South of Sligo Ave & West of Piney	44	2	2	12%	0.48%
Highland View	53	1	1	0%	0.00%
Long Branch / Brookside Forest	52	2	2	19%	0.78%
Long Branch / Rolling Terrace	48	2	3	27%	1.09%
Takoma Park - Betw een Maple Ave and Piney Branch Rd.	47	1	2	6%	0.23%
New Hampshire Estates	49	2	2	18%	0.70%
Takoma Park - Betw een New Hampshire Ave and Carroll Avenue	323	5	5	4%	0.18%
Takoma Park - East of New Hampshire Avenue	325	9	9	0%	0.02%

These population and job forecasts are from Round 7.1 of the Metropolitan Washington Council of Governments (COG) Cooperative Forecasts. The densities reported in the table have been rounded to the nearest whole number but the percentages reported are based on the values prior to rounding.

In general, the following observations can be made about the housing and job growth forecasted within the Purple Line corridor:

- The highest growth rate in household density is in the Bethesda and Silver Spring CBDs.
- The highest rate of growth in household density is in TAZ 34, in the Silver Spring CBD between East-West Highway and Fenton Street south of Wayne Avenue.
- The forecasted growth within established neighborhoods near the CBDs is minimal.
- The largest rate of increase in employment growth is forecasted to be at National Naval Medical Center (NNMC) in Bethesda.
- The greatest concentration of employment is forecast to remain in the Bethesda and Silver Spring CBDs. The Bethesda CBD will have both a greater net employment density and more total employment than the aggregation of the NIH/NNMC campuses.

### Definition of Alternatives

This section of the memo includes a brief description of each alternative followed by summary information on the service profile (hours, frequency, and vehicle type), ridership, capital costs, and cost effectiveness.

#### *No Build Alternative*

The No Build Alternative assumes that no new improvements would be made to the transportation system in the corridor, other than the planned transportation projects that are assumed in the Constrained Long Range Plan (CLRP) of the COG.

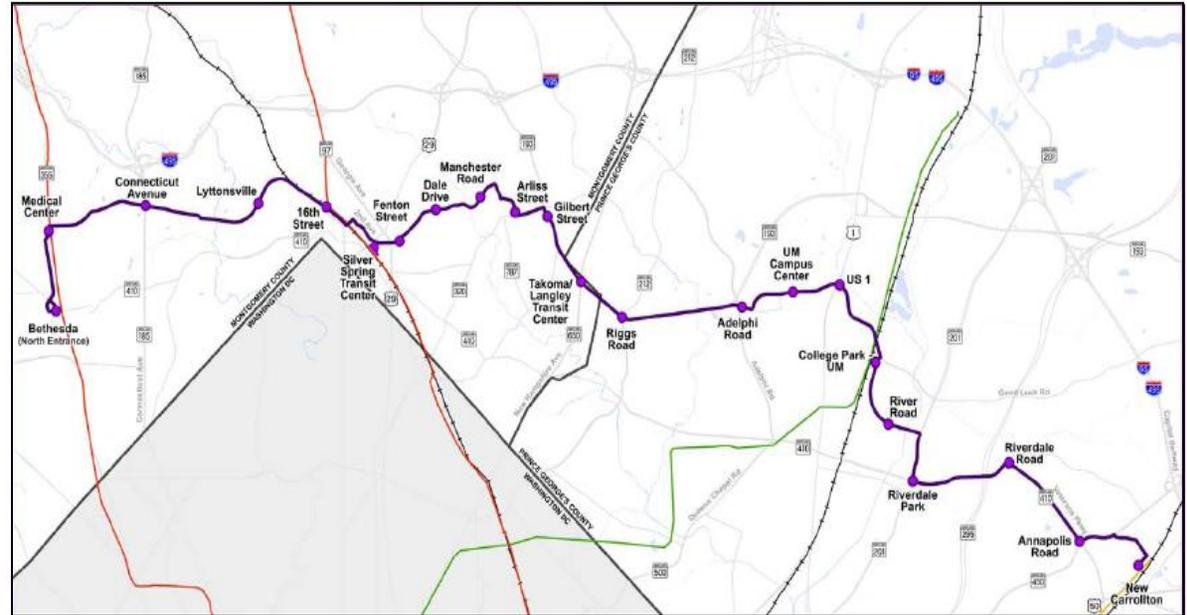
#### *Transportation System Management Alternative (TSM)*

The TSM alternative would include improved bus service in the corridor including a new through-route from Bethesda to New Carrollton replacing the existing WMATA J4 route, and overlaying service on portions of the WMATA F4/F6 routes between College Park and New Carrollton. A combination of limited stops and selected intersection and signal improvement strategies would be the core of service improvements. Standard buses would be used.

*Alternative 3: Low Investment BRT*

Key Features

- Serves Bethesda CBD via Woodmont Avenue
- Does not serve Bethesda Metrorail south entrance
- Alignment is on Jones Bridge Road in shared lanes
- At-grade crossing of Connecticut Avenue
- Enters Georgetown Branch right-of-way at Jones Mill Road
- The Capital Crescent Trail (CCT) is constructed east of Jones Mill Road To Silver Spring—not west of Jones Mill Road
- Two bridges—one for the BRT and one for the CCT—over Rock Creek Park
- CCT connection to Rock Creek Trail is provided east of the CCT bridge over Rock Creek Park
- Transitway stays on south side of CSX, crosses 16<sup>th</sup> Street at-grade, and enters the Silver Spring CBD via 2<sup>nd</sup> Avenue and Wayne Avenue
- Operates in shared curbside lanes on Wayne Avenue, Piney Branch Road, and University Boulevard



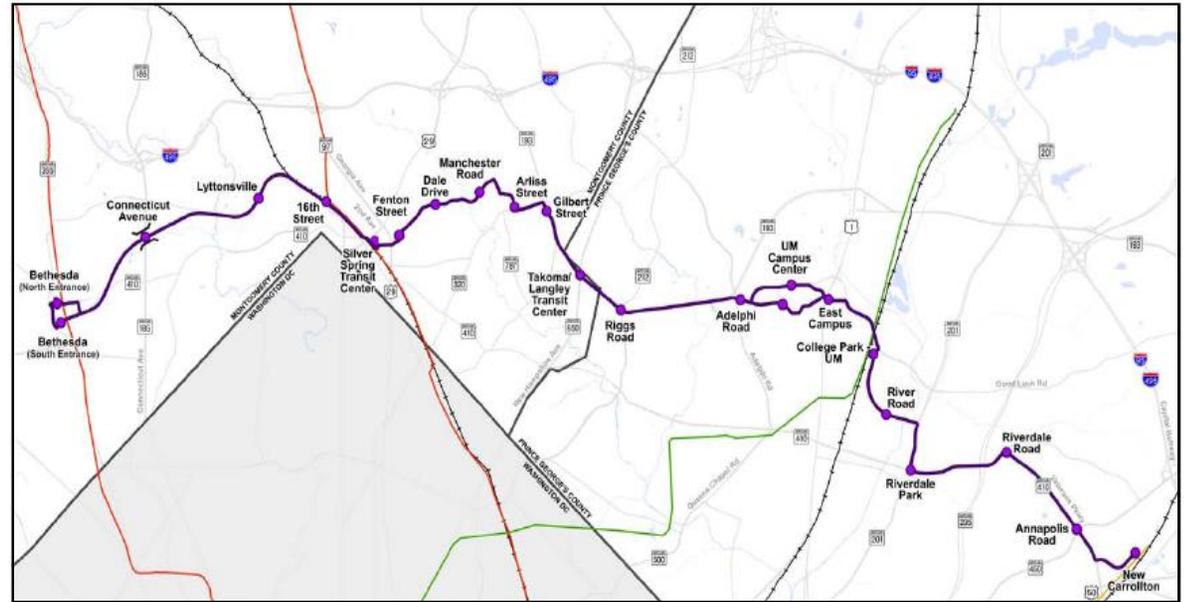
Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Medical Center	4.7	-
Medical Center	Connecticut Avenue	6.0	10.7
Connecticut Avenue	Lyttonsville	5.2	15.9
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.4	18.3
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	6.2	24.5
Silver Spring Transit Center / Metrorail	Fenton Street	4.6	29.1
Fenton Street	Dale Drive	2.8	31.9
Dale Drive	Manchester Place	2.3	34.2
Manchester Place	Arliss Street	4.8	39.0
Arliss Street	Gilbert Street	6.6	45.6
Gilbert Street	Takoma/Langley Transit Center	4.8	50.4
Takoma/Langley Transit Center	UM Campus Center	15.0	65.4
UM Campus Center	College Park – UM Metrorail	10.8	76.2
College Park – UM Metrorail	New Carrollton Metrorail	19.6	95.8

### Alternative 4: Medium Investment BRT

#### Key Features

- Uses Georgetown Branch right-of-way east of Pearl Street
- When westbound, leaves the Georgetown Branch right-of-way at Pearl Street and operates on counterclockwise loop serving both Bethesda Metrorail entrances before re-entering right-of-way at Bethesda Avenue and Woodmont Avenue.
- CCT remains in tunnel adjacent to transitway as only one (westbound) lane is required for bus
- CCT is constructed from Bethesda Metrorail south entrance to SSTC
- Transitway and CCT cross Connecticut Avenue on aerial structure
- Transitway and trail go under Jones Mill Road. Bridges are added for Rock Creek crossing and connection as described under Low Investment BRT alternative
- Transitway is on south side of CSX while trail crosses CSX on new bridge near Talbot Street bridge. The transitway crosses 16<sup>th</sup> Street and Spring Street at-grade and crosses over the CSX right-of-way east of the Falklands Apartments in order to enter the SSTC
- Leaves the SSTC in dedicated lanes on Bonifant Street and operates in shared curbside lanes with added left turn lanes on Wayne Avenue at Cedar Street, Dale Drive, and Sligo Creek Parkway
- Operates in dedicated curbside lanes on Piney Branch Road and University Boulevard. Intersections are crossed at-grade



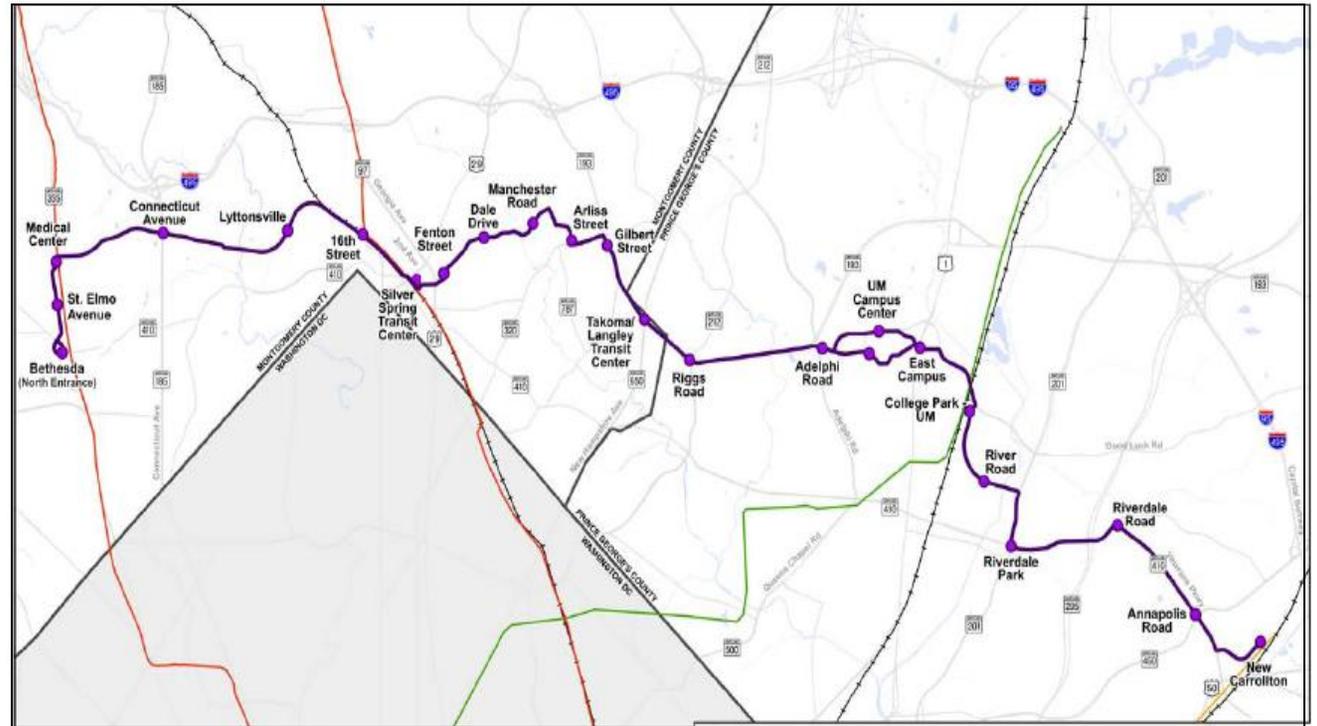
#### Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Bethesda Metrorail South	5.2	-
Bethesda Metrorail South	Connecticut Avenue	5.5	10.7
Connecticut Avenue	Lyttonsville	3.1	13.8
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.4	16.2
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.1	18.3
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	21.4
Fenton Street	Dale Drive	3.0	24.4
Dale Drive	Manchester Place	2.3	26.7
Manchester Place	Arliss Street	4.7	31.4
Arliss Street	Gilbert Street	3.4	34.8
Gilbert Street	Takoma/Langley Transit Center	2.3	37.1
Takoma/Langley Transit Center	UM Campus Center	11.2	48.3
UM Campus Center	College Park – UM Metrorail	6.0	54.3
College Park – UM Metrorail	New Carrollton Metrorail	18.3	72.6

*Alternative 4A: Medium Investment BRT via Jones Bridge Road*

Key Features

- Combines features of Alternative 3 (in Bethesda and along Jones Bridge Road) with features of Alternative 4 (for balance of alignment)
- Adds a station near St. Elmo and Woodmont Avenues
- As in the case of Alternative 3, the CCT would not be constructed west of Jones Mill Road in this alternative



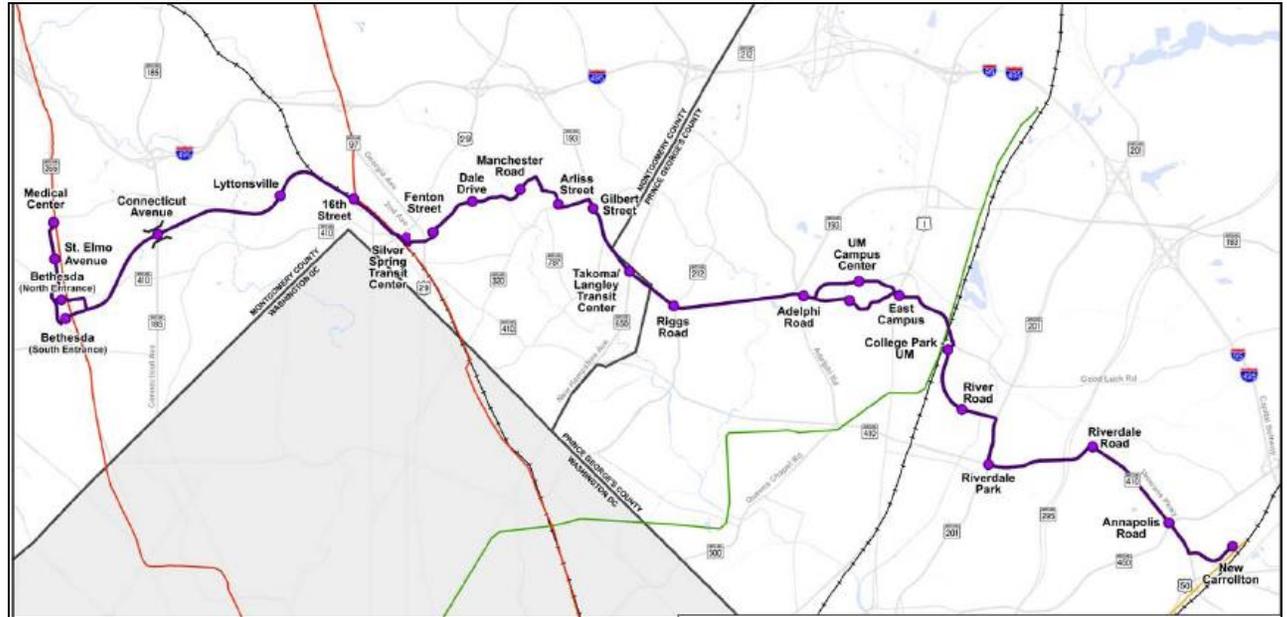
Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Saint Elmo Ave.	3.0	-
Saint Elmo Ave.	Medical Center	3.0	6.0
Medical Center	Connecticut Ave.	6.0	12.0
Connecticut Ave.	Lyttonsville	5.2	17.2
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.4	19.6
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.1	21.7
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	24.8
Fenton Street	Dale Drive	3.0	27.8
Dale Drive	Manchester Place	2.3	30.1
Manchester Place	Arliss Street	4.7	34.8
Arliss Street	Gilbert Street	3.4	38.2
Gilbert Street	Takoma/Langley Transit Center	2.3	40.5
Takoma/Langley Transit Center	UM Campus Center	11.2	51.7
UM Campus Center	College Park – UM Metrorail	6.0	57.7
College Park – UM Metrorail	New Carrollton Metrorail	18.3	76.0

*Alternative 4B – Medium Investment  
BRT via Georgetown Branch Extended  
To Medical Center*

Key Features

- Similar to Alternative 4 but with extension to Medical Center Metrorail Station via station at St. Elmo Avenue.
- The Bethesda Metrorail south entrance would be served only on trips in the eastbound direction.



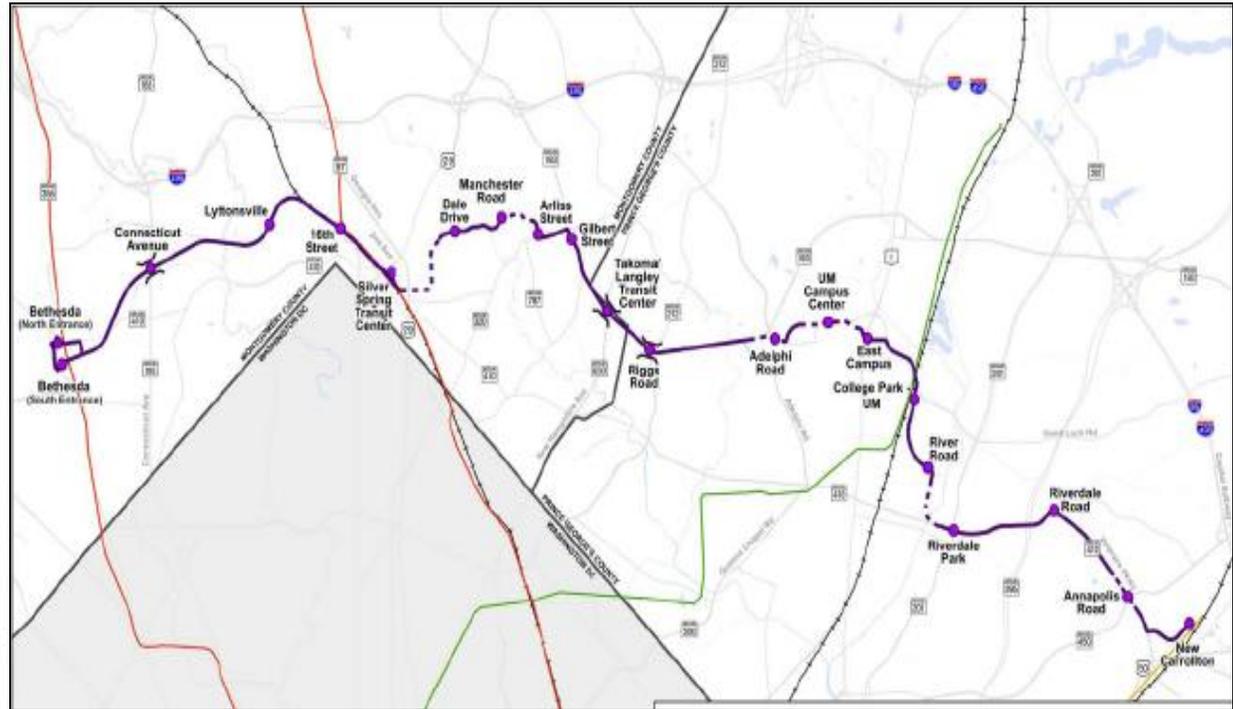
Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Medical Center	Saint Elmo Ave.	3.0	-
Saint Elmo Ave.	Bethesda Metrorail North	3.0	6.0
Bethesda Metrorail North	Bethesda Metrorail South	5.2	11.2
Bethesda Metrorail South	Connecticut Ave.	5.5	16.7
Connecticut Ave.	Lyttonsville	3.1	19.8
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.4	22.2
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.1	24.3
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	27.4
Fenton Street	Dale Drive	3.0	30.4
Dale Drive	Manchester Place	2.3	32.7
Manchester Place	Arliss Street	4.7	37.4
Arliss Street	Gilbert Street	3.4	40.8
Gilbert Street	Takoma/Langley Transit Center	2.3	43.1
Takoma/Langley Transit Center	UM Campus Center	11.2	54.3
UM Campus Center	College Park – UM Metrorail	6.0	60.3
College Park – UM Metrorail	New Carrollton Metrorail	18.3	78.6

### Alternative 5: High Investment BRT

#### Key Features

- Same routing as Alternative 4 west of SSTC except it crosses 16<sup>th</sup> Street and Spring Street below-grade—at about the level of the CSX tracks
- Enters a tunnel south of the SSTC to go under Georgia Avenue and Grove Street before surfacing on Wayne Avenue just east of Cedar Street
- Continues in dedicated lanes on Wayne Avenue until it enters tunnel under Plymouth Street to Arliss Street
- Includes grade separation at New Hampshire Avenue and Riggs Road in addition to Connecticut Avenue.



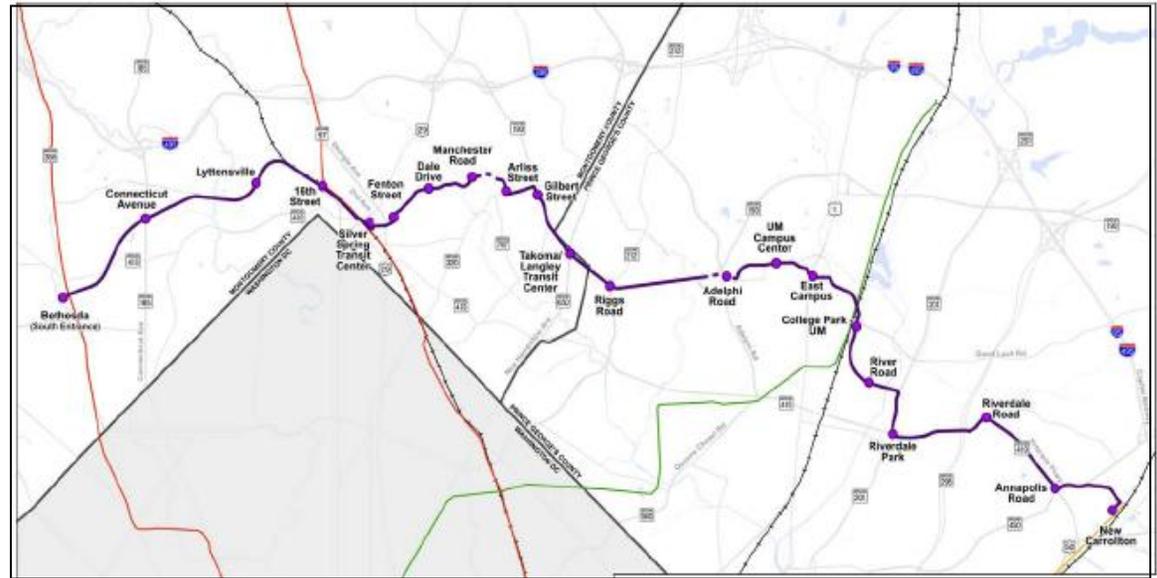
Estimated 2030 Travel Times (doesn't include access or walk, wait, or transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Bethesda Metrorail South	5.2	-
Bethesda Metrorail South	Connecticut Ave.	5.5	10.7
Connecticut Ave.	Lyttonsville	3.1	13.8
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.4	16.2
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.1	18.3
Silver Spring Transit Center / Metrorail	Dale Drive	2.6	20.9
Dale Drive	Manchester Place	2.1	23.0
Manchester Place	Arliss Street	1.4	24.4
Arliss Street	Gilbert Street	4.0	28.4
Gilbert Street	Takoma/Langley Transit Center	2.2	30.6
Takoma/Langley Transit Center	UM Campus Center	7.4	38.0
UM Campus Center	College Park – UM Metrorail	5.9	43.9
College Park – UM Metrorail	New Carrollton Metrorail	15.0	58.9

### Alternative 6: Low Investment LRT

#### Key Features

- Alignment is within Georgetown Branch right-of-way starting just west of Wisconsin Avenue with a connection to the Bethesda Metrorail south entrance
- The CCT exits the right-of-way just east of the tunnel under Wisconsin Avenue and goes through Elm Street Park, crossing Wisconsin Avenue at-grade
- The LRT and trail cross Connecticut Avenue at-grade
- There are two new bridges over Rock Creek—one for the LRT and one for the CCT. The LRT and CCT go under Jones Mill Road
- The LRT alignment in the CSX right-of-way and traveling east out of the SSTC is the same as Alternative 4 except that the LRT travels in the middle shared lanes of Wayne Avenue. Unlike Alternative 7: Medium Investment LRT, there are no new left turn lanes added at selected intersections
- The LRT enters a tunnel after Manchester Place and continues under Plymouth Street to emerge on Arliss Street
- The LRT is in dedicated lanes in the median of Piney Branch Road and University Boulevard. The intersections at New Hampshire Avenue and Riggs Road are crossed at-grade under this alternative.



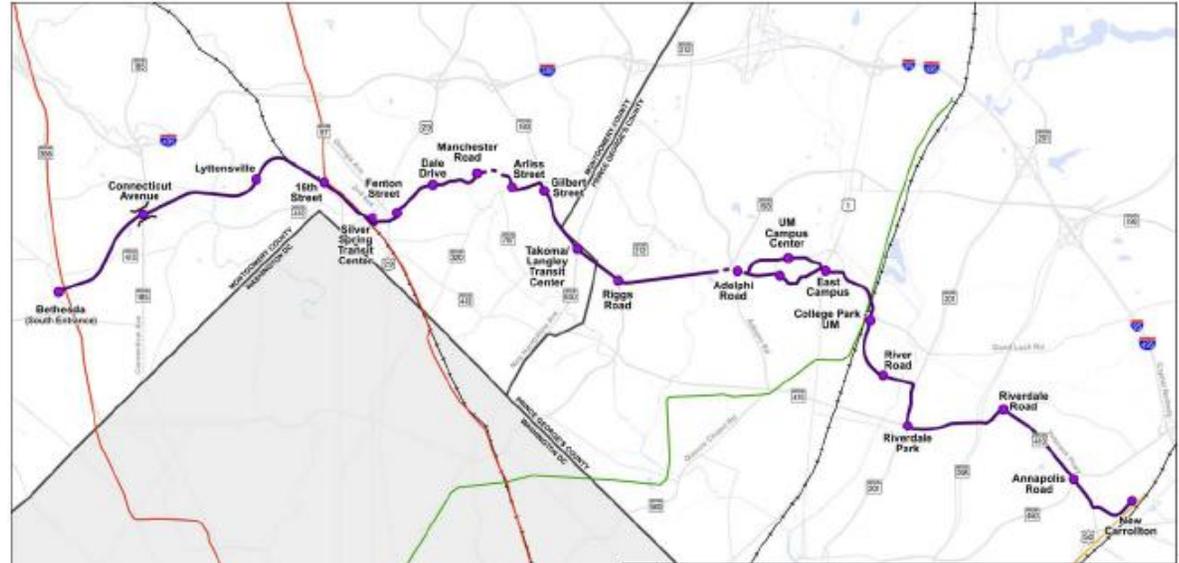
Estimated 2030 Travel Times (doesn't include access or walk, wait, or transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	4.0	-
Connecticut Avenue	Lyttonsville	2.3	6.3
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.1	8.4
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.8	11.2
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	14.3
Fenton Street	Dale Drive	3.8	18.1
Dale Drive	Manchester Place	3.1	21.2
Manchester Place	Arliss Street	1.4	22.6
Arliss Street	Gilbert Street	3.8	26.4
Gilbert Street	Takoma/Langley Transit Center	2.2	28.6
Takoma/Langley Transit Center	UM Campus Center	8.6	37.2
UM Campus Center	College Park – UM Metrorail	6.0	43.2
College Park – UM Metrorail	New Carrollton Metrorail	18.7	61.9

### Alternative 7: Medium Investment LRT

#### Key Features

- Same routing as Alternative 6 in Bethesda- Chevy Chase area, except that there are two bridges over Connecticut Avenue, one for the LRT and one for the CCT
- Same alignment as Alternative 4 within the CSX right-of-way except that the transitway crosses 16<sup>th</sup> Street and Spring Street below grade
- Similar to Alternative 4, the transitway leaves the SSTC in dedicated lanes on Bonifant Street and then operates in the shared median of Wayne Avenue with additional left turn lanes at Cedar Street, Dale Drive, and Sligo Creek Parkway
- Like Alternative 6, the LRT enters a tunnel after Manchester Place and continues under Plymouth Street to emerge on Arliss Street.
- The crossing of New Hampshire Avenue and Riggs Road are at-grade in this alternative



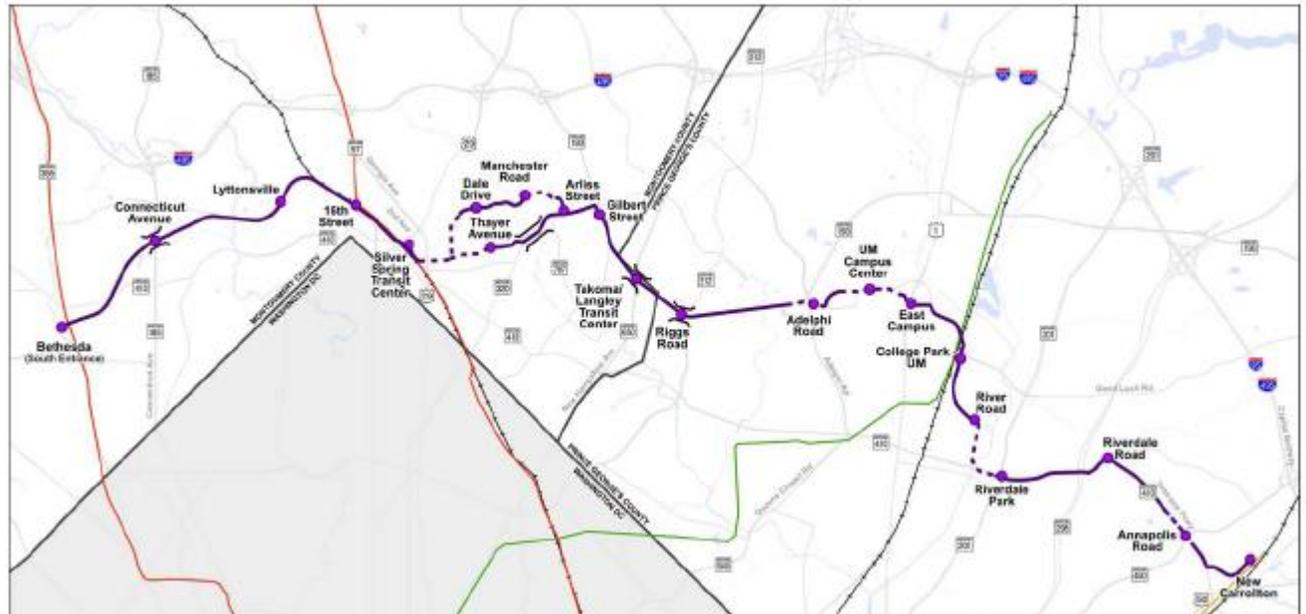
Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer times)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	2.4	-
Connecticut Avenue	Lyttonville	2.3	4.7
Lyttonville	Woodside / 16 <sup>th</sup> Street	2.1	6.8
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.0	8.8
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	11.9
Fenton Street	Dale Drive	3.1	15.0
Dale Drive	Manchester Place	2.8	17.8
Manchester Place	Arliss Street	1.4	19.2
Arliss Street	Gilbert Street	3.8	23.0
Gilbert Street	Takoma/Langley Transit Center	2.2	25.2
Takoma/Langley Transit Center	UM Campus Center	8.6	33.8
UM Campus Center	College Park – UM Metrorail	6.0	39.8
College Park – UM Metrorail	New Carrollton Metrorail	18.7	58.5

### Alternative 8: High Investment LRT

#### Key Features

- In the Bethesda-Chevy Chase area, the same as Alternative 7 except that the CCT doesn't leave the Georgetown Branch right-of-way at Elm Street Park but instead continues through the tunnel above the LRT
- Enters a tunnel south of the SSTC to go under Georgia Avenue and Grove Street before surfacing on Wayne Avenue just east of Cedar Street
- This alternative includes a design option that has an alternative tunnel between Silver Spring and Thayer Avenues. The LRT surfaces behind East Silver Spring Elementary School and crosses Sligo Creek on a bridge. This alignment does not have station stops on Wayne Avenue. The travel times shown below do not include this alignment
- Like Alternative 5, this alternative includes grade separation at New Hampshire Avenue and Riggs Road in addition to Connecticut Avenue



Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer times)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	2.4	-
Connecticut Avenue	Lyttonsville	2.3	4.7
Lyttonsville	Woodside / 16 <sup>th</sup> Street	2.1	6.8
Woodside / 16 <sup>th</sup> Street	Silver Spring Transit Center	2.0	8.8
Silver Spring Transit Center / Metrorail	Dale Drive	3.6	12.4
Dale Drive	Manchester Place	2.4	14.8
Manchester Place	Arliss Street	1.4	16.2
Arliss Street	Gilbert Street	3.8	20.0
Gilbert Street	Takoma/Langley Transit Center	2.1	22.1
Takoma/Langley Transit Center	UM Campus Center	7.4	29.5
UM Campus Center	College Park – UM Metrorail	5.9	35.4
College Park – UM Metrorail	New Carrollton Metrorail	14.8	50.2

Service Profile of the Build Alternatives

Each of the six build alternatives share the same assumptions on hours and frequency of service.

The hours of service are similar to Metrorail as noted in the chart below:

Day of Week	Hours
Monday – Thursday	5:00 AM – 12:00 AM
Friday	5:00 AM – 3:00 AM
Saturday	7:00 AM – 3:00 AM
Sunday	7:00 AM – 12:00 AM

The frequency varies by time of day and day of week as noted below:

Day of Week	Early AM	Peak	Midday	PM Peak	Evening	Late PM
Weekdays	10 min.	6 min.	10 min.	6 min.	10 min.	10 min.
Saturdays	20 min.	N/A	10 min.	N/A	10 min.	20 min.
Sundays	20 min.	N/A	10 min.	N/A	10 min.	20 min.

As previously noted, two types of vehicles are under consideration – Bus Rapid Transit (BRT) or Light Rail Transit (LRT).



A BRT vehicle can generally accommodate up to 120 passengers (including standees and assuming an articulated bus about 60 feet long as shown left) and can be powered by hybrid-electric, diesel, or compressed natural gas (CNG) engines. The vehicle shown is in use in Los Angeles.

An LRT vehicle can generally accommodate around 135 passengers (including standees and assuming an articulated car about 90 feet long as shown right) and can be powered by



electricity. It is assumed the Purple Line trains would consist of two cars during the peak periods. One LRT train can therefore accommodate about 270 passengers or more than twice as many passengers as one BRT bus. The vehicle shown is in use in Charlotte.

The MTA has assumed the fare structure for the Purple Line will be the same as Metrobus:

- Regular Fare (cash) - \$1.35
- Regular fare (SmarTrip) - \$1.25
- Express Bus Fare - \$3.10
- Transfers - free

It is also assumed that fares will be purchased at stations similar to Metrorail and that a proof of purchase will be required to show inspectors who periodically check for confirmation of the fare having been paid.

Estimates of Ridership, Costs, and Cost Effectiveness

The AA/DEIS estimates capital costs and overall benefits of each alternative. The estimates are reached using methodologies reviewed by the FTA and described in detail in Chapter 6 of the AA/DEIS. The cost and cost effectiveness estimates have the following characteristics:

- costs are in 2007 dollars
- cost effectiveness is an estimate of the incremental benefit over the TSM alternative
- the cost effectiveness number is an “annualized cost per hour of user benefit”
- the lower the cost effectiveness number the better
- when using 2007 dollars, if the cost effectiveness number exceeds \$23.99 the alternative isn’t eligible for federal funding using the current rating practice.
- the cost effectiveness measure reflects benefits to all travelers, not just transit users
- the methodology for arriving at an annualized cost per hour of user benefit is designed to capture as many costs as possible and provide an “apples to apples” comparison. It captures life cycle costs, the cost of capital, travel time savings, and other factors. It ignores funding sources and costs or revenues that are not directly related to the project.

The chart below presents the costs and the estimate of the cost effectiveness for each of the original six build alternatives along with three variations (4A, 4B, and 7A), two of which are included in the AA/DEIS and another that the staff requested the MTA to examine.

TABLE 6 – Cost and Ridership

Alternative	Total Capital Costs (2007)	Annual Operating Costs (2007)	Cost Effectiveness (CE) Measure – Annualized Cost Per Hour Of User Benefit	Average Weekday Boardings - 2030	Notes
2 - TSM	\$81,960,000	\$14,600,000	N/A	16,900	baseline alternative
3 - Low Investment BRT	\$386,390,000	\$17,300,000	\$18.24	40,000	via Jones Bridge Road
4 - Medium Investment BRT	\$579,820,000	\$17,300,000	\$14.01	51,800	
4A - Medium Investment BRT via Jones Bridge Road	\$597,000,000	\$17,300,000	\$15.62 <sup>8</sup>	50,000	reviewed in response to town of Chevy Chase concerns

<sup>8</sup> This CE number reflects the estimated \$60 million cost of a new entrance at the southern end of the Medical Center Red Line Station. Without the entrance, the CE number is \$14.04.

Alternative	Total Capital Costs (2007)	Annual Operating Costs (2007)	Cost Effectiveness (CE) Measure – Annualized Cost Per Hour Of User Benefit	Average Weekday Boardings – 2030	Notes
4B - Medium Investment BRT via Georgetown Branch and extended to Medical Center	\$585,000,000	\$18,300,000	\$13.34	58,000	included by MTA for comparison with Medium Investment BRT via Jones Bridge Road
5 - High Investment BRT	\$1,088,480,000	\$15,800,000	\$19.34	58,800	
6 - Low Investment LRT	\$1,206,150,000	\$26,400,000	\$26.51	59,300	
7 - Medium Investment LRT	\$1,220,150,000	\$25,000,000	\$22.82	62,600	
7A - Medium Investment LRT with tunnel from SSTC to east of Cedar Street <sup>9</sup>	\$1,330,000,000	\$24,000,000	\$22.89	64,700	“Hybrid” Alternative analyzed by MTA at request Of staff <sup>10</sup>
8 - High Investment LRT	\$1,634,840,000	\$22,200,000	\$23.71	68,100	

### Master Plan Advisory Group (MPAG)

The MPAG was established by the Planning Board to work with the staff on Purple Line planning, including the review of the AA/DEIS and the development of a Purple Line Functional Plan after the selection of a LPA. The MPAG has met 17 times since its appointment in September of last year.<sup>11</sup> The MPAG comprises individuals and stakeholders along the Purple Line alignment. The MPAG’s role is to assist the Planning Board and staff in reviewing the AA/DEIS, delving into the project details and informing staff and Planning Board of things (positive and negative) that deserve additional focus as well as things about the project they do don’t like.<sup>12</sup> The MPAG’s input over the last year has been constructive and added value to the

<sup>9</sup> This alternative – like the other High Investment Alternatives – does not include stations at Dale Drive or at the proposed library site at Wayne Avenue and Fenton Street.

<sup>10</sup> The staff has also recently asked the MTA to consider analyzing (i.e., include in the coded network) a tunnel that would extend under Wayne Avenue and surface in the vicinity of Mansfield Road.

<sup>11</sup> A summary of the MPAG work – along with related Purple Line documents and reports – is available on the Planning Board Purple Line project web site at:

<http://www.mcparkandplanning.org/Transportation/projects/bicounty.shtm>

<sup>12</sup> See the Purple Line Functional Master Plan Purpose and Outreach Strategy Report, pages 15-18, at: <http://www.mcparkandplanning.org/planning/viewer.shtm#http://www.mcparkandplanning.org/Transportation/projects/documents/FINALPURPOSEANDOUTREACHREPORT010808.pdf> for a discussion of initial issues raised by the MPAG.

planning process. To our knowledge, it is the only forum where the diverse views of residents and stakeholders along the alignment are heard on a regular basis. On a project of this scope, the absence of a consensus by the MPAG on any specific issue doesn't diminish the value of MPAG contributions. Additional information on major issues raised by the MPAG and the MTA and staff response to those issues is included throughout this memo.