# Chapter 3
# Transportation and Traffic

# Chapter 3. Transportation and Traffic

In this chapter, the transportation and traffic impacts of the No Build, TSM, and six Build alternatives are evaluated. This chapter is organized into sections that describe regional travel patterns and potential impacts on public transportation, highways and roadways, parking, bikeways, and major pedestrian pathways.

## 3.1. Public Transportation

### *3.1.1. No Build Alternative*

Existing transit service in the corridor is provided by WMATA Metrorail and Metrobus, Montgomery County Ride On local bus, Prince George's County TheBus local bus, the University of Maryland Shuttle, MARC commuter rail, and Amtrak. Table 3-1 lists the principal existing transit services within the corridor.

The transit service levels in the Constrained Long Range Plan (CLRP) are assumed for the No Build alternative except for the Bethesda to Silver Spring segment of the Purple Line.

Transit projects in the Maryland Consolidated Transportation Program (FY 2007–2012) located within the corridor, and expected to be in place by 2030, include the following:

- Southern Entrance to Bethesda Metro Station – A new entrance to the mezzanine of the Bethesda Metro Station at the southern end of the platform. This second entrance was anticipated at the time of the initial construction of the Metro station, but left unbuilt until ridership required it. The design of this project has been funded by Montgomery County and is currently underway.
- Silver Spring Transit Center – This project provides a fully integrated transit center at the Silver Spring. It will include bus bays for Metrobus and Ride On, an intercity bus facility, a taxi queue area, and a kiss-and-ride facility. Construction has begun on this facility and should be complete by 2010. Provisions have been made in the transit center design to accommodate the Purple Line. For the TSM and Low Investment BRT the buses would use the middle level bus facility.
- Takoma/Langley Park Transit Center – A new transit center will be built at the northwest corner of the University Boulevard and New Hampshire Avenue intersection. It is expected to be completed by 2010. The TSM and all the Build alternatives would have a station at this transit center. This project is being funded by the State of Maryland and Montgomery and Prince George's Counties.

**Table 3-1: Existing Transit Service**

| Route | Terminal & Intermediate Points |
|---|---|
| Metro Red Line | Shady Grove – Glenmont |
| Metro Green Line | Greenbelt – Branch Avenue |
| Metro Orange Line | Vienna/Fairfax/GMU – New Carrollton |
| WMATA J1, J2, J3 | Montgomery Mall – Bethesda – Silver Spring Metro |
| WMATA J4 | Bethesda Metro – Silver Spring – College Park Metro |
| WMATA C2 | Wheaton Metro – Greenbelt Metro |
| WMATA C4 | Twinbrook Metro – Prince George's Plaza Metro |
| WMATA F4 | Silver Spring – New Carrollton |
| WMATA F6 | Silver Spring – New Carrollton |
| Ride On 15 | Silver Spring Metro – Langley Park |
| TheBus 17 | Langley Park – UM – College Park Metro |
| UM Shuttle 111 | UM – Silver Spring Metro |
| UM Shuttle 104 | UM – College Park Metro |
| MARC Brunswick Line | Washington – Rockville – Gaithersburg - Brunswick |
| MARC Penn Line | Washington – BWI Thurgood Marshall Airport – Baltimore –Perryville |
| MARC Camden Line | Washington – Baltimore |
| Amtrak Northeast Corridor | Washington – New York and points north and south |

The Metrorail system opens at 5 AM on weekdays and 7 AM on weekends. It operates until midnight Sunday through Thursday and until 3 AM on Fridays and Saturdays.

Metrobus schedules vary by route, with most routes running every day. Ride On schedules also vary by route, with most routes running daily. TheBus buses operate Monday through Friday, with no service on weekends or holidays. Bus headways on all three systems vary by time of day. Table 3-2 lists the bus routes within the corridor and their headways. Transit service to the National Naval Medical Center/National Institutes of Health area is provided from Silver Spring and points east via the WMATA J1 route, while the Red Line Medical Center Metro Station connects to the entire rail-bus network.

**Table 3-2: Bus Headways within the Corridor (minutes)**

| Route | Terminal and Intermediate Points | Early Morning | AM Peak | Midday | PM Peak | Evening | Saturday | Sunday |
|---|---|---|---|---|---|---|---|---|
| WMATA J1 | Montgomery Mall-Medical Center-Silver Spring Metro | -- | 20 | -- | 20 | --- | -- | -- |
| 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 | -- | -- | -- |
| WMATA C2 | Wheaton Metro-Greenbelt Metro | -- | 22 | 30 | 16 | -- | 30 | -- |
| WMATA C4 | Twinbrook Metro-Prince George's Plaza Metro | 10 | 22 | 30 | 16 | 30 | 30 | 16 |
| WMATA F4 | Silver Spring – New Carrollton | 12 | 12 | 40 | 15 | -- | 30 | 60 |
| WMATA F6 | Silver Spring – New Carrollton | -- | 20 | 40 | 30 | -- | -- | -- |
| Ride On 15 | Silver Spring Metro-Langley Park | 15 | 4 | 12 | 4 | 30 | 12 | 15 |
| TheBus 17 | Langley Park-UM-College Park Metro | 45 | 45 | 45 | 45 | -- | -- | -- |
| UM Shuttle 111 | UM – Silver Spring Metro | -- | 35 | 75 | 45 | 30 | -- | -- |
| UM Shuttle 104 | UM – College Park Metro | 8 | 8 | 12 | 8 | 20 | 20 | 20 |

Since no changes are anticipated to the bus network under the No Build alternative, it is not anticipated that current service levels would change substantially.

The No Build alternative would not include any alterations to the existing Metrobus, Ride On, or TheBus systems. It would not include addition of a new mode or new exclusive right-of-way, and therefore is not anticipated to substantially increase the reliability of the existing transit system. It is expected that increasing roadway congestion will result in lengthened bus running times and longer travel times for all vehicles and continue to decrease the reliability of the bus service, its adherence to its operational schedule, and the predictability of expected headways and transit travel times.

### *3.1.2. TSM Alternative*

The TSM alternative would include enhanced bus service in the corridor and a new through-route from Bethesda to New Carrollton replacing the existing J4 route and adding service on portions of the F4/F6 routes between College Park and New Carrollton. The TSM bus service would consist of a limited-stop bus route that would make stops consistent with those of the Build alternatives. The core service improvements under the TSM alternative include limited-stop bus service, selected intersection and signal preference strategies, and upgrades to bus stop amenities. See Chapter 2 for a more detailed description of the TSM alternative.

A principal difference between the TSM and the Build alternatives is that the TSM service would operate on East West Highway between Bethesda and Silver Spring, rather than along a new guideway along the Georgetown Branch and Metropolitan Branch railroad rights-of-way between Bethesda and Silver Spring, as with the Build alternatives (except Low Investment BRT, which runs along Jones Bridge Road.) Along East West Highway, stops would be located at Connecticut Avenue and at Grubb Road.

The TSM service would provide faster one-seat rides between activity centers, including Medical Center Metro Station, Bethesda Metro Station, Silver Spring Transit Center, Takoma/Langley Park Transit Center, University of Maryland, College Park Metro Station, and New Carrollton Metro Station. This route would also serve transfers to bus routes operating on radial streets, including those on Wisconsin Avenue, Connecticut Avenue, Colesville Road, Georgia Avenue, New Hampshire Avenue, Riggs Road, Adelphi Road, US 1, Kenilworth Avenue, and Annapolis Road. It would serve the long-haul trips now carried by WMATA J2/J3, Ride On 15, and, to a degree, WMATA C2/C4, and it is estimated to serve nearly 80 percent of the passengers now boarding the routes named above.

Transit service to the National Naval Medical Center/National Institutes of Health area would be provided from Silver Spring and points east through the enhanced WMATA J1 service with intersection, operational, or service modifications. The Red Line Medical Center Station would continue to provide connectivity to the entire rail-bus network.

Because of the importance of serving the trips that interface with the Metrorail services in the Purple Line corridor, the TSM span of service would match the Metrorail span of service. The Metrorail system opens at 5 AM on weekdays and 7 AM on weekends. It operates until midnight Sunday through Thursday and until 3 AM on Fridays and Saturdays.

The fare structure for the TSM service would be the same as under the No Build alternative, recognizing that fares would increase over time. SmartCard, or some other means of electronic fare collection, may enable an integrated fare structure and convenient transfer with other transit services in the corridors.

End-to-end, the TSM route is 16 miles long, requiring about 108 minutes of running time with an average round trip speed of 9 miles per hour. Today, the bus routes along the alignment operate in very difficult circumstances with a wide range of times in each direction and between the AM and PM. Anecdotal reports from WMATA indicate that the J4 route often requires 50 percent more time than is scheduled on certain runs to complete its trip. These conditions complicate schedule preparation and operations planning. It is assumed TSM measures would somewhat mitigate these conditions; however, 2030 background traffic volumes and traffic congestion levels will be far greater than they are today.

The TSM alternative includes modifications to existing Metrobus routes intended to improve reliability, including limited-stop bus service, and intersection improvements and signal priority at certain intersections. At intersections where queue jump lanes and signal priority would be implemented, transit's reliability would increase because the effects of congestion at these locations would be reduced. In addition, the limited-stop service would provide faster connections between major origins and destinations, as well as providing one-seat rides.

However, there is only limited opportunity for improving transit service reliability using signal preference strategies in the corridor. The major radial roadways that cross the corridor, such as Connecticut Avenue, Georgia Avenue, New Hampshire Avenue, Riggs Road, Adelphi Road, US 1, Kenilworth Avenue, and Annapolis Road, are the major sources of delay and unreliability. These arterial roadways carry very heavy traffic flows into and out of Washington, DC and other activity centers. There is very little opportunity to introduce signal preferences at these intersections without causing a major exacerbation of traffic congestion. Queue jump lanes, however, do provide a travel time reliability advantage enabling transit vehicles to get to the intersection and limit the delay to one or two traffic signal cycles.

**Table 3-3: TSM Bus Headways (minutes)**

| Route | Terminal and Intermediate Points | Early Morning | AM Peak | Midday | PM Peak | Evening | Weekend |
|---|---|---|---|---|---|---|---|
| TSM | Bethesda – New Carrollton | 10 | 6 | 10 | 6 | 10 | 20 |
| WMATA J1 | Medical Center – Silver Spring | -- | 20 | -- | 20 | -- | -- |
| WMATA J3 | Eliminate; replace with Ride On 15 service | -- | -- | -- | -- | -- | -- |
| WMATA C2 | Terminate at Langley Park<br>Langley Park – Greenbelt | 30 | 15 | 20 | 15 | 30 | 30 |
| WMATA C4 | Twinbrook Metro – Prince George's Plaza Metro | 10 | 8 | 15 | 8 | 20 | 20 |
| WMATA F4 | Silver Spring – New Carrollton | 12 | 10 | 30 | 10 | -- | 30 |
| WMATA F6 | Terminate at Prince George's Plaza<br>Prince George's Plaza – New Carrollton | -- | 15 | 30 | 15 | -- | -- |
| Ride On 15 | Bethesda – Langley Park (extend to Bethesda) | 15 | 15 | 15 | 15 | 30 | 15 |
| TheBus 17 | Langley Park–UM–College Park Metro | 45 | 45 | 45 | 45 | -- | -- |

### *3.1.3. Build Alternatives*

Six Build alternatives are under consideration. They include two transit modes, BRT and LRT. Each mode is being analyzed with three potential levels of investment: low, medium, and high. All of the Build alternatives would extend the full length of the corridor between the Bethesda Metro Station and the New Carrollton Metro Station with some variations in alignment location, type of running way (shared, dedicated, or exclusive), and amount of grade separation. The decision to construct dedicated lanes is dependent on the results of the operations modeling (which assumes no dedicated lanes), as well as construction costs and potential environmental benefits and impacts. Each of the Build alternatives is described briefly below and in greater detail in Chapter 2, *Alternatives Considered.*

#### Alternative 3 - Low Investment BRT

Low Investment BRT would primarily use existing streets to minimize capital costs. It would incorporate improvements to traffic signals (including signal priority where possible), signage, and travel lanes in appropriate areas. This alternative would mostly operate in mixed lanes, crossing all intersections at grade, and would include queue jump lanes at major intersections. Dedicated BRT lanes would be provided southbound along Kenilworth Avenue, and westbound along Annapolis Road. This is the only Build alternative that would operate on Jones Bridge Road (directly serving the National Institutes of Health and the National Naval Medical Center) and that would use the bus portion of the new Silver Spring Transit Center.

#### Alternative 4 - Medium Investment BRT

Medium Investment BRT is a composite of elements from the Low and High Investment BRT. Medium Investment BRT incorporates those lower-cost features for segments of Low Investment BRT that perform reasonably and those of High Investment BRT that provide reasonable benefits relative to the higher costs. The major incremental change for Medium Investment BRT is that between Bethesda and Silver Spring the transit service runs in a guideway in the Georgetown Branch right-of-way instead of along Jones Bridge Road. It would serve both the existing Bethesda bus terminal and the new south entrance to the Bethesda Metro Station beneath the Apex Building. At the Silver Spring Transit Center, the buses would enter on an aerial structure parallel to, but at a higher level than, the existing Metro and CSX tracks. Along University Boulevard the alternative would be in dedicated lanes and the alternative would leave Campus Drive in the University of Maryland at Regent's Drive to proceed directly through the East Campus development.

#### Alternative 5 - High Investment BRT

High Investment BRT is structured to provide the fastest travel time of the BRT alternatives. Tunnels and aerial structures are proposed at key locations to improve travel time and reduce delay. When operating within or adjacent to existing roads, this alternative would operate largely in dedicated traffic lanes. Like Medium Investment BRT, this alternative would serve the Bethesda Metro Station at both the bus terminal and the new south entrance. At the Silver Spring Transit Center, the buses would enter on an aerial structure parallel to, but at a higher level than, the existing Metro and CSX tracks.

#### Alternative 6 - Low Investment LRT

The terminal station for Low Investment LRT would be the Bethesda Metro Station with a connection to the southern end of the existing station platform (the LRT alternatives would only serve the south entrance of the Bethesda Metro Station and would operate there in a stub-end platform arrangement). It would operate in shared and dedicated lanes with minimal use of vertical grade separation and horizontal traffic separation. At the Silver Spring Transit Center, the light rail transit would enter on an aerial structure parallel to, but at a higher level than, the existing tracks.

This alternative would incorporate signal priority and/or queue jump lanes at major intersections, where possible to achieve substantial time savings or reliability without overly adversely affecting traffic at the intersections.

#### Alternative 7 - Medium Investment LRT

Medium Investment LRT is a composite of elements from Low and High Investment LRT. This alternative incorporates those lower cost features for segments of Low Investment LRT that perform reasonably and those of High Investment LRT that provide reasonable benefits relative to their higher costs. The principal incremental change for Medium Investment LRT is the introduction of several grade separations at major roadways and more dedicated sections along roadways; however, it does not include some of the longer tunnel sections in East Silver Spring, the University of Maryland, or Riverdale Park included under High Investment BRT and LRT.

#### Alternative 8 - High Investment LRT

High Investment LRT is nearly identical to High Investment BRT, except that it only serves the south entrance of the Bethesda Metro Station and would not serve the bus terminal.

#### Build alternatives Operations

The span of service for the Build alternatives would mirror that for the Metrorail system, including extended hours on weekend nights. See Table 3-4.

**Table 3-4: Span of Service**

| 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 headways of the various Build alternatives would vary by time of day to reflect demand requirements. Proposed headways are shown by time period in Table 3-5. The span of services of the bus routes that feed the TSM and Build alternatives would be adjusted to serve the market needing extended service times.

**Table 3-5: Year 20303 Build Alternatives Headways (minutes)**

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

The fare for all of the Build alternatives under consideration would be consistent with the current local bus fare structure, recognizing that this would increase over time. SmartCard, or some other means of electronic fare collection, would enable an integrated fare structure and convenient transfer with the other transit services in the corridor.

The end-to-end travel times and average estimated speeds for each build alternative are shown in Table 3-6. As expected, High Investment LRT, with strategic grade separation and mostly dedicated or exclusive right-of-way, would have the shortest running time and the highest average speed of all the alternatives.

**Table 3-6: Year 2030 End-to-End Travel Times**

| | End-to-End Running Time (minutes) | Average Speed (mph) |
|---|---|---|
| TSM | 108 | 9 |
| Low Investment BRT | 96 | 10 |
| Medium Investment BRT | 73 | 13 |
| High Investment BRT | 59 | 16 |
| Low Investment LRT | 62 | 15 |
| Medium Investment LRT | 59 | 16 |
| High Investment LRT | 50 | 19 |

Average station-to-station travel time estimates for the Build alternatives are shown in Table 3-7.

The Medium Investment BRT variation via Jones Bridge Road would have an end-to-end running time of 76 minutes, which would result in an average speed of 13 mph. The other variation, Medium Investment BRT Extended to Medical Center, would have an end-to-end running time of 78 minutes, which would also result in an average speed of 13 mph. Under this latter variation, the time to downtown Bethesda, the larger travel market than Medical Center, would be 59 minutes compared to the 76 minutes via the Jones Bridge Road alignment.

*Reliability*

The overall reliability of any of the Build alternatives would be higher than that for the No Build or TSM alternatives because portions of the service, depending on the alternative, would operate in dedicated lanes or exclusive right-of-way, thus removing the vehicles from the potential delays of roadway congestion. In areas where the Purple Line would operate in shared lanes, it is anticipated that queue jump lanes and signal prioritization would be implemented where possible. The High Investment alternatives would have the highest reliability, and the Low Investment alternatives would have the lowest reliability. Because of the terminal configuration of High and Medium Investment BRT at Bethesda that involves a street-running loop, those two alternatives would not be as reliable as their LRT counterparts. Similarly, Low Investment BRT with its operations along Jones Bridge Road between Bethesda and Jones Mill Road would have lower reliability than Low Investment LRT, which would operate in the Georgetown Branch right-of-way, an exclusive right-of-way.

**Table 3-7: Year 2030 Average Station-to-Station Travel Times (minutes)**

| Segment | TSM | Low Investment BRT | Medium Investment BRT | High Investment BRT | Low Investment LRT | Medium Investment LRT | High Investment LRT |
|---|---|---|---|---|---|---|---|
| Bethesda Metro, North entrance to Medical Center Metro | N/A | 4.7 | N/A | N/A | N/A | N/A | N/A |
| Bethesda Metro, North entrance to Bethesda Metro, South entrance | N/A | N/A | 5.2 | 5.2 | N/A | N/A | N/A |
| Medical Center Metro to Connecticut Avenue | N/A | 6.0 | N/A | N/A | N/A | N/A | N/A |
| Bethesda Metro, South entrance to Connecticut Avenue | 10.8 | N/A | 5.5 | 5.5 | 4.0 | 2.4 | 2.4 |
| Connecticut Avenue to Grubb Road | 7.3 | N/A | N/A | N/A | N/A | N/A | N/A |
| Connecticut Avenue to Lyttonsville | N/A | 5.2 | 3.1 | 3.1 | 2.3 | 2.3 | 2.3 |
| Grubb Road to Silver Spring Transit Center | 13.2 | N/A | N/A | N/A | N/A | N/A | N/A |
| Lyttonsville to Woodside/16th Street | N/A | 2.4 | 2.4 | 2.4 | 2.1 | 2.1 | 2.1 |
| Woodside/16th Street to Silver Spring Transit Center | N/A | 6.2 | 2.1 | 2.1 | 2.8 | 2.0 | 2.0 |
| Silver Spring Transit Center to Fenton Street | 5.1 | 4.6 | 3.1 | N/A | 3.1 | 3.1 | N/A |
| Silver Spring Transit Center to Dale Drive | N/A | N/A | N/A | 2.6 | N/A | N/A | 3.6 |
| Fenton Street to Dale Drive | 4.8 | 2.8 | 3.0 | N/A | 3.8 | 3.1 | N/A |
| Dale Drive to Manchester Road | 2.9 | 2.3 | 2.3 | 2.1 | 3.1 | 2.8 | 2.4 |
| Manchester Road to Arliss Street | 4.9 | 4.8 | 4.7 | 1.4 | 1.4 | 1.4 | 1.4 |
| Arliss Street to Gilbert Street | 6.6 | 6.6 | 3.4 | 4.0 | 3.8 | 3.8 | 3.8 |
| Gilbert Street to Takoma/Langley Transit Center | 4.8 | 4.8 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 |
| Takoma/Langley Transit Center to Riggs Road | 5.8 | 5.6 | 2.7 | 1.7 | 2.4 | 2.4 | 1.7 |
| Riggs Road to Adelphi Road | 6.0 | 5.7 | 5.6 | 3.1 | 3.3 | 3.3 | 3.1 |
| Adelphi Road to UM Campus Center | 4.0 | 3.7 | 2.9 | 2.6 | 2.9 | 2.9 | 2.6 |
| UM Campus Center to UM East Campus | 8.6 | 8.6 | 3.0 | 2.9 | 3.0 | 3.0 | 2.9 |
| UM East Campus to College Park Metro | 2.0 | 2.2 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| College Park Metro to River Road | 2.0 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| River Road to Riverdale Park | 5.5 | 5.4 | 4.3 | 3.2 | 4.6 | 4.6 | 3.1 |
| Riverdale Park to Riverdale Road | 4.4 | 4.0 | 4.7 | 2.9 | 4.8 | 4.8 | 2.9 |
| Riverdale Road to Annapolis Road | 4.7 | 4.0 | 3.6 | 3.5 | 3.5 | 3.5 | 3.3 |
| Annapolis Road to New Carrollton Metro | 4.6 | 4.4 | 3.8 | 3.5 | 3.9 | 3.9 | 3.6 |
| **Total Running Time (rounded up to the nearest minute)** | **108** | **96** | **73** | **59** | **62** | **59** | **50** |

Note: Time represent average of morning and afternoon peak period travel times in the eastbound and westbound direction.

*Ridership*

Ridership forecasts are used to gauge the comparative attractiveness of alternatives under consideration. They are measured in terms of daily passengers and daily boardings, also called linked and unlinked trips. A passenger, or linked trip, is defined as travel from trip origin to trip

destination, regardless of the number of transfers or mode changes required. A boarding, or unlinked trip, is counted as the number of times a person enters a vehicle for travel, inclusive of transfers. One linked trip from origin to destination could comprise multiple unlinked trips.

Purple Line ridership forecasts were measured in terms of total and new daily transit trips (linked), peak period boardings and alightings by station, and by peak period line volumes.

*Total and New Transit Trips*

The Build alternatives would generate approximately a one percent increase in total regional transit ridership over the No Build alternative, while the TSM would generate approximately one half percent increase in total regional transit ridership. Detailed ridership forecasts are shown in Table 3-8. The results of the ridership modeling would indicate that forecast ridership on the Purple Line will not be the key determinant in selecting a preferred alternative, but rather the results of the environmental, traffic, and cost-benefit analyses.

*District–to-District Travel Patterns*

As discussed in Chapter 1, and shown in Figure 1-3 the Washington metropolitan area was defined as a set of districts to enable a discussion of the current travel patterns. A set of districts are defined around the major activity centers of Bethesda, Silver Spring, College Park, and New Carrollton in the corridor. Three additional districts are used to describe the "wedge" areas in between the major activity centers, Connecticut Avenue/Lyttonsville, Takoma Park/ Langley Park, and Riverdale Park. These seven districts constitute the Purple Line corridor. Other districts are used to define major sections of Washington, DC, and travel market areas around the Metrorail lines (both branches of the Red Line, Green Line, and Orange Line) running north and northeast of the corridor. The rest of the region is defined by larger districts for the remainder of Maryland and the areas of Virginia.

What this information shows is that while there is quite a bit of existing transit travel within the Purple Line corridor, there is a greater number of trips associated with areas outside the corridor, i.e., with Washington, DC and areas north along the Metrorail Red, Green, and Orange Lines, especially up toward the Shady Grove-Rockville area and the Glenmont area. While the major activity centers account for the majority of the trips, a substantial number of trips are associated with the wedge districts, those areas not presently served by Metrorail and dependent on street-running bus service operating in congested mixed traffic, are linked with either one of the major activity centers or other areas accessible via the Metrorail system, especially Washington, DC.

Referring to Table 3-9, by the year 2030 under the No Build, daily transit trips are forecast to grow by 953,000, 52 percent, for a total of 2,711,000.

Transit trips associated with the corridor grow by 38 percent, to 234,000, while trips within the corridor grow by 43 percent to 62,000 trips. While the general pattern and distribution of these transit trips would be similar to current trips, the level of growth is substantial, increasing the severity and the magnitude of the mobility needs of Purple Line corridor travelers.

The TSM alternative would increase daily total transit trips by 16,000 over the 2030 Future No Build. Of these new transit trips, 13,200, over 80 percent, are between the corridor and areas outside the corridor; while the other 2,800 trips are within the corridor. The TSM alternative provides most of the benefits to corridor trips to access the transit services that connect with the rest of the region; rather than travel among districts within the corridor.

All the Build alternatives have a similar pattern of change in the travel patterns, but because they have a similar alignment and station definitions and vary primarily by travel times, have different amount of new transit trips with High Investment LRT generating the highest number of new transit trips, and the Low Investment BRT generating the lowest.

**Table 3-8: Year 2030 Total Daily Linked Transit Trips**

| | Type of Trip | No Build | TSM | Low Invest. BRT | Med. Invest. BRT | High Invest. BRT | Low Invest. LRT | Med. Invest. LRT | High Invest. LRT |
|---|---|---|---|---|---|---|---|---|---|
| Bus | Work | 236,139 | 238,873 | 229,096 | 226,886 | 225,970 | 225,829 | 225,448 | 224,879 |
| | Non-work | 211,747 | 214,772 | 207,301 | 205,934 | 205,403 | 205,344 | 205,098 | 204,434 |
| Metrorail | Work | 561,114 | 560,040 | 558,148 | 558,299 | 557,668 | 558,423 | 558,377 | 558,446 |
| | Non-work | 298,451 | 300,917 | 300,909 | 301,583 | 301,852 | 302,331 | 302,523 | 303,011 |
| Commuter Rail | Work and Non-work | 47,944 | 48,983 | 48,922 | 48,937 | 48,984 | 48,934 | 48,930 | 48,956 |
| Purple Line | Work | NA | NA | 13,827 | 17,896 | 20,759 | 20,444 | 21,377 | 22,953 |
| | Non-work | NA | NA | 8,570 | 11,169 | 12,423 | 12,307 | 12,849 | 13,488 |
| **Total Transit Trips** | | **1,355,395** | **1,363,585** | **1,366,773** | **1,370,704** | **1,373,059** | **1,373,612** | **1,374,602** | **1,376,167** |
| **New Transit Trips Relative to No Build (Rounded)** | | N/A | 8,200 | 11,400 | 15,300 | 17,700 | 18,200 | 19,200 | 20,500 |

**Table 3-9: Regional Transit Trips**

| | Existing 2000 | 2030 No Build | 2030 TSM | 2030 Representative Build Alternative |
|---|---|---|---|---|
| Trips Associated with Purple Line Corridor | 169,000 | 234,000 | 302,000 | 334,000 |
| Trips within Purple Line Corridor | 44,000 | 62,000 | 65,000 | 75,000 |
| **Total Regional Trips** | **1,778,000** | **2,711,000** | **2,727,000** | **2,749,000** |

*Daily Line Haul Boardings*

Table 3-10 shows the total daily boardings for each of the alternatives. A boarding is when a person uses the transit service for all or part of trip. The boardings are shown for trips only using the Purple Line (over half the boardings), trips primarily on Metrorail and using the Purple Line for part of that trip, and trips primarily on MARC and using the Purple Line for part of that trip. High Investment LRT attracts the highest number of boardings followed by the other LRT alternatives and then the BRT alternatives.

The Medium Investment BRT variation via Jones Bridge Road, with the addition of the station at Woodmont Avenue and St. Elmo Street, would have total daily boardings of 50,000, while the other variation, Medium Investment BRT Extended to Medical Center, also including the station at Woodmont Avenue and St. Elmo Street, would have total daily boardings of 58,000. The Jones Bridge Road variation shows that the longer routing to the larger Bethesda travel market results in a loss of 2000 daily boardings relative to the original Medium Investment BRT alternative. The variation extending the service to Medical Center from Bethesda increases the daily boardings by 6,000.

*Daily Station Boardings*

Daily boardings, by station, for each of the Build alternatives are shown in Table 3-11. Not surprisingly given the shorter travel times, the highest number of riders is attracted by High Investment LRT, followed by Medium Investment LRT, and then Low Investment LRT and High Investment BRT, which attract approximately the same number of riders. All of the Build alternatives, except Low Investment BRT, have the same top three stations for daily boardings: the western terminus in Bethesda (north or south), the Silver Spring Transit Center, and the College Park Metro Station. For Low Investment BRT, the top three stations for daily boardings are the Silver Spring Transit Center, US 1 and College Park Metro Station.

*Station Mode of Access*

At all the stations along the Purple Line walk and feeder bus access would be the principal means of access and egress. At the Bethesda, Silver Spring, College Park, and New Carrollton Stations, transfer with Metrorail would be the major connection. With the exception of Bethesda, MARC connections are available at those stations. Major bus interfaces would occur at Bethesda, Silver Spring, Takoma/Langley, College Park, and New Carrollton stations. All these connections are with existing services. Some of the existing bus services would be modified to better integrate with the Purple Line service. Some existing bus services that duplicate the Purple Line service may be cut back. While parking facilities exist at the four Metrorail stations that connect with the Purple Line, no new park-and-ride facilities would be provided at any of the Purple Line stations. Kiss-and-ride could occur at some of stations, as occurs today at some bus stops, but additional kiss-and-ride facilities are being considered at Connecticut Avenue at the Georgetown Branch right-of-way, and at Lyttonsville.

*University of Maryland Student Travel*

The travel of University of Maryland employees, faculty, and staff to and from the campus is captured within the regional travel model forecasts and these trips are included in the

**Table 3-10: Year 2030 Daily Purple Line Ridership**

| Transit Ridership (daily boardings) | TSM | Low Invest. BRT | Medium Invest. BRT | High Invest. BRT | Low Invest. LRT | Medium Invest. LRT | High Invest. LRT |
|---|---|---|---|---|---|---|---|
| Purple Line | 12,700 | 22,200 | 29,300 | 33,800 | 32,500 | 33,900 | 36,100 |
| Purple Line via Metrorail | 2,100 | 16,700 | 21,100 | 23,700 | 25,300 | 27,200 | 30,500 |
| Purple Line via MARC | -- | 1,100 | 1,400 | 1,400 | 1,500 | 1,500 | 1,500 |
| **Total** | **14,800** | **40,000** | **51,800** | **58,900** | **59,300** | **62,600** | **68,100** |

**Table 3-11: Year 2030 Build Alternatives Daily Boardings**

| Segment | TSM | Low Inv. BRT | Med. Inv. BRT | High Inv BRT | Low Inv. LRT | Med. Inv. LRT | High Inv. LRT |
|---|---|---|---|---|---|---|---|
| Bethesda Metro, North Entrance | 800 | **1,400** | **5,600** | **6,000** | **N/A** | **N/A** | **N/A** |
| Medical Center Metro | N/A | **3,900** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** |
| Bethesda Metro, South Entrance | N/A | **N/A** | **2,800** | **3,000** | **11,300** | **12,700** | **13,300** |
| Montgomery Avenue | 100 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** |
| Connecticut Avenue | 100 | **400** | **500** | **500** | **900** | **900** | **1000** |
| Grubb Road | 500 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** |
| Lyttonsville | N/A | **600** | **700** | **700** | **800** | **800** | **900** |
| Woodside/16th Street | N/A | **1,400** | **2,000** | **2,500** | **2,200** | **2,300** | **2,400** |
| Silver Spring Transit Center | 1,200 | **5,100** | **8,700** | **10,400** | **11,100** | **12,200** | **13,600** |
| Fenton Street | 600 | **600** | **600** | **N/A** | **700** | **700** | **N/A** |
| Dale Drive | 500 | **1,200** | **1,300** | **1,400** | **1,300** | **1,400** | **1,500** |
| Manchester Place | 600 | **700** | **800** | **1,100** | **800** | **900** | **1,200** |
| Arliss Street | 600 | **800** | **900** | **1,700** | **1,300** | **1,500** | **2,200** |
| Gilbert Street | 300 | **300** | **900** | **1,300** | **1,200** | **1,200** | **1,400** |
| Takoma/Langley Transit Center | 1300 | **1,400** | **2,300** | **3,200** | **2,700** | **3,000** | **3,700** |
| Riggs Road | 300 | **400** | **600** | **800** | **700** | **800** | **900** |
| Adelphi Road | 400 | **500** | **600** | **700** | **600** | **700** | **700** |
| UM Campus Center | 600 | **1,500** | **2,100** | **2,200** | **2,100** | **2,200** | **2,200** |
| US 1 – East Campus | 700 | **4,400** | **4,400** | **4,700** | **4,500** | **4,500** | **4,700** |
| College Park Metro | **2,400** | **8,000** | **8,600** | **9,100** | **8,600** | **8,600** | **8,900** |
| River Road | 500 | **1,500** | **1,500** | **1,500** | **1,500** | **1,500** | **1,500** |
| Riverdale Park | 600 | **1,400** | **1,500** | **1,600** | **1,600** | **1,500** | **1,600** |
| Riverdale Road | 500 | **500** | **500** | **700** | **600** | **500** | **700** |
| Annapolis Road | 500 | **900** | **1,100** | **1,200** | **1,000** | **1,000** | **1,200** |
| New Carrollton Metro | 1,700 | **3,100** | **3,800** | **4,500** | **3,800** | **3,700** | **4,500** |
| **Total Boardings** | **14,800** | 40,000 | 51,800 | 58,800 | 59,300 | 62,600 | 68,100 |

forecasts for the Purple Line. Many of the 36,000 students live on campus or in nearby housing within walking distance of the campus. Others live off campus and commute to school. These trips are not as concentrated in the peak periods as employee trips and are not as regular, given that the University is not in full session over the summer and various break periods.

A portion of these commuting students would use the UM Shuttle, TheBus and WMATA bus services. The UM Shuttle provides connecting services to the College Park and Silver Spring Metro Stations. Many of these trips again occur outside the normal commuting peak periods – in evenings and on weekends.

The UM Shuttle provides a regular and relatively frequent service between the campus and the College Park Metrorail station throughout most of the day, carrying about 3,000 trips on a typical day. The service connecting with Silver Spring carries about 500 trips on a typical day. According to the Shuttle operator, approximately half of the users are students, or about 1,700 per day. With the Purple Line in place, these shuttle services would be discontinued or re-routed and these 1,700 would likely use the Purple Line. Some portion of these trips is likely already included in the regional model forecasts. As noted earlier, the University faculty and staff are fully accounted for by the regional forecasting model. For the purposes of the comparison of the alternatives, the analysis assumes that these trips are included in the regional forecasts and would be similar across all the alternatives.

Future travel forecast to be developed for the Locally Preferred Alternative, once selected, will include a separate student trip purpose forecast.

*Special Event and Special Generator Trips*

Venues such as sport stadiums and arenas and events, such as festivals or holiday fireworks displays, generate trips that may not be included in the regional travel forecasting process. Washington, DC is site of many of special events and special generators that occur with enough regularity and frequency that these are included in the regional model forecasts. Special events and generators within the corridor are not included in the regional forecasts. The principal special event and special trip generator venue is the University of Maryland campus in College Park, with Byrd Stadium, Comcast Center, and Clarice Smith Performing Arts Center. Byrd Stadium seats 50,000 people and hosts five to seven home weekend football games annually. The UM Shuttle carries a total of 2,000 to 3,000 trips (i.e., 1,000 to 1,500 individuals) for each game. This would mean that between 2 and 3 percent of the total attendance uses the Shuttle. For basketball, soccer, lacrosse, field hockey, and events at the Clarice Smith Performing Arts Center, Shuttle ridership is relatively low. While the University of Maryland does not have actual records, on an annual basis the total number of special event and special generator trips on the Shuttle is between 40,000 and 50,000. Not all these trips would be candidates for the Purple Line; however, the Purple Line could make using transit for these types of trips associated with the University of Maryland more attractive, especially if the Purple Line is on Campus Drive.

Most of these trips will be outside the normal weekday peak period, being on weekday evenings and on weekends. Averaging out over a typical weekday, these trips would represent about 170 trips, which is less than one percent of the daily usage of the Purple Line alternatives. So, while the Purple Line would provide an improved and attractive means of accessing the events at the University of Maryland and other venues, the amount will be a relatively small compared to the total usage.

*Transportation System User Benefits*

Transportation system user benefit is a measure of benefits that would accrue to users of the transportation system as a result of implementing an alternative. The users include both existing system users such as existing transit riders who might benefit from a faster trip or more convenient access to the service, as well as new transit users. These benefits include both time and monetary costs and are expressed in terms of minutes saved. The user benefit is calculated within the region's mode choice model for all alternatives and uses a measure of the traveler's value of time to convert monetary and other costs to their equivalence in time, which is added to actual time savings. In this way, the measure includes a more comprehensive accounting of the total costs of travel.

Table 3-12 shows the total user benefits for TSM and each of the Build alternatives. As the table shows, TSM would generate more than 400,000 minutes of user benefit (about 6,700 hours) to travelers in the Washington metropolitan area each day. All of the Build alternatives would generate higher user benefits than the TSM. Low Investment BRT would offer 55 percent more user benefits than TSM, while High Investment LRT would generate twice the user benefits of TSM.

Additional user benefits can accrue to users of fixed guideway transit services due to attributes of these systems not reflected strictly in terms of travel times and out-of-pocket costs. These are referred to as "mode specific attributes" and account for perceived benefits that users feel they receive for amenity, comfort, reliability, safety and other characteristics associated with the mode. The degree to which these additional benefits accrue to the users depends on the definitions of the alternatives. These would accrue to all the Build alternative users to varying degrees, depending on the specific attributes of the alternative. Table 3-13 shows the user benefits with the mode specific attributes included.

**Mode-Specific Attributes**

These attributes account for perceived benefits that users feel they receive for amenities, comfort, reliability, safety and other characteristics of the mode.

The Medium Investment BRT variation via the Jones Bridge Road, with the addition of the station at Woodmont Avenue and St. Elmo Street, would generate daily user benefits of 976,000 minutes in the year 2030 with the mode specific attributes included, which would be approximately a 575,000-minute daily increase over the TSM alternative but approximately 46,000 minutes daily less than the original Medium Investment BRT alternative. The other variation, Medium Investment BRT Extended to

**Table 3-12: Year 2030 Daily Transportation System User Benefits by Alternative**

| | Daily User Benefits (minutes) | Increase in Daily User Benefits over TSM (minutes) | Percent over TSM |
|---|---|---|---|
| TSM | 401,200 | -- | -- |
| Low Investment BRT | 623,700 | 222,500 | 55% |
| Medium Investment BRT | 851,200 | 450,000 | 112% |
| High Investment BRT | 994,200 | 593,000 | 148% |
| Low Investment LRT | 1,033,700 | 632,500 | 158% |
| Medium Investment LRT | 1,098,200 | 696,000 | 174% |
| High Investment LRT | 1,211,800 | 810,600 | 202% |

**Table 3-13: Year 2030 Daily Transportation System User Benefits with Mode Specific Attributes**

| | Daily User Benefits (minutes) | Increase in Daily User Benefits over TSM (minutes) | Percent over TSM |
|---|---|---|---|
| TSM | 401,200 | -- | -- |
| Low Investment BRT | 702,300 | 301,100 | 75% |
| Medium Investment BRT | 1,022,200 | 621,000 | 155% |
| High Investment BRT | 1,258,000 | 856,800 | 214% |
| Low Investment LRT | 1,180,600 | 779,400 | 194% |
| Medium Investment LRT | 1,303,800 | 902,600 | 225% |
| High Investment LRT | 1,489,600 | 1,088,400 | 271% |

Medical Center with the addition of the station at Woodmont Avenue and St. Elmo Street, would generate daily user benefits of 1,070,000 minutes in the year 2030 with the mode specific attributes included, which would be approximately a 669,000-minute daily increase over the TSM alternative and an approximate 48,000 minutes daily increase over the original Medium Investment BRT. This indicates the travel time benefits of serving the major Bethesda market directly while also providing a one-seat ride to the Medical Center area.

*Farebox Revenue*

Farebox revenues are the fares collected from passengers using the transit services for making trips. People use a variety of means to pay fares, including cash, tokens, passes, and electronic farecards. Passes and farecards for multi-trip, or weekly and monthly periods are typically purchased at a discount. Fare revenues include both fares at the initial boarding of the trip as well any transfer costs. The Purple Line corridor has a number of transit operators including WMATA, MARC, Ride On, and TheBus. For the purposes of this analysis, the operator of the Purple Line would be the MTA.

With the increase in systemwide transit users forecasted for the alternatives, the increase in systemwide farebox revenues relative to the 2030 No Build are presented in Table 3-14.

**Table 3-14: Annual Change in Systemwide Farebox Revenues by Alternative Relative to 2030 No Build**

| | |
|---|---|
| TSM | $3,423,000 |
| Low Investment BRT | $5,829,000 |
| Medium Investment BRT | $7,500,000 |
| High Investment BRT | $8,452,000 |
| Low Investment LRT | $8,921,000 |
| Medium Investment LRT | $9,356,000 |
| High Investment LRT | $10,167,000 |

## 3.2. Highways and Roadways

### *3.2.1. Regional Effects on Travel and Congestion*

The Build alternatives have the potential to slightly reduce traffic congestion and slightly improve regional air quality by prompting a shift in the mode of travel from private automobiles to public transit, either with BRT or LRT.

The potential regional traffic benefits of both the TSM alternative and the six Build alternatives were evaluated based on the change in daily vehicle trips, vehicle miles traveled (VMT), vehicle hours traveled (VHT), highway operating speeds, intersection levels-of-service (LOS), and representative travel times.

The results of these analyses are presented in the following discussion and in Table 3-15. The regional travel demand model, developed under the auspices of MWCOG, was used to generate the data. This data represents daily trips and vehicle miles traveled for the entire region contained in the MWCOG model.

**Vehicle Trips**

In a travel demand model, a vehicle trip represents a vehicle traveling from a unique origin to a unique destination; a tabulation of the total vehicle trips account for neither the number of passengers in a vehicle nor the length of the trip.

The Purple Line would operate in a built-out urban area, and station locations were selected to maximize walk and bus transfer access. Additionally, no new park-and-ride facilities and only limited formal kiss-and-ride facilities are being proposed as part of the TSM and Build alternatives. Therefore, it is expected that the change in vehicle trips would provide the most complete representation of the overall change in automobile usage. Each trip removed from the network is one less automobile traveling through the corridor each day.

For this project, the total number of vehicle trips in 2030 would decrease from 25,806,975 to 25,803,544 (-3,421 trips) from the No Build alternative to the TSM alternative. Low, Medium, and High Investment BRT would further decrease the total number of vehicle trips compared to the No Build alternative, by 11,005;

**Table 3-15: Year 2030 Regional Travel Impacts**

| | Daily Vehicle Trips | Daily VMT |
|---|---|---|
| **No Build** | 25,806,975 | 261,054,037 |
| **TSM** | 25,803,554 | 261,040,445 |
| Change over No Build | -3,421 | -13,592 |
| % Change over No Build | -0.013% | -0.005% |
| **Low Investment BRT** | 25,795,970 | 261,001,838 |
| Change over No Build | -11,005 | -52,199 |
| % Change over No Build | -0.043% | -0.020% |
| **Medium Investment BRT** | 25,792,838 | 260,940,475 |
| Change over No Build | -14,137 | -113,562 |
| % Change over No Build | -0.055% | -0.044% |
| **High Investment BRT** | 25,790,959 | 260,878,947 |
| Change over No Build | -16,016 | -175,090 |
| % Change over No Build | -0.062% | -0.067% |
| **Low Investment LRT** | 25,790,505 | 260,886,581 |
| Change over No Build | -16,470 | -167,456 |
| % Change over No Build | -0.064% | -0.064% |
| **Medium Investment LRT** | 25,789,722 | 260,870,434 |
| Change over No Build | -17,253 | -183,603 |
| % Change over No Build | -0.067% | -0.070% |
| **High Investment LRT** | 25,788,222 | 260,867,637 |
| Change over No Build | -18,753 | -186,400 |
| % Change over No Build | -0.073% | -0.071% |

14,137; and 16,016 trips, respectively. Low, Medium, and High Investment LRT would result in a slightly larger decrease in total vehicle trips than the BRT Alternatives. Low, Medium, and High Investment LRT would decrease total daily vehicle trips by 16,470; 17,253; and 18,753 trips, respectively, compared to the No Build alternative. The reduction in daily vehicle trips under the various Build alternatives represents changes in magnitude of 0.04 to 0.07 percent relative to the No Build alternative.

The change in vehicle trips was further broken down into the nineteen districts shown in Figure 1-3. This analysis provides additional insight into the expected reduction in total automobile trips in the areas immediately surrounding the Purple Line corridor. Table 3-16 indicates the total reduction in automobile trips relative to the No Build alternative, both into and out of, each of the nineteen districts for each of the six Build alternatives.

The results in Table 3-16 indicate that the LRT alternatives generally result in a greater reduction in automobile trips than the BRT alternatives in the various districts. The table shows that the change in automobile travel is expected to be greatest in the districts that surround the Purple Line corridor. The largest change in automobile traffic is expected in the College Park district, with a net decrease in automobile trips between 5,500 and 7,100 per day. The Silver Spring district is expected to see a net decrease in automobile trips between 2,800 and 5,900 per day. The Build alternatives are also expected to reduce the number of trips made by automobile in the Bethesda (900 to 4,300 trips per day), Takoma-Langley (1,300 to 3,900 trips per day), Riverdale Park (2,400 to 2,900 trips per day), Connecticut-Lyttonsville (1,000 to 1,300 trips per day), and New Carrollton (1,000 to 1,500 trips per day) districts, which also directly adjoin the Purple Line.

Note that all the values in Table 3-16 represent trips which start or end in these particular districts; it is reasonable to expect that the actual reduction in automobile trips within a particular district would be higher due to a reduction in trips passing through the district. For example, a trip from Bethesda to Silver Spring is represented in the Bethesda and Silver Spring values; however, there is a high likelihood such a trip would pass through the Connecticut-Lyttonsville district, further reducing the number of cars on the road in that area.

A measurable reduction in automobile trips is also projected for districts that do not directly adjoin the Purple Line corridor; this trend is most pronounced in those districts that are served by a direct Metrorail connection. Within the Shady Grove district (served by the Red Line), automobile trips are projected to decrease between 1,000 and 2,200 per day, depending on the Build alternative. Similarly, the Glenmont (Red Line) and Greenbelt (Green Line) districts are projected to see decreases in automobile trips. A substantial reduction in automobile trips (between 2,200 and 3,900) is also projected within Washington, DC.

**Table 3-16: Year 2030 Reduction in Automobile Trips by District Compared to No Build**

| District | Low Invest. BRT | Medium Invest. BRT | High Invest. BRT | Low Invest. LRT | Medium Invest. LRT | High Invest. LRT |
|---|---|---|---|---|---|---|
| Bethesda | 892 | 1,989 | 2,165 | 3,745 | 4,150 | 4,314 |
| Connecticut - Lyttonsville | 999 | 998 | 1,035 | 1,195 | 1,278 | 1,283 |
| Silver Spring | 2,777 | 4,306 | 4,938 | 5,152 | 5,627 | 5,864 |
| Takoma - Langley | 1,251 | 2,432 | 3,388 | 2,986 | 3,285 | 3,850 |
| College Park | 5,522 | 6,346 | 6,927 | 6,540 | 6,601 | 7,092 |
| Riverdale Park | 2,446 | 2,605 | 2,890 | 2,675 | 2,640 | 2,949 |
| New Carrollton | 1,041 | 1,218 | 1,501 | 1,283 | 1,236 | 1,544 |
| Shady Grove | 1,026 | 1,333 | 1,494 | 1,775 | 1,994 | 2,150 |
| Glenmont | 498 | 926 | 1,041 | 1,257 | 1,377 | 1,482 |
| Greenbelt | 723 | 859 | 1,020 | 917 | 940 | 1,075 |
| Washington DC (All 4 Districts)* | 2,172 | 2,754 | 3,306 | 3,277 | 3,447 | 3,946 |
| Southwest Montgomery County | 116 | 389 | 473 | 524 | 620 | 707 |
| North | 962 | 1,717 | 1,947 | 2,147 | 2,308 | 2,515 |
| South | 949 | 1,083 | 1,206 | 1,193 | 1,204 | 1,308 |
| East | 1,240 | 1,492 | 1,803 | 1,561 | 1,510 | 1,850 |
| West | 88 | 121 | 150 | 125 | 133 | 151 |

* The four districts comprising Washington, DC have been combined.

### Vehicle Miles Traveled (VMT)

A second parameter that can be used to evaluate the impact of transit alternatives on overall automobile usage is the overall VMT in the region. Vehicle miles represent the total miles traveled during all of the vehicle trips within a region, without regard to the number of passengers in a vehicle.

In 2030, under the No Build alternative, a total of 261,054,037 vehicle miles would be traveled each day in the Washington metropolitan area. Under the TSM alternative, that total would be decreased slightly by 13,592 vehicle miles. Under Low Investment BRT, the total VMT is projected to decrease by 52,199 vehicle miles compared to the No Build alternative. Under Medium Investment BRT, the total VMT is projected to decrease by 113,562 relative to the No Build alternative, and under High Investment BRT the total VMT would be reduced by 175,090 vehicle miles relative to the No Build alternative. Low Investment LRT (-167,456 vehicle miles), Medium Investment LRT (-183,603 vehicle miles), and High Investment LRT (-186,400 vehicle miles) would also decrease total daily VMT, relative to the No Build alternative.

For transit facilities with park-and-ride and kiss-and-ride facilities at many of the stops, the reduction in vehicle trips is often combined with a more substantial reduction (on a percentage basis) in total VMT. This trend occurs because not only do vehicle trips decrease, but some portion of the remaining vehicle trips are shortened as people drive to a transit stop and then transfer to transit for the remainder of their trip. Given the few kiss-and-ride and park-and-ride facilities associated with the TSM and Build alternatives, the daily VMT results could provide a skewed picture of the impacts of the Purple Line on automobile traffic. The vehicle trip data indicate that there is a small, but measurable, decrease in the number of daily vehicle trips associated with each alternative. Due to this reduction in vehicle trips, levels of congestion may slightly decrease on particular routes, which may lead to some of the remaining vehicle trips selecting routes that are longer in terms of distance (more vehicle miles traveled).

### Roadway Operating Speeds

The average roadway speed represents the operating speeds in the region. For some projects, this can be used as a measure of the reduction in traffic congestion. However, given the small magnitude of the reduction in total

daily vehicle trips for the Build alternatives, the change in the average roadway speeds is projected to be quite small. For this project, the average roadway speed in 2030 under the No Build alternative is 24.5 mph. There would be no measurable increase in the regional average roadway speeds under any of the Build alternatives.

**Levels of Service on Key Highway Links**

For this project, detailed peak hour traffic analyses were conducted for numerous signalized intersections along the roadways that the Purple Line would run parallel to or cross at grade. For the purposes of these traffic analyses, the 2030 volume forecasts assumed that there would be no change in these peak-hour volumes between the No Build, TSM, and Build alternatives. As was discussed earlier, there are reductions in vehicle trips projected for the TSM and Build alternatives, so this assumption is sufficiently conservative. However, due to this assumption of constant traffic volumes between the No Build and Build alternatives, a comparison of the level of service on a link basis was not expected to reveal measurable differences among the various alternatives. Instead, a comparison of the levels of service of signalized intersections in the corridor was developed.

### *3.2.2. Corridor Impacts of Alternatives and Operations*

According to the 2030 CLRP, very few major capacity improvements are planned for the existing roadway network in the corridor. In fact, the two most notable improvements: the widening of Kenilworth Avenue from River Road north to Pontiac Street from four lanes to six lanes, and the widening of US 1 from I-95 south to College Avenue from four lanes to six lanes, are on north-south routes that would not directly compete with the east-west travel service provided by the Purple Line. In the case of Kenilworth Avenue, the section to be widened is beyond the immediate vicinity of the Purple Line. Nonetheless, these improvements were included in the roadway networks for the No Build, TSM, and Build alternatives.

**No Build Alternative**

The No Build alternative includes several improvements to the roadway system that have been approved independently of the Purple Line as of 2007. Design year traffic analyses for these locations assumed these improvements would be in place. These projects include, but are not limited to, the following:

- Intersection improvements at University Boulevard and New Hampshire Avenue to include a second northbound left turn from New Hampshire Avenue to westbound University Boulevard (currently under construction)
- Intersection improvements at University Boulevard and Riggs Road to include a second westbound left-turn lane and third eastbound through lane on University Boulevard (funded for Preliminary Engineering only)
- Intersection modifications at Colesville Road and 2nd Avenue to remove the existing northbound left-turn lane with traffic re-routed via East West Highway, 16th Street, Spring Street, and 2nd Avenue.

**TSM Alternative**

The TSM alternative includes the operation of an enhanced bus system, which would incorporate transit signal priority measures at various signalized intersections along the corridor and selected use of right-turn lanes as queue by-pass lanes to improve transit time. East of the Silver Spring, the TSM trunk line bus service would run in operating environments comparable with Low Investment BRT described below. West of Silver Spring, the primary TSM service would operate largely along East West Highway where there is no opportunity for queue jump lanes or other geometric changes without substantial capital costs or property impacts. The TSM alternative assumes no major geometric changes to the intersections under analysis, beyond those discussed for the No Build alternative.

**Build Alternatives**

The AA/DEIS includes the analysis of six Build alternatives for the Purple Line. These alternatives are differentiated by the two transit modes being considered, BRT and LRT, as well as by three levels of capital investment, Low, Medium, and High. In general, the Build alternatives follow the same route and would require modifications to the existing roadway network to construct and operate a transit service. The Build alternatives differ in the extent of the roadway widening required in various segments (based on operations in dedicated transit lanes or in shared lanes in mixed traffic), the provision of grade separation at key junctions, and the modifications required to existing traffic signals to accommodate the BRT or LRT movements. The following section summarizes the various physical modifications intended to improve the speed and reliability of the transit service, minimize impacts to automobile traffic, and increase pedestrian and vehicle safety that would be associated with each of the Build alternatives. These modifications were included in the traffic analyses for each alternative.

Highway and roadway effects of the Medium Investment BRT variation along Jones Bridge Road are covered by the discussions relative to the original Medium Investment BRT alternative east of Jones Mill Road and generally by the discussions relative to Low Investment BRT west of Jones Bridge Road. The Medium BRT Extended to Medical Center variation is covered by the discussions of the original Medium Investment BRT between New Carrollton and Bethesda plus the discussion of Low Investment BRT for the section between the Bethesda Metro Station (north entrance) and the Medical Center along Woodmont Avenue and Wisconsin Avenue/Rockville Pike.

*Bethesda Metro to Silver Spring Metro*

Starting from the west, the Build alternatives would all originate at a connection with the existing Bethesda Metro Station, located on the Red Line.

Low Investment BRT would begin at the existing Bethesda bus loop on Edgemoor Lane and then enter mixed traffic in the existing travel lanes on Old Georgetown Road along Woodmont Avenue. Approaching Wisconsin Avenue along Woodmont Avenue, Low Investment BRT would turn onto a new parallel alignment, west of Wisconsin Avenue, in front of the National Institutes of Health (NIH). This alternative would then use the existing traffic signal, which would be modified to include a new signal phase to serve BRT movements, at the intersection of Wisconsin Avenue and Jones Bridge Road to turn onto Jones Bridge Road. At that intersection, a queue jump lane would be provided for westbound BRT vehicles to bypass traffic waiting to turn onto Wisconsin Avenue. The Low Investment BRT would then continue east along Jones Bridge in mixed traffic, using the existing travel lanes and passing through the signalized intersections of Glenbrook Parkway, Grier Road, and Platt Ridge Road. At the intersection of Connecticut Avenue and Jones Bridge Road, a queue jump lane would be provided for westbound BRT. The alternative would then continue east along Jones Bridge Road, passing through the signalized intersection at Manor Road in mixed traffic in the existing travel lanes. An eastbound queue jump lane would be provided at the intersection with Jones

Mill Road to allow BRT to turn right onto Jones Mill Road. The alignment would then immediately turn east onto the Georgetown Branch right-of-way and enter Rock Creek Park, where it would tie into the alignment followed by the remaining alternatives.

The remaining five Build alternatives would follow an alternate route between Bethesda Metro Station and Rock Creek Park. The Medium and High Investment BRT Alternatives would follow a one-way loop in downtown Bethesda from the Georgetown Branch right-of-way onto Pearl Street in the existing travel lanes, then west along East West Highway and Old Georgetown Road in the existing travel lanes, through the existing bus terminal on Edgemoor Road, south along Woodmont Avenue, and then turn back east under the Air Rights building to rejoin the Georgetown Branch right-of-way. All five of the remaining alternatives would then follow the Georgetown Branch right-of-way, operating in an exclusive transit right-of-way adjacent to a new permanent hiker-biker trail, cross under East West Highway, and continue east toward Connecticut Avenue. Low Investment LRT would include an at-grade crossing of Connecticut Avenue; this would be accomplished by adding a new exclusive signal phase to serve LRT movements at the intersection of Connecticut Avenue and Chevy Chase Lakes Drive. The remaining four Build alternatives would cross Connecticut Avenue on an aerial structure with the hiker-biker trail also crossing on a separate bridge. All five alternatives then continue east, crossing under Jones Mill Road along the Georgetown Branch right-of-way and entering Rock Creek Park.

From Rock Creek Park, all six Build alternatives continue toward the east along the Georgetown Branch right-of-way. The alternatives would cross under Lyttonsville Place, crossing Stewart Avenue at grade, and then turn and run parallel to the existing CSX railroad tracks; the Build alternatives would be located on the south side of the CSX tracks. The alternatives would continue east along the CSX tracks crossing 16th Street and Spring Street. Low and Medium Investment BRT, and Low Investment LRT, would cross 16th Street and Spring Street at grade. This crossing would be accomplished by the installation of new traffic signals on 16th Street and Spring Street to accommodate crossings of the transit vehicles. Medium and High Investment LRT, and High Investment BRT would cross both 16th Street and Spring Street below the existing street levels.

At Spring Street, Low Investment BRT would turn north from the CSX tracks and follow Spring Street in mixed traffic in the existing travel lanes, and then turn east onto Second Avenue, continuing to operate in mixed traffic in the existing travel lanes before crossing Colesville Road at the existing signalized intersection at grade. Low Investment BRT would then continue briefly on Wayne Avenue before turning right onto Ramsey Street and accessing the Silver Spring Transit Center, which is being constructed on the site of the existing Red Line Silver Spring Metro Station.

From Spring Street, the remaining five Build alternatives would continue along the south side of the CSX tracks before crossing the tracks on an aerial structure into the Silver Spring Transit Center.

*Silver Spring Metro to College Park Metro*

From the Silver Spring Transit Center, each of the Build alternatives would use one of three different routes to connect to Wayne Avenue and continue eastward.

Low Investment BRT would exit the Silver Spring Transit Center back onto Ramsey Street and then turn right onto Wayne Avenue. This alternative would continue east, in mixed traffic within the existing travel lanes, crossing Dixon Street, Georgia Avenue, Fenton Street, and Cedar Street at the existing traffic signals. This alternative would then continue east along Wayne Avenue, operating in mixed traffic within the existing travel lanes, passing through the signalized intersections of Dale Drive, Mansfield Road, and Sligo Creek Parkway. The alignment would then continue east along Wayne Avenue and up a steep grade to the signalized intersection at Flower Avenue. Low Investment BRT would then turn right onto Flower Avenue followed by an immediate left onto Arliss Street at the existing unsignalized intersection. Continuing to operate in mixed traffic within the existing travel lanes, Low Investment BRT would then turn left onto Piney Branch Road and then right onto University Boulevard. Low Investment BRT would continue east along University Boulevard in shared lanes, passing through numerous existing traffic signals, before turning onto Campus Drive, crossing Adelphi Road, and entering the campus of the University of Maryland. Low Investment BRT would operate in mixed traffic throughout the campus. From Campus Drive, the alignment would turn left along Presidents Drive to Union Lane, and return to Campus Drive near Cole Field House. Low Investment BRT would continue along Campus Drive, pass through the roundabout at Regents Drive, and continue toward US 1. This alternative would cross US 1 at grade, using the existing traffic signal at Campus Drive and Paint Branch Parkway. After crossing US 1, Low Investment BRT would turn east onto Paint Branch Parkway where it would tie into the alignment of the remaining Build alternatives.

High Investment BRT and LRT would exit the Silver Spring Transit Center and continue south along the CSX tracks before entering a tunnel section in the vicinity of Silver Spring Avenue. This tunnel section would curve to the north under Grove Street, and High Investment BRT and LRT would return to grade along Wayne Avenue between Cedar Street and Dale Drive. To accommodate the tunnel portal on Wayne Avenue and provide a higher level of transit service, Wayne Avenue would be reduced from two to one travel lane in each direction. The second existing travel lane would be converted to transit-only use. New eastbound and westbound left-turn lanes would be provided at the existing traffic signal at Dale Drive and the westbound left-turn movement at the signalized intersection at Mansfield Road would be restricted and that traffic would be re-routed to the intersection at Dale Drive. A new eastbound left-turn lane would be added at Sligo Creek Parkway. East of Sligo Creek Parkway, Wayne Avenue would be widened by two lanes to provide a dedicated transit lane in the median in each direction. At a point 900 feet east of Sligo Creek Parkway, High Investment BRT and LRT would turn from Wayne Avenue and enter a tunnel section beneath Plymouth Street. A new signal would be required along Wayne Avenue to allow transit vehicles to enter and exit the median of Wayne Avenue. The tunnel section would return to grade along Arliss Street, just east of Flower Avenue, where High Investment BRT and LRT would join with Low and Medium Investment LRT and Medium Investment BRT, and the five alternatives would continue eastward.

Low and Medium Investment LRT and Medium Investment BRT would exit the Silver Spring Transit Center and turn onto Bonifant Street where they would operate at grade in dedicated transit lanes on the north side of Bonifant Street. Under Medium Investment LRT, Bonifant Street, between Ramsey Street and Fenton Street, would be converted from two-way operation to one-way operation (either eastbound or westbound). On-street parking would remain along the south curb. The very low volume of westbound or eastbound traffic currently using Bonifant Street between Fenton Street and Georgia Avenue would be diverted to Thayer Avenue, one block

to the south. Some minor widening of Bonifant Street is expected between Ramsey Street and Georgia Avenue, where these alternatives would cross at grade using the existing traffic signal. The slight modification would accommodate the conversion of Bonifant Street to one-way operation. Under Low Investment LRT two-way traffic would be maintained on Bonifant Street between Georgia Avenue and Fenton Street; this would require the removal of on-street parking along the south curb of Bonifant Street.

Approaching Fenton Street, these alternatives would turn left and tie into the existing signalized intersection of Fenton Street and Wayne Avenue as a new approach. The traffic signal would be modified to incorporate a new signal phase to accommodate transit movements. Low and Medium Investment LRT and Medium Investment BRT would then continue east, passing through Cedar Street on Wayne Avenue. Wayne Avenue would be widened by one lane between Cedar Street and Fenton Street to accommodate an exclusive westbound left-turn lane for transit vehicles at Fenton Street and a new eastbound left-turn bay for automobile traffic at Cedar Street, under Medium Investment LRT. Under Low Investment LRT, an exclusive westbound left turn lane for transit vehicles would be provided at Fenton Street. Low Investment LRT would share the existing inside travel lane with left turning and through automobile traffic at Cedar Street.

LRT would function as a streetcar east of Cedar Street; the tracks for Low and Medium Investment LRT would be constructed in the existing inside travel lane in each direction along Wayne Avenue; two travel lanes would be maintained in each direction: the outside travel lanes would carry regular traffic and the inside travel lanes would carry mixed traffic (LRT and automobiles). Under Medium Investment LRT, at the existing signalized intersection at Dale Drive, a new left-turn lane for automobile traffic would be provided in the eastbound and westbound directions. If a station is provided to the east of Dale Drive, then a westbound left-turn lane would not be provided due to property impacts. Instead, a dedicated pedestrian pathway would be constructed in the median to allow pedestrians to safely access the station using the signalized crossings at Dale Drive. Under Low Investment LRT, the light-rail vehicles in both directions would share the inside travel lanes with left-turning and through traffic.

Continuing east, Low Investment LRT would continue through the signalized intersection at Sligo Creek Parkway in the existing travel lanes. Both eastbound and westbound LRT vehicles would share lanes with left turning traffic at Sligo Creek Parkway. For Medium Investment LRT new eastbound and westbound left turn lanes would be provided at Sligo Creek Parkway. East of Sligo Creek Parkway, Wayne Avenue would be widened by two lanes to provide two dedicated transit lanes in the median. At a point approximately 900 feet east of Sligo Creek Parkway, the Low and Medium Investment LRT would turn off of Wayne Avenue into a tunnel section beneath Plymouth Street. A new traffic signal would be required along Wayne Avenue at this location to permit light rail transit vehicles to enter and exit Wayne Avenue. The Low and Medium Investment LRT return to grade along Arliss Street, just east of Flower Avenue.

Meanwhile, Medium Investment BRT would continue along Wayne Avenue in the existing travel lanes, passing through the intersection with Sligo Creek Parkway, turning right onto Flower Avenue, and then left onto Arliss Street. At this point on Arliss Street, these three alternatives would join the High Investment BRT and High Investment LRT and all five of these remaining Build alternatives would continue eastward on generally the same alignment.

These five alternatives would turn left onto Piney Branch Road, which would be widened to accommodate one new dedicated transit lane in each direction; all the LRT Alternatives and High Investment BRT would operate in the median, while Medium Investment BRT would operate in the curb lanes, which would be shared with right-turning traffic along Piney Branch Road. The existing two-way left-turn lane between Arliss Street and Barron Street would be removed, and the unsignalized access points along this segment of Piney Branch Road would be converted to right-in / right-out access.

At University Boulevard, these five alternatives would turn right onto University Boulevard, which would be widened to accommodate one new dedicated transit lane in each direction. The LRT Alternatives and High Investment BRT would operate in a protected median section; while Medium Investment BRT would operate in the curb lanes, which would also accommodate right-turn movements. Along University Boulevard, for automobile traffic, the lane configurations at the signalized intersections would remain unchanged relative to the No Build alternative. For the LRT Alternatives and High Investment BRT, the signal phasing for the eastbound and westbound left turns at all signalized intersections would need to be converted to protected-only phasing due to the presence of the median-running transitway. A number of existing unsignalized median breaks along University Boulevard may need to be closed to automobile traffic; new traffic signals or active warning signing would also be considered at the remaining locations. The treatment of these unsignalized intersections would be addressed in greater detail during the Preliminary Engineering phase.

At the intersections of University Boulevard and New Hampshire Avenue, Riggs Road, and Adelphi Road, grade-separated crossings for transit vehicles would be provided for both High Investment LRT and BRT. These streets would be crossed at grade using the existing traffic signals for the remaining alternatives, with one exception: all LRT alternatives would have a below-grade crossing of Adelphi Road due to the steep grade.

After crossing Adelphi Road, these five alternatives would continue eastward through the University of Maryland campus. Medium Investment BRT and Low and Medium Investment LRT would follow the same general alignment as Low Investment BRT through Campus Drive until reaching the roundabout at Regents Drive. Under these options, however, Campus Drive would be closed to through vehicle traffic between Union Lane and the ‘M’ Circle (except for other transit vehicles, emergency services, and University service vehicles), consistent with the University’s Master Plan. Automobile traffic through campus would be re-routed to Paint Branch Drive, Regents Drive, and Stadium Drive. Under these three options, the Regents Drive roundabout would be re-configured into a pair of T-intersections. Medium Investment BRT and Low and Medium Investment LRT would turn slightly south and enter a new exclusive right-of-way through the parking lots adjacent to the Armory and on to Rossborough Lane.

After crossing Adelphi Road, High Investment BRT and High Investment LRT would continue into a full tunnel section beneath the center of the campus. These alternatives would return to grade in a new exclusive right-of-way to be constructed along the south side of the existing campus recreational fields through the parking lots adjacent to the Armory and on to Rossborough Lane.

This new exclusive right-of-way would intersect US 1 at grade as the fourth leg of the existing intersection of US 1 and Rossborough Lane, which would be maintained as part of the

proposed East Campus Development. All five of these alternatives would then continue through the East Campus Development, along Rossborough Lane, in dedicated transit lanes.

These five alternatives would then turn right onto Paint Branch Parkway, where the alignment would be joined by Low Investment BRT. All six alternatives would now continue east along Paint Branch Parkway.

For Low and Medium Investment BRT the transit vehicles would operate in mixed traffic within the existing travel lanes along Paint Branch Parkway before turning right onto River Road and accessing the station adjacent to the existing College Park Metro Station.

High Investment BRT and Low, Medium, and High Investment LRT would operate in mixed traffic before turning right onto an exclusive right-of-way through a proposed development at the existing College Park Metro Station. The existing traffic signal at the intersection of Paint Branch Parkway and the Metro parking garage would be modified to include an additional signal phase for westbound light rail transit vehicles to turn left onto Paint Branch Parkway.

*College Park Metro to New Carrollton Metro*

High Investment BRT and Low, Medium, and High Investment LRT would all operate in new exclusive right-of-way to be constructed on the south side of River Road. New traffic signals or gate arms would be provided at the unsignalized driveways along the south side of River Road to separate vehicle and pedestrian traffic from the movements of the transit vehicles.

High Investment LRT and BRT would turn from River Road, east of Rivertech Court, and enter a tunnel that would pass underneath an existing park and stream. This tunnel would return to grade in the median of East West Highway, just west of its existing signalized intersection with Kenilworth Avenue. These alternatives would cross Kenilworth Avenue at grade, using the existing signal phasing, and continue east along East West Highway in two new dedicated transit lanes constructed in the median. The existing turning lane would be maintained at the signalized intersections along East West Highway; however, the signal phasing would be modified along East West Highway to convert the eastbound and westbound left turns to protected-only movements. The existing overpasses at the Baltimore-Washington Parkway would be lengthened to accommodate dedicated lanes as part of High Investment BRT and LRT, which would continue east and then turn right into the median of Veterans Parkway. These alternatives would then continue east in new dedicated transit lanes constructed in the existing median of Veterans Parkway and pass under the existing signalized intersection of Veterans Parkway and Annapolis Road. High Investment BRT and LRT would then turn left from the median of Veterans Parkway onto Ellin Road; two new dedicated transit lanes would be constructed on the south side of Ellin Road. A new gate arm or traffic signal would be required at Hanson Oaks Court to separate automobile and transit movements at this unsignalized crossing. These alternatives would then terminate at the New Carrollton Metro Station.

After departing the Purple Line station adjacent to the College Park Metro Station, Low Investment BRT would operate in shared lanes along River Road. Low Investment BRT would then turn onto Kenilworth Avenue, which would be widened to provide one dedicated transit lane in the southbound direction. Northbound bus rapid transit vehicles under Low Investment BRT would operate in mixed traffic within the existing northbound lanes on Kenilworth Avenue. This alternative would then turn left onto East West Highway, where it would operate in mixed traffic within the existing travel lanes, and pass through the existing signalized intersections along the corridor. Continuing in mixed traffic operations, within the existing travel lanes, this alternative would then turn right onto Veterans Parkway. The alternative would then turn left onto Annapolis Road, where the eastbound bus rapid transit vehicles would operate in mixed traffic within the existing travel lanes before turning right onto Harkins Road; one new dedicated transit lane would be provided along Annapolis Road between Harkins Road and Veterans Parkway for westbound bus rapid transit vehicles. Low Investment BRT would continue on Harkins Road, operating in mixed traffic in the existing travel lanes, before terminating at the New Carrollton Metro Station.

Medium Investment BRT would also operate in mixed traffic along River Road. At the intersection of River Road and Kenilworth Avenue, Medium Investment BRT would use the existing traffic signal to turn into two newly constructed dedicated transit curb lanes (all widening of Kenilworth Avenue to accommodate these lanes would occur west of the existing western curb line) on Kenilworth Avenue. The signal phasing along northbound Kenilworth Avenue would be modified to eliminate potential conflicts between northbound through traffic and left-turning bus rapid transit vehicles. Medium Investment BRT would then continue south along Kenilworth Avenue, operating in the new transit-only curb lanes.

Medium Investment BRT would then turn left onto East West Highway and operate in two newly dedicated transit curb lanes. The turn from Kenilworth Avenue to East West Highway could be accommodated with minor adjustments to the signal phasing at the intersection and some minor geometric modifications (shifting of stop bars) to accommodate the turning radius of the bus rapid transit vehicle. Medium Investment BRT would continue east along East West Highway in dedicated transit lanes until reaching the diamond interchange at the Baltimore-Washington Parkway. At the existing signalized intersections of the northbound and southbound off-ramps, a new signal phase would be added to allow Medium Investment BRT to leave its dedicated transit lanes and enter the existing travel lanes beneath the Baltimore-Washington Parkway overpasses; thereby not requiring any lengthening of the overpasses. After clearing the overpasses, Medium Investment BRT would then re-enter two newly constructed dedicated transit lanes along the curb. Medium Investment BRT would then turn onto Veterans Parkway using the existing signal phasing and would operate in mixed traffic within the existing traffic lanes. Medium Investment BRT would then cross Annapolis Road at grade, using the existing traffic signal, and would continue to Ellin Road before using the existing traffic signal at Ellin Road to turn into two newly constructed dedicated transit lanes (all widening along Ellin Road would occur to the south of the existing curb line). Medium Investment BRT would then terminate at the New Carrollton Metro Station.

Low and Medium Investment LRT would exit the College Park Metro Station and continue in a new exclusive right-of-way parallel to and south of River Road. This exclusive right-of-way would turn and continue parallel to, and west of, Kenilworth Avenue. The tracks for Low and Medium Investment LRT would cross the western leg of the intersection of Rittenhouse Street at grade, making use of the existing traffic signal to provide time separation; the signal phasing at Rittenhouse Street would be modified to convert the northbound and southbound left turns to protected-only phasing. Two new gate arms would be required at Quesada Road and Quintana Street to prohibit unsignalized automobile movements when light rail vehicles are approaching.

Low and Medium Investment LRT would then turn left from Kenilworth Avenue into two dedicated transit lanes in the median of East West Highway. To accommodate these two dedicated median transit lanes, East West Highway would be restriped to eliminate the existing two-way left-turn lane and the existing parking lanes along the north and south curb lanes. The existing signal phasing at the signalized intersections at Mustang Drive and 64th Place would not be modified; however, the left-turn movements from East West Highway would be made from the new median transit lanes, which would be shared for a short distance upstream of these intersections. Low and Medium Investment LRT would continue east along East West Highway in dedicated transit lanes until reaching the diamond interchange at the Baltimore-Washington Parkway. At the existing signalized intersections of the northbound and southbound MD 295 off-ramps, a new signal phase would be added to allow Low and Medium Investment LRT to leave the dedicated median transit lanes and enter the existing travel lanes beneath the Baltimore-Washington Parkway overpasses. After clearing the overpasses, Low and Medium Investment LRT would then re-enter two new dedicated median transit lanes. These alternatives would then use the existing signal phasing at the intersection of East West Highway and Veterans Parkway and Riverdale Road to turn into two new dedicated transit lanes within the median on Veterans Parkway. These alternatives would continue along the same alignment until reaching the signalized intersection at Annapolis Road.

At that intersection, Low Investment LRT would use a new signal phase to turn left from Veterans Parkway into a new exclusive transit right-of-way on the south side of Annapolis Road. Gate arms would be required at several business driveways along Annapolis Road, as well as at 77th Avenue and Garrison Road. The exclusive transit right-of-way would turn right and parallel to the southwest side of Harkins Road, crossing the IRS entrance across from West Lanham Drive using the existing traffic signal. New gate arms would be required at two business driveways along the west side of Harkins Road; however, volumes along Harkins Road are low, so these gate arms are not expected to cause operational problems. Low Investment LRT would terminate at the New Carrollton Metro Station.

At the intersection of Veterans Parkway and Annapolis Road, Medium Investment LRT would use the existing traffic signal phasing to cross Annapolis Road and continue in dedicated median transit lanes south along Veterans Parkway. At Ellin Road, a new signal phase would be added to allow Medium Investment LRT to turn left from the median of Veterans Parkway into a new exclusive transit right-of-way on the south side of Ellin Road. A new gate arm would be required at Hanson Oaks Court to separate automobile and transit movements at this unsignalized crossing. This alternative would then terminate at the New Carrollton Metro Station.

### *3.2.3. Impacts to Intersection Operations*

A detailed analysis of the projected traffic operations at existing signalized intersections along the corridor was conducted for each of the No Build, TSM, and Build alternatives. Intersection capacities and levels of service (LOS) were determined based on the methodology presented in the 2000 version of the *Highway Capacity Manual*, published by the Transportation Research Board.

It should be noted that the Purple Line passes through an area that is already heavily congested during peak periods. LOS E and F operations are already occurring at a number of key intersections along the corridor. Typically, these intersections are expected to continue to operate at unacceptable levels of service (LOS F) in 2030 under the No Build and Build alternatives.

**Level of Service**

The level of service for a signalized intersection is based on the average delay per vehicle. LOS A represents the highest quality operations with very low delay (less than 10 seconds per vehicle). LOS F represents the lowest quality operations, with delay exceeding 80 seconds per vehicle. LOS F conditions are often the result of over-saturated conditions, where vehicle demand at the intersection exceeds its capacity to process vehicles. Under LOS F conditions, it is common for some vehicles to not pass through the intersection within a single cycle.

One of the key goals in designing the alternatives for the Purple Line was the minimization of impacts to automobile traffic at existing signalized intersections along the corridor, as well as to minimize the number of new grade crossings that would require gate arms and other measures, which would negatively impact traffic flow on major roadways.

Regarding the proposed stations, no detailed analysis was conducted to assess their impact on automobile traffic since no new park-and-ride facilities would be constructed as part of this project, almost all of the ridership would be walk access or transfers from other transit services. As has been noted previously, the station locations were selected to maximize walk access and transfers from the existing transit network; therefore, the stations would not be expected to promote measurable increases in vehicular traffic near the stations.

#### Changes to Traffic Volumes and Intersection Level of Service

Tables 3-17 and 3-18 summarize the intersection levels of service for the 64 signalized intersections within the corridor in the AM and PM peak hours under existing conditions, as well as for the projected 2030 No Build, TSM, and Build alternatives.

#### No Build Alternative

The substantial increase in volumes projected under the No Build alternative would result in increased congestion throughout the corridor; this trend is most obvious at the intersections currently operating at or near capacity and are projected to experience a substantial increase in queuing and delay in 2030.

#### TSM Alternative

Under the TSM alternative, which would provide intersection improvements to increase travel time reliability and slightly reduce transit travel times, no intersections are expected to experience a decrease in the overall intersection level of service. Isolated minor street approaches may experience minor increases in delay due to the provision of signal priority; however, this increase in delay would be balanced by decreases in delay for the major street movements.

#### Build Alternatives

The Build alternatives are generally expected to maintain traffic conditions. The addition of left turn lanes is expected to improve traffic congestion in some locations, while the use of shared lanes by the Purple Line would degrade conditions in other locations. Minor intersection modifications would likely be needed at a number of locations throughout the corridor.

## Table 3-17: AM Peak Hour Intersection Levels of Service

| Intersection | Existing | 2030 No Build | 2030 TSM | 2030 BRT | | | 2030 LRT | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Med | High | Low | Med | High |
| **Bethesda to Silver Spring** | | | | | | | | | |
| Woodmont Avenue at Old Georgetown Rd | B | B | B | C | B | B | B | B | B |
| Woodmont Avenue at Edgemoor Lane | A | A | A | A | A | A | A | A | A |
| Old Georgetown Road at Edgemoor Lane | A | B | B | B | B | B | B | B | B |
| Woodmont Avenue at Norfolk Avenue | A | A | A | A | A | A | A | A | A |
| Woodmont Avenue at St. Elmo Avenue | A | A | A | A | A | A | A | A | A |
| Woodmont Avenue at Cordell Avenue | A | A | A | A | A | A | A | A | A |
| Woodmont Avenue at Battery Lane | B | B | B | B | B | B | B | B | B |
| Jones Bridge Rd at Wisconsin Avenue | D | E | E | F | E | E | E | E | E |
| Jones Bridge Rd at Glenbrook Pkwy | A | A | A | A | A | A | A | A | A |
| Jones Bridge Rd at Grier Rd | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Jones Bridge Rd at Platt Ridge Rd | A | A | A | A | A | A | A | A | A |
| Jones Bridge Rd at Connecticut Ave | F | F | F | F | F | F | F | F | F |
| Jones Bridge Rd at Manor Rd | A | A | A | A | A | A | A | A | A |
| Jones Bridge Rd at Jones Mill Rd | E | F | F | F | F | F | F | F | F |
| Connecticut Ave at Chevy Chase Lake Dr | A | A | A | A | A | A | B | A | A |
| 16th Street at New Purple Line Crossing | N/A | N/A | N/A | A | A | N/A | A | N/A | N/A |
| **Silver Spring to College Park** | | | | | | | | | |
| 2nd Ave at Spring St | B | B | B | B | B | B | B | B | B |
| 2nd Ave at Fenwick Ave | A | A | A | A | A | A | A | A | A |
| 2nd Ave at Cameron Ave | A | A | A | A | A | A | A | A | A |
| Colesville Rd at 2nd Ave | D | C | C | C | C | C | C | C | C |
| Wayne Ave at Ramsey Rd | C | C | C | C | C | C | C | C | C |
| Wayne Ave at Dixon Ave | Unsig. | A | A | A | B | A | B | B | A |
| Wayne Ave at Georgia Ave | C | D | D | D | D | D | D | D | D |
| Georgia Ave at Bonifant St | A | A | A | A | A | A | A | A | A |
| Georgia Ave at Thayer Ave | A | A | A | A | B | A | B | B | A |
| Wayne Ave at Fenton St | C | C | C | D | C | C | C | C | C |
| Wayne Ave at Cedar St | B | C | C | C | A | C | B | B | C |
| Wayne Ave at Dale Dr | B | C | C | D | B | F | B | B | F |
| Wayne Ave at Mansfield Rd | A | A | A | A | A | D | A | A | D |
| Wayne Ave at Sligo Creek Pkwy | D | E | E | E | C | F | C | C | F |
| Wayne Ave at Flower Ave | B | B | B | C | B | B | B | B | B |
| Piney Branch Road at Arliss St | A | A | A | A | A | A | A | A | A |
| Piney Branch Rd at Barron St | B | B | B | B | B | B | B | B | B |
| University Blvd at Piney Branch Rd | E | F | F | F | F | F | F | F | F |
| University Blvd at Carroll Ave | E | E | E | E | E | E | E | E | E |
| University Blvd at Shopping Center West | A | B | B | B | A | A | B | B | B |
| University Blvd at New Hampshire Avenue | E | F | F | F | F | F | F | F | F |
| University Blvd at Shopping Center East | A | B | B | B | B | B | B | B | B |
| University Blvd at 15th Avenue | B | B | B | B | B | B | B | B | B |
| University Blvd at Riggs Rd* | E | D | D | D | D | D | D | D | D |
| University Blvd at 23rd Avenue | A | A | A | A | A | A | B | B | B |
| University Blvd at W. Park Drive | A | A | A | B | A | A | B | B | B |
| University Blvd at Campus Drive | B | C | C | C | C | C | C | C | C |
| Adelphi Rd at Campus Drive | E | E | E | F | E | E | E | E | E |
| Campus Dr at Regents Drive | D | D | D | C | C | C | C | C | C |
| US 1 at Campus Drive | D | E | E | F | F | F | F | F | F |
| US 1 at Rossborough Lane** | A | B | B | B | B | B | B | B | B |
| Paint Branch Pkwy at Fire Academy | B | D | D | D | D | D | D | D | D |
| Paint Branch Pkwy at Metro Parking | B | B | B | B | B | B | B | B | B |
| Paint Branch Pkwy at River Road | B | B | B | B | B | B | B | B | B |
| **College Park to New Carrollton** | | | | | | | | | |
| Kenilworth Ave at River Rd | B | C | C | C | C | C | C | C | C |
| Kenilworth Ave at Rittenhouse St | A | A | A | A | A | A | A | A | A |
| Kenilworth Ave at East West Hwy | E | F | F | F | F | F | F | F | F |
| East West Hwy at 62nd Place | A | A | A | A | B | B | B | B | B |
| East West Hwy at 64th Ave | A | A | A | A | A | A | A | A | A |
| East West Hwy at Baltimore-Washington Pkwy Southbound Ramps | B | B | B | B | C | C | C | C | C |
| East West Hwy at Baltimore-Washington Pkwy Northbound Ramps | B | B | B | B | C | C | C | C | C |
| East West Hwy at 67th Ave | A | A | A | A | A | A | A | A | A |
| East West Hwy at Riverdale Rd | C | D | D | E | D | D | D | D | D |
| Annapolis Rd at Veterans Pkwy | F | F | F | F | F | F | F | F | F |
| Annapolis Rd at Harkins Rd | A | A | A | B | A | A | A | A | A |
| Harkins Rd at W. Lanham Rd | A | A | A | B | A | A | B | A | A |
| Veterans Pkwy at Ellin Rd | B | B | B | B | D | D | B | D | D |

Cells shaded in blue indicate an adverse traffic effect (Levels reduced to D, E, or F) compared to No Build
Cells shaded in yellow indicate a beneficial effect (improved conditions) compared to No Build
* In 2030, Riggs Road includes a second westbound left-turn lane and a third eastbound through lane.
** In 2030, a new access point would be added to Baltimore Avenue to serve vehicle movements from the East Campus Development. Certain Purple Line alternatives would form the fourth leg at this new intersection.
N/A – Not applicable

## Table 3-18: PM Peak Hour Intersection Levels of Service

| Intersection | Existing | 2030 No Build | 2030 TSM | 2030 BRT | | | 2030 LRT | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Med | High | Low | Med | High |
| **Bethesda to Silver Spring** | | | | | | | | | |
| Woodmont Ave at Old Georgetown Rd | B | B | B | B | B | B | B | B | B |
| Woodmont Ave at Edgemoor Ln | A | A | A | A | A | A | A | A | A |
| Old Georgetown Rd at Edgemoor Ln | A | A | A | A | A | A | A | A | A |
| Woodmont Ave at Norfolk Ave | A | A | A | A | A | A | A | A | A |
| Woodmont Ave at St. Elmo Ave | B | B | B | B | B | B | B | B | B |
| Woodmont Ave at Cordell Ave | A | A | A | A | A | A | A | A | A |
| Woodmont Ave at Battery Ln | B | B | B | B | B | B | B | B | B |
| Jones Bridge Rd at Wisconsin Ave | E | F | F | F | F | F | F | F | F |
| Jones Bridge Rd at Glenbrook Pkwy | B | B | B | B | B | B | B | B | B |
| Jones Bridge Rd at Grier Rd | A | B | B | B | B | B | B | B | B |
| Jones Bridge Rd at Platt Ridge Rd | A | A | A | A | A | A | A | A | A |
| Jones Bridge Rd at Connecticut Ave | F | F | F | F | F | F | F | F | F |
| Jones Bridge Rd at Manor Rd | B | B | B | B | B | B | B | B | B |
| Jones Bridge Rd at Jones Mill Rd | F | E | E | F | E | E | E | E | E |
| Connecticut Ave at Chevy Chase Lake Dr | A | B | B | B | B | B | C | B | B |
| 16th St at New Purple Line Crossing | N/A | N/A | N/A | A | A | N/A | A | N/A | N/A |
| **Silver Spring to College Park** | | | | | | | | | |
| 2nd Avenue at Spring Street | C | C | C | C | C | C | C | C | C |
| 2nd Avenue at Fenwick Avenue | A | A | A | A | A | A | A | A | A |
| 2nd Avenue at Cameron Avenue | A | A | A | A | A | A | A | A | A |
| Colesville Road at 2nd Avenue | D | C | C | C | C | C | C | C | C |
| Wayne Avenue at Ramsey Road | C | C | C | C | C | C | C | C | C |
| Wayne Avenue at Dixon Avenue | Unsig. | B | B | B | B | B | B | B | B |
| Wayne Avenue at Georgia Avenue | C | D | D | D | D | D | D | D | D |
| Georgia Avenue at Bonifant Street | A | A | A | A | A | A | A | A | A |
| Georgia Avenue at Thayer Avenue | B | B | B | B | B | B | B | B | B |
| Wayne Avenue at Fenton Street | C | C | C | C | D | C | D | D | C |
| Wayne Avenue at Cedar Street | C | D | D | D | C | C | D | D | C |
| Wayne Avenue at Dale Drive | C | E | E | F | D | F | D | D | F |
| Wayne Avenue at Mansfield Road | A | A | A | A | A | C | A | A | C |
| Wayne Avenue at Sligo Creek Pkwy | C | E | E | F | E | F | E | E | F |
| Wayne Avenue at Flower Avenue | B | C | C | C | C | C | C | C | C |
| Piney Branch Road at Arliss Street | B | B | B | B | C | C | C | C | C |
| Piney Branch Road at Barron Street | B | B | B | B | B | B | B | B | B |
| University Blvd at Piney Branch Rd | F | F | F | F | F | F | F | F | F |
| University Blvd at Carroll Avenue | C | C | C | C | C | C | C | C | C |
| University Blvd at Shopping Center West | B | A | A | A | A | A | B | B | B |
| University Blvd at New Hampshire Avenue | F | F | F | F | F | F | F | F | F |
| University Blvd at Shopping Center East | B | B | B | B | B | B | B | B | B |
| University Blvd at 15th Avenue | C | C | C | C | C | C | C | C | C |
| University Blvd at Riggs Road* | F | F | F | F | F | F | F | F | F |
| University Blvd at 23rd Avenue | B | B | B | B | B | C | C | C | C |
| University Blvd at W. Park Drive | B | B | B | B | B | B | B | B | B |
| University Blvd at Campus Drive | C | D | D | D | D | D | D | D | D |
| Adelphi Road at Campus Drive | F | F | F | F | F | F | F | F | F |
| Campus Drive at Regents Drive | F | F | F | E | E | E | E | E | E |
| US 1 at Campus Drive | D | F | F | E | E | E | E | E | E |
| US 1 at Rossborough Lane** | B | E | E | E | E | E | E | E | E |
| Paint Branch Pkwy at Fire Academy | B | B | B | B | B | B | B | B | B |
| Paint Branch Pkwy at Metro Parking | A | A | A | A | A | A | A | A | A |
| Paint Branch Pkwy at River Road | B | B | B | B | B | B | B | B | B |
| **College Park to New Carrollton** | | | | | | | | | |
| Kenilworth Avenue at River Road | B | B | B | C | B | B | B | B | B |
| Kenilworth Avenue at Rittenhouse Street | A | B | B | B | B | B | B | B | B |
| Kenilworth Avenue at East West Hwy | F | F | F | F | F | F | F | F | F |
| East West Hwy at 62nd Place | B | C | C | D | C | D | C | C | D |
| East West Hwy at 64th Avenue | A | A | A | A | A | A | A | A | A |
| East West Hwy at Baltimore-Washington Pkwy southbound Ramps | C | C | C | C | E | D | E | E | D |
| East West Hwy at Baltimore-Washington Pkwy northbound Ramps | B | B | B | B | D | B | D | D | B |
| East West Hwy at 67th Avenue | A | B | B | C | B | B | B | B | B |
| East West Hwy at Riverdale Road | D | F | F | F | F | F | F | F | F |
| Annapolis Road at Veterans Pkwy | E | F | F | F | F | F | F | F | F |
| Annapolis Road at Harkins Road | B | B | B | B | B | B | B | B | B |
| Harkins Road at W. Lanham Road | A | A | A | B | A | A | B | A | A |
| Veterans Pkwy at Ellin Road | C | B | B | B | C | C | B | C | C |

Cells shaded in blue indicate an adverse traffic effect (Levels reduced to D, E, or F) compared to No Build
Cells shaded in yellow indicate a beneficial effect (improved conditions) compared to No Build
* In 2030, Riggs Road includes a second westbound left-turn lane and a third eastbound through lane.
** In 2030, a new access point would be added to Baltimore Avenue to serve vehicle movements from the East Campus Development. Certain Purple Line alternatives would form the fourth leg at this new intersection.
N/A – Not applicable

**Mitigation of Adverse Traffic Effects**

The six Build alternatives would result in adverse effects to traffic at up to four of the 64 key intersections during the peak hours of operation. The potential adverse effects of the Build alternatives could in many cases be mitigated by the addition or modification of turn lanes at intersections.

### *3.2.4. On-Street Parking Impacts*

Impacts to parking on private property are discussed in Chapter 4. The TSM alternative would not require the removal of on-street parking. However, several of the Build alternatives would require peak-hour restrictions of on-street parking along certain roadway segments. Several of the Build alternatives would also require the complete removal of on-street parking along several segments.

**Low Investment BRT**

Low Investment BRT would require the restriction during the AM and PM peak periods of all on-street parking in both directions along Woodmont Avenue, between Old Georgetown Road and Wisconsin Avenue. There are currently peak-hour parking restrictions along this segment, but those restrictions would need to be expanded to accommodate Low Investment BRT.

A short section of on-street parking would also need to be restricted during peak travel periods along Jones Bridge Road near the intersection of Jones Mill Road. This segment would serve as a queue jump lane for eastbound buses.

On-street parking would also need to be restricted during peak travel periods on Wayne Avenue, between Cedar Street and Mansfield Road, to accommodate Low Investment BRT. There are currently peak-hour parking restrictions along this segment, but those restrictions would need to be expanded to accommodate Low Investment BRT.

**Medium Investment BRT**

On-street parking along the north curb line of Bonifant Street would need to be removed to accommodate Medium Investment BRT. Parking along the south curb could remain under Medium Investment BRT if Bonifant Street is converted to one-way usage.

On-street parking would need to be restricted during peak travel periods on Wayne Avenue, between Cedar Street and Mansfield Road to accommodate Medium Investment BRT. There are currently peak-hour parking restrictions along this segment, but those restrictions may need to be modified or expanded.

Additionally, on-street parking along both the north and south sides of East West Highway, between 61st Place and 64th Avenue would need to be removed to accommodate the two new dedicated transit curb lanes proposed for this segment.

**High Investment BRT**

On-street parking along Wayne Avenue between Cedar Street and Mansfield Road would need to be removed to accommodate High Investment BRT.

Additionally, on-street parking along both the north and south sides of East West Highway, between 61st Place and 64th Avenue would need to be, at a minimum, restricted during peak travel periods to accommodate the two new dedicated median transit lanes.

**Low Investment LRT**

On-street parking along the north curb line of Bonifant Street would need to be removed to accommodate Low Investment LRT. Parking along the south curb would also need to be removed to maintain Bonifant Street as a two-way street.

On-street parking would need to be restricted during peak travel periods on Wayne Avenue between Cedar Street and Mansfield Road to accommodate Low Investment LRT. There are currently peak-hour parking restrictions along this segment, but those restrictions would need to be expanded.

Additionally, on-street parking along both the north and south sides of East West Highway, between 61st Place and 64th Avenue would need to be, at a minimum, restricted during the peak travel periods to accommodate the two new dedicated median transit lanes.

**Medium Investment LRT**

On-street parking along the north curb line of Bonifant Street would need to be removed to accommodate Medium Investment LRT. Parking along the south curb could remain.

On-street parking would need to be restricted during peak travel periods on Wayne Avenue between Cedar Street and Mansfield Road to accommodate this alternative. There are currently peak-hour parking restrictions along this segment, but those restrictions would need to be expanded.

Additionally, on-street parking along both the north and south sides of East West Highway, between 61st Place and 64th Avenue would need to be, at a minimum, restricted during peak travel periods to accommodate the two new dedicated median transit lanes.

**High Investment LRT**

On-street parking along Wayne Avenue between Cedar Street and Mansfield Road would need to be removed to accommodate High Investment LRT.

Additionally, on-street parking along both the north and south sides of East West Highway between 61st Place and 64th Avenue would need to be, at a minimum, restricted during peak travel periods to accommodate the two new dedicated median transit lanes.

## 3.3. Pedestrian and Bicycle Access

Numerous pedestrian and bicycle facilities are located throughout the corridor. The Interim Georgetown Branch Trail along the Georgetown Branch right-of-way, which extends from Bethesda to Silver Spring, is a heavily used hiker-biker trail on an exclusive alignment from Bethesda to Lyttonsville. At Lyttonsville the trail turns and runs parallel to the CSX corridor on existing streets. All Build alternatives except Low Investment BRT would include construction of the Capital Crescent Trail extension east from its current terminus in Bethesda at Woodmont Avenue to the Silver Spring Transit Center. Low Investment BRT would include construction of the trail from Jones Mill Road to the Silver Spring Transit Center. The conceptual designs for this trail are described in Chapter 2.

The Build alternatives would accommodate plans for connection of the Capital Crescent Trail to the Metropolitan Branch Trail and the Green Trail at the Silver Spring Transit Center. The Metropolitan Branch Trail and the Green Trail are separate projects from the Purple Line and are not dependent on the Purple Line. The Green Trail, which will connect the Sligo Creek Trail with the Silver Spring Transit Center, will follow Wayne Avenue parallel to the Purple Line surface alternatives. The MTA has worked with the M-NCPPC to accommodate the trail, with minimal impacts to adjacent properties. County guidelines permit a combined sidewalk and trail eight feet wide outside of a central business district. The trail would be on the north side of Wayne Avenue, separated from the transitway and road by a five-foot landscaped buffer.

**Capital Crescent Trail in the Georgetown Branch Right-of-Way**

In accordance with SHA guidelines, bicycle lanes would be added to University Boulevard as part of its reconstruction under Medium and High Investment BRT and all three LRT Alternatives.

The corridor includes several areas with substantial existing pedestrian activity. Existing pedestrian volumes are in the moderate to high range in downtown Bethesda, downtown Silver Spring, Takoma Park/Langley Park, and the University of Maryland areas. Both BRT and LRT systems operate safely today in comparable environments.

Although the station locations are regarded as conceptual and will be more specifically located in the subsequent Preliminary Engineering phase, they have been placed at suitable locations with respect to walk and bus transfer access to the system, including existing and planned development, other transit services, especially the Metrorail stations, and the planned transit centers at Silver Spring and Takoma/Langley Park. Many of the projected users of the Purple Line would be existing transit users who already make up a portion of the pedestrian activity along the corridor. These existing transit users would simply be shifting from the existing bus service to the Purple Line and would not represent new pedestrians making use of the facilities in the station areas. Therefore, the net increase in pedestrians due to the Purple Line could be less than the total ridership projections would indicate. Some increased concentrations of pedestrian activity would be expected on the approaches to the proposed station locations. The magnitude of the changes in pedestrian volumes is a function of the specific station and projected levels of ridership at those locations. A qualitative analysis of pedestrian facilities along the alignment indicates that they are likely to be sufficient to accommodate an increase in pedestrian activity. There is a well-developed network of sidewalks and pedestrian pathways in the area, and pedestrian signals (including pedestrian-actuated signals) are already provided at the vast majority of signalized intersections crossed by the Purple Line. Additional measures to accommodate any potential increases in pedestrian volumes in and around the proposed station areas could include: the widening of existing crosswalks and sidewalks, the installation of pedestrian-actuated signals at those locations that lack them, the enhancement of roadside signing alerting motorists of areas of increased pedestrian activity. Additionally, it could be appropriate to install median fencing, landscaping, or other measures at the station locations to encourage pedestrians to use the marked crosswalks at the signalized intersections.

## 3.4. Deliveries

Generally, High Investment BRT and the three LRT Alternatives would operate in dedicated transit lanes constructed in the median, or in the case of mixed traffic operations, in the inside travel lane. In most areas, there would be at least two general purpose travel lanes in each direction; which is sufficient to provide access to properties adjacent to the roadway alignment.

In the few instances where the alternatives would limit general purpose traffic to a single travel lane, such as Wayne Avenue between Cedar Street and Sligo Creek Parkway under the High Investment alternatives, stopping would generally not be permitted. This configuration may make access to and from driveways more difficult, though vehicles could encroach on the trackway if necessary.

Low and Medium Investment BRT would generally operate in the curb lanes, in either mixed traffic or dedicated transit lanes. These curb lanes could be used by vehicles accessing adjacent properties.

## 3.5. Emergency Vehicles

Emergency vehicles can be affected by a transit project due to changes in traffic volumes or operations along the corridor. The Build alternatives are generally expected to maintain, or in some cases, slightly improve the projected traffic operations under the No Build condition. Minor signal modifications would be required at a number of locations throughout the corridor, but these modifications would not prevent the continuing use or implementation of emergency vehicle preemption at those signals. LRT tracks are constructed in roadways flush with the roadway surface so they can be crossed by other vehicles. Thus they would not impede or create a barrier for emergency vehicles.

The Build alternatives would result in the removal of a limited number of existing buses, which operate on routes that would duplicate service. Additionally, the Build alternatives would typically operate in dedicated transit lanes; the net effect would be to reduce the number of transit vehicles operating in the general purpose lanes. Overall, the Build alternatives are not projected to substantially affect emergency vehicles operating in the corridor.

For the Purple Line, there is one major medical facility located adjacent to the proposed alternatives. The National Naval Medical Center is located along Jones Bridge Road, adjacent to Low Investment BRT. However, the National Naval Medical Center is a United States Naval facility, intended for treatment of servicemen and women; this facility is not an emergency treatment center for area residents. Access to this facility would not be affected by the presence of BRT vehicles along Jones Bridge Road.

There is one fire station located adjacent to Annapolis Road and Low Investment BRT and LRT in the New Carrollton area. This fire station

currently utilizes a dedicated traffic signal to access Annapolis Road. Neither alternative is expected to substantially impact the operations of this station; the LRT would operate in a dedicated right-of-way, along the south side of Annapolis Road in this area. However, due to the length of the LRT vehicles (up to 180 feet), there would be increased potential that the exit from the fire station could be blocked by a stopped light rail vehicle. This scenario is unlikely due to the provision of a dedicated transit right-of-way, but could be caused by another vehicle encroaching on the tracks. The remaining Build alternatives do not use Annapolis Road and would not affect the access to this fire station.

There are fire stations on some of the roads crossed by the Purple Line, including Connecticut Avenue, Georgia Avenue, Riggs Road, and US 1; the Purple Line would not impede access from these stations as it would not be operating on the roads in front of the stations. Where the Purple Line is in dedicated lanes emergency vehicles would benefit by the opportunity to travel in these lanes.

## 3.6. Construction Impacts

The Build alternatives would be constructed in a manner that would minimize potential negative impacts to traffic, businesses, and communities. Potential traffic impacts of construction could include the narrowing of travel lanes, temporary lane closures (which would probably be limited to off-peak or nighttime periods when traffic volumes are low), speed reductions, or short-term detours. Some existing bus routes may experience minor delays or be re-routed for short durations; however, no major service disruptions are expected. Prior to construction, a traffic management plan would be developed in coordination with SHA and both counties to minimize potential traffic impacts.

Public outreach would be conducted to inform motorists about upcoming changes to traffic patterns or detours. Emergency services would be consulted during the development of the traffic management plan, and such providers would be kept up to date regarding any detours or potential delays due to construction.