

## Chapter 3.0

# Transportation Effects

This chapter describes the existing and planned transportation systems, services and facilities in the Purple Line corridor, explains how the No Build Alternative and the Preferred Alternative would potentially impact them, and identifies mitigation strategies to offset unavoidable effects.

This chapter is organized by transportation category. Categories covered in this chapter include public transportation services, the roadway network, bicycle and pedestrian facilities, parking facilities, and freight railroad services and facilities.

### *Changes to this Chapter since the AA/DEIS*

This chapter, previously Chapter 3: Transportation and Traffic, in the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) has been updated since publication of the AA/DEIS. The future year of analysis, the horizon year, has been advanced from 2030 to 2040. As noted in Chapter 1.0, FTA requires that a project sponsor quantify measures using at least a 20-year horizon. The AA/DEIS, completed in 2008, used a horizon year of 2030; five years later, the Final Environmental Impact Statement (FEIS) uses 2040 to be consistent with the Metropolitan Washington Council of Governments (MWCOC) Transportation Planning Board forecasts. For additional information refer to *Purple Line Travel Forecasts Results Report (2013)* and *Purple Line Traffic Analysis Technical Report (2013)*.

New topics covered in this chapter are freight and passenger railroad facilities, and safety and security.

In the AA/DEIS this chapter included a discussion of construction impacts. Because of the advancement of the design of the project, MTA is able to provide a greater level of detail on construction impacts and so this topic is now covered in its own chapter, Chapter 5.0.

## 3.1 Public Transportation

### 3.1.1 Introduction

Long-term operational effects of the Preferred Alternative on public transportation use and services were considered by examining forecasted ridership demand and potential changes to existing facilities once the Purple Line becomes operational.

The 2008 AA/DEIS was prepared using information and data from the MWCOC Round 7.0 Cooperative Land Use Forecasts and a forecasting tool based on MWCOC's regional forecasting model. The regional model, with a horizon year of 2030, was used to estimate the No Build conditions and the

subsequent changes in travel patterns that would result from the introduction of the Purple Line into the transportation system. Since that time MWCOC has developed the Round 8.0 Cooperative Forecasts.

This FEIS reflects two changes in forecasting since the publication of the 2008 AA/DEIS: (1) the use of the Round 8.0 forecasts rather than the Round 7.0 forecasts; and (2) a horizon year of 2040 rather than 2030. The inclusion of the employment shifts resulting from the closure of the Walter Reed Army Medical Center and the transfer of its functions to the National Naval Medical Center in Bethesda, pursuant to the Base Realignment and Closure Act, are the most significant differences between Round 7.0 and Round 8.0 within the corridor; there is also

some growth in regional population and employment over the 2030-2040 period.

For further information see the *Purple Line Travel Forecasts Results Report (2013)* and the *Purple Line Validation and Calibration Technical Report (2013)*.

### The Regional Travel Demand Model

A regional travel demand forecasting model is a mathematical representation of the availability of transportation facilities (roads and transit) and the demand for travel in an urban area.

The region covered in the MWCOG model covers 22 jurisdictions and about 6,800 square miles and includes the District of Columbia and parts of three states: Maryland, Virginia, and West Virginia.

The model uses population and employment data, approved zoning, and the highway and transit networks, to calculate the expected demand for transportation facilities.

### Ridership

Ridership forecasts are used to gauge the comparative attractiveness of alternatives under consideration. They are measured in terms of (1) total and new daily transit trips and (2) peak period boardings by station.

A “transit trip” is defined as the travel of one person from trip origin to trip destination, regardless of the number of transfers or mode changes required. For example, a trip from home to work, using bus and Metrorail, would be counted as one “transit trip.” The term “passenger” is sometimes used to refer to a transit trip.

A “boarding” is defined as the number of times a person enters a vehicle for travel. A single passenger’s trip from origin to destination could include multiple boardings—for example, a boarding of a Ride On bus, followed by a boarding of Metrorail.

## 3.1.2 Affected Environment

As described in Chapter 1.0, existing rail transit services in the corridor include three Washington Metropolitan Area Transit Authority (WMATA) Metrorail lines, all three of Maryland Transit Administration’s (MTA) commuter rail lines (MARC), and Amtrak at New Carrollton. Metrorail trains operate approximately every 4 to 6 minutes during peak periods and 6 to 12 minutes during off peak periods.

More than 75 bus routes provided by Montgomery County Ride On, Prince George’s County TheBus, and WMATA Metrobus operate in the corridor. Of these, only 13 provide east-west service, predominately disconnected routes that do not serve the corridor from end-to-end. The University of Maryland operates Shuttle-UM in much of the corridor; while this service is not open to the general public, it does serve a large number of University of Maryland (UMD) students, faculty, and employees in the corridor.

Metrorail and MARC primarily serve north-south trips in the corridor. The only east-west transit service is provided by buses, whose speed and reliability is affected by the roadway congestion. In addition, county bus services terminate at the county boundary in the Takoma Park/Langley Park area, so travelers on those services crossing the respective county boundaries must transfer. Table 1-3 in Chapter 1.0 shows existing scheduled transit travel times for trips in the corridor.

## 3.1.3 No Build Alternative

As described in Section 2.3.1, the No Build Alternative includes the existing highway network and transit service, plus those transportation improvements that have been included in the Financially Constrained Long-Range Plan (CLRP) for implementation by 2040, except for the Purple Line.

The end-to-end travel time between Bethesda and New Carrollton on Metrorail is 55 minutes, but this route does not provide access to any of the intermediate stops that would be available on the Purple Line.

The CLRP includes new north-south and east-west bus service within Prince George's County, but does not extend new service throughout the Purple Line corridor. As noted in Chapter 2.0, Montgomery County is evaluating a bus rapid transit network, but this is not funded for construction, and is not included in the No Build Alternative. As the No Build Alternative would not include a new mode or new exclusive right-of-way, it is not anticipated to substantially increase the reliability of the existing bus system. It is expected that increasing roadway congestion will lengthen bus running times and result in longer travel times for cars and buses.

Automobile travel times for a trip between Bethesda and New Carrollton are expected to increase by approximately 30 percent and 40 percent during the morning and evening peak periods, respectively.<sup>1</sup> The projected bus transit travel time between Bethesda and New Carrollton is anticipated to increase to 108 minutes under the No Build Alternative. This condition will decrease the reliability of the bus service, impair its ability to meet its operations schedule, and adversely affect the predictability of expected headways and transit travel times.

### 3.1.4 Preferred Alternative

The Preferred Alternative, described in detail in Section 2.3.2, would provide new east-west light rail transit (LRT) service between Bethesda and New Carrollton. The Preferred Alternative would travel in dedicated or exclusive transit lanes for 13.9 miles of its 16.2-mile length, allowing the Purple Line to operate more reliably than the No Build Alternative bus services. In 2040, the end-to-end peak hour travel time for the Preferred Alternative would be 63 minutes, including stops at all stations.

<sup>1</sup> Multiple travel time runs were conducted in both the eastbound and westbound directions during the AM and PM peak periods. Year 2040 travel times were estimated using the average increase in delay across the corridor, based on the projected 2040 traffic conditions. For additional information refer to *the Purple Line Traffic Analysis Technical Report (2013)*

## Long-term Operational Effects

### Total and New Transit Trips

The Preferred Alternative is projected to generate 28,626 new transit trips for the entire Washington DC region in 2040. This is an increase of 1.7 percent in total regional transit ridership over the No Build alternative. Ridership forecasts are shown in Table 3-1 broken out by the four transit service types for both work and non-work trips, to show how the Preferred Alternative would shift trips. The forecasts for 2030 are included for comparison of projections to the horizon year previously presented in the AA/DEIS. Both 2030 and 2040 ridership forecasts in this FEIS use the Round 8 Cooperative Forecasts.

### Travel Patterns

Travel forecasts show that while there is considerable existing transit travel within the Purple Line corridor itself, the majority of transit trips in the Purple Line corridor have an origin or destination outside the corridor. For example, many transit trips that begin or end in the corridor are part of a trip that extends into Washington DC or areas to the north of the Purple Line corridor. These trips commonly use the Metrorail Red, Green, and Orange Lines, especially in the Shady Grove/Rockville area and the Glenmont area. While the major activity centers in the corridor account for the majority of the trips, a substantial number of these transit trips are associated with areas in between the Metrorail lines, and depend on street-running bus service operating in congested mixed traffic. The following terms are used to describe the different types of transit trips in the corridor:

- Transit trip “associated with the corridor” means the trip has either an origin or a destination in the corridor.
- Transit trip “within the corridor” means the trip origin and the trip destination are both in the corridor.
- “Corridor-related” transit trips include trips associated with the corridor and trips within the corridor.

Table 3-2 shows that under the No Build Alternative, daily transit trips in the Washington DC region are forecast to grow by 503,080 to 1,655,074, almost 44 percent, over the 29 years from 2011 to 2040. Corridor-related transit trips grow by 49 percent, to 221,833, clearly demonstrating the growing demand for transit in this corridor.

While the general pattern and distribution of transit trips would be similar to current trips, the level of growth within the corridor under the Preferred Alternative is substantial. Trips associated with the corridor in year 2040 for the Preferred Alternative would increase by 5,877 trips compared with the No Build Alternative (an increase of 2.9 percent). Year 2040 trips within the corridor for the Preferred Alternative would increase by 19,468 or 88 percent. These increases in transit trips demonstrate the benefit of the Preferred Alternative in improving mobility by better connecting the communities within the corridor.

### Daily Boardings

Table 3-3 shows the total number of daily boardings on the Purple Line, as well as the breakdown for three types of Purple Line trips:

- Trips using the Purple Line where the Purple Line would be the primary means of travel (including those passengers who got to and from the Purple line on foot or by bus)
- Trips primarily on Metrorail, which use the Purple Line for part of that trip
- Trips primarily on MARC, which use the Purple Line for part of that trip

In 2040, 27 percent of the Purple Line boardings would be trips that also include riding Metrorail, reflecting the ability of the Preferred Alternative to provide connectivity to the Metrorail system.

**Table 3-1. Total Daily Regional Transit Trips, 2030/2040**

| Transit Service                        | Type of Trip      | 2030<br>No Build<br>Alternative | 2040<br>No Build<br>Alternative | 2030<br>Preferred<br>Alternative | 2040<br>Preferred<br>Alternative |
|--|-------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|
| Bus                                    | Work              | 312,829                         | 326,373                         | 300,964                          | 313,802                          |
|  | Non-work          | 215,736                         | 230,303                         | 211,194                          | 225,521                          |
| Metrorail                              | Work              | 758,022                         | 802,619                         | 755,725                          | 800,235                          |
|  | Non-work          | 232,737                         | 249,646                         | 231,441                          | 248,271                          |
| Commuter Rail                          | Work and Non-work | 45,126                          | 46,134                          | 45,088                           | 46,105                           |
| Purple Line                            | Work              | N/A                             | N/A                             | 30,250                           | 32,259                           |
|  | Non-work          | N/A                             | N/A                             | 16,442                           | 17,508                           |
| Total Transit Trips                    |                   | 1,564,450                       | 1,655,075                       | 1,591,104                        | 1,683,701                        |
| New Transit Trips Relative to No Build |                   | N/A                             | N/A                             | 26,654                           | 28,627                           |

Note: Trips are assigned as to modes depending on the length of the trip on each mode. For example, a trip that would be traveled mostly on the Purple Line and would involve a short ride on a bus is an assigned trip on the Purple Line. Similarly, a trip that would be traveled mostly on Metrorail and uses the Purple Line as a means of accessing the Metrorail station is assigned as a Metrorail trip.

Source: *Purple Line Travel Forecasts Results Report (2013)*

**Table 3-2. Regional Transit Trips**

| Trips                                | 2011<br>Existing | 2030<br>No Build<br>Alternative | 2040<br>No Build<br>Alternative | 2030<br>Preferred<br>Alternative | 2040<br>Preferred<br>Alternative |
|--------------------------------------|------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|
| Associated with Purple Line Corridor | 135,851          | 187,996                         | 199,709                         | 193,750                          | 205,586                          |
| Within Purple Line Corridor          | 12,914           | 20,520                          | 22,124                          | 38,384                           | 41,592                           |
| Total Regional Trips                 | 1,151,994        | 1,564,450                       | 1,655,075                       | 1,591,104                        | 1,683,701                        |

Source: *Purple Line Travel Forecasts Results Report, (2013)*

**Table 3-3. Year 2030/2040 Daily Purple Line Boardings**

| Transit Ridership (daily boardings) | 2030 Preferred Alternative | 2040 Preferred Alternative |
|-------------------------------------|----------------------------|----------------------------|
| Purple Line                         | 46,837                     | 49,791                     |
| Purple Line and Metrorail           | 17,224                     | 18,972                     |
| Purple Line and MARC                | 477                        | 536                        |
| <b>Total</b>                        | <b>64,538</b>              | <b>69,299</b>              |

Source: Purple Line Travel Forecasts Results Report (2013)

**University of Maryland Student and Employee Travel**

The travel of UMD employees (faculty and staff) to and from the campus is captured within the regional model’s travel forecasts, and these trips are included in the forecasts for the Purple Line. In contrast, the student trips to and from campus are not included in the forecasts, except as part of a separate analysis of “Special Events / Student Boardings,” as shown in Table 3-4. Many of the current 37,000 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, as UMD is not in full session over the summer and during other breaks.

The university operates a shuttle bus service for its students, faculty, and staff, who make two million trips per year on this service. Four of the 18 Shuttle-UM routes (Shuttle-UM 111 Silver Spring Metro, Shuttle-UM 126 New Carrollton, Shuttle-UM 109 River Road, and Shuttle-UM 104 College Park Metro) operate in the Purple Line corridor serving major activity centers and destinations such as the Silver Spring Metro Station, the College Park Metro Station, New Carrollton Metro Station, and M Square Research Park. The ridership on these routes has been growing for the last several years and is estimated to grow 25 percent over the next 20 years as the student population grows and the on-campus parking supply becomes more restricted.

Of the four routes, Shuttle-UM 104 between the university campus and the College Park Metro station is the most heavily used, running at 6-minute headways from 6 AM to 7:30 PM, and every 20 minutes until 3:30 AM. An estimated 60 percent of the riders are students. This shuttle

route is assumed to be discontinued with the opening of the Purple Line, diverting 2,550 trips per average weekday in 2030 to the Purple Line. The Shuttle-UM 111 to Silver Spring is likewise assumed to be discontinued, diverting another 525 trips per day. The Shuttle-UM 126-New Carrollton and Shuttle-UM 109 River Road carry a much smaller estimated percent of students among their ridership. These routes likely would be modified so as not to duplicate the Purple Line service. Another 90 trips in 2030 would be diverted from these two routes.

Student and visitor trips also would be diverted from various The Bus routes (14-River Road and 17-College Park Metro) and Metrobus routes (J4, F6, F8, and C2/C4). An estimated 900 trips would be diverted from these routes.

The total number of student and visitor trips diverted from the discontinued or modified Shuttle-UM, The Bus and Metrobus routes is estimated to be 4,065 trips in 2030 on an average weekday when school is in session. As noted above, the travel of University employees are already included in the regional model forecasts.

**Special Event and Special Generator Trips**

Venues such as sport stadiums and arenas, and events such as festivals and holiday fireworks displays, generate trips that occur outside of the typical weekday travel patterns. Washington DC is the site of many special trip generators and major events that occur with enough regularity and frequency that these are included in the regional model forecasts. Special events and generators within the Purple Line corridor, however, are not included in the regional forecasts.

The principal special event and special trip generator venue in the Purple Line corridor is the UMD campus, with Byrd Stadium, Comcast Center, and Clarice Smith Performing Arts Center. Byrd Stadium seats 50,000 people and hosts five to seven weekend football games annually. UMD is the site of many major sport and cultural events including major football and basketball games, numerous other sporting events and tournaments, concerts and similar activities that bring several hundred thousand visitors to the campus throughout the

year—albeit typically on weekends and evenings. 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 UMD more attractive, especially with the Purple Line traveling along Campus Drive. The percentage of these trips that is estimated to use the Purple Line is estimated to be relatively small (3 percent), generating 75,000 boardings per year, or the equivalent of 255 boardings on a typical day in 2030.

While University of Maryland University College adjacent to the proposed Adelphi Road/West Campus station is largely a distance learning institution, there is a commuter student population which would be directly served by the Purple Line. Approximately 350 daily boardings would be generated by these students. The hotel and conference center hosts many large events, as well as numerous smaller events. While these vary by day of the week and season, an average of 80 daily Purple Line boardings is estimated for 2030.

**Table 3-4. Year 2030/2040 Daily Purple Line Boardings by Station**

| Segment                              | 2030 Preferred Alternative | 2030 Preferred Alternative with Special Event/Student Boardings Included <sup>1</sup> | 2040 Preferred Alternative | 2040 Preferred Alternative with Special Event/Student Boardings Included <sup>1</sup> |
|--------------------------------------|----------------------------|---|----------------------------|---|
| Bethesda                             | 14,780                     | 14,780  | 14,990                     | 14,990  |
| Chevy Chase Lake/Connecticut Avenue  | 2,240                      | 2,240   | 2,250                      | 2,250   |
| Lyttonsville                         | 1,330                      | 1,330   | 1,340                      | 1,340   |
| Woodside/16th Street                 | 1,570                      | 1,570   | 1,620                      | 1,620   |
| Silver Spring Transit Center         | 12,490                     | 12,870  | 12,940                     | 13,320  |
| Silver Spring Library                | 2,810                      | 2,810   | 3,010                      | 3,010   |
| Dale Drive                           | 870                        | 870   | 960                        | 960   |
| Manchester Place                     | 1,860                      | 1,860   | 1,910                      | 1,910   |
| Long Branch                          | 790                        | 790   | 890                        | 890   |
| Piney Branch Rd/University Boulevard | 1,160                      | 1,160   | 1,240                      | 1,240   |
| Takoma/Langley Transit Center        | 1,940                      | 1,940   | 2,190                      | 2,190   |
| Riggs Road                           | 1,860                      | 1,960   | 2,220                      | 2,320   |
| Adelphi Road/West Campus             | 910                        | 1,280   | 1,020                      | 1,390   |
| Campus Center                        | 550                        | 2,270   | 730                        | 2,500   |
| East Campus                          | 3,650                      | 3,930   | 4,310                      | 4,600   |
| College Park/UMD Metro               | 5,190                      | 7,090   | 5,790                      | 7,740   |
| M Square                             | 1,350                      | 1,350   | 1,730                      | 1,730   |
| Riverdale Park                       | 2,100                      | 2,100   | 2,390                      | 2,390   |
| Beacon Heights                       | 1,830                      | 1,830   | 1,900                      | 1,900   |
| Annapolis Road/Glenridge             | 1,360                      | 1,360   | 1,410                      | 1,410   |
| New Carrollton                       | 3,910                      | 3,910   | 4,460                      | 4,460   |
| <b>Total Boardings</b>               | <b>64,550</b>              | <b>69,300</b>   | <b>69,300</b>              | <b>74,160</b>   |

Daily boardings have been rounded

<sup>1</sup> Includes UMD special event, special generator, and student trips

Source: *Purple Line Travel Forecasts Results Report (2013)*.

The combined estimate for UMD student and special generator/special event Purple Line boardings in 2030 is 4,750. These boardings would occur on days when UMD is in session or the special events are happening. These trips are not as concentrated in the peak periods as employee trips and are not as regular, as UMD is not in full session over the summer and various break periods. The number of these boardings estimated to board the Purple Line is expected to grow by a little more than 2 percent between 2030 and 2040, to total of 4,860.

### Station Boardings

Daily boardings by station for the Preferred Alternative in 2030 and 2040 are shown in Table 3-4. The Bethesda, Silver Spring Transit Center, College Park/UMD Metro, and New Carrollton stations have the highest boarding of any of the stations, demonstrating the connectivity the Purple Line would have with the Metrorail system. The 2030 Preferred Alternative and 2040 Preferred Alternative columns do not include the UMD student and special event and special generators travel discussed previously. The 2030 and 2040 “Preferred Alternative with Student/Special Boardings Included” columns includes these boardings, although as discussed above, these boardings would only occur on days when the university is in session.

### Station Mode of Access

At most Purple Line stations, walking and bus would be the principal ways that passengers get to and leave the stations. At the Bethesda, Silver Spring Transit Center, College Park/UMD Metro, and New Carrollton Stations, a transfer to or from Metrorail would be the most common entry/exit mode. MARC connections are also available at Silver Spring Transit Center, College Park/UMD Metro, and New Carrollton. Major bus transfers would occur at Bethesda, Silver Spring Transit Center, the Takoma/Langley Transit Center, College Park/UMD Metro, and New Carrollton. At the UMD Campus Center station transfers would occur with the Shuttle-UM system as well. All these connections assume a future bus system based on existing service levels and routes. Some of the existing bus services in the corridor could be modified to better integrate with the Purple Line service, either by relocating stop locations or modifying schedules.

Another way to access stations is by automobile. While no new park-and-ride facilities would be provided at the Purple Line stations, the four Metrorail stations that would connect with the Purple Line have existing parking facilities that could be used by Purple Line riders. Some of the Metrorail users who would park at these stations under the No Build, would access these stations via the Purple Line under the Preferred Alternative (thus reducing demand for parking at these stations under the Preferred Alternative). On the other hand, some Purple Line riders who would access the service by automobile would use the existing parking facilities at the four Metrorail stations (thus increasing parking demand at these stations under the Preferred Alternative). In addition, some Purple Line riders who would use the Metrorail system as part of their trips would access the system by car at other Metrorail stations, thus increasing demand for parking at Metrorail stations outside the corridor. Overall, the travel forecasting analysis showed that adequate parking supply was available for the changes in parking demand with the Purple Line (see *Purple Line Travel Forecasts Results Report*, 2013).

### Passenger Travel Benefits

Benefits to travelers as a result of implementing the Purple Line can accrue to new transit users, as well as to existing transit riders who might benefit from a faster trip or more convenient access to the service. Table 3-5 lists the total systemwide passenger travel benefits for the Preferred Alternative. The travel benefits are calculated to represent the savings in travel times combined with out-of-pocket costs converted to minutes. In this way, the measure includes a comprehensive accounting of the total benefits of travel.

**Table 3-5. Year 2030/2040 Daily Systemwide Passenger Travel Benefits**

|                            | Daily Benefits (minutes) |
|----------------------------|--------------------------|
| 2030 Preferred Alternative | 1,694,900                |
| 2040 Preferred Alternative | 2,088,240                |

Note: This table does not include any travel benefits for UMD students and special generator trips.

Source: *Purple Line Travel Forecasts Results Report (2013)*

### Fare Box Revenue

Fare box revenues are the fares collected from passengers using the transit services. People use a variety of means to pay fares, including cash, passes, and electronic fare cards. Fare revenues include both fares at the initial boarding of the trip as well as any transfer costs for transfers to other services.

The Preferred Alternative is expected to increase the number of future systemwide (regional) transit users. As a result annual systemwide fare box revenues for all transit services are expected to increase by \$8,888,502 in 2030 compared to the No Build Alternative, and by \$9,615,564 in 2040.

### Bus Service Effects

Local bus routes in the Purple Line corridor would likely be modified or adjusted to serve Purple Line stations, or to respond to service redundancy and improve efficiency. These adjustments could include modifications to headways, routes, or hours of service.

Some bus routes currently run on routes parallel to portions of the Preferred Alternative and potentially could have their service levels adjusted or could be eliminated. However, it should be noted that while the routes may be parallel, the service is generally not identical because the bus stops tend to be spaced closer together than the Purple Line stations. Examples of bus routes that could be adjusted or eliminated include:

- WMATA Route J4
- Ride On 15
- Shuttle-UM's Route 111
- Shuttle-UM's Route 104

Decisions about these changes would be made by the transit providers of those services prior to the start of the Purple Line service.

### Mitigation

Mitigation is not warranted because the Purple Line would provide new transit service in the corridor where bus service would be removed.

Some bus routes would be adjusted or modified by the local providers, as needed.

### Short-term Construction Effects and Mitigation

Prior to construction, a Transportation Management Plan for the Purple Line would be developed to minimize potential negative impacts to traffic and transit as described in Section 5.3.

Potential impacts to local bus services during the construction of a transportation project could include the narrowing of roadway travel lanes, temporary lane closures (limited, when possible, to off-peak or nighttime periods when traffic volumes are low), roadway speed reductions, shifting or consolidation of bus stop locations, or short-term detours.

## 3.2 Roadways

### 3.2.1 Introduction

Data used to assess potential effects on roadway facilities and traffic included roadway system characteristics, intersection turning movement volumes, and daily and peak period traffic volumes. Analysis tools included traffic simulation modeling and travel demand forecasting. Existing and horizon year 2040 roadway network and traffic patterns were analyzed using the MWCOG's travel demand model. Traffic congestion was quantified using the 2000 Highway Capacity Manual, the national standard for evaluating traffic operations.

### 3.2.2 Affected Environment

#### *Levels of Service at Intersections along the Alignment*

Along the Purple Line corridor, traffic capacity is typically constrained by signalized intersections, rather than by the number of roadway lanes. Peak hour traffic analyses were conducted for 51 intersections along the Preferred Alternative alignment. Table 3-6 presents the level of service (LOS) of the intersections that would operate at or exceeding capacity (LOS E or LOS F) in 2040 under the No Build and the Preferred Alternative. Those intersections with levels of service E or F during one or more of these conditions are highlighted in orange and red, respectively.

### Level of Service

Level of service (LOS) is a measure of the quality of operations of a roadway. It looks at speed, traffic volume and road geometry. LOS A represents free flow conditions and LOS F represents a breakdown of vehicular flow. Typically, in urbanized areas LOS D or better is considered adequate.

As shown in Table 3-6, 11 intersections (22 percent) operate at LOS E or F during one or both peak hours. The remaining intersections currently operate at LOS D or better during the AM and PM peak hours.

**Table 3-6. Levels of Service at Intersections along the Alignment that would operate at or Exceeding Capacity in 2040**

| Intersection  | 2012 Existing |     | 2040 No Build Alternative |    | 2040 Preferred Alternative |    |
|---|---------------|-----|---------------------------|----|----------------------------|----|
|   | AM            | PM  | AM                        | PM | AM                         | PM |
| Wayne Avenue @ Fenton Street                            | C             | C   | C                         | D  | C                          | F  |
| Wayne Avenue @ Dale Drive                               | B             | C   | C                         | F  | E                          | E  |
| Wayne Avenue @ Sligo Creek Parkway                      | D             | C   | F                         | F  | D                          | F  |
| Wayne Avenue @ Manchester Road                          | E             | E   | F                         | F  | C                          | F  |
| Piney Branch Road @ University Boulevard                | D             | D   | D                         | D  | F                          | F  |
| University Boulevard @ Carroll Avenue                   | D             | C   | E                         | C  | D                          | C  |
| University Boulevard @ Merrimac Drive                   | D             | F   | F                         | F  | A                          | A  |
| University Boulevard @ New Hampshire Avenue             | D             | E   | D                         | F  | D                          | E  |
| University Boulevard @ Riggs Road                       | D             | E   | E                         | F  | E                          | F  |
| University Boulevard @ 15th Avenue                      | B             | D   | B                         | D  | B                          | E  |
| University Boulevard @ Guilford Road                    | C             | F   | B                         | F  | A                          | A  |
| University Boulevard @ Campus Drive                     | B             | C   | C                         | D  | C                          | E  |
| Campus Drive @ Adelphi Road                             | E             | E   | E                         | F  | E                          | F  |
| Campus Drive @ Regents Drive                            | D             | F   | F                         | F  | E                          | E  |
| Paint Branch Parkway @ Rossborough Lane                 | N/A           | N/A | F                         | F  | B                          | E  |
| Paint Branch Parkway @ MFRI Building Entrance           | B             | B   | F                         | F  | C                          | B  |
| Paint Branch Parkway @ Metro Parking                    | A             | B   | E                         | F  | F                          | F  |
| River Road @ Rivertech Court                            | E             | F   | F                         | F  | D                          | D  |
| River Road @ Haig Drive                                 | C             | C   | E                         | D  | A                          | A  |
| Kenilworth Avenue @ East-West Highway                   | F             | F   | F                         | F  | F                          | F  |
| Veterans Parkway @ Glenridge Yard                       | E             | F   | F                         | F  | A                          | A  |
| Veterans Parkway @ Annapolis Road                       | E             | E   | E                         | E  | E                          | F  |
| Total LOS F Intersections (by peak period)              | 1             | 6   | 9                         | 15 | 3                          | 9  |
| Intersections at or exceeding capacity (by peak period) | 6             | 11  | 15                        | 16 | 8                          | 15 |
| Total Intersections at or exceeding capacity            | 11            |     | 18                        |    | 15                         |    |

Note: Green shading denotes levels of service A-D; orange and red shading denote intersection levels at or exceeding capacity, i.e., with LOS of E or F.

Source: Purple Line Traffic Analysis Technical Report (2013)

### 3.2.3 No Build Alternative

In the latest update of the CLRP (July 2012), there are no east-west roadway projects programmed for funding along the Purple Line corridor. The effects of increased traffic would be most pronounced at intersections currently operating at or exceeding capacity, where an increase in queuing of traffic and delay is anticipated by 2040. The level of service analysis of the 2040 No Build Alternative clearly shows further deterioration in levels of service at key intersections.

As shown in Table 3-6 the analysis forecasted that during the 2040 No Build condition 18 intersections (35 percent) will operate at LOS E or F during one or both peak hours, compared to 11 intersections (21 percent) under existing conditions. The impact of the No Build Alternative on region-wide travel and congestion are presented as part of the Preferred Alternative discussion below.

### 3.2.4 Preferred Alternative

#### *Long-term Operational Effects*

Analysis of the long-term traffic effects on intersections for the year 2040 Preferred Alternative forecasted that of the 52 key intersections, 15 intersections (29 percent) would operate at LOS E or F during one or both peak periods (refer to Table 3-6). Level of service analysis of the Preferred Alternative clearly shows an improvement at most intersections when compared to the No Build Alternative, particularly along University Boulevard, River Road, and Veterans Parkway.

The Preferred Alternative would be at grade except for one short tunnel section and three sections elevated on structures. It would operate mainly in dedicated or exclusive lanes providing fast reliable transit operations. There are three segments of the Preferred Alternative that operate in mixed-use lanes: Wayne Avenue, Paint Branch Parkway, and Ellin Road. On Wayne Avenue traffic analysis showed that the addition of left turn lanes at the signalized intersections (proposed as part of the Preferred Alternative) would actually improve traffic operations in 2040. Paint Branch Parkway has sufficient capacity to maintain acceptable levels of service even with the addition of the Purple Line.

On Campus Drive in the UMD campus the Preferred Alternative will operate in a dedicated transitway with buses. Travel patterns on campus, as well as other campus roadway extensions result in improved transit travel time for both buses and light rail.

Where changes in traffic patterns are planned, the Preferred Alternative is expected to divert some traffic from existing roads onto adjacent streets. The following locations shown in Table 3-7 identify streets where some traffic could divert from and to, as a result of changes made to traffic patterns due to the Preferred Alternative.

#### Regional Effects on Travel and Congestion

The Preferred Alternative has the potential to improve traffic conditions and roadway system performance by upgrading intersections with added turn lanes and the addition or modification of traffic signals. In addition, by prompting a shift in the mode of travel from private automobiles to public transit, the Preferred Alternative has the potential to reduce traffic congestion. While these changes would represent relatively small changes on a regional level, they would represent appreciable improvements over the No-Build Alternative within the corridor. The potential regional traffic benefits of the Preferred Alternative were evaluated based on the change in daily vehicle trips, vehicle miles traveled (VMT), roadway operating speeds, intersection LOS, and representative travel times. These areas are discussed in the *Purple Line Travel Forecasts Results Report (2013)*, with the key findings summarized in the following sections.

#### Vehicle Trips

In a travel demand model, a vehicle trip is a vehicle traveling in a single direction from an origin to a destination. The number of passengers in a vehicle and the length of the trip also are forecast by the model but are not included in the vehicle trip tabulations. Table 3-8 presents daily vehicle trips expected with the No Build Alternative and the Preferred Alternative for the entire metropolitan region as forecasted by the model.

**Table 3-7. Traffic Diversion under the Preferred Alternative**

| Street Changed   | Change   | Streets to Which Traffic Would Likely Divert   |
|--|--|--|
| Bonifant Street  | Converted to one-way street<br><ul style="list-style-type: none"> <li>■ eastbound east of Georgia Avenue</li> <li>■ westbound west of Georgia Avenue</li> </ul>    | Wayne Avenue to the north and Thayer Avenue to the south   |
| Left turn access to the Whole Foods on Wayne Avenue just east of Fenton Street | Right in, right out only   | Cedar Street   |
| Piney Branch Road  | Elimination of left turns  | Gilbert Street, Seek Lane, Greenwood Avenue and Domer Avenue   |
| University Boulevard   | Reduced to 4-lane typical section<br>Closure of several median openings  | Nearest signalized intersections where left turns and U-turns would be permitted   |
| Campus Drive   | Currently a 2-lane roadway, this would be widened to a 3-lane roadway, with one-way westbound for automobiles and the other 2 lanes dedicated for transit vehicles | Eastbound traffic primarily to Fieldhouse Drive and Stadium Drive — eastbound through trips may continue along University Boulevard rather than cut through the campus |
| Kenilworth Avenue  | All intersections converted to right in, right out only except at Rittenhouse Street because of median alignment   | Left turns into and out of Quesada Road and Quintana Street along the west side of Kenilworth Avenue would be accommodated at the Rittenhouse Street traffic signal    |
| Veterans Parkway   | Closure of access into and out of the Glenridge Shopping Center  | Two existing shopping center access driveways along MD 450   |

**Table 3-8. Regional Daily Vehicle Trips**

|                        | 2030                 |                       | 2040                 |                       |
|------------------------|----------------------|-----------------------|----------------------|-----------------------|
|                        | No Build Alternative | Preferred Alternative | No Build Alternative | Preferred Alternative |
| Daily Vehicle Trips    | 26,110,617           | 26,095,033            | 27,702,467           | 27,685,677            |
| Change over No Build   | —                    | -15,584               | —                    | -16,790               |
| % Change over No Build | —                    | -0.060%               | —                    | -0.061%               |

Source: Purple Line Travel Forecasts Results Report, (2013)

Under the Preferred Alternative in 2040 the number of daily vehicle trips would be 16,790 less than under the No Build Alternative. The number of daily vehicle trips in 2040 represents a reduction of 0.06 percent on a regional basis relative to the No Build alternative. Though regionally small, the change would benefit the corridor roadway system performance, where the reduction would occur.

The change in regional vehicle trips was further broken down by areas in the region, focusing on those in the corridor. This analysis provides additional insight into the expected reduction in total automobile trips in the areas immediately surrounding the Preferred Alternative.

Table 3-9 shows the total reduction in automobile trips relative to the No Build Alternative, both into

and out of each area. The largest change in automobile traffic is expected in the Bethesda, College Park, and Silver Spring areas, with net decreases in automobile trips of between 4,500 and 5,400 per day in 2040 in all areas except in the Connecticut Avenue-Lyttonsville area. Note that all

the values represent the trips that would start and those that end in these particular areas. For example, a trip from Bethesda to Silver Spring is represented in both the Bethesda and Silver Spring values. It is reasonable to expect that the actual reduction in automobile trips within a particular area would be greater due to fewer trips passing through the area from adjoining areas.

There is a high likelihood that a trip from Bethesda to Silver Spring would pass through the Connecticut Avenue-Lyttonsville area, further reducing the number of cars on the road in that area (the analysis presented in Table 3-9 does not reflect the additional reduction in Connecticut-Lyttonsville traffic).

**Table 3-9. Change in Vehicle Trips in the Corridor where the Change Is Appreciable, Compared to No Build Alternative**

| Area                       | 2030 Preferred Alternative | 2040 Preferred Alternative |
|----------------------------|----------------------------|----------------------------|
| Bethesda                   | -4,580                     | -4,498                     |
| Connecticut — Lyttonsville | -939                       | -942                       |
| Silver Spring              | -5,153                     | -5,390                     |
| Takoma/Langley             | -2,690                     | -3,064                     |
| College Park               | -4,412                     | -5,408                     |
| Riverdale Park             | -2,241                     | -2,468                     |
| New Carrollton             | -1,152                     | -1,303                     |

Source: *Purple Line Travel Forecasts Results Report (2013)*

### Vehicle Miles Traveled

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. VMT represents the total miles traveled during all of the vehicle trips within a region, without regard to the number of passengers in a vehicle.

Table 3-10 shows that in year 2040, under the No Build Alternative, 195,519,477 vehicle miles would be traveled each day in the region. Under the Preferred Alternative, that total would be slightly lower by 129,828 (0.07 percent).

### Roadway Operating Speeds

The region-wide average roadway speed is calculated by the travel demand model. For some projects, this average can be used as a measure of the reduction in traffic congestion. However, given the small reduction in total daily vehicle trips on a regional scale for the Preferred Alternative, the change in the average roadway speed is projected to be quite small.

### Minimization

MTA has minimized traffic and roadway effects resulting from both the Purple Line and forecasted traffic conditions. Based on the Preferred Alternative, roadway and intersection traffic LOS would be improved overall compared to the No Build Alternative.

At various intersections minimization and avoidance efforts would include

combinations of additional turning lanes, additional traffic signals to control traffic flow, and adjustments to traffic signal phases and timing to optimize intersection operations. These traffic measures have been incorporated into the Preferred Alternative and are reflected in the LOS analysis for the Preferred Alternative intersections shown above in Table 3-6.

### Mitigation

To mitigate the effects of future traffic and Purple Line operations, new signals are proposed for the following 18 currently unsignalized intersections:

- Bonifant Street at Dixon Avenue
- Wayne Avenue at Manchester Road
- Wayne Avenue at Plymouth Tunnel
- Arliss Street at South Shopping Center Access
- Piney Branch Road at Garland Avenue
- University Boulevard at Seek Lane
- University Boulevard at Merrimac Drive
- University Boulevard at Lebanon Street
- University Boulevard at 14th Avenue
- University Boulevard at Guilford Road
- University Boulevard at 24th Avenue (North)
- Presidential Drive/Union Drive at Valley Drive
- Campus Drive at Regents Drive
- Paint Branch Parkway at Rossborough Lane
- River Road at Rivertech Court
- River Road at Haig Drive
- Veterans Parkway at Glenridge Yard
- Ellin Road at the New Carrollton Bus Stop

For further information see the *Purple Line Traffic Analysis Technical Report (2013)*.

### Short-term Construction Effects and Mitigation

As described in Chapter 5.0, construction of the Preferred Alternative has the potential to affect traffic and roadway operations in a number of ways that are typical of construction projects in existing roadways.

**Table 3-10. Vehicle Miles Traveled**

|                                    | 2030                 |                       | 2040                 |                       |
|------------------------------------|----------------------|-----------------------|----------------------|-----------------------|
|                                    | No Build Alternative | Preferred Alternative | No Build Alternative | Preferred Alternative |
| Vehicle Miles Traveled             | 190,126,536          | 189,975,165           | 195,519,477          | 195,389,649           |
| Change from No Build Alternative   | —                    | -151,371              | —                    | -129,828              |
| % Change from No Build Alternative | —                    | -0.08%                | —                    | -0.07%                |

Source: *Purple Line Travel Forecasts Results Report (2013)*

The Transportation Management Plan will provide detailed mitigation for these temporary construction impacts to traffic. Section 5.3 provides a description of the Transportation Management Plan, including public notification requirements, and coordination with emergency services.

### 3.3 Pedestrian and Bicycle Facilities

#### 3.3.1 Introduction

This section documents existing and planned pedestrian and bicycle facilities located within the Purple Line corridor and presents potential benefits and impacts during operations and construction of the Preferred Alternative (compared with the No-Build Alternative).

#### 3.3.2 Affected Environment

Multi-use trails, sidewalks, and bicycle lanes form a bicycle and pedestrian network that extends through many parts of the region. The corridor includes portions of eight multi-use trails, sidewalks and a number of bicycle lanes within roadway rights-of-way. The multi-use trails which are adjacent to, or cross the Preferred Alternative are the Capital Crescent (Georgetown to Bethesda), Georgetown Branch Interim, Rock Creek, Green, Sligo Creek, Long Branch, Northwest Branch, Paint Branch, and Northeast Branch Trails. The Georgetown Branch Interim Trail is within the right-of-way where the proposed Purple Line would be located. The roadways within the corridor generally have sidewalks provided on at least one side of the roadways. Bicycle lanes are provided on some roadways within the corridor.

#### 3.3.3 No Build Alternative

As described in Chapter 2.0 the No Build Alternative includes the completion of the Green Trail, bikeway and pedestrian improvements in the Bethesda Central Business District, and the Dale Drive sidewalk. The No Build Alternative does not include the construction of the Capital Crescent Trail from Bethesda to Silver Spring, therefore no impacts are expected.

### 3.3.4 Preferred Alternative

#### *Long-term Operational Effects*

Throughout the corridor the Preferred Alternative includes:

- Additional sidewalks and crosswalks in station areas, where needed to support safe station access
- Sidewalks along both sides of new and reconstructed roadways
- Bicycle racks at stations, where space allows and ridership estimates indicate a need.

The Preferred Alternative includes the following location-specific changes to bicycle and pedestrian facilities:

- Using funding to be provided by Montgomery County, the eastern 4.3 miles of the Capital Crescent Trail from Bethesda to Silver Spring would be constructed and paved, replacing the existing Georgetown Branch Interim Trail between Bethesda and Stewart Avenue. The Capital Crescent Trail would provide a permanent trail, separate from the roadways, from Stewart Avenue into downtown Silver Spring.<sup>2</sup> Most of the existing vegetation within the Georgetown Branch right-of-way will be removed; the trail will be regraded, and landscaped. Retaining walls will be built in some locations, and fencing provided between the trail and the transitway. The trail will be paved 12 feet wide, with 2-foot unpaved shoulders on either side. Lighting and other amenities will be provided near stations and at other locations as determined by Montgomery County. Twenty-three formal access points will be constructed. See Chapter 2.3.2 for more detail.
- New signalized pedestrian crosswalks across 16th Street, Wayne Avenue, Arliss Street, Piney

<sup>2</sup> The Preferred Alternative assumes that the permanent Capital Crescent Trail between Talbot Avenue and Silver Spring would be located in CSXT right-of-way in accordance with the County's land use plan. The completion of the trail in the CSXT corridor is contingent on agreement between Montgomery County and CSXT on the use of CSXT property on the north side of the CSXT tracks for the trail. If agreement is not reached by the time the Purple Line construction occurs, MTA would construct the trail from Bethesda to Talbot Avenue. From Talbot Avenue to Silver Spring, an interim signed bike route on local streets would be used.

Branch Road, University Boulevard, Campus Drive, and River Road.

- Wider outside roadway travel lanes to accommodate bicycles on Piney Branch Road, University Boulevard, and Kenilworth Avenue, and a 5-foot wide bicycle lane on the eastbound side of Veterans Parkway, separated from the traffic lane by striping.
- Wider sidewalks and crosswalks, pedestrian plazas and refuges along University Boulevard, especially in station areas, where needed and where reasonably feasible.
- Construction of a new bikeway across the UMD campus.

### Mitigation

MTA will design bicycle and pedestrian crossings to meet the requirements of the Americans with Disabilities Act (ADA), the Manual on Uniform Traffic Control Devices, the American Railway Engineering and Maintenance of Way Association, American Association of State Highway and Transportation Officials, and other relevant requirements and guidelines to ensure that a high level of service, safety and durability are provided.

### Short-term Construction Effects and Mitigation

Construction of the Preferred Alternative would temporarily affect bicycle and pedestrian facilities and activities, and may include temporary sidewalk and trail route detours. The Transportation Management Plan discussed in Section 5.3 will address detours and temporary connections to maintain continuity of bicycle and pedestrian facilities during the construction. Pedestrian movements would be maintained to the extent reasonably feasible and pedestrian access to adjacent properties would be maintained during construction. Where it is not possible to maintain existing movements, alternate routing with appropriate signing would be designated.

## 3.4 Parking Facilities

### 3.4.1 Introduction

The Purple Line is consistent with the State's Smart Growth policies to encourage new development in areas that are already developed reducing use of the

automobile, and therefore reducing parking needs. Parking in the corridor is not at capacity. In 2011 Montgomery County completed a Parking Policy Study to evaluate the need to better align with other policies that promote travel by other modes than automobile.<sup>3</sup>

MTA inventoried the types of parking facilities, locations, and the number of parking spaces located within a Purple Line parking study area. These included parking lots wholly or partially within the limits of disturbance (LOD), on-street parking in the LOD and public parking garages within one-quarter mile of Purple Line stations. Data sources included field reconnaissance, available mapping, and data from parking facility owners, including the counties, WMATA, and private entities. Parking facilities consist of the following:

- **On-street Parking**—Public parking along the sides of streets
- **Parking Garage**—Parking structures within one-quarter mile of Purple Line stations that patrons of the Purple Line might use for parking
- **Non-residential Parking Lots**—Paved areas used for parking that are open for public use or to serve businesses and non-residential parking
- **Residential**—Driveways and parking pads, as well as parking lots of apartments or condominiums

Parking impacts in the study area were classified as either permanent or temporary. Permanent parking effects consist of permanent loss of parking spaces that would not be reconstructed in their existing locations nor would they be replaced in other locations. Temporary parking effects consist of parking spaces that would be temporarily lost due to construction and would be unavailable for some duration during construction but would be available after construction or would be relocated.

<sup>3</sup> M-NCPPC and Montgomery County Department of Transportation, *Montgomery County Parking Policy Study*, Study Summary, 2011

### 3.4.2 Affected Environment

Within the study area there are a total of 17,962 parking spaces, consisting of:

- 327 (2 percent) on-street parking spaces
- 8,395 (47 percent) parking garage spaces
- 7,897 (44 percent) non-residential parking lot spaces
- 1,343 (7 percent) residential parking lot spaces, for apartments and condominiums

### 3.4.3 No Build Alternative

Under the No Build Alternative 940 new parking garage spaces would be available in downtown Bethesda. In addition, the planned extension of Presidential Drive and the relocation of Valley Drive on the UMD campus would result in the loss of 324 spaces in parking lots, even if the Purple Line were not built, and the University plans to add structured parking on campus to address the loss of these spaces and other parking lots on campus. There are no other changes in the parking space inventory under the No Build Alternative. This analysis assumed that there would be no impacts to the current on-street parking spaces in year 2040 consistent with the fact there are no proposed modifications in the CLRP (July 2012). For the analysis, the on-street and off-street parking are assumed to remain the same in the No Build condition as in the existing condition.

The demand for parking would increase as additional growth in population, employment and vehicular traffic occur in the corridor. New residential, commercial, and institutional development would be required to provide parking according to the current local zoning and development requirements.

### 3.4.4 Preferred Alternative

#### *Long-term Operational Effects*

The Preferred Alternative would remove 1,395 existing parking spaces in the corridor. Table 3-11 shows the number of parking spaces by facility type anticipated to be eliminated. The majority of parking impacts would occur in the portion of the corridor between the Silver Spring Transit Center and the UMD campus.

**Table 3-11. Parking Spaces Permanently Removed under the Preferred Alternative**

| Parking Facility Type        | Number of Existing Spaces | Number of Spaces Parking Permanently Removed |
|------------------------------|---------------------------|--|
| On-Street Parking            | 327                       | 220  |
| Parking Garages              | 8,395                     | 12   |
| Non-residential Parking Lots | 7,897                     | 897  |
| Residential Parking Lots     | 1,343                     | 110  |
| <b>Total</b>                 | <b>17,962</b>             | <b>1,239</b>                                 |

#### On-street Parking

The Preferred Alternative would remove 220 on-street parking spaces. Thirty spaces would be removed from Bonifant Street between Fenton Street and Georgia Avenue as a result of converting Bonifant Street to one-way traffic, 60 spaces would be removed along southbound Arliss Street, 3 spaces would be removed from Piney Branch Road, 66 spaces would be removed along the service roads on University Boulevard to maintain a 4-lane roadway with the addition of the Purple Line in the center median, and the remaining 61 spaces would be removed on the University of Maryland Campus.

#### Parking Garages

The Preferred Alternative would remove twelve spaces from the Bonifant-Dixon Parking Garage where the lowest level of the bridge connecting the north and south buildings of the parking garage would be removed.

#### Non-Residential Parking Lots

The Preferred Alternative would remove 897 spaces in non-residential parking lots. On the UMD campus, 344 spaces would be removed due to the extension of Presidential Drive and relocation of Valley Drive, and 121 spaces would be removed from a parking lot off of Administration Circle next to the Visitor Center. As noted above, the UMD master plan assumes the extension of Presidential Drive and relocation of Valley Drive, and includes the Preferred Alternative alignment through campus. The design of the alignment through campus was developed in joint meetings of MTA and the UMD Facilities Master Plan committee.

The majority of the remaining permanent impacts to non-residential parking lots in the Purple Line corridor are in the parking lots of shopping centers adjacent to the roadways planned for widening due to the Preferred Alternative.

### Residential Parking Lots

The Preferred Alternative would remove 102 spaces from the residential parking lots of eight apartment complexes.

### Mitigation

#### On-Street Parking

Mitigation of permanent impacts to on-street parking is not proposed except on Bonifant Street.

MTA has met with business owners along Bonifant Street to discuss the issue of lost parking. MTA will continue to work with the businesses and Montgomery County to identify specific mitigation strategies such as changing the meters in the county-owned Bonifant parking lot to prohibit eight hours of parking to discourage commuter parking.

#### Parking Garages and Non-Residential Parking Lots

Mitigation of permanent parking loss is not proposed in lots where the current parking is underutilized and remaining parking capacity exceeds parking utilization. Where parking spaces on private property are lost through acquisition of property for the project, MTA will purchase the property at fair market value.

In cases where parking impacts would appreciably affect businesses and the parking cannot be replaced due to lack of available replacement locations, MTA will conduct appraisals and compensate business owners for long-term adverse effects that the loss of parking would have on their businesses, above and beyond the compensation for right-of-way displacements.

The parking lot used by Montgomery County Department of Transportation employees at Lyttonsville will be replaced with a new parking deck.

### Residential Parking Lots

Property owners will be compensated for the acquisition of parking spaces, but mitigation is not proposed.

### Delivery and Service Access

An important part of parking access is loading zones for businesses in the LOD. Loading zones can be on-street or off-street. On Bonifant Street, where the Purple Line would eliminate parking and loading zones on the north side of the street, MTA will work with Montgomery County and local businesses to identify alternative loading zones.

### Short-term Construction Effects and Mitigation

Some parking spaces would be temporarily unavailable during construction of the Preferred Alternative. Table 3-12 summarizes the temporary parking impacts within the corridor. The Transportation Management Plan discussed in Section 5.3 would address temporary parking plans during the construction of the Purple Line. Because MTA will phase construction activities most of these spaces will only be affected for a portion of the five-year construction period.

**Table 3-12. Temporary Removal of Parking Spaces under the Preferred Alternative.**

| Parking Type                 | Existing Spaces | Spaces Temporarily Affected |
|------------------------------|-----------------|-----------------------------|
| On-Street Parking            | 327             | 69                          |
| Parking Garages              | 8,395           | 0                           |
| Non-Residential Parking Lots | 7,897           | 1,577                       |
| Residential Parking Lots     | 1,343           | 565                         |
| <b>Total</b>                 | <b>17,962</b>   | <b>2,211</b>                |

### On Street Parking

Wayne Avenue is a four-lane roadway with on-street parking during off peak hours. Parking on the north side is restricted during the morning peak period, Monday through Friday and the south side is restricted during the evening peak period, Monday through Friday. 61 parking spaces along Wayne Avenue would be temporarily unavailable during construction on Wayne Avenue. The other eight spaces are scattered throughout the corridor,

and would thus have a minimal impact on parking availability.

#### Residential and Non Residential Parking Lots

Several non-residential and residential parking lots would be temporarily unavailable during the construction of the Preferred Alternative. Most of the temporary parking loss is due to the need for construction staging areas. Below are some examples of the larger parking lots where spaces are removed temporarily during construction.

- **Lyttonsville Yard**—This would include the parking at the County Maintenance Lot during construction of the Lyttonsville Yard. MTA will coordinate with Montgomery County to find a temporary alternative site during construction.
- **Silver Spring International Middle School**—The parking lot would be reconfigured resulting in temporary loss of parking during construction. MTA will coordinate with the school to minimize disruptions, to the extent reasonably feasible.
- **Wayne Manchester Towers and Kenwood House Condominiums**—Parking lots would be temporarily removed during the construction of the Plymouth Tunnel.

#### Delivery and Service Access

MTA will work with stakeholders and local businesses affected by the temporary loss of loading zones, or access to loading zones, to identify alternate or temporary loading areas.

## 3.5 Railroad Facilities and Operations

### 3.5.1 Introduction

There are a number of active freight rail facilities within the Purple Line corridor. The sections below describe these freight rail services and operations.

### 3.5.2 Affected Environment

CSXT operates two freight rail lines in the corridor: the CSXT Metropolitan Subdivision (often referred to as the Metropolitan Branch) and the CSXT Capital Subdivision. The Metropolitan Subdivision approaches the corridor from the northwest, runs parallel to the WMATA Red Line starting at 16th Street, and passes through Silver Spring before

entering Washington DC. The Capital Subdivision approaches the corridor from the northeast and runs from Greenbelt to College Park and southward into Washington DC. Amtrak and MARC operate on both subdivisions. Currently, the Metropolitan Subdivision accommodates two Amtrak train movements, 19 MARC trains, and roughly 18 CSXT freight trains per day. The Capital Subdivision accommodates 13 MARC trains and roughly 18 CSXT freight trains per day. The WMATA Green Line operates within the Capital Subdivision right-of-way before diverting after the College Park-UMD Metro station.

### 3.5.3 No Build Alternative

The No Build Alternative does not affect railroad operations.

### 3.5.4 Preferred Alternative

The Preferred Alternative would run parallel to the Metropolitan Subdivision in the 1.2-mile section between Michigan Avenue and Silver Spring. The Purple Line alignment would also primarily be within CSXT right-of-way from Talbot Avenue to 16th Street and use small portions of CSXT right-of-way from 16th Street to Silver Spring. The Preferred Alternative would use up to 2.7 acres of CSXT right-of-way. In compliance with CSXT requirements, MTA would provide a barrier wall where the Purple Line would parallel the CSXT tracks, as a physical barrier separating the Purple Line tracks from the existing CSXT and WMATA tracks.

Just west of Colesville Road in Silver Spring, the Purple Line would cross over the CSXT Metropolitan Subdivision and the WMATA Red Line on a new bridge. The bottom of the bridge would have a minimum clearance of 23 feet above the top of rail of the CSXT tracks. At College Park, the Preferred Alternative would cross under the Capital Subdivision on Paint Branch Parkway. A short portion of Paint Branch Parkway would be lowered under the railroad bridges to accommodate the Purple Line overhead wire system.

Structures to be reconstructed over CSXT tracks include the Talbot Avenue and Spring Street

bridges; new structures would include the Capital Crescent Trail bridge north of Talbot Avenue and the light rail bridge over CSXT tracks immediately west of Colesville Road. The need to extend the 16th Street bridge would be determined during further design development.

There is a short siding on the southwest side of the CSXT mainline right-of-way that turns to run in the Georgetown Branch. MTA would need to relocate this siding out of the Georgetown Branch right-of-way to the CSXT right-of-way, parallel to the CSXT mainline.

Operationally, the Preferred Alternative would be located on its own track and right-of-way and would not use CSXT track or infrastructure, nor would it affect CSXT's operations or the operations of Amtrak, MARC or WMATA. MTA will continue to coordinate with CSXT regarding the use of their right-of-way as well as design and safety requirements.<sup>4</sup>

### *Long-term Operational Effects*

There are no long term effects anticipated on CSXT freight rail operations; therefore, no mitigation is proposed.

### *Short-term Construction Effects and Mitigation*

During construction of the Preferred Alternative, MTA and its contractors would require access to CSXT property, and would perform activities in proximity to CSXT operations. MTA will coordinate with CSXT regarding the nature and extent of construction activities affecting CSXT property. MTA and its contractors will comply with CSXT's access, safety and operational requirements during project construction, including but not limited to securing appropriate easements and agreements,

<sup>4</sup> The Preferred Alternative assumes that the permanent Capital Crescent Trail between Talbot Avenue and Silver Spring would be located in CSXT right-of-way in accordance with the County's land use plan. The completion of the trail in the CSXT corridor is contingent on agreement between Montgomery County and CSXT on the use of its property on the north side of the CSXT tracks for the trail. If agreement is not reached by the time the Purple Line construction occurs, MTA would construct the trail from Bethesda to Talbot Avenue. From Talbot Avenue to Silver Spring, an interim signed bike route on local streets would be used.

adopting CSXT safety procedures, and ensuring CSXT access to their facilities at all times. CSXT operations would be maintained at all times during the construction of the Preferred Alternative.

## 3.6 Aviation Facilities and Operations

### 3.6.1 Introduction

One general aviation facility is located near the Purple Line Corridor. The following sections describe this facility and its operations.

### 3.6.2 Affected Environment

The College Park Airport, owned by MNCPPC, is a general aviation facility located near the UMD campus just east of the Purple Line corridor. The facility covers 70 acres and has one runway, which is oriented northwest to southeast. It has 46 aircraft based at the facility, and about 70 aircraft operations occur weekly.

### 3.6.3 No Build Alternative

The No Build Alternative does not affect aviation operations.

### 3.6.4 Preferred Alternative

Under the Preferred Alternative, as the Purple Line approaches College Park Airport from the west, it would follow Paint Branch Parkway and operate in shared lanes. The alignment would be below-grade as it passes under the CSX Capital Subdivision tracks, and it then would turn south to access the College Park station and beyond.

### *Long-term Operational Effects*

No long-term effects on the airport facility or operations are anticipated. One reason is that the Preferred Alternative would follow the current alignment of Paint Branch Parkway near College Park Airport and be below-grade as it passes under the railroad tracks near the airport; the Purple Line would not even be visible to or from the airport. Another reason is that the Preferred Alternative alignment is parallel to the runway and thus would not affect the safety zone for aircraft takeoffs and landings.

### *Short-term Construction Effects and Mitigation*

The Preferred Alternative would have no short-term construction effects on the College Park Airport and its operations.

## 3.7 Safety and Security

This section identifies general safety and security considerations related to the design, construction, and operation of the Preferred Alternative including new tracks, at-grade crossings, stations, tunnels, and the storage and maintenance facilities. The Preferred Alternative would feature current safety and security systems and procedures to protect passengers, workers, and adjacent communities. This section addresses general safety procedures that would be in place once the Preferred Alternative is in operation, as well as those to be implemented during its construction.

### 3.7.1 Introduction

The safety and security process and activities for this project from planning, through design, construction, testing and verification, and pre-revenue operations leading to commencement of revenue service, are governed by FTA's requirements in Circular C 5800.1, *Safety and Security Management Guidance for Major Capital Projects* (2007). This document identifies specific safety and security activities that a transit agency must perform and document in a Safety and Security Management Plan (SSMP).

The MTA multi-modal System Safety Program Plan (SSPP) and the Maryland Department of Transportation (MDOT) State Safety Oversight Standard and oversight process govern the system safety, fire and life safety and security design criteria development process. MTA also participates in programs managed by other federal departments such as the Department of Homeland Security (DHS). MTA has developed and periodically updates the Purple Line SSMP, based on FTA comments, Project Management Plan updates, and project safety and security activities, organizational updates, work scope changes, and changes to assignments of responsibilities among project participants.

MTA will continue to assess whether adequate provisions have been made for safe and secure operations and what design features would be included to minimize auto, transit or pedestrian accidents.

### 3.7.2 No Build Alternative

Safety and security for the No Build Alternative would include the existing policies in the corridor. The No Build Alternative would have no effect on safety and security within the corridor.

The following documents were reviewed to describe existing procedures:

- MTA's System Safety Program Plan (SSPP), December 2012
- MTA's System Security and Emergency Preparedness Plan (SSEPP), November 2011
- MTA's LRT Design Criteria Manual, April 2012

The SSPP, developed as a means of integrating safety into MTA operations and services, establishes mechanisms for identifying and addressing hazards associated with MTA operations and services and provides a means of ensuring that system modifications are implemented with thorough evaluation of their potential effect on safety. The plan is revised annually and submitted to MDOT, as part of the state safety oversight process.

MTA has developed the SSEPP as a tool to securely operate their transit systems and to coordinate with local, state, and federal agencies regarding security and emergency preparedness issues. MTA participates in programs managed by the DHS, the Office for Domestic Preparedness, the Transportation Security Administration, and the Transit Security Grant Program, all of which require a SSEPP.

#### Passenger Safety

The SSPP gives MTA employees and departments the responsibility of upholding the highest level of safety for passengers. MTA promotes safety and security through passenger and public awareness programs.

#### Stations and Facilities

The SSPP provides the framework for ensuring passenger and employee safety at MTA stations and facilities. MTA has established a Hazard Identi-

fication and Resolution Process to identify and eliminate as many hazardous conditions or situations as possible. As part of this process, MTA performs frequent inspections of its facilities, tracks, systems and station areas. MTA also employs police personnel as well as security guards and fare inspectors, who provide armed and unarmed security on MTA's existing transit services. MTA stations will include closed circuit television (CCTV).

### Vehicles

MTA transit vehicles are equipped with physical safety and security measures to support the overall operation of the transportation system, including CCTV equipment and Automatic Vehicle Locaters that use global positioning system units to provide the location of any operating vehicle at any time. In addition, local and commuter buses, MARC, Mobility paratransit services, light rail, and Metro subway vehicles are regularly inspected for unsafe or unhealthy items or situations.

### Employees and Contractors (Construction Safety)

MTA's SSPP contains provisions for an Employee Safety Program including a wide range of occupational safety and health, injury and illness prevention, hazard communication, industrial hygiene, fire and life safety, emergency preparedness, operational safety, environmental, and security programs. These programs have been developed in accordance with federal, state, and local regulatory requirements, and are implemented by MTA and construction contractors.

### Emergency Preparedness Plan for Transit Operations

The overall objective of emergency preparedness and planning is to ensure fast and efficient response to emergencies or disasters in a manner that minimizes risk to the safety and health of passengers, employees, and emergency response personnel, as well as unnecessary property loss. To meet this objective, MTA has written comprehensive emergency preparedness operations plans (EPOP) for the organization as a whole, and for each of its modal operations (i.e., Metro, Light Rail, MARC, Bus, and Mobility). An EPOP addresses the roles of the many MTA offices that participate including Police, Safety, Media Relations, Engineer-

ing, Human Resources, and Procurement. These plans also establish the roles and responsibilities to be carried out by various emergency response agencies during an emergency. The EPOPs are supplemented by the comprehensive SSEPP, Standard Operating Procedures, Emergency Operating Procedures, and the emergency operating rules used by each mode.

### Police and Security Operations

MTA's Security Program has been developed and coordinated by MTA Police Force, with input from all MTA departments. The SSEPP emphasizes that the security of customers, employees, and property is not the sole responsibility of the police force, but the responsibility of every employee and department within MTA. The Police Force is dedicated to providing security to MTA customers, employees, and property. It consists of personnel who possess police officer authority extending throughout the State of Maryland as established through Maryland Transportation Article Section 7-207 and the Annotated Code of Maryland Article 27, Section 594B. The force conforms to all training requirements set forth by the Maryland Police and Correctional Training Commissions, and all officers are certified through this commission. The officers also receive additional track access training. Training includes response to incidents in accordance with MTA's Emergency Plan and dealing with transit-specific criminal activity. MTA also employs security guards and fare inspectors, who provide unarmed security and enforce the fare payment system.

### Pedestrian and Motorist Safety

To the extent practicable, MTA will seek to reduce or eliminate pedestrian and motorist conflicts with transit vehicles at MTA stations and facilities. However, conflicts do occur, especially at stations where pedestrians must cross streets at-grade to access platforms, as would be the case for many Purple Line stations. Many safety measures including crosswalks, signals, lighting, and fencing in certain locations, help to reduce the number of conflicts and incidents. In addition, basic design elements are used to enhance safety, including use of platform and parking lot layouts that avoid or reduce pedestrian/vehicle and vehicle/vehicle

conflicts, as well as careful use of landscaping to eliminate blind spots and provide openness for security surveillance.

MTA stations and facilities are designed to comply with the ADA to improve safety and ease of movement for disabled individuals. For this corridor, which runs through dense residential, shopping and business districts, operator training and public outreach is important in contributing to pedestrian and motorist safety.

### 3.7.3 Preferred Alternative

The Preferred Alternative would be designed, constructed, and operated in accordance with MTA's SSPP and SSEPP, both of which would be updated to include specific requirements for the Preferred Alternative, and submitted through the MDOT State Safety Oversight Standard and oversight process for approval, prior to revenue service. The project would be designed in accordance with MTA's *LRT Design Criteria Manual*, which is being prepared for both the proposed Red and Purple Line LRT systems.

The design would be based, in part, on a preliminary hazard analysis and a threat and vulnerability analysis, which would be used to help determine risk mitigation and implementation priorities. MTA would prioritize risks and select sets of countermeasures for the Purple Line that would provide the best overall risk reduction. The basis of design for the Preferred Alternative is predicated on compliance with local, state, and federal design standards and requirements, as referenced in the *LRT Design Criteria Manual*. These design standards mitigate and control potential safety and security hazards and risks to an acceptable level in accordance with transit industry practices and experience from similar light rail transit systems in the United States.

In compliance with the National Fire Protection Association (NFPA) 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems* 2010 Edition, the Preferred Alternative would incorporate appropriate fire and life safety requirements into all aspects of the project design and construction.

Strategies such as Crime Prevention through Environmental Design and the use of police, private security patrols, and security cameras would be employed as appropriate to make the light rail facilities as safe and secure as possible. MTA's existing light rail operations policies and procedures that are designed to address potential catastrophic events and to prevent terrorist activities would be expanded to include the Purple Line. Design considerations such as platform location and length, pedestrian crossings, and alignment design would be used to ensure that the project operates safely.

#### Station Platforms and Vehicles

The station platforms are being designed using MTA design principles to increase natural surveillance opportunities. CCTV cameras would be placed on every platform and monitored by MTA's transit police and operations personnel. The ticket vending machines would contain passenger assistance telephones linked to the central control center. MTA's transit police would provide roving patrols on the LRT vehicles and at stations. MTA personnel would monitor proof of payment on the LRT vehicles.

Additional safety features would include public address systems on transit vehicles and on station platforms to make emergency announcements. Safety elements that would be put in place for multi-use paths and other access to the stations could include walkways, emergency phones, limited entry and exit points, and provisions for persons with disabilities.

#### Emergency Ventilation System

The emergency ventilation systems for the enclosed transitway in Bethesda, the Silver Spring Library station, and the Plymouth Street tunnel would be designed in accordance with NFPA 130 fire safety standards.

#### Vehicular, Bicycle, and Pedestrian Safety

Safety provisions would be made to minimize conflicts between transit vehicles, automobiles, bicyclists, and pedestrians. Crossings would be clearly marked with signage and pavement markings. Bicycle and pedestrian crossings would be provided at select street and rail crossings.

At some locations, rail crossing gates would be used to stop vehicles at the transitway. The gates would include an active warning system that would alert the control center of interference with the gates. At grade crossings with flashers and gates, stationary crossing bells also would ring for approximately five seconds while the gate arms are lowered. Onboard warning devices or bells would be sounded within five seconds of a transit vehicle approaching a grade crossing. At grade crossings with traffic signals, no crossing flashers, bells or gates are proposed, as LRT vehicles would follow traffic signals just as other vehicles do.

Safety and security on the Capital Crescent Trail would be provided by Montgomery County because the trail would be a county facility. Design of the trail has included Crime Prevention through Environmental Design principles, and other safety and security considerations. Montgomery County has approved lighting at trail connections and trail underpasses. The county police will be responsible for policing the trail, as they do the rest of the county's trails.

#### Safety and Security during Construction Activities

The safety and security of construction workers and the general public would be a key element of Purple Line construction activities. On-site construction equipment, including heavy industrial cranes and trucks hauling excavated material on local roads, would create potential safety hazards for pedestrians and motorists. Construction workers operating or working in concert with equipment at the various construction staging areas also would create increased opportunities for safety and security breaches. The construction sites and related equipment would potentially be vulnerable to safety and security violations, particularly during times of construction equipment shutdown and construction site closure. Construction sites will be fenced to reduce these hazards. MTA will work with the construction contractors to ensure adherence to applicable federal and state safety protocols and the following:

- MTA's Purple Line Safety and Security Management Plan (SSMP), October 5, 2012, Version 3, Section 8

- MTA System Safety Program Plan (SSPP), December 2012, Section 18
- MTA's Contractor's Safety and Health Guidelines (CSHG), March 2011

The Purple Line SSMP, MTA's multi-modal SSPP and MTA's CSHG require that contractors develop a project-specific health and safety plan. The goal of this plan would be to identify, eliminate, minimize, and control safety hazards and related risks by establishing requirements, clear lines of authority and levels of responsibility and accountability. Detailed provisions for the contractor's security requirements during construction are provided in the Purple Line SSMP. Examples of safety- and security-related best practices for construction activities include:

- The contractors will install the following:
  - Fencing and shielding at all construction sites to reduce vulnerability to trespassing and vandalism and to protect adjacent walkways and streets
  - Warning and guide signage to alert the public to the presence of work areas and to physically separate work areas from public spaces, including at times of equipment shutdown and site closure
  - Signage to enable the public to seek alternative routes of travel if needed, in the vicinity of the construction sites
- The contractor will prepare and implement crane safety plans, among other project specific items specified in MTA's CSHG.
- Traffic on streets adjacent to construction sites will be managed through enactment and enforcement of an approved Transportation Management Plan that will include lane closures, travel lane shifts, bus stop relocations, and relocated and protected sidewalks and bicycle lanes. These plans will be developed during further design development (see Section 5.4.)

#### Effects on Emergency Services

There are several emergency service providers located in the project study area, including fire stations, police stations, and medical facilities. These facilities are identified in the *Purple Line Environmental Resource Maps*. Among the

community resources shown are: fire stations, police stations, and medical facilities. MTA will coordinate with emergency service providers (police, fire, etc.) to minimize impacts and identify potential mitigation measures for emergency service routes affected both during and after construction.

### 3.8 Minimization and Mitigation

This section summarizes MTA's commitments to minimize and mitigate impacts to transportation described in Sections 3.1 through 3.6 during the design, construction, and operation of the Preferred Alternative.

- Prior to construction, a Transportation Management Plan for the Purple Line would be developed to minimize potential negative impacts to traffic, transit and pedestrians as described in Section 5.3
- Pedestrian movements would be maintained to the extent reasonably feasible, and pedestrian access to adjacent properties would be maintained during construction. Where it is not possible to maintain existing movements, alternate routing with appropriate signing would be designated.
- Mitigation of permanent impacts to on-street parking on Bonifant Street will be addressed through coordination with Montgomery County.
- The parking lot used by Montgomery County Department of Transportation employees at Lyttonsville will be replaced by a new parking facility.
- On Bonifant Street, where the Purple Line would eliminate parking and loading zones on the north side of the street, MTA will work with Montgomery County and local businesses to identify alternative loading zones.
- MTA will work with stakeholders and local businesses affected by the temporary loss of loading zones, or access to loading zones, to identify alternate or temporary loading areas.

