

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 <ul style="list-style-type: none"> ■ eastbound east of Georgia Avenue ■ westbound west of Georgia Avenue 	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 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.² 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

² 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.