Evaluation of a Tunnel on Wayne Avenue between the Silver Spring Transit Center and Mansfield Road

May 2009

EVALUATION OF A TUNNEL BETWEEN THE SILVER SPRING TRANSIT CENTER AND MANSFIELD ROAD

The segment of the Purple Line corridor between the Silver Spring Transit Center and Long Branch presents a number of challenges. The topography of the area includes a stream valley with steep grades which the Purple Line must cross. There is no major east-west commercial roadway in this area. Wayne Avenue is a county-classified arterial roadway, but it is more residential in character than other roads in the corridor that serve the same transportation function. Since the initiation of the project the MTA has evaluated many alignments for this area. In considering these alternatives, the MTA, in consultation with Montgomery County and the Maryland - National Capital Park and Planning Commission, assessed the alignments for reasonableness and relevance to the project's purpose and need. These alignment options are described in the AA/DEIS; as well as the reasons for their inclusion or not, as alternatives in the AA/DEIS.

The Montgomery County Council and County Executive Isiah Leggett, while endorsing the Purple Line and supporting the Medium Investment LRT alternative, have requested that the analysis of a tunnel to Mansfield Road be brought to the same level of detail as the alternatives in the AA/DEIS, prior to the selection of the Preferred Alternative.

Public Involvement in the Purple Line

The MTA conducted an extensive public involvement program throughout the Purple Line planning process with periodic large open houses; newsletters; a website; Community Focus Groups; and meetings with community and civic associations, major stakeholders, and local elected officials.

Since Scoping in 2003, MTA has held over 110 meetings with community groups in the Silver Spring and Takoma Park areas. MTA also established Community Focus Groups for downtown Silver Spring, East Silver Spring, and University Boulevard. In total, 75 community groups were invited to the Community Focus Groups from downtown Silver Spring, East Silver Spring, and the Takoma/Langley Park communities.

In 2008 alone, over 20 community meetings were held in or near the East Silver Spring community. This included four meetings with the Park Hills Civic Association and Seven Oaks/ Evanswood Civic Association, both of which include neighborhoods along Wayne Avenue.

At these community meetings the MTA received feedback on the proposed alternatives and modified them to address a number of community concerns; and accommodated requests by community groups to evaluate additional alternatives to determine if the impacts of the Purple Line could be reduced without significantly increasing the overall project cost and adversely affecting the project's cost-effectiveness and affordability.

Several major meetings with East Silver Spring community groups were held in March and April 2008, prior to the release of the AA/DEIS. At these meetings, MTA presented the residents with the findings of its evaluation of the proposal for a tunnel under Wayne Avenue with a portal at Mansfield Road. The community was presented with preliminary information regarding cost,

impacts to property, travel times, and ridership for the proposed longer tunnel option; and shown how these compared to the other alternatives through Silver Spring.

Additional Tunnel Options in East Silver Spring

Some of the residents along Wayne Avenue have opposed a surface alignment because of concerns about adverse effects to the neighborhood. They expressed a broad range of concerns including vehicular traffic, pedestrian safety (particularly for school children), diversion of traffic on to local streets, noise, community disruption, and roadway widening. The MTA was asked by community members to evaluate a longer tunnel than the High Investment LRT alternative that extended from the Silver Spring Transit Center to Wayne Avenue and Cedar Street. The first request was for a tunnel that would cross under Sligo Creek. Because this tunnel would have to cross under Sligo Creek (a very low elevation relative to the land elevations on either side of the creek valley) the tunnel would not be able to come up to the surface until it reaches Piney Branch Road at Barron Street, near University Boulevard, resulting in a much longer and more costly tunnel. Upon presenting the technical difficulties and high cost of such a tunnel, the MTA was asked to evaluate a tunnel that would extend to just east of Mansfield Road on Wayne Avenue, west of Sligo Creek.

Light Rail Alternatives in the AA/DEIS

Low Investment Light Rail

The Low Investment Light Rail Alternative would leave the CSX right-of way on Bonifant Street at grade, in dedicated lanes. It would turn into the site of the future County Library just west of Fenton Street. A station would be built in the site, integrated into the library development. The light rail would continue through the site to the intersection of Fenton Street and Wayne Avenue. It would travel on Wayne Avenue in shared lanes, entering a tunnel east of Manchester Road due to excessively steep grades on Wayne Avenue and continuing under Plymouth Street to emerge on Arliss Street. The transitway would turn left on Piney Branch Road and would continue in dedicated lanes. East of the Silver Spring Transit Center stations were proposed at Fenton Street, Dale Drive, and Manchester Place. Since the release of the AA/DEIS the MTA has agreed to remove the stop at Dale Drive, but to build the alignment to accommodate a future station.

Medium Investment Light Rail

The Medium Investment Light Rail alternative is the same as the Low Investment Light Rail except that it would travel on Wayne Avenue in shared lanes with some added left turn lanes at the signalized intersections to improve traffic performance. Like Low Investment Light Rail the alignment would enter a tunnel east of Manchester Road and continue under Plymouth to emerge on Arliss Street. The transitway would turn left on Piney Branch Road and would continue in dedicated lanes. East of the Silver Spring Transit Center stations were proposed at Fenton Street, Dale Drive, and Manchester Place. As noted above, the MTA has agreed to eliminate the Dale Drive station.

High Investment Light Rail

The High Investment Light Rail Alternative would extend in tunnel from the Silver Spring Transit Center to Wayne Avenue just east of Cedar Street. It would continue east on Wayne Avenue at grade, in dedicated lanes with a single traffic lane in each direction, to the tunnel

under Plymouth to Arliss Street. The transitway would turn left on Piney Branch Road and would continue in dedicated lanes. East of the Silver Spring Transit Center stations are proposed at Dale Drive and Manchester Place. As noted above, the MTA has agreed to eliminate the Dale Drive station.

Silver Spring/Thayer Avenue Design Option

High Investment LRT also has a design option which would extend in tunnel from the Silver Spring Transit Center, but instead of turning north under Grove Street, would continue in tunnel under the back yards of the houses on Silver Spring Avenue and Thayer Avenue. The alignment would return to the surface on Thayer Avenue behind East Silver Spring Elementary School. A station would be located just east of the portal on Thayer Avenue. The transitway would continue along Thayer Avenue to Piney Branch Road where it would turn left. Once on Piney Branch Road the transitway would be on an elevated structure taking it over Sligo Creek and Sligo Creek Parkway until just east of Manchester Road. The transitway would continue on Piney Branch Road to University Boulevard in dedicated lanes, with a station near Arliss Street. It should be noted that there is no public or county support for this option.

Additional Alternatives Evaluated at Community Request

Tunnel under Sligo Creek

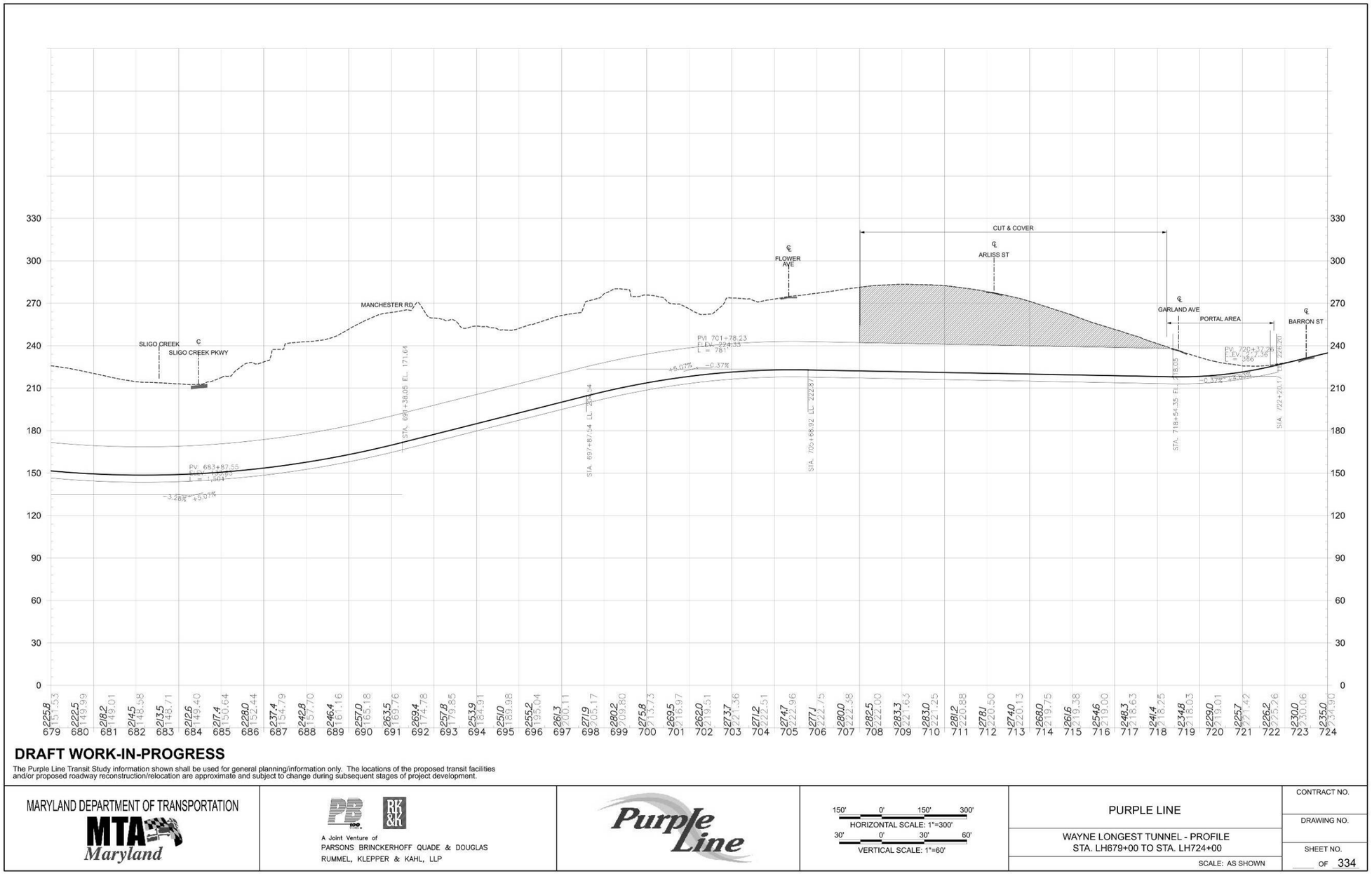
The first tunnel that local residents asked the MTA to evaluate would have passed under Sligo Creek. In order to tunnel under a creek without disturbing the hydrology of the stream the transitway must descend very deep. Because of the depth required to tunnel under the creek, and the rapidly rising topography east of the creek, this tunnel would not be able to return to the surface until the alignment was on Piney Branch Road, at Barron Street. See Figure 1: Tunnel under Sligo Creek. This is due to the limitations on how steep a grade a light rail vehicle can climb. For this study the recommended maximum grade for a sustained length greater than 1500' was 6%. This grade would need to be exceeded for the alignment to emerge from the tunnel at Arliss Street. The capital cost for this alternative, from the Silver Spring Transit Center to University Boulevard would be approximately $419 million. This alternative was not evaluated for detailed study in the AA/DEIS because it would have been extremely expensive and would not have provided meaningful travel time benefits, thus would have substantial negative impacts to the cost-effectiveness of the project. Because of the prohibitive cost of underground stations, this option would have had no stations between the Silver Spring Transit Center and Gilbert Street on University Boulevard, a distance of almost two miles. This would have deprived a large area of access to the Purple Line and the accessibility and mobility benefits it would provide. Both Fenton Street at the site of the new County Library and Long Branch are areas where Montgomery County strongly endorses Purple Line stations, to serve the existing businesses and residents, and to support planned economic development. Based on these findings, it was determined that the tunnel was too costly, did not the meet the stated objective of supporting county plans and policies, and did not provide sufficient benefit to warrant further study.

Tunnel to Mansfield Road

Community members concerned about the at-grade use of Wayne Avenue suggested a second tunnel option with a portal on Wayne Avenue between Mansfield Road and Sligo Creek

Parkway. This option has been studied and the analysis is presented below. Some of this

Figure 1: Profile of Tunnel under Sligo Creek to Barron Street

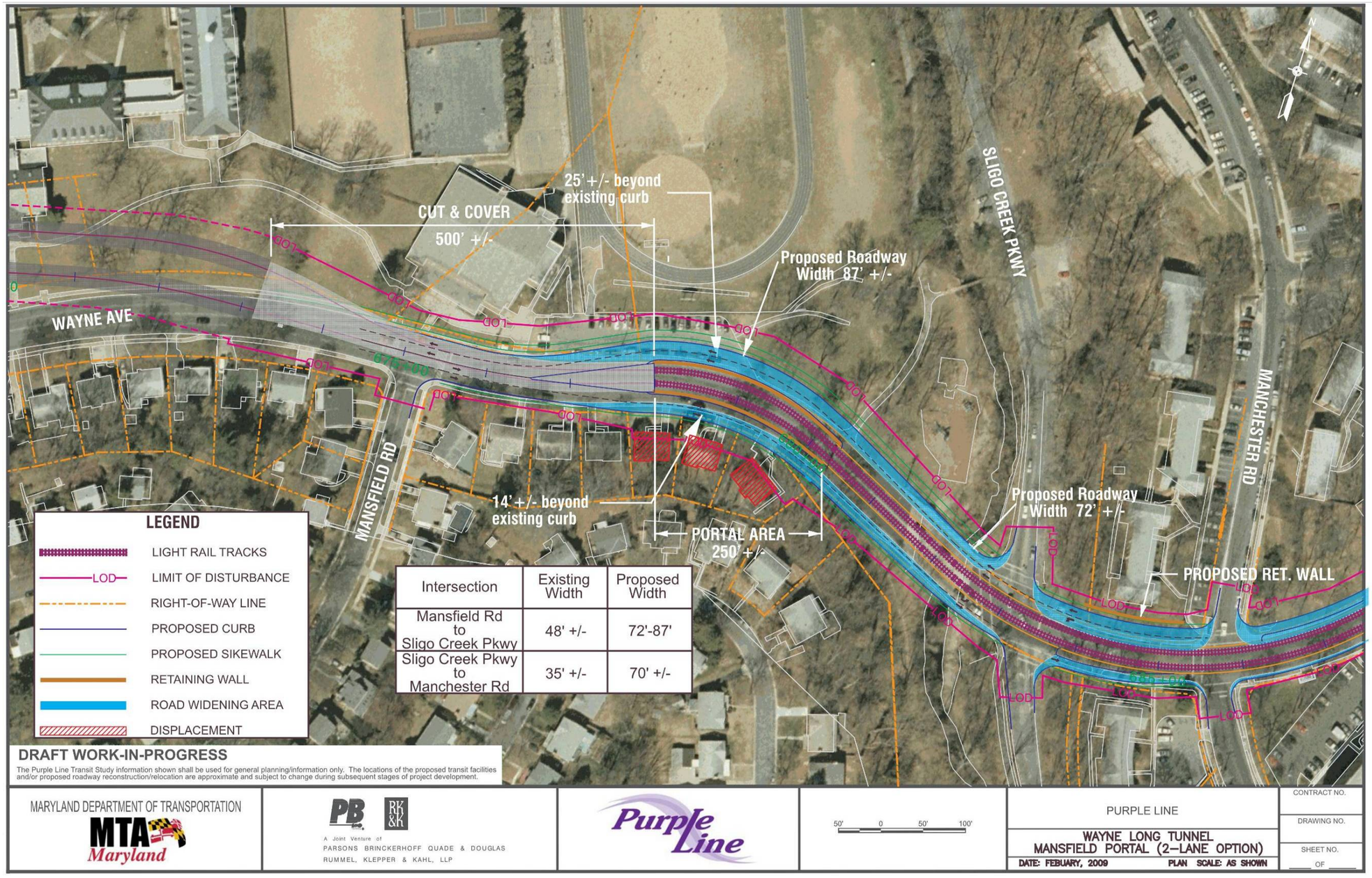


DRAFT WORK-IN-PROGRESS

The Purple Line Transit Study information shown shall be used for general planning/information only. The locations of the proposed transit facilities and/or proposed roadway reconstruction/relocation are approximate and subject to change during subsequent stages of project development.

MARYLAND DEPARTMENT OF TRANSPORTATION MTA Maryland	A Joint Venture of PARSONS BRINCKERHOFF QUADE & DOUGLAS RUMMEL, KLEPPER & KAHL, LLP	Purple Line	150' 0' 150' 300' HORIZONTAL SCALE: 1"=300' 30' 0' 30' 60' VERTICAL SCALE: 1"=60'	PURPLE LINE WAYNE LONGEST TUNNEL - PROFILE STA. LH679+00 TO STA. LH724+00 SCALE: AS SHOWN	CONTRACT NO. DRAWING NO. SHEET NO. OF 334

Figure 2: Plan of Tunnel to Mansfield Road



Intersection	Existing Width	Proposed Width
Mansfield Rd to Sligo Creek Pkwy	48' +/-	72'-87'
Sligo Creek Pkwy to Manchester Rd	35' +/-	70' +/-

information was shared with the local community members prior to the publication of the AA/SDEIS, however the analysis here provides more depth. Table 1 presents a comparison of the Wayne Avenue alternatives.

Table 1: Comparison of LRT Alternatives (from the Silver Spring Transit Center to University Boulevard)

Alternative	Low Inv. LRT: At grade in shared lanes	Medium Inv. LRT: At grade in shared lanes with added left turn lanes	High Inv. LRT: Tunnel to Cedar Street, dedicated on Wayne Avenue	Tunnel to Mansfield Road
Stations	Fenton Street, Dale Drive*, Manchester Place, Arliss Street	Fenton Street, Dale Drive*, Manchester Place, Arliss Street	Dale Drive*, Manchester Place, Arliss Street	Manchester Place, Arliss Street
Displacements	1 commercial building on Bonifant St, 1 duplex on Plymouth St, and 1 house at Arliss St. and Flower Ave	1 commercial building on Bonifant St, 1 duplex on Plymouth St, and 1 house at Arliss St and Flower Ave	1 duplex on Plymouth St and 1 house at Arliss St and Flower Ave	3-4 houses on Wayne Ave, 1 duplex on Plymouth St, and 1 house at Arliss St and Flower Ave
Permanent underground easements for tunnels (acres)	1	1	6	9
Capital Cost from SSTC to University Blvd	$178 million	$179 million	$296 million	$352 million
Cost Effectiveness for entire project	$26.51	$22.82	$23.71	$23.90
2030 Travel Times	10.0	9.0	6.0	5.4
Parkland Impacts (acres)	0.14	0.15	0.15	0.41
On-Street Parking Restrictions or Removal	Expanded peak hour restrictions on Wayne Avenue	Expanded peak hour restrictions on Wayne Avenue	Elimination of all on-street parking east of Cedar St.	On-street parking is already prohibited east of the proposed tunnel portal

* The MTA has agreed to eliminate the Dale Drive station

Under the Mansfield Road tunnel option the length of the transitway on Wayne Avenue would be reduced by approximately ½ mile. The alignment would be underground at the Sligo Creek Elementary and Silver Spring International Middle Schools. There would not be a station at the Silver Spring Library. See Figure 2: Tunnel to Mansfield Road. The natural and human environmental impacts of the tunnel to Mansfield Road are discussed below, as well as the cost, cost effectiveness and ability to meet the project purpose and need.

Property

The property displacements identified in Table 1 are based on conceptual planning and engineering, and are intended to provide information on the general order of magnitude of property impacts, as well as allow a comparison of the impacts of the alternatives within the East Silver Spring area.

All of the alternatives require some widening of the public right-of-way along Wayne Avenue. However, for much of Wayne Avenue the public right-of-way is actually quite wide, so the additional turn lanes for the Medium Investment alternative would not require much private property. However, the public is likely unaware that some of the property they consider as their front yard is actually public right-of-way. The tunnel portal at Mansfield Road would require more widening of Wayne Avenue than the other alternatives because two traffic lanes in both directions are maintained, and the necessary additional widening (approximately 10 feet) around the tunnel portal and for two additional dedicated transit lanes. The widening extends on both sides of Wayne Avenue into private residential property and parklands. Neither side is well suited for widening. The houses on the south side of Wayne Avenue sit above the roadways meaning retaining walls would be needed where the roadway is widened, and the presence of parkland on the north raises the issue of impacts under Section 4 (f) of the US DOT Act of 1966. The amount of property required from three or four houses on Wayne Avenue is so great (see Figure 2) that it would result in the displacement of those residents.

As noted above, all alternatives would require strip acquisitions of residential property. The amount of property taken from parcels along Wayne Avenue for the alternatives evaluated in the DEIS varies. Low Investment LRT, for which no turning lanes are being added, would require the smallest property acquisitions on Wayne Avenue. Medium Investment LRT requires property acquisition from those locations where the roadway is widened to add left turn lanes. Approximately 40% (2110 feet) of Wayne Avenue between Fenton Street and the Plymouth portal is widened, at least to some extent, in varying widths to account for tapering of the roadway, for the left turn lanes.

Table 2 – Average Width of Property Requirements beyond Public Right-of-Way

Note: this does not account for widening for the Green Trail

		Fenton Street to Cedar Street	Cedar Street to Greenbrier Drive	Greenbrier Drive to Dale Drive	Dale Drive to Mansfield Road	Mansfield Road to Sligo Creek Parkway	Sligo Creek Parkway to Plymouth Portal
Distance		900 ft	900 ft	700 ft	1200 ft	800 ft	1000 ft
Low Investment LRT	North side	2'±	0'±	0'±	1'±	8'±	5'±
	South side	0'±	0'±	0'±	0'±	0'±	0'±
Medium Investment LRT	North side	9'±	2'±	2'±	7'±	12'±	5'±
	South side	2'±	0'±	0'±	0'±	0'±	0'±
High Investment LRT	North side	-	12'±	10'±	7'±	12'±	5'±
	South side	-	10'±	4'±	0'±	5'±	0'±
Tunnel to Mansfield Road	North side	-	-	-	0'±	20'±	5'±
	South side	-	-	-	0'±	11'±	0'±

All tunnel alternatives have sections of their alignment between downtown Silver Spring and Flower Avenue located beneath private property. Construction of any of these tunnel sections will require the purchase of an underground easement from each property owner. Also, depending on the length of the tunnel segment, private property on the surface may be required for ventilation shafts and other tunnel safety features.

Any tunnel option has its greatest impact at the portal area. A tunnel portal requires approximately eight feet additional roadway width for the retaining walls and structure and has a considerable visual impact, and, when in the median of a roadway, can have accessibility and mobility impacts to adjacent properties. This is particularly true for the Mansfield Road portal because of the proximity of the houses to the roadway and the grade differential between the street and the houses. The three houses in the area just west of the tunnel portal, where the roadway widens for the portal, would have the access to their driveways limited to right in/right out only.

Access

The additional area needed for the tunnel would also result in changes of access for some of the driveways along the south side of Wayne Avenue. Access to and from the driveways of the three houses immediately east of Mansfield Road would be limited to a right in – right out only. This restricted access to homes would be considered a significant adverse impact to these residential properties.

Visual Impacts

The tunnel portal at Mansfield Road would have a direct visual impact from the park and the remaining houses east of Mansfield Road. Also, due to its placement on the primary roadway serving the community, building a tunnel portal at this location would create a visual impact affecting the overall community.

Natural Environment

The primary environmental resource located in this area is Sligo Creek. Generally, adverse effects to the environment are not expected from any of the Build Alternatives because they travel along the existing road. The widening required will not have major effects to the natural environment. The increased impervious surface would require appropriate stormwater management. As for the rest of the project, the stormwater treatment plans would be approved by the Maryland Department of the Environment. The tunnel to Mansfield Road, because it requires the most widening at Sligo Creek Parkway, would have the greatest impact of all the alternatives, but as noted, the impacts are relatively minor.

Parklands

The tunnel to Mansfield Road would require approximately .4 acre of property from Sligo Creek Stream Valley Park and Sligo Cabin Neighborhood Park. While not a large amount, this is more than what is required under the other LRT alternatives. (See Table 1). The tunnel to Mansfield Road would require property from Sligo Cabin Neighborhood Park and the parking lot for the playing fields of the Silver Spring International Middle School. The playing fields and parking lot are part of Sligo Creek Stream Valley Park. Under Section 4(f) of the US DOT Act of 1966 the use of parklands for a federally funded or approved transportation project is only permissible

when there is no "feasible or prudent" alternative to the use. Given the alternatives under consideration it is possible that this option would not be acceptable to the Maryland-National Capital Park and Planning Commission, which has jurisdiction over the parks. The case for a *de minimus* impact finding under recent legislative changes would need to be carefully reviewed for applicability if this option were carried forward. In addition, these parklands may be protected under Section 6(f) of the Land and Water Conservation Funds Act (LWCFA) under which the Secretary of Interior must approve any conversion of property acquired or improved with funding assistance under this act.

Travel times

The tunnel to Mansfield provides a travel time shorter than the Low, Medium, and High Investment LRT alternatives described in the AA/DEIS. Both the tunnel alternatives are faster (more than 3 minutes), both because of the lack on interaction with traffic and intersections, but also because of having fewer stations. Each additional station would add a minimum of one half minute to the travel time. It should be noted that when at grade the tunnel options are in dedicated lanes. Specifically, for the High Investment alternatives in a tunnel to Cedar Street, dedicated transit lanes (replacing two of the existing general traffic lanes, one in each direction) would be provided along the remaining portion of Wayne Avenue; whereas, for the Mansfield Road tunnel option, the dedicated transit lanes would be new lanes built in addition to the existing traffic lanes, due to its proximity to the Plymouth tunnel required for all light rail options.

Cost

The estimated capital cost for the tunnel to Mansfield Road is $352 million from the Silver Spring Transit Center to University Boulevard. This alternative has the longest length of tunnel and therefore the highest cost. The costs are considerably lower for the Low and Medium Investment LRT Alternatives which include only the required tunnel under Plymouth.

Cost-Effectiveness and Affordability

A key measure used in the FTA's evaluation of transit projects is the cost-effectiveness index, which measures the relative advantages of a proposed transit system compared to a baseline alternative. This index relates the capital and operating costs of a transit system to each hour of user benefit (travel time savings, etc) which are derived from that system.

The Medium and High Investment LRT alternatives have cost-effectiveness values which would satisfy the current criteria for a "Medium" ($15.00 to $23.99) cost-effectiveness rating from the FTA. The Low Investment LRT Alternative would satisfy the current criteria for a "Medium-Low" ($24.00 to $30.00) cost-effectiveness rating. A "medium" or better is required for funding eligibility.

While all the alternatives and options are currently expected to meet the federal cost-effectiveness requirements, it must be remembered that the affordability of the project is a critical consideration. The ability of an option to meet the cost-effectiveness index is immaterial if that option is beyond the financial capacity of the State of Maryland.

Reliability

The reliability of transit operations will be adversely impacted due to conflicts with other traffic. This can happen at intersections and when regular traffic is in the same lanes as the transit vehicles.

The alternatives with tunnel or exclusive right-of way would have the highest reliability because they would not be subjected to interference from traffic. Therefore, the High Investment alternatives would have the highest reliability, and the Low Investment alternatives would have the lowest reliability.

The tunnel to Mansfield Road would have slightly more reliability than the High Investment LRT with a tunnel to Cedar Street due to the fact that it is in tunnel at the intersections of Wayne Avenue with Dale Drive and Mansfield Road. However, as these are small streets with less traffic than Wayne Avenue, the delays would not be large.

While dedicated or exclusive right-of-ways are the most desirable operating environment for transit systems due to the faster and more reliable travel times which can be attained, operations in mixed traffic (within shared lanes) are also common and can provide reliable travel times. For the Purple Line, operations in mixed traffic are proposed for two segments: Wayne Avenue (between Fenton Street and Sligo Creek Parkway) and Paint Branch Parkway (between Rossborough Lane and River Road). By providing separate left-turn lanes and using signal priority strategies to reduce the delay at the traffic signals along Wayne Avenue, it is expected that consistent and reliable travel times can be attained along this segment. Also, by operating in the inside lanes, rather than the curb lanes, the potential for unexpected delays, such as those due to illegally stopped or parked vehicles, trucks making deliveries, or broken down vehicles (which are typically moved to the right side of the road), should be reduced.

Ridership, Accessibility, and Equity

Table 3 shows the estimated daily boardings at each station between downtown Silver Spring and Manchester Place. The data indicates that the High Investment LRT Alternative, with a tunnel to Cedar Street, would attract 7 percent more boardings at the four Silver Spring area stations than the surface-running Medium Investment LRT Alternative and 17 percent more boardings at these stations than the Low Investment LRT Alternative. All of these are the alignments as defined in the AA/DEIS with a station at Dale Drive. However, it must be remembered that ridership is primarily a function of travel time and accessibility. The High Investment alternative, offering faster travel times throughout the corridor would attract more riders. To provide a comparison that isolates the ridership changes resulting from the inclusion of tunnel along Wayne Avenue the travel forecasting model was used to develop projections for an option that used the Medium LRT outside of East Silver Spring, but included a tunnel option to Mansfield Road. This number indicates that number of boardings in the Silver Spring area for the Tunnel to Mansfield road is 14,650. Because the tunnel option is slightly faster that the medium surface alternative, this option has a marginally higher ridership than the county-requested Medium Investment LRT without a station at Dale Drive. This reflects the poorer accessibility due to the lack of a station at the New County library at Fenton Street. Under the Medium Investment LRT alternative, if the Dale Drive surface station is eliminated, of the 1400 projected riders, about 500 would switch to the Fenton Street station, 200 would switch to the Manchester station and 700 would not use the Purple Line.

One of the key objectives of the Purple Line is to provide neighborhood access and stations in comfortable walking distance. This is especially important since new park-and-ride lots would not be provided as part of the project. The tunnel options do not meet that objective nearly as well as the surface options, particularly the Mansfield tunnel because it does not have a station at the new County library (Fenton Street and Wayne Avenue). The distance between the Silver Spring Transit Center and the station at the Plymouth portal is almost 1 ½ miles leaving that area without convenient access to the Purple Line. This compares to an average distance for the entire 16-mile Purple Line corridor of approximately .75 miles between stations.

Table 3: Year 2030 LRT Alternative Daily Station Boardings

Alternative		SSTC	Fenton Street	Dale Drive	Manchester Place	Total Boardings for Station Group
Low Inv. LRT: At grade in shared lanes	**AA/DEIS**	11,100	700	1,300	800	13,900
Medium Inv. LRT: At grade in shared lanes with added left turn lanes	**AA/DEIS**	12,200	700	1,400	900	15,200
High Inv. LRT: Tunnel to Cedar St., dedicated on Wayne Ave.	**AA/DEIS**	13,600	N/A	1,500	1,200	16,250
High Inv. LRT: Tunnel to Mansfield Road	**County request**	13,650	N/A	N/A	1,400	15,050
Medium Inv. LRT: Tunnel to Mansfield Road	**County request**	13,450	N/A	N/A	1,200	14,650
Medium Inv. LRT without Dale Drive Station*	**County request**	12,200	1,200	N/A	1,100	14,500

* Alignment would be built to accommodate a station at a future date.

Effects on Traffic

MTA evaluated the effects of the Build Alternatives on traffic operations along Wayne Avenue during the AM and PM peak hours. The results of this analysis are summarized in Table 4. Under the No-Build condition, the intersections of Wayne Avenue and Dale Drive and Wayne Avenue and Sligo Creek Parkway are expected to operate near their capacity in 2030. The tunnel to Mansfield Road would avoid impacts to the intersection of Wayne Avenue and Dale Drive, but would negatively impact the intersection of Wayne Avenue and Sligo Creek Parkway, resulting in LOS F operations during the peak period.

The Low Investment LRT Alternative, which would operate in shared lanes, is not expected to substantially impact traffic operations at the signalized intersections along Wayne Avenue. The Medium Investment LRT Alternative, which would operate in shared lanes but include widening for left-turn lanes at critical locations, is expected to improve overall traffic operations along the corridor relative to the No Build condition.

The High Investment LRT Alternative, which would provide dedicated transit lanes for the LRT by converting two of the four existing travel lanes, is expected to negatively impact intersection operations along Wayne Avenue, particularly at the critical intersections at Dale Drive and Sligo Creek Parkway. Under the High Investment LRT Alternative, these two intersections are

projected to operate at LOS F during the peak periods in 2030, with increased delay for motorists.

Parking

Parking on Wayne Avenue would not change under the Tunnel to Mansfield Road alternative from what it is today.

Along Wayne Avenue under the Low and Medium Investment LRT Alternatives, the existing time of day/day of week parking restrictions would be expanded to ensure reliable transit operations during the peak periods. During off-peak periods, it is expected that on-street parking would be permitted in the curb lanes on Wayne Avenue west of Mansfield Road, as it is today. East of Mansfield Road on Wayne Avenue parking is not permitted today, nor under any of the Build alternatives. If a station is provided at Dale Drive in the future, parking in the eastbound curb lane on Wayne Avenue in the vicinity of the station would need to be prohibited at all times.

Much, if not all of the existing parking for the playing fields would also need to be removed to provide the necessary width for the tunnel portal and the County's planned Green Trail; and on-street parking would not be available in this area to replace the lost parking. This lot currently has parking for approximately 20 to 25 cars.

Table 4: Impacts on 2030 Intersection Peak Hour Level of Service (AM/PM)

Alternative	Projected 2030 Level of Service				
	Wayne Ave at Fenton St	Wayne Ave at Cedar St	Wayne Ave at Dale Dr	Wayne Ave at Mansfield Rd	Wayne Ave at Sligo Creek Pkwy
No Build	C/C	C/D	C/E	A/A	E/E
Low Inv. LRT: At grade in shared lanes	C/D	B/D	B/D	A/A	C/E
Medium Inv. LRT: At grade. in shared lanes with added left turn lanes	C/D	B/D	B/D	A/A	C/E
High Inv. LRT: Tunnel to Cedar St., dedicated on Wayne Ave.	C/C	C/C	F/F	D/C	F/F
Tunnel to Mansfield Road	C/C	C/D	C/E	A/A	F/F

Construction Impacts

Construction of the cut-and-cover section and portal area would require several months to complete. Depending on the soil conditions, maintenance of traffic requirements and weather conditions it is estimated to take eight to twelve months to complete the structural work. During the construction period it is assumed that no parking would be allowed from approximately 300 feet west to 600 feet east of Mansfield Road and that only one lane of through-traffic would be maintained in each direction.

Prior to the construction of the cut-and-cover section and the portal it is estimated that the utility relocations and lane widening for maintenance of traffic would take approximately four to six months.

Following completion of the tunnel and cut-and-cover section the new roadway, storm drains, and conduits for Wayne Avenue would be constructed. This construction could take another four to six months.

While some of this work may be done concurrently, under the worst case scenario we estimate the total duration of construction in this area to be between 16 to 24 months. In addition to construction impacts such as noise, the cut-and-cover construction would adversely affect traffic operations for the community to a greater extent than the other alternatives along Wayne Avenue.

Conclusion

The tunnel to Mansfield Road would eliminate impacts to the portion of Wayne Avenue west of Mansfield Road. Natural environmental impacts would not be substantially different for this option. Parkland impacts are greater, not substantially, but the existence of "feasible and prudent" alternatives with smaller impacts may be an issue.

This option would have major adverse impacts to the residences on the south side of Wayne Avenue east of Mansfield Road. Three houses would likely be displaced, and the remaining houses in this section of Wayne Avenue would be subject to accessibility and mobility impacts.

The cost is much greater, nearly twice the cost of the at-grade Medium Investment alternative. The tunnel to Mansfield Road alternative provides faster overall travel times and therefore slightly higher ridership, but fewer stations. This tunnel would provide only minimal travel time benefits compared to the High Investment Alternative which includes a tunnel to Cedar Street, and adds approximately $50 million to the project cost, but higher than the Medium Investment LRT. There are travel time benefits, but the cost is twice as high. However, the overall cost-effectiveness for this alternative does remain within the FTA's "medium" range.

It bears repeating that while all the alternatives and options are currently expected to meet the federal cost-effectiveness requirements, the affordability of the project is a critical consideration. The ability of an option to meet the cost-effectiveness index is immaterial if that option is beyond the financial capacity of the State of Maryland. In these times of fiscal constraint the cost and benefits of the various elements of the project must be carefully weighed to avoid inclusion of elements that would render the entire project not viable.

The MTA has concluded that this tunnel option would not reduce adverse community effects when compared to the tunnel portal near Cedar or the Medium Investment LRT, and in fact would escalate the magnitude of those effects, while simply transferring them to another location on Wayne Avenue. Further, this longer tunnel option would not serve the community with walkable, easily accessible neighborhood stations as well as the other Wayne Avenue surface options. Based on the significant impacts to the residents in the tunnel portal area, the additional costs, and the loss of a station serving the Silver Spring Library, it was determined that this tunnel option did not provide sufficient benefits to justify its inclusion in the AA/DEIS or to continue its design.