

Appendix I: Planning Framework

The 1990 Approved and Adopted *Georgetown Branch Master Plan Amendment* identifies the Georgetown Branch right-of-way as the location for both the Silver Spring & Bethesda Trolley and the Capital Crescent Trail, and the Apex Building (nee “Embassy Plaza Building”) site as the location of the Bethesda trolley station. The Plan recommends the connection of the Bethesda trolley station and the Bethesda Metro station south entrance, and includes specific design recommendations for the design and function of the various station elements.

The 1994 Approved and Adopted *Bethesda CBD Sector Plan* includes the Purple Line station within the “Metro Core District”, with Woodmont and Bethesda Avenues forming the western and southern boundaries of the district. The Sector Plan recommends for this district the highest intensity development, focusing primarily on commercial uses and employment, but not precluding residential development. For the station block, the Sector Plan recommends medium- to high-density office development, with retail and service uses along Woodmont Plaza, and CBD-2 zoning. The Plan “recommends optional method employment uses on most CBD-2 sites, at 4 FAR. Optional method residential use is also allowed at 5 FAR.”(p.58) The Sector Plan also makes design recommendations for the portion of the block along Woodmont Avenue. The Sector Plan does not make specific recommendations regarding development of the eastern portion of the block.

The *Bethesda CBD Sector Plan* highlights the need to “integrate the Silver Spring-Bethesda Trolley into the transportation and land use pattern” (p. 143) and supports “connection of a light rail to the Silver Spring CBD using the Georgetown Branch right-of-way, with a terminal located near the south entrance to Metro in the Bethesda CBD Metro Core.” (p. 146). The Sector Plan acknowledges the complexity of the planned connection between the Metro station south entrance and the trolley station and recommends alternative station locations within the Georgetown Branch right-of-way.

The 2010 Approved and Adopted *Purple Line Functional Plan* reconfirms the location of the Bethesda terminal station under the Apex Building and reinforces as key features of the station the pedestrian connections to the Bethesda Metro station south entrance, Elm Street, and Woodmont Plaza.

Appendix II: Recent Development Approvals in the Plan Area

The remaining properties on the Plan area block are now included within an approved development project called “Woodmont/7200.” Below is a chronological summary of the Planning Board approvals to date.

Artery Organization

- Project Plan 919810090
- Preliminary Plan 119830150
- Site Plan 819840020
- Site Plan approved 1984
- Lot area: 2.2 acres
- 282,111 sf. of office and retail uses



Woodmont East, Phase Two

- Included existing office/retail building (i.e., “Phase One”) at Woodmont Avenue and Elm Street in the northwest corner of the block.
- Project Plans 920070070, 92007007A
- Preliminary Plans 120070200, 12007020A
- Site Plan 820090080
- Approved 2008-2009
- Lot area: 2.48 acres
- 210 multi-family dwelling units
- 225 hotel rooms
- 37,136 square feet of retail
- 286,879 square feet of office



Woodmont/ 7200

- Combines the Artery and Woodmont East projects
- Project Plan 92007007B
- Preliminary Plan 12007020B
- Site Plan 82009008A
- Approved 2012
- Lot area: 5.82 acres
- 210 multi-family dwelling units
- 182,950 square feet of hotel
- 81,165 square feet of retail
- 755,739 square feet of office



Appendix III: Transportation

- **Benefits of Redevelopment**
- **Full Storage Bicycle Station**
- **Bethesda South Entrance Project**
- **Capital Crescent Trail**
- **Traffic**
- **Bike Station Technical Memo**

Bethesda Purple Line Minor Master Plan Appendix – Benefits of Redevelopment

Benefits of Redevelopment

Table 1 provides an evaluation of the benefits of redeveloping the Apex Building before or after the end of 2015, compared to current plans.

Capital Crescent Trail: The 1994 Bethesda CBD Sector Plan recommends that the mainline Capital Crescent Trail branch into a Surface Route and a Tunnel Route between Elm Street Park and Woodmont Avenue. This recommendation was confirmed in the 2005 Countywide Bikeways Functional Master Plan. The Surface Route was envisioned to provide access to trail users accessing local land use, while the Tunnel Route was envisioned to separate trail users from the traffic and delays of a busy intersection. In 2012 the County Council decided not to proceed with the Tunnel Route for the trail as then envisioned, due to the extensive cost and liability to the Apex Building. However, with the removal of the Apex Building it is possible to construct a new tunnel for the trail that crosses Wisconsin Avenue below grade. While this tunnel could be built if redevelopment of the Apex Building occurs before or after the end of 2015, the tunnel could be designed to be straighter and would have a lower cost if the building is torn down prior to the end of 2015.

Planned Red Line Entrance: Existing plans include two high speed elevators on Elm Street as part of the Bethesda Station South Entrance project. These elevators have a visual presence on Elm Street and provide a circulation area that is adequate, but not ideal. If the Apex Building is torn down by the end of 2015, the elevators could be incorporated into the redeveloped Apex Building site with additional space for pedestrian circulation. This would reduce the cost of the high-speed elevators by approximately \$10 million.

Woodmont Plaza: Existing Purple Line plans will have an aesthetical impact on Woodmont Plaza. The Purple Line tail tracks would extend up to 100 feet into the plaza, and a ventilation tower that is 40 feet wide by 18 feet long by 90 feet high may need to be located in the plaza. If the Apex Building is torn down by the end of 2015, the ventilation tower could be incorporated into a redeveloped Apex Building and the tail tracks would extend only about 30 feet into the plaza. If the Apex Building is torn down after the end of 2015, the ventilation tower could be relocated into the redeveloped Apex Building for a cost, but the tail tracks would continue to extend 100 feet into the plaza.

Bicycle Storage: With redevelopment of the Apex Building site it is possible to reserve space for a full-service bicycle storage facility that is adjacent to the Capital Crescent Trail, the Red Line station entrance, and the Purple Line platform. A bicycle storage facility – not to be confused with a bikeshare station – is important to provide access to and from transit and for commuters to Bethesda.

Purple Line Platform: Current plans for the Bethesda Purple Line station include a platform that is constrained. About 12 support columns for the Apex Building would be located in the platform, creating an impediment for pedestrian circulation and reducing the waiting area for boarding passengers. In addition, the platform is on a slight curve so there would be a small gap between the train and the platform. The estimated pedestrian level of service at this station is the lowest along the alignment under current plans. If the Apex Building is torn down by the end of 2015, the platform area for the Bethesda Purple Line station could be improved by removing the Apex Building support columns and

Bethesda Purple Line Minor Master Plan Appendix – Benefits of Redevelopment

straightening out the platform to minimize the gaps, improving the pedestrian flow on the platform at this end of line station.

Redevelopment of Apex Building: If the owners of the Apex Building decide to redevelop after the Purple Line is constructed, there is likely to be an additional cost to construct over an operational light rail line.

Bethesda Purple Line Minor Master Plan Appendix – Benefits of Redevelopment

Table 1: Benefits of Apex Building Redevelopment

Item	Current Plans		Apex Building Demolished Before End of 2015 ²	Apex Building <u>Not</u> Demolished Before End of 2015
Capital Crescent Trail	<u>Local Trail</u> : street ¹ <u>Thru Trail</u> : street ¹		<u>Local Trail</u> : street ¹ <u>Thru Trail</u> : new tunnel separate from Purple Line	<u>Local Trail</u> : street ¹ <u>Thru Trail</u> : new tunnel separate from Purple Line (curvier, more costly)
Planned Red Line Station Entrance	Pedestrian Circulation	Adequate	More space for pedestrian circulation	Adequate
	Streetscape Aesthetics	Elevators on Elm Street sidewalk	Elevators in Apex Building site	Elevators on Elm Street sidewalk
Woodmont Plaza Aesthetics	Ventilation Tower	Very large structure most likely in plaza (40 ft x 18 ft x 90 ft)	<u>During Purple Line Construction</u> : Structure integrated into Apex site	<u>During Purple Line Construction</u> : Very large structure most likely in plaza <u>After Purple Line Construction</u> : Potential costly relocation into Apex site
	Purple Line Tail Tracks	About 100 ft	About 30 ft	About 100 ft
Long Term Bicycle Station Facility	None		Integrated into Apex Building site	Difficult to integrate
Purple Line Platform	Adequate - pillars impede pedestrians - curved platform (gaps) - co-mingling w/sidewalk users		Better - unimpeded circulation - straight platform (no gaps) - no co-mingling w/sidewalk users	Adequate - pillars impede pedestrians - curved platform (gaps) - no co-mingling w/sidewalk users
Redevelopment of Apex Building Site	n/a		<u>During Purple Line Construction</u> : no additional cost <u>After Purple Line Construction</u> : adds cost to developer	<u>During Purple Line Construction</u> : n/a <u>After Purple Line Construction</u> : adds cost to developer

Bethesda Purple Line Minor Master Plan Appendix – Full Service Bike Station

Full-Service Bicycle Station

While bicycling is one of the least used modes of access to metrorail stations, it is growing at a fast rate. In 2012 1.0% of all trips to metrorail were by bicycle, up from 0.4% in 2002. WMATA has adopted a bicycle access mode share goal of 2.1% by 2020 and 3.5% by 2030¹. A full service bicycle storage facility – not to be confused with a bikeshare station – can provide access to and from transit and for commuters to Bethesda. This bicycle storage facility should be located in the Apex Building site on the Purple Line level, due to its proximity to the Red Line, Purple Line, and the Capital Crescent Trail.

WMATA opened a 2,500 square foot facility at the College Park metrorail station in 2012 and is planning to open facilities at four other metrorail stations in the coming year, including Vienna, West Hyattsville, East Falls Church, and Franconia-Springfield.

The potential market for a long term bicycle storage facility was developed by considering the number of transit boardings and alightings at the Bethesda South Station for Purple Line and Red Line passengers, as well the employment and household forecasts in the immediate area. The Planning Department contracted with the Toole Design Group to estimate the number of bicycle parking spaces and the square foot requirements for a long term bicycle storage facility (see Toole Design Group technical memo). Their analysis considered four scenarios for estimating bicycle parking demand in 2030:

- No Growth: assumes no change to existing rates of bicycle access to transit in Bethesda (2.3%) and a nominal rate of bicycle access for commuters to jobs in Bethesda (1%)
- Medium Growth: assumes a conservative rate of bicycle access to transit in Bethesda (5.0%) and a nominal rate of bicycle access for commuters to jobs in Bethesda (1%)
- Standard Growth: assumes a rate of bicycle access to transit (9.7%) that is consistent with WMATA's bicycle access goals for Bethesda in 2030 and a nominal rate of bicycle access for commuters to jobs in Bethesda (1%)
- Highest Growth: assumes a rate of bicycle access to transit in Bethesda (12.0%) that is more consistent with WMATA's bicycle access goals for other Metrorail station with adjacent high quality trails (College Park, West Hyattsville, East Falls Church, and Medical Center) and a slightly higher rate of bicycle access for commuters to jobs in Bethesda (3%)

For each of the four scenarios, the potential demand for three user groups was estimated as follows:

- Red Line passengers: WMATA estimates there will be 4,153 passengers boarding the Red Line in Bethesda during the morning peak period in 2030²
- Purple Line passengers: MTA estimates there will be 1,047 passengers boarding the Purple Line in Bethesda during the morning peak period in 2030³

¹ WMATA Board of Directors, Resolution 2011-10

² Source: 2011 WMATA Bike Parking Forecasting Study - Station Level

³ Source: Bethesda Station South Entrance Alternate Station Concept (07/23/13) Elevator Simulation Calculations

Bethesda Purple Line Minor Master Plan Appendix – Full Service Bike Station

- Commuters that work in the area surrounding the station: Based on the land use forecasts for TAZ 637⁴, and trip generation rates in the January 2013 LATR guidelines, there will be 3,182 AM peak hour vehicular trips in 2030

Toole Design estimates that 87.5% of the bicycle parking demand for the Red Line will be at the Bethesda South Station, due to its proximity to the Capital Crescent Trail.

In addition, Toole Design considered two different mixes of bicycle parking types – a WMATA Parking Mix that includes four types of bicycle storage and a High Capacity Parking Mix that only includes two types of bicycle storage and uses space more economically.

Overall, there is a demand of between 150 bicycle parking spaces (Low Growth) to 650 bicycle parking spaces (high growth), with a spatial requirement ranging from 1,800 square feet to 13,500 square feet (see Table 2).

Table 2: Bicycle Parking Demand and Spatial Requirements by Growth Scenario (rounded)

Scenario	Parking Demand (2030)	Spatial Requirements (Sq Ft)	
		WMATA Parking Mix	High Capacity Parking Mix
Low Growth	150	2,900	1,800
Medium Growth	250	5,500	3,500
Standard Growth	500	10,000	6,400
High Growth	650	13,500	8,700

The County should reserve space for 500 bicycle parking spaces on the Apex Building site (the Standard Growth scenario). The Medium Growth scenario assumes current growth patterns in bicycle mode share, but this is likely to increase once the Capital Crescent Trail and other bikeway improvements are completed. The High Growth estimate may ultimately be achievable, but remains untested at this time. Regarding the parking mix it is unclear at this time which parking mix is preferable. The plan recommends 10,000 square feet, because this could ultimately include space for showers, changing facilities, and a bicycle repair shop, and because it appears there is sufficient additional space in the Apex Building to accommodate this use.

⁴ Source: MWCOG Cooperative Land Use Forecasts Round 8.0

Bethesda Purple Line Minor Master Plan Appendix – Bethesda South Entrance

Bethesda South Entrance Project

The concept plan for the Bethesda South Entrance project includes two high-speed elevators that travel between Elm Street and the Red Line and four high-speed elevators that travel between the Purple Line and the Red Line. The alternative station design includes five high speed elevators within the Apex Building site that travel between Wisconsin Avenue and the Red Line. According to MTA, none of the elevators stop at the Purple Line level in the alternative station design because this would degrade the level of service for Red Line customers, and the constraints of the site would require passengers to cross the light rail tracks. However, this will require all passengers transferring between the Purple Line and the Red Line to first travel up to street level and then descend back into the station – an inconvenience that will create additional congestion at street level. On balance, we believe that a direct elevator connection between the Purple Line and Red Line should be retained for the following reasons:

Level of Service for Red Line Customers: Table 3 shows the number of boardings and alightings for the Metrorail Red Line, the Purple Line, and transfers between the Red Line and Purple Line, for both the existing Bethesda North Station (located at Wisconsin Ave and Old Georgetown Road) and the planned Bethesda South Station. According to the *Bethesda Station South Entrance Alternate Station Concept (07/23/13) Elevator Simulation Calculations* report, there will be more Red Line passengers at the South Entrance that transfer to and from the Purple Line than do not transfer to and from the Purple Line. And since the inconvenience to Red Line passengers that must go out of their way to transfer to and from the Purple Line is likely to be greater than the inconvenience to Red Line passengers who are delayed because the elevators make an additional stop, at least some of the elevators should either make an additional stop at the Purple Line station, or travel just between the Red Line station and the Purple Line station. This analysis should be confirmed by a travel time study for Red Line passengers and pedestrian level of service study.

Pedestrian Crossings of Purple Line Tracks: One of the benefits of light rail compared to heavy rail is that pedestrians can walk across the tracks. In fact, pedestrians are permitted to walk across the tracks at most Purple Line stations, including the Bethesda station in the concept plan. While the Bethesda station has higher passenger volumes than other stations, it is not uncommon for pedestrians to cross the tracks at other high volume stations light rail lines.

Table 3: 2030 Daily Ridership Summary

Daily	Entrance	Metrorail Bethesda Station		Purple Line Bethesda Station		Transfers Between Metrorail and Purple Line		Total Access Demand (excludes transfers)	
		Boardings	Alightings	Boardings	Alightings	From Metro to PL	From PL to Metro	Boardings	Alightings
South Entrance with Purple Line	North	8,992	8,976	0	0	0	0	8,992	8,976
	South	5,008	5,524	4,303	5,699	5,582	7,443	9,311	11,223
	Total	14,000	14,500	4,303	5,699	5,582	7,443	18,303	20,199
						East - Elm/Wisconsin		65%	6,052
						West- Woodmont		35%	3,258
								58%	6,509
								42%	4,714
								Total	12,561
									61%
									7,973
									39%

Source: *Bethesda Station South Entrance Alternate Station Concept (07/23/13) Elevator Simulation Calculations*

Bethesda Purple Line Minor Master Plan Appendix – Capital Crescent Trail

Capital Crescent Trail Surface Route

As stated in the 1994 Bethesda CBD Sector Plan, the Surface Route of the Capital Crescent Trail is important “since it will allow easy access to many businesses and activities and will contribute to the vitality of the area.” It will be the only branch of the trail open during construction of the Purple Line and if a Tunnel Route is not constructed, this branch of the Capital Crescent Trail will become the mainline.

The Montgomery County Department of Transportation (MCDOT) is in the conceptual phase of design for this segment of the trail. The concept plan deviates from the 1994 Sector Plan in several regards. First, it routes the trail along 47th Street instead of 46th Street. Second, the concept plan envisions implementing the Surface Route as a cycle track and a sidewalk along Bethesda Avenue and Willow Lane instead of a shared use path adjacent to a sidewalk. Planning staff agrees that the trail should be routed along 47th Street, since there will be fewer impacts to the road network and to the residences along 46th Street. Staff also agrees that the trail should be implemented as a cycle track and a sidewalk instead of a shared use path and a sidewalk along Willow Lane and Bethesda Avenue, since these areas have the greatest potential for conflicts between cyclists and pedestrians. While both cycle tracks and shared use paths maintain separation from traffic, a cycle track is a bicycle-only facility that maintains separation from pedestrians, whereas a shared use path accommodates all users (bicycles, pedestrians, joggers, skaters, etc).

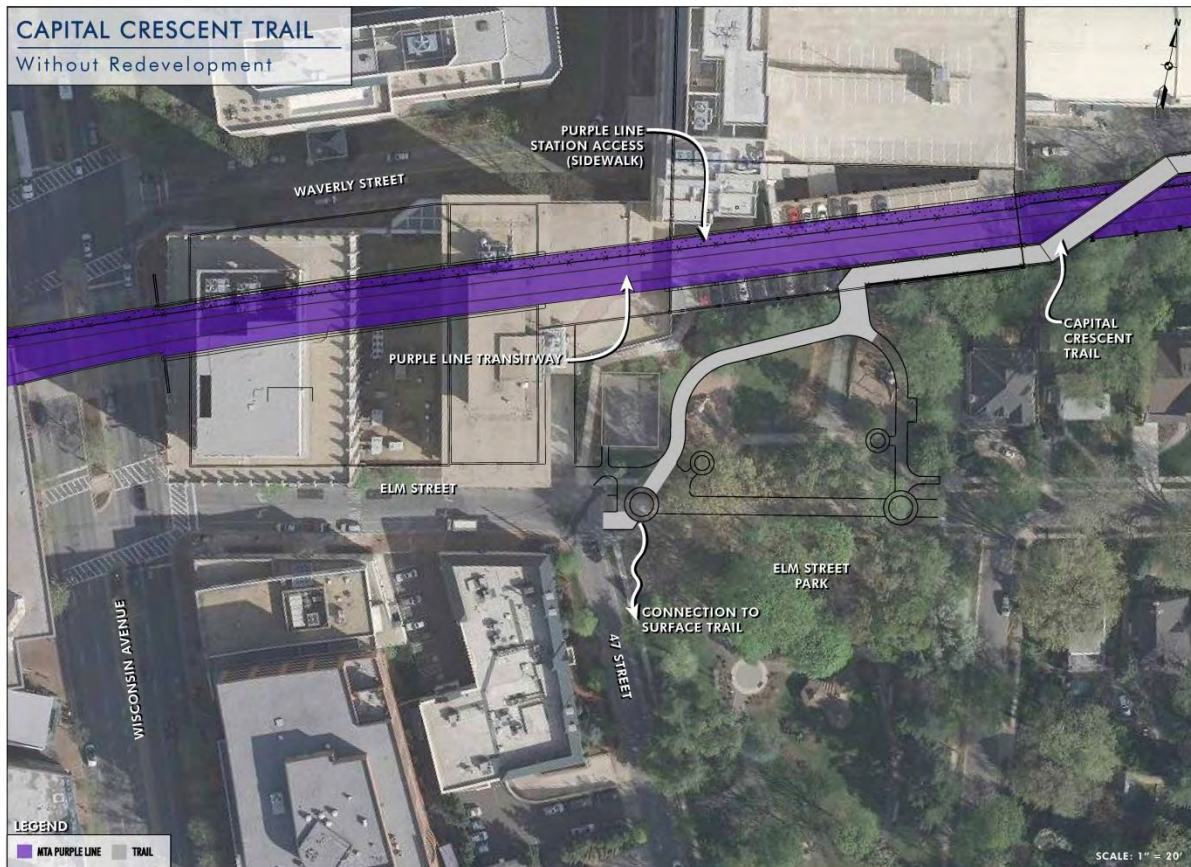
Much of the facility planning discussion regarding the Surface Route is driven by an approval for 7200 / Wisconsin development project, which requires the developer to pay for a cycle-track like facility on the north side of Bethesda Avenue. If a result of this plan is that the approved development along Bethesda Avenue is substantially rethought, it may be possible to improve upon the trail design on Bethesda Avenue by eliminating one or more driveways and widening the trail and sidewalk, especially on the western end.

Comparison of Tunnel Options for the Capital Crescent Trail

Baseline Condition

As noted above and illustrated in Figure 4 below, the current plan is for the Capital Crescent Trail is to utilize the Surface Route as the main connection through downtown Bethesda. Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and winds through the northern portion of Elm Street Park. It then transitions into the Surface Route, traveling southbound along the east side 47th Street, heading westbound along the south side of Willow Lane, crossing Wisconsin Avenue, and then heading westbound along the north side of Bethesda Avenue. A narrow 5 to 7 foot wide sidewalk would provide access from the Capital Crescent Trail directly into the Purple Line station, running adjacent to the Purple Line, but would be prohibited for bicycles due to space limitations. The benefits of a new tunnel should be weighed against this Baseline condition.

Figure 4: Capital Crescent Trail without Redevelopment

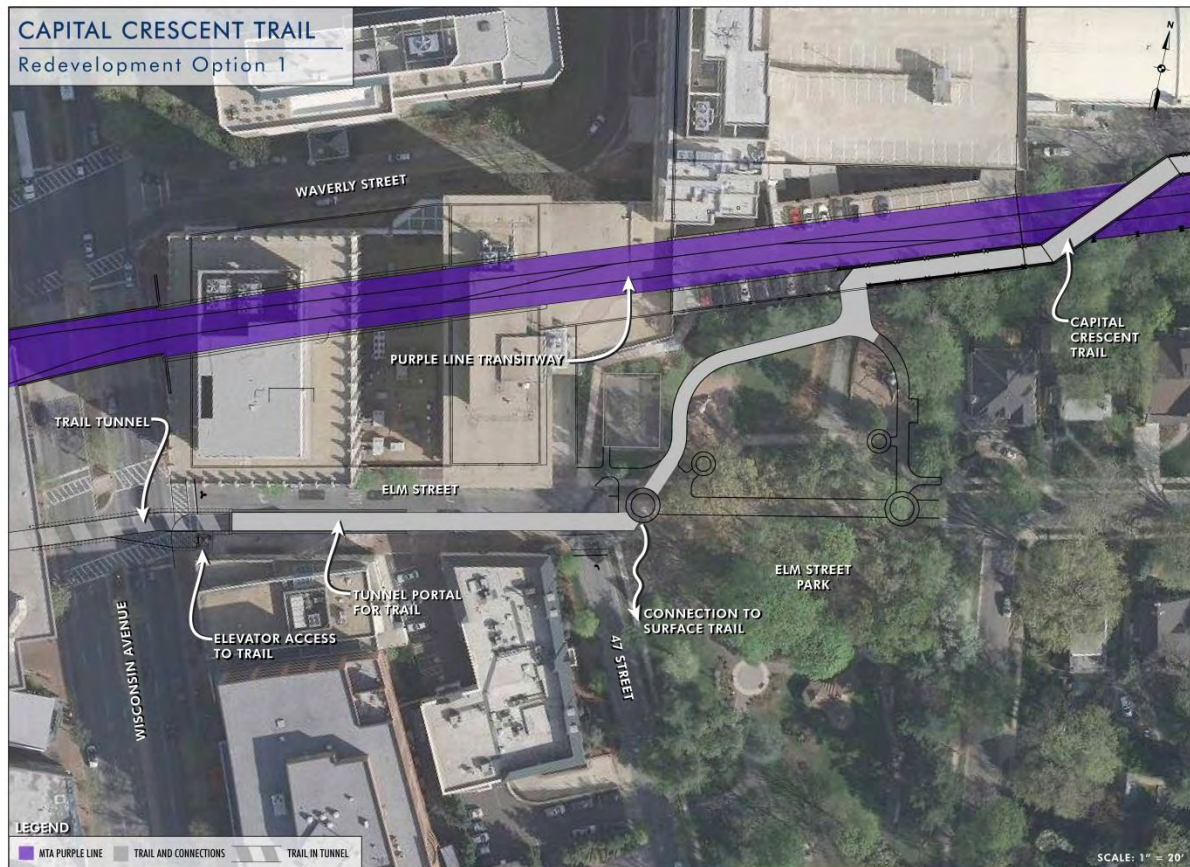


MTA has developed two concepts for a new Tunnel Route for the Capital Crescent Trail. Both options assume the construction of the Surface Route, as described above, though they would not include the narrow 5 to 7 foot wide sidewalk running adjacent to the Purple Line.

Tunnel Option 1

Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and winds through the northern portion of Elm Street Park (see Figure 5). At the intersection of Elm Street and 47th Street the trail branches into the Tunnel Route and the Surface Route of the Capital Crescent Trail. The Surface Route heads south along 47th Street. The Tunnel Route crosses 47th Street at grade and travels along the south side of Elm Street. The trail begins to descend at an 8% grade into a 13 foot wide tunnel just west of a driveway to avoid blocking a small parking lot for 4610 Elm Street. It then passes beneath Wisconsin Avenue in a tunnel and enters the Apex Building site at the Purple Line level (about 15 feet below Wisconsin Avenue). Since an 8% grade does not meet ADA requirements, an elevator is provided at the southeast corner of Wisconsin Avenue and Elm Street for trail users that are unable to navigate the steep grade. Tunnel Option 1 would remove both rows of on-street parking on Elm Street (14 parking spaces).

Figure 5: Capital Crescent Trail Tunnel Option 1

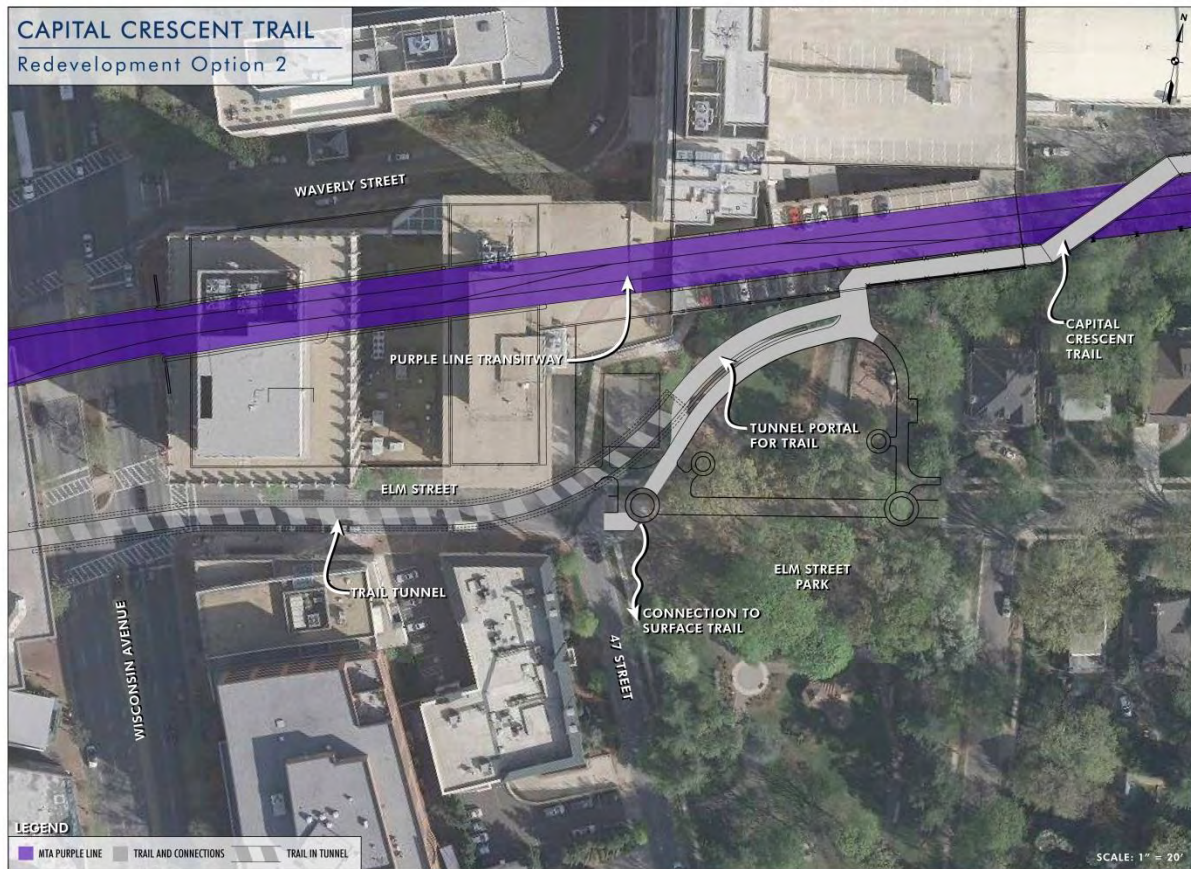


Tunnel Option 2

Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and immediately branches into the Tunnel Route and the Surface Route of the Capital Crescent Trail in the northern portion of Elm Street Park (see Figure 6). The Surface Route winds through the park and then heads south along 47th Street. The Tunnel Route parallels the Surface Route for a short period, then enters a tunnel on the east side of the basketball courts. The tunnel curves through Elm Street Park, then travels underneath Elm Street in a 16 foot wide trail. It then passes beneath Wisconsin Avenue in a tunnel and enters the Apex Building site at the Purple Line level (about 15 feet below Wisconsin Avenue).

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Figure 6: Capital Crescent Trail Tunnel Option 2



Comparison of Tunnel Options

Table 4 compares the two tunnel options.

- **Tunnel Length:** In most instances – weather being a notable exception – trail users would prefer a shorter tunnel to a longer tunnel, especially when they are in confined spaces. The tunnel is 225 feet long for Option 1 and 450 feet long for Option 2.
- **Tunnel Width:** To accommodate the potential high usage of the Tunnel Route, the trail should be at least 15 feet wide in the tunnel and tunnel portal. Cyclists tend to shy away from retaining walls and other fixed objects and therefore a 15 foot wide trail would have an effective width of about 11 feet. The current design for Option 1 includes a width of 13 feet (an effective width of 9 feet). While widening the tunnel to 15 feet is technically feasible, it could include a substantial cost if the utility vaults on the north side of Elm Street need to be relocated. MTA will evaluate the location of the electrical vaults (and the additional cost) if the County recommends moving forward with Option 1. Option 2 would be 16 feet wide its entire length.
- **Tunnel Grade:** Perhaps the most important design consideration for Option 1 is the 8% grade over a distance of 225 feet that is needed to avoid cutting off access to the parking lot for 4610 Elm Street (see below). An 8% grade is very steep and would be difficult – if not impossible – for

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several user groups to navigate, including children, elderly, and disabled users. An elevator at the southeast corner of Wisconsin Avenue and Elm Street would provide an ADA compliant alternative route. An 8% grade could be an issue because: 1) it would allow cyclists traveling downhill toward the Purple Line station to reach high speeds on their bikes, and 2) because cyclists traveling uphill typically need additional space to navigate steep grades and could come in contact with other trail users if the trail is only 13 feet wide. Many trail users may opt instead to cross Wisconsin Avenue at grade using the Surface Route or at Elm Street to avoid the tunnel. Tunnel Option 2 has a segment of about 150 feet that has a grade of 4.75%. While this is still steep, it meets ADA requirements and is much more reasonable for various user groups to navigate.



Parking Lot Entrance to 4610 Elm Street

- Tunnel Curvature: Perhaps the most important design consideration with Option 2 is the curvature of the tunnel in Elm Street Park. While there is sufficient sight distance to achieve the design speed of the trail, there will be many trail users that are uncomfortable using a tunnel where they cannot see the end of the tunnel, especially during low demand periods. This will be more of an issue for pedestrians who travel at slower speeds than cyclists.
- Impacts to Elm Street Park: In Option 1 the junction of the Mainline, Surface Route, and Tunnel Routes of the Capital Crescent Trail occurs at the northwestern edge of Elm Street Park so only a single shared use path passes through the northern section of Elm Street Park. In Option 2 the junction of the Mainline, Surface Route, and Tunnel Routes of the Capital Crescent Trail occurs at the northern edge of Elm Street Park so that two shared use paths pass through this section of the park. Option 2 therefore has a greater impact to the park than Option 1. Option 2 may require removal and replacement of the half basketball court. The Department of Parks is

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concerned about the loss of any recreational facilities in Bethesda, which already has a low level of service for many park facilities.

- Impacts to Elm Street: Option 1 would eliminate 14 on-street parking spaces and a left turn lane. Option 2 would have no impact on Elm Street.
- Street Crossing: Option 1 contains an at-grade crossing of 47th Street, though the volume on this road is low¹. Option 2 contains no street crossings.
- Convergence of Shared Use Paths: In Option 1 the Tunnel Route, Surface Route, and Mainline of the Capital Crescent Trail converge at a single point in a visible location. In Option 2 the convergence of the trail is somewhat more complicated, requiring the Tunnel Route and Surface Route to parallel each other for a short distance.
- Capital Cost: MTA has estimated a preliminary, order-of-magnitude capital cost of \$15 million for Option 1 and \$30 million for Option 2.

¹ A 2004 traffic count showed 1,500 vehicles between 6:00 am and 7:00 pm on a weekday.

Bethesda Purple Line Minor Master Plan Appendix – Capital Crescent Trail

Table 4: Comparison of Tunnel Options

	Tunnel Option 1	Tunnel Option 2	Advantage
Tunnel Length	225 feet	450 feet	Option 1
Tunnel Width	13 ft wide, expandable to 16 ft wide with added cost	16 ft wide	Option 2
Tunnel Grade	Very steep for short distance (8% for 225 feet), requires elevator for ADA	Somewhat steep for shorter distance (4.75% for 140 feet)	Option 2
Tunnel Curvature	Slight bend near station	Slight bend near station; curve in park	Option 1
Impacts to Elm Street Park	One bikeway/shared use path through park (that serves as both the tunnel route and the surface route)	Two bikeways/shared use paths through park (tunnel route and surface route)	Option 1
Impacts to Elm Street	Eliminates on-street parking	None	Option 2
Street Crossing	Crosses 47 th Street at grade (volume is about 1,500 daily vehicles)	No at grade street crossing	Option 2
Convergence of Bikeways/Shared Use Paths	Less complicated convergence at Elm St / 47 th St	More complicated convergence in Elm St Park	Option 1
Capital Cost*	\$15 million	\$30 million	Option 1

*preliminary order-of-magnitude costs

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Recommendation

The baseline condition for our evaluation of the two trail tunnel options was the planned Surface Route for the Capital Crescent Trail and the narrow 5 to 7 foot sidewalk adjacent to the Purple Line. We assessed what the operating conditions for existing and new trail users of that baseline facility would be and determined what incremental benefits would be available for each of the trail tunnel options. After completing that functional assessment, we assessed whether the benefits of each tunnel option would justify the costs.

For bicyclists using the Capital Crescent Trail, both Tunnel Option 1 and Tunnel Option 2 provide good benefits over the baseline condition, but the advantages vary for different user groups. For advanced and intermediate level cyclists who would likely use the Surface Route, the benefits are fewer and are due largely to travel time savings. For basic and child cyclists who might otherwise be deterred from using the trail, the benefits are greater and are due to travel time savings and avoiding an at-grade crossing at Wisconsin Avenue. Tunnel Option 2 is somewhat better than Tunnel Option 1 for bicyclists. The major concern with Option 2 – personal security – is less critical for the cyclists than for pedestrians. Personal security only becomes an issue during periods of low usage. Since cyclists would have the option of using the surface route during these low usage times, it may not be accurate to weigh this issue so negatively for all of users. On the other hand, the average cyclists will be able to travel through the tunnel in about 30 seconds, faster than they would be able to do on the surface route.

For pedestrians using the Capital Crescent Trail, both Tunnel Option 1 and Tunnel Option 2 provide important benefits over the baseline condition, such as a faster travel time, conflicts at driveways and minor roadway intersections, and conflicts at the MD355 intersection. Either tunnel alternative would attract cyclists, thereby decreasing potential conflicts with pedestrians queuing at the MD355 intersection, as well as along the shared use path segment along 47th Street. But because both tunnel options have drawbacks - the 8% grade for Tunnel Alternative 1 and the tunnel length and curve for Tunnel Alternative 2 - and because the Surface Route as currently conceived provides a high quality alternative for many trail users, the benefits of the tunnel options as currently conceived are moderate for pedestrians. Tunnel Option 1 is somewhat better than Tunnel Option 2 for pedestrians, due to the longer tunnel that may deter some pedestrians using it, especially at night and other low-demand periods.

The problem is that while the surface route that is planned would have almost the best accommodation that can be achieved in an urban context, absent a separate right-of-way, it involves more potential conflict than is typical with the rest of the Capital Crescent Trail. From a regional trail perspective, the surface route alone falls short for basic and child cyclists, who may be deterred from using a trail that crossings a major highway. The only way to eliminate those deficiencies is to build a tunnel, an expensive option whose value must be judged in terms of not only how many users' experience would be improved, but also by how many users would no longer perceive the experience as being substandard. Tunnel Option 2 is somewhat better than Tunnel Option 1 for cyclists, but Tunnel Option 1 is somewhat better than Tunnel Option 2 for pedestrians, and both options are better than the baseline. Both options have drawbacks that will limit the benefit for users and that would continue to be perceived by some users as having a substandard experience. However, if Option 1 can be widened to

Bethesda Purple Line Minor Master Plan Appendix – Capital Crescent Trail

16 feet and if the grade can be reduced to below 5 percent, Option 1 would become an excellent connection and would justify the costs. At this time it appears the only way to reduce the grade of the trail without major impacts to Elm Street Park is to close the commercial driveway on the south side of Elm Street and relocate the 10 parking spaces somewhere else. In the longer term, with redevelopment, it may be possible to eliminate the parking lot altogether.

Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Traffic Analysis

A traffic analysis was conducted for the Bethesda Purple Line Station area that focused on five gateway intersections to Bethesda and two intersections immediately adjacent to the site. The analysis used traffic counts to evaluate existing congestion and the TRAVEL/3 regional model to evaluate 2040 congestion based on the likely growth under the existing master plan.

Because there are no subzones with a parcel specific evaluation of existing and future land use for the entire TAZ, we have to make assumptions on the relationship between the existing and approved development in the TAZ and the Round 8.0 2040 land use forecast. More specifically, we have to give some thought to what was assumed for the site in the development of the Round 8.0 2040 land use forecast.

If we assume that the existing and approved land use for the site (Apex, JBG, Federal Realty) is close to what was assumed in the Round 8.0 2040 land use forecast for development for the site (i.e., there is no “space” or “room” for additional development for the site within the Round 8.0 2040 land use forecast) and then we add the difference attributable to any master plan “build out” (the theoretical maximum under any eventual proposed zoning in this Minor Master Plan Amendment) for the site, we get the “High Estimate” (or most traffic) scenario.

If we assume instead that the Round 8.0 2040 land use forecast for the TAZ is more representative of a scenario where the site develops close to build-out instead of the “existing and approved” (i.e., there is “space” or “room” for the additional development for the site within the Round 8.0 land use forecast) and then we add the difference attributable to any master plan “build-out” (the theoretical maximum under any eventual proposed zoning in this Minor Master Plan Amendment) for the site, we get the “Low Estimate” (or less traffic) scenario.

It should be noted that it is unlikely the eventual development would equate to the theoretical maximum available under the proposed zoning and that the transit mode share inherent in the trip rates is representative of the Metro Station Policy Area overall and not a specific development located at the convergence of the Red Line and Purple Line. For these reasons, it likely the more applicable congestion results are closer to the lower end of the range provided by this initial analysis. For both scenarios the additional traffic was then assigned to the road network. The resulting Critical Lane Volume (CLV) and Highway Capacity Manual (HCM) analysis are shown for each intersection below. Of the seven intersections evaluated in this plan, three exceed the congestion standards and could require mitigation.

Intersection of Wisconsin Avenue / East-West Highway / Old Georgetown Road

This intersection is below the 1800 CLV standard for the Bethesda CBD in all scenarios, but in the 2040 Master Plan High Estimate scenario it exceeds the 1.13 HCM standard during the AM and PM peak hours. To bring this intersection within an acceptable level of congestion would require:

- Converting the existing northbound left/through lane to a left lane

Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Wisconsin Avenue / Bradley Blvd

This intersection is below the 1800 CLV standard except in the 2040 Master Plan High Estimate during the PM peak hour and the 1.13 HCM standard in all future scenarios for the AM and PM peak hours. To bring this intersection within an acceptable level of congestion would require:

- Add a second northbound left turn lane
- Converting the existing eastbound through lane to a left/through lane
- Converting the existing westbound left lane to a left/through lane

Adding a second northbound left turn lane would require road widening.

Intersection of Bradley Blvd / Arlington Road

This intersection is below the 1800 CLV standard in all scenarios. It exceeds the 1.13 HCM standard for the PM peak hour in the existing scenario and the AM and PM peak hours in all future scenarios. To bring this intersection within an acceptable level of congestion would require:

- Convert the existing southbound left/through lane into a through lane and add a left turn lane

Adding a southbound left turn lane would require road widening.

In addition, to accommodate traffic forecasts for the Master Plan High Estimate would require dynamic lane use:

- Southbound Direction
 - AM peak lane configuration is left, through/right
 - PM peak lane configuration is left, through, right
- Eastbound Direction
 - AM peak lane configuration is left, left, through, through/right
 - PM peak lane configuration is left, through, through, through/right

Since we expect the congestion results to be closer to the “Low Estimate” than the “High Estimate”, dynamic lane use is unlikely to be needed.

Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Wisconsin Avenue / East-West Highway / Old Georgetown Road

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	1237 (1321)	0.77 (0.83)	C (D)	41.0 (44.9)	0.94 (1.00)	D (D)
2040 Existing & Approved	1473 (1446)	0.92 (0.90)	E (D)	86.4 (65.3)	1.10 (1.12)	E (E)
2040 Master Plan Low Estimate	1488 (1486)	0.93 (0.93)	E (E)	88.2 (65.9)	1.11 (1.13)	F (E)
2040 Master Plan High Estimate	1615 (1654)	1.01 (1.03)	F (F)	120.1 (95.5)	1.20 (1.22)	F (F)
2040 Master Plan High Estimate with Improvements (1)	1449 (1314)	0.91 (0.82)	D (D)	59.6 (44.2)	1.05 (0.97)	E (D)

** AM (PM)

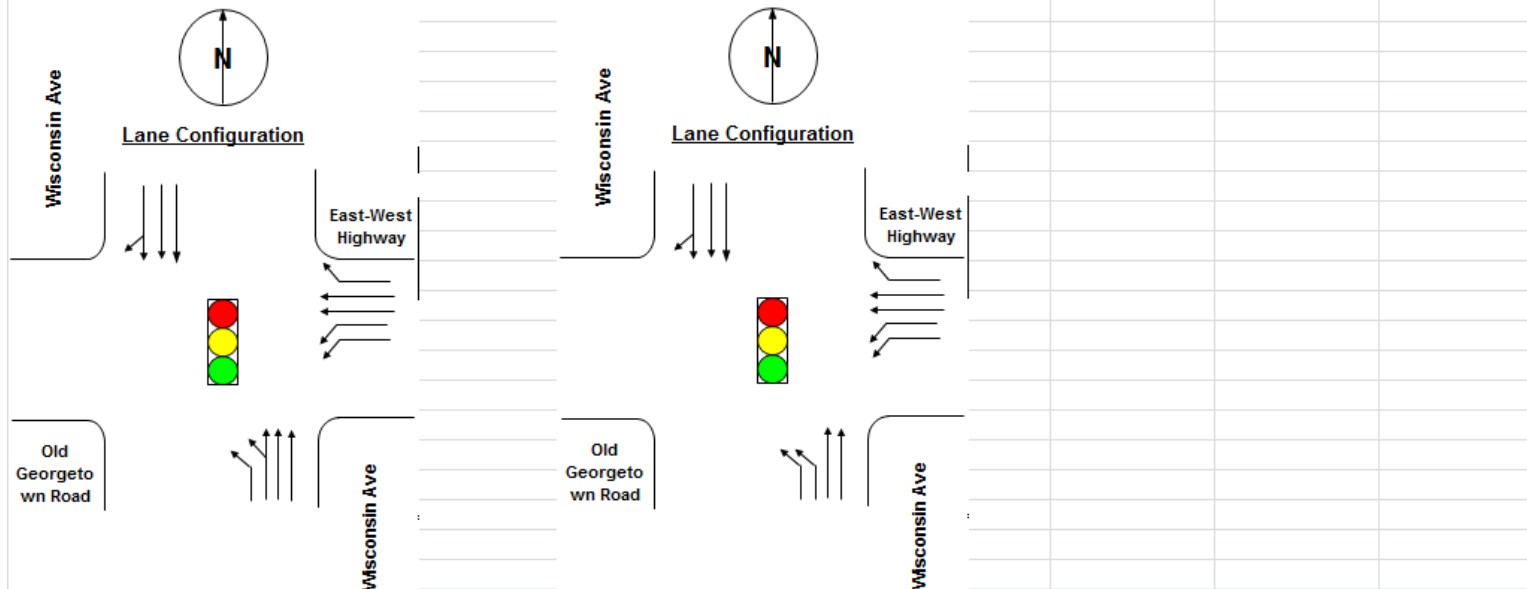
= exceeds standard for Bethesda CBD

Improvements

(1) Northbound Direction: Revise lane configuration from Left, Left/Through, Through, Through to Left, Left, Through, Through

Existing:

Improvements #1:



Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Wisconsin Avenue / Bradley Blvd

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	1319 (1414)	0.82 (0.88)	D (D)	34.6 (48.8)	0.92 (1.00)	D (D)
2040 Existing & Approved	1605 (1665)	1.00 (1.04)	F (F)	72.7 (84.1)	1.16 (1.30)	E (F)
2040 Existing & Approved with Improvements (1)	1443 (1420)	0.90 (0.89)	D (D)	79.2 (78.9)	1.06 (1.04)	E (E)
2040 Master Plan Low Estimate	1622 (1683)	1.01 (1.05)	F (F)	76.2 (87.6)	1.17 (1.32)	E (F)
2040 Master Plan Low Estimate with Improvements (1)	1458 (1433)	0.91 (0.90)	E (D)	82.7 (80.9)	1.06 (1.04)	F (F)
2040 Master Plan High Estimate	1729 (1831)	1.08 (1.14)	F (F)	101.1 (133.3)	1.44 (1.38)	F (F)
2040 Master Plan High Estimate with Improvements (1)	1524 (1513)	0.95 (0.95)	E (E)	99.4 (120.1)	1.08 (1.13)	F (F)

** AM (PM) = exceeds standard for Bethesda CBD

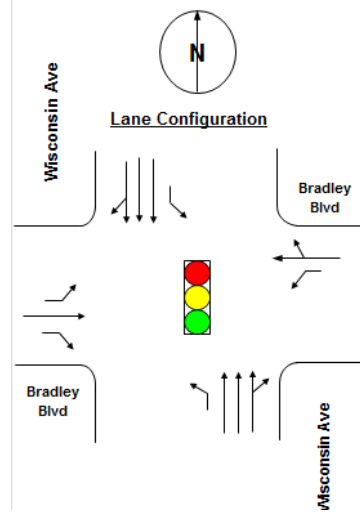
Improvements

(1) Northbound Direction: add 2nd left turn lane

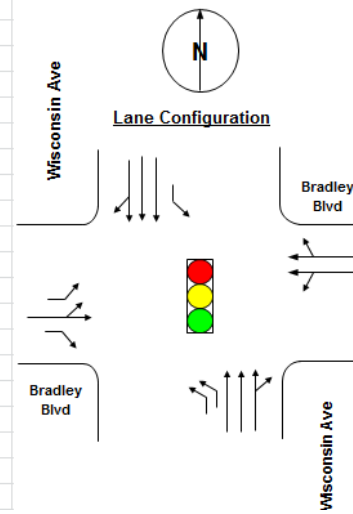
Eastbound Direction: Revise lane configuration from Left, Through, Right to Left, Left/Through, Right

Westbound Direction Revise lane configuration from Left, Through/Right to Left/Through, Through/Right

Existing:

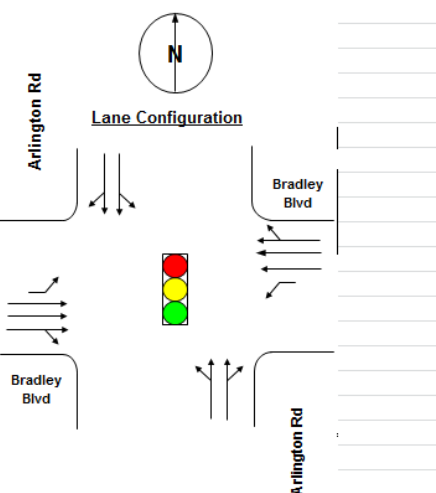
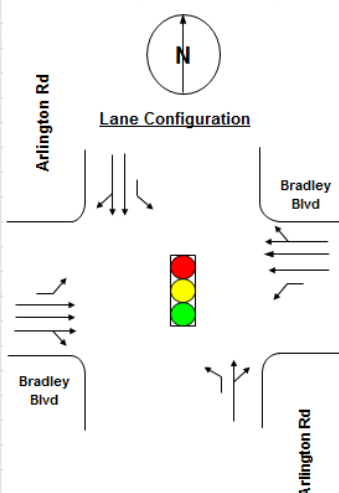
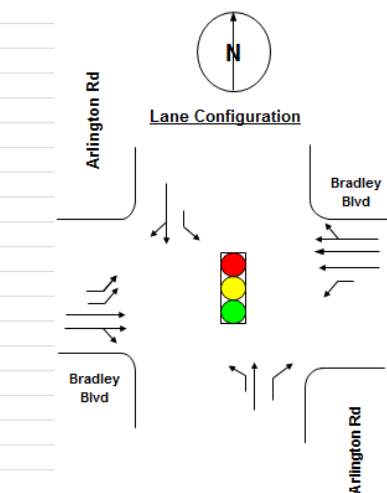
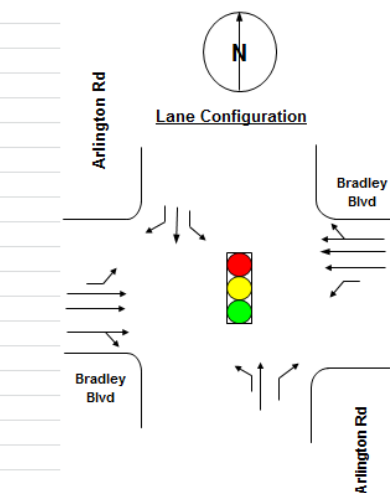


Improvements #1:



Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Bradley Blvd / Arlington Road

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	939 (1238)	0.59 (0.77)	A (C)	65.5 (129.3)	0.92 (1.32)	E (F)
2040 Existing & Approved	1145 (1485)	0.72 (0.93)	B (E)	84.1 (180.8)	1.15 (1.50)	F (F)
2040 Existing & Approved with Improvements (1)	1343 (1391)	0.84 (0.87)	D (D)	81.2 (79.0)	1.09 (1.10)	F (E)
2040 Master Plan Low Estimate	1150 (1487)	0.72 (0.93)	B (E)	84.7 (180.9)	1.15 (1.59)	F (F)
2040 Master Plan Low Estimate with Improvements (1)	1348 (1393)	0.84 (0.87)	D (D)	81.3 (78.2)	1.09 (1.10)	F (E)
2040 Master Plan High Estimate	1217 (1595)	0.76 (1.00)	C (E)	96.7 (213.4)	1.17 (1.71)	F (F)
2040 Master Plan High Estimate with Improvements (1,2)	1263 (1414)	0.79 (0.88)	C (D)	85.3 (88.6)	1.08 (1.13)	F (F)
** AM (PM)	= exceeds standard for Bethesda CBD					
<u>Improvements</u>						
(1) Southbound Direction: Revise land configuration from Left/Through, Through/Right to Left, Through, Through/Right						
(2) Dynamic Lane Use:						
Southbound Direction: AM peak lane configuration is left, through/right; PM peak lane configuration is left, through, right						
Eastbound Direction: AM peak lane configuration is left, left, through, through/right; PM peak lane configuration is left, through, through, through/right						
<u>Existing:</u>	<u>Improvements #1:</u>		<u>Improvements #2 (AM Peak):</u>		<u>Improvements #2 (PM Peak):</u>	
						

Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Wisconsin Avenue / Montgomery Lane

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	1050 (998)	0.66 (0.62)	B (A)	16.4 (17.7)	0.83 (0.78)	B (B)
2040 Existing & Approved	1140 (1254)	0.71 (0.78)	B (C)	16.4 (23.5)	0.84 (0.91)	C (C)
2040 Master Plan Low Estimate	1155 (1260)	0.72 (0.79)	C (C)	22.6 (24.4)	0.84 (0.91)	C (C)
2040 Master Plan High Estimate	1176 (1400)	0.74 (0.87)	C (D)	25.3 (60.2)	0.89 (1.02)	C (E)
** AM (PM)		= exceeds standard for Bethesda CBD				

Intersection of Wisconsin Avenue / Elm Street / Waverly Street

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	784 (942)	0.49 (0.59)	A (A)	4.5 (5.9)	0.57 (0.72)	A (A)
2040 Existing & Approved	1059 (1136)	0.66 (0.74)	B (C)	8.9 (11.0)	0.74 (0.86)	A (B)
2040 Master Plan Low Estimate	1063 (1193)	0.66 (0.75)	B (C)	9.0 (11.2)	0.75 (0.87)	A (B)
2040 Master Plan High Estimate	1191 (1367)	0.74 (0.85)	C (D)	12.8 (27.5)	0.83 (1.01)	B (C)
** AM (PM)		= exceeds standard for Bethesda CBD				

Bethesda Purple Line Minor Master Plan Appendix – Traffic Analysis

Intersection of Wisconsin Avenue / Bethesda Avenue / Willow Lane

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	757 (808)	0.47 (0.50)	A (A)	15.6 (22.0)	0.53 (0.63)	B (C)
2040 Existing & Approved	966 (1007)	0.60 (0.63)	A (B)	18.4 (26.2)	0.70 (0.83)	B (C)
2040 Master Plan Low Estimate	979 (1012)	0.61 (0.63)	A (A)	13.7 (22.6)	0.74 (0.82)	B (C)
2040 Master Plan High Estimate	1149 (1351)	0.72 (0.84)	B (D)	21.8 (48.9)	0.83 (1.13)	C (D)
** AM (PM)		= exceeds standard for Bethesda CBD				

Intersection of Old Georgetown Road / Woodmont Avenue

Land Use Scenario	Critical Lane Volume			HCM		
	CLV	V/C Ratio	Level of Service	Delay (sec)	V/C Ratio	Level of Service
Existing	974 (1088)	0.61 (0.68)	A (B)	14.0 (36.6)	0.76 (0.84)	B (D)
2040 Existing & Approved	1175 (1153)	0.73 (0.72)	C (C)	20.6 (31.7)	0.94 (0.86)	C (C)
2040 Master Plan Low Estimate	1177 (1157)	0.74 (0.72)	C (C)	24.6 (31.4)	0.92 (0.87)	C (C)
2040 Master Plan High Estimate	1257 (1204)	0.79 (0.75)	C (C)	31.3 (35.0)	0.98 (0.90)	C (C)
** AM (PM)		= exceeds standard for Bethesda CBD				

MEMORANDUM

Date: September 17, 2013

To: David Anspacher, Planner Coordinator, M-NCPPC

Organization: M-NCPPC, Functional Planning and Policy Division

From: Robert Patten, Senior Planner; Bryan Barnett Woods, Planner; Daniel Biggs, Landscape Architecture Practice Leader; Jeff Ciabotti, Senior Planner;

Project: Bicycle and Pedestrian Technical Assistance for Bethesda Purple Line Station Minor Master Plan Amendment

Re: Assessment of bicycle parking demand at Bethesda Station South

This document explains how bicycle parking demand projections were developed for Bethesda South Station, at the location of the planned South Entrance to the Red Line and the planned Purple Line station. These projections will help determine the amount and types of bicycle parking infrastructure required to meet potential demand. Future bike parking infrastructure at Bethesda Station South will serve three constituencies:

- 1) Transit users who will ride the Red Line
- 2) Transit users who will ride the Purple Line
- 3) Individuals who live and work near the train station in the Bethesda Central Business District (CBD), and would switch transportation modes to bicycling if a secure, convenient, and high quality bike parking service existed.

The 2030 projection for the Red Line is from the WMATA Bike Parking Forecasting Study – Station Level and estimates that 4,151 people will board the Red Line during the AM peak period. Furthermore, the Red Line projections also account for the additional entrance created by the new Bethesda South Station. Considering the likely origins and destinations of bicycle trips to the Red Line, and the new condition of both a North and South Station entrance, Toole Design Group (TDG) planning judgment estimates that Red Line access demand for bike parking be split 87.5% / 12.5% between the South and North Entrances, respectively.

The 2030 projection for the Purple Line is from the 2013 adjusted ridership summary, which is part of the Bethesda Station South Entrance Alternative Station Concept (7/23/13) Elevator Simulation Calculations report prepared by MTA, and estimates that 1,047 people will board the Purple Line during the AM peak period. Since the only entrance to the Bethesda Purple Line will be from the southern station, it is assumed that all Purple Line AM peak boardings will arrive by the southern entrance. These projections exclude individuals who transfer between the two lines, ensuring that the projections only include individuals that arrive at the station.

The third projection used is the AM peak hour incoming motor vehicle trips into Transportation Analysis Zone (TAZ) 637, which includes Bethesda Station South and is representative of the Bethesda CDB. This projection is derived from the Metropolitan Washington Council of Governments Cooperative Land Use Forecasts Round 8.0 for TAZ 637 and vehicular trip generation rates in the Planning Department's LATR guidelines for Bethesda. It estimates 2,867 inbound AM peak hour trips in 2010 and 3,353 inbound AM peak hour trips in 2040.

Since predicting future bike parking needs at transit stations is not an exact science, a range of estimates are provided based upon how aggressive the County would like to generate bike-transit trips. There are four estimates measuring the potential bicycle parking demand for the Bethesda Station South in 2030:

- 1) no change in the current bike access rates (low estimate¹)
- 2) a conservative growth in bike access rates (medium estimate²)
- 3) growth based on WMATA 2030 system wide goal for bike access of 3.5%, which is also consistent with APBP guidelines (standard estimate³), and
- 4) a goal-based growth in bike access adjusted for the presence of a high quality trail access demand (high estimate⁴)

2030 Bethesda South Station Bike Parking Projections

	Projected Bicycle Parking Demand
Low Estimate	140
Medium Estimate	266
Standard Estimate	486
High Estimate	657

¹ Currently, there is a 2.3% bicycle access rate at the Bethesda Metro Station; from 2010 WMATA Metrorail Bicycle & Pedestrian Access Improvement Study.

² The medium estimate assumes that 5% of AM peak boardings will be individuals arriving to the station by bicycle.

³ The standard estimate assumes that 9.7% of AM peak boardings will be individuals arriving to the station by bicycle.

⁴ The high estimate assumes 12% of AM peak boardings will be individuals arriving to the station by bicycle.

The WMATA 2030 3.5% goal and the National APBP Guidelines

WMATA has set a goal of 3.5% bicycle access system-wide for 2030⁵. However, since each station has a proportionately different share of bicycle ridership, each station will need to achieve a unique rate of bicycle access to achieve the goal system-wide. Since Bethesda Station has a higher than average share of transit riders, its rate of bicycle access is also higher. To meet the system-wide 3.5% goal, 9.7% of Bethesda Red Line users will need to arrive by bicycle⁶. Other stations served by major trail systems comparable to the Capital Crescent Trail have even higher indexes. See table below.

<u>Station Name</u>	<u>Trail Names</u>	<u>Bike Parking Need Index</u>
College Park	Anacostia Tributaries Trail System	19.5%
East Falls Church	Custis / 4-Mile Run / W & O D Trail Systems	13.0%
Medical Center	Bethesda Trolley Trail and Rock Creek Trail	28.8%
West Hyattsville	Anacostia Tributaries Trail System	12.3%

Additionally, the national guidelines for a rail station in an urban high demand area, like Bethesda Station, recommend supplying bicycle parking infrastructure for nine percent of AM peak boardings⁷. The nine percent is composed of two percent parking for short-term bike parking and seven percent for long-term or commuter bike parking. Bethesda Station South will need 352 bike parking spaces to account for a 9.7% bicycle access for the Red Line. Finally, the twelve percent projection is a conservative estimate based on the chart above representing other stations served by trails systems in this region.

Bicycle Demand Projections Conclusion

To meet the low and medium projected demands, the Bethesda Station South will need to supply bicycle parking infrastructure for 140 and 266 bicycles, respectively. However, neither of these levels of infrastructure will meet WMATA's 3.5% bicycle access goal, nor adhere to national standards. In order to achieve WMATA's goal, as well as attain national standards, it is recommended that Bethesda South Station supply bicycle parking infrastructure for at least 9.7% of AM peak boardings for the Red and Purple Lines or at least 486 bicycle parking spaces to accommodate the projected 2030 daily use. Moreover, it is recommended that Bethesda South Station allocate space for 12.0% of AM peak boardings for the Red Line and Purple Line or 657 bicycle parking spaces to be able to fully accommodate any increase in bicycle parking demand resulting from improvements to the Capital Crescent Bike Trail.

⁵ WMATA Board of Directors, Resolution 2011-10

⁶ The methodology for projecting 2030 Bike Parking capacity needs are based on 2007 customer service survey data and 2010 bike parking census data to establish a bike parking share index (multiplier) for each of 86 Metrorail Stations. Bethesda's need is based upon a 9.7% bike arrival rate for projected 2030 AM peak boardings.

⁷ National Association of Pedestrian and Bicycle Professionals, Bicycle Parking Guidelines 2nd Edition 2010.

Space Requirements for Bicycle Parking Projections

In addition to projecting the bicycle access demand for Bethesda Station South, it is also necessary to account for the amount of space required to park and access those bicycles. To accurately determine the space requirements, the type of bicycle parking infrastructure must be identified. The WMATA Pedestrian and Bicycle CIP⁸ lists criteria and recommendations for the best mix of parking equipment types based on the type of Metrorail Station. There are four types of parking infrastructure recommended:

- 1) Covered/Unsecure U-Rack parking
- 2) Standard Bicycle Lockers
- 3) On Demand Lockers
- 4) Two-Tiered High Capacity Bike Parking

Covered/Unsecure U-rack parking is the common outdoor bike rack which resembles an inverted 'U' shape and is attached to the sidewalk. U-racks are self-serve units. Two bicycles can be secured to the rack at once and bicyclists can lock and un-lock their bicycles at any time. Although very convenient, this type of parking infrastructure is less secure than other available types.

Standard bicycle lockers are metal or hard-plastic lockers that can store one or two bicycles. Although standard bike lockers are also self-serve units, they are reserved specifically for one person who has the key to the locker and can use the locker at his or her convenience for a fixed amount of time. Standard bicycle lockers are more secure than other types of parking infrastructure, but they are the least convenient for the general public and require a significant amount of space.

Similar to standard lockers, on demand lockers are self-serve units that hold one or two bicycles and can be accessed at a cyclist's convenience. However, these lockers are available at a first come first serve basis and usually use a key-code to lock or unlock the locker. Additionally, on demand lockers can be programmed to meet the varied needs of cyclists and bike stations, such as reserving an on demand locker to be used as a standard for a set amount of time, or varying the price of using the locker to meet demand. On demand lockers are as secure as standard lockers and are more convenient for the general public, but these lockers still require a significant amount of space.

Two-tiered high capacity bicycle parking is a self-serve or valet service bicycle parking infrastructure that stacks an additional row of bicycles above the ground level and are common among bike stations. These racks can be used as reserved and secured spaces or as on demand bicycle parking in areas with high bicycle activity. The security of the two tiered rack depends on the location – a bike station, open access lot, or valet lot. However, the two-tiered rack requires much less space than the bicycle locker or the u-rack, which can make space available for additional bike facilities or other uses.

The following projections reflect two mixes of bike parking types. In the WMATA Pedestrian and Bicycle CIP, Bethesda is identified as a Regional Urban Center and the first set of projections are based on the WMATA recommended mix for train stations in regional urban centers and it includes:

- 1) 50% Covered/Unsecured U-Rack Parking
- 2) 5% Standard Bicycle Lockers

⁸ A memo for the Pedestrian and Bicycle CIP, "Criteria for determining the best mix of parking equipment types for Metrorail stations" Oct. 2011 identifies Bethesda Station as a Regional Urban Center.

- 3) 15% On Demand Lockers
- 4) 30% Two-Tiered High Capacity Parking

The second set of space requirements represents a mix of bike parking equipment that emphasizes high capacity bicycle parking; it eliminates all lockers, and halves the amount of u-rack parking. The second mix includes:

- 1) 25% Covered/Unsecured U-Rack Parking
- 2) 0% Standard Bicycle Lockers
- 3) 0% On Demand Lockers
- 4) 75% Two-Tiered High Capacity Parking

The space requirements are derived from the sizes of existing bike parking infrastructure used at other WMATA rail stations and include space to maneuver the bicycle into the parking space. The maneuvering space is determined by the width of the bicycle parking spot by the average length of bicycle (six feet). Additionally, these projections include a 10% contingency space.

Bethesda Station South Bike Parking Square Footage Projections

	Low Estimate	Medium Estimate	Standard Estimate	High Estimate
WMATA Recommendation Mix	2,866	5,461	9,979	13,501
High Capacity Parking Mix	1,848	3,522	6,435	8,705

Note: All numbers are in square feet.

Space Requirements Projections Conclusion

In order to achieve WMATA's bicycle access goals, attain national standards, and maintain WMATA's recommended parking mix it will be necessary to reserve at least 9,979 square feet of space solely for bicycle parking. Should Bethesda Station South adopt a higher-capacity mix for bicycle parking infrastructure, it can reduce the amount of required space by nearly 3,500 square feet to 6,435 square feet. Moreover, high capacity bike parking infrastructure can more readily be used for bicycle station parking, which can better accommodate a combination of self-serve and valet-service bike parking, or the space made available by higher capacity infrastructure can be used for additional bike facilities or other amenities at the train station.

Table X: Bicycle Parking Demand

			No change over 2013 bike access to transit rates. ¹⁰		Conservative Growth Estimate		Goal-Based Growth Estimate (WMATA) ⁴ , Consistent with National Guidelines (APBP) ⁵		Goal-Based Growth Estimate (Adjusted for High Quality Trail Access Demand Factor) ⁹	
			Low Estimate		Medium Estimate		Standard Estimate		High Estimate	
	2030 Demand Projection AM Peak (Transit Boardings/CBD arrivals)	Estimated Bethesda South Entrance Share of Red Line Bike Parking Demand	Percent of Bicycle to Station Trips	Count of Bike to Station Trips	Percent of Bicycle to Station Trips	Count of Bike to Station Trips	Percent of Bicycle to Station Trips	Count of Bike to Station Trips	Percent of Bicycle to Station Trips	Count of Bike to Station Trips
Bethesda Station Red Line AM Peak Period Boardings ¹	4,151	87.5%	2.3%	83.5	5.0%	181.6	9.7%	352.3	12%	435.9
Bethesda Purple Line AM Peak Period Boardings (excludes transfers between Red Line and Purple Line) ²	1,047	NA	2.3%	24.1	5.0%	52.4	9.7%	101.6	12%	125.6
AM Peak Hour Incoming Motor Vehicle Trips (TAZ 637) ³	3,182	NA	1.0%	31.8	1.0%	31.8	1.0%	31.8	3.0%	95.5
Total Bike Parking Demand to be Supplied by an On-site Full-Service Bicycle Storage Facility at the new Bethesda South Station				139		266		486		657
AM Peak Bike Arrivals Needed to reach WMATA Red Line 2020 2.1% Target ⁷	229									
AM Peak Bike Arrivals Needed to reach WMATA Red Line 2030 3.5% Target ⁸	401									

¹ Bethesda Red Line 2030 AM Boardings Projection is from the 2011 WMATA Bike Parking Forecasting Study - Station level. Considering the likely origins and destinations of bicycle trips to the Red Line, and the new condition

² Bethesda Purple Line 2030 AM Boardings Projection is from the 2013 Adjusted Ridership Summary, part of the Bethesda Sta South Entrance Elevator Data Report (Does not include AM Peak Boardings to Purple Line generated

³ TAZ 367 2030 projection is based on the MWCOG Round 8.0 Total Motor Vehicle Trips (which uses a 2010 projection of 2,867 and a 2040 projection of 3,353). One percent of in bound AM Peak Hour motor vehicle trips to TAV

⁴ Percentage required (9.7%) for Bethesda Station to meet a system wide goal of 3.5% bicycle users

⁵ Standard % Estimate (Column H) is APBP's 7% for long term bike parking and 2% short term bike parking, for a rail transit station in an urban high demand setting; from Bicycle Parking Guidelines 2nd Edition

⁶ Incidental Bike Parking would include inverted-U racks placed on the street or in plaza areas at the entrance points to the Bethesda South Station, which may be used by those going to the building, to transit services or for

⁷ AM Peak bike Arrivals needed to Reach WMATA goals is from the 2011 WMATA Bike Parking Forecasting Study - Station level

⁸ Only the Standard and High estimates attain the WMATA Red Line 2030 3.5% target

⁹ WMATA's methodology for projecting 2030 Bike Parking capacity needs are based on 2007 customer service survey data and 2010 bike parking census data to establish a bike parking share index (multiplier) for each of 86

¹⁰ Current bicycle access to the Bethesda Station is 2.3%; from 2010 WMATA Metrorail Bicycle & Pedestrian Access Improvements Study.

Station Name	Trail Names	Bike Parking Need Index
College Park	Anacostia Tributaries Trail	19.5%
East Falls Church	Custis / 4-Mile Run / W & O D	13.0%
Medical Center	Bethesda Trolley Trail and Rock	28.8%
West Hvttsville	Anacostia Tributaries Trail	12.3%

Table X: Bicycle Parking Spatial Requirements (WMATA Parking Mix)

				No Growth Estimate		Medium Growth		Standard Growth ⁷		High Growth	
Total Bike Parking Demand to be Supplied by an On-site Full-Service Bicycle Storage Facility at the new Bethesda South Station				140		266		486		657	
WMATA Recommendation Mix¹											
	Bike Parking Infrastructure Attributes	Share of Bike Parking Mix	Area Required (Sq. Ft./Bike)⁶	No Increase in Capacity		Medium Capacity Increase		Standard Capacity Increase		High Capacity Increase	
Parking Type				Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)
Covered/Unsecured Inverted U-Rack ²	Self-Serve, unsecured, publicly accessible, moderate footprint	50%	20	70	1,395	133	2,659	243	4,858	329	6,572
Bicycle Locker ³	Self-Serve, secured, publicly inaccessible, large footprint	5%	29	7	204	13	389	24	711	33	962
On Demand Locker ³	Self-Serve, secured, publicly accessible, large footprint	15%	29	21	613	40	1,168	73	2,134	99	2,887
Two Tiered High Capacity Bike-n-Ride Parking ⁴	Self-Serve or valet, secured or unsecured, publicly accessible, small footprint	30%	9	42	393	80	749	146	1,368	197	1,851
Total Parking Capacity				140		266		486		657	
Area Needed for Bike Parking, including Maneuvering Space (Sq. Ft.)					2,606		4,965		9,072		12,273
+ 10% Contingency Space					2,866		5,461		9,979		13,501
¹ WMATA Recommendation is composed of 50% Covered Inverted U-Rack, 25-35% High Security Storage Area, 15-25% On-Demand Locker Capacity, and 0-5% Standard Lockers; from pedestrian and Bicycle CIP Criteria for determining the best mix of bike parking equipment types for Metrorail stations, 2011.											
² Inverted U-Rack - 12 sq.ft. parking foot print and 8 sq. ft. of maneuvering space, at 36" rack spacing; derived from WMATA College Park Bike and Ride Facility											
³ Double entry bike locker, containing two triangular interior spaces - 6.5ft x 3.166ft (20.58 sq.ft.) unit and 6ft x 3.166ft (19 sq. ft.) maneuvering space on either side of the locker; CycleSafe M02 Model											
⁴ Two-tiered bike rack - 7.833ft X 5ft (39.166 sq. ft.) unit and 6ft x 10.5 ft (73.5 sq. ft.) maneuvering space; Dero, Dero Decker 1-Sided Model for 12 bicycles											
⁵ High capacity bike parking mix doubles the space dedicated for two tiered bike parking											
⁶ Area required includes footprint of parking infrastructure and six linear feet of maneuvering space											
⁷ Standard growth estimate accounts for WMATA's 2030 3.5% bike accessibility goal, and is consistent with 2010 APBP bike parking guidelines											

Table X: Bicycle Parking Spatial Requirements (High Capacity Parking Mix)

				No Growth Estimate		Medium Growth		Standard Growth ⁷		High Growth	
Total Bike Parking Demand to be Supplied by an On-site Full-Service Bicycle Storage Facility at the new Bethesda South Station				140		266		486		657	
High Capacity Bike Parking Mix⁵											
	Bike Parking Infrastructure Attributes	Share of Bike Parking Mix	Area Required (Sq.Ft./Bike) ⁶	No Increase in Capacity		Medium Capacity Increase		Standard Capacity Increase		High Capacity Increase	
Parking Type				Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)	Capacity	Area Required (Sq. Ft.)
Covered/Unsecured Inverted U-Rack ²	Self-Serve, unsecured, publicly accessible, moderate footprint	25%	20	35	698	66	1,329	121	2,429	164	3,286
Bicycle Locker ³	Self-Serve, secured, publicly inaccessible, large footprint	0%	29	-	-	-	-	-	-	-	-
On Demand Locker ³	Self-Serve, secured, publicly accessible, large footprint, programmable	0%	29	-	-	-	-	-	-	-	-
Two Tiered High Capacity Bike-n-Ride Parking ⁴	Self-Serve or valet, secured or unsecured, publicly accessible, small footprint	75%	9	105	983	199	1,872	364	3,421	493	4,628
Total Parking Capacity				140		266		486		657	
Area Needed for Bike Parking, including Maneuvering Space (Sq. Ft.)					1,680		3,201		5,850		7,914
+ 10% Contingency Space					1,848		3,522		6,435		8,705

¹ WMATA Recommendation is composed of 50% Covered Inverted U-Rack, 25-35% High Security Storage Area, 15-25% On-Demand Locker Capacity, and 0-5% Standard Lockers; from pedestrian and Bicycle CIP Criteria for determining the best mix of bike parking equipment types for Metrorail stations, 2011.

² Inverted U-Rack - 12 sq.ft. parking foot print and 8 sq. ft. of maneuvering space, at 36" rack spacing; derived from WMATA College Park Bike and Ride Facility

³ Double entry bike locker, containing two triangular interior spaces - 6.5ft x 3.166ft (20.58 sq.ft.) unit and 6ft x 3.166ft (19 sq. ft.) maneuvering space on either side of the locker; CycleSafe M02 Model

⁴ Two-tiered bike rack - 7.833ft X 5ft (39.166 sq. ft.) unit and 6ft x 10.5 ft (73.5 sq. ft.) maneuvering space; Dero, Dero Decker 1-Sided Model for 12 bicycles

⁵ High capacity bike parking mix doubles the space dedicated for two tiered bike parking

⁶ Area required includes footprint of parking infrastructure and six linear feet of maneuvering space

⁷ Standard growth estimate accounts for WMATA's 2030 3.5% bike accessibility goal, and is consistent with 2010 APBP bike parking guidelines

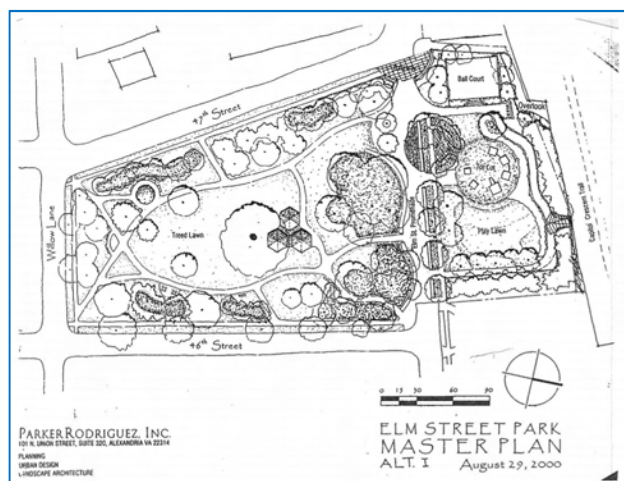
Appendix IV: Elm Street Urban Park



Elm Street Urban Park is located in downtown Bethesda, on the east side of Wisconsin Avenue, just outside of the Central Business District (CBD). The park is approximately two acres in size and was originally constructed as a park in the early 1980's. The park consists of two discreet but connected areas, referred to as the southern and northern portions, separated by a block-long section of the abandoned Elm Street road right-of-way. The former right-of-way was transformed into a tree-lined promenade with seating areas providing convenient east-west access between the CBD and the residential neighborhoods east of Wisconsin Avenue, in the Town of Chevy Chase. A direct connection to the Air Rights tunnel and the Metropolitan Branch Trail is provided by an existing trail in the park.

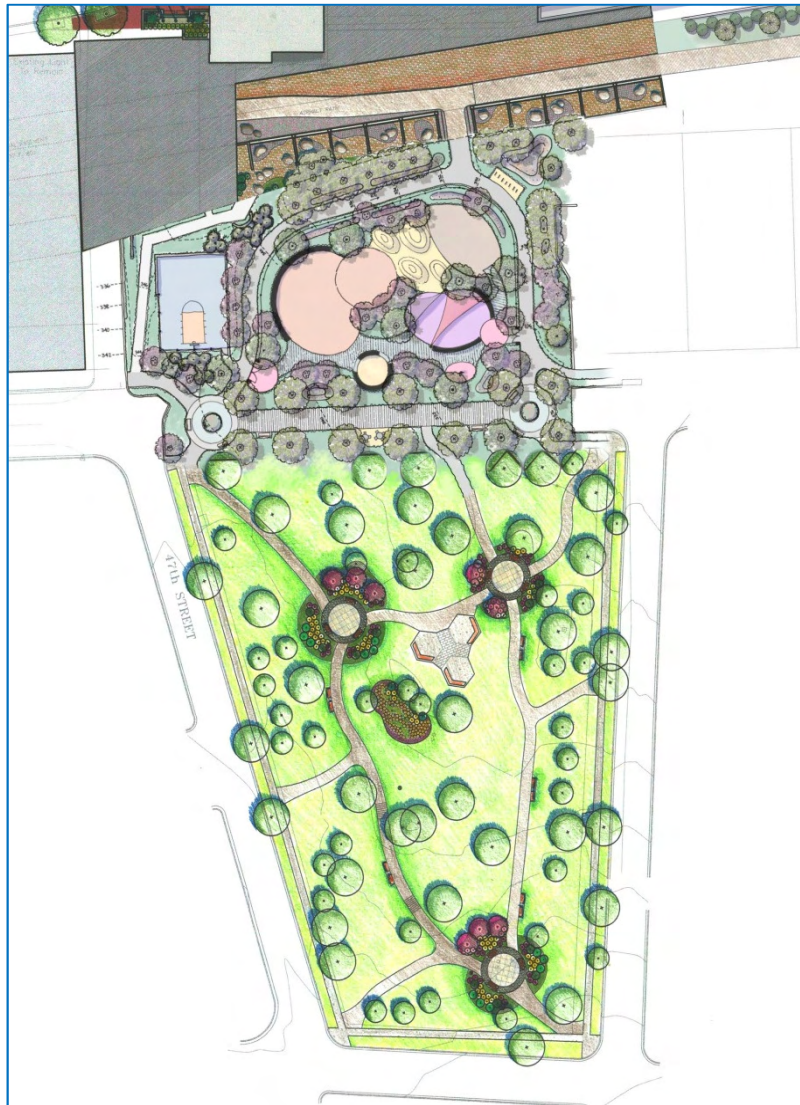
A park master plan was reviewed by the Planning Board in December of 2000, as part of the approval process for a Project Plan for the adjacent Air Rights Property. As part of that approval, the developer of the Air Rights property agreed to renovate the southern portion of the park. The renovation included new trails and seating areas, site furnishings, landscape plantings, and the restoration of an existing public art piece. Construction was completed in 2009.

In 2010, the Planning Board approved a Project Plan amendment for the Air Rights property for 7300 Pearl Street. As part of that approval the developer agreed to participate in a public-private partnership to renovate the northern portion of the park. The Planning Board's approval



established a list of improvements that the developer was responsible for providing. At that time these improvements totaled between \$550,000-\$600,000 and included reconstruction of the east-west promenade, providing the hardscape and infrastructure for a new state-of-the-art playground, a new bike path connection to the Metropolitan Branch Trail, walls, fencing, lighting, signage, landscape planting, utilities, design and engineering services, stormwater management, etc.

It was anticipated that the Department of Parks would construct the remaining improvements including playground equipment and resilient, rubberized surfacing, renovate the basketball court, provide shade structures, ornamental gateways, public art, a drinking fountain, and possibly reroute or underground overhead utility lines.



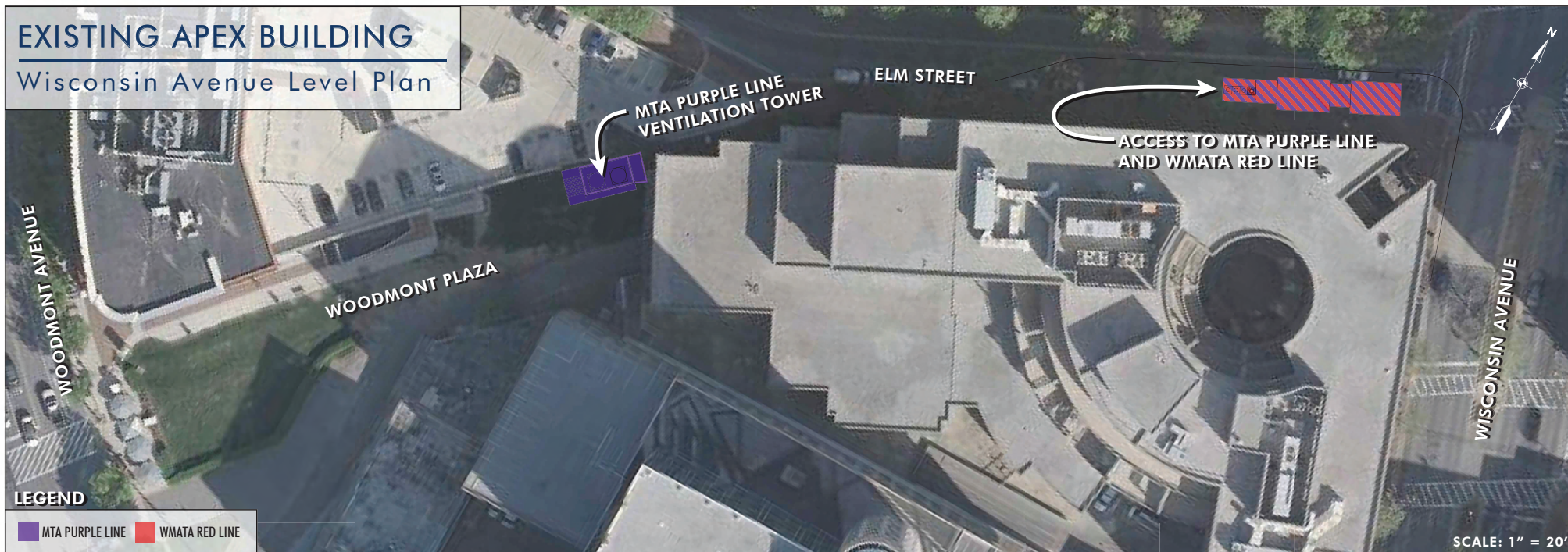
The Town of Chevy Chase was also committed to contributing towards the cost of the improvements.

At this time, the schedule for the renovation of the northern portion of the park is not certain as the approved development of 7300 Pearl Street, has not proceeded.

Appendix V: MTA drawings

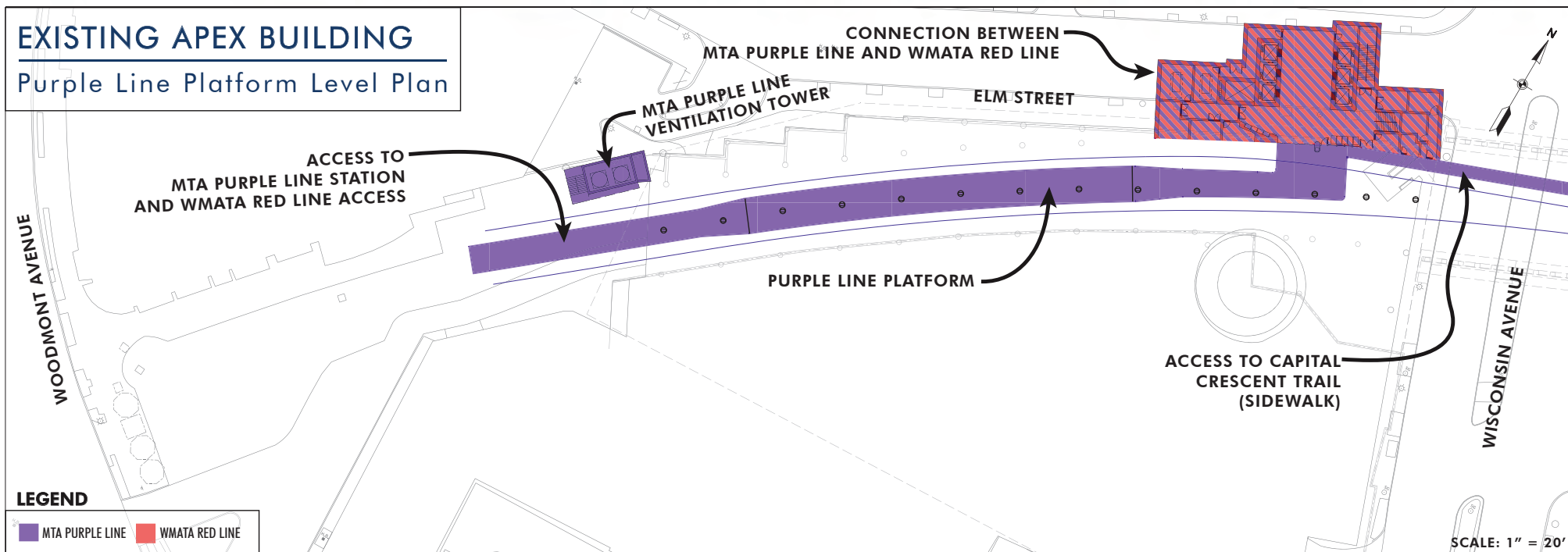
EXISTING APEX BUILDING

Wisconsin Avenue Level Plan



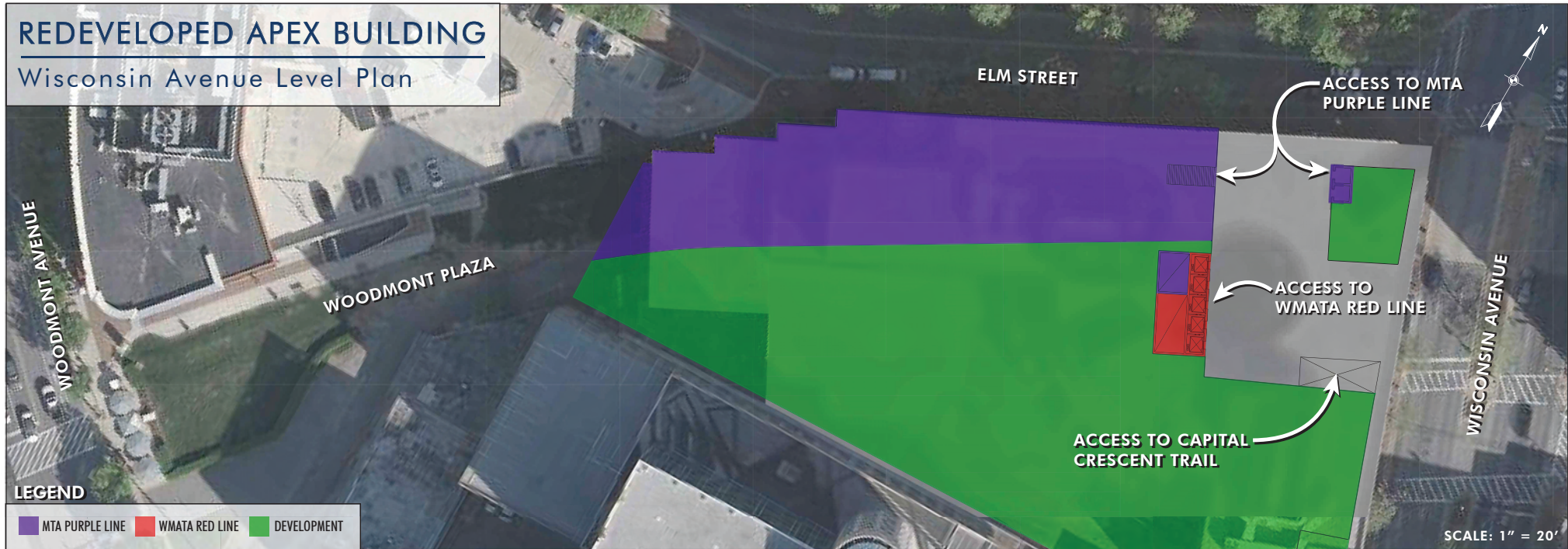
EXISTING APEX BUILDING

Purple Line Platform Level Plan



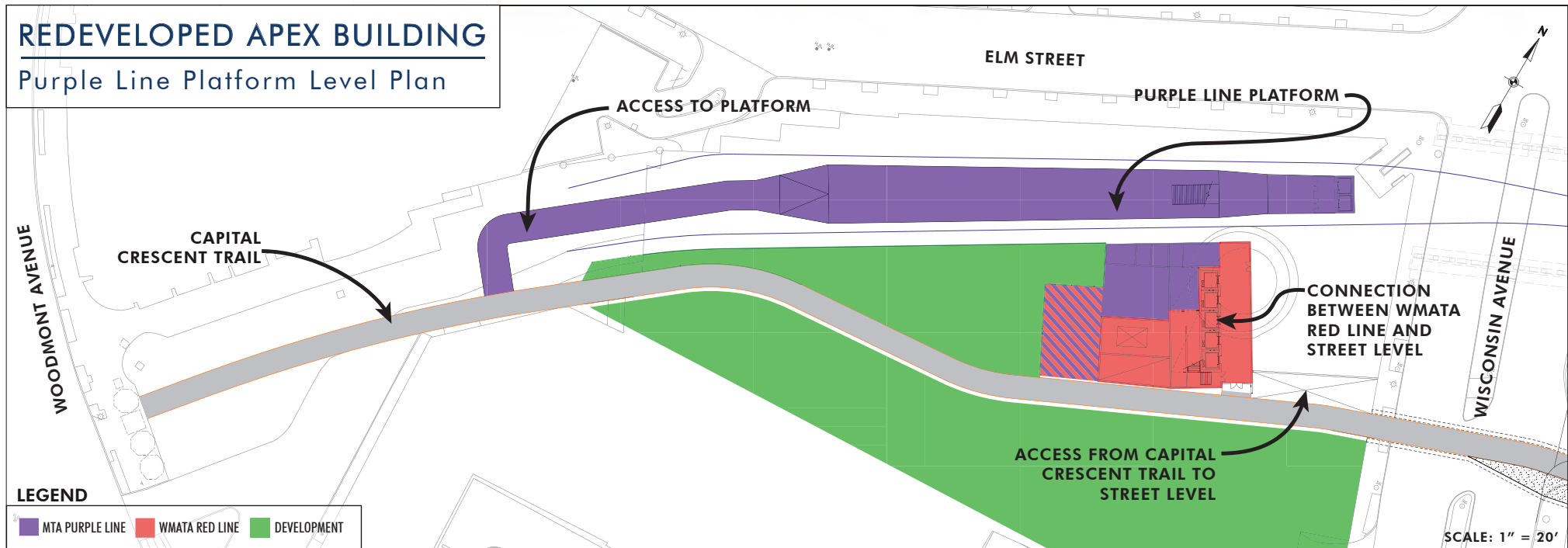
REDEVELOPED APEX BUILDING

Wisconsin Avenue Level Plan

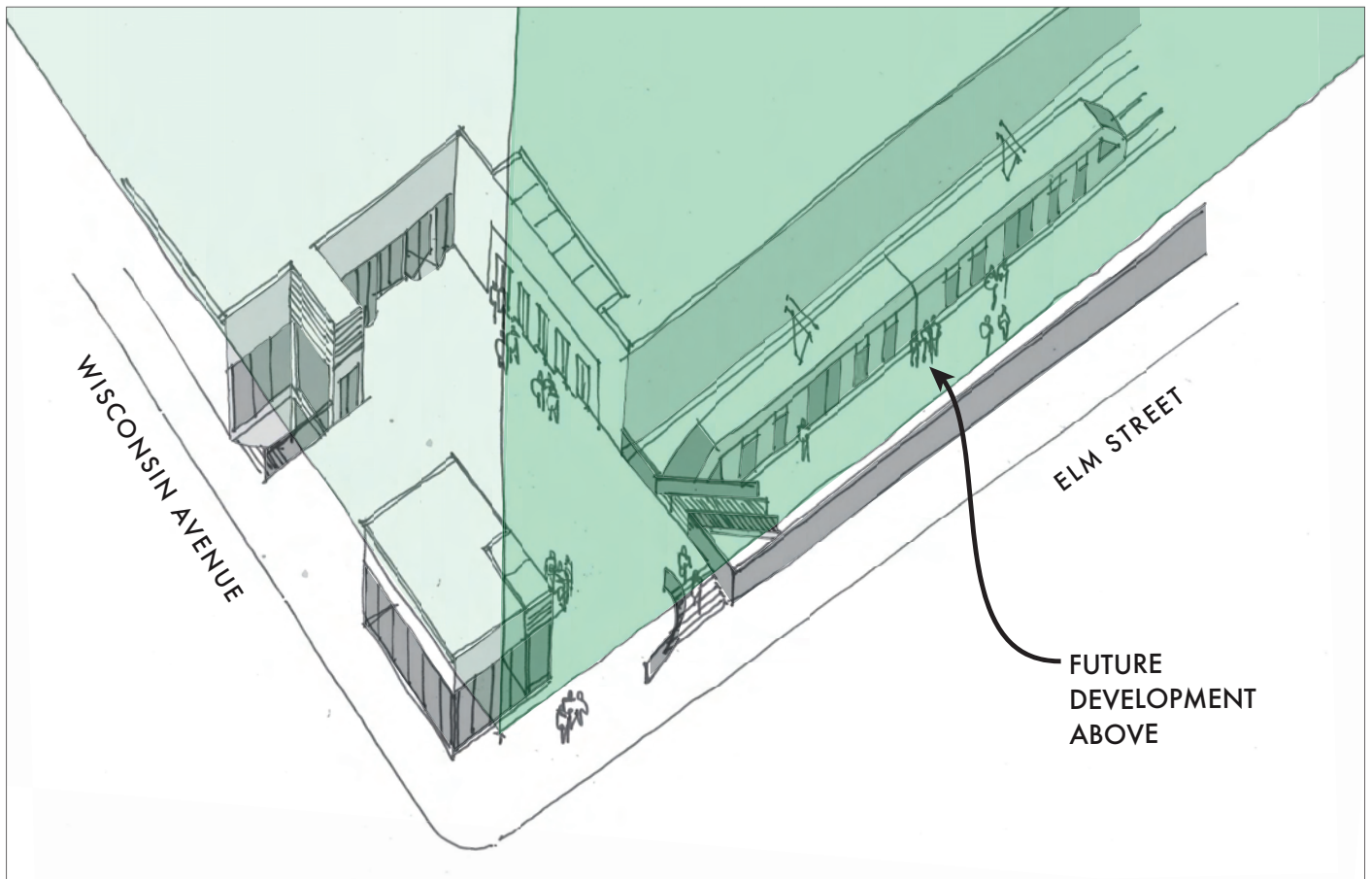
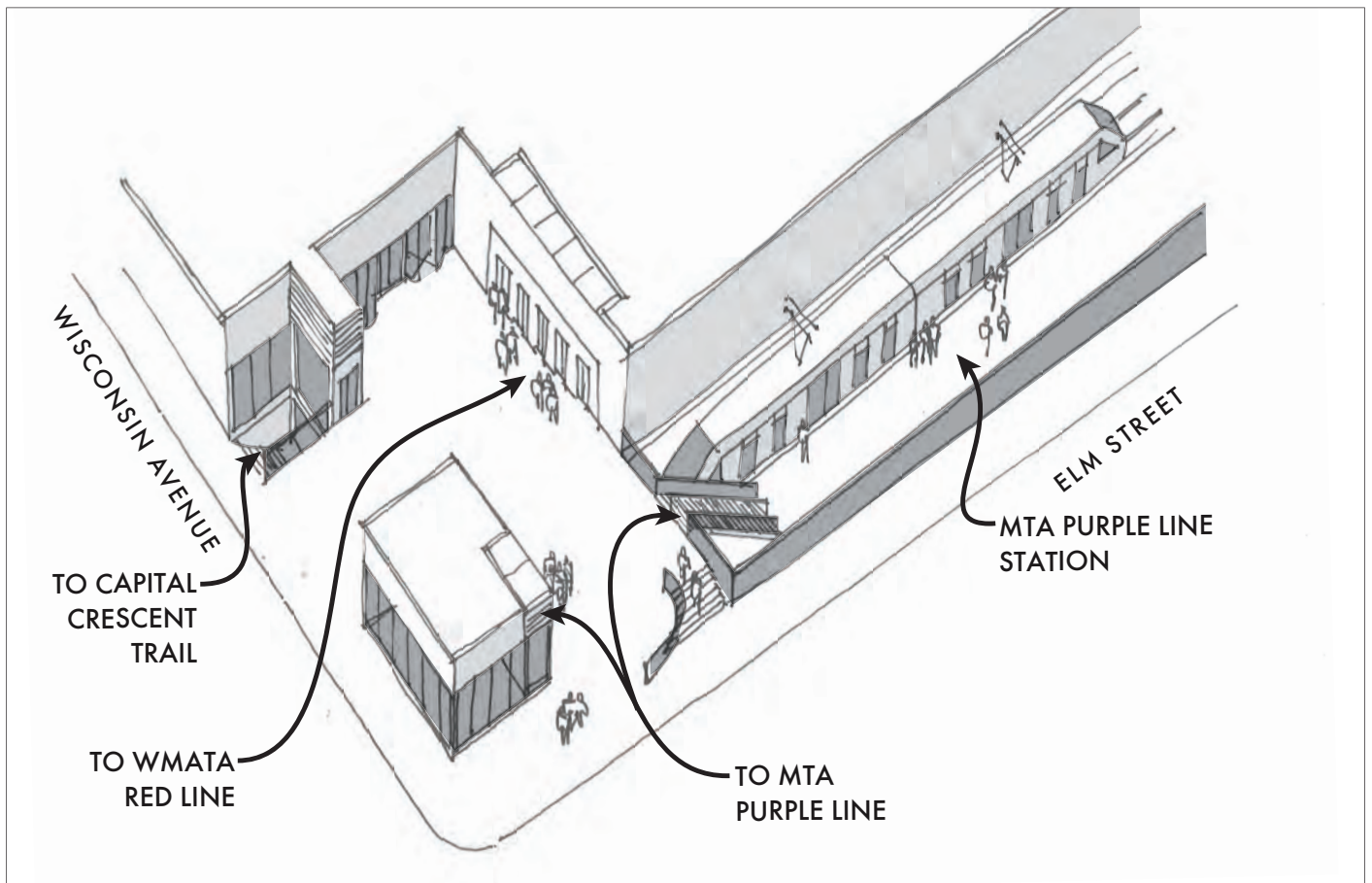


REDEVELOPED APEX BUILDING

Purple Line Platform Level Plan

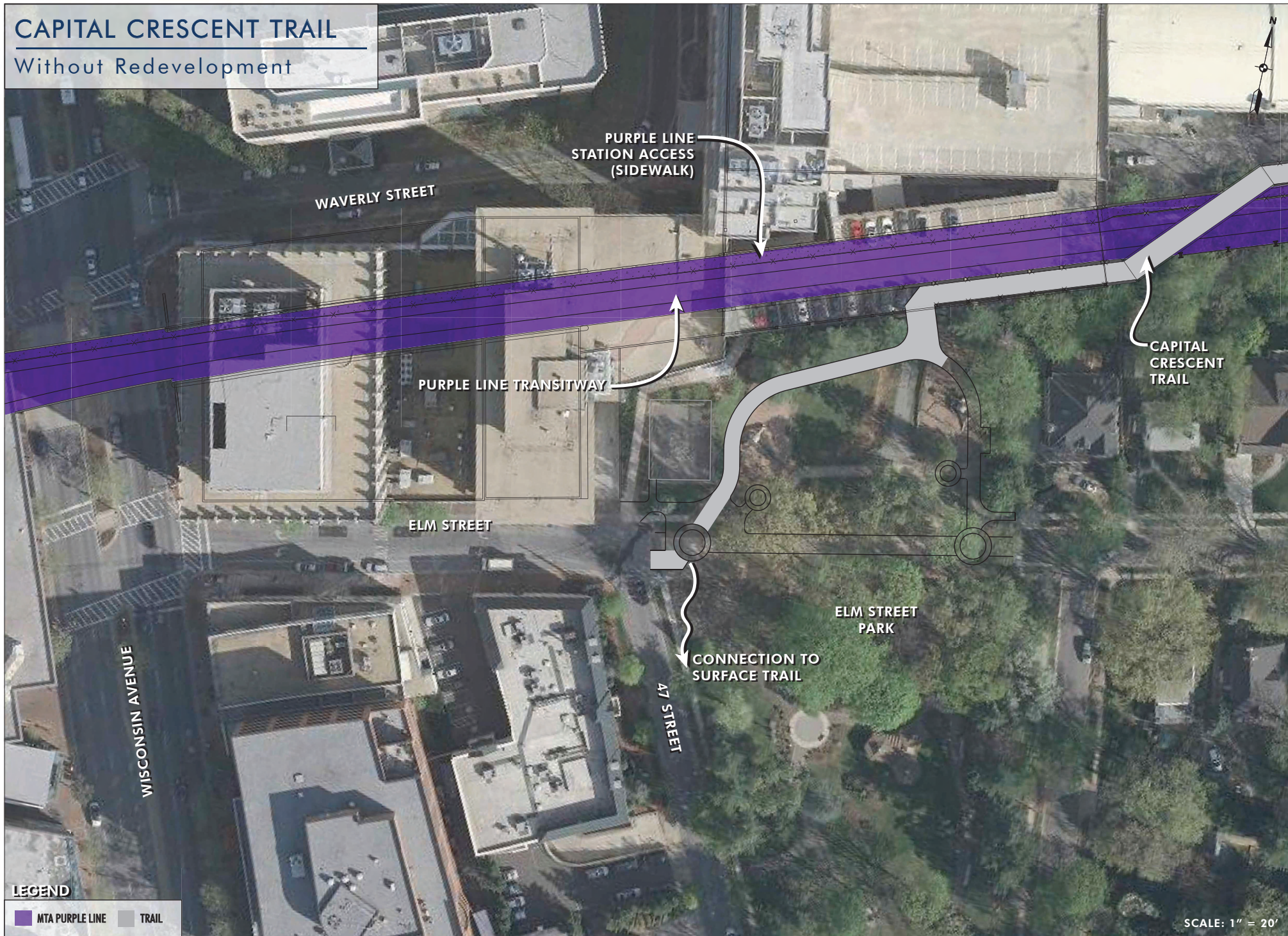


REDEVELOPED APEX BUILDING



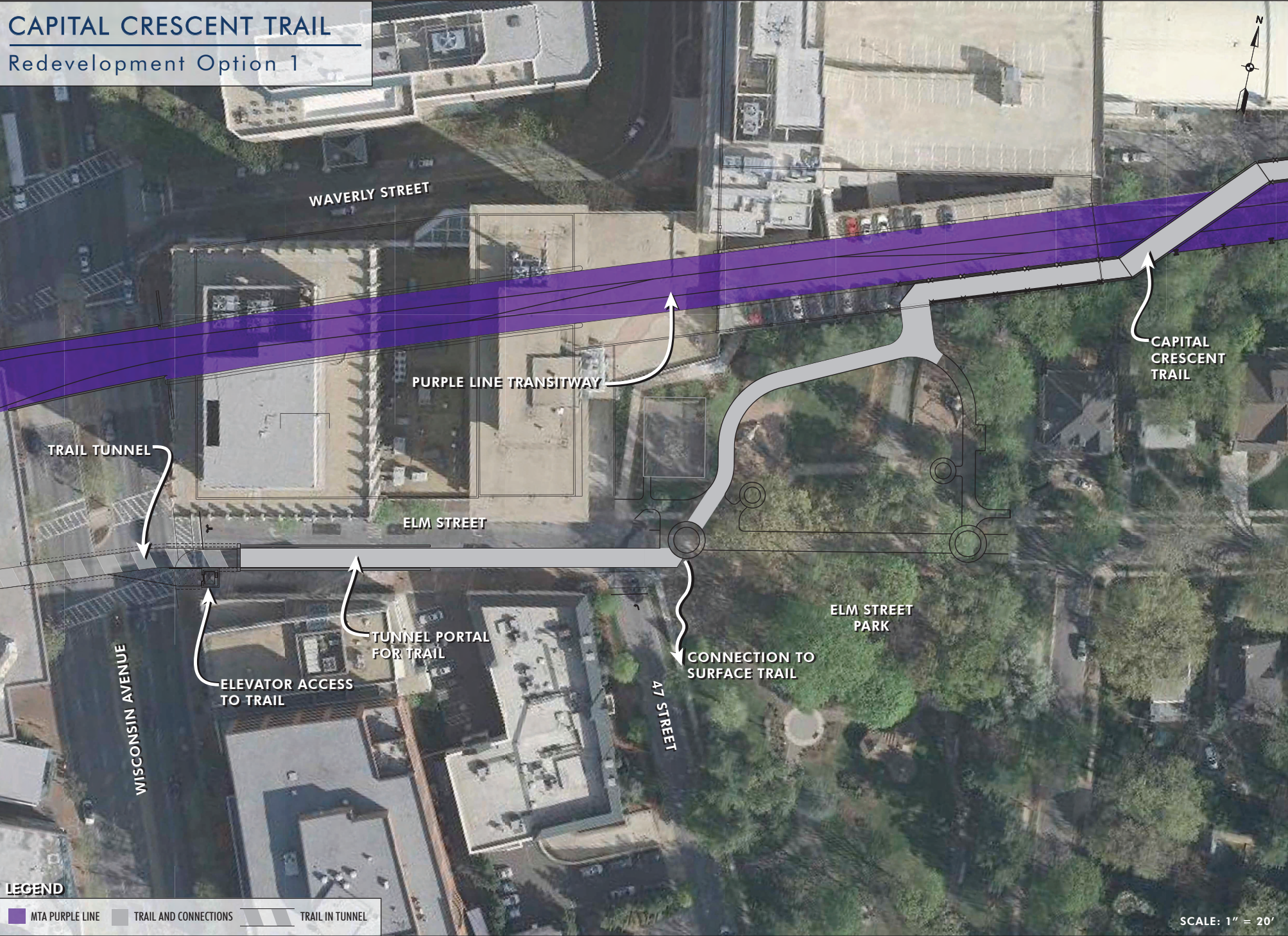
CAPITAL CRESCENT TRAIL

Without Redevelopment



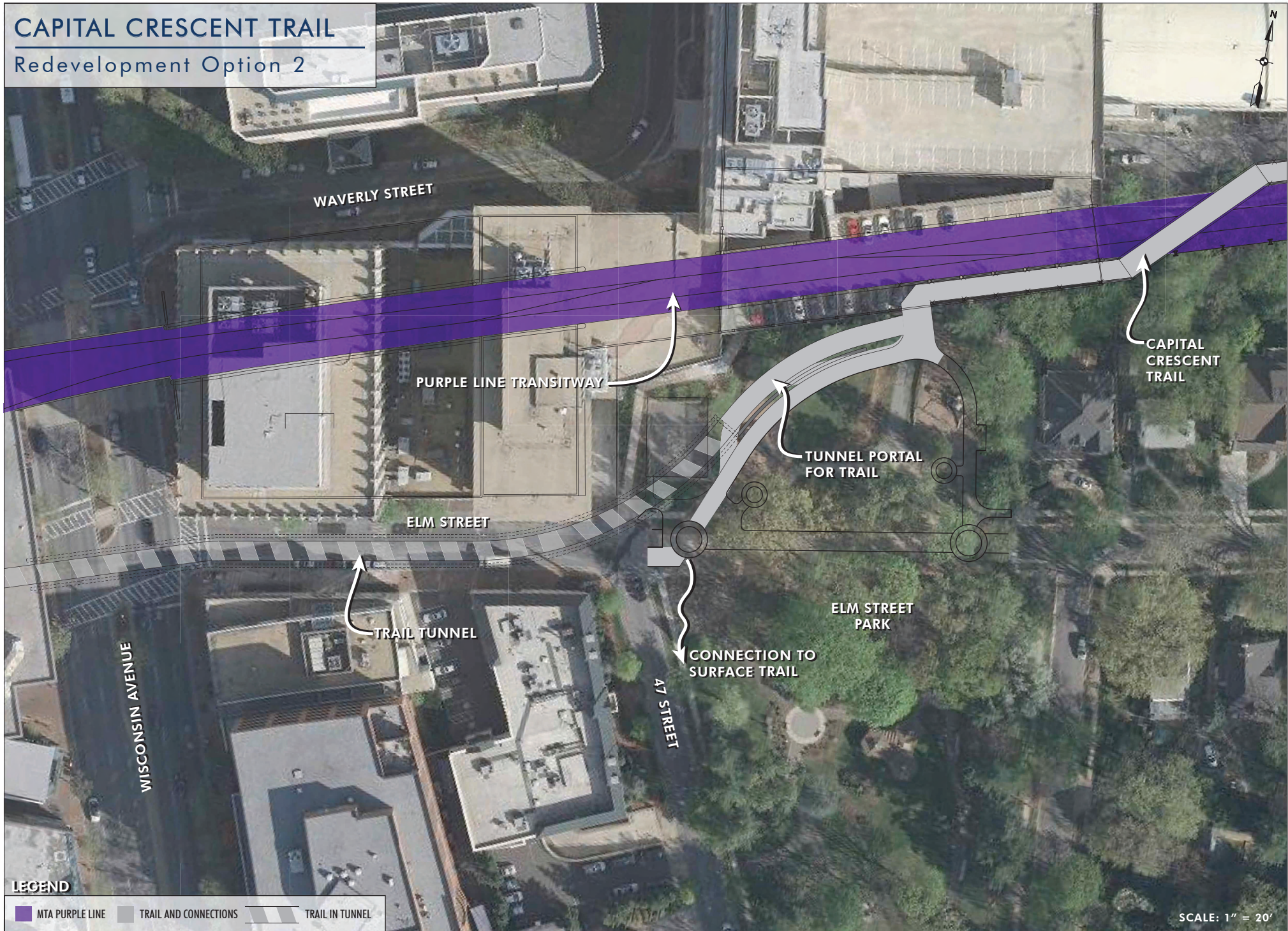
CAPITAL CRESCENT TRAIL

Redevelopment Option 1



CAPITAL CRESCENT TRAIL

Redevelopment Option 2



Appendix VI: Bolan Smart Associates report

Appendices to MNCPPC Planning Board Report
Bethesda Purple Line Station Financial Analysis

September 20, 2013

Background

Bolan Smart Associates (BSA) was asked to assist MNCPPC in the financial analysis aspects of its evaluation of two Bethesda Purple Line (PL) Station options involving what is known as the Apex Building. The approach and findings outlined in this report are based on best available sources of information, with noted limitations. While the ownership of the Apex property was contacted, the ownership representatives declined to provide any specifics regarding building and occupant details. Due to the myriad of design, engineering and other factors impacting cost considerations, the findings need to be viewed as representative of a range of estimates.

Summary

Notwithstanding the inexact nature of the subject financial analysis, the conclusions are clear:

1. Increasing the zoning capacity to the maximum currently permitted under County Code is not likely to create the economic conditions sufficient to justify the near term demolition of the Apex Building. Other assistance, perhaps valued upwards of \$5M to \$10M, may be needed to help close the financial gap.
2. While increased potential density conveys value, the variety of costs incurred to (a) relocate the existing tenants, and (b) construct the new building structural systems needed to support the PL Station, act as value “deducts” (up to \$25M+/-) that may exceed the near term benefit of using extra density. This means that keeping the existing building may be the better economic choice.
3. Given the type of public cost commitments represented by the two station options, there are no station related “cost savings” to be realized that could hypothetically be directed to help in redeveloping the Apex property. A suggested \$10M savings in moving the new Red Line Station southern entrance off of Elm Street and onto the Apex property is more than offset by the added cost of either of two tunnel options that would restore the Capital Crescent Trail access under Wisconsin Avenue (as proposed to be part of the demolition approach and included only as a pedestrian walkway if the current right-of-way is retained).
4. There are two types of possible solutions to helping close the likely economic gap, which could be either sufficient in themselves, or could work in tandem. One is the prospect of gaining economic efficiencies by consolidating the Apex property with the adjoining properties for purposes of redevelopment (with or without merged ownership). The other approach is to employ public investment tools otherwise used for public purpose by Montgomery County and the State of Maryland, including what might be appropriately considered part of the Purple Line construction budget.

Scenarios – (see MNCPPC report for site illustrations)

KEEP Existing Apex Building

- Purple Line project funds station improvements inside current tunnel right-of-way.
- New Red Line Station southern entrance elevator shafts come up through Elm Street.
- Montgomery County pays for new Red Line southern entrance (\$80M).
- Possible building redevelopment longer-term constructed around existing PL Station.

DEMOLITION / New Development (2016)

- Property ownership provides newly constructed right-of-way shell-ready for PL Station.
- Purple Line project funds station improvements inside new shell right-of-way.
- New Red Line Station southern entrance elevator shafts moved south off Elm Street.
- Montgomery County pays for new Red Line southern entrance (\$70M).
- Montgomery County pays for replacement Capital Crescent Trail tunnel (\$15M to \$30M).

Public Cost Differentials

Purple Line Project (street access, platform improvements and tracking) – As currently contemplated, the proposed Purple Line Station related costs in Bethesda are budgeted to be funded from a combination of public improvements (assuming a station-ready shell) and private sources (in such case as a new station-ready shell needs to be provided). The prevailing Purple Line project construction budget includes:

- Purple Line Station track and interior
- Purple Line ventilation stack (40 ft by 20 ft shaft extending 90 feet above grade)

The Maryland Transit Administration (MTA), the agency coordinating the planning of the Purple Line, estimates that there is no material cost difference between equipping the existing KEEP tunnel and a newly constructing equivalent shell under DEMO. The assumption is that the Bethesda Station would be built within an Apex property provided “box” or “shell”, either in the exiting tunnel, or a new equivalent. This means under the DEMO scenario, the property owner would be responsible for paying for a replacement PL Station shell, obviously per agreed upon engineering and design.

Under the KEEP option, MTA’s needed date of beneficial occupancy (ready to start PL Station improvement) could be later than 2015, but under DEMO, the current building would have to come down by late 2015 or early 2016 in order for the new construction to provide MTA with a new station-ready shell in time to add the Purple Line related improvements before the targeted 2020 opening. Any PL Station operational cost differentials associated with the KEEP vs. DEMO scenarios are expected to be minimal.

Montgomery County – At an earlier point, Montgomery County committed to funding the construction of a new southern entrance to the existing Bethesda Metro Red Line Station. The budgeted cost for this Red Line Station improvement ranges between \$80M (KEEP) and \$70M (DEMO). Under MTA estimates, the \$10M+ construction cost savings under the DEMO option is attributed mostly to not needing to relocate major utility infrastructure under Elm Street, which would be needed under the KEEP option.

Montgomery County is also considering funding the replacement of the Capital Crescent Trail under the DEMO option, with at an estimated cost of \$15M to construct a new tunnel solely under Wisconsin, or \$30M to fund the Wisconsin tunnel plus a tunnel connection extending further east under Elm Street. Operational cost differentials for Montgomery County and for the Red Line Station are assumed as a wash under either station scenario. The contemplated Montgomery County capital costs include:

Red Line South Entrance	\$70M to \$80M
CCT Option 1 (Wisconsin tunnel to Elm Street portal)	\$15M
CCT Option 2 (Wisconsin tunnel to Elm Street Park portal)	\$30M
CCT Through New Bldg Interior Finishes	\$300K

Economic Impact – There are a variety of non-direct public related economic cost and benefit implications regarding the respective Apex property scenarios:

KEEP Existing Apex Building

- Elm Street west of Wisconsin closure (partial two+ years).
- Spin-off effects on neighborhood of added Purple Line Station.

DEMOLITION / New Development

- Wisconsin Avenue closure (partial one year), and maybe Elm Street east of Wisconsin.
- Temporary loss of existing Apex related business activity.
- Accelerated economic returns from much larger Apex redevelopment than current.
- Premium neighborhood spin-off effects of superior Purple Line Station.

Of first order, the respective required partial street closures will cause disruption to both traffic and area businesses, patrons and residents. Without estimating specifics, the expectation is that based simply on the magnitude of traffic levels, a partial closing of Wisconsin Avenue (DEMO) for up to one year for tunnel construction, would result in a least twice the economic disruption compared with a partial closure of Elm Street west of Wisconsin for two or more years to allow for the Red Line elevator shaft construction.

Additional potential economic impact on Montgomery County and the Bethesda community consequent from the near-term demolition of the Apex building relates to the relocation options and decisions for the existing users, including:

- American Society of Health-System Pharmacists (ASHP - building owners)
- Morgan Stanley Smith Barney
- Various financial, real estate and other office type users
- Regal 10 Cinemas, Food and Wine Company, and other smaller first floor retail oriented tenants

With one exception, the assumption is that most existing tenants in the Apex Building could readily relocate within downtown Bethesda. The exception is the 10 theater Regal Cinemas, an older format movie house (opened in 1992), but still a contributing business to the surrounding neighborhood. With an estimated 350,000+ annual ticket sales, generating some \$300,000+ in annual Montgomery County amusement tax revenue, there is no question that the theaters

represent a unique economic presence. The question is how important is the movie operation to the rest of downtown Bethesda, and to some degree, the rest of Montgomery County?

Given the breadth of other economic activity in downtown Bethesda, the temporary, or even permanent absence of the Regal 10 Cinemas, is not expected to be a fundamental deciding factor in the vast majority of peoples' decisions to frequent downtown Bethesda. Moreover, the tax revenue impact on Montgomery County would be expected to be mitigated by offsetting movie house patronage elsewhere in the County, with a limited amount of leakage spreading into other jurisdictions.

Private Sector Considerations – Apex KEEP vs. DEMOLITION valuations

The Apex ownership's voluntary decision to facilitate tearing down the existing building is predicated on the value of demolishing the existing building, and starting afresh, matching or exceeding the forgone value of keeping the building. Whether or not the Apex ownership is an active real estate developer, the decision to proceed with building anew is driven primarily by deciding that the income value of the building "as is" is less than the land value of the property as if it were made available for new development (representing the "contributory value" of the land towards new development):

KEEP Valuation Components

- Income value of existing 170,000 sf bldg. circa 1992 (1.54 FAR, assessed @ \$44M for 2013*).
- Present value of unused buildable area (future redevelopment) if available or achievable.
- Deduct for construction cost premiums for future redevelopment to build around PL Station.

DEMOLITION Valuation Components (land without current building)

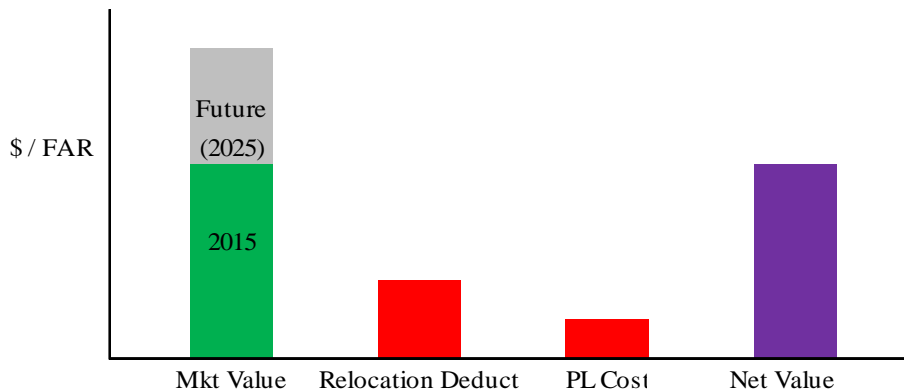
- Present value of potential building area (FAR).
- Deducts associated with possible costs of relocating the tenants in the current building.
- Deducts for costs for replacing the PL Station "shell".

Land Value Variables – There are many variables that factor into the determination of the actual land value for a given site. For the Apex property, these include:

1. The amount of buildable square footage permitted under zoning (floor-area ratio, or FAR).
2. The near-term and projected longer-term market demand (and timing) for new construction.
3. The price for immediately marketable building area (FAR).
4. The hold price, or discounted value, of future to-be-built FAR.
5. Building footprint / massing factors (how much FAR can be optimally used on-site).
6. Private sector costs of accommodating the Purple Line.
7. Possible value enhancements associated with having a better Purple Line Station.

* 2013 real estate assessed value of the current Apex property is \$43.86M. This value, calculated by the State of Maryland, was last reset in 2011, and reportedly included consideration of building net income in determining value. Following a three year cycle of updates, the next assessment is in 2014. For real estate taxation purposes, the building has a 32.4% tax exemption attributed to the non-profit status of the health related major user (ASHP).

Net Land Value per FAR
(market value – tenant relocation costs – PL Station costs = net value)



Note: Relocation deduct applies only to DEMO scenario, as future redevelopment of existing Apex Building would be planned ahead.

Zoning – Based on discussion with MNCPPC, there are three zoning scenarios that could be applied to the PL Station options:

- existing zoning = up to 550,000 square feet (5.0 FAR)
- hypothetical (uncertain) future zoning = up to 880,000 sf (8.0 FAR) (330,000 sf over 5.0 FAR)
- actual future zoning = up to 880,000 square feet (8.0 FAR) (330,000 sf over 5.0 FAR)

The existing zoning is assumed to apply equally under either the KEEP or DEMO scenarios. The hypothetical future zoning and actual future zoning categories are premised on the current potentially allowable density applicable in downtown Bethesda, based on the Montgomery County zoning code, but that is not presently available at the subject location. With the pending 2014+ review and possible update of the downtown-wide Bethesda Sector Plan, one scenario might be that the Apex property may become eligible for an increase in permitted FAR regardless of any accelerated or other near term public action associated with accommodating the Purple Line Station. Seeing however, as the outcome of the future Bethesda Sector Plan review remains an uncertainty as of today, the assumption for valuation purposes under the KEEP option is that the future prospects of being granted an 8.0 FAR needs to be considered as hypothetical, with the implication being that the property owner must heavily discount the possible future value of this uncertain zoning, if even to assign it any value at all. For the purposes of this analysis, the assumed zoning treatment under the DEMO scenario is not limited by a zoning uncertainty, and is assigned the full surety of an actual future 8.0 FAR zoning.

Current (2015) Land Value – In the case of the existing Apex building, while it is currently only a little over 20 years old, three economic considerations are at work accelerating its possibly being razed and redeveloped within the next 10 to 20 years regardless of the Purple Line Station construction scenario. Since the building's initial opening there has been: (a) a profound rise in the overall level of economic activity in downtown Bethesda (especially in the blocks immediately adjacent to the Apex property); (b) there is now the presumed arrival of the combined Purple Line and Red Line South Entrance at this location; and (c) there has been a dramatic increase in land value, both in terms of per FAR values, and the amount of existing or

hypothetical future unbuilt FAR available compared with the existing building. All of these factors translate into the situation where the underlying value of the land, if made available for new development, may exceed the income value of the property as currently improved.

Based on recent land sale comparables and discussions with real industry practitioners, a current unencumbered land value for near term development in downtown Bethesda is estimated to be in the range of \$100 per buildable / allowable square feet of development. This would be for a centrally located mixed use development undifferentiated between commercial or residential uses, and is assumed to be the market based benchmark for determining the current value of buildable area under the KEEP option. In the case of the DEMO scenario, a slight 5% value premium is added (\$105 per FAR) to the immediately developable FAR, an addition attributable to: (a) being able to build additional parking below grade (see deduct discussion below); and (b) the superior user environment that would be assumed to result from building a totally new Purple Line Station vs. fitting one into the existing rail tunnel easement.

Development Phasing and Land Value Discounts – Since the end user market / tenant demand in Bethesda is finite, it is not as if an unlimited amount of additional potential FAR is all valued the same per FAR in present day (i.e. 2015) terms. Above a certain level (say 550,000 SF) for a commercial / residential mixed use project, at even the best of locations, the ability to market more space for near term use starts to diminish. For valuation purposes, this means that above a certain (admittedly imprecise) point, the current value of extra unused FAR on a specific property begins to decline relative to the initially marketable building area. The economic impact of this is to dilute the current value of the extra buildable area, to be held for a period of time, and only to be realized sometime in the future when the unbuilt FAR actually becomes economic to develop. The development community deals with this phenomenon by discounting the future value of currently unmarketable FAR by some factor, assumed in this analysis at a 10.0% per year discount rate (or 20% discount in case of hypothetical zoning) after applying an annual assumed value appreciation of 2.0%.

- present value of FAR = current buildable FAR value + discounted value of future unbuilt FAR

For the purposes of this study, it is assumed that under DEMO 550,000 square feet of FAR (existing zoning @ 5.0 FAR) could be built near term, and that any additional potential FAR would need to be held off the market for up to ten years (2025), until such time as the background market is ready to absorb the development of the additional square footage. In the meantime, the cost of the unbuilt FAR would be carried by the property owner:

KEEP FAR Land Valuation (2015)

current buildable square foot value (170,000 sf)	\$100 per FAR (incl. in existing bldg value)
discounted value of future unbuilt area (380,000 sf)	\$48 per FAR (10% annual disc. from 2025)
disc. value of hypothetical unbuilt area (330,000 sf)	\$20 per FAR (20% annual disc. from 2025)

Notes: Future unbuilt area reflects actual zoning (i.e. 5.0 FAR); hypothetical unbuilt area reflects potential but uncertain future zoning (i.e. difference between actual 5.0 FAR and possible 8.0 FAR).

Analysis assumes that current unbuilt FAR could not be transferred for immediate redevelopment to an alternate site.

DEMOLITION FAR Land Valuation (2015)

current buildable square foot value (550K)	\$105 per FAR
discounted value of future unbuilt area (330K)	\$50 per FAR (10% annual disc. from 2025)
discounted value of hypothetical unbuilt area	not applicable for actual 8.0 FAR zoning

Land Value Deducts (unencumbered land value minus value deducts = net land value) – As introduced above, the starting point for determining net land value of the to-be-built FAR is other land values / sales that are not otherwise unencumbered by PL Station development related implications. From this base, any value deducts need to be applied. In the case of the subject property, these possible value deducts associated with redevelopment include the following:

Redevelopment Value Deducts

	<u>KEEP</u>	<u>DEMOLITION</u>
Construction Start / Phasing	2025+	2016+
Foundations	> 35% challenged	new
Parking	< 60% footprint	95% footprint
Existing Users Relocation	not applicable	major expense
Other Existing Ownership Costs	not applicable	not considered
Removal of Existing Building	similar	similar
PL Station Exterior / Shell	existing	needs replacement
PL Emergency Ventilation Stack	no impact / off-site	to be added inside bldg
Red Line Surface Ventilation	existing	needs replacement
CCT Through Building	not planned / existing walkway	to be added inside bldg
New Bldg Extra Construction Costs	substantial	minor

Future Apex Building Redevelopment (KEEP) – The current Apex site area from Elm Street to the southern edge of the current tunnel under the KEEP scenario, in other words a major portion of the below-grade footprint of the existing Apex building, would be basically unusable to the Apex owners under future redevelopment. In addition, under the KEEP scenario, the existing concrete pilings in the area of the existing tunnel supporting what would be the PL Station and the current building are not considered sufficient to support a much taller building than at present. What this means is that in addition to the general construction staging challenges of redeveloping the Apex property around an operating PL Station at some future date under KEEP, the ability to effectively re-engineer the foundations may be seriously compromised. This is not a 100% encumbrance, however, since the station area under KEEP, including some modest setback from the existing tunnel structure, and extending north to the Elm Street property line, encompasses only 35% of the overall Apex site.

Though no specific design or engineering analysis has been conducted on the part of MNCPPC, the view is that the challenge of constructing a new 550,000 sf project of 20+ story buildings around and over an existing PL Station is likely to require a combination of special engineering

and construction compromises. Were these extra expenses to cost, or to result in a devaluation totaling on the order of \$15 to \$20 / sf of building area compared to if there was no PL Station, the total additional expense could top \$10M under the KEEP scenario, or on the order of 5% of a new development costing upwards of \$200M.

Near-Term Redevelopment (DEMOLITION) – As outlined above, there are major differences in terms of implied private sector costs between the KEEP and DEMO scenarios. While under DEMO there are some distinct design and engineering advantages associated with being able to build an entirely new PL Station and building complex, there are also extraordinary one-time costs that a KEEP scenario does not have to replicate. The biggest additional expense under DEMO is likely to be relocating all the current users, involving early termination of leases, moving and re-fitting costs at new locations, plus possible ongoing business related disruptions. The other primary extra cost is the assumption under the proposed DEMO scenario that the private property owner needs to provide suitable replacement space (and larger than under KEEP) in which to locate the PL Station and associated other public components. This means that the private developer needs to allocate built area and deliver an enclosed “shell” space comprising floors, walls and ceilings for each of the direct PL Station components spanning both the concourse and street levels, incorporate a new CCT platform traversing the concourse level, and accommodate a 40 ft by 20 ft emergency ventilation shaft extending to the roof level of any new building.

As with the KEEP scenario, detailed analysis of each potential cost deduct item has not been conducted on the part of MNCPPC. The expectation is that the extra expenses under DEMO could readily cost \$25M or more (\$150 / sf if computed against the current 170,000 sf Apex building or \$45 / sf for a new 550,000 sf building) compared to where there was no required tenant relocation or PL Station shell replacement construction needed. These substantial and unique total cost deducts mean that from a net land valuation standpoint, the first \$25M of additional FAR value that may be assigned to the DEMO option provides no net financial benefit to the Apex ownership.

Quantitative Summary – Apex ownership perspective

Illustrative Net Valuations

KEEP FAR Valuation (current building + unused FAR @ 5.0 total FAR per existing zoning)

current building value (2014)	\$45M (170,000 sf) (2013 assessed value \$44M)
unused FAR @ 5.0 FAR	\$20M (380,000 FAR built in 2025)
PL Station cost deducts	<u>(\$10M)</u> +/-
Total	\$55M +/-

KEEP Valuation (current building + unused FAR @ 8.0 total hypothetical FAR)

current building value (2014)	\$45M (170,000 sf built)
unused FAR @ 5.0 FAR	\$20M (380,000 FAR built in 2025)
hypothetical additional 3.0 FAR	\$5M (330,000 FAR built in 2025)
PL Station cost deducts	<u>(\$10M)</u> +/-
Total	\$60M +/-

DEMO Valuation @ 5.0 FAR

FAR @ 5.0 FAR	\$60M (550,000 FAR built in 2016+)
PL Station cost deducts	<u>(\$25M)</u> +/-
Total	\$35M +/-

DEMO Valuation @ 8.0 FAR

FAR @ 5.0 FAR	\$60M (550,000 FAR built in 2016+)
unused FAR @ 3.0 FAR	\$15M (330,000 FAR built in 2025)
PL Station cost deducts	<u>(\$25M)</u> +/-
Total	\$50M +/-

KEEP vs. DEMOLITION Comparisons

DEMO Valuation @ 5.0 FAR

DEMO @ 5.0 FAR	\$35M+/-
KEEP @ Current Bldg	<u>\$45M+/-</u>
Difference / Gap	(\$10M)+/-

DEMO Valuation @ 8.0 FAR

DEMO @ 8.0 FAR	\$50M+/-
KEEP @ Current Bldg	<u>\$45M+/-</u>
Difference / Gap	\$5M +/-

DEMO @ 8.0 FAR	\$50M+/-
KEEP @ 5.0 FAR	<u>\$55M+/-</u>
Difference / Gap	(\$5M)+/-

DEMO @ 8.0 FAR	\$50M+/-
KEEP @ Hypothetical 8.0 FAR	<u>\$60M+/-</u>
Difference / Gap	(\$10M)+/-

Economic Gap Considerations

Current Apex Ownership – Despite the challenges of navigating an accelerated repositioning of its current property and taking on a major move, there are a number of prospects driving the potential for the current Apex ownership to consider embracing a DEMOLITION scenario:

1. Under near-term redevelopment, possibility of obtaining more FAR and avoiding the future uncertainties regarding achievable building area.
2. Accelerated opportunity to realize future redevelopment value, enhanced by optimum design and construction.
3. Expedited resolve of possible future internal decision making requirements regarding future redevelopment of the existing building.
4. Moment-in-time opportunity to benefit from active collaboration with the public sector.
5. Avoidance of inconvenience of living through a PL Station construction project.
6. Updating of their (ASHP) occupied space (not in 25 year old building).
7. Possible public interest appeal of helping make for a better long-term urban transit environment.

Consolidated Block Planning and Development – With or without merging ownerships, both the Apex property interest and the adjoining 7200 Wisconsin / Woodmont parcels could gain significant cost savings / added value through coordinated block-wide planning, construction and operations. The whole block shares in dealing with the impacts of the existing former rail right-of-way the split up the parcels. They have in common some non-rectangular property boundaries and shared street frontages, and could have aligning interests in improving the overall through site access, including how the treatment of the Purple Line Station impacts the wider block. In short, a jointly conceived, block-wide development plan could help achieve a higher market profile for the respective properties, which when coupled with design and construction cost efficiencies, could be projected to convey millions of dollars of added value to each subcomponent.

Other Public Financed or Benefited Offsets – There is no question that the accelerated redevelopment of the Apex site, combined with a more optimally designed Purple Line Station, will translate into some degree of additional economic activity and tax revenue for Montgomery County and the State of Maryland. Without adjusting for whether a bigger, more prominent building complex, and the positive spin-off effect that will occur surrounding the new station, is 100% new, or primarily redistributive of what would otherwise occur, two increments of net economic gain are likely to be true:

- First is the probability that a DEMO scenario will realize more quickly a much bigger new building than would occur were the current Apex building to stay. Near-term, the additional real estate revenues alone generated by a new building could easily exceed \$2.0M per year more than is currently the case.
- Second, other economic multipliers, including an incremental halo effect of having a superior permanent Purple Line, would add to the overall positive economic impact of witnessing a DEMOLITION scenario compared with KEEP scenario.

Granted, these positives need to be tempered by the probability that over time some of these development upticks will occur anyway, and the possibility (considered unlikely) of the migration of the owner / user (ASHP) to another jurisdiction. Nonetheless, the prospect of pushing forth with a DEMOLITION equation provides an economic impact foundation to help make it happen by applying any number of public investment tools otherwise used for public purpose by Montgomery County and the State of Maryland.

Study Limitations

- No cost premiums added for making DEMO scenario happen by 2015.
- Non-real estate related costs of current Apex ownership not considered.
- Process and costs of obtaining needed replacement easements not considered.
- Assume no near term APF / traffic constraints affecting redevelopment.

Public Benefits – See MNCPPC report

Appendix VII: MTA memo on Purple Line Cost Implications for Apex Building



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
James T. Smith, Jr., Secretary • Robert L. Smith, Administrator

TO: Gary Erenrich, DOT
Tom Autrey, M-NCPPC
David Anspacher, M-NCPPC
Elza Hisel-McCoy, M-NCPPC
Charles Latucca, DOT

FROM: Michael D. Madden, Project Manager
Maryland Transit Administration

SUBJECT: Purple Line
Cost Implications for Apex Building

DATE: September 6, 2013

Over the past weeks the Maryland Transit Administration's (MTA) Purple Line team has been conducting preliminary studies of a revised plan for the Apex Building site in Bethesda. We have identified many significant benefits for transit and trail users, as well as potential for significant transit-oriented development. Several parties have inquired as to the cost savings which would occur as a result of demolishing the presently-occupied Apex Building in Bethesda. This memorandum serves to outline the project-related cost impacts affecting decisions by public agencies and private entities. Demolition and redevelopment of the Apex Building must be viewed in the context of three interrelated projects: the Purple Line, the Capital Crescent Trail and a new south entrance to the Bethesda Metro station; and, to some extent which agency is bearing the cost of those projects. Finally, an ongoing study by the Maryland-National Park and Planning Commission is examining demolition/redevelopment of the Apex building purely as an improvement to urban design, transit accessibility, and development.

As shown below, nearly all of the known savings to the demolition/redevelopment of the Apex Building would accrue to the County-sponsored Bethesda Metro south entrance project; however, the County's long-term vision of an adjacent, underground Capital Crescent Trail through Bethesda would raise the County's total cost by \$5 - \$20 million depending on the final design alternative selected by the County for the Capital Crescent Trail.

Cost Impacts associated with Demolition/Redevelopment of Apex Building (in millions)				
	Savings to	Base Cost (w/ Apex)	Potential Cost (w/o Apex) -- Option 1	Potential Cost (w/o Apex) -- Option 2
Bethesda Metro South Entrance	County	\$ 80.0	\$ 70.0	\$ 70.0
Capital Crescent Trail	County	\$ 0.3	\$ 15.0	\$ 30.0
Purple Line Station	MTA	\$ 37.0	\$ 37.0	\$ 37.0
<p>Trail Options: The first option is a tunnel under Wisconsin Avenue only with a portal in Elm Street east of Wisconsin Avenue and the trail connecting into Elm Street Park. The second option is a tunnel under Wisconsin Avenue, Elm Street and a portion of Elm Street Park with a portal within the park right before entering the Air Rights Building.</p>				
<p>Purple Line: At this time, MTA cannot say with certainty that there would be much of a cost difference for the Purple Line station. Platform and track/system components would be similar under either condition. It is possible that the new station configuration would allow reduction or elimination of the ventilation equipment, but due to the early stage of design we have not verified this and therefore any potential savings are not reflected in the chart above. Also, we would note that these savings would be partially offset by addition of 2 elevators and stairs between the Wisconsin Avenue Level and Purple Line Level.</p>				
<p>Bethesda Metro South Entrance: Estimated savings of \$10M for the Bethesda Metro South Entrance project if the entrance is relocated within the Apex Building footprint. This savings is based only on anticipated utility impacts. We did not include any paving and restoration savings on Elm Street as it's likely it will still be used during construction as part of the haul route.</p>				

Additional technical considerations in demolition and redevelopment which are also unquantifiable at this time (and would depend on the redevelopment scenario and timing) relate to:

- Construction of a potential parking structure at- or below-grade of the building
- Ease of access to/from the construction area for all of the projects
- Construction efficiencies and integration risk mitigation for the construction of the projects jointly
- *Less disruption to Elm Street during construction and ability to maintain current traffic pattern for Elm Street long term*

While MTA sees many benefits and opportunities to demolition/redevelopment of the Apex Building, MTA continues to defer to Montgomery County government to draw a final conclusion regarding its efficacy.