APPENDIX 14: CONNECTIONS: TRANSPORTATION ANALYSIS

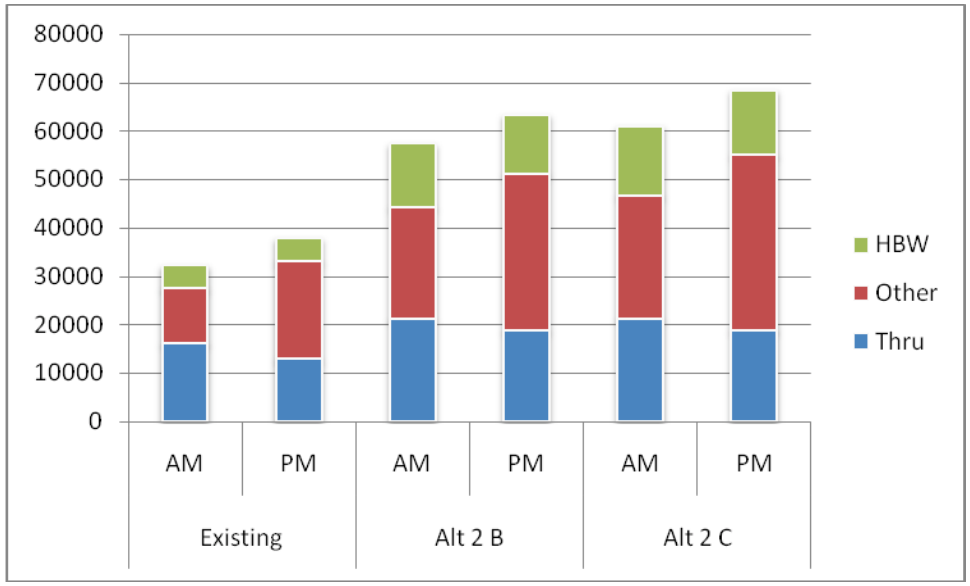
Transportation Planning, 2008

Germantown has various options of transportation for citizens in the community. There are major highways, buses, MARC, bicycle facilities, and sidewalks to facilitate travel to and from locations across the study area. These forms of transportation provide mobility and access in a safe manner and shape the community's character in conjunction with land use pattern and urban design. This Appendix will be subject to revision pending publication of the Planning Board Draft Plan depending upon the recommendations in the Plan.

Analysis

The roadway system is analyzed with the current conditions and its ability to serve the study area's travel desires based on existing and future travel patterns. The system was analyzed using two different levels of analysis. The Department's travel demand model (TRAVEL/3) was applied to test local land use proposals in conjunction with the Metropolitan Washington Council of Governments (COG) adopted land use forecasts for the region. The TRAVEL/3 model results develop baseline conditions reflecting planned land use and transportation changes outside of the Germantown Employment Area Sector Plan. A second level, the Local Area Model (LAM), refine the forecasts at the local level, using quick-response methodologies from NCHRP Report 255 to convert system-level forecasts to project-level forecasts. Both the TRAVEL/3 and LAM use the four step process of trip generation, trip distribution, mode split, and traffic assignment.

Figure 2



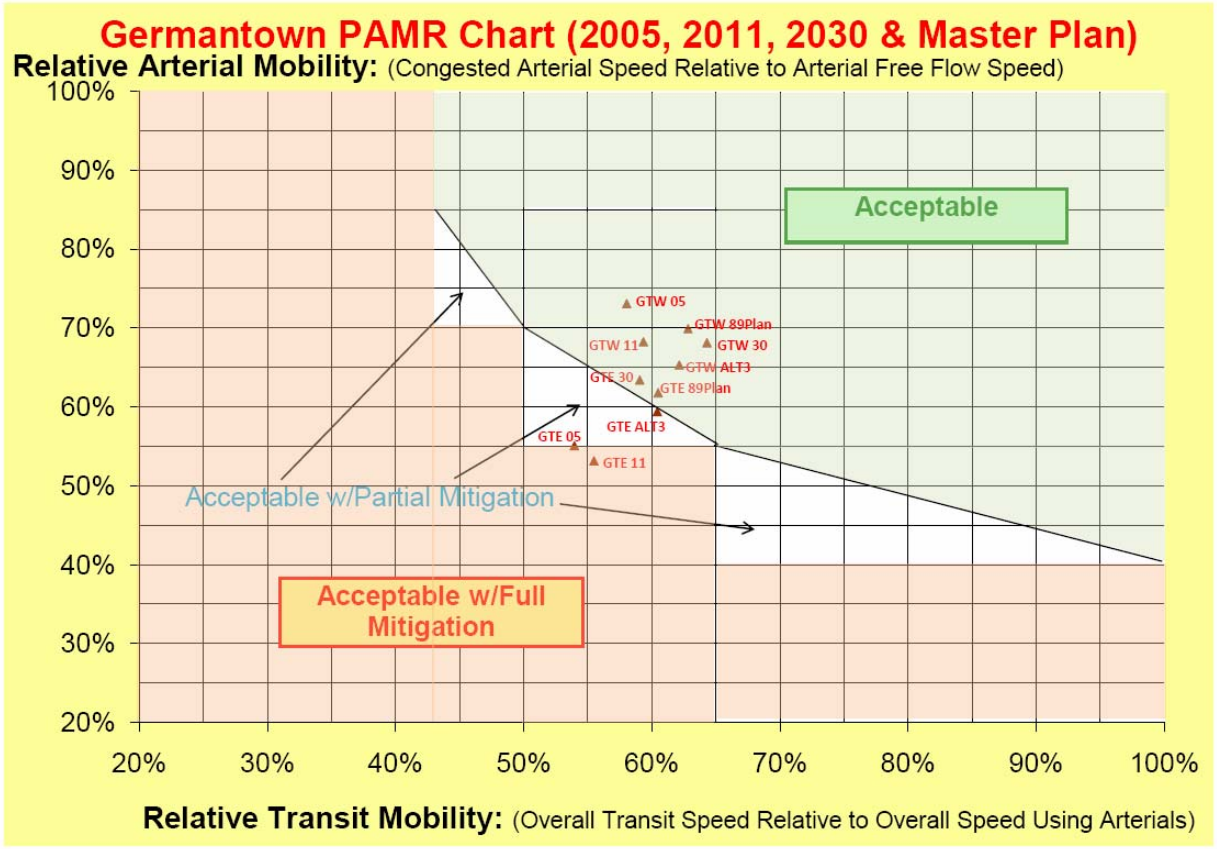
The LAM was used to create a finer-grain analysis based on the planned Germantown neighborhoods, a more refined road network, and localized Travel Demand Management (TDM) programs that reflect a non-auto driver mode split goal specific to Germantown, and higher than that which would be reflected at a larger scale analysis. The LAM analyzed the existing conditions in Germantown and analyzes four future year (2030) land use scenarios created by planners and the community. The land use scenarios were assigned into traffic analysis zones as seen in Figure 1. An assumption was made in the LAM to allow transit

access and travel demand management improvements based on the type of land use proposed. With the CCT and a continuing focus on sustainable transportation initiatives an average areawide achievement of a 25 percent non-auto driver mode share for employees (compared to 16 percent today) was used in the LAM. The land use scenarios generate a number of trips and attract trips from outside of Germantown, which is trip generation and distribution. Those trips were spread out over the network based on destinations using the Local Area Transportation Review (LATR) guidelines, which is trip assignment. The trips assigned to the roads allow planners to determine how much congestion occurs at intersections.

The scenarios generally result in more traffic volume from the existing conditions than the 1989 Master Plan. There is a significant increase in traffic volumes into the area and out of the area as seen in Figure 2. Several land scenarios were modeled and can be seen in Table 1 showing the differences in the amount of development for each proposal.

Table 1 Scenario	Commercial SF	Dwelling Units DU	Outbound PM Peak Hour Vehicle Trips
Existing	8,062,334	6,591	24,954
Alternative 2B	21,025,408	13,442	44,472
Alternative 2C	23,004,920	15,101	49,512

Figure 3



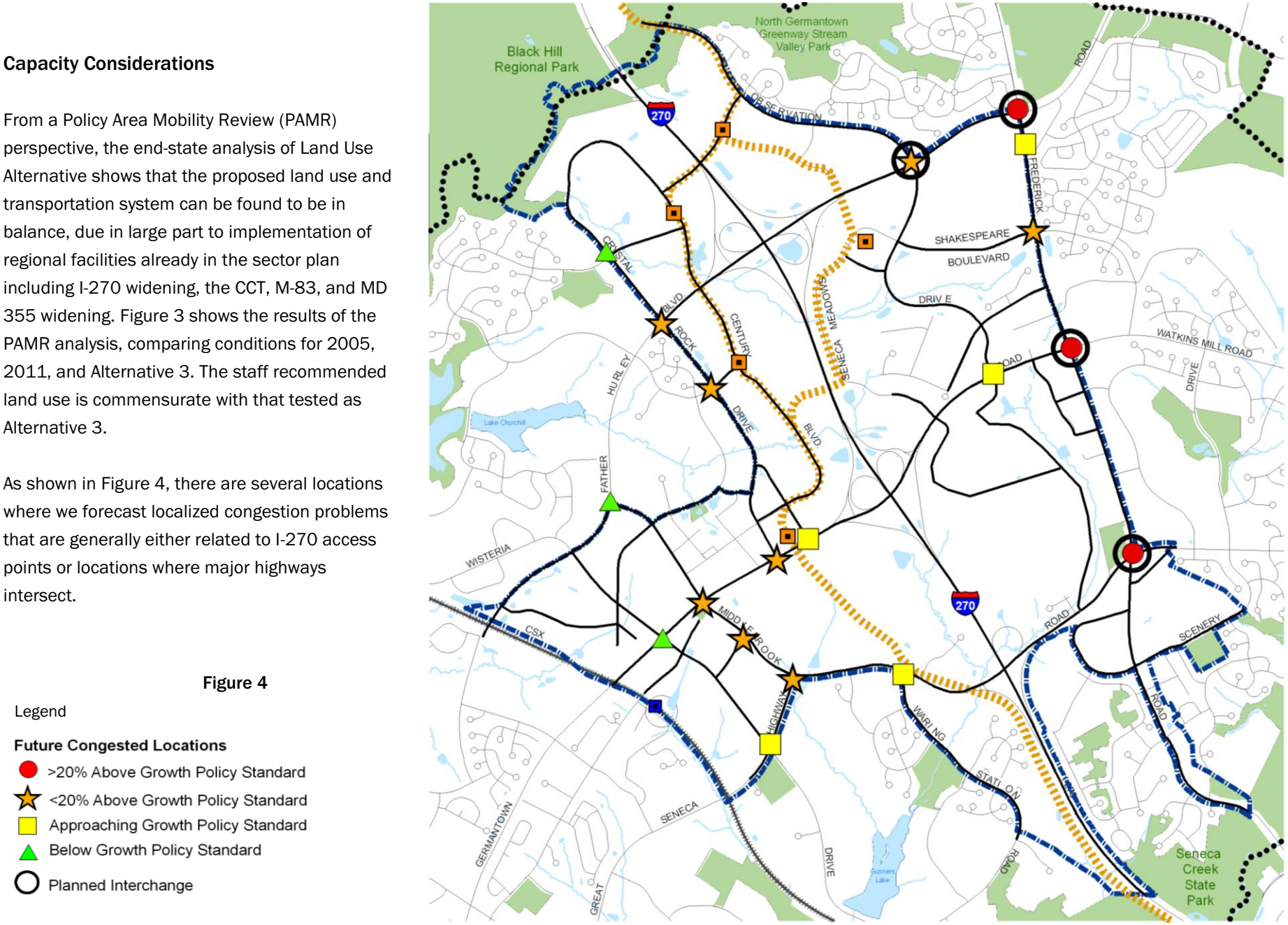
Gtown_PAMR_Mitigation_temporal\Gtwon_PAMR_Chart_Mitigation 12/14/2007

Capacity Considerations

From a Policy Area Mobility Review (PAMR) perspective, the end-state analysis of Land Use Alternative shows that the proposed land use and transportation system can be found to be in balance, due in large part to implementation of regional facilities already in the sector plan including I-270 widening, the CCT, M-83, and MD 355 widening. Figure 3 shows the results of the PAMR analysis, comparing conditions for 2005, 2011, and Alternative 3. The staff recommended land use is commensurate with that tested as Alternative 3.

As shown in Figure 4, there are several locations where we forecast localized congestion problems that are generally either related to I-270 access points or locations where major highways intersect.

Figure 4



Several new master planned streets break up the superblocks, with additional connectivity supporting both the distribution of vehicular traffic and accessibility by non-auto modes. The Plan recommends an expansion of the I-270/Father Hurley Boulevard interchange to facilitate intermodal transfer where the CCT crosses I-270 via Dorsey Mill Road; this access could also alleviate the localized congestion problem at Father Hurley Boulevard and Crystal Rock Drive.

The localized congestion problems shown in Figure 4 reflect the current growth policy intersection congestion standards. For those intersections where future interchanges are not recommended, full pedestrian accommodation needs to be incorporated within any proposed reconstruction. Travel demand management measures should be considered as the first priority for addressing congestion. In the Plan's urban areas and transit station areas, intersection widening should be considered a last resort to best preserve a transit-oriented development planned along the CCT.

Table 2

Intersection Volume/Capacity (V/C) Ratios

Map Symbol	Intersection	Existing	2030 Sector Plan
★	Crystal Rock Dr & Cloverleaf Center	0.44	1.04
★	Crystal Rock Dr & Father Hurley Blvd	0.69	1.12
★	Crystal Rock Dr & Germantown Rd (MD 118)*	0.92	1.05
▲	Crystal Rock Dr & Kinster Dr	0.39	0.74
▲	Father Hurley Blvd & Middlebrook Rd*	0.45	0.60
● ○	Frederick Rd (MD 355) & Germantown Rd (MD 118)	1.10	1.32
■	Frederick Rd (MD 355) & Henderson Corner Rd	0.76	0.99
● ○	Frederick Rd (MD 355) & Middlebrook Rd	0.96	1.39
● ○	Frederick Rd (MD 355) & Ridge Rd (MD 27)	1.05	1.11
★	Frederick Rd (MD 355) & Shakespeare Dr	0.89	1.09
■	Germantown Rd (MD 118) & Aircraft Blvd*	0.68	0.97
★	Great Seneca Hwy (MD 119) & Middlebrook Rd	0.69	1.11
■	Great Seneca Hwy (MD 119) & Wisteria Dr	0.62	0.95
★	Middlebrook Rd & Crystal Rock Dr*	0.51	1.00
★	Middlebrook Rd & Germantown Rd (MD 118)*	0.81	1.03
■	Middlebrook Rd & Waring Station Dr	0.73	0.91
■	Observation Dr & Germantown Rd (MD 118)	0.61	0.91
★ ○	Observation Dr & Ridge Rd (MD 27)	1.00	1.08
▲	Wisteria Dr & Germantown Rd (MD 118)*	0.85	0.68

*Capacities based on a 1600 CLV congestion standard.

Once the scenarios are added to the local network, local intersections are evaluated based on the policy standard of congestion for the area where the intersection is located. Critical lane volumes (CLV) is an analysis used for existing signalized intersections in the area to determine the highest amount of volume a through lane can hold. CLV is a calculation for intersections that uses through traffic and traffic turning left against oncoming traffic. For the Germantown area, there are two different policy standards of congestion. The Germantown Town Center area has a congestion standard of 1600, while the rest of Germantown has a congestion standard of 1425. Existing conditions are represented by traffic volumes observed between 2002 and 2006. The CLVs are converted into a volume over capacity ratio that can be seen in Table 2 and in Figure 4 with a star noting capacities based on a 1600 CLV congestion standard. The existing conditions columns have three intersections currently failing. The 2030 Sector Plan column represents CLVs with recommended improvements includes new roads, extra lanes, and turn lanes at the intersections shows seven failing intersections. At three of these locations (along MD 355), the Plan recommends grade-separated interchanges to address traffic congestion at Plan buildout. At three other intersections, the forecast V/C ratio is less than 10 percent over capacity, a level where an at-grade solution is expected to be the most practical.

Changes to the 1989 Master Plan of Highways

The following paragraphs summarize the changes between the 1989 Germantown Master Plan and the recommendations expected to be included in the Planning Board Draft of the 2009 Germantown Employment Area Sector Plan at time of Appendix production.

I-270 Improvements

This Plan supports the widening of I-270 to a twelve-lane facility with some managed lane component to provide preferential treatment to transit vehicles and high-occupancy vehicles. The Maryland State Highway Administration (SHA) is studying options that include express toll lanes; this Sector Plan does not set policy regarding whether or not tolling should be provided on I-270 but notes that value pricing is a useful demand management tool. The SHA is also examining limited interchange reconstruction in Germantown including the provision of some direct access ramps to and from express toll lanes.

I-270 Intermodal Access at Dorsey Mill

Incorporation of direct access to the Dorsey Mill transit station to and from the north along I-270 is desirable. This access can be provided by either direct access ramps at the Dorsey Mill Road interchange or a revision to the Father Hurley Boulevard interchange. The new access would facilitate intermodal connections between future managed lanes and bus services on I-270 and the transit service along the Corridor Cities Transitway. This access would also reduce congestion at the junction of Father Hurley Boulevard with Crystal Rock Drive, reduce commercial traffic use of Kinster Drive, and provide better access to businesses along Century Boulevard. The access would need to be coordinated with State Highway Administration and Federal Highway Administration. Staff has determined that a fully separated interchange at Dorsey Mill Road would likely not meet Interstate Access Point Approval requirements as it would not be needed to facilitate freeway flow. However, a future reconstruction of the Father Hurley Boulevard interchange to connect to the CCT crossing in the vicinity of Dorsey Mill Road could provide both the intermodal connection and facilitate local access. Development of a split urban diamond configuration, similar to the I-270 Spur interchange with Old Georgetown Road (MD 187)

and Rockledge Drive, would be one means to achieve this objective.

Target Speeds

The Germantown Employment Area Sector Plan identifies target speeds for non-residential roadways classified in the Sector Plan, following the guidance in the County Code and Executive Regulation 31-08.

Controlled Major Highway

A controlled major highway is defined in the 2007 road code as "a road meant exclusively for the through movement of vehicles at lower speeds than a freeway. Access must be limited to grade-separated interchanges or at-grade intersections with public roads." Three roads in the Plan area; Father Hurley Boulevard/Ridge Road (MD 27), Frederick Road (MD 355), and Great Seneca Highway (MD 119) either meet the definition for a controlled major highway or should be classified as such for mobility and access management purposes. Classification implementation for these roads does not mean that existing driveway cuts should be closed. These roads in the 1989 Germantown Master Plan were classified as major highways.

- **MD 355 Corridor Considerations**

Along the MD 355 corridor, forecast traffic congestion is severe at locations where MD 355 intersects east-west major highways such as Ridge Road (MD 27). The 1989 Master Plan recommends a grade-separated interchange at this location. This Plan also recommends grade separated interchanges at the MD 355 intersections with Middlebrook Road and MD 118.

The DPWT study of Midcounty Highway Extended (M-83) is expected to be completed in early 2010, after the Germantown Plan adoption. The master plan alignment for M-83 is outside of the Germantown Plan study area. The master-planned alignment is in both the Master Plan of Highways and the regional Constrained Long Range Plan and has been assumed as part of the network of regional transportation improvements for the purposes of Sector Plan analysis.

DPWT has studied an alternative to building M-83 by improving MD 355. Their preliminary findings are that a MD 355 alternative that generally respected the current 150' wide right-of-way and existing development in the corridor would not meet the study purpose and need. Staff concurs with that finding, but has worked with DPWT to expand their study to include an alternative that does meet the purpose and need, in order to more fully evaluate alternatives to M-83. Staff recommends a 250' wide right-of-way for MD 355 in the draft Plan with a staging element that would link the ultimate right-of-way width to a County Council decision regarding the M-83 study in 2010. The wider right-of-way would also provide the ability to study bus rapid transit concepts further during the same staging period.

Staff has also explored the development of what Peter Calthorpe terms an "urban network"; the provision of at-grade, one-way couplets where major highways meet. This concept could be applied at each of the MD 355 intersections with MD 27, MD 118, and Middlebrook Road. Preliminary analyses indicate that this approach (the replacement of a single wide intersection with four intersections of one-way streets around a town square type of feature) could provide mobility levels commensurate with that achieved by the proposed grade-separated interchanges. The urban network would also have a lower capital cost, but requires a substantial and coordinated redevelopment to implement. The Plan recommends that the urban network concept be studied further, either as a supplemental study to the Plan (should budgetary constraints permit) or as an alternative within any project planning study of interchange construction.

- **Father Hurley Boulevard**
  The number of travel lanes on the portion of Father Hurley Boulevard west of Wisteria Drive should be reduced from six lanes to four lanes, based on confirmation of travel demand volumes examined during the Facility Planning study in 2003.

- **Great Seneca Highway**
  Great Seneca Highway today meets the definition for a controlled major highway, with one exception. This road in the 1989 Germantown Master Plan was classified as a major highway.

Arterials

- **Crystal Rock Drive – Father Hurley Boulevard to MD 118**
  Crystal Rock Drive has several classifications throughout its entire length. From Kinster Drive to Aircraft Drive, Crystal Rock Drive is classified as a four lane, divided arterial. This particular section of Crystal Rock Drive has a recreational greenway proposed adjacent to the eastern edge of the right-of-way.

- **Observation Drive – MD 118 to Middlebrook Road**
  A parallel route to I-270 and MD 355 from a regional standpoint is needed, which is achieved by a southerly extension of Observation Drive across the Montgomery College campus to Middlebrook Road, with a roadway connection eastward to MD 355 at Cider Press Lane and a potential second easterly connection to MD 355 north of the Boys and Girls Club property. This connection will facilitate access within and across the campus, reducing local trip lengths. This Plan adds a new extension of Observation Drive to the east of the campus along the stream valley buffers as a four lane, undivided road to serve both local and regional transportation needs.

Minor Arterials

- **Cider Press Place**
  This is an extension of an existing two lane residential road one block in length on the west side of MD 355. This roadway extension will connect to the new extension of Observation Drive on the Montgomery College campus to MD 355. This particular alignment is preferred based on the relatively limited stream buffer crossing at the eastern edge of the campus.

- **Crystal Rock Drive – MD 118 to Middlebrook Road**
  The portion of Crystal Rock Drive that connects Middlebrook Road to Germantown Road is being reclassified as a minor arterial roadway with a local bicycle facility.

- **Kinster Drive**
  Kinster Drive was classified as a four-lane, divided arterial in the 1989 Germantown Master Plan. Based on public comment and staff discussions, Kinster Drive will be changed in the Sector Plan to remain as a two lane divided, minor arterial road with on-street parking. Staff forecasts that with the I-270 Dorsey Mill Road access and the Public Hearing Draft Plan land use, Kinster Drive will carry approximately 7,000 vehicles per day, within the capacity of a two-lane roadway.

Business Streets

Any street in this Plan boundary that was classified as an industrial street in the 1989 Germantown Master Plan was reclassified as a business street.

- **Blunt Road**
  Blunt Road is classified as a two lane business street. The cul-de-sac will be removed and the road will connect to MD 355. At Middlebrook Road, further study is needed to determine if this newly created intersection will be a right-in or right-out design or whether a full movement intersection or left-turn in treatment can be designed to meet both traffic control and sight distance requirements.

- **Century Boulevard**
  Century Boulevard is designated as a four lane divided business street with a shared-use bicycle path from the proposed Dorsey Mill Road extension to Crystal Rock Drive. From Crystal Rock Drive to Wisteria Drive, Century Boulevard is classified as a two lane business street. Century Boulevard is proposed to be extended from Wisteria Drive to the proposed Waters Road extension. This extension will facilitate connections between the Town Center and the West End (including to the MARC station) without traveling on Germantown Road.

- **Crystal Rock Drive**
  Crystal Rock Drive has several classifications. This road is classified as a four lane business street from the proposed Dorsey Mill Road extension to Kinster Drive and from Middlebrook Road to Wisteria Drive. A portion of this road from Black Hill Park to Kinster Drive will have a recreational greenway proposed on the eastern portion of the road. However, the entire length of Crystal Rock Drive has a proposed local bicycle facility.

- **Goldenrod Lane**
  Goldenrod Lane is reclassified as a four lane business street. This extension will connect to Observation Drive, skirting along the edge of the forest. This road should be provided in conjunction with the development plans for the Technology Park. The connection will allow students to access the Technology Park and will give other employees access to the Technology Park through Observation Drive and the new connection via Cider Press Place Extended to MD 355.

- **Middlebrook Road – MD 118 to Father Hurley Boulevard**
  Middlebrook Road was classified as a major highway in the 1989 Germantown Master Plan. Based on its proposed function serving a re-orientation of proposed Town Center development, Middlebrook Road from Germantown Road to Father Hurley Boulevard is reclassified as a four lane, divided business street. This road from Germantown Road to Frederick Road (MD 355) will maintain the classification set in the 1989 Germantown Master Plan of a six lane, divided major highway. Middlebrook Road will continue to have a shared-use path alongside the entire length of the road.

- **Waterford Hills Boulevard**
  Waterford Hills Boulevard is a new addition to the Germantown Employment Area Sector Plan. The existing road that intersects Father Hurley Boulevard will be extended to the proposed Century Boulevard extension. Waterford Hills Boulevard will be a four lane, divided business street with a local bicycle facility.

- **Waters Road**
  Waters Road is a new two lane business street that connects Wisteria Drive to Germantown Road.

- **New, Unnamed Business Streets**
  There are three proposed new unnamed business streets in the Germantown Employment Area Sector Plan. There are two new two lane roads that connect Century Boulevard to Crystal Rock Drive (B-17 and B-19). The third new business street is a two lane road from Seneca Meadows Parkway to Milestone Center Drive called B-25 that will pass over Ridge Road adjacent to the eastern leg of the CCT.

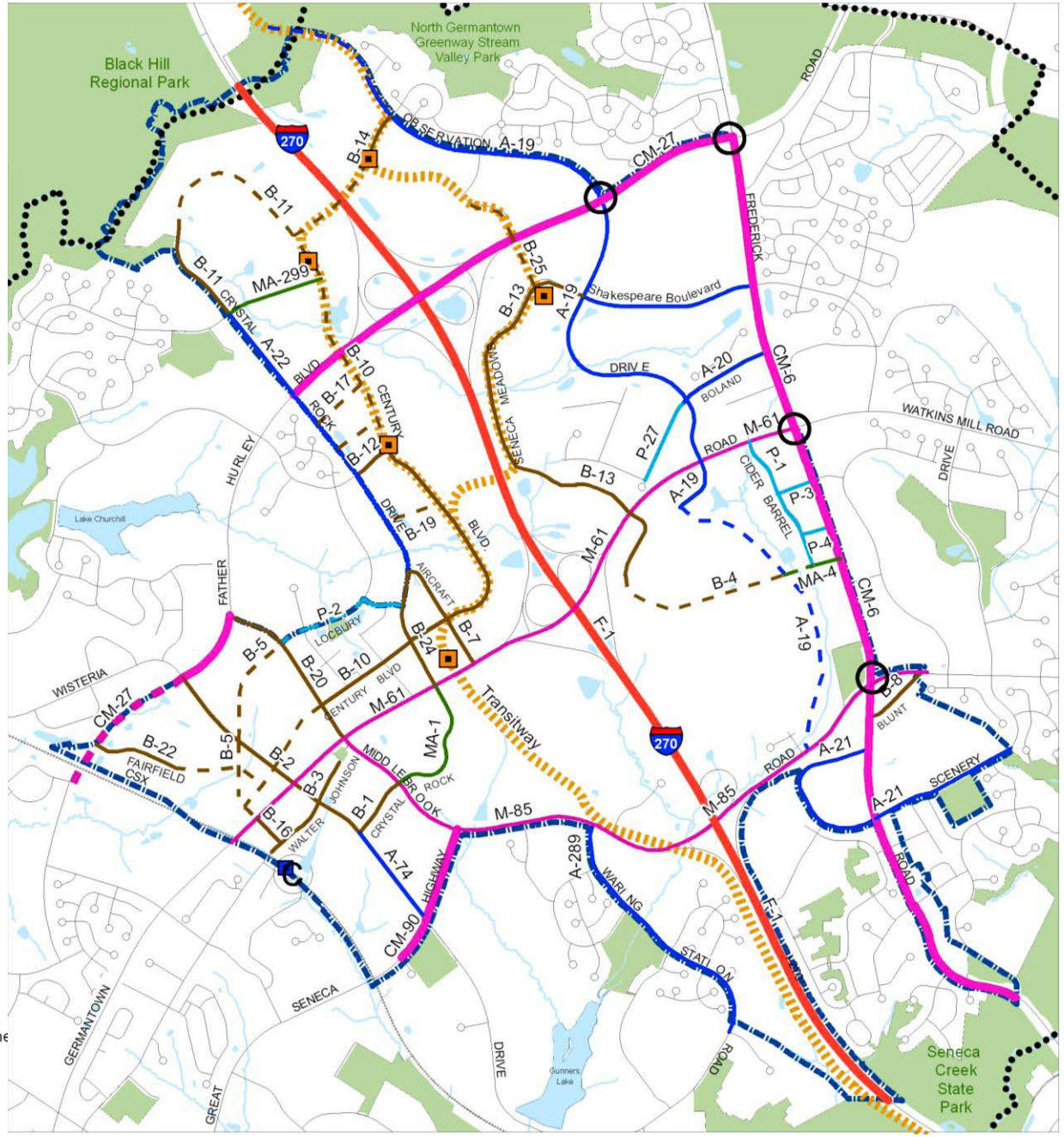


Figure 5

Legend

- Freeway
- Controlled Major Highway
- Controlled Major Highway (Planned)
- Major Highway
- Arterial
- Arterial (Planned)
- Future Interchange
- Minor Arterial
- Minor Arterial (Planned)
- Business
- Business (Planned)
- Residential Primary
- Residential Primary (Planne

The following are roads that were not classified in the 1989 Germantown Master Plan, but are classified as business streets in this Plan that did not have changes to them.

- Bowman Mill Road
- Cloverleaf Center Drive
- Seneca Meadows Road (formerly Goldenrod Lane)
- Walter Johnson Drive

Public Transportation

Germantown has several forms of public transportation for the community. MARC and Ride On buses give residents options for traveling throughout the County.

The Brunswick line of the MARC commuter rail service has a train station located in Germantown between Middlebrook Road and Dawson Farm Road as seen in Figure 6. There are nine MARC trains that stop at Germantown. Currently, there is a free paved parking lot to either side of the railroad tracks allowing riders to park their cars all day. From April 2005 to April 2006 there were 729 people on an average daily basis board MARC at the Germantown station.

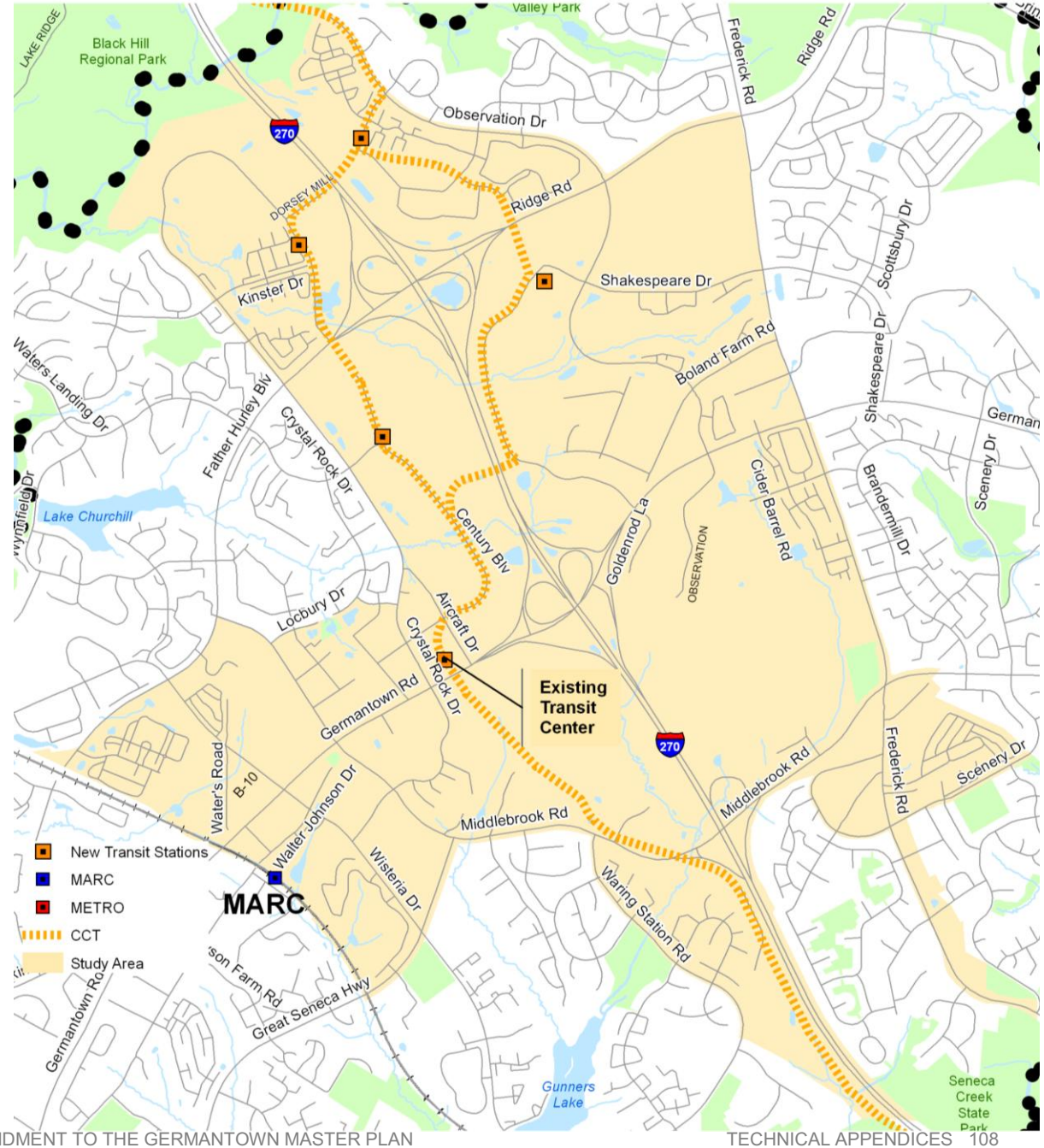


Figure 6.
MARC and Transit stations.

Table 3
Public Transportation Facilities & Segments

Facility	From	To	Type	Trains per day	Average Daily Riders
MARC Brunswick Line	Martinsburg, WV	Washington D.C.	Commuter Rail	9	7,122
MARC Brunswick Line	Germantown stop		Commuter Rail	9	729
Ride On Route 55	Rockville	Germantown Transit Center	Bus	N/A	6,890
Ride On Route 61	Shady Grove	Germantown Transit Center	Bus	N/A	2,639
Ride On Route 70 Express	Milestone Park and Ride	Bethesda	Bus	N/A	593
Ride On Route 74	Shady Grove	Germantown Transit Center	Bus	N/A	751
Ride On Route 75	Clarksburg Correctional Facility/Urbana	Germantown Transit Center	Bus	N/A	233
Ride On Route 79	Shady Grove	Germantown	Bus	N/A	133
Ride On Route 82	Clarksburg Town Center	Germantown Transit Center	Bus	N/A	77
Ride On Route 83	Germantown Transit Center	Milestone Park and Ride	Bus	N/A	696
Ride On Route 90	Shady Grove	Damacus	Bus	N/A	843
Ride On Route 90	Damascus	Milestone Park and Ride	Bus	N/A	843
Ride On Route 97	Germantown Transit Center	Gunners Lake	Bus	N/A	703
Ride On Route 98	Germantown Transit Center	Seabreeze Court	Bus	N/A	360
Ride On Route 100 Express	Shady Grove	Germantown Transit Center	Bus	N/A	1,632
Corridor Cities Transitway	Shady Grove	Clarksburg	Proposed	N/A	

This is one of several stops along the Brunswick line providing weekday commuters the ability to travel from Germantown to Silver Spring or to Washington D.C. to work. Some commuters use the MARC train to transfer to the Rockville Metro Station or the Silver Spring Metro Station and continue their commute by Metro. By 2015, MARC plans to add 3,800 new seats to the Brunswick Line and build a parking garage near the MARC station to accommodate some of these commuters.

The Corridor Cities Transitway (CCT) as seen in Figure 7 is a master-planned public transportation system that will either be light rail transit or bus rapid transit between the Shady Grove Metro Station and Frederick County by way of Washingtonian, Quince Orchard, Metropolitan Grove, Germantown, and Clarksburg. The western alignment of the CCT within Germantown is under current study by the Maryland Transit Administration (MTA), as shown in Figure 6. At the time of this Plan draft, the MTA draft Environmental Assessment was not yet released nor had a decision been made regarding the mode of the CCT. As part of this sector plan, the Middlebrook Road CCT transit station is being

removed. This proposed station serves a limited commercial area, which is not suitable for transit-oriented development due in part to its size, shape, and topographic constraints. Removing a low-priority and low-volume station from the CCT Master Plan Alignment would improve overall transit line speeds, and therefore boost ridership.

Multi-modal accessibility is paramount in ensuring that the CCT is a viable facility with ridership levels competitive for federal funding. This Plan makes the following recommendations regarding CCT station facilities:

- Development at the Germantown Town Center station should accommodate 9 bus bays to facilitate the pulse-type of transfer currently associated with Ride-On Route 100 service.
- The Cloverleaf and Observation Drive/Seneca Meadow stations should be planned to have adjacent on-street bus stops.
- Development at the Dorsey Mill and Manekin stations, adjacent to the proposed new I-270 access ramps should each be planned to accommodate 500 parking spaces, 10 kiss-and-ride spaces, and 4 bus bays.

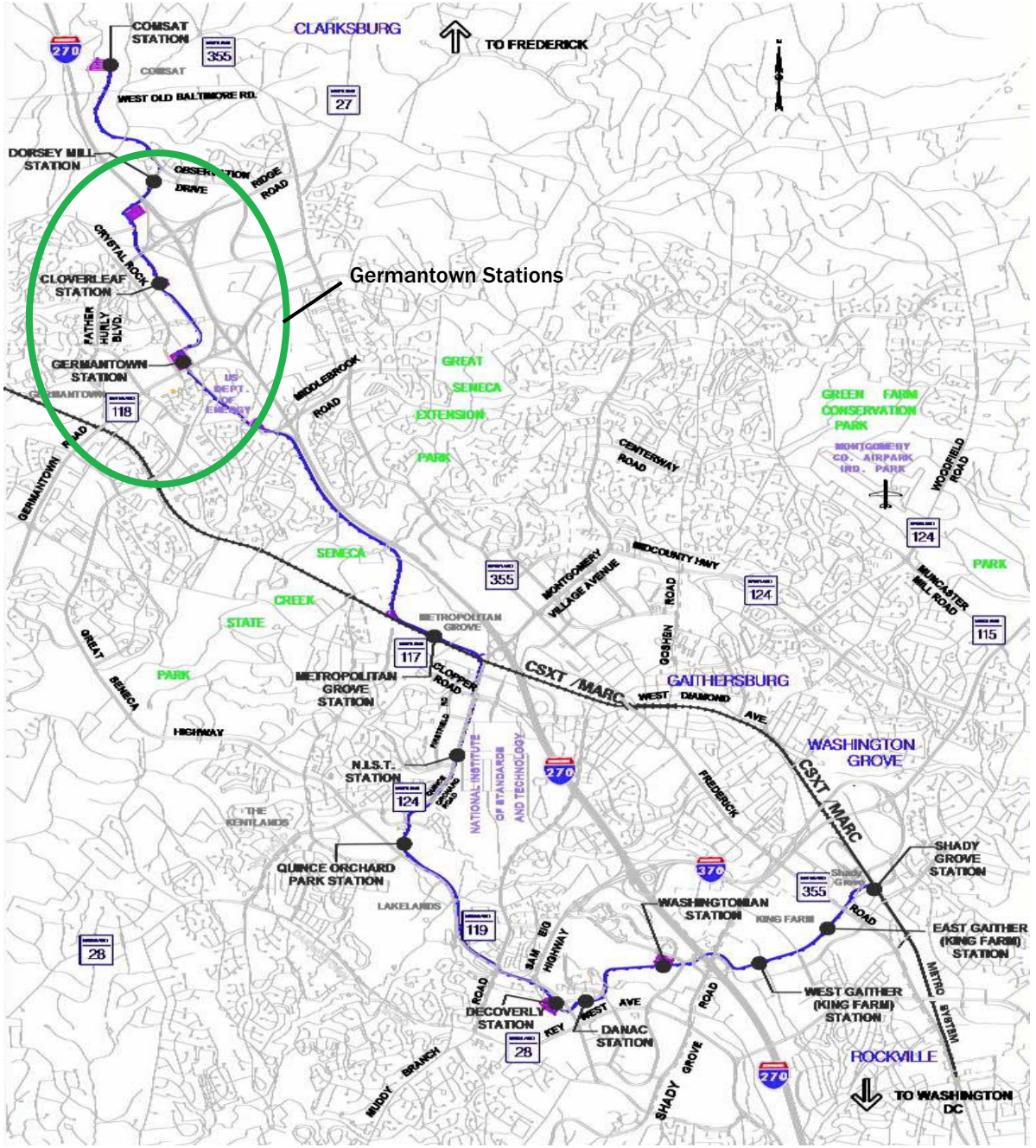


Figure 7:
Corridor Cities Transitway (CCT)
Source: MTA and SHA, I-270/US15 Multimodal Transitway Study Area, September 2006

Germantown Town Center has a transit station located along Crystal Rock Road with a free paved parking lot behind the transit center. The County's Ride On bus services allow commuters to travel from Germantown to Bethesda, Shady Grove, Gaithersburg, and Rockville. Currently, there are eleven Ride On bus routes that travel throughout the area with six routes having a final stop at the Transit Center. Additional parking is currently needed near the transit center and will be needed in the future with the future CCT. Table 3 contains more details about ridership on each route that travels in the study area.

As stated in the report, explore the feasibility, funding, and proposed route for a circulator bus with DOT and initiate this service between the Town Center, MARC station, and transit neighborhoods.

The future Germantown Town Center Station