MARC Rail Communities Sector Plan
Appendices A - I

December 2018

Appendix A -

Boyds MARC Station Concept Study, Anderson Property Site Analysis, Montgomery County Department of Transportation

ANDERSON PROPERTY SITE ANALYSIS

Introduction

The Montgomery County Department of Transportation (MCDOT) initiated a feasibility study in the fall of 2012 to evaluate the need for transit service expansion to the existing Boyds MARC Station on Clopper Road in Boyds, Maryland. The study area is shown in Figure 1. Due to future development, MCDOT's Ride On service may expand in the future to Clarksburg and would provide service to the Boyds MARC station, Clarksburg's closest station. The Boyds MARC Station Project was initiated as a result of a request from the Boyds Civic Association for greater frequency of stops of the MARC Brunswick line at the Boyds station. The Boyds Transit Improvements Feasibility Study, November 2015 summarized existing conditions, identified goals for the station to meet the expanded service request, evaluated potential sites, and recommended the improvements that could accommodate the projected expansion needs. After the completion of the feasibility study, one of the adjacent sites considered for the improvements (Anderson Property) has become available for purchase, see Figure 2, sites 7 and 9. As a result, a concept layout was developed to provide bus access and additional parking for the existing Boyds MARC station on these two adjacent sites. This site analysis will briefly summarize existing conditions, identify the goals developed in the feasibility study for the station to meet the expanded service request, evaluate the feasibility of the Anderson Property.

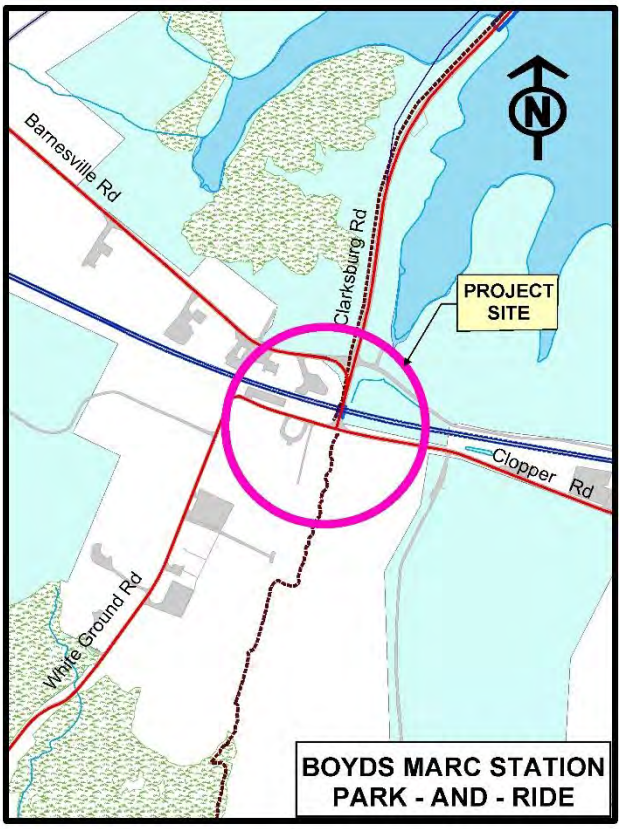

FIGURE 1: STUDY AREA

Existing Conditions

The Boyds MARC station is along the Maryland Transit Administration's MARC Brunswick line. It is currently a flag stop with four stops in the morning rush hours and six stops in the afternoon rush hours. Development to the north of the station along Barnesville Road (MD 118) consists primarily of commercial properties while development to the south of the station along Clopper Road is primarily residential properties. Clopper Road is currently an undivided two-lane two-way county roadway with a posted speed limit of 25 mph. While there are no pedestrian or bicycle facilities along the roadway, there is an existing pedestrian tunnel for access to the other side of the tracks located to the west of the station platform. The Boyds station and part of Clopper Road are located within the Boyds Historic District. Current ridership is in the high teens daily for the Boyds MARC train. The existing parking lot at the station provides fifteen (15) spaces. The parking lot and station are owned by CSX Railroad and leased and maintained by MTA.

Goals for the Station

Through extensive coordination with the Maryland-National Capital Park and Planning Commission (M-NCPPC) and the Boyds Civic Association's (BCA) Advisory Working Group, project goals were established for the Boyds station expansion and broken into two phases. The first phase involves adding a bus bay and turn around for Montgomery County's Ride On to access the Boyds MARC Station. The second phase involves adding a bus bay and an expanded parking lot with at least twenty-five (25) additional parking spaces in the same location. Both phases assume implementation could be completed within five to ten years depending on funding and will require right-of-way acquisition and construction plans.

In order to achieve these goals, different sites in the area were researched and evaluated based upon numerous criterion developed by the study team for the feasibility study. Twelve (12) sites were selected to have potential in reaching at least one of the phased goals. The study team coordinated with M-NCPPC and the BCA's Advisory Working Group to select criteria and discuss these potential sites. The Anderson Property represents sites 7 and 9 from the Boyds Transit Feasibility Study, see Figure 2. The Anderson Property is located to the north of the tracks owned by CSX along Barnesville Road (Route 117), across from the existing MARC Station, and approximately 350 feet west of the intersection of Barnesville Road and Clarksburg Road. Combined, the two parcels total 1.16 acres of land. Currently there are several buildings located on the properties with a gravel parking lot. One of those buildings, an old mill which is situated closest to the CSX tracks, is classified as historic and is located within the Boyds historic boundary, see Figure 3. This determination was confirmed through coordination with Montgomery County Historic Preservation. This would require a historic area work permit for any improvements on the parcel.

A conceptual transit and parking option was developed utilizing the Anderson Property that combines sites 7 and 9 from the Boyds Feasibility Study. The goal was to provide a bus bay and turn around for Ride On to access the existing station and also provide parking for commuters at the same location with easy access to the MARC platform. The option shown in Figure 4 would satisfy both phases of the project goals identified in the Boyds Feasibility Study. The following outlines some site evaluation criteria and analysis pertinent to this option.

Site Evaluation Criteria

The Boyds Feasibility Study assessed twelve site locations for the transit improvements based on a set of evaluation criteria. This analysis evaluates the Anderson property (sites 7 and 9) based on the same set of criteria. The evaluation criteria for assessment include:

- Accommodates buses and provides room for twenty-five (25) or more additional parking spaces
- Potential Impacts to be considered include the following:
  - Impacts to private property
  - Walking distance from existing station (preferably within 1/10th mile of station)
  - Potential safety concerns – security, pedestrian and vehicular interaction
  - SHA/CSX coordination issues
- Boyds Civic Association's Working Group Concerns
  - North of the Tracks
  - Within 1/10 Mile of the Station
  - Pedestrians Required to Cross Street
  - Adjacent to a Residence
  - Enhances Boyds Character

Site Evaluation

Both phases of the project goals involve adding a bus bay and turn around for Montgomery County's Ride On to access the Boyds MARC Station. With the existing buildings in place at the Anderson property, a bus does not have the required area to turn around within the existing gravel area. Therefore, the existing buildings that are not considered historic would need to be demolished in order to provide room for a bus turnaround and for commuter parking. The existing historic mill could be maintained, but only that building would be able to remain. A bus turn around and single parallel bus bay can fit within the property area and could accommodate a 40' commuter bus.

Also, a proposed bus station platform would be located in front of the historic mill. That platform could be approximately 100 feet long. Sidewalks would connect the bus drop-off area to the MARC Station platform, allowing commuters to access the MARC Station. However, grading and/or ADA ramps would be required in order to make the sidewalk ADA compliant. Currently, with the GIS contours provided, there appears to be approximately a 10% grade from the bus drop-off area to the existing MARC Station platform. A maximum grade of 12:1 or 8.33% is acceptable for sidewalks to be ADA compliant, so currently the area is too steep for ADA-compliant sidewalk in the existing condition.

There is no passing room available for one bus to pass a parked or disabled bus, so it is likely only one bus would be able to access the site at a time. Buses could use the bus loop by entering in the northwest corner of Site 7, traveling counterclockwise, and then exiting in the northeast corner of the Site 7 property approximately 270 feet west of the Barnesville Road/Clarksburg Road intersection. Buses would directly exit onto eastbound traffic along Barnesville Road. No major changes would need to be done to Barnesville Road such as widening or changes in lane configuration. Additionally, it appears there should be no sight distance issues for buses exiting onto Barnesville Road. With a proposed 35 MPH design speed (30 MPH posted speed), the exit from the parcel would meet the required 287' of sight distance in the most conservative condition (assuming a 9% downgrade along Barnesville Road).

A proposed parking area could include 40-50 parking spaces on sites 7 and 9. Setback requirements require that parking spaces be a minimum of 10 feet from the existing public right-of-way. The parcels include non-linear right-of-way lines, which limit how many parking spaces could fit on the parcels. Commuters would enter and exit the transit area at the same entrance the buses would use to exit onto Barnesville Road. The entrance would likely need to be

approximately at least 30-35 feet wide to allow room for cars to enter the transit area while buses are waiting to pull out. Constructing the parking lot would require grading with a proposed closed drainage system. Currently, site 9 consists of steep sloped areas, some of which have an existing 2:1 slope according to GIS contours. The GIS topographic information indicates that the proposed parking lot could be constructed on fill and would not require retaining walls. The parking lot would be located on an elevated section, and it is likely a closed drainage system could be configured appropriately on the site.

No formal traffic analysis for sites 7 and 9 for this configuration was completed. However, utilizing the traffic counts from SHA dated October 22, 2014 and November 5, 2014, existing conditions during peak hour operations can be evaluated. The biggest concern from a Ride On operation standpoint for the use of sites 7 and 9 is the ability to enter and exit the site efficiently without significant travel delay in order for MARC and Ride On patrons to make timed transfers. The primary movements of concern are traveling eastbound on Barnesville Road (MD 117) and turning right or left onto Clarksburg Road (MD 121). The intersection operates at a Level of Service B and C for the left turn and right turn movements, respectively, for the 7:30 AM peak. The intersection operates at a Level of Service D and A for the left and right turn movements respectively, for the 4:30 PM peak. It is not anticipated that incorporating Ride On service and a park and ride lot at site 7 and 9 would increase the trip volume to change the level of service for the intersection. The operation of the intersection would potentially improve the level of service based on the results of studies, and improvements currently being proposed by SHA at the MD 117 and Clopper Road intersection to the south.

The Anderson concept layout would meet the Boyds Civic Association's Working Group concerns and the Montgomery County site criteria. The site is north of the railroad tracks, and is within one tenth of a mile of the existing station. Pedestrians would access the station directly from the bus bay and parking area and would not require any roadway crossings. The concept location is not adjacent to any residences. The concept would maintain the existing historic mill building on the Anderson property and could be constructed in a style that would maintain or enhance the Boyd's surrounding character.

The concept would require acquisition of private property, which is currently for sale, and would require a considerable amount of site work. An environmental database search on Merlin, McAtlas, USFWS, PAC, and EJ screen shows there are no USFWS species and no environmental flags for the Anderson Properties. Note that no online sites are available to evaluate the property for HAZMAT concerns. This would need to be completed as part of the property acquisition process. It would require demolition of two single story structures and one two-story structure. Grading would be required to construct the parking lot and provide pedestrian access to the existing station but would not likely require retaining walls. It would require coordination with CSX to provide pedestrian access to the station, and coordination with SHA to provide vehicular access to Barnesville Road. Lighting will be required for the parking lot and for pedestrian safety. Cars and buses would exit the facility approximately 270 feet from the existing Barnesville Road/Clarksburg Road intersection. The entrance and exit would not require further modification to existing Barnesville Road and would not likely impact any possible future improvements to the Barnesville Road/Clarksburg Road intersection being considered by SHA. Additional pavement width along Barnesville Road to provide a left turn lane into the parking lot would be a possible solution to address traffic congestion concerns but would require coordination with SHA.

BOYDS TRANSIT IMPROVEMENTS

Montgomery County Department of Transportation

FACILITY PLANNING

Figure 2: Potential Sites

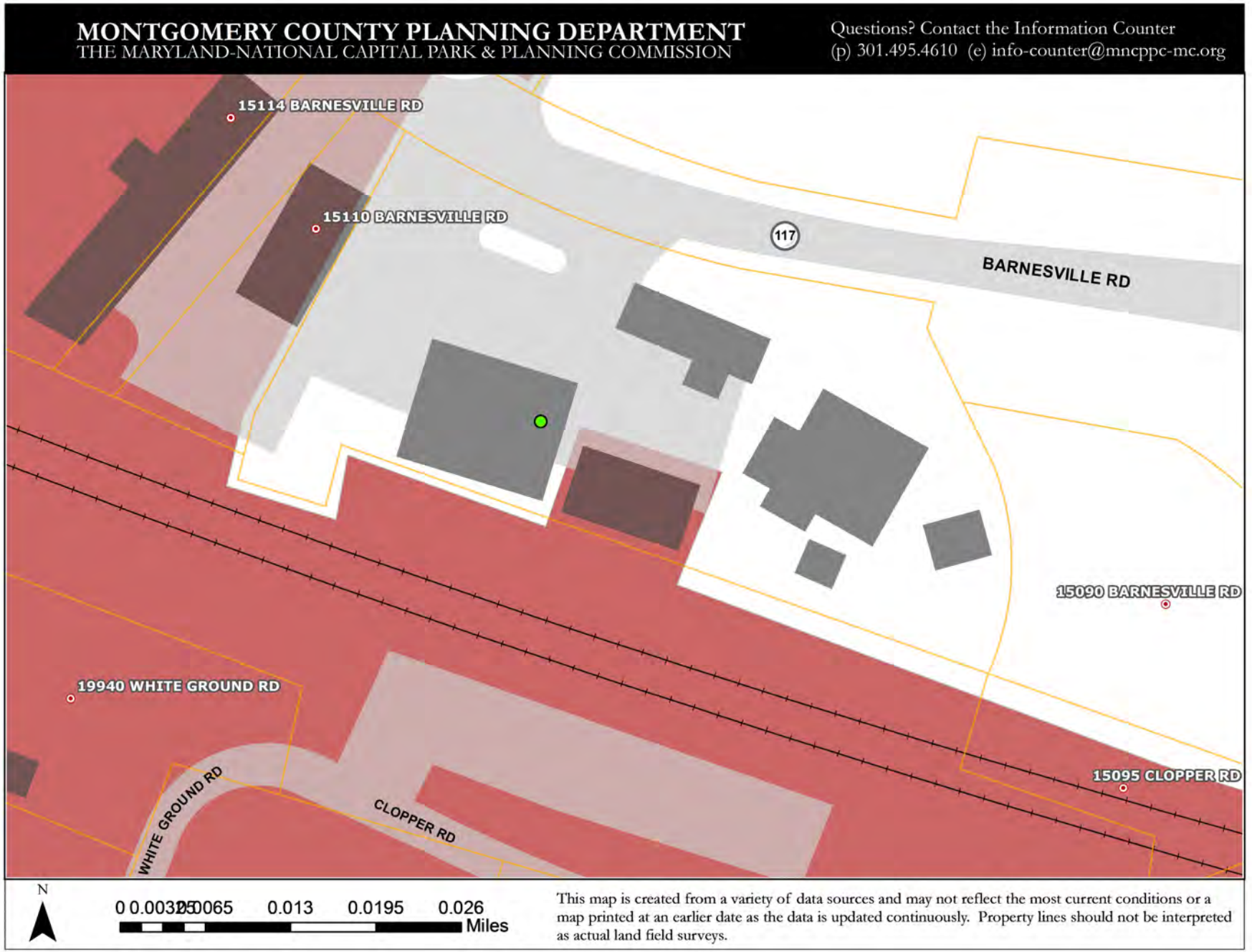

Figure 3: Historic boundary

DRILL HOLES

DRILL HOLES

DRILL HOLES

BORDER REV1 DATE: July 1, 2005

N

BARNESVILLE ROAD (ROUTE 117)

CLARKSBURG ROAD (ROUTE 121)

BUSES ONLY

EXISTING ROW

44 PARKING SPACES

DESIGNATED HISTORIC BUILDING

BOYDS MARC STATION

WHITE GROUND ROAD

CLOPPER ROAD (ROUTE 117)

LEGEND

- DEMOLISH EXISTING BUILDING
- CONCRETE SIDEWALK
- BOYDS HISTORIC DISTRICT BOUNDARY
- EXISTING RIGHT-OF-WAY

Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

DES: WR&A				
DRN: WR&A				
CHK: WR&A				
DATE: AUGUST 2015	BY	NO.	REVISION	DATE

FIGURE 4: CONCEPT LAYOUT

MONTGOMERY COUNTY
DEPARTMENT OF
TRANSPORTATION

FACILITY PLANNING

DWG. –

SCALE 1"=30'

SHEET ⊥ OF ⊥

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4/5/2017

Appendix B -

Boyds MD 117 Crossing Study Evaluation

November 18, 2016

Boyds MD 117 Crossing Feasibility Evaluation

Contents

Appendices

Background

The Montgomery County Planning Department, in coordination with the Maryland State Highway Administration (SHA) and Montgomery County Department of Transportation (DOT), requested a feasibility analysis for a new roadway crossing of MD 117 (Barnesville Road/Clopper Road) over the CSX railroad line in Boyds, MD. The purpose of this analysis is to identify planning level concepts and cost estimates associated with the feasibility of constructing a new grade separated roadway connection over or under the railroad. This report summarizes the findings of the analysis.

Existing Site Conditions

As described in the Maryland Area Regional Commuter (MARC) Rail Communities Plan Scope of Work, Boyds, MD is a small, rural unincorporated town with a population of approximately 2,000 people according to the 2013 American Communities Survey. The community consists primarily of single-family homes on large lots on the eastern edge of the County's Agricultural Reserve. The town is located between two larger communities, Clarksburg to the north and Germantown to the east.

The heart of Boyds is centered on its MARC rail station and small commercial area west of the intersections of Barnesville Road, Clarksburg Road and Clopper Road. Little Seneca Lake, a man-made lake serving as a backup drinking water supply within the Black Hill Regional Park, is a defining feature of the area roughly 450ft northeast of the existing crossing. A well-preserved and cohesive historic district is located on both sides of the MARC station platform and extends down White Ground Road south of the MARC station. The Boyds Local Park is another important feature within the community. The entire area is located outside of the municipal sewer envelope, so it is served by private well and septic

MCDOT is currently evaluating alternatives to provide bus pull-offs in both directions on Clopper Road to connect MARC passengers from the northwestern part of the county to the Boyds station. This would be a new existing condition by the time the crossing moves forward into preliminary design. This could potentially include the addition of sidewalks or other pedestrian connections to the existing MARC station. The bus pull-offs may be considered an interim condition that will be impacted by alternative alignments options for Route 117 or alternative MARC station locations.

Figure 1: Boyds, MD Location Map

Existing Railroad Track & Bridge Structure

The existing rail line consists of two tracks on tangent alignment running east-west through the project area with a single span bridge spanning MD 117. The tracks carry freight, Amtrak passenger, and MARC passenger rail service, and are owned by CSX Transportation. As an active railroad in use daily, any significant impacts to existing rail traffic during construction is undesirable.

The structure consists of a single-span steel superstructure supported on reinforced concrete abutments that are assumed to be founded on spread footings. The bridge is perpendicular to the roadway with no apparent skew. The existing structure provides approximately 13 ft. of vertical clearance for the roadway passing under the railroad (field verification of clearance was not conducted). A bridge inspection or load rating was not included as part of this feasibility analysis.

The population increase in this area has also resulted in the Countywide Transit Corridors Functional Master Plan recommending an additional 25 feet of horizontal clearance allowance be considered between the Frederick County line and Metropolitan Grove to accommodate a future third track north of the two existing tracks. The ability to accommodate three tracks is to be accounted for in the feasibility analysis.

As Clarksburg and Cabin Branch continue to see population increases there will be a growing need to understand the feasibility of road and rail improvements in this area with additional users anticipated on both networks.

Figure 2: MARC Station Platform (looking west)

Approach Roadway

MD 117 is a two lane highway that runs along a generally east-west alignment through Boyds and crosses under the CSX railroad tracks just east of the Boyds MARC rail station. MD 117 is named Barnesville Road on the north side of the CSX railroad tracks and Clopper Road on the south side of the rail tracks. Barnesville Road intersects Clopper Road and White Ground Road at an all-way stop controlled T-intersection on the south side of the rail crossing. An existing driveway along the north side of the tracks accesses the Winderbourne Mansion, a Victorian home within the historic district, and the WSSC for the dam. MD 117 intersects MD 121 (Clarksburg Road) just north of the rail bridge crossing. A 30 mile per hour posted speed limit is provided on MD 117 through the project area. MD 117 is considered a significant commuter route for residents in the Clarksburg area traveling toward central Montgomery County, North Virginia, or other District of Columbia, and the annual average daily traffic (AADT) volume on MD 117 is 7,682 vehicles per day, per information provided by the Maryland SHA count database.

Figure 3: MD 117/ Clarksburg Road Intersection (looking west)

Figure 4: MD 117 Approaching Rail Bridge (looking south)

Operational deficiencies exist on MD 117 from MD 121 south past the CSX railroad tracks to Clopper Road. The Boyds Civic Association has noted traffic delay issues on MD 117 and MD 121 in the vicinity of the railroad bridge during both the weekday morning and evening

peak periods. The geometric constraints of the site, including the short distance between the two roadways and the inability to widen MD 117 under the narrow railroad bridge has limited the improvements available in the area. The limited roadway width and proximity of the rail bridge to the Barnesville Road/Clopper Road intersection results in sight distance limitations for vehicles approaching the intersection. The Boyds Historic District would also be impacted if Clopper Road were to be widened with a longer railroad bridge or realigned south of the CSX tracks to accommodate a larger signalized intersection or roundabout to improve traffic control efficiency.

The Maryland SHA has conducted a traffic operations study and identified issues associated with the all-way stop controlled MD 117/MD 121/White Ground Road intersection. The study notes congestion and queuing stemming from the intersection and recommends a traffic signal with vehicle detection at this location to minimize operational issues. In June 2015, the Maryland SHA District 3 Traffic Engineer submitted a Design Request package to signalize the intersection.

Utilities within the Bridge Site

There are aerial utilities along the north and south side of Clopper Road through the project area as well as under the bridge and mounted to the top of the east abutment, just under the concrete slab. No ground surveyor bridge inspection was completed to identify utilities as part of this study, however there is an existing drainage structure located on the south side of the current underpass on the south side of roadway.

Hazardous Materials

Hazardous materials, consistent with those found in the vicinity of former and active railways, are anticipated in the excavated soils near and within the right-of-way and should be treated as such. The most common contaminants are metals, pesticides (such as lead arsenate), petro-chemicals and creosote from existing crossties.

Planned Roadway and Railroad Cross Section

The proposed railroad typical section will follow the existing horizontal alignment with the same cross section as existing along with an additional 25-foot width to the north for a potential future third track.

The proposed MD 117 roadway alignment varies based on the alternatives discussed below for both horizontal alignment and vertical profile. Both alternatives will be required to accommodate the future widening of the roadway.

Montgomery County Planning staff identified the MCDOT roadway design standard for a Rural Minor Arterial Road (MC-2004.33) as an appropriate design reference for MD 117 in the study area. The proposed roadway cross section used for the feasibility evaluation assumes a total width of 44′-0″ including two 12′-0″ travel lanes and two 5′-0″ shoulders, as defined in the Rural Minor Arterial Standard. Additionally, two 5′-0″ sidewalks are shown in the roadway cross-section for the feasibility evaluation and assumed in cost estimating purposes. The sidewalk is

intended to support overall pedestrian connectivity across the rail tracks, as could specifically support future rail passenger movements between north and south side station platforms for facilities.

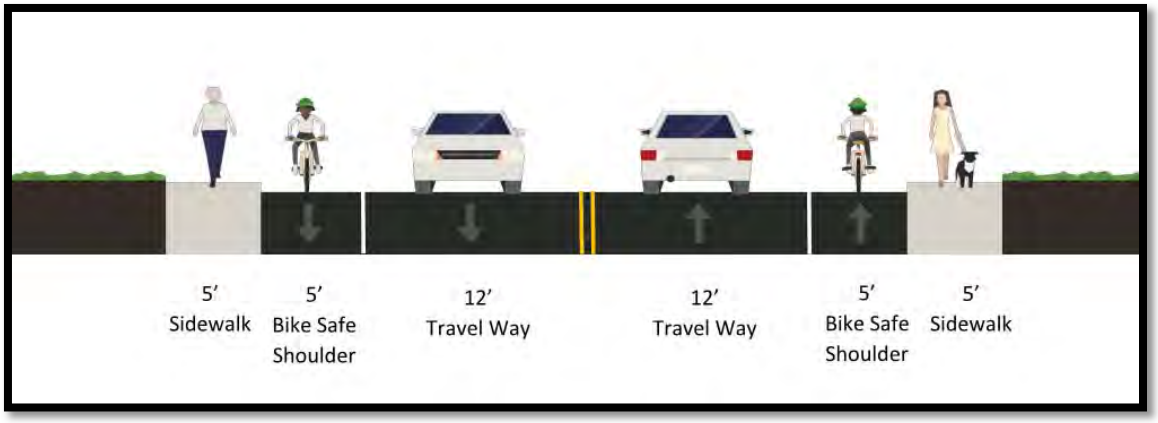


Figure 5: Typical Roadway Section

Alternative Identification

There are two basic alternatives for a new railroad crossing for MD 117 at Boyds:

- Alternative 1 – New Roadway Bridge over Railroad
- Alternative 2 – New Railroad Bridge over Re-aligned MD 117

Each of the above alternatives are discussed further below and each has a number of variations to consider based on the desired alignments, impacts, costs, and constructability, while maintaining a 30MPH speed limit. All recommendations will need to be further investigated during preliminary design, including the bridge type and constructability of the project.

Alternative 1

This alternative retains the existing railroad bridge, re-routes MD 117 along an alignment to the east of MD 121, and constructs a new MD 117 roadway bridge over the railroad. An approximately 500-foot long section of existing Clopper Road, along the northern boundary of the Local Boyds Park, would be converted to a cul-de-sac with driveway to the Local Boyds Park and a private entrance for a private property owner on the south side of the street. This alternative includes a 3-way stop for local traffic at the intersection of MD 121, White Ground Road, and Clopper Road. Traffic volume data provided by the Maryland SHA suggests that all-way Stop control is likely to provide adequate traffic operations at the Barnesville Road (MD 117)/Clarksburg Road (MD 121) intersection. A roundabout is an alternative intersection configuration option, or a traffic signal may be considered for the intersection subsequent to separate evaluation of traffic operations and traffic signal warrants contained in the Manual on Uniform Traffic Control Devices (MUTCD).

The conceptual design for Alternative 1 considered the following primary project constraints:

- Minimize impacts to MD 117 vertical profile

- Provide a vertical clearance sufficient for the requirements of the railroad corridor, including a planned third track
- Maintain two lanes of traffic on MD 117 in each direction
- Maintain freight and passenger railroad traffic
- Accommodate the private/reservoir access road to be realignment beneath the bridge
- Accommodate a skewed bridge alignment for the crossing

A single-span bridge was the only span configuration considered as multiple spans are not practical or required for this length of crossing. This alternative would locate the face of the south abutment a sufficient distance away from the southern track to accommodate a pedestrian walkway from the west side of the new MD 117 roadway to the east side along the face of abutment. This would be a fenced multi-use path providing access from Clopper Road to a potential future MARC station on the east side of MD 117. This span configuration would result in a span length of 250 feet along the 40° skew.

The anticipated bridge structure depth and top of deck elevation that sets the roadway profile will be as required for the HL-93 loading and minimum 23 feet of railroad vertical clearance. This assumes there will be no lowering of the existing track profiles in conjunction with this project. If CSX representative indicate the existing track profiles can be lowered, additional cost savings may be realized by subsequently lowering the bridge and roadway embankments. However, the track work would then be increased significantly to not only lower the grade at the bridge but also to transition a newly depressed profile back to existing grades on the rail approaches. This could also impact the current MARC station platforms to the west.

Proposed Superstructure

The superstructure alternatives investigated were based on a single-span bridge configuration as noted above. Minimizing the superstructure depth will be critical to minimize the MD 117 profile raises on each approach. The following superstructure types were considered:

The proposed bridge will be designed using Load and Resistance Factor Design (LRFD) in accordance with AASHTO LRFD Bridge Design Specifications and AREMA guidelines for an HL-93 roadway vehicle.

Prestressed Concrete Box Beams – The single-span length and configuration is suited for adjacent box beams. The deck thickness would need to vary to accommodate the profile and the roadway cross-slope, increasing the overall structure depth.

Steel Girders – Steel plate girders or rolled beams are suitable for the single-span length and can easily accommodate the skew. The girders can be cambered to follow the road profile, maximizing the clearance under the bridge. Future maintenance costs will need to be taken into consideration.

Concrete Beams – concrete beams are suitable for the single-span length, however the skew exceeds the maximum recommended and the depth of girders far exceeded the steel option, therefore this option was not considered further.

Based on the span and available superstructure types considered, a single span steel girder bridge is the recommended superstructure type. A depth of structure value of four feet is assumed for conceptual planning purposes.

Proposed Substructure

Based on the assumption that the existing structure is founded on spread foundations, the proposed structure north of the rail tracks will also be supported on shallow spread foundations. This assumption will require further validation based on the subsurface exploration program as discussed above and is compatible with the superstructure types discussed above. The substructure will consist of full-height reinforced concrete abutments to minimize span length and superstructure depths. Stormwater management and drainage systems will be necessary and are included in cost estimate assumptions. It should also be noted that SHA will not allow precast substructure units if they design or own the proposed structure.

The roadway section south of the rail tracks will be constructed on retaining walls to minimize the footprint of the substructure. This design will eliminate potential impacts on private property along the south side of Clopper Road (MD 117) and maximize available land for parking between the rail tracks and Clopper Road, where the MARC station may be relocated.

To limit the construction duration and minimize impacts to the railroad operations, precast substructure elements should be considered during final design. In addition, accelerated bridge construction methods should also be considered including a short duration accelerated bridge construction closure over a weekend or a few days (i.e. self-propelled modular transporter (SPMT), heavy lift, slides, etc.).

Proposed Retaining Walls

The proposed retaining walls are assumed to be Mechanically Stabilized Earth (MSE) systems as listed on the Maryland State Highway Administration list of Approved Proprietary Retaining Walls. This assumption will require further evaluation after a subsurface exploration program is completed during the preliminary design phase. New methods and technologies for these walls as well as other slope retention continue to be developed for locations of restricted Right-of-Way, marginal subsurface conditions, and other environmental or property impact constraints and the Maryland SHA continues to update the proprietary wall list to keep abreast of these technologies.

Figure 6: MSE Retaining Wall Example

The application of MSE walls for this project appears to be well suited based on constructability and cost and the precast concrete wall panels can easily accommodate aesthetic architectural treatments such as various stone patters, colors, and textures. These flexible wall systems also are an inexpensive option for curved alignments and can easily be incorporated into the abutments at each end of the bridge. Those charged with the final planning, design, and implementation of these improvements will need to evaluate a host of options that come with these wall types and the latest technologies after the subsurface soil borings are provided and a geotechnical engineering evaluation is complete.

Accessibility

The Alternative 1 concept includes a pedestrian path passing under the planned roadway bridge, along the south side of the rail tracks, to provide a direct connection for residents in the town to the potential MARC station site. The concept also includes sidewalks along the planned MD 117 roadway alignment that will provide a connection between the potential MARC station site and the MD 121/MD 117 intersection. The sidewalks will follow the prevailing grade of the road alignment, which is addressed in ADA requirements for highway design. Additional review by county or state ADA coordinators may be desirable to evaluate the need or desirability for alternative accessible routes.

Alternative Renderings

A rendered model was created for Alternative 1 to illustrate the proposed roadway overpass in a way that is visually appealing to the client and public. The following images depict different views of the model. Slope lines shown in the renderings are conceptual and avoid known wetland boundaries, but will require further evaluation in preliminary design to minimize or eliminate potential impacts to the Little Seneca Lake wetland boundaries.

Figure 7: Alternative 1 Overview (Looking North)

Figure 8: Alternative 1 Overpass (Looking East)

Figure 9: Alternative 1 Overpass from Boyds Historic District (near 19925 White Ground Road)

Alternative 2

This alternative re-aligns MD 117 along a curved alignment and includes construction of a new railroad bridge over MD 117 east of the existing crossing. The MD 117 (Barnesville Road)/ MD 121 (Clarksburg Road) intersection will remain in the current location and continue to function as a three-leg unsignalized intersection. A roundabout could be considered an alternative configuration for this intersection. The White Ground Road/MD 117 (Clopper Road) intersection will be relocated along the planned curvature of the MD 117 alignment and the intersection will be located near the western rail bridge abutment.

Alternative 2 considers similar constraints as Alternative 1. These considerations include minimizing impacts to MD 117 vertical profile, providing sufficient roadway vertical clearance under the bridge, maintaining two lanes of traffic on MD 117 in each direction, maintaining freight and passenger railroad traffic, providing an additional railroad track width, and accommodating a moderate skew for the crossing. The roadway alignment and vertical profile comply with Montgomery County and Maryland SHA roadway standards. The proposed rail bridge abutment design will provide a significant setback from the western roadway edge to provide optimal driver sight distance for drivers turning from White Ground Road onto Route 117 at the unsignalized intersection.

The planned rail bridge will maintain the rail track elevation and Alternative 2 includes no raised structural elements above the existing railroad tracks. This concept represents a minimal potential visual impact alternative. Because the MD 117 roadway alignment is located below the existing ground elevation, the new roadway connection will not be visible from nearby residences and traffic noise may be somewhat reduced relative to Alternative 1.

A single-span bridge was again the only span configuration considered as multiple spans are not practical for this roadway configuration below the bridge. The proposed railroad bridge will

be designed in accordance with AASHTO Bridge Design Specifications and AREMA guidelines for a Cooper E-80 railroad design vehicle.

The anticipated bridge structure depth and top of deck and rail elevations would be set based on maintaining existing railroad profiles and supporting a Cooper E-80 loading while establishing roadway vertical clearance. This span configuration would result in a span length of 90 feet along the railroad.

Proposed Superstructure

Minimizing the superstructure depth will again be critical to minimize the MD 117 profile sag curve under the bridge on each approach. Steel plate girders or rolled beams are most suitable for the single-span length to accommodate railroad loading and can easily accommodate the skew. The girders can be closely spaced to maximize the clearance under the bridge. Based on the span and railroad loading, a single span steel girder bridge is the recommended superstructure type.

Proposed Substructure

Based on a similar assumption from Alternative 1 that the existing structure is founded on spread foundations wherever possible, the proposed structure will also be supported on shallow spread foundations. This assumption will require validation based on the subsurface exploration program by a geotechnical engineer. The substructure will consist of full-height reinforced concrete abutments to minimize span length and superstructure depths.

Drainage structures would be added under the bridge with a lowering of the existing road surface elevations. A full drainage analysis would need to be completed during preliminary design to determine whether downstream catch basins will require modifications of if a pumping system would need to be considered. Costs for adding drainage structures and piping are included in the order-of-magnitude cost estimate that follows.

Similar to the Alternative 1 roadway bridge, an option to limit the construction duration and minimize impacts to the railroad operations would be to use as much precast substructure elements as possible. In addition, similar accelerated bridge construction methods should also be considered to incorporate a short duration accelerated bridge construction closure over a weekend or a few days. Alternatively, the railroad bridge could be constructed in two phases with one track at a time using sheet piling or soldier pile walls between phases to support excavation for the new substructures. It is not possible to construct Alternative 2 without some impacts to rail operations and detouring of traffic on a temporary basis, whether that be to push all traffic to one track and construct the bridge in phases or have a short term shutdown of all traffic and construct the bridge using accelerated bridge construction methods.

Accessibility

The Alternative 2 concept provides the opportunity for at-grade pedestrian connections between Boyds and a relocated MARC station. The concept accounts for rail bridge abutment locations that would also allow adequate right-of-way for a trail connection along the west side of Route 117 under the rail bridge. The trail would provide a potential connection between the Local Boyds Park and pedestrian/bicycle facilities north of the rail tracks.

Alternative Renderings

A rendered model was produced for the Alternative 2 concept. The following image shows and aerial level view of the Alternative 2 rail bridge and roadway realignment concept.

Figure 10: Alternative 2 Overview (Looking North)

The following set of figures provide a side-by-side comparison of the relative visual character and impacts of both alternatives. Photographs taken in the study area are provided for context regarding the locations of the visualizations.

Figure 11: View from near 15004 Clopper Road. Left: Site photo looking east at rail bridge and Clopper Road. Middle: Alternative 1 highway bridge. Right: Alternative 2 rail bridge.

Figure 12: View from near 15020 Clopper Road. Left: Site photo looking east along White Ground Road to Clopper Road. Middle: Alternative 1 highway bridge. Right: Alternative 2 rail bridge.

Figure 13: View from near 14920 Clopper Road. Left: Site photo looking west. Middle: Alternative 1 highway bridge, looking north. Right: Alternative 2 rail bridge, looking west.

Figure 14: View from Clopper Road, near gravel industrial lot, looking west toward Boyds and rail bridge. Left: Site photo looking west. Middle: Alternative 1 highway bridge, looking west. Right: Alternative 2, looking west.

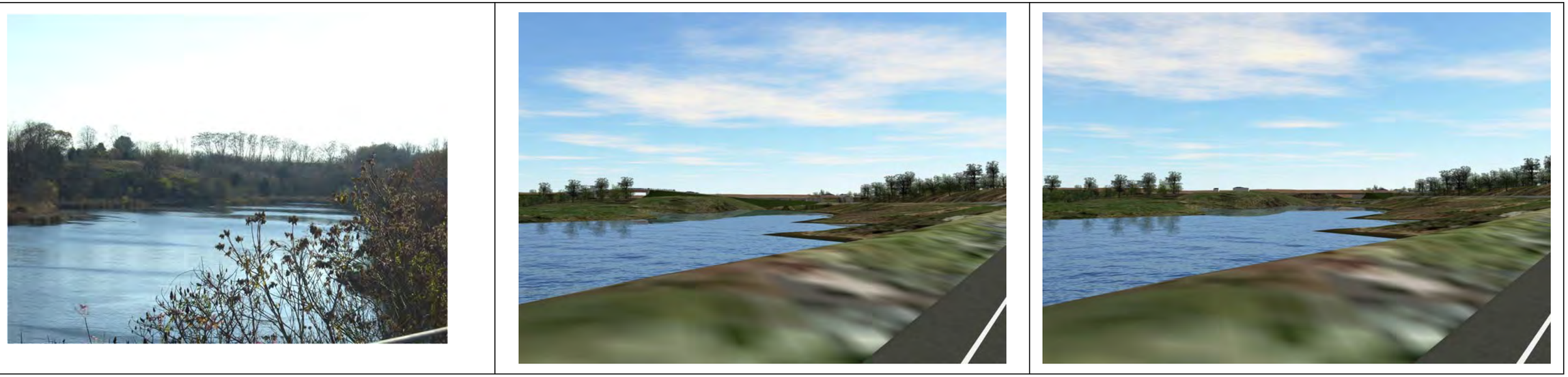


Figure 15: View from Clarksburg Road (MD 121), looking south across reservoir. Left: Site photo looking south. Middle: Alternative 1 highway bridge, looking south. Right: Alternative 2, looking south.

Figure 16: View from Barnesville Road (MD 117), looking east. Left: Site photo looking east. Middle: Alternative 1 highway bridge, looking east. Right: Alternative 2, looking east.

Roadway and Railroad Traffic Management

The viability of any modified MD 117 rail crossing must provide for construction sequencing that allows existing freight and passenger rail operations to be maintained throughout the majority of construction. Any short-term temporary railroad closures or the establishment of available work windows between train schedules will require close coordination and prior approval of the railroad. One of the primary constraints is to maintain rail traffic during construction although a determination of whether rail traffic can be maintained on one of the two tracks (instead of two in full time use) should be considered as this could significantly impact construction costs. The first alternative evaluated show impacts to the rail operations but not to the degree as the second, which will have a significant advantage when considering constructability and the railroad requirements.

Construction of a new bridge will not require phased construction as the limits of disturbance for each alternative maintain adequate separation from existing traffic crossing the rail lines. During construction, the current two lanes of roadway travel will be maintained in both directions at all times, albeit with reduced lane and shoulder widths likely at times and short-term lane closures with flaggers.

The following anticipated sequence of construction is assumed for the feasibility evaluation:

- Phase One: Relocate MD 117 traffic and rail traffic to any temporary alignments or combined track usage respectively. Construction of the bridge will take place in the work area outside of the existing roadway alignments as much as possible. Depending on the Railroad Agreement and selected alternative, there may or may not be a shift in rail traffic to a single track to reduce construction costs through providing a contractor with additional work space.
- Phase Two: Roadway traffic will have a series of temporary alignment shifts as the roadway approaches to the new bridge are constructed. Once these approaches are in place, one or both lanes of traffic can be moved onto the newly constructed roadway and remaining approach work completed. Similar to Phase 1 and also dependent on the selected alternative, there may be multiple switching of tracks for freight and passenger rail traffic to facilitate construction.
- Phase Three: Final grading, existing roadway and bridge removal, and any railroad temporary impacts will be restored to original conditions.

Clearances

The horizontal and vertical clearances for the proposed bridge structure will be in accordance with MARC and AREMA requirements, as applicable. A minimum 23'0" vertical railroad clearance from the top of rail for the proposed track profile to low beam elevation was used for the bridge over railroad alternative (Alternative 1). A minimum vertical clearance of 14’-6” was used for the roadway under the railroad bridge alternative (Alternative 2) based on minor arterial roadway standards.

Geotechnical Data

Geotechnical data has not been obtained for this study and a subsurface exploration program consisting of half dozen soil borings along the new roadway embankment locations and at the proposed bridge abutments is recommended. Additionally, depending on the selected alternative and the management of rail traffic during construction, a temporary retaining wall between tracks may need to be constructed which would require additional borings along the railroad to provide required design criteria. The foundations for the bridge are assumed to be cast-in-place concrete abutments supported on shallow spread footings for the purposes of cost estimating in this feasibility analysis. If the subsurface investigation results in a recommendation from a geotechnical engineer to use deep foundations such as caissons or piling so, this could increase construction costs estimates.

Constraints Imposed by Approach Roadway Features

The proposed roadway cross-section is based on planned future widening of MD 117 and the proposed bridge width has been shown to accommodate the future build out. If either alternative proceeds into detailed design, further analysis is appropriate to evaluate whether right-turns should be channelized. Sidewalks do not currently exist on the MD 117 approaches in this area. The feasibility evaluation conservatively assumes sidewalks will be constructed along MD 117 in the study area, though it is possible to only construct a sidewalk on the bridge initially.

Traffic control during construction will be a major constraint for construction and will require multiple lane shifts and temporary alignments throughout construction. It is assumed that peak hour traffic volumes will always be accommodated with two open lanes while off-peak times will allow short-term flagger-controlled lane closures when needed for specific operations.

Constraints Imposed by Feature Crossed

For the bridge over the railroad alternative (Alternative 1), daily freight and passenger rail service on the line that must be maintained during bridge construction. This will be a primary constraint on all aspects of design, construction, and cost estimating and an early coordination meeting with railroad owners and operators is highly recommended prior to selecting an alternative. Depending on the allowable rail traffic management requirements, the potential exists for increasing the construction duration and order-of-magnitude costs by a factor of two.

Constraints Imposed by Utilities

There are known aerial utilities within the immediate bridge site that would require relocation and these utility relocations have been accounted for in the feasibility evaluation cost estimates. The proposed roadway and bridge corridor will easily accommodate underground utilities via conduit within the roadway embankment and mounted on the bridge if desired. The final number and size of the conduits can be determined in preliminary design.

Constraints Imposed by Cultural Resources & Environmental Sensitive Areas

There are multiple cultural resources and environmentally sensitive areas within the vicinity of the project. An in-depth environmental analysis was not completed as part of this initial feasibility analysis, however, the alternatives presented generally minimize impacts to resources to the greatest extent possible while balancing other factors including cost, constructability and providing sufficient vertical clearance and acceptable roadway grades.

Hazardous Material Disposition

There is a potential for hazardous materials being encountered in any excavated soils within the railroad Right-of-Way. On-site testing will be required to identify the limits and level of any contamination and any encountered hazardous materials will be disposed of in accordance with applicable regulations. Depending on the anticipated volume of soils that may be impacted within the rail corridor, a pre-characterization program can be completed by obtaining test samples to the anticipated excavation elevations during the geotechnical subsurface exploration.

Bridge Aesthetics

Over the past ten years, increasing interest has been shown in the aesthetic aspects of bridges and structures. This interest has come from a broad spectrum of people, including owners and the public at large. Some of the focus has been centered on "landmark" signature bridges which add significant cost to projects; however, bridge designers have also been increasing its efforts to improve the aesthetic design of all bridges.

Early application of the concepts of adding aesthetically pleasing features can make a significant improvement in the appearance of the bridge and each of the bridge alternatives presented here can incorporate a host of bridge aesthetic features to be further evaluated in preliminary design. Some common features include patterns to exposed concrete surfaces in ashlar stone or a host of other patterns available through the use of form liners. Bridge railing elements or pilasters are often considered along with lighting and colored concrete. Other considerations are to match elements of the environment or other bridges locally.

There’s a fundamental approach to aesthetic design for bridges to provide visual elements that meet the objectives or the viewer and user as well as the long term functionality and durability of the structure. Early communication and coordination of these options during preliminary design is key to ensuring objectives are met within available funding goals before design decisions are made that impact options. An additional contingency is included in the estimate to account for aesthetics features.

Figure 17: Ashlar Stone Abutment Example

Order-of-Magnitude Cost Estimate

The following estimates include costs for construction of new abutments, superstructure, removal of the existing structure (as applicable), roadway approach work, and contingencies. Costs for track work are included in the track portion of the overall project cost estimate. Costs for modifying the rail profile in any way has not been included as we assume it would not be allowed. The estimate also excludes the relocation of utilities and disposal of hazardous materials. A more detailed breakdown the cost estimates for each alternative can be found in the appendixes to this report.

Preliminary Bridge Cost Estimate

Alternative	Estimated Cost
Alternative 1	$10,000,000
Alternative 2	$7,500,000

Structural Type Recommendation

Considerations for structure selection include railroad impacts, constructability, structure life expectancy, environmental impacts, and estimated cost. Alternative 1 costs more than Alternative 2; however Alternative 2 requires significantly more railroad coordination and impacts which are unknown costs at this time. The advantages of Alternative 2 are a more desirable roadway geometry, less sightline impacts in historic district without a bridge elevated over the railroad, minimized maintenance costs without approach roadway walls and taller bridge abutments, and minimized construction duration. The disadvantages of Alternative 2 are that there will be greater impacts along the rail line compared to Alternative 1. Ownership of the railroad bridge would need to be established and evaluated since the maintenance of the highway bridge vs. the railroad bridge would potentially be different entities.

Prior to further evaluating alternatives or selecting a preferred alternative that involves significant railroad bridge reconstruction, it is recommended that M-NCPPC staff conduct a meeting with railroad ownership and operators to discuss options for impacts and maintenance of rail traffic requirements.

Other Alternatives Considered

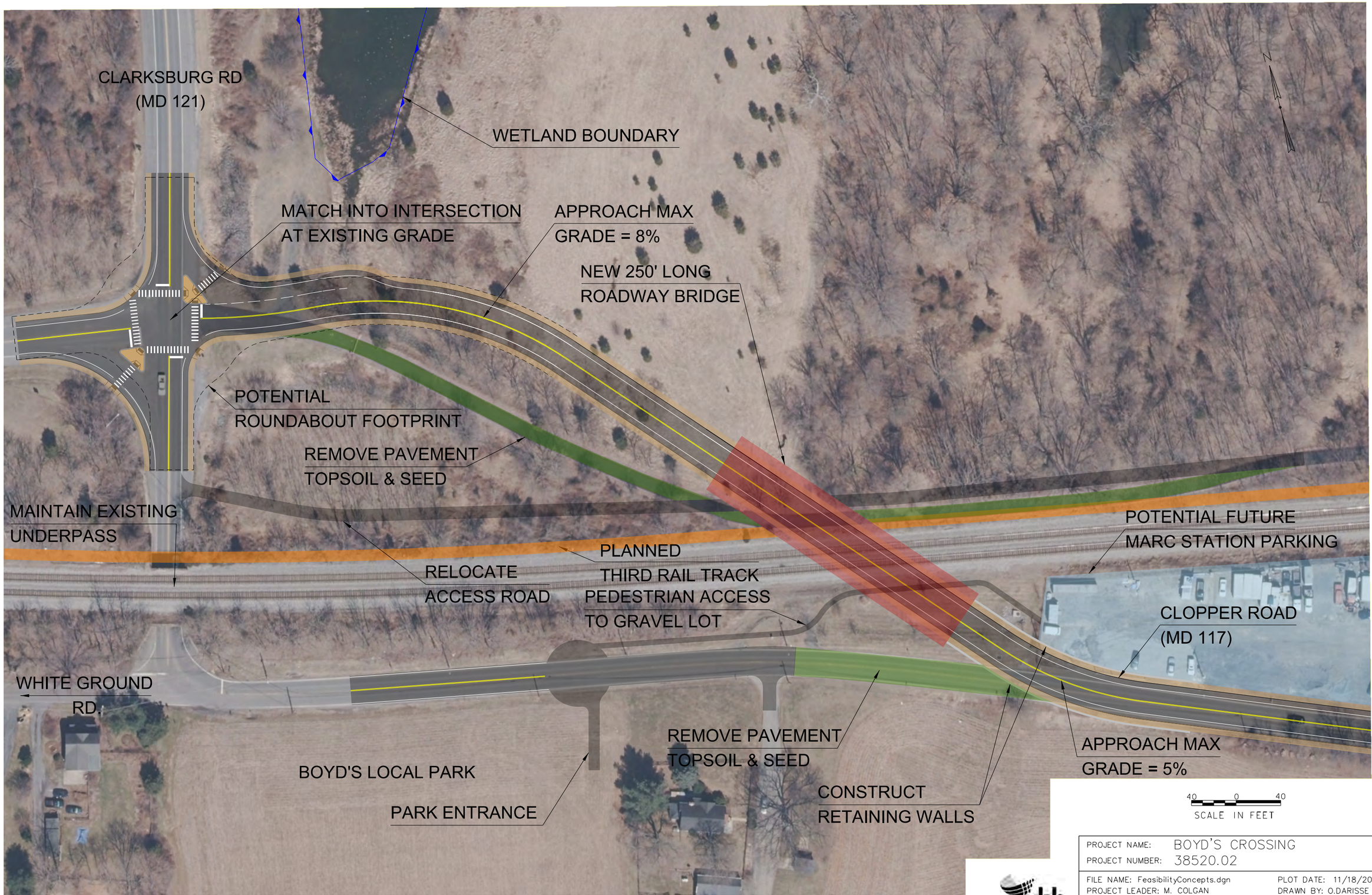
VHB developed other preliminary alternatives for the Route 117 crossing feasibility evaluation; however, these alternatives contain significant constraints that limited their feasibility and were generally considered inferior options. Specifically, tunneling options were initially considered but eliminated from further feasibility evaluation.

Tunneling Option

Tunneling under the railroad along the Alternative 1 alignment was considered as a possible alternative to constructing a bridge over the railroad. This option results in significantly greater cost for construction. Additionally, this option involves greater potential for issues with groundwater and stormwater issues within the tunnel. A tunnel would likely require a significant permanent pumping system, which would increase both initial construction costs and long-term maintenance costs.

Appendix A

Alternative Plan 1



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SCALE IN FEET

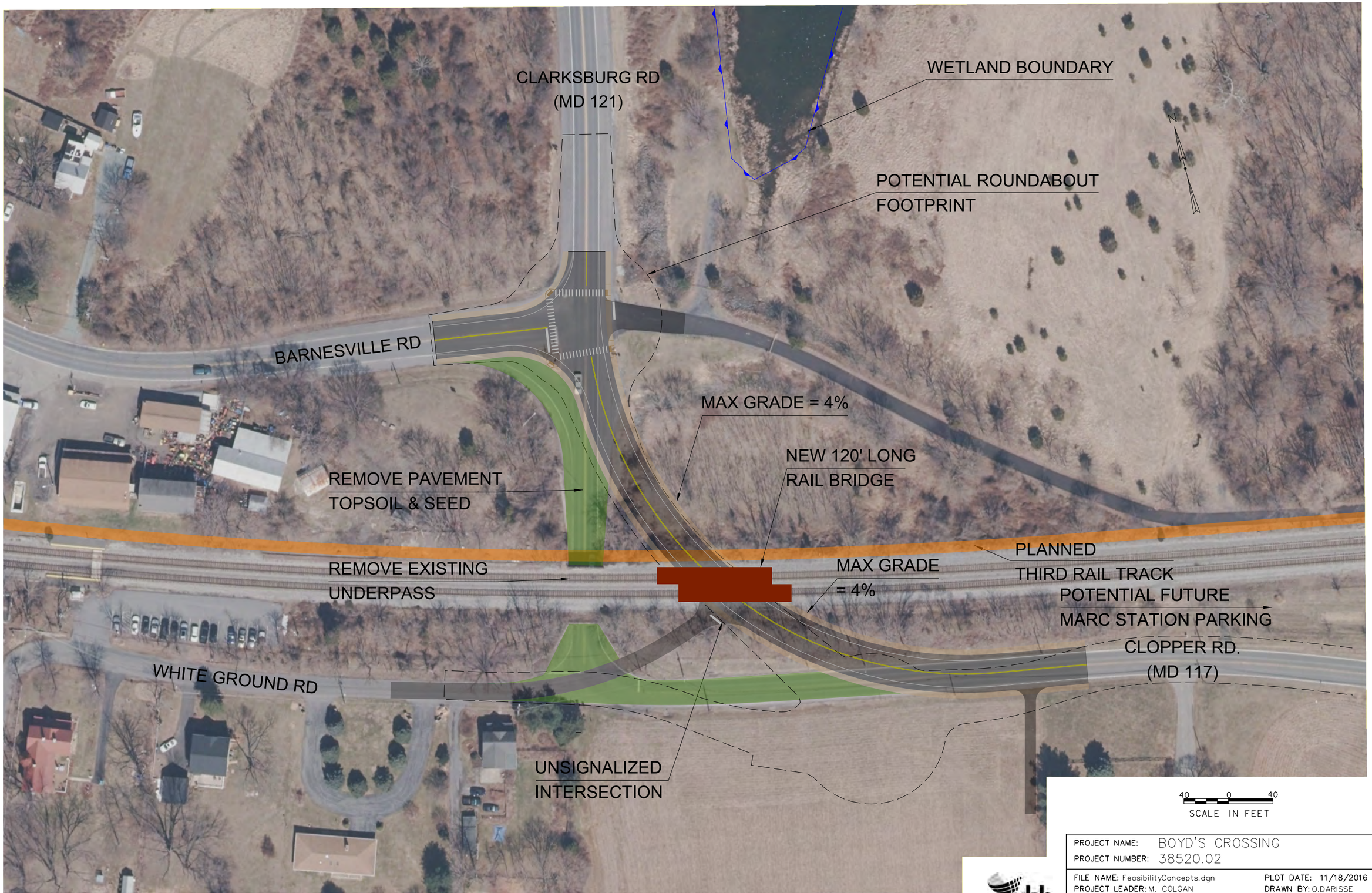
PROJECT NAME:	BOYD'S CROSSING
PROJECT NUMBER:	38520.02

FILE NAME: FeasibilityConcepts.dgn	PLOT DATE: 11/18/2016
PROJECT LEADER: M. COLGAN	DRAWN BY: O.DARISSE
DESIGNED BY: O.DARISSE	CHECKED BY: D.M. PECK
ALTERNATIVE 1 INTERSECTION OPTION	SHEET 1 OF 4

vhb

Appendix B

Alternative Plan 2



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SCALE IN FEET

PROJECT NAME: BOYD'S CROSSING
PROJECT NUMBER: 38520.02

FILE NAME: FeasibilityConcepts.dgn
PROJECT LEADER: M. COLGAN
DESIGNED BY: O.DARISSE
ALTERNATIVE 2 INTERSECTION OPTION

PLOT DATE: 11/18/2016
DRAWN BY: O.DARISSE
CHECKED BY: D.M. PECK
SHEET 3 OF 4

Appendix C

Detailed Order-of-Magnitude Cost Estimate

Program Level Order-of-Magnitude Project Cost Estimate - Alternate 1

Feasability Assessment of MD 117 Grade Separation, Boyds MD
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 38520.02

CALCULATED BY: J.D. KEENER
DATE: 11/18/2016
CHECKED BY: M.A. COLGAN

	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
	CONSTRUCTION COSTS				
1	Roadway Excavation	7000	CY	$15.00	$ 105,000.00
2	Bridge Superstructure and Substructure	1	LS	$2,250,000.00	$ 2,250,000.00
3	Structure Excavation	200	CY	$20.00	$ 4,000.00
4	Embankment and Subgrade	60000	CY	$40.00	$ 2,400,000.00
5	Hot Mix Asphalt (HMA)	4500	TON	$125.00	$ 563,000.00
6	Metal Railing	750	LF	$30.00	$ 23,000.00
7	End Treatments	4	LS	$5,000.00	$ 20,000.00
8	Retaining Walls	2	LS	$250,000.00	$ 500,000.00
9	Maintenance of Roadway Traffic	1	LS	$35,000.00	$ 35,000.00
10	Maintenance of Rail Traffic and Flaggers	1	LS	$75,000.00	$ 75,000.00
11	Drainage / Stormwater Infrastructure (assume 5% above items)				$ 299,000.00
12	Water Pollution Control (assume 2% above items)				$ 125,000.00
13	Treatment and Disposal of Contaminated Soils (assume 2% above items)				$ 128,000.00
14	Miscellaneous Construction Items (assume 15% above items)				$ 979,000.00
	Sub-Total Construction Items				$ 5,975,000.00
15	Construction Mobilization (Assume 9% construction items)				$ 538,000.00
16	Design Engineering (Assume 12% construction items)				$ 717,000.00
17	Roadway/Bridge Construction Engineering (Assume 7% construction items)				$ 418,000.00
18	Staging/Maintenance of Traffic (Assume 8% construction items)				$ 478,000.00
19	Contingency for Level of Cost Estimating (30% construction items)				$ 1,793,000.00
20	Right-of-Way Allowance	1	LS	$ 100,000.00	$ 100,000.00
				GRAND TOTAL =	**$10,000,000.00**

Program Level Order-of-Magnitude Project Cost Estimate - Alternative 2

Feasability Assessment of MD 117 Grade Separation, Boyds MD
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 38520.02

CALCULATED BY: **Megan Suffel**
DATE: **11/18/2016**
CHECKED BY: **Mark Colgan**

	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
	CONSTRUCTION COSTS				
1	Roadway Excavation	6500	CY	$15.00	$ 98,000.00
2	Bridge Superstructure and Substructure	1	LS	$1,500,000.00	$ 1,500,000.00
3	Structure Excavation	5000	CY	$20.00	$ 100,000.00
4	Rock Excavation	2000	CY	$35.00	$ 70,000.00
5	Embankment and Subgrade	11000	CY	$30.00	$ 330,000.00
6	Hot Mix Asphalt (HMA)	3800	TON	$125.00	$ 475,000.00
7	Metal Railing	400	LF	$30.00	$ 12,000.00
8	End Treatments	4	LS	$5,000.00	$ 20,000.00
9	Retaining Walls	4	LS	$150,000.00	$ 600,000.00
10	Removal of Existing Underpass	1	LS	$150,000.00	$ 150,000.00
11	Maintenance of Roadway Traffic	1	LS	$50,000.00	$ 50,000.00
12	Maintenance of Rail Traffic and Flaggers	1	LS	$125,000.00	$ 125,000.00
13	Drainage / Stormwater Infrastructure (assume 5% above items)				$ 177,000.00
14	Water Pollution Control (assume 2% above items)				$ 74,000.00
15	Treatment and Disposal of Contaminated Soils (assume 3% above items)				$ 113,000.00
16	Miscellaneous Construction Items (assume 15% above items)				$ 584,000.00
	Sub-Total Construction Items				$ 4,380,000.00
17	Construction Mobilization (Assume 9% construction items)				$ 394,000.00
18	Design Engineering (Assume 12% construction items)				$ 526,000.00
19	Roadway/Bridge Construction Engineering (Assume 7% construction items)				$ 307,000.00
20	Staging/Maintenance of Traffic (Assume 12% construction items)				$ 526,000.00
21	Contingency for Level of Cost Estimating (30% construction items)				$ 1,314,000.00
22	Right-of-Way Allowance	1	LS	$ 100,000.00	$ 100,000.00
				GRAND TOTAL =	**$7,500,000.00**

Appendix C -

Transportation Analysis Summary for the MARC Rail Communities Sector Plan

Sabra, Wang & Associates, Inc.

Engineers · Planners · Analysts

DRAFT

MEMORANDUM

DATE: **10/06/2017**

FROM: Paul Silberman, P.E., PTOE, Sabra, Wang & Associates, Inc.
Elisa Mitchell, P.E., Sabra, Wang & Associates, Inc.

TO: Laura Hodgson, LEED AP, Montgomery County Planning Department of the Maryland-National Capital Park and Planning Commission

SUBJECT: **Transportation Analysis Methodology and Results for the MARC Rail Communities Plan**

This white paper describes the transportation analyses performed in support of the MARC Rail Communities Plan and the results of the analyses. The analyses focus on the Germantown study area because zoning allows for substantial additional development within that area. However, no public sewer and a lack of a market for substantial redevelopment in Boyds means very little growth and additional traffic is projected; therefore, minimal transportation analysis was completed for Boyds. The analyses include travel demand forecasting, evaluation of intersection operating performance, and evaluation of roadway operating performance under selected land use and transportation network alternatives. The analyses follow the process and standards set forth in Montgomery County's 2017 *Local Area Transportation Review* (LATR) *Guidelines* and 2016 Subdivision Staging Policy.

Executive Summary

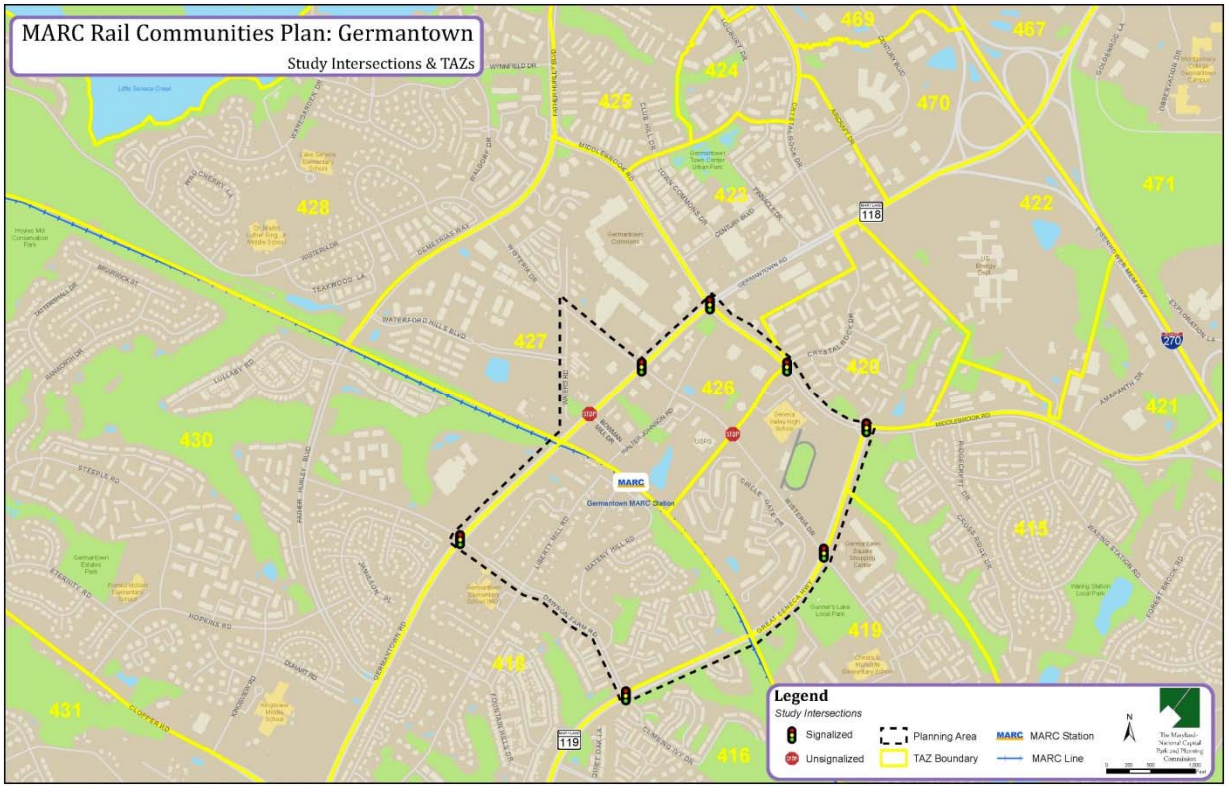
The major intersections within the planning area for the Germantown portion of the MARC Rail Communities Plan include eight existing intersections and one future intersection. The intersection capacity for all intersections was assessed using the 2000 Highway Capacity Manual (HCM) methodology and the Critical Lane Volume (CLV) methodology for three scenarios: 2015 Existing, 2040 Build Out, and 2040 Build Out with Road Diet. The 2040 Build Out with Road Diet evaluates the 2040 Build Out scenario volume with less through lanes than currently planned along two of the primary roadways through the planning area, Middlebrook Road and Great Seneca Highway (MD 119). All intersections evaluated in all three scenarios were found to be at or below the applicable congestion standards defined in Table 2 of the 2017 LATR Guidelines. Existing traffic volumes were sourced from recent transportation studies, and the future volumes were developed using results derived from the application of the Metropolitan Washington Council of Government's (MWCOG) regional travel demand model, based off an expected build out land use scenario received from Montgomery County Planning Department staff.

The planning area for the Boyds portion of the MARC Rail Communities Plan includes two intersections. The intersection capacity was assessed using the 2000 HCM methodology and the CLV methodology for two scenarios: 2015 Existing and 2040 With Annual Growth. In the 2040 scenario, one intersection was found to be below the applicable congestion standard referenced above and one intersection was found to be above the threshold. Maryland State Highway Administration (MD SHA) is aware of the congestion

at the southern intersection and is planning to install a traffic signal at both intersections due to their proximity. Using the traffic signal parameters noted in the MD SHA study, both intersections signalized operate below the applicable vehicle delay standards defined in Table 2 of the 2017 LATR Guidelines. Existing traffic volumes were sourced from a recent MD SHA study, and the future volumes were calculated using the average annual growth rate computed from volumes within the MD SHA study.

Germantown Study Area

The Germantown MARC Rail Community planning area, shown in map below by the black dashed line, is generally bounded by Germantown Road (MD 118), Middlebrook Road, Great Seneca Highway (MD 119), and Dawson Farm Road, except for the triangular area north of Germantown Road. Eight major study intersections were analyzed for transportation adequacy, plus a future intersection included in the future analyses scenarios. The new intersection connects Waters Road and Bowman Mill Drive at Germantown Road and is expected to be signalized in the future 2040 Build Out scenario. The primary roadways through the planning area are: Germantown Road, Middlebrook Road, Crystal Rock Drive, Great Seneca Highway, and Wisteria Drive.



Germantown Travel Demand Forecasting Process

Updating Land Use in the Travel Demand Model with Expected Level of Build Out

A variety of land use forecasts/concepts were received from Montgomery County Planning Department staff encompassing various levels of buildout. The land use data was aggregated by traffic analysis zone (TAZ) into the following categories: residential (number of households), residential (population), non-

residential (square feet of office, retail, industrial, or other), and employment (number of jobs by office, retail, industrial, or other).

A comparison of the proposed land use forecasts received from the Montgomery County Planning Department and the MWCOG regional travel demand model input data showed significant differences, including additional development in the Planning Department's Master Plan forecast because that forecast includes moderate to high build out of zoning while the MWCOG forecast includes what development the area is likely to capture based on market trends. To revise the MWCOG model to be consistent with the land use forecasts of the Master Plan, a subarea forecasting process based upon the MWCOG 2.3.57a regional travel demand forecasting model and Round 8.4 Cooperative Forecasts was used. The MWCOG regional travel demand model is developed at the level of detail needed to support the evaluation of the regional Constrained Long Range Plan and air quality analysis. In support of the subarea forecasting process, more detailed transportation networks and TAZs are often incorporated into this tool to capture the local traffic patterns for subarea/corridor studies. This change was necessary for the Germantown MARC Rail Communities Plan study area. The post mode choice assignment approach used was developed to add the desired level of detail to the transportation network and mimic the previous Planning Department transportation model subarea process used for similar studies (e.g., Travel/3, used for the White Flint Sector Plan Update). Steps taken to revise the travel demand model included the following.

- The 2015 and 2040 MWCOG 2.3.57a travel forecasting model networks and TAZ land use files were used as a foundation.
- The 2015 and 2040 network details (TAZ boundary splits) within the Germantown Study "impact area," which include the MARC Rail Communities Study Area and surrounding TAZs, were transferred from the recently developed MNCPPC Travel/4 travel forecasting model.
- Additional network detail was added including splitting MWCOG TAZs to create sub TAZs. Spilt TAZs included numbers 418, 420, 426, and 427.

This process ensures that the results are consistent with the adopted regional model but also allows for additional network and zone detail within the Germantown Study Area.

Modeled Scenarios

Three scenarios were analyzed for Germantown: 2015 Existing, 2040 Build Out, and 2040 Build Out with Road Diet. The 2015 Existing scenario represents existing conditions today; 2015 data was used because it was less than one year old at the start of the Master Plan process. The 2040 Build Out scenario models what the expected level of build out would be based on the proposed zoning and analysis of Germantown's development patterns over time. Full build out assumed a 22 percent density bonus for maximum contribution of moderately priced dwelling units (MPDUs) within the study area. As it is unlikely every residential property will provide 15 percent MPDUs for the density bonus, the 2040 Build Out scenario models approximately 95 percent build out of the residential development under the proposed zoning. The 2040 Build Out scenario models approximately 100 percent build out of the non-residential proposed zoning. The 2040 Build Out scenario also assumed the 2009 Germantown Master Plan recommendation of four through lanes on Wisteria Drive, whereas now there are only two through lanes in certain sections. The 2040 Build Out with Road Diet scenario evaluates the same traffic volumes generated from the 2040 Build Out scenario with the lane adjustments noted above for Wisteria Drive,

but analyzes Middlebrook Road with four through lanes instead of the existing six lanes and Great Seneca Highway as four lanes instead of the prior master plan's six lanes. This reduction in lanes for Middlebrook Road and Great Seneca Highway constitute the Road Diet recommended as part of the MARC Rail Communities Plan.

The 2040 land use concept that the future traffic volume is based on is shown in the table below.

Sub TAZ	Households	Population	Jobs			
			Office	*Retail*	*Industrial*	*Other*
4271	259	542	0	39	0	0
4272/4273	1215	2899	1365	855	257	70
4201	0	0	0	0	0	503
4202	1235	2665	0	0	0	0
4203	999	2316	199	2	0	0
4261	175	419	1641	113	0	0
4262	272	675	302	60	27	25
4181	434	1333	7	0	0	2
4182	776	2166	0	158	0	139
Total	**5,365**	**13,015**	**3,514**	**1,227**	**284**	**739**

Developing Future Average Daily Traffic

With a revised travel demand model, a 2015 subarea forecast for average daily traffic (ADT) was prepared and validated and a 2040 subarea forecast for ADT based on the expected level of build out was prepared.

The model output ADT figures were refined using factoring methods outlined in the NCHRP Report 765[1]. A combination of the ratio and difference method was used. These methods require field ADT figures and model derived base year ADT figures. Historical ADT counts along the primary roadways within the planning area (Germantown Road, Great Seneca Highway, Middlebrook Road, and Wisteria Drive) were sourced from MD SHA's Internet-Traffic Monitoring System (I-TMS). A baseline of the *difference* and *ratio* of field ADT figures to model-produced ADT was established. The model produced future volumes were adjusted by 1) the baseline difference, and 2) the baseline ratio. The two adjusted future volumes were averaged to create smoothed out volumes, less affected by extremes that may result from the travel demand modeling process. The table below illustrates the process.

Segment	Base Year Field ADT	Base Year Model ADT	Base Year Difference	Base Year Ratio	Horizon Year ADT	Horizon Year Adjusted Difference	Horizon Year Adjusted Ratio	Horizon Year Average
A	*1,000*	*1,200*	*=1,200-1,000*	*=1,200/1,000*	*20,000*	*=20,000+200*	*=20,000*1.2*	*=(20,200+24,000)/2*
A	**1,000**	**1,200**	**200**	**1.2**	**20,000**	**20,200**	**24,000**	**22,100**

[1] TRB. NCHRP Report 765 *Analytical Travel Forecasting Approaches for Project-Level Planning and Design.* 2014.

Note: An updated build out land use forecast was shared by Planning Department staff in June of 2017. The updated land use forecast was compared to the 2016 land use forecast used to develop the 2040 average daily traffic volume, revealing either no change or a reduction in buildout. Therefore, the previously developed average daily traffic and turning movement volumes were not revised. To be conservative, all traffic analysis was conducted based on the higher build out land use yield from the fall 2016 scenario.

Developing Future Intersection Turning Movement Counts

Existing turning movement counts for the morning and evening peak hours were primarily sourced from the Seneca Valley High School Traffic Impact Study and collected in March and April of 2015. The turning movement counts for two study intersections were sourced from the Planning Department's Intersection Analysis online application and dated May of 2016. (A data summary table is appended.)

The average annual growth rate, calculated from the change in existing ADT to 2040 forecasted ADT, was applied to the existing intersection volumes to achieve the 2040 forecasted intersection volumes. A network wide average annual growth rate of 0.47% was applied. The 2040 network turning movement counts were balanced to smooth out significant changes in volumes between intersections, and rounded to the nearest multiplier of five.

Germantown Intersection Analysis

According to the 2017 LATR Guidelines, the nine study area intersections fall in two separate policy areas, each with their own intersection congestion standard; Germantown West or Germantown Town Center. For study simplification and consistency, all study intersections were assessed using the critical lane volume method (CLV) and the 2000 Highway Capacity Manual method (HCM). A Synchro (version 9) model was built using existing signal timings and balanced existing traffic volumes. Signal timings were sourced from the Germantown Pedestrian Initiative study dated April 2016. The intersection capacity was assessed and compared to the congestion standard for three scenarios of two time periods each: 1) 2015 Existing AM and PM, 2) 2040 Build Out AM and PM, and 3) 2040 Build Out with Road Diet AM and PM. The relevant congestion standard varies for each study area intersection between a CLV of 1425 and 1500 and between 51 and 80 seconds of delay per vehicle.

2015 Existing Scenario

When evaluating existing volumes, the overall intersection CLV and delay values do not exceed the congestion standards. The intersection of Middlebrook Road and Great Seneca Highway reaches the policy standard threshold for delay at 51 seconds for the AM peak hour only.

2040 Build Out Scenario

The future scenario accounted for 2040 traffic volumes and a new intersection at Germantown Road and Waters/Bowman Mill Roads. Side street volume was estimated based on surrounding land use. The overall intersection CLV and delay values would not exceed the applicable policy area congestion standards for all study area intersections. The intersection of Middlebrook Road and Great Seneca Highway has a 2040 morning intersection delay of 49 seconds, just two seconds below the applicable congestion standard.

2040 Build Out with Road Diet Scenario

This future scenario also accounted for 2040 traffic volumes and a new intersection at Germantown Road and Waters/Bowman Mill Roads. The Road Diets described in the table below were tested in this scenario. Specifics regarding the lane use assumed at each study area intersection under the future cross-section scenario are appended.

Roadway	2015 Existing Cross Section	2040 Future Scenarios Cross Section
Middlebrook Road	A divided six-lane section with a raised, concrete median	*Reduction in travel lanes (Road Diet):* A divided four-lane section with widened raised median for turn lanes and trees
Wisteria Drive	Generally, two travel lanes with a center two-way-left-turn lane expanding to two through lanes at the intersection approaches	*Number of Lanes per 2009 Master Plan:* A consistent divided four-lane section with a center median for left turn lanes
Great Seneca Highway	A divided four-lane section with at-grade median	*Maintain Existing Number of Lanes:* Maintain existing divided four-lane section instead of increasing to six-lane section per 2009 Master Plan

Under 2040 Build Out with Road Diet scenario, the overall intersection capacity for all study intersections are below the CLV and delay congestion standards.

The table below summaries the CLV and HCM intersection capacity results across the scenarios.

Plan Area	Location ID	E-W Road	N-S Road	Standard		Capacity Results: Existing 2016 AM	Existing 2016 PM	Future 2040 AM	Future 2040 PM	Future 2040 Cross Section AM	Future 2040 Cross Section PM	2040 Configuration (if different than existing)
Germantown MARC Rail Community	1	Middlebrook Rd	MD 118 (Germantown Rd)	*1500*	CLV	A (865)	A (944)	A (997)	B (1075)	A (997)	C (1197)	WB: L | L | T | T+R (Reduced by one through lane)[1]
				63	Synchro	D (41.6)	D (47.2)	D (47.8)	D (49.4)	D (44.2)	E (57.2)	
	2	Wisteria Dr	MD 118 (Germantown Rd)	*1500*	CLV	A (713)	A (985)	A (802)	C (1218)	B (802)	A (1218)	
				63	Synchro	D (38.5)	D (40.8)	D (39.5)	D (47.5)	D (43.3)	D (52.8)	
	3	Dawson Farm Rd	MD 118 (Germantown Rd)	*1425*	CLV	A (526)	A (590)	A (635)	A (722)	A (635)	A (722)	
				51	Synchro	B (19.8)	C (23.0)	C (21.1)	C (26.6)	C (21.1)	C (26.6)	
	4	Middlebrook Rd	Crystal Rock Dr	*1500*	CLV	A (786)	A (760)	A (898)	A (886)	B (1042)	B (1122)	EB: L | T | T+R / WB: L | T | T+R (Reduced by one through lane)[1] Minor signal timing adjustments (Optimized spilts)
				63	Synchro	C (29.7)	B (14.2)	C (23.7)	B (15.1)	C (24.7)	C (22.5)	
	5	Wisteria Dr	Crystal Rock Dr	*1500*	CLV	A (395)	A (578)	A (519)	A (737)	A (448)	A (503)	WB & EB: L | T | T+R (Added a through lane and revised lane sharing) Note: Two Way Stop Controlled Intersection; average intersection
				63	Synchro	A (<10.0)	A (<10.0)	A (<10.0)	A (<10.0)	A (<10.0)	A (<20.0)	
	6	Middlebrook Rd	MD 119 (Great Seneca Hwy)	*1425*	CLV	B (1052)	A (867)	C (1178)	A (983)	D (1347)	B (1088)	EB: U | T | T | R (Removed third through lane)[1] Add northbound right turn permited-overlap phase
				51	Synchro	D (51.0)	C (32.2)	D (49.5)	C (30.9)	D (35.6)	C (24.8)	
	7	Wisteria Dr	MD 119 (Great Seneca Hwy)	*1425*	CLV	A (723)	A (719)	A (868)	A (983)	B (1026)	B (1059)	EB: L | T | R / WB: L | T+R (Reduced by one through lane)[1]
				51	Synchro	C (27.4)	C (26.6)	C (28.7)	C (28.3)	C (28.3)	C (29.1)	
	8	Dawson Farm Rd	MD 119 (Great Seneca Hwy)	*1425*	CLV	A (565)	A (768)	A (701)	A (931)	A (701)	A (931)	
				51	Synchro	B (15.6)	B (14.0)	B (19.4)	B (18.3)	B (18.7)	B (19.0)	
	9	Waters Rd / Bowman Mill Dr	MD 118 (Germantown Rd)	*1500*	CLV	N/A	N/A	A (888)	C (1198)	A (888)	C (1198)	New Signalized Intersection
				63	Synchro	N/A	N/A	C (33.5)	E (57.6)	C (32.6)	D (52.2)	

[1] *The road diet analysis reflects a reduction in the existing number of travel lanes; otherwise a road diet anlaysis reflects NOT the construction of additional lanes as noted in the Master Plan*

Boyds Analysis Summary

The Boyds MARC Rail Community planning area generally extends to Little Seneca Lake on the north, almost to Ganley Road on the west, near the intersection of White Ground Road and Hoyles Mill Road on the south, and about 3,500 feet east of Clarksburg Road along the railroad tracks. There are two major study intersections in the planning area including Barnesville Road (MD 117) at Clarksburg Road (MD 121), the northern intersection, and Clopper Road (MD 117) at Clarksburg Road (MD 121), the southern intersection.

While the proposed zoning in Boyds would allow some redevelopment, no public sewer and a lack of a market for substantial redevelopment in Boyds means very little growth and additional traffic is projected. Therefore, no land use forecasts were developed by Planning Department staff for Boyds and no transportation modeling was necessary.

Boyds Intersection Data

Existing turning movement counts for the morning and evening peak hours were obtained from the MD SHA memo documenting the design request package to signalize the intersection of MD 117 (Clopper Road / Clarksburg Road) and Clopper Road and collected in September and December of 2014.

The average annual growth rate was calculated from the change in existing 2015 volumes to 2035 forecasted volumes from the MD SHA study, and that growth rate was applied for another five years to achieve 2040 forecasted intersection volumes. The 2040 network turning movement counts were balanced to smooth out significant changes in volumes between intersections, and rounded to the nearest multiplier of five.

Boyds Intersection Analysis

The two study area intersections are located within the Rural East policy area where the congestion standard is 1350 critical lane volume and 41 seconds of delay per vehicle. Both study intersections were assessed using the CLV method and the 2000 HCM method. A Synchro (version 9) model was built using signal parameters from a 2015 MD SHA study and balanced existing traffic volumes. The intersection capacity was assessed and compared to the congestion standard for two scenarios of two time periods each: 1) existing 2015 AM and PM, 2) future 2040 AM and PM.

When evaluating existing volumes, the overall intersection CLV and delay values do not exceed the policy area congestion standards. Using 2040 projected future volumes, the northern intersection is projected to operate below the applicable CLV congestion standard, but the southern intersection is projected to operate above the applicable CLV congestion standard using a conservative analysis that did not discount right turns on red that were permitted. MD SHA is aware of the congestion at the southern intersection and is planning to install a traffic signal at both intersections due to their proximity. Using the traffic signal parameters noted in the MD SHA study, both intersections evaluated as signalized intersections would operate below the applicable CLV and vehicle delay standards defined in Table 2 of the 2017 LATR Guidelines.

The table below summaries the CLV and HCM intersection capacity results across the scenarios.

[BOYDS SUMMARY TABLE FORTHCOMING IN NEXT DRAFT]

<u>Appended</u>

1. *Data Summary Table*
2. *Cross Sections & Lane Use Changes under the Future Scenario*
3. *Critical Lane Volume Worksheets*
4. *HCM Reports*

MEMORANDUM

DATE: December 13, 2018
SUBJECT: Transportation Analysis Summary for the MARC Rail Communities Plan

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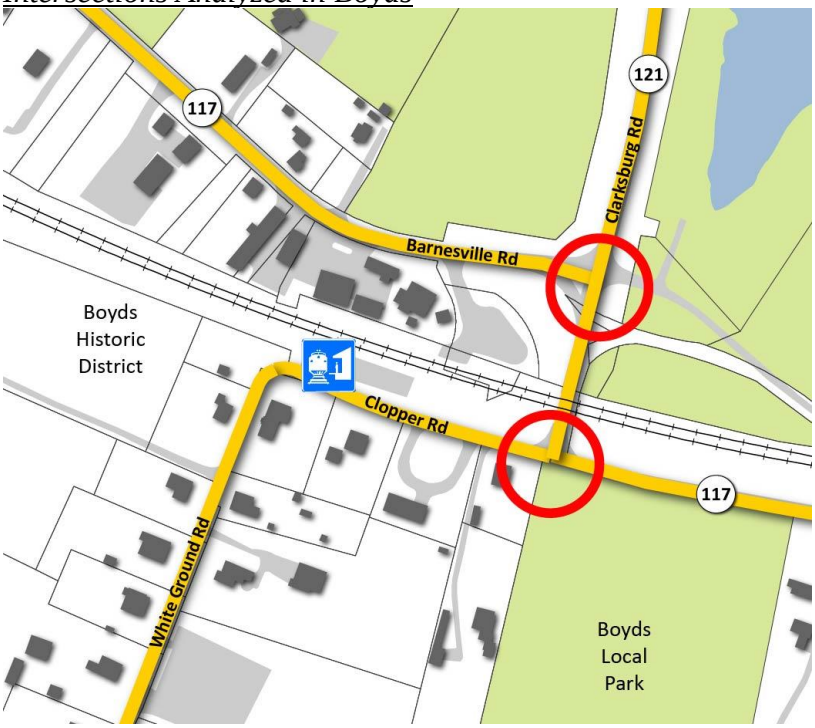
This memorandum provides a summary of the transportation analyses performed in support of the MARC Rail Communities Plan. The analyses focus on the Germantown study area because the zoning allows for substantial additional development within that area.

The transportation analysis was conducted by Sabra & Associates and included travel demand forecasting, evaluation of intersection operating performance, and evaluation of roadway operating performance under selected land use and transportation network alternatives. The analyses follow the process and standards set forth in Montgomery County's 2017 *Local Area Transportation Review* (LATR) *Guidelines* and 2016 Subdivision Staging Policy.

Boyds

The planning area for the Boyds portion of the MARC Rail Communities Plan includes two intersections that were analyzed – the intersection of Clarksburg Road (MD 121) and Barnesville Road (MD 117) and the intersection of Clarksburg Road (MD 121) and Clopper Road (MD 117).

Intersections Analyzed in Boyds



In Boyds, the absence of public sewer service, land constraints due to protected forest and farmland, and the desirability of maintaining rural village character means very little growth and additional projected traffic. Therefore, transportation analysis for Boyds included only two scenarios: 2015 Existing Conditions and 2040 With Annual Growth. The intersection capacity was assessed using both the 2000 Highway Capacity Manual (HCM) methodology and the Critical Lane Volume (CLV) methodology. In the 2040 scenario, one intersection was found to be below the applicable LATR congestion standard and one intersection was found to be above the threshold. Maryland Department of Transportation - State Highway Administration (MDOT-SHA) is aware of the congestion at the southern intersection and recently installed a traffic signal at both intersections due to their proximity.

Using the traffic signal parameters noted in the MDOT-SHA study, both signalized intersections operate below the applicable vehicle delay standards defined in Table 2 of the 2017 LATR Guidelines. Therefore, further mitigation is not needed. Existing traffic volumes were sourced from a recent MDOT-SHA study, and the future volumes were calculated using the average annual growth rate computed from volumes within the MDOT-SHA study.

Germantown

The Germantown MARC Rail Community planning area includes eight major study intersections that were analyzed for transportation adequacy, plus a future intersection included in the future analysis scenarios. The new intersection connects Waters Road and Bowman Mill Drive at Germantown Road and is expected to be signalized in the future scenarios. Like the Boyds analysis, the intersection capacity for all Germantown intersections was assessed using the 2000 Highway Capacity Manual (HCM) methodology and the Critical Lane Volume (CLV) methodology. Existing traffic volumes were sourced from recent transportation studies, and the future volumes were developed using results derived from the application of the Metropolitan Washington Council of Government's (MWCOG) regional travel demand model, based on the build out land use densities/scenarios described briefly in the following sections.

Intersections Analyzed in Germantown

Several rounds of transportation analyses were performed for Germantown in the process of determining the roadway network, number of lanes of traffic, and recommended densities:

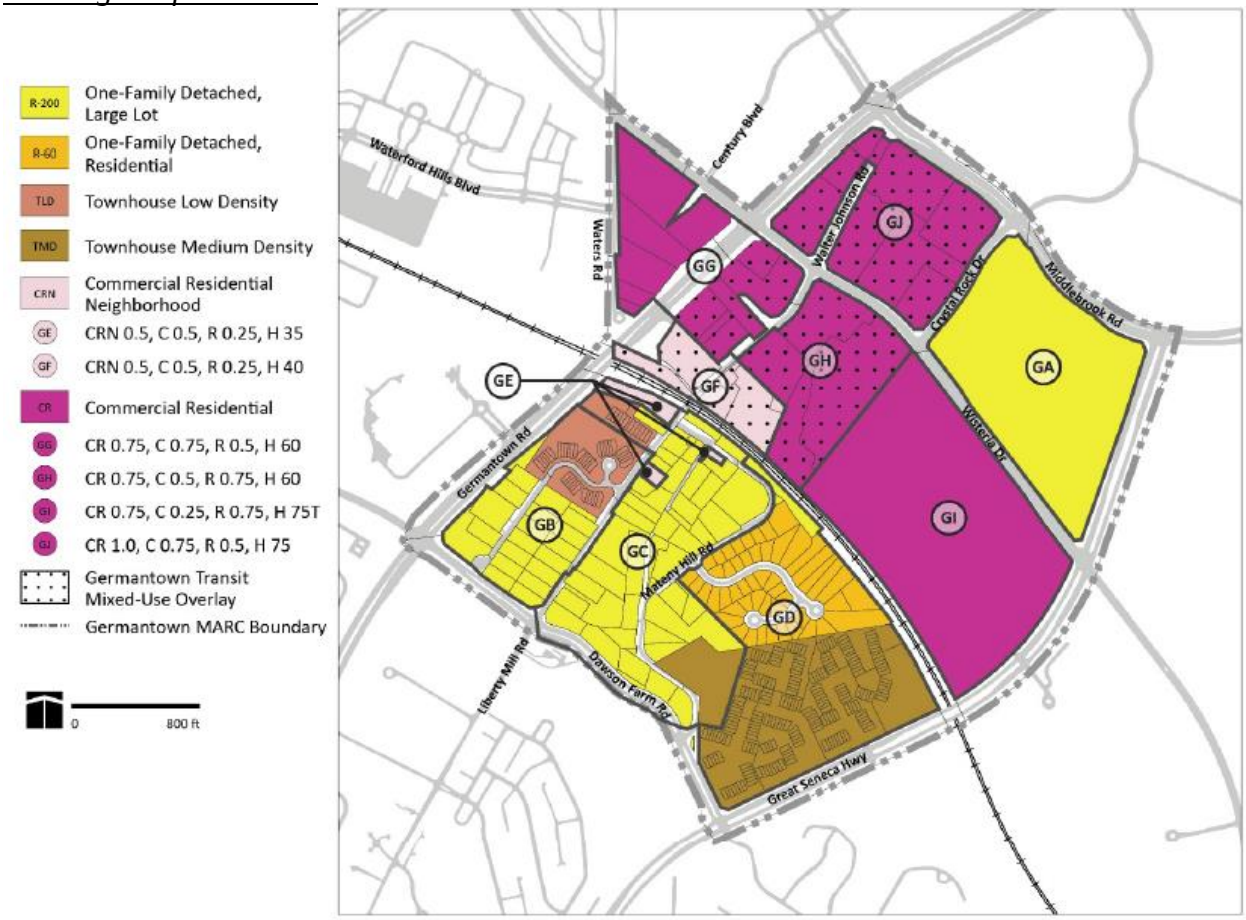
- Working Draft Fall 2017
- Working/Public Hearing Draft Edits Winter 2017/2018
- First June 2018 Transportation Worksession
- Second June 2018 Transportation Worksession
- Worksession September 2018
- Worksession November 2018

Working Draft Fall 2017

Three scenarios were analyzed for the staff draft of the Sector Plan: 2015 Existing, 2040 Build Out, and 2040 Build Out with Road Diet. The 2040 Build Out with Road Diet evaluates the 2040 Build Out scenario with fewer through lanes than currently planned along two of the primary roadways through the planning area, Middlebrook Road and Great Seneca Highway (MD 119). Along Middlebrook Road, the road diet scenario assumed four through lanes (two in each direction) instead of the existing six lanes that exist along this section. Along Great Seneca Highway, the scenario evaluated the existing four through lanes (two in each direction) instead of the previous Master Plan recommendation of six lanes. Both 2040 Build Out Scenarios assumed densities and zoning that were like those proposed in the 2009 Germantown Employment Sector Plan and are shown in the graphic below. Additionally, all future scenarios

included an analysis of Wisteria Drive with four through lanes, instead of the existing three lanes, consistent with the recommendations of the 2009 Germantown Employment Sector Plan.

Working Draft Densities



All intersections evaluated in the 2015 Existing and 2040 Build Out scenarios were found to be at or below the applicable congestion standards defined in the 2017 LATR Guidelines (1500 CLV and 63 seconds in the Germantown Town Center Policy Area and 1425 CLV and 51 seconds in the Germantown West Policy Area). The 2040 Build Out with Road Diet scenario resulted in four intersections exceeding the congestion standard, but all four intersections could be mitigated with signal timing/phasing modifications and/or lane reassignment. A new traffic signal would be required at the intersection of Wisteria Drive and Crystal Rock Drive with the densities proposed in the Build Out scenarios.

Working/Public Hearing Draft Edits Winter 2017/2018

In December 2017 after presentation of the Working Draft, the Planning Board directed staff to complete another transportation analysis of the zones and densities that were established in the Germantown portion of the plan area by the 2014 zoning code revision to present during the worksessions. This scenario would include the road diet on Middlebrook Road (reduction in through lanes from six to four) and retention of the existing lanes on Great Seneca Highway (instead of widening to six lanes). The Planning Board was concerned that the proposed densities

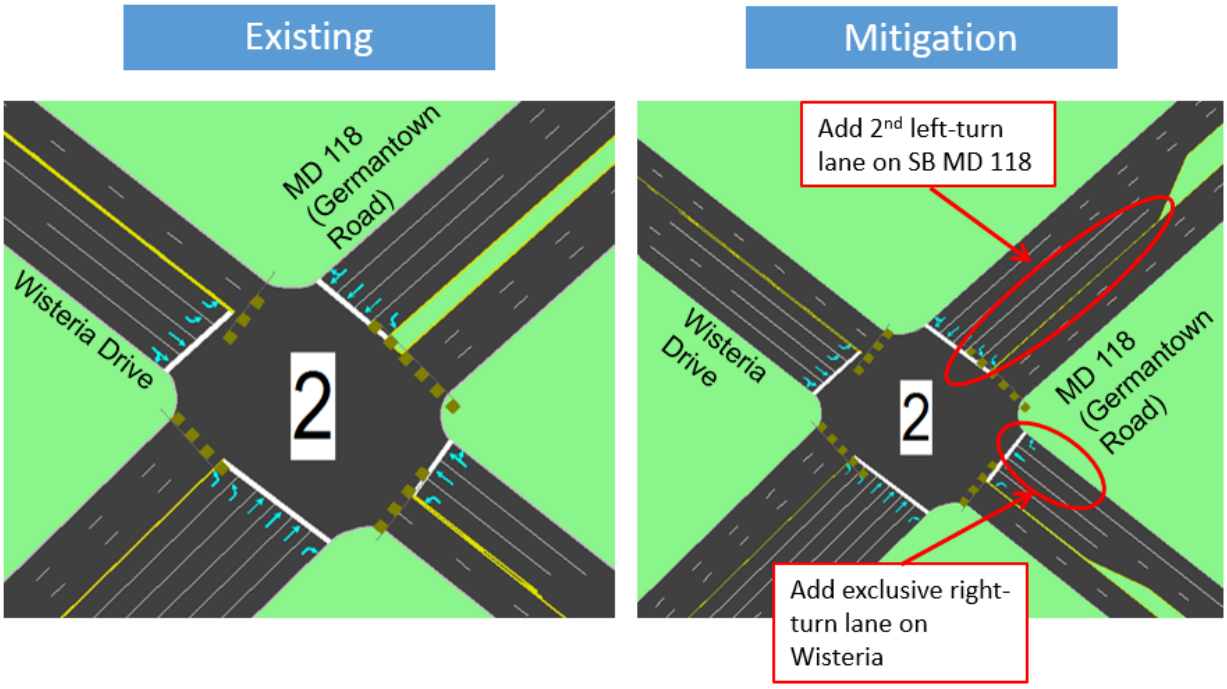
in the Working Draft constituted a down-zoning of the properties. Staff worked with Sabra and Associates to complete this work in the Spring of 2018.

First June 2018 Transportation Worksession
At the first transportation worksession in June 2018, staff presented the results of the transportation analysis that examined the current densities under the 2014 zoning with testimony modifications received at the Planning Board's Public Hearing. This scenario examined densities of 0.75 to 2.0 Floor Area Ratio (FAR), densities significantly greater than those recommended in the Working Draft. Under this scenario (Current Zoning with Testimony), the transportation analysis showed that:

- Middlebrook Road operates adequately under the Road Diet.
- Six intersections exceed the congestion standard.
- All but two of these six intersections can be mitigated with signal timing/ phasing modifications, and/or lane reassignment. This includes a new traffic signal at the intersection of Wisteria Drive at Crystal Rock Drive.
- The two intersections requiring increased roadway footprint are:
    - MD 118 (Germantown Road) at Wisteria Drive, and
    - MD 118 (Germantown Road) at Bowman Mill Drive.

The intersection at Bowman Mill Drive northbound would require one additional lane to accommodate the density, widening the pedestrian crossing distance to approximately 30 feet instead of the existing 20 feet. The intersection of Germantown Road at Wisteria Drive would require an additional (second) southbound left-turn lane from Germantown Road to Wisteria Drive and an exclusive right-turn lane (additional lane) from westbound Wisteria Drive to northbound Germantown Road (see image below). This widening of Germantown Road would require pedestrians to cross three northbound lanes and then six southbound lanes (a minimum of thirty and sixty feet, respectively), which conflicts with an important goal of the Plan to improve connectivity for all users.

Mitigation Required at Wisteria Drive for Additional Density



After hearing the results of the transportation analysis, the Planning Board directed staff to analyze whether removing the road diet on Middlebrook Road and maintaining the previous master plan recommendation of six lanes on Great Seneca Highway would allow the 2014 zoning densities to be accommodated without creating an extra wide crossing at the intersection of Germantown Road and Wisteria Drive.

Second June 2018 Transportation Worksession

At the second transportation worksession in June of 2018, staff presented the updated intersection analysis (HCM delay analysis) of the 2014 zoning densities with public testimony and six lanes on both Middlebrook Road and Great Seneca Highway. As directed by the Planning Board, the analysis did not rerun the travel demand model and redistribute trips, but it did reanalyze the traffic already determined to be on the roads with the new lane geometry. The results revealed that while there were minor decreases in intersection delay at five intersections, four intersections were not impacted (i.e., there was no change in the average vehicle delay). These results indicated that:

- All intersections on Middlebrook Road and Great Seneca Highway over the delay threshold in the previous scenario (Current Zoning with Testimony, including the road diet) remained over the delay threshold with the six-lane cross sections. Therefore, there would be no change in the recommended mitigation – all intersections over the threshold would still need to be mitigated with signal timing/phasing modification and/or lane reassignment as previously identified.
- There were no changes in delay at the intersections where widening was recommended as mitigation for the Current Zoning with Testimony scenario. Therefore, widening would still be required at segments of the Germantown Road and Wisteria Drive intersection to widths equal to or greater than 60 feet.

After the presentation members of the Planning Board discussed the need to accommodate all users of the transportation network in a safe manner, particularly at the intersection of Wisteria Drive/Germantown Road where there had been a pedestrian fatality in the last two years and taking into consideration the County's push towards Vision Zero. The Planning Board then directed staff to examine how to achieve the road diet and not widen critical intersections to crossing distances of 60 feet or more while still achieving as much development as possible. The Planning Board also directed staff to look at any solutions that could help to achieve all these goals, including adding an interconnected street grid, adjusting mode split assumptions, changing the congestion standard, or other creative ideas. The Planning Board noted that reduced commercial densities would be acceptable, but that they wanted to increase or at least retain the residential density.

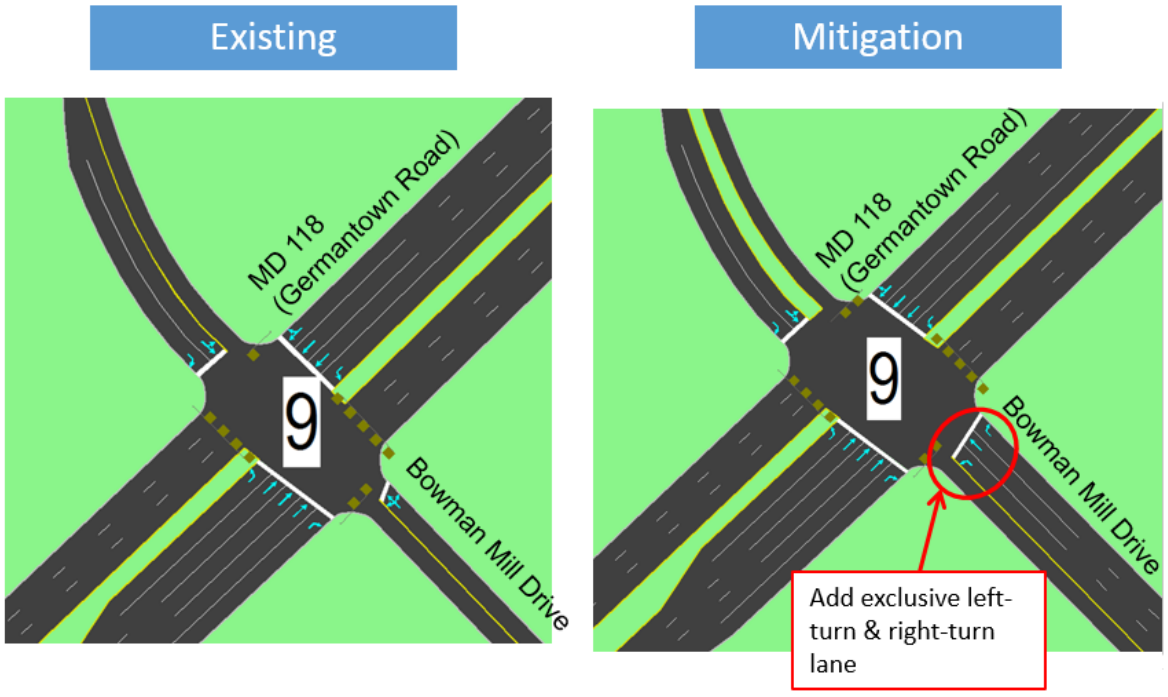
Worksession September 2018

Over the summer of 2018, staff examined ideas that would retain density while not requiring expansion of wide intersections. To maximize existing roadway capacity and achieve the Plan's vision to "reduce dependency on the automobile for all daily trips by improving the pedestrian and bicycle environments," staff proposed increasing the road network to distribute trips more evenly and reduce congestion (and therefore the need for widening) at any one location. Staff recommended extending Walter Johnson Road to Middlebrook Road, extending Bowman Mill Drive from the MARC station to Great Seneca Highway, and extending Crystal Rock Drive to the Bowman Mill Drive extension (see below).

Germantown Study Area with Proposed New Road Network

Staff also developed two new development scenarios that examined densities between those recommended in the 2040 Build Out scenario (0.5 to 1.0 FAR) and the Current Zoning with Testimony scenario (0.75 to 2.0 FAR). These two new scenarios were titled Adjusted 2014 Zoning Ordinance with expanded road network (with FARs from 1.0 to 2.0) and Modified FAR with expanded road network (with FARs from 1.0 to 1.5). Both scenarios would require no widening at the intersection of Germantown Road and Wisteria Drive but widening would be required at Bowman Mill Drive and Germantown Road. The widening at this later intersection would include adding one exclusive left turn land and one exclusive right turn lane to the northbound approach of Bowman Mill Drive, thereby increasing the crossing distance from approximately 20 feet to approximately 40 feet.

Mitigation Required at Bowman Mill Drive for Additional Density

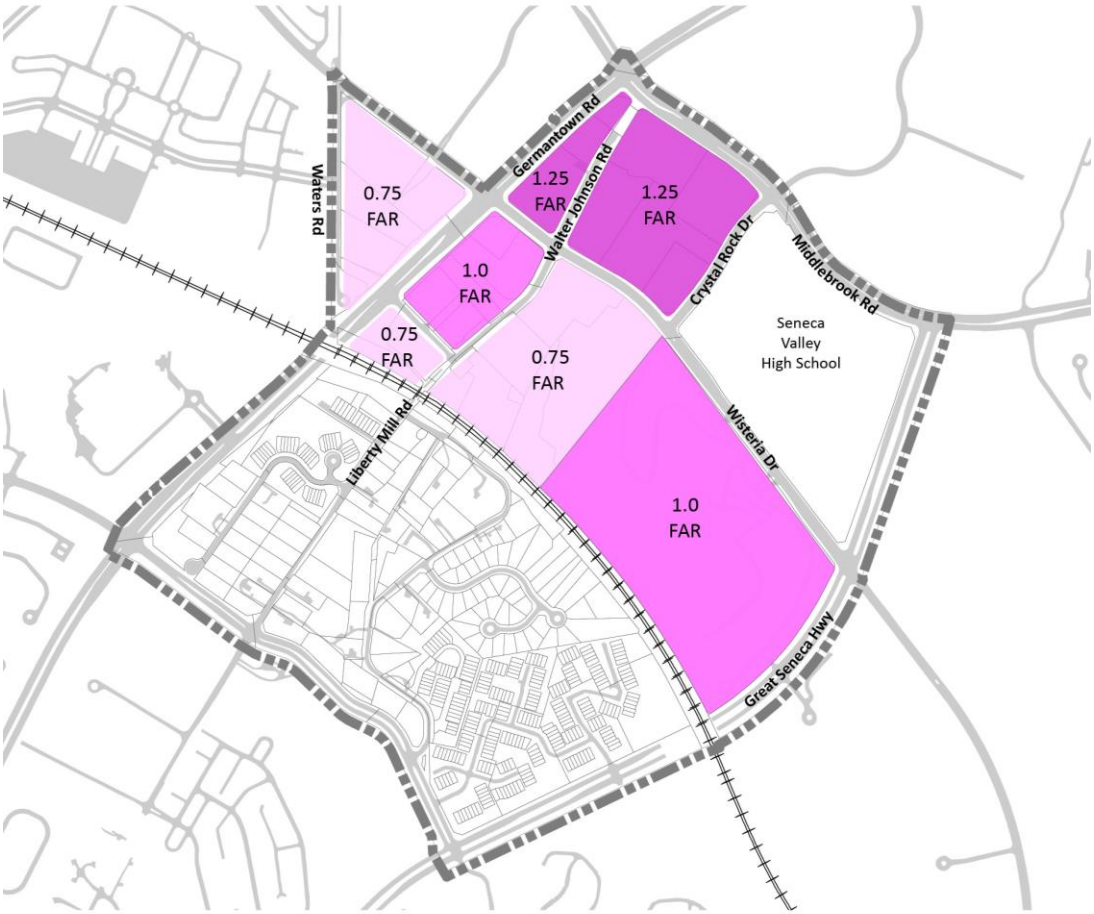


At this September worksession, the Planning Board commented that FARs of 2.0 were not realistic for Germantown, as that would require high-rise construction (greater than six stories) which was not envisioned to be financially feasible in Germantown in the future. Therefore, the Planning Board directed staff to come back with a recommendation for residential yields that were realistic for the Germantown MARC area. Since higher densities had been evaluated from a transportation perspective at this worksession and shown to achieve the goals of the Sector Plan (road diet, intersection crossings of no more than 60 feet) while meeting the congestion standards defined in the 2017 LATR Guidelines with only minor adjustments, the Planning Board did not direct staff and the consultant team to conduct further transportation analysis.

Worksession November 2018

Staff presented the modified "realistic" densities to the Planning Board in November, with FARs ranging from 0.75 to 1.25. To acknowledge public testimony, the Planning Board revised staff's recommendation on the block between Germantown Road and Walter Johnson Road and between Wisteria Drive and Bowman Mill from 0.75 to 1.0 FAR. The Planning Board directed staff to finalize the Plan for transmission to the County Council with the densities shown in the image below.

Final Planning Board Directed Densities



In summary, the transportation analyses indicated that the following additional transportation network adjustments may be required to achieve these proposed densities in the future:

- Bowman Mill Drive/Germantown Road: The intersection would need to be signalized and the westbound approach of Bowman Mill Drive (currently striped as one lane) would need to be widened to include an exclusive left-turn lane and an exclusive right-turn lane
- Wisteria Drive/Germantown Road: Optimize signal splits and offsets
- Middlebrook Road/Germantown Road: Optimize signal splits and offsets
- Wisteria Drive/Crystal Rock Drive: Signalize intersection
- Middlebrook Road/Great Seneca Highway: Add northbound right turn permitted overlap phase and optimize signal splits and offsets

Germantown Conclusion

The Planning Board recommends densities in Germantown of 0.75 to 1.25 FAR as well as the originally proposed road diet on Middlebrook Road, four lanes on Great Seneca Highway instead of the previously planned six lanes, the other road sections included in the Plan, and the new road network connections presented at the September 2018 worksession.

Appendix D -

Urban Land Institute Washington Leadership Institute Mini-Technical Assistance Panel

MARC RAIL COMMUNITIES

A study of the Germantown MARC Station

Urban Land Institute Washington

mTAP

Report prepared by Leadership Institute program members and not directly produced, reviewed or endorsed by ULI. ULI and ULI Washington make no representations or warranties as to the contents of this presentation.

Contents

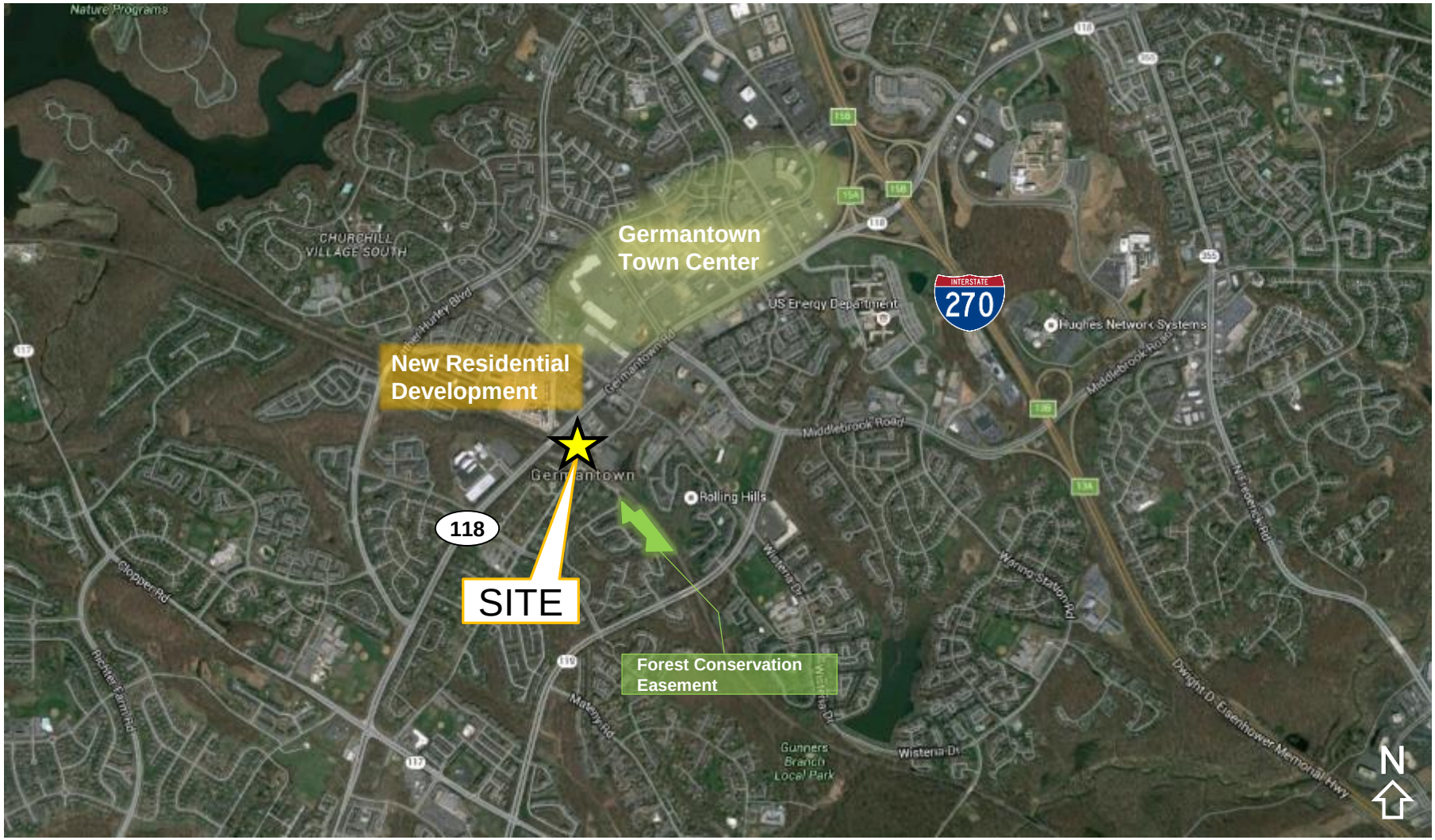
Understanding of the Challenge

- How can the parking situation be improved at the Germantown MARC station?
- What public/private development is possible/appropriate?
- Are there any creative options for financing?
- How can the Germantown MARC station help the county and the region?
- What lessons can be learned to apply elsewhere?

Stakeholder Interviews & Data Sources

- Stakeholders:
  - MARC
  - MNCPPC
  - Ride-On
- Market Data
  - CoStar
  - Delta Associates
  - Leasing & sales data for Adjacent properties
- Local Experts
  - Chamber of Commerce
  - Historical Society
  - Developers
  - Civil Engineers
  - Land Use Planners
  - Metro

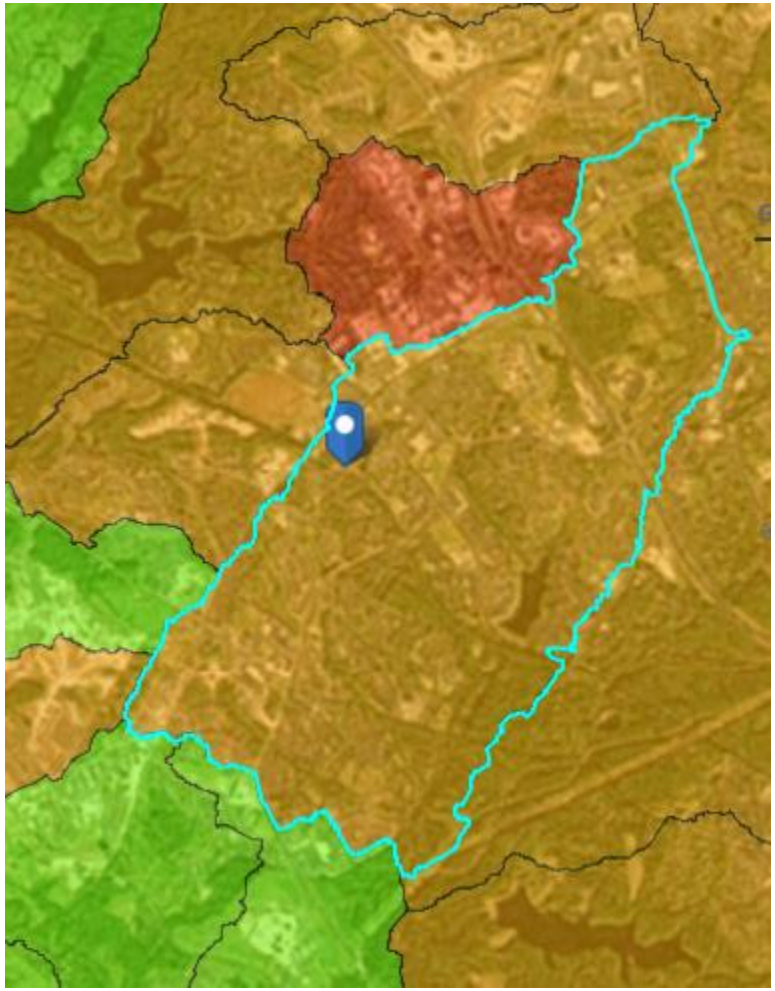
Site – Local Context



Site – Aerial View

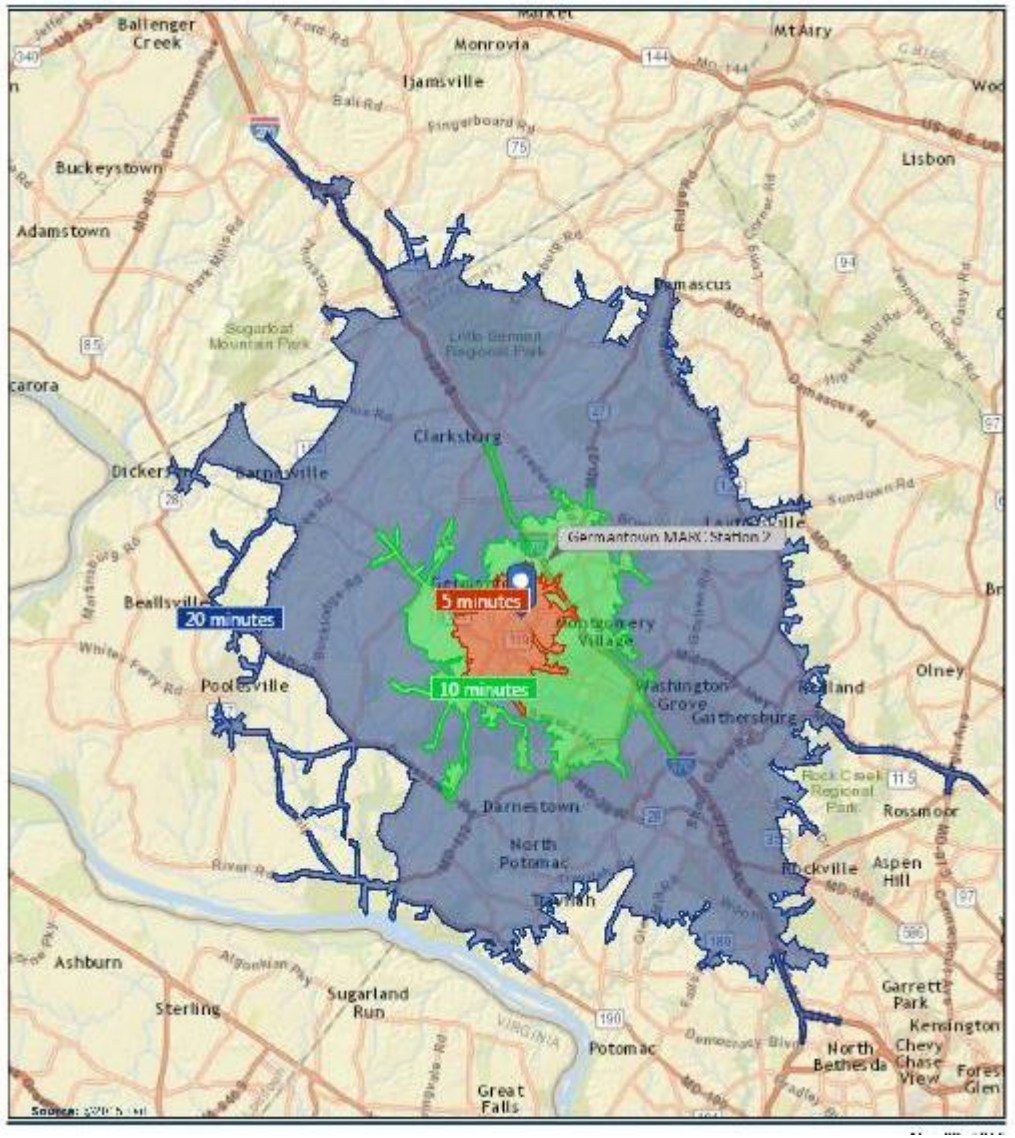
Site Watershed

- Station drains into Gunners Branch which drains to Middle Seneca Creek. Stream condition is Fair
- The pond adjacent to MARC station holds much of the runoff from the south/east side of the town center
- Park & Ride listed as a priority project in the Montgomery County 2012 Great Seneca Watershed Improvement Plan
- Conservation easement adjacent to pond/stream for future walking & biking path



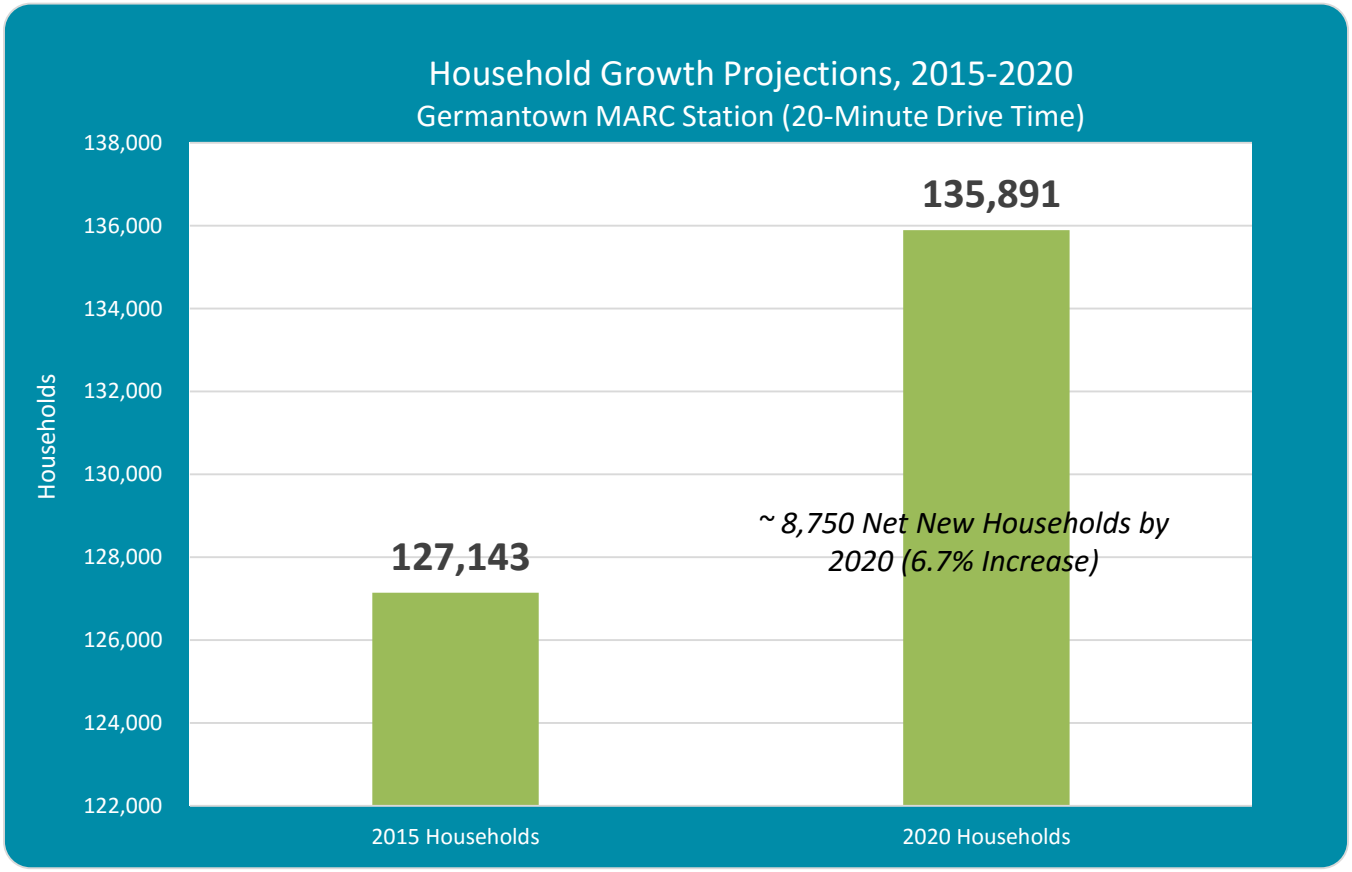
Demographic & Economic Trends

- Germantown MARC Station primary submarket defined as 20-minute drive time



Demographic & Economic Trends

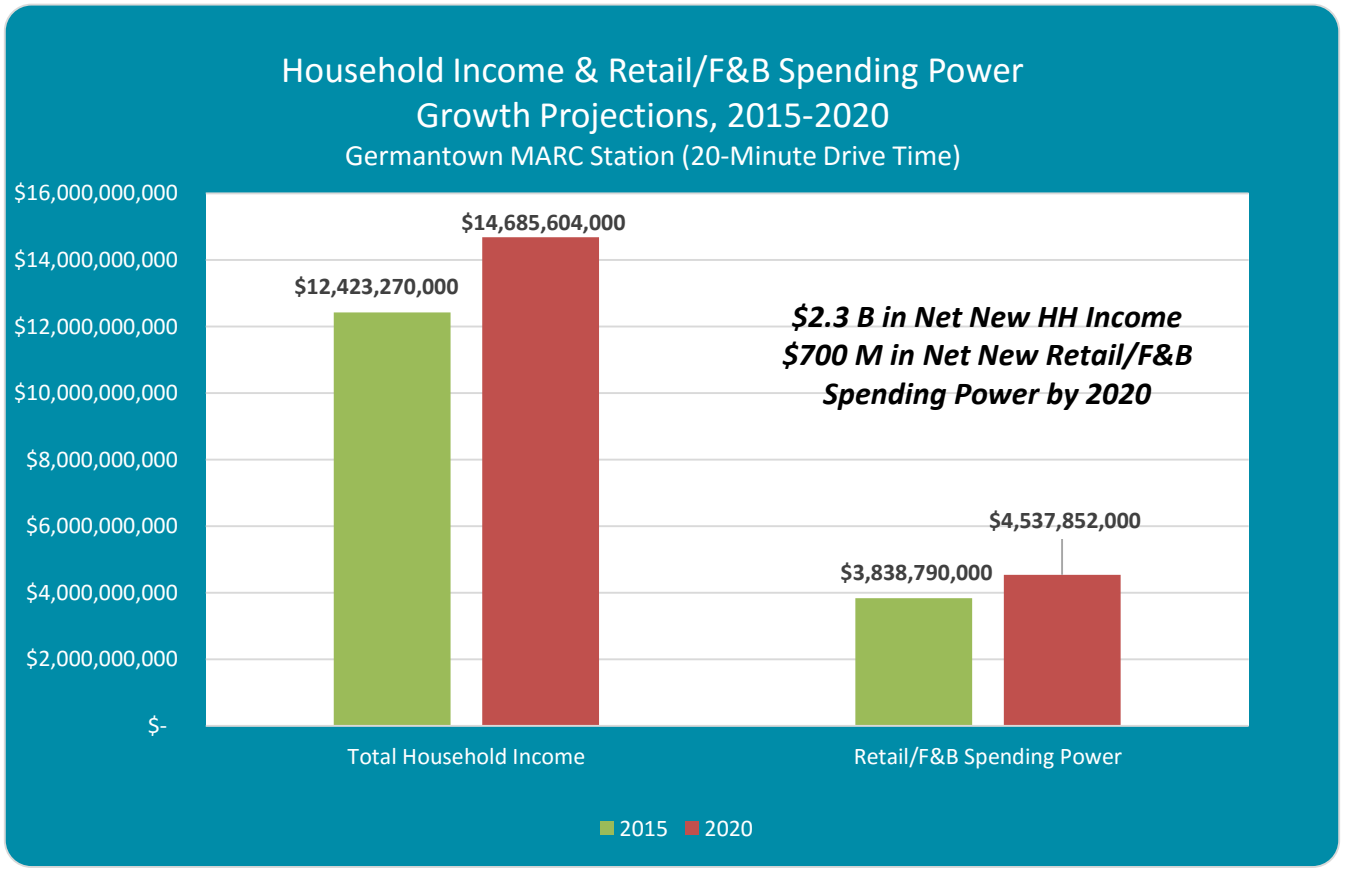
- Strong household growth forecasted through 2020 will drive housing starts, retail spending and commuter traffic



Source: ESRI, based on U.S. Census data

Demographic & Economic Trends

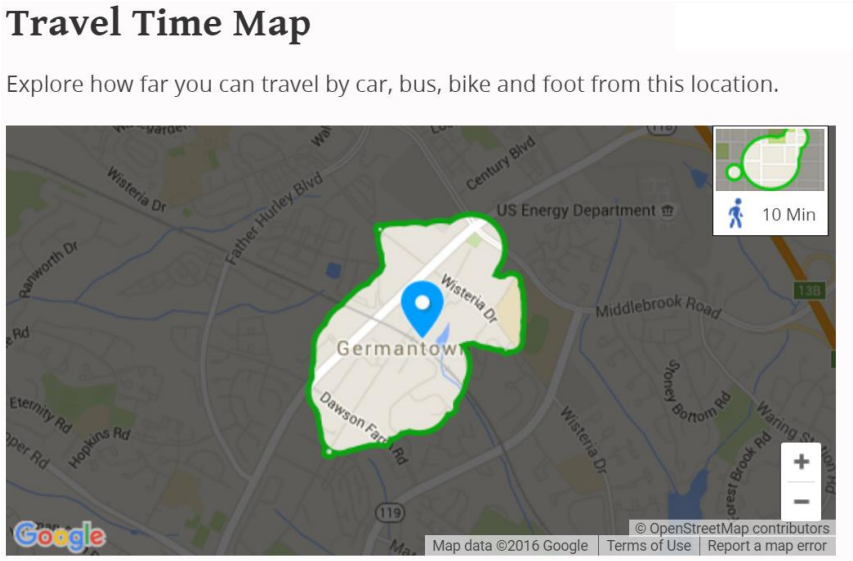
- $700 M in net new household spending could support up to 1.7 M Sq. Ft of new development in submarket by 2020

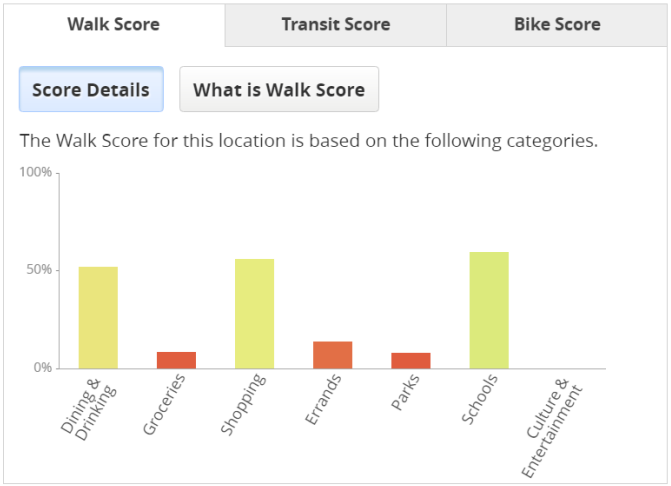


Source: ESRI, based on U.S. Census data

Connectivity Considerations

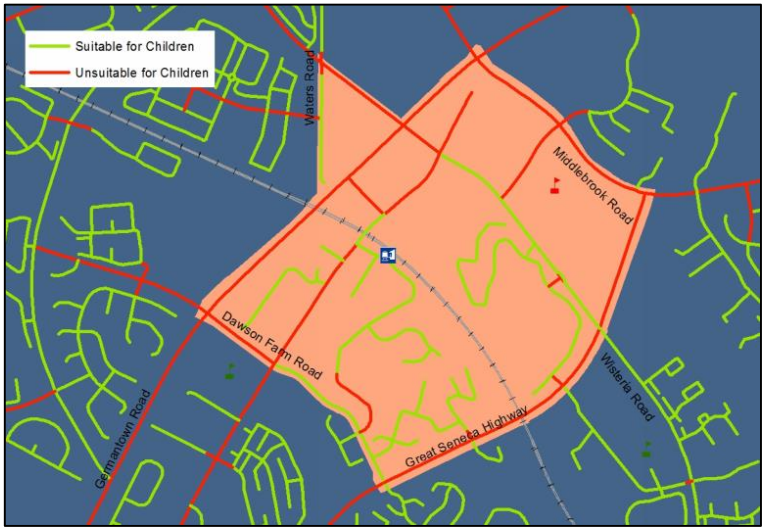
- Pedestrian
  - Walk score = 32 (of 100)
    - Based on destinations reached within 10 min walk
  - Challenges
    - Auto-dominated area with major roadways
    - Sidewalk gaps
  - Opportunities
    - Increase access to MARC station using existing street network as well as proposed expansion
    - Private development to help fund infrastructure improvements





Connectivity Considerations

- Bicycle
  - Bike rack capacity available at the Germantown MARC station
  - Additional bikeway facilities would enhance bicycle access to the MARC station
  - Shared use path proposed adjacent to Germantown Rd.
  - Expansion of bicycle network planned along Bowman Mill and Walter Johnson Rd.



Bicycle Suitability

Bikeway Recommendations

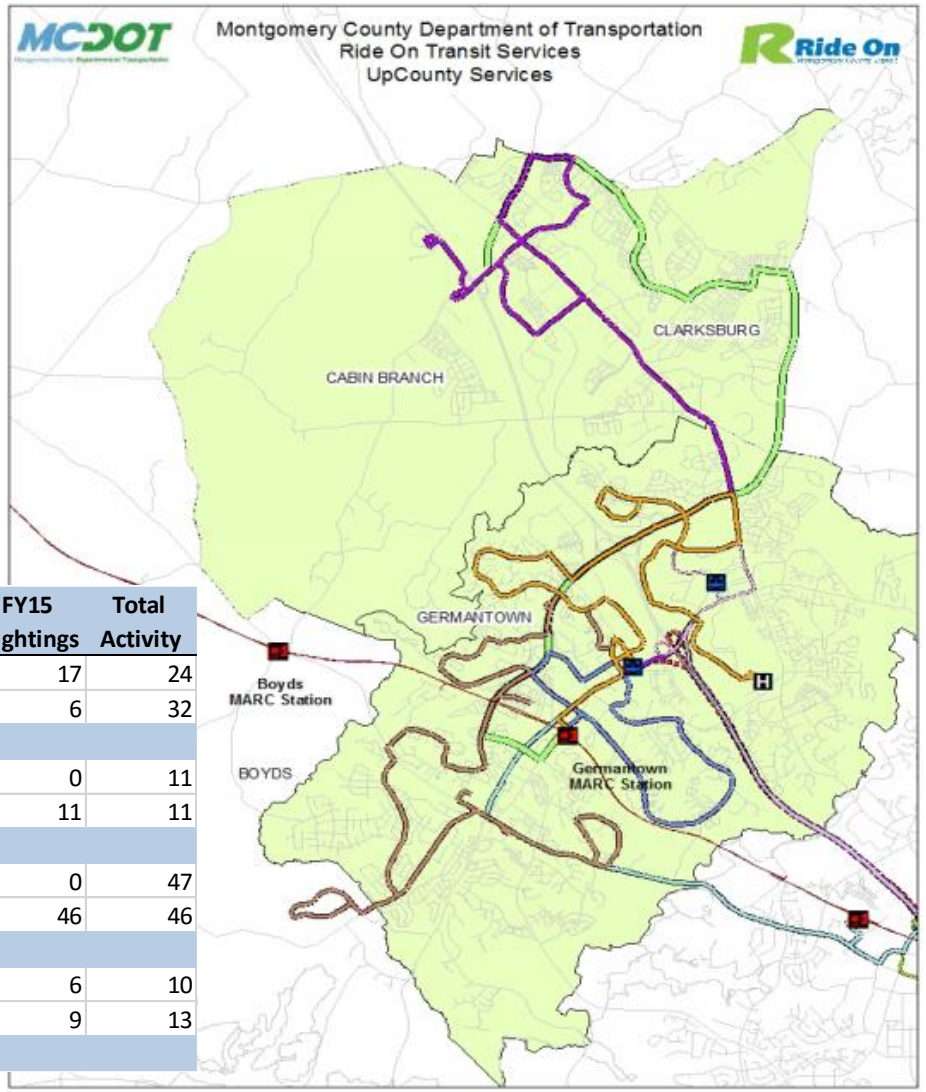
Bike station

Shared-use path

Photos Source MNCPPC

Connectivity Considerations

- Buses
  - Four Ride On routes serve the Germantown MARC Station
  - Approximately 200 weekday trips in FY15
  - Additional space needed for bus circulation

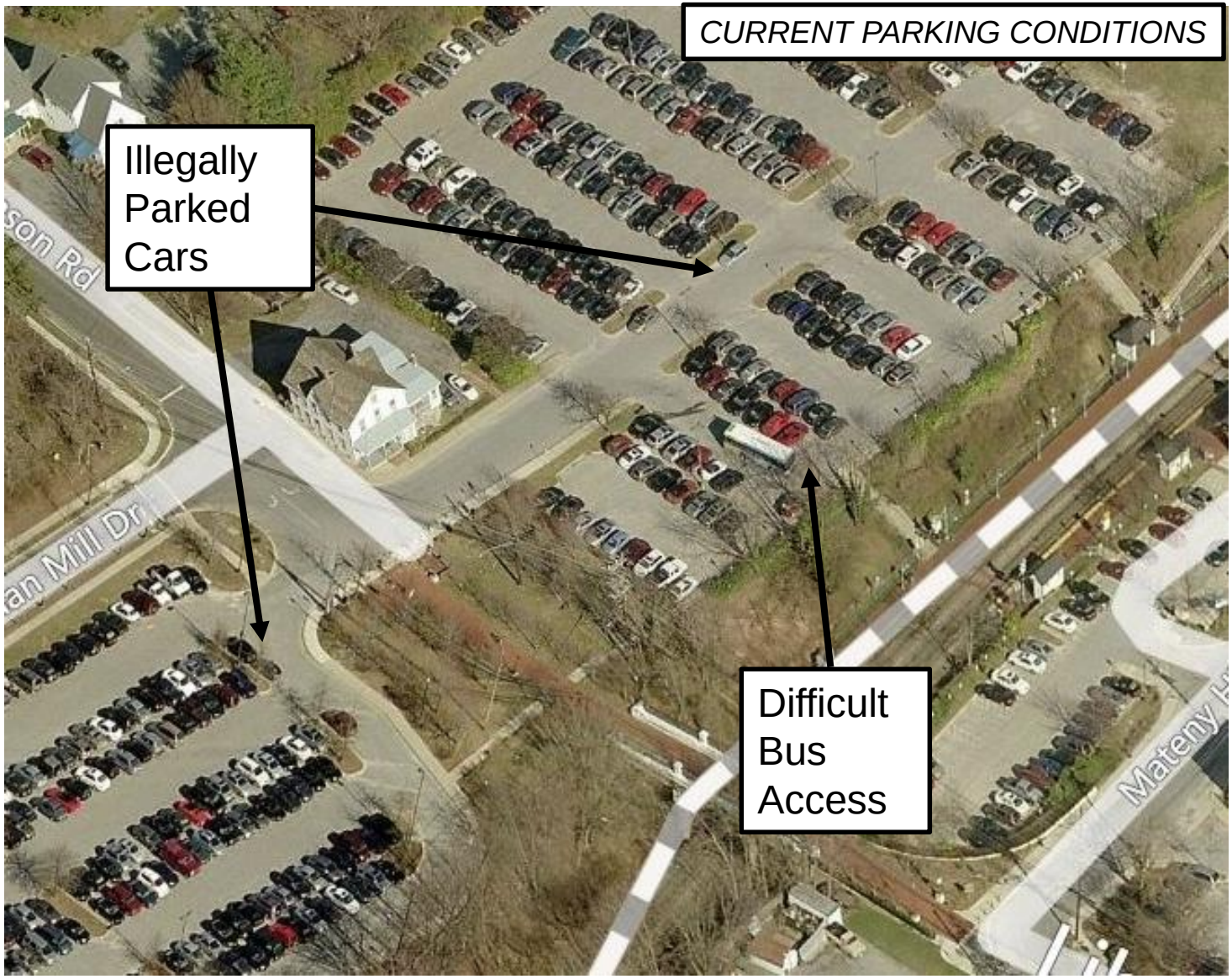


Route	Direction	Route Description	FY15 Boardings	FY15 Alightings	Total Activity
61	North	Stops on Germantown Road near north MARC	7	17	24
61	South	parking lot	26	6	32
83	North	Service between Germantown Transit Center	11	0	11
83	South	and MARC Germantown station	0	11	11
94	North	Express service between Clarksburg and MARC	47	0	47
94	South	Germantown station	0	46	46
97	AM Loop	Service between Germantown Transit Center	4	6	10
97	PM Loop	and Germantown MARC station	4	9	13

Source: MCDOT

Source: MCDOT

Connectivity Considerations



Connectivity Considerations

New Road Connections

- Waters Road Realignment
  - Facilitate bike and pedestrian access across Germantown Rd.
- Road connecting Walter Johnson Rd to Germantown Rd
  - Facilitate access to new parking garage.
  - Helps create a street grid
- Other
  - Mateny Hill Rd extension

Community Concerns

- Preserve Historic Resources
  - Including road network – primarily on the south/west side of tracks
- Maintain Location for Flea Market
  - Publicly accessible
  - Protected from elements
- Create Community Amenity Space
  - Adjacent to station, per Master Plan guidance

MARC Service – Brunswick Line

- Germantown Station Today
  - 9 trains serve station in both AM and PM per weekday
  - Approximately 900 boardings at station per weekday
    - Parking – 694 plus (carpooling)
    - Ride On – 95
    - Walk/bike – <100
- MARC average annual growth 2007 to 2012 - 1.7%
- Germantown Station Tomorrow and Beyond
  - Explore parking facility expansion
  - Lengthen existing trains to accommodate growing ridership
  - Install additional bike racks/lockers at stations
  - Additional triple tracking
  - Increased peak and off-peak service
  - Reverse commute service

Development Factors: Parking Garage

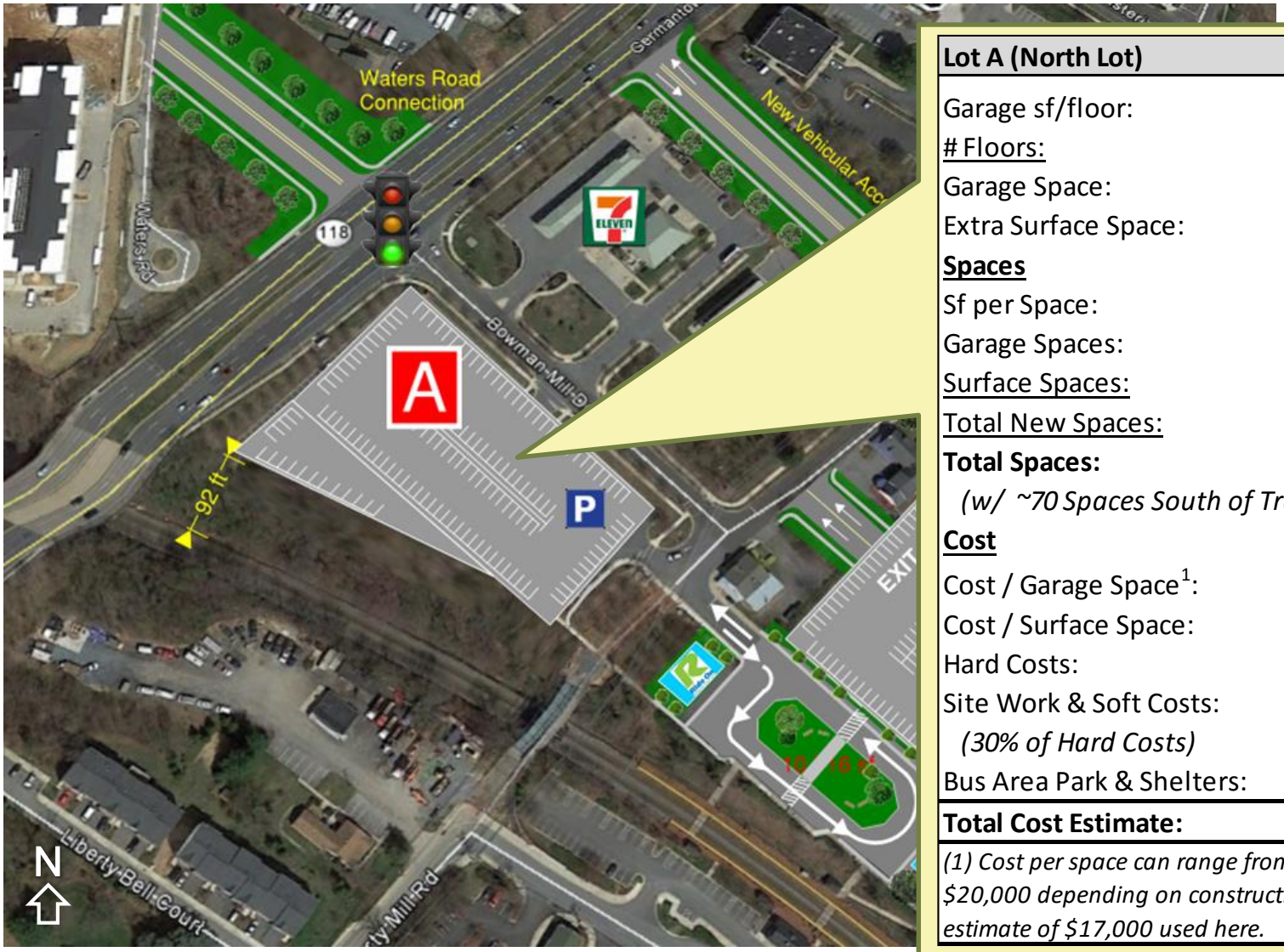
- Considerations
  - Determine whether precast or cast-in-place construction
  - Cost drivers include:
    - Façade treatment
    - Number of elevators
    - Site work (more expensive on South Lot due to topography)
- Due to the high cost of foundation & site work, it is more efficient to build higher garages (3+ stories)
- The most efficient approach will be to build only one garage
- North Lot (Lot A) is generally more valuable for private development due to road frontage

Glenmont Metro Station 1200 space parking garage.

MARC Parking Garage Analysis

- MARC parking
  - 694 spaces, 99% utilization rate
  - 55% of riders driving to station from < 2 miles away
  - Two parking garage options:
    - Option A – North parking lot
    - Option B – South parking lot
- Both options provide 900 -1,100 total spaces that would serve mid-term (15-year) growth in ridership
- Bus Circulation, Bike Rooms & Bus/Rider Shelter

Lot A - Space Yield & Cost Estimate



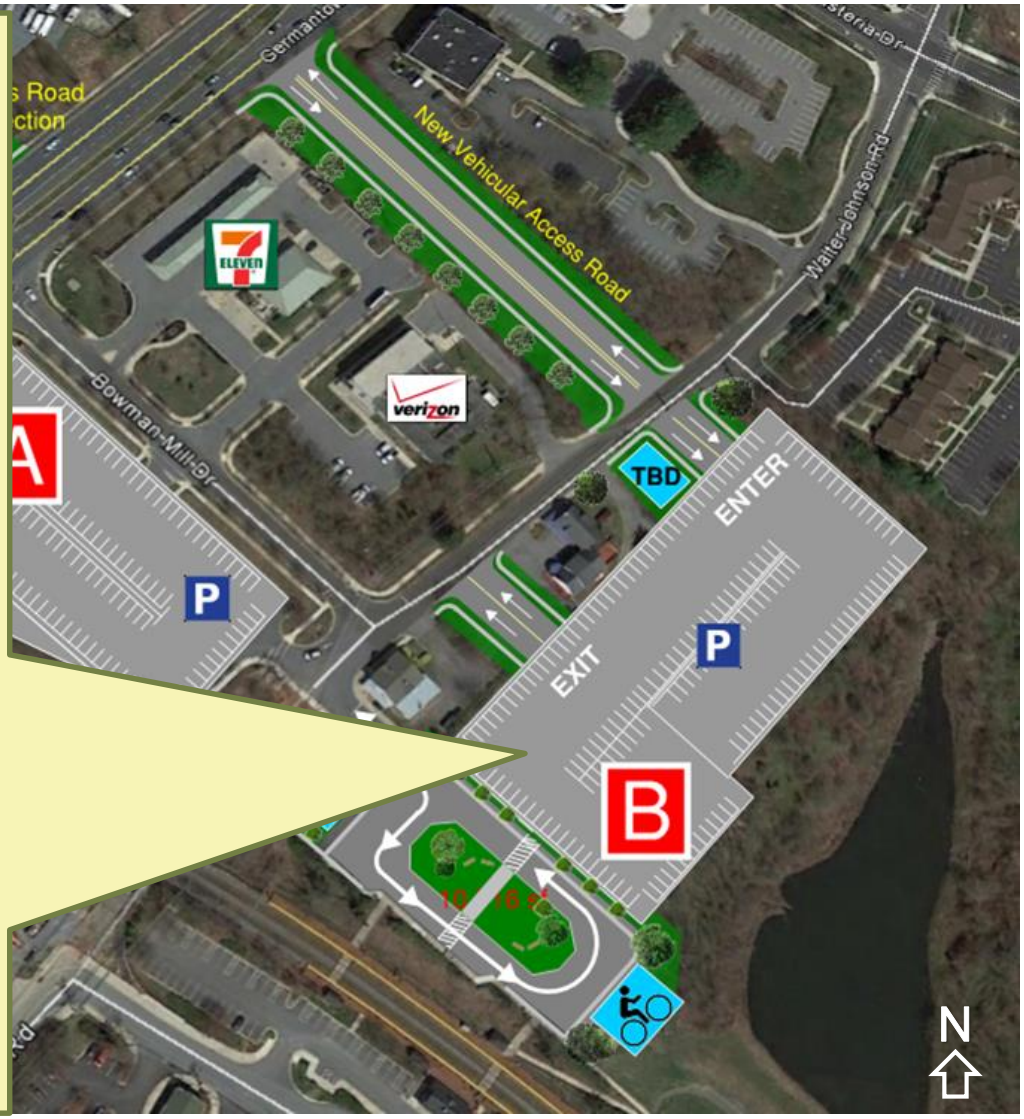
Lot A (North Lot)	
Garage sf/floor:	72,000 sf
# Floors:	4
Garage Space:	288,000 sf
Extra Surface Space:	16,000 sf
Spaces	
Sf per Space:	350 sf
Garage Spaces:	823
Surface Spaces:	46
Total New Spaces:	869
Total Spaces:	**939**
(w/ ~70 Spaces South of Track)	
Cost	
Cost / Garage Space[1]:	$17,000
Cost / Surface Space:	$7,000
Hard Costs:	$14,300,000
Site Work & Soft Costs:	$4,300,000
(30% of Hard Costs)	
Bus Area Park & Shelters:	$1,000,000
Total Cost Estimate:	**$19,600,000**

(1) Cost per space can range from $14,000 - $20,000 depending on construction type. Middle estimate of $17,000 used here.

Lot B - Space Yield & Cost Estimate

Lot B (South Lot)	
Garage sf/floor:	110,000 sf
# Floors:	3
Garage Space:	330,000 sf
Extra Surface Space:	0 sf
Spaces	
Sf per Space:	350 sf
Garage Spaces:	943
Surface Spaces:	-
Total New Spaces:	943
Total Spaces:	**1,013**
(w/ ~70 Spaces South of Track)	
Cost	
Cost / Garage Space[1]:	$17,000
Cost / Surface Space:	$7,000
Hard Costs:	$16,000,000
Site Work & Soft Costs:	$4,800,000
(30% of Hard Costs)	
Bus Area Park & Shelters:	$1,000,000
Total Cost Estimate:	**$21,800,000**

(1) Cost per space can range from $14,000 - $20,000 depending on construction type. Middle estimate of $17,000 used here.



Private Development Factors: General

- If a parking garage is built on one lot, the other lot is available for private development
- This also works well for Private development, which works best with a full lot (critical mass & autonomy)
- Land acquisition costs for CSX land & adjacent parcel along Walter Johnson Rd. must be quantified and established
- Value to developers is quantified using Residual Land Value Approach

Residual Land Value: Example

FINAL VALUE AT COMPLETION:	**$10,000,000**
(aka Stabilized value)	
LESS:	
Known Costs:	
- Construction (Hard) Costs	$6,000,000
- Soft Costs (Design Fees, Consulting, Marketing, Etc.)	$1,000,000
- Developer/Investor Profit Margin	$1,000,000
TOTAL COSTS	**$8,000,000**
REMAINING RESIDUAL LAND VALUE:	**$2,000,000**

Private Development Factors: Residential

- For rental apartments, North Lot Works better for visibility & access
- Surface-Parked Apartments are feasible but have low yield (max. ~95 units on North Lot)
- Structured Parking could fit, but is not economically feasible
- Townhouses work well in this area, but would only work on South lot away from busy street
- Townhouses could yield 35-40 towns on South Lot

Private Development Factors: Retail

- North Lot (Location A) is the only suitable retail location
- Site is too small to attain critical mass with Anchors
- Retail core in Germantown Town Center will maintain competitive advantage
- Retail demand would need to be destination retail (e.g. national pad chains) or;
- Wait until new development advances to a point where neighborhood retail or a specialty use (e.g. childcare facility) could be feasible

Private Development Options - Summary

Use	Does it Fit?	Can the Use Perform?	Economically Feasible?	Value
Residential				
Apartment - Surface Park	✓	✓	✓	**Low**
Apartment - Garage Parking	✓	✓	✗	-
Townhomes	✓	✓	✓	**Mid/High**
Condo	✓	✗	-	-
Single Family	✓	✗	-	-
Retail				
Anchored Center	✗	-	-	-
Neighborhood Retail	✓	✓	✓	**Low/Mid**
Pad Retail	✓	✓	✓	**Variable**
Multi-Story Retail or Retail/Office Mixed Use - Garage Parking	✓	✓	✗	-
Office				
Mid/Low-Rise Office	✓	✗	-	-
Other				
Specialty (e.g. Childcare Facility)	✓	✗	-	-
Affordable Housing	✓	**TBD**	-	-

Development Example Scenario #1
Residential Apartments w/ Surface Parking (Lot A)

Residual Land Value Estimate – Scenario 1 - Apartments

Building Profile	
Stories:	4
Units	95
FAR:	0.9
Parking Spaces:	149
Parking Ratio	1.6
Net Operating Income	$1,500,000
Sales Value :	**$22,800,000**
(6.5% Cap Rate, 2% Transaction Costs)	

Budget	
Hard Costs	$14,500,000
Soft Costs	$3,600,000
Investor Profit Margin	$3,300,000
Total Costs	**$21,400,000**

REMAINING RESIDUAL LAND VALUE:	**$1,400,000**
(before cost of CSX land acquisition)	

Development Example Scenario #2
Residential Townhomes (Lot B)

Design is a conceptual site plan and not to scale

Land Value Estimate
Scenario 2 -Townhomes

	Townhouse Yield Study					
	Development Name		**# of Towns**	**Land Area (SF)**	**Land Area (Acres)**	**Density (Units/Acre)**
1.	Waterford Hills North	Germantown	79	243,734	5.6	14.1
2.	Waterford Hills South	Germantown	85	254,361	5.8	14.6
3.	Harvest Glen	Germantown	103	319,600	7.3	14.0
4.	Seneca Hill	Germantown	109	351,541	8.1	13.5
5.	Dawson Beach	Woodbridge, VA	116	358,499	8.2	14.1
	Average/Totals		**492**	**1,527,735**	**35.1**	**14.0**
	Indicated Subject Yield		**37**	**115,000**	**2.6**	**14.0**

Land Value Range

Sales Price (per Unit)	Land Value (as a % of Sales Price)* 25%	30%	35%
$375,000	$3,500,000	$4,200,000	$4,900,000
$400,000	$3,700,000	**$4,400,000**	$5,200,000
$425,000	$3,900,000	**$4,700,000**	$5,500,000
$450,000	$4,200,000	$5,000,000	$5,800,000

**Land values are before acquisition cost of adjacent parcel*

Development Example Scenario #3 Neighborhood Retail - (Single Story) (Lot A)

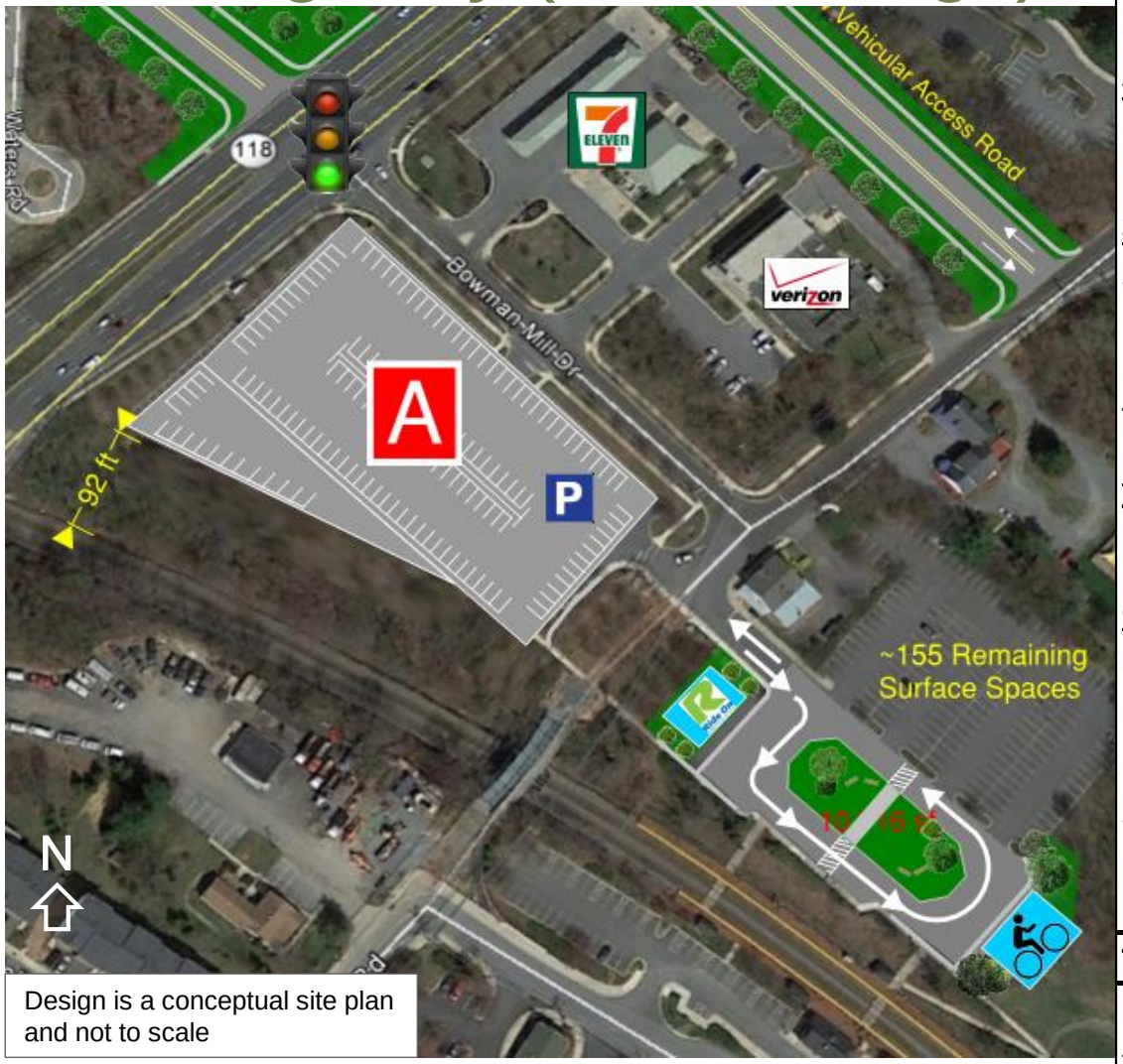
Residual Land Value Estimate – Scenario 3 –Neighborhood Retail

Building Profile	
Stories:	1
GSF:	32,000
FAR:	0.3
Parking Spaces:	128
Parking Ratio (per 1,000 sf):	4.0
Net Operating Income	$760,000
Sales Value :	**$11,500,000**
(6.5% Cap Rate, 2% Transaction Costs)	

Budget	
Hard Costs	$6,500,000
Soft Costs	$1,600,000
Investor Profit Margin	$1,600,000
Total Costs	**$9,700,000**

REMAINING RESIDUAL LAND VALUE:	**$1,800,000**
(before cost of CSX land acquisition)	

Sample Development Option #4 Parking Only (Lot A Garage)



Design is a conceptual site plan and not to scale

Lot A (North Lot) - Parking Only	
Garage sf/floor:	72,000
# Floors:	4
Garage Space:	288,000
Extra Surface Space:	16,000
Spaces	
Sf per Space:	350
New Garage Spaces:	823
New Surface Spaces:	46
Total New Spaces:	869
Existing Surface Spaces:	155
Total Spaces:	**1,094**
(w/ ~70 Spaces South of Track)	
Cost	
Cost / Garage Space[1]:	$17,000
Cost / Surface Space:	$7,000
Hard Costs:	$14,300,000
Site Work & Soft Costs:	$4,300,000
(30% of Hard Costs)	
Bus Area Park & Shelters:	$1,000,000
Total Cost Estimate:	**$19,600,000**

(1) Cost per space can range from $14,000 - $20,000 depending on construction type. Middle estimate of $17,000 used here.

Funding Sources: Public

- MNCPPC-sponsored land swap or air rights
- Fed/state/local grants
  - HUD/EPA Sustainable Communities Grant
  - Federal DOT Transportation Infrastructure Generating Economic Recovery (TIGER) Grant
    - Application would require a multi-jurisdictional REGIONAL parking strategy to measure the potential for “mode shift” (transitioning auto passengers to public transit riders)

Funding Sources: Public-Private

- Near-Term Feasibility:
  - PPP not feasible for Scenario 1 or 2 due to relationship between costs/ revenues and lack of parking income
  - Tax Increment Financing not feasible due to insufficient commercial density within a reasonable TIF district boundary
    - Annual bond repayment for parking deck is $1.45 M ($25M capital cost, 30 years, 4%)
    - Potential incremental real property revenue from project is insufficient to meet bond repayment needs (estimated <$50K/year at buildout)

Funding Sources: Public-Private

- Mid- to Long-term:
  - Strong demographic and economic indicators (high value HH incomes and growth trends) indicated future opportunity for creative Public/Private Financing
    - Master Developer RFP process recommended to market site/identify high quality, well capitalized development partner with experience securing other public funding sources
    - Combination of developer proffers (in exchange for GC position on garage) and public subsidies
    - Linkage fees (stormwater tax credits, other housing linkage fees)
    - Low income housing tax credits for mixed income housing (buy down on the capital costs for the housing to cross-subsidize the garage

Funding Sources: Private/Commercial

- Conventional Bank Loan
  - Project financing necessitates a stream of income for repayment
  - Commercial financing not a viable option without generating income by charging for parking
    - MARC does not currently charge for parking other than at stations where Metro is also present (shared parking)
    - Additionally, given the amount of available land and parking in the Germantown area, paid parking is not prevalent in the community and would potentially push many users to the next station (which includes free parking) on the MARC line

Summary of Development Challenges

- Private development land value is insufficient to fund parking garage without public subsidies
- Neighborhood compatibility, not economics, should therefore drive private development
- To support new construction w/ structured parking would require Residential rents of approx. $2.50 psf (25% higher than current estimate of $2.00 psf) or retail rents of approx. $30 (20% higher than the current estimate of $25 for this location)
- High value private development alternatives may require fee simple sale of the land (e.g. townhouses or condos) –potentially incompatible with County objectives

Summary of Development Challenges

- Land acquisition
- Competitive disadvantages to other sites
- Reliance on new development to fund infrastructure that would connect station to Town Center
- Circulation and access requirements for buses on east side
- Free commuter parking, riders are likely to drive elsewhere to avoid new parking fees (if instituted)
- Competing desires between improving pedestrian and vehicular safety and preserving community historic character

Recommendations

- Conduct a regional commuter study (including a rider intercept survey) to test potential for expanded utilization of MARC
- Explore potential of regional commuter park and ride system
- Promote “Mode Shift” from auto passengers to public transit and alternative modes
- Target state and federal grants/partnerships to fund regional planning studies and capital requirements for the garage and associated public transit improvements (HUD Sustainable Communities, TIGER, etc.)

Recommendations

- Add public parking at Boyds MARC station in advance to help manage overflow during construction of Germantown garage
- Build Germantown MARC garage before other private uses to maintain parking supply
- Improve access for pedestrians and bicycles, not just cars
  - No vehicular connection over the tracks (at this time)
  - Create a public walking and biking path adjacent to pond/stream (if possible) to provide additional site access as well as a public amenity

Recommendations

- Transition to paid parking
  - Revenue from paid parking could offset costs
  - 1,000 spaces X $6 X 250 days/year = $1.5 million (equal to annual bond payment on construction of $25 M decked garage)
- Engage a broker and legal counsel to explore issuance of a private Master Developer RFP to help defray cost of garage
- Engage local residents to explore ways to address pedestrian safety while preserving historic character of nearby roads

Questions?

Appendix E -
Historic Preservation

Appendix E: Historic Preservation
MARC Rail Communities Sector Plan, Working Draft
December 2017

Existing Historic Sites and Districts in Boyds and Germantown:

- Boyds, Winderbourne (1979 designation. Description from Kelly, Clare Lise. *Places from the Past; The tradition of Gardez Bien in Montgomery County, Maryland*. Silver Spring: M-NCPPC, 2011. Print.)
- Boyds Historic District (description from the 1985 Boyds Master Plan)
- Germantown Historic District and Individual Sites (descriptions from the 1989 Germantown Master Plan)
- Germantown Historic Resources (2009 Germantown Employment Area Sector Plan)
- Germantown Appendix 10, Cultural and Historic Table (2009 Germantown Employment Area Sector Plan Appendix)
- Germantown Appendix 11, Cultural Resources (2009 Germantown Employment Area Sector Plan)
- Germantown Appendix 12, Historic Preservation Elements (2009 Germantown Employment Area Sector Plan)

windows. The front façade features a large, steeply pitched central gable echoed by flanking dormers. The pedimented double-door entrance has oversize sidelights and transom. The front door opens into a large reception hall with rear fireplace. The parlor at left has a slate fireplace with mantel and the dining room at right features cornice molding. Two sets of stairs can be seen from the hall, the main stairway at front and a service stair at rear. The house lacks its original porches across the main block and flanking wings. The property has also been known as Riverview. Outbuildings include a bank barn with metal ventilators and terra cotta silo, and a double corncrib.

Clare Lise Cavicchi, M-NCPPC, 1993

White-Poole House *12/14-2*
(1870s with earlier log rear ell)

White-Poole House 12/14-2
(1870s with earlier log rear ell)
21600 Beallsville Road

The White-Poole House represents the railroad community of Sellman that thrived from the 1873 opening of the Metropolitan Branch until the 1930s. Also known as Barnesville Station, the community provided local access to the train for the town of Barnesville, located to the north. In 1882, Sellman had a population of 50. In addition to the railroad station, there were 3 stores, a post office, church, school and canning factory. The White-Poole House began as a log house built in the early to mid 1800s. In the railroad era, the front Gothic Revival block was constructed. The residence was home to two Sellman merchants: shoemaker James Carlisle, and general store keeper Oscar K. Poole.

M-NCPPC, 1986

Winderbourne (1884) *18/10*

Winderbourne *(1884)* 18/10
15001 Barnesville Road

This high-style Queen Anne residence was the summer home of Enoch and Mary Totten. Mrs. Totten was the daughter of Timothy Howe, Wisconsin Senator and sole heir to the fortune of Elias Howe, inventor of the sewing machine bobbin. Howe's bobbin, a lock stitch device known in those days as a winder, known was manufactured and sold by Singer and other companies worldwide. At his death in 1867, his fortune amounted to $13 million. Mary Howe Totten built her vacation estate in 1884, naming it Winderbourne in recognition of the winder device that brought her family fortune.

The Tottens chose a vacation home site adjacent to Bonnie Brae, the picturesque village-like Boyd estate. Situated on a hill overlooking Seneca Creek, Winderbourne was originally accessed from Clopper Road by a bridge across the railroad tracks, built in part and maintained by the railroad company. The house bears such unusual features as a grand sweeping staircase, great triangular fireplace and concealed downspouts leading to an underground cistern. The grounds were cultivated with imported trees and shrubs and outfitted with a gazebo and an ice pond.

7

APPENDIX A

RESOURCES WITHIN THE BOYDS HISTORIC DISTRICT

This amendment recommends the designation of the area identified in Figure as a Master Plan Historic District. All properties within the District will be subject to the provisions of the County's Historic Preservation Ordinance, Chapter 24A of the Montgomery County Code, which governs exterior changes to the District's resources and their environmental settings.

(Note: For future reference and administration of the Ordinance, the Atlas identification number 18/8 has been assigned to District properties as indicated.)

18/8 Boyds Agricultural Village

- A cohesive grouping of residential, religious and commercial structures characteristic of a turn-of-the-century agricultural village and reflective of the rail-oriented heritage of the County.

The following properties are recognized as primary resources to the Boyds Historic District:

Atlas #	Site	Parcel #
18/8-1	David Mauglin House - 15215 Barnesville Road	P972

- Circa 1890--Gothic Revival residence with decorative fan-like porch brackets and carved balusters.
- The only surviving structure built by Col. James A. Boyd, contractor with the B & O Railroad and co-developer of Boyds.

18/8-2 15200 Barnesville Road P26

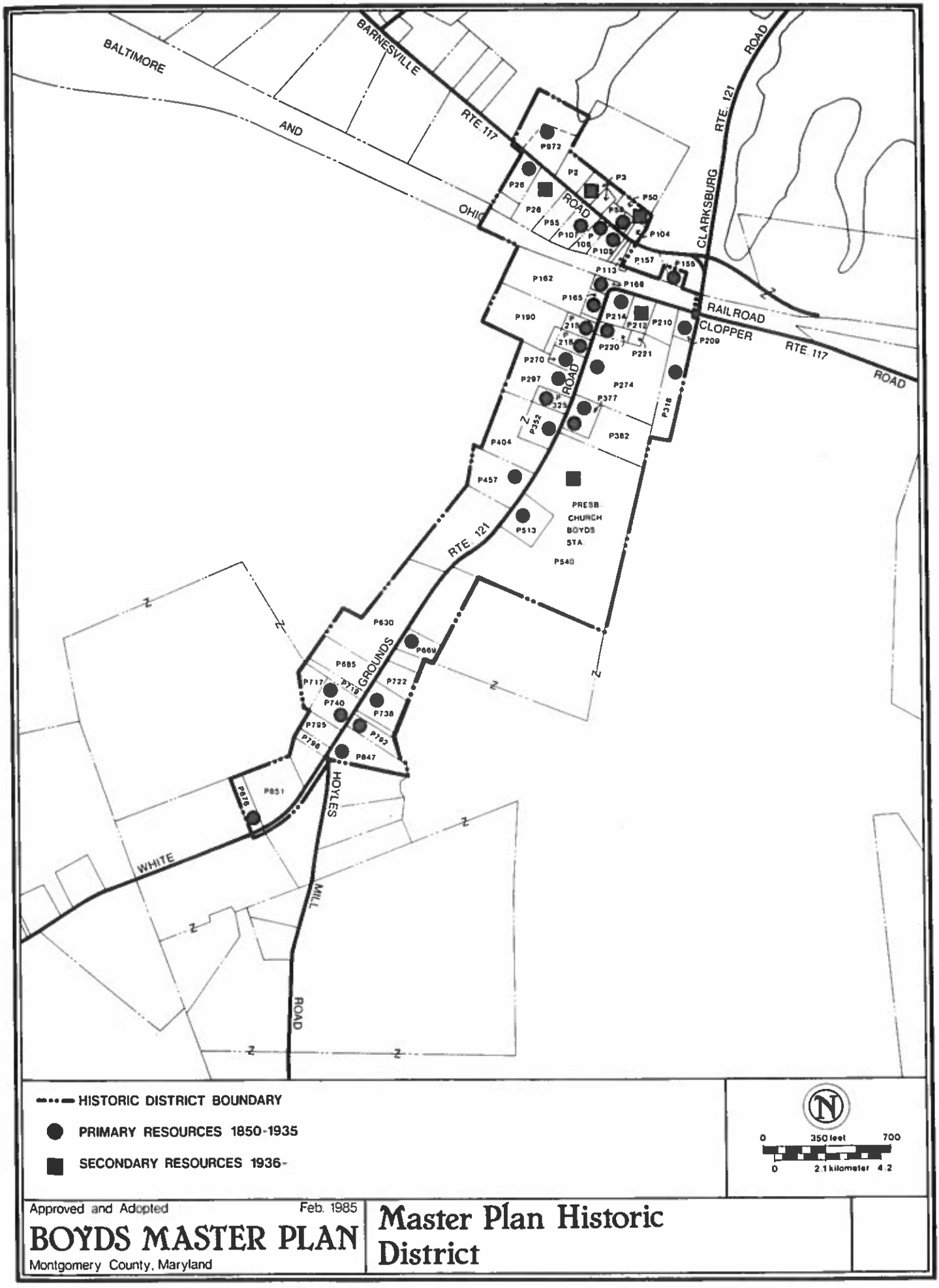
- Constructed between 1880-1890.
- Example of the Gothic Revival style includes wraparound porch with turned columns and fan brackets and an entrance treatment with transom and sidelights.

18/8-3 15130 Barnesville Road P107

- Turn-of-the-century revival style with wraparound porch with neo-classical columns, bay window, and ornate eave brackets.

18/8-4 15121 Barnesville Road P58

- Circa 1880--Gothic Revival dwelling with double-hung sash and wheel window in the center gable.



Approved and Adopted Feb. 1985

BOYDS MASTER PLAN

Montgomery County, Maryland

Master Plan Historic District

Atlas #	Site	Parcel #
18/8-5	Antique Shop - 15120 Barnesville Road	Part of P105

- Constructed ca. 1890.
- Freestanding retail shop with tin gable roof typical of late 19th/early 20th century rural commercial structures.

18/8-6	National Solvents - 15114 Barnesville Road	Part of P105

- Constructed circa 1890-1900.
- Deep, narrow commercial building with lap siding and tin gable roof with simple hipped-roof porch.

18/8-7	Boyds Market - 15110 Barnesville Road	Part of P105

- Original frame section circa 1920, front formstone section with mission revival facade added in the 1940's.
- Typical in both design and building materials of early 20th century commercial structure.

18/8-8	Hoyles Mill - 15100 Barnesville Road	Part of P157/155

- Two-story frame grist mill with pressed tin siding constructed ca. 1915.
- One of only a handful of grist mills surviving in Montgomery County.

18/8-9	Boyds Passenger Platform and Station Site	B&O RR Right-of-Way

- Site of the original B&O station in operation from 1880's to the track widening in the 1920's. Second station operated from the 1920's to 1968.
- Historically significant as the transportation improvement which brought new development to the area giving rise to the town of Boyds.

18/8-10	15004 Clopper Road	P209

- Circa 1880--two-story frame, simple early Gothic Revival residence.

18/8-11	15010 Clopper Road	P318

- Circa 1880--two-story frame, Gothic Revival, residence featuring window wheel side gables and decorative porch treatment across the front of the house.
- Setting includes a two-story outbuilding of the same period with German siding connected to the main house by a modern breezeway.

Atlas #	Site	Parcel #
18/8-12	15030 Clopper Road	P214

- Circa 1880's--two-story frame, Gothic Revival residence featuring wheel window in center gable of main (north) facade, and two-story turriculate bay on west (White Grounds Road) facade.

18/8-13	19940 White Grounds Road	P166

- Circa 1905--two-story frame, vernacular farmhouse fronting the B&O tracks.

18/8-14	19934 White Grounds Road	P165

- Circa 1890's--two-story frame vernacular farmhouse.

18/8-15	19925 White Grounds Road	P220

- Circa 1900's--two story frame, simple Gothic Revival residence, featuring wheel window in center gable of main facade.

18/8-16	19924 White Grounds Road	P215

- Circa 1880's--two-story frame, Gothic Revival residence featuring lancet arch window in center.gable of main facade; center gable is repeated in roof line of decorative porch.

18/8-17	19920 White Grounds Road	P218

- Circa 1890's--two-story frame, Queen Anne residence featuring protruded second story center bay surmounted by center gable covered in fish-scale shingles.

18/8-18	19921 White Grounds Road	P274

- Circa 1880's--Queen Anne style residence featuring German siding, two-story extended bay with gable on front facade with carved sunrise design on the eaves.

18/8-19	19916 White Grounds Road	P270

- Circa 1900's--two-story frame Gothic Revival residence featuring cross gable roof with decorative brackets, Palladian window in center gable of main facade; center gable repeated in porch roof line.

18/8-20	19910 White Grounds Road	P297

- Circa 1910's--two-story frame, Colonial Revival style residence with hipped roof and dormers and featuring projected bay entranceway.

Atlas #	Site	Parcel #
	- Setting includes a carriage house with German siding, gable front, seamed tin roof and cupola.	
18/8-21	19904 White Grounds Road	P325
	- Circa 1920's--two-story frame, Colonial Revival residence, apparently covered later with brick veneer.	
18/8-22	Boyds Presbyterian Church	P377
	- 1876--Gothic Revival rural church.	
	- Setting includes a cemetery to the rear of the church yard.	
18/8-23	Presbyterian School	P377
	- Circa 1870's--one-story and loft frame schoolhouse featuring cupola with louvered windows.	
18/8-24	19900 White Grounds Road	P352
	- Circa 1880's--two-story frame, Gothic Revival residence, hipped roof with center gable on main facade featuring decorative brackets.	
18/8-25	19810 White Grounds Road	P457
	- Circa 1880's--two-story frame rural vernacular farmhouse.	
18/8-26	19801 White Grounds Road	P513
	- Circa 1880's--two-story frame Gothic Revival residence.	
18/8-27	Diggens House - 19701 White Grounds Road	P669
	- Constructed between 1870's-1890's.	
	- Important as an example of a typical two-story, two room up, two room down, post emancipation black dwelling.	
18/8-28	Duffin Family House - 19635 White Grounds Road	P722
	- Circa 1980--significant to the County as an unusual example of an extended dwelling.	
	- Similar in floor plan to typical post emancipation dwelling but more elaborate in decorative detailing with bracketed porch supports and a porch gable directly aligned with the center gable of the original portion of the house.	

18/8-29 Duffin-Hebron House - 19625 White Grounds Road P738

- Constructed 1870-1890's.
- Typical two room up, two room down, post emancipation dwelling.

18/8-30 St. Marks Methodist Church - 19620 White Grounds Rd. P740

- Constructed in 1893--typical vernacular rural church with interesting decorative verge board along front gable.
- Setting includes a small cemetery to the side and rear of the church yard.
- Ancilliary parish hall dating from the 1930's is not architecturally significant and need not be preserved as part of the environmental setting.

18/8-31 William Gibbs House - 15465 Hoyles Mill Road P847

- Circa 1870's--Typical post emancipation dwelling.

18/8-32 Boyds Negro School - 19510 White Grounds Road P876

(Note: Previously designated as individual Historic Site #18/11 as part of the September 1979 Master Plan for Historic Preservation).

- 1895--frame, 1½-story rectangular structure.
- A one-room school for black children on this lot in 1879 was replaced by this structure, which was used until 1936.

The following properties are recognized as secondary resources to the Boyds Historic District:

Atlas #	Site	Parcel #
18/8-33	15140 Barnesville Road	P28

- Constructed ca. 1950 in an imitation of the bungalow style.

18/8-34 15131 Barnesville Road P3

- Constructed ca. 1930, modified bungalow style.

18/8-35 15020 Clopper Road P212

- Non-historic structure constructed in the 1940's--one and half story stucco over cement block.

Atlas #	Site	Parcel #
18/8-36	Boyds Day Care Center	P540

- Non-historic structure constructed in the 1950's.
- Two-story cinderblock, brick and frame building.

The following properties are recognized as spatial resources to the Boyds Historic District and are included in the environmental setting of the District:

Atlas #	Parcel #
18/8-37	P55

- Vacant parcel--former site of Wheelwright's house, circa 1900 Gothic Revival structure.

18/8-38	P2

- Vacant--open space.

18/8-39	P382

- Open space associated with Boyds Presbyterian Church, portion in use as church cemetery.

18/8-40	P630
18/8-41	Part of 850
18/8-42	P685
18/8-43	Part of 440
18/8-44	P719
18/8-45	P722
18/8-46	Part of 747
18/8-47	P796
18/8-48	P851

- Parcels 630-851 are vacant and predominantly covered by second growth and scrub vegetation.

Atlas #	Site	Parcel #
18/8-49	P717	
	- Open space associated with St. Mark's Church, portion in use as a cemetery.	
18/8-50	P795	
	- Vacant--former site of St. Mark's rectory circa 1900 Gothic Revival cottage.	
18/8-51	P210	
18/8-52	Part of 274	
18/8-53	P162	
18/8-54	P190	
18/8-55	Part of P297	
18/8-56	Part of P404	
	- Parcels 210- part of 404 are associated with primary resources and are currently either in open space, under cultivation or in use as pasture.	
18/8-57	Part of 540	
	- Property associated with the Boyds Day Care Center functioning partially as parking and play areas for the Center with a portion under cultivation.	

Historic Resources

The *Master Plan for Historic Preservation* and the Historic Preservation Ordinance, Chapter 24A of the Montgomery County Code, are designed to protect and preserve Montgomery County's historic and architectural heritage. When an historic resource is placed on the *Master Plan for Historic Preservation*, the adoption action officially designates the property as an historic site or historic district, and subjects it to the further procedural requirements of the Historic Preservation Ordinance. Amendments to area master plans that evaluate historic resources for designation also amend the *Master Plan for Historic Preservation.*

Designation of historic sites and districts serves to highlight the values that are important in maintaining the individual character of the County and its communities. It is the intent of the County's preservation program to provide a rational system for evaluating, protecting and enhancing the County's historic and architectural heritage for the benefit of present and future generations of Montgomery County residents. The accompanying challenge is to weave protection of this heritage into the County's planning program so as to maximize community support for preservation and minimize infringement on private property rights.

The following criteria, as stated in Section 24A-3 of the Historic Preservation Ordinance, shall apply when historic resources are evaluated for designation in the *Master Plan for Historic Preservation*:

(1) Historical and cultural significance:

The historic resource:

a. has character, interest, or value as part of the development, heritage or cultural characteristics of the County, State, or Nation;

b. is the site of a significant historic event;

c. is identified with a person or a group of persons who influenced society;

d. exemplifies the cultural, economic, social, political or historic heritage of the County and its communities; or

(2) Architectural and design significance:

The historic resource:

a. embodies the distinctive characteristics of a type, period or method of construction;

b. represents the work of a master;

c. possesses high artistic values;

d. represents a significant and distinguishable entity whose components may lack individual distinction; or

e. represents an established and familiar visual feature of the neighborhood, community, or County due to its singular physical characteristic or landscape.

Implementation

Once designated on the *Master Plan for Historic Preservation*, historic resources are subject to the protection of the Ordinance. Any substantial changes to the exterior of a resource or its environmental setting must be reviewed by the Historic Preservation Commission and an historic area work permit issued under the provisions of the County's Preservation Ordinance, Section 24A-6. In accordance with the *Master Plan for Historic Preservation* and unless otherwise specified in the amendment, the environmental setting for each site, as defined in Section 24A-2 of the Ordinance, is the entire parcel on which the resource is located as of the date it is designated on the *Master Plan.*

Designation of the entire parcel provides the County adequate review authority to preserve historic sites in the event of development. It also ensures that,

from the beginning of the development process, important features of these sites are recognized and incorporated in the future development of designated properties. In the case of large acreage parcels, the amendment will provide general guidance for the refinement of the setting by indicating when the setting is subject to reduction in the event of development; by describing an appropriate area to preserve the integrity of the resource; and by identifying buildings and features associated with the site which should be protected as part of the setting. It is anticipated that for a majority of the sites designated, the appropriate point at which to revise the environmental setting will be when the property is subdivided.

Public improvements can profoundly affect the integrity of an historic area. Section 24A-6 of the Ordinance states that an Historic Area Work Permit for work on public or private property must be issued prior to altering an historic resource or its environmental setting. The design of public facilities in the vicinity of historic resources should be sensitive to and maintain the character of the area. Specific design considerations should be reflected as part of the Mandatory Referral review processes.

In the majority of cases, decisions regarding preservation alternatives are made at the time of public facility implementation within the process established in Section 24A of the Ordinance. This method provides for adequate review by the public and governing agencies. In order to provide guidance in the event of future public facility implementation, the amendment addresses potential conflicts existing at each site and suggests alternatives and recommendations to assist in balancing preservation with community needs.

In addition to protecting designated resources from unsympathetic alteration and insensitive redevelopment, the County's Preservation Ordinance also empowers the County's Department of Environmental Protection and the Historic Preservation Commission (HPC) to prevent the demolition of historic buildings through neglect.

The Montgomery County Council passed legislation in September 1984 to provide for a tax credit against County real property taxes in order to encourage the restoration and preservation of privately owned structures located in the County. The credit applies to all properties designated on the *Master Plan for Historic Preservation* (Chapter 52, Art. VI). Furthermore, the Historic Preservation Commission maintains up-to-date information on the status of preservation incentives including tax credits, tax benefits possible through the granting of easements on historic properties, outright grants and low-interest loan programs.

Germantown's Historic Resources (Figure 42 and Table 23)

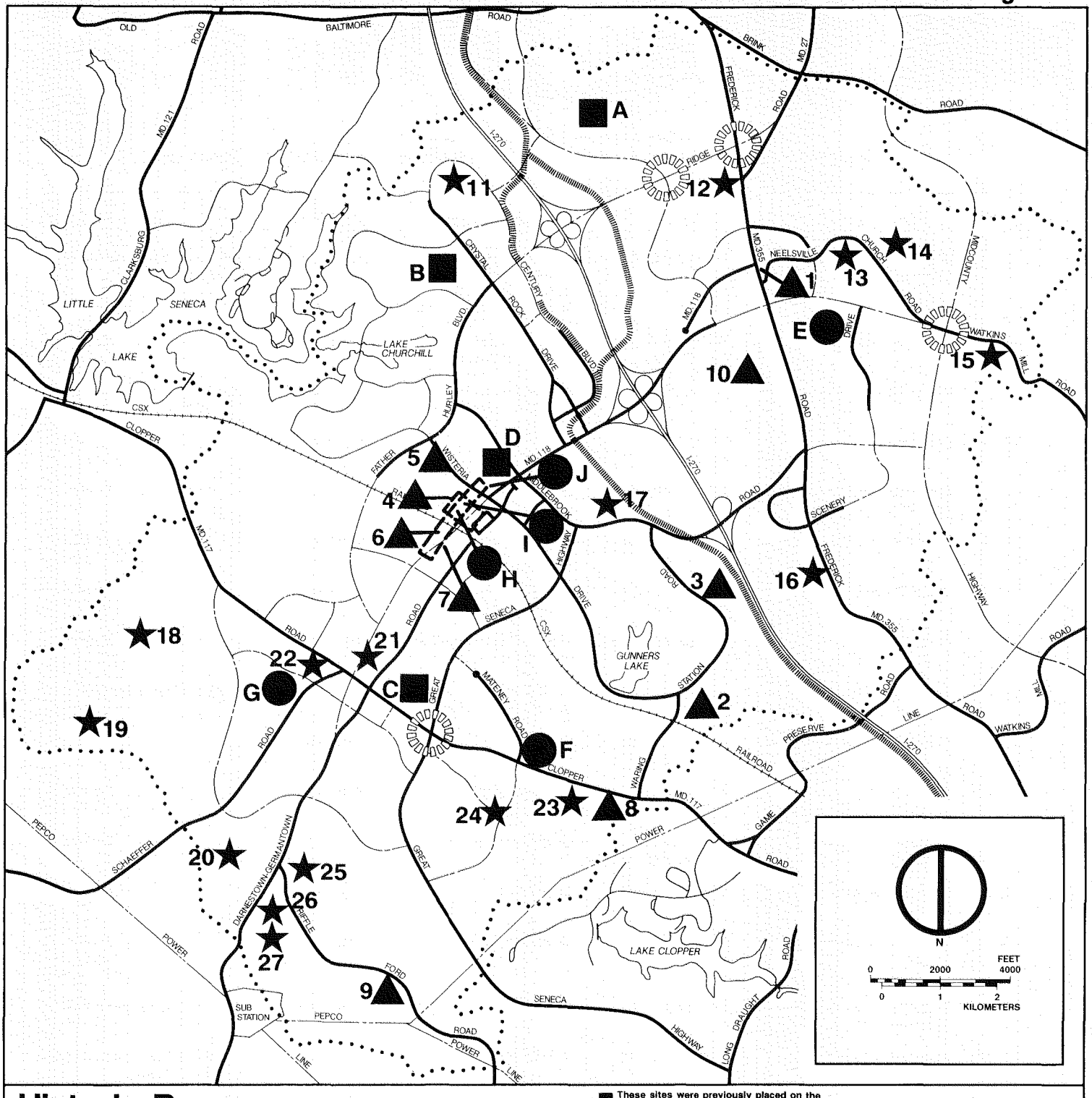
Table 24 lists all historic resources within the Germantown Planning Area. The ten resources with positive recommendations are now included in the *Master Plan for Historic Preservation*. This table highlights each site's name, address, physical condition, HPC recommendations, and whether the Plan recommends its inclusion on the *Master Plan for Historic Preservation* (positive) or its removal from the *Locational Atlas* (negative). Some of the sites listed in the table have been acted upon in earlier amendments and will not be considered in this Master Plan. Their status is noted in Table 23.

More detailed information and analysis regarding each individual historic site is included in Appendix L. In addition, resources, that are located in Analysis Areas and are affected by planning issues in those areas, are referenced in the appropriate sections of the Land Use Chapter of this Plan.

20th Century Historic Sites

On an increasingly frequent basis, the Historic Preservation Commission has been asked to consider 20th century sites, not listed on the *Locational Atlas* for *Master Plan* designation. As a result of this interest, a survey of 20th century historic resources is being conducted to provide a context in which to evaluate these structures. The survey will identify the architectural styles, themes, and historic context of the first half of the 20th century in Montgomery County. Upon completion of the survey, the 20th century resources will be documented and evaluated for designation on the *Master Plan for Historic Preservation*.

This Plan acknowledges the potential for designation of 20th century resources to the *Master Plan for Historic Preservation* that may be identified in the Germantown Planning Area.



Historic Resources

■ These sites were previously placed on the Master Plan for Historic Preservation:

A	Waters (Dr. William A.) House	19/1 (1979)
B	Waters (Brick) House	19/3 (1979)
C	Dunn Log House (Grusendorf)	19/19 (1979)
D	Madeline V. Waters House	19/13-1 (1985)

● These sites were previously deleted from the Locational Atlas:

E	Ward (E.G.) Log House	19/8
F	Musser Barn and Cemetery	19/20
G	Snyder/King Barn	19/18
H	Liberty Milling Co. Silos	19/13-3
I	Pumphrey's Store	19/13-2
J	Germantown Bungalows	19/13-4

▲ As part of this plan, these sites have been added to the Master Plan for Historic Preservation:

1	Neelsville Presbyterian Church	19/5
2	Waring Viaduct	19/10
3	Waring/Crawford Farm	19/11
4	Germantown Historic District	19/13
5	Pumphrey/Mateney House	19/13-5
6	Upton Bowman House	19/13-6
7	Wallich/Heimer House	19/13-7
8	Clopper's Mill Ruins	19/21
9	Gassaway (John H.) Farm	19/27
10	Cider Barrel	19/33

★ As part of this plan, these sites have been deleted from the Locational Atlas:

11	Waters Log House	19/2
12	Londonderry	19/4
13	Trundle Farmhouse	19/6-1
14	Briggs Farmhouse	19/6-2
15	Watkins Mill Site	19/7
16	Ricketts Cemetery	19/9
17	Log Cabin/Middlebrook Road	19/12
18	Henry Musser Farm	19/14
19	Richter House	19/15
20	Richter/King Farm	19/16
21	Old Germantown Historic District	19/17
22	Leaman Farmhouse	19/17-1
23	Strider Log Meathouse	19/22
24	Cromwell (William) House	19/23
25	Snyder/King Barn (2)	19/24
26	Germantown Baptist Ch. and Cem.	19/25
27	C.T. Leaman House	19/26

Comprehensive Amendment to the Master Plan for Germantown

Montgomery County, Maryland

The Maryland-National Capital Park and Planning Commission

TABLE 23

GERMANTOWN'S HISTORIC RESOURCES
(See Figure 43 for locations and see Appendix L for more detailed descriptions and analysis of individual Historic Sites)

Site #	Site Name	Address	Physical Condition	HPC Recommendation	Plan Recommendation*
19/1	Waters (Dr. Wm.A.) House (Pleasant Fields)	21200 Waters Road	Occupied Residence Bank barn-poor condition House-good condition Exterior work being done.	Included on Master Plan for Historic Preservation in 9/79	
19/2	Waters Log House	Waters Road (near I-270)	Ruins - only end chimneys remaining	Negative	Negative
19/3	Waters House (brick)	Waters Landing	Existing Foundation; Commemorative Park	Included on Master Plan for Historic Preservation in 1979	
19/4	Londonderry	21100 Frederick Road	Fair Condition/ Altered/Moved	Negative	Negative
19/5	Neelsville Presbyterian Church	20701 Frederick Road	Good	Positive	Positive
19/6-1	Trundle Farmhouse	11200 Neelsville Church Road	Good Condition/ Altered	Negative	Negative
19/6-2	Briggs Farmhouse	11301 Neelsville Church Road	Good Condition/ Altered	Negative	Negativ
19/7	Watkins Mill Site	Watkins Mill Road	Mill building burned down; frame house	Negative	Negative
19/8	Ward (E.G.) Log House	MD 355	Good Condition Barn: Good Condition	Removed from Locational Atlas 1/84	
19/9	Cemetery (Rickett's)	End of Rambling Road	Overgrown	Negative	Negative
19/10	Waring Viaduct	Waring Station Road & B&O Railroad	Excellent Condition	Positive	Positive
19/11	Waring/Crawford Farm	19100 Waring Station Road	Good Condition	Positive	Positive
19/12	Log Cabin/Middlebrook Road	Middlebrook Road	Demolished	Negative	Negative
19/13	Germantown Historic District	Mateney Road, west of railroad tracks	Good Condition	Positive	Positive
19/13/1	Madeline V. Waters House	19500 MD 118	House burned down	Included in Master Plan for Historic Preservation in 5/85	
19/13-2	Pumphrey's Store	19401A MD 118	Poor Condition	Removed from the Locational Atlas by action of the the Planning Board (1/9/86).	
19/13-3	Liberty Milling Co. Silos	MD 118 and Mateney Road	Demolished	Silos removed from the Locational Atlas by action of the Planning Board (2/6/86). The land remains within the Germantown Historic District (#19/13).	
19/13-4	Germantown Bungalows	19441, 19445, 19449, 19501 and 19511, MD 118	Demolished	Removed from the Locational Atlas by action of the Planning Board (2/13/86).	
19/13-5	Pumphrey/Mateney House	19401 Germantown Road		Poor Condition	Positive	Positive
19/13-6	Upton Bowman House	19219 Germantown Road		Good Condition	Positive	Positive
19/13-7	Wallich/Heimer House	19120 Mateney Road	Good Condition	Positive		Positive

TABLE 23 (Cont'd.)

Site #	Site Name	Address	Physical Condition	HPC Recommendation	Plan Recommendation
19/14	Hoyle Farm/Log Cabin aka Henry Musser Farmhouse	14615 Hoyles Mill Road	Fair Condition/ Altered	Positive	Negative
19/15	Richter Farm House	15000 Hoyles Mill Road	Good Condition	Negative	Negative
19/16	Richter/King Farm	14210 Schaeffer Road	House: Demolished; Barn: Poor Condition	Negative	Negative
19/17	Germantown (Old) District	Intersection of Germantown & Clopper Roads	Altered	Negative	Negative
19/17-1	Leaman Farmhouse	13820 Clopper Road	Good Condition	Positive	Negative
19/18	Snyder/King Barn #1	MD 118, South of Clopper Road	Ruins	Removed from Locational Atlas 1/84	
19/19	Grusendorf Log House	13315 Clopper Road	Attached non-historic building burned; log house fair condition; Roof collapsed - needs stabilizing	Included on Master Plan for Historic Preservation in 2/81	
19/20	Musser Barn & Cemetery	12811 Clopper Road	___	Removed from Locational Atlas 1/84	
19/21	Clopper's Mill Ruins	Clopper Road at Great Seneca Creek	Ruins	Positive	Positive
19/22	Strider Log Meathouse	Clopper Rd. (Seneca State Park Office)	Gone	Negative	Negative
19/23	Cromwell (Wm.) House	"Williams Range" off MD 118 in 18100 block	Poor Condition	Negative	Negative
19/24	Snyder/King Barn #2	MD 118 & Riffleford Road	Demolished	Negative	Negative
19/25	Germantown Baptist Church and Cemetery	17710 Riffleford Road	New building	Negative	Negative
19/26	Leaman (C.T.) House	17600 Riffleford Road	Excellent Condition	Negative	Negative
19/27	Gassaway (John H.) Farm	17200 Riffleford Road	Good Condition	Positive	Positive
19/33	Cider Barrel	20410 Frederick Road	Good Condition	Positive	Positive

* *The 10 resources with positive recommendations are now included in the Master Plan for Historic Preservation.*

HISTORIC RESOURCES

Germantown's historic resources contribute to community identity and quality of place. Historic buildings and the historic district are linked to the rest of Germantown through pedestrian paths, active use, and cultural events. New construction and public spaces must be compatible with historic resources and incorporate historic themes and design elements.

Community Identity

Historic sites contribute to community identity and bolster the quality of place envisioned for Germantown's future.

- Enhance and celebrate historic and cultural facilities.
- Landmark historic sites along MD 355 such as the Cider Barrel and Neelsville Church provide a sense of place and wayfinding aids for residents and visitors. Explore options for use of the structure on the Cider Barrel Historic site at its current location. If an appropriate use cannot be identified, the historic Cider Barrel should be relocated to public property such as the police and fire site, the Upcounty Regional Services Center, along the Century Boulevard promenade, or other public property that may be identified.

Cultural Activity

Cultural events and activating uses, including weekend markets and holiday events, enliven the areas in and around the MARC station in the heart of the Germantown Historic District. Rail transport has been an essential part of Germantown's history and will continue to be important to its future. The compact community envisioned for Germantown will be compatible with the historic railroad community resources. The introduction of mixed-use activity near the train station will enhance community life in and near the MARC station to serve commuters' and residents' needs.

Other historic approaches include:

- dedicating the historic Pleasant Fields/Basil Waters House as a center for community events and educational exhibits.
- connecting transit station activity centers to designated historic sites and cultural features in parks.
- establishing pedestrian connections between residential areas and the MARC station can promote train use, decrease the need for parking, and increase the visibility of the historic district.
- protecting historic sites by integrating these resources into the community with compatible land uses.

Pumphrey-Mateney House historic site near the MARC station

Neelsville Presbyterian Church along MD 355

Historic Pleasant Fields/Basil Waters House is used for community events

Design Direction

New development and construction should be compatible with and defined by historic resources that establish community identity. Design elements relating to community history of railroad and other themes should be incorporated into public spaces and new construction to reinforce community identity.

Historic Themes:

- A Native American Hunting and Gathering Ground (10,000 B.C. – 1607 A.D.)
- The Waters Family and Early Agrarian Founders (18th century – early 20th Century)
- Water and Steam Powered Mills (mid-18th Century – 1920s)
- The Germans Behind Germantown (1830s – 1870s)
- A Settlement that Followed Transportation (Pre-1600 – present)

Designated historic sites should be protected and integrated into the community with compatible adjacent land uses.

See Appendixes 10, 11, and 12 for further information.

19/3 Foundation, William Waters, Jr. House

APPENDIX 10: CULTURAL AND HISTORIC RESOURCES TABLE

Park Planning and Stewardship, Department of Parks, and Historic Preservation, Planning Department

This table shows the status and location of cultural and historic resources in the Germantown Master Plan area. The resources are further described in Appendices 11 and 12:

- Appendix 11 contains information on cultural resources in county and state parks; these resources are managed by the Parks Cultural Resources Stewardship Section.
- Appendix 12 contains information on resources supervised by the Historic Preservation Section of the Planning Department.

Resource Name	Resource Number	Address	Associated Park	Master Plan Designation Status	Further References
Atomic Energy Building		Route 118 and I-270		Not on Locational Atlas	Appendix 12
Black Hill Gold Mine		20926 Lake Ridge Drive, Boyds (park address)	Black Hill Regional Park	Not on Locational Atlas	Appendix 11
Black Rock Mill	24/6	16500 Black Rock Road	Seneca Creek State Park	Master Plan for Historic Preservation	Appendix 11
Boyd-Maughlin House	18/8	15215 Darnestown Road, Boyds	Black Hill Regional Park	Master Plan for Historic Preservation	Appendix 11
Calico Crab House	18M0363	Archaeological site*			Appendix 11
Cider Barrel	19/33	20410 Frederick Road		Master Plan for Historic Preservation	Appendix 12
Clopper Mill Ruins	19/21	Near Clopper Road and Waring Station Road, Seneca Creek State Park, Gaithersburg	Seneca Creek State Park	Master Plan for Historic Preservation	Appendices 11 and 12
Davis Mill Ruins	14/54	18900 Frederick Road (park address)	Great Seneca Stream Valley Park	Not on Locational Atlas	Appendix 11
Germantown Historic District	19/13	Liberty Mill Road and B&O Railroad vicinity		Master Plan for Historic Preservation	Appendix 12

Resource Name	Resource Number	Address	Associated Park	Master Plan Designation Status	Further References
Grusendorf Log House	19/19	Near Visitor Center, Seneca Creek State Park, 11950 Clopper Road, Gaithersburg	Seneca Creek State Park	Master Plan for Historic Preservation	Appendices 11 and 12
Hoyles Mill Ruins		14000 Schaeffer Road	Hoyles Mill Conservation Park	Not on Locational Atlas	Appendix 11
John H. Gassaway Farm	19/27	17200 Riffle Ford Road		Master Plan for Historic Preservation	Appendix 12
Kavanaugh II Historical Archaeological Site	18M0181	Archaeological site*			Appendix 11
Kavanaugh III Prehistoric Archaeological Site	18M0182	Archaeological site*			Appendix 11
Kavanaugh IV Prehistoric Archaeological Site	18M0183	Archaeological site*			Appendix 11
Kavanaugh V Prehistoric Archaeological Site	18M0184	Archaeological site*			Appendix 11
Kavanaugh VI Prehistoric Archaeological Site	18M0185	Archaeological site*			Appendix 11
Kavanaugh VII Prehistoric Archaeological Site	18M0186	Archaeological site*			Appendix 11
Kavanaugh VIII Historical Archaeological Site	18M0187	Archaeological site*			Appendix 11
King Farm Dairy Mooseum		18028 Central Park Circle	South Germantown Recreational Park	Not on Locational Atlas	Appendix 11
Little Seneca Creek Viaduct, B&O Metropolitan Branch Railroad Bed	18/44	Wisteria Drive vicinity (WSSC property)	Black Hill Regional Park	Master Plan for Historic Preservation	Appendices 11 and 12
Madeline V. Waters House Site	19/13-1	12900 Wisteria Drive		Master Plan for Historic Preservation	Appendix 12
Middlebrook	18M0362	Archaeological site*			Appendix 11
Neelsville Presbyterian Church	19/5	20701 Frederick Road		Master Plan for	Appendix 12

Resource Name	Resource Number	Address	Associated Park	Master Plan Designation Status	Further References
				Historic Preservation	
Parcel EC-1 Stone House	18MO205	Archaeological site*			Appendix 11
Pleasant Field	18MO408	Archaeological site*			Appendix 11
Pleasant Fields/ Basil Waters House	19/1	21200 Waters Road	Waters House Special Park	Master Plan for Historic Preservation	Appendices 11 and 12
Pumphrey-Mateny House	19/13-5	19401 Walter Johnson Road		Master Plan for Historic Preservation	Appendix 12
Rabbit	18MO175	Archaeological site*			Appendix 11
Site 6	18MO472	Archaeological site*			Appendix 11
Stone Culverts and Railroad Bed	19/40	Harvest Glen Way Vicinity		Master Plan for Historic Preservation	Appendix 12
Upton Bowman House	19/13-6	19219 Liberty Mill Road		Master Plan for Historic Preservation	Appendix 12
Wallich-Heimer House	19/13-7	19120 Mateny Road		Master Plan for Historic Preservation	Appendix 12
Waring Viaduct	19/10	B&O tracks at Great Seneca Creek		Master Plan for Historic Preservation	Appendix 12
Waring-Crawford Farm	19/11	19212 Forest Brook Road		Master Plan for Historic Preservation	Appendix 12
Waters Mill and House	18MO461	Archaeological site*			Appendix 11
Waters Mill Ruins, Chimney Ruins, and W&M Boundary Marker	18MO461	Various locations in Black Hill Regional Park, 20926 Lake Ridge Drive, Boyds	Black Hill Regional Park	Not on Locational Atlas	Appendix 11
Watkins Mill Ruins	19/7	18900 Frederick Road (park address)	Great Seneca Stream Valley Park	Not on Locational Atlas	Appendix 11
William Waters, Jr. House Site	19/3	Between 20511 and 20533 Shadyside Way		Master Plan for Historic Preservation	Appendices 11 and 12
Wisteria	18MO594	Archaeological site*			Appendix 11
355-1	18MO361	Archaeological site*			Appendix 11
**No addresses given for archaeological sites.*					

APPENDIX 11: GERMANTOWN CULTURAL RESOURCES

Park Planning and Stewardship Division, Department of Parks, 2008

From Artifact to Attraction: A Strategic Plan for Cultural Resources in Parks, provides a blueprint for stewarding cultural resources and making them more visible to the public. The Cultural Resources Stewardship Section of the Park Planning and Stewardship Division uses the Plan as the foundation for its evolving work stewarding upwards of 150 park-based cultural resources.

This section reflects new park planning emphasis on historical and cultural interpretation and outreach. Historic interpretation is an important element of this plan and will be emphasized in the parkland and through the public amenity process. The interpretation of cultural and historic resources will support the vision of a sense of place that reflects Germantown's unique character.

Policy Guidance

From Artifact to Attraction: A Strategic Plan for Cultural Resources in Parks arose from the County Council's interest in understanding stewardship objectives and recommendations concerning Park-owned historical and archaeological sites. The plan was presented to the Historic Preservation Commission, the Planning Board, and the Planning, Housing, and Economic Development (PHED) Committee of the County Council. The document is not a master plan, but rather a strategic plan.

Plan Objectives

The Germantown Employment Area Sector Plan includes two types of information pertaining to cultural resources in parks: 1) a series of themes relating to Germantown; and 2) archaeological and historical resources on local, public parkland. The objective of this Sector Plan is to highlight opportunities to develop historic interpretation on local parkland, whether that is through future capital improvements by the Department of Parks or by developer amenity. Cultural resources on parkland are all those resources that help tell the story of the County's history, whether they are designated or not. Note that all sites that are designated on the *Master Plan for Historic Preservation* or on the *Locational Atlas and Inventory of Historic Sites* in the Germantown vicinity, regardless of whether they are in public or private ownership, are identified in the section titled "Historic Resources." Therefore, certain sites may be included in both this chapter on Parks as well as in the Historic Resources material within this Plan.

Cultural Resources Interpretive Themes and Opportunities

Five themes are identified for interpretation as follows:

1. **Native American Hunting and Gathering Grounds** (10,000 B.C. – 1607 A.D.). The area around Germantown served as a hunting and gathering grounds for various prehistoric peoples through the centuries.
2. **The Waters Family and Early Agrarian Founders** (18th Century – Early 20th Century). Germantown contains several historic buildings and sites associated with this prominent family who helped shape the agricultural tradition of Germantown. The sites are part of the farming legacy of the county. (Photo of the Waters House-Pleasant Fields previous page.)
3. **Water and Steam Powered Mills** (mid-18th Century - 1920s). Milling operations utilizing natural water resources eventually were converted to steam.

The Germans Behind Germantown (1830s - 1870s). Early German settlers built log structures and ran many mercantile operations. Their community became known as "Log Town."

5. **A Settlement that Followed Transportation** (Pre-1600 – Present). Transportation changes from water routes to foot trails, trails to dirt roads, roads to rail lines, and rail lines to paved roads and highways resulted in the movement of Germantown's core area from one place to the next over the centuries. (Historical photo of Seneca Viaduct below.)

Germantown's history can be conveyed through cultural resources in parks in the following ways:

- Public Art Interpretation in one or more of the urban parks proposed near transit stops.
- Historic and cultural interpretation can be implemented within urban open space nodules via collaboration with local artists in the following ways:

  - The creation of sculptures.
  - The use of "ghosting" of historic images on current building facades.
  - The fixed telescoping of historic views that can be compared with current views, etc.
- A historical marker trail along the Seneca Greenway Corridor that parallels Seneca Creek.
- An improved trailhead at the Waters House Special Park where it accesses the Upcounty Corridor, or North Greenbelt.
- Possible installation of a signed or brochure-guided cultural walk along the proposed Crystal Rock Greenway, culminating at the Black Hill Regional Park Visitors' Center.

The opportunity exists for the Department of Parks, private developers, and the Arts and Humanities Council of Montgomery County to create exciting and meaningful works of art that interpret Germantown's history. Within this context, opportunities also should be explored to creatively make use of some of the large local boulders from a dismantled Germantown railroad culvert, since these boulders still exist in storage at Black Hill Regional Park.

Each of the themes in this Plan could be interpreted with signage complete with text and illustrations.

The history of the Waters Family and other early agrarian founders should be told when a new trailhead can be constructed at the rear of the Waters House property. (Photo, opposite page, of the trailhead location at the Waters House Barn at near left.)

The Montgomery County Historical Society and the Heritage Tourism Alliance of Montgomery County have partnered with the Conference and Visitors' Bureau of Montgomery County and the Arts and Humanities Council of Montgomery County to study a proposed conversion of the bank barn at the Waters House Special Park into a Heritage and Visitor's Center. This barn, like all the buildings at Waters House Special Park, is owned by the Commission. If successful, the proposed project will create an additional destination point within Waters House Special Park that will offer information on local heritage, the Agricultural Reserve, park and recreational activities, hotels and dining, heritage tours and functions, wineries, local historical societies, etc.

Content of the Interpretive Themes

Boldface in text highlights extant resources which include the following:

1. *Historic sites designated on the Master Plan for Historic Preservation (identifiable by resource number with /, e.g. 19/13).*
2. *Cultural resources found in county parkland, not designated on the MPHP.*
3. *Archeological resource (identified with MO number, e.g. 18MO461).*

Theme 1: Native American Hunting and Gathering Grounds (10,000 B.C. to 1607 A.D.)

For thousands of years the Germantown region hosted a variety of prehistoric peoples. Although no Paleo-Indian sites (10,000 B.C. to 9000 B.C.) are particular to the area, a few locations along the Potomac River and one in the Sandy Spring region have been associated with these Ice Age hunters who are identified by their fluted Clovis-like points and mega-fauna hunting practices. The Sector Plan area would surely have been traversed and known to these nomads.

After 9000 B.C., a warming and drying trend brought on the beginning of more modern environmental changes associated with the Holocene era. A different prehistoric hunting and gathering tradition, called the Archaic Period, arose in the temperate climate and more modern flora and fauna which now covered the region. These Indians, too, were nomadic and, by the end of the Late Archaic Period, can be definitely placed in Germantown.

These were the Late Archaic broad-blade users who made the Savannah River and Susquehanna Broadspear points found in the **Kavanaugh III** (18MO182) and **Site 6** (18MO472) sites. The new side-notched shapes have been attributed to the introduction of the new atlatl, or spear thrower, which allowed for more force and distance. The Late Archaic Period was the height of the seasonal hunting and foraging pattern that would have focused more particularly on the resources of local creeks and streams. Broad-blade implements are thought to be specialized harpoons for fishing such as would have occurred in Seneca Creek. However, their users would also have gathered the starchy seeds and tubers of the wetlands and hunted the deer and other fauna that came there to feed.

Small mobile bands of between 50 and 100 people would most likely have visited the Sector Plan area in the summer and fall when hunting and gathering would have been at its best. Such Indians would have located their sites to exploit nut harvests, turkeys, and various vegetable foods, in addition to deer. Archaeologists have never discovered what type of structures these Archaic peoples made, but they were probably similar to the small round huts of later periods, usually covered with skins or woven reeds.

Late Archaic semi-permanent macro-band camps (100+ people) would have been located in areas of higher resource potential, mostly along the Fall Line, the geological break between the Coastal Plain (Prince George's County) and Montgomery County's Piedmont uplands. Their seasonal round would have taken them from such winter camps to springtime harvests in southern Maryland and back up into the western foothills again for the summer and fall.

The only evidence of Woodland or Agricultural Indians (1000 B.C. to 1607 A.D.) in the greater Germantown area comes from known Indian paths. Modern Route 355, was part of the old "Sinequa" Indian trail that eventually wound its way to Point-of-Rocks. Seneca Creek was also named for the northern Seneca Indians who used that stream valley as a way south.

Woodland villages have been discovered only in the Potomac Valley region of Montgomery County and its associated islands. However, earlier Indians would have also made use of the Germantown area solely to hunt and gather seasonal flora. Because such villages were abandoned about 100 years before European contact, archaeologists have no knowledge of any of their tribal affiliations, linguistic stocks, or even migration destinations.

When John Smith sailed up the Potomac in 1609, the Germantown area, along with the rest of Montgomery County, had become a sort of prehistoric no-man's-land, buffering the Algonquians of southern Maryland against the northern Iroquois (Seneca) and Susquehannocks and western Siouan and Shawnee tribes. The Susquehannocks and the Seneca were especially territorial about their rights to hunt in the region. It was the Susquehannocks who created the path that shows up on a 1716 map as the "Tehoggee Trail", a rugged thoroughfare we now know as River Road. By this time, the Indians of Germantown and Montgomery County had long disappeared into prehistory.

Theme 2: The Waters Family and Early Agrarian Founders (18th-20th Centuries)

Although Montgomery County was formed out of Frederick County in 1776, the establishment of a stable agrarian culture began much earlier. Europeans first took out land patents in the late 17th century. The earliest patents for the Germantown area were mostly in the mid-18th century. What had been the "old Sinequa" (Seneca) Indian path now led settlers west along what they called the "Great Road" (Route 355). They used the old Indian trail to roll their hogsheads (large barrels) of tobacco from their farms to the port of Georgetown.

The British settlers established the farming practices used in southern Maryland; a soil-depleting, slave-oriented tobacco culture. Most Montgomery County tobacco farms averaged only about three or four enslaved people, but some were larger. In the 1790s, upon their marriages, the three Waters brothers, Zachariah, William, Jr., and Basil, all were given land in what is now Germantown by their father, William, Sr. A stone boundary marker with the initials W & M (for the William and Mary Waters tract, photo, left) is located in the Black Hill Regional Park west of Germantown. The combined Waters property covered all of present northeast Germantown, comprising about 1,500 acres, and included a tobacco plantation worked by 22 slaves. The fourth Waters brother, Ignatius, inherited their father's estate in Brookeville. The stone foundations of the **William Waters, Jr. House** (19/3) are all that remain of a substantial brick residence built in the late 1700s.

Around 1810, Zachariah Waters also established a mill along Little Seneca Creek with three milling operations producing flour, lumber, and flaxseed oil. The mill ceased operation in c. 1895. Today the Waters Mill ruins are still visible, and they are interpreted by an historic marker in Black Hill Regional Park.

While the Zachariah and William, Jr. Waters homes no longer stand, the Basil Waters House, dating from the late 18th century, does. Basil Waters developed his property into a large tobacco plantation known as **Pleasant Fields** (19/1, 18MO408). In the mid-1800s Basil's nephew, Dr. William A. Waters, lived in the house and had his doctor's office there. The house gained its present Italianate appearance under ownership of Charles Waters, son of William. Charles built or expanded the frame section and compatibly redesigned the existing house. The new large central hall was outfitted with an elegant curved staircase. Charles Waters bred racehorses on the property, one of which set the East Coast trotting record in 1898. The property, which remained in the Waters family until 1932, includes a bank barn and double corncrib. A small Waters family burial plot is nearby on Hawk's Nest Lane. The restored house and barn are owned by the M-NCPPC, open for community events, and operated in part by the Montgomery County Historical Society.

Theme 3: Water and Steam Powered Mills (mid-18th century through 1920s)

From 1820 to 1900, a booming economy emerged in the Germantown area. This new prosperity was made possible by the development of agricultural diversification and new fertilizers, as well as the advent of the railroad in the area by the 1870s. The change from a folk-oriented tobacco culture to a more nationally-focused industrial economy brought Montgomery County into the larger American pattern of development.

Along the waterways of Great Seneca Creek and Little Seneca Creek, grist and saw mills had appeared by the mid-18th century. The establishment of **Waters Mill** (18MO461) in Black Hill Regional Park, and other milling operations along Seneca Creek in the Germantown area, reflect the growth of water-powered manufacturing technology in the Piedmont region, where streams run swiftly. Early maps of the area identify mills as "G&S mills" for the water-powered grist and sawing activities located along these streams. These local businesses not only served the community's commercial needs with grain and lumber processing, but also provided important social and political functions as community gathering and voting places. The mills' names pay tribute to the early residents who lived near Germantown: Benson, Crowe, Clopper, Davis, Watkins, Waters, Magruder, and Hoyle.

Mill ruins known as the **Clopper Mill** (19/21) are located in Seneca Creek State Park. A mill was built on this site in the 1770s by Nicholas Sibert. About 1795, Zaccharíah MacCubbin rebuilt the mill in stone. Francis C. Clopper, a prosperous owner of woolen factory and mills, expanded the mill with brick. The mansion house for Clopper's estate, called Woodlands, was located near the park's visitor center.

It is difficult to determine exact construction dates of many of the early mills. Some burned or deteriorated, and their foundation stones were reused to build new mills on the same site. Early documents record ownership transfers that often meant a change in the name of the mill and the road where it was located.

Early water mills were located along a steady stream of water and were constructed using local stone and timber. Mill structures ranged in size from two- to three-story masonry or clapboard structures, and some even utilized two water wheels. Early water-powered mills were located along steady, fast-moving streams and were constructed using local stone and timber.

Mills from the 18th and early 19th century were usually powered by undershot wheels, where the force of the water against the lower blades turned the wheel. As the population and agricultural production increased, the need for reliable water power for milling and milling operations grew. Experiments using different types of wheel designs were used, with the overshot wheel being the most popular. In this design, the water struck the upper blades on top of the wheel and moved it down by the force of gravity.

At least an eight foot drop in elevation was necessary for locating a mill along a waterway. In addition, an ample supply of water was created by building a small dam or "mill pond" upstream from the mill. Water was diverted from the pond through a ditch called a "mill race" or "head race." The mill race contained a grate to filter debris before reaching the water wheel. Upon turning the large wheel, the water then flowed through the "tail race" and was diverted back to the main stream. The Waters Mill ruin in Black Hill Regional Park contains remnants of these races.

The large water wheel turned a shaft that powered a series of cogged wheels inside the mill structure, transferring power by moving from large to small gears and ultimately turning the mill stone for grinding. Two stones were used for grinding. The top stone, called the runner, rotated over the stationary bottom runner, or bed stone. Both stones were cut with furrows to grind and channel the grain to the stone's edge. Grain was poured into the center of the top stone and moved out through the furrows where the ground flour or meal was collected at the edges.

Early grist mills used locally-quarried stones for grinding rye, buckwheat, and cornmeal producing a coarsely ground flour or "country custom" flour. Stones were also imported from France and Germany and produced more finely ground flour. "Cullin" stones were a blue-black lava stone and "French burrs" were freshwater quartz stones quarried in Northern France.

A list of some of the water-powered mills located on public parkland near the Germantown Employment Area Sector Plan is located at the end of this document. Of the mill ruins cited, one of the most intact ruins, and an example of a mill constructed using the local black rock, is **Black Rock Mill** (24/6), now part of Seneca Creek State Park (photo previous page).

Water power fueled the mills until the advent of steam power in the 1850s. Later milling operations ventured away from the streams and towards steam power, locating near the railroad line for transportation purposes. In 1888, the Bowman Brothers' Liberty Mill was built next to the present-day Germantown depot, along the Metropolitan Branch Railway line of the Baltimore & Ohio (B&O) Railroad. The wooden flour mill burned in 1914 but was rebuilt and modernized in 1916 with six huge silos. In 1918 Augustus Selby and his four partners bought the mill and operated it until 1963. A grain elevator and grain dryer were part of the operation in the 1920s and 30s, but burned in 1972 after the mill had closed. Still standing, and located in the **Germantown Historic District** (19/13), is a grain scale housed in a small metal shed on Mateny Hill Road, southwest of Blunt Avenue. The Liberty Mill was at one time the second largest mill in the state.

Theme 4: The Germans Behind Germantown (1830s – 1870s)

The first German settlers in the area came from old Frederick County, and they established small farms growing grains and cereals. In the 1830s and 1840s, Pennsylvania Germans, as well as immigrants from Germany and Slavic countries, settled at the crossroads of Germantown (now called Liberty Mill Road) and Clopper (Route 117) Roads. Some of the first settlers were the families of Domenicus Stang, a blacksmith; Franz Grusendorf, a stonemason; and Asher Rosenmeier and Charles Adler, who ran the community's store.

Other early families included the Metzes and the Richters. Many immigrants were millers and farmers who tilled small plots of corn and tobacco. During this period, when farmers from the surrounding area came into town and heard more German than English, the area became known as "Germantown." The name Germantown first occurred in print in the mid-19th century, on a land deed. The settlement was also sometimes called "log town" because the Germans brought log construction to the area. Today only one of the known German-built dwellings associated with the original cluster of homes and shops from this particular time of settlement survives. The sole remaining structure is the **Grusendorf Log House** (19/19, photo right), which originally stood on the east side of Clopper Road, near Route 118. The house has been relocated to Seneca Creek State Park, southeast of Germantown.

Theme 5: A Settlement that Followed Transportation (pre-1600s – Present)

The settlements at Germantown have undergone five significant changes, from 1) Native American temporary settlements along the waterways in the pre-1600 period to 2) a small Germanic crossroads settlement at Germantown and Clopper Roads in the 1830s, to 3) a vital railroad stop in the 1880s and 90s, to 4) a "Corridor City" aligned with Frederick Road (Route 355) by the 20th century, to 5) part of the technology corridor in the 1970s, defined primarily by Interstate-270.

The initial movement of people and industry was away from the waters and towards the roads. After the Germans settled along east-west-running Clopper Road, the settlement kept shifting northwards: first with the coming of the B & O Railroad, next to better surface transportation with the paving of Frederick Road and then, with the construction of Interstate 270. Present-day Liberty Mill and Walter Johnson Roads were the original Germantown Road.

During the late 19th century, with the establishment of the railroad, farmers were able to ship their produce, grain, and milk to Washington, and also receive fertilizers to enrich the soil for larger yields. The railroad continued to provide a strong economic link for Germantown, especially to the expanding metropolitan regions of Baltimore and Washington.

In 1878, the first Germantown railroad depot was constructed. In 1891, it was replaced with a larger frame building. This depot burned in 1978 and was reconstructed following the same Victorian-era architectural details. Another railroad transportation component is the massive stonework of the **Waring Viaduct** (19/10) and its larger twin over the Little Monocacy River (near

Dickerson, MD). The 350 foot-long, three-arch viaduct of roughly dressed granite supports the tracks that are about 70 feet above the Great Seneca Creek. A granite abutment and piers also remain from the **Little Seneca Creek Viaduct** (18/44), a single-track railroad bridge.

As the automobile became the preferred method of transportation in the area, accommodations arose for motorists along Frederick Road. The **Cider Barrel** (19/33) was constructed in 1926 by Andrew Baker to sell cider and apples from his orchard. Located east of Germantown, this once-popular road-side stand still stands today.
The mid-20th century saw the growth of the area continue with the location of the main headquarters for the Atomic Energy Commission (now U.S. Department of Energy) in Germantown. The completion of the I-270 "Technology Corridor" during the 1970s provided for further commercial, business, and educational development. During this time period, a satellite campus for Montgomery Community College started in Germantown. Today, the area continues to develop along this transportation corridor with three major intersections providing access to the surrounding community.

List of Park-Based Cultural Resources

Known Prehistoric Archaeological Sites

There are seven prehistoric archaeological sites within and adjacent to the Germantown Sector Plan area. All of them consist of lithic scatter; i.e., they contain flakes and chips that were knocked off to manufacture tools and projectile points. Except for the Kavanaugh III (18M0182) and Site 6 (18M0472) sites, no diagnostic artifacts were discovered which would relate the other Indian sites to definite time periods.

Both the Kavanaugh III and Site 6 sites uncovered projectile points which dated to the Late Archaic Period, circa 3000 to 1000 B.C. The Kavanaugh III site contained the base fragment of a Susquehanna Broadspear-like point. Named for the Susquehanna site where it was first identified, it is triangular shaped, broad–based and side-notched, dating from 1750 B. C. to 700 B. C. The Site 6 point was a quartz Savannah River-like projectile. Again, named after its original Savannah River location, this point was triangular-based and side-notched with a broad triangular stem. Such spear points date from 3000 B.C. to 1000 B.C.

TABLE 1: Known Prehistoric Archeological Sites

Site Number	Site Name	Site type	Period
18M0182	Kavanaugh III	Archaic Lithic Scatter	Prehistoric
18M0183	Kavanaugh IV	Lithic Scatter	Prehistoric
18M0184	Kavanaugh V	Lithic Scatter	Prehistoric
18M0185	Kavanaugh VI	Lithic Scatter	Prehistoric
18M0186	Kavanaugh VII	Lithic Scatter	Prehistoric
18M0472	Site 6	Archaic Lithic Scatter	Prehistoric
18M0594	Wisteria	Lithic Scatter	Prehistoric

Known Historical Archaeological Sites

There are nine historical archaeological sites near the Germantown Employment Area Sector Plan. Seven of these are farmsteads; one is a masonry structure, and the other is a mill complex. They span a time from the late 18th to the early/middle 20th century.

Table 2: Known Historical Archaeological Sites

Site Number	Site Name	Site type	Period
18MO175	Rabbit	Farm	19th century
18MO181	Kavanaugh II	Frame Structure	Historic
18MO187	Kavanaugh VIII	Masonry Structure	19th century
18MO205	Parcel EC-1 Stone House	Farmstead	19th/20th century
18MO361	355-1	Farm	----------
18MO362	Middlebrook	Farm	18th-20th century
18MO363	Calico Crab House	Farm	19th century
18MO408	Pleasant Field	Farmstead	18th century
18MO461	Waters Mill & House	Mill	18th-20th century

Additional Cultural Resources in Parks

19/1 Pleasant Fields/Basil Waters House

(c 1790s-early 1800s; 1890s)
21200 Waters Road, Waters House Special Park Master Plan for Historic Preservation

The Waters family inhabited Pleasant Fields for more than a century. Basil Waters established the large tobacco plantation about 1790. The brick sections of the house (center and left) are the earliest, dating from the late 1700s or early 1800s. During the mid-19th century, Basil's nephew, Dr. William Waters, owned the property and located his doctor's office in a back room on the first floor. Dr. Waters served as the general practitioner for the community and also continued wheat and corn on the farm. In 1907, Dr. Waters' son, Charles, inherited the house and farm. Charles redesigned and expanded the house to its current Italianate-style appearance. The property was used for breeding racehorses and remained in the family until 1932.

Today, the restored house is open to the public and contains offices for non-profit groups and provides public meeting space. Now called the Waters House Special Park, the property includes a large bank barn, a corncrib, and carriage house and is adjacent to the North Germantown Greenway Stream Valley Park. The family burial ground of all three brothers' families is preserved near the Pleasant Fields property on Hawks Nest Lane.

Waters Mill Ruins, Chimney Ruins, and Boundary Marker

Black Hill Regional Park
Not Designated

In c. 1810, Zachariah Waters also established a mill along Little Seneca Creek with three milling operations—flour grinding, flax-seed oil pressing, and lumber cutting. The mills ceased operation c. 1895. An 1865 Martenet and Bond map, labels

the mill site as “Mrs. Waters Mill,” for Eleanor (Ellen) Waters, who was Zachariah’s daughter-in-law. Ellen operated the mills after her husband, Tilghman Waters, died in 1864. The Waters’ grist and saw-mill ruins are visible from the Black Hill trail and interpreted by a historic marker in Black Hill Regional Park. Foundations from the late 18th-century miller’s house are in the vicinity. The site provides a good example of the head race and tail race used to direct water to and from the milling operation. Also located along the trail is a remaining “W&M” stone boundary marker indicating the William and Mary Waters land tract. Near the park’s picnic area and playground are two stone chimneys and a foundation from a former tenant house owned by the Waters family.

14/54 Davis Mill Ruins

Great Seneca Stream Valley Park
Not Designated

The Davis Mill, located along Davis Mill Road near Great Seneca Creek, was purchased by John Samuel Davis in the 1880s. A mill was at this site as early as 1783. During the time Davis operated the grist mill, it was a three-story, clapboard, frame building with a stone foundation. Davis’ homestead was nearby and overlooked the mill. The mill burned in the 1940s. An interpretive historical marker is located at the mill site.

19/7 Watkins Mill Ruins

Great Seneca Stream Valley Park
Not Designated

The Watkins Mill site is located along the Great Seneca Creek at Watkins Mill Road. Originally built by Aden Grey, a grist mill has been at this site since 1783. From 1791 to 1846, the Dorsey family owned the property and ran a grist and saw milling operation. From 1859 to 1877, it was owned and operated by Susan Ann and Remus Snyder. At that time, the mill road was also called “Snyder’s Mill Road.” Levi Watkins purchased the mill at auction and operated the grist mill. By the 1880s, the mill produced 600 barrels of wheat flour, 10,000 pounds of buckwheat flour, and 185,000 pounds of cornmeal a year. The mill burned in 1908. Part of the mill foundation remains along the creek bank, and portions of the mill race are visible. A radio tower is located near the former mill pond. The miller’s house burned in 1920. An interpretive historical marker is located at the mill site.

King Farm Dairy Mooseum

South Germantown Regional Park
Not Designated

The c. 1930s James and Macie King Dairy barn is part of the 650 acre South Germantown Regional Park. The large concrete block barn features a gambrel roof. Two original concrete silos are connected to the barn. In 2001-2002, the Department of Parks restored the exterior of the barn and added missing roofs to the silos. The barn is open to the public as the King Farm Dairy Mooseum (photo below).

Hoyles Mill Ruins

Hoyles Mill Conservation Park
Master Plan for Historic Preservation

The Hoyles Mill site is located along Hoyles Mill Road in the Hoyles Mill Conservation Park. This 19th century mill was operated by the Hoyle family on part of their farm land along Little Seneca Creek. The 1850 Census of Manufacturers lists it as a grist and a saw mill. It operated until 1914 when the Hoyles moved their milling operation to Boyds to be closer to the railroad. The mill ruins still contain remains of the water-powered turbine that replaced the mill wheel in the second half of the 19th century.

18/44 Little Seneca Creek Viaduct, B&O Metropolitan Branch Railroad Bed

Black Hill Regional Park and WSSC Property
Master Plan for Historic Preservation

This resource consists of the remains of the 1896 viaduct that traversed Little Seneca Creek and an abandoned c. 1865 railroad bed located approximately midway between Boyds and Germantown. These structures were once part of the c. 1860s Metropolitan Branch of the B&O Railroad, a 43-mile link between Washington, D.C. and the Main Line of the B&O at Point of Rocks, MD. Upon its completion in 1873, an economic boom began for the communities located near its route; consequently, the former crossroads community of Germantown moved its commercial development to the northeast, creating "New Germantown" along this railroad.

The remaining masonry structures once supported a single-tracked metal railroad bridge in operation until 1928. The bridge was abandoned when the railroad was double-tracked, straightened, and rerouted farther south. The bridge was built on a four-degree curve with a total span of about 480 feet and approximately 105 feet above water at its midpoint. The bridge was designed by John E. Greiner (1859-1942), an engineer with the B&O Railroad, using a relatively standard bridge design with the track supported by deck-type girder spans which were, in turn, supported by nine bents, arranged into four towers and one stand-alone bent.

In 1980, a dam was constructed to create the Little Seneca Lake reservoir. Construction occurred in the center of the viaduct site; the western section of the viaduct and its stone piers were either removed or buried.

The rest of the viaduct remains are located along the former eastern slope of Little Seneca Creek. It consists of one large granite-end abutment and four stone piers. The abutment is approximately 31 feet wide and 12 feet long. The structure stands some 12 feet above grade at its exposed end. Two dates are chiseled in the structure, "6.17.96" and "10.13.96" (photo below), and, probably represent the periods of construction. At the base of the stone abutment stand four stone piers. The 1896 viaduct replaced an early 1870s wooden trestle. Visible remains from this earlier bridge are the stone retaining walls that the B&O Railroad used as rip-rap for the base of the fill on the east bank of the creek. The viaduct structures are located on WSSC property.

The remaining B&O Metropolitan Branch Railroad Bed is a significant landscape feature that is cut into the hillside and leads from Wisteria Drive to the Little Seneca dam. It is now part of Black Hill Regional Park and is currently being used as an access road to service the dam. The road is closed to the public.

18/8 Boyd-Maughlin House

15215 Darnestown Road
(Black Hill Regional Park)
Master Plan for Historic Preservation

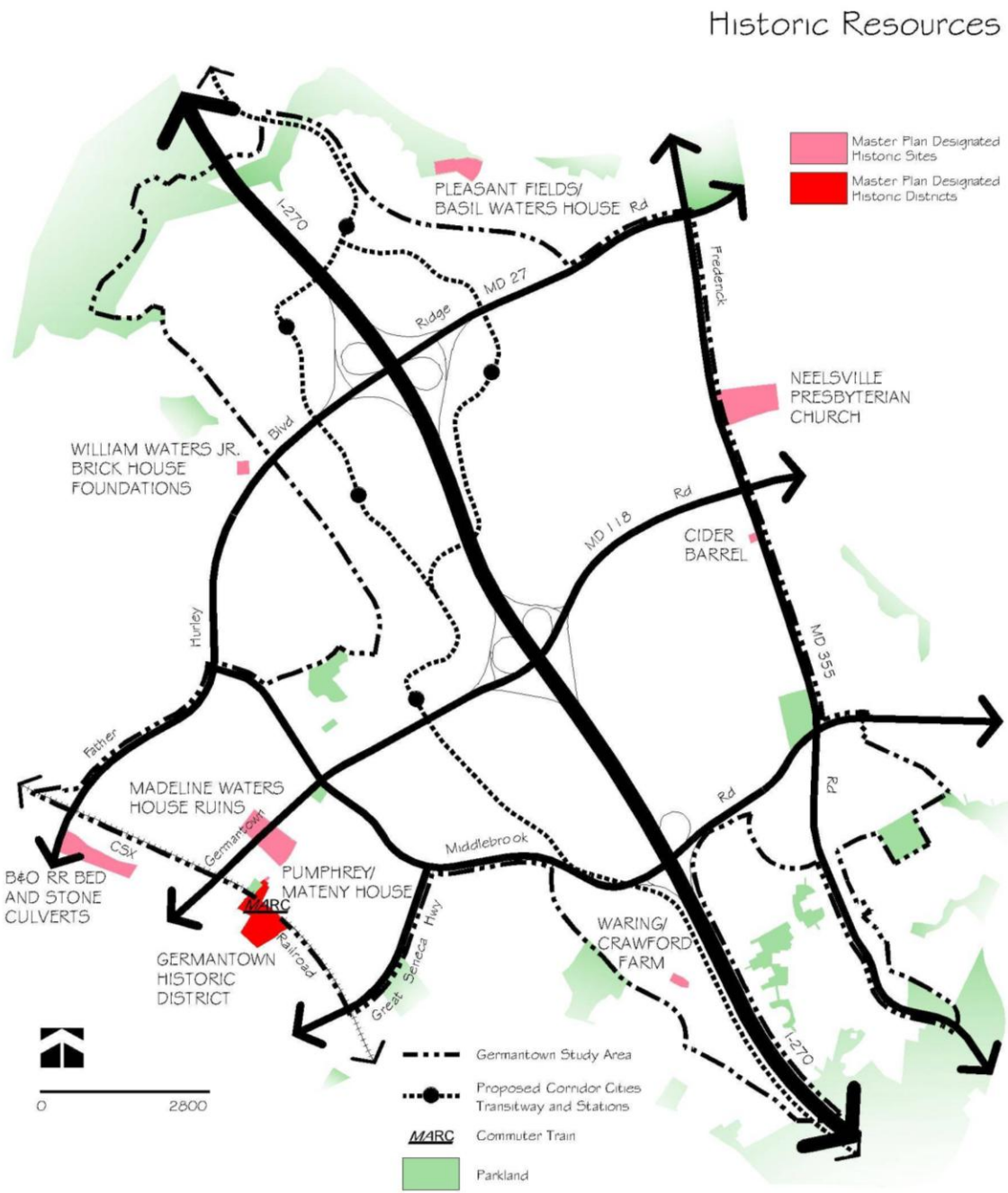
One of the earliest structures in the Boyds Historic District, is the David Maughlin House also known as the Boyd-Maughlin house that dates from 1866. The two-story, frame, clapboard house is a good example of the rural Gothic Revival influenced vernacular architecture. Features include a cross-gabled roof, bracketed porch posts, and a central front gable with a small arched window. The property is now part of the Black Hill Regional Park and rented as a residence.

Black Hill Gold Mine

Black Hill Regional Park
Not Designated

Remnants of mining pits from the Black Hill Gold Mine are located in the Black Hill Regional Park. Starting around 1850, miners used picks and shovels in open-pit extraction in attempts to find gold. However, results were disappointing since ore containing gold was rarely found. In 1947, George A. Chadwick purchased the property and later converted the mine to a bomb shelter. An interpretive historical marker is located at this site.

Photos: Black Rock Mill



Map 1: Historic Resources

APPENDIX 12: HISTORIC PRESERVATION ELEMENTS

Historic Preservation, Planning Department, 2008

Objective

The intent of the County's preservation program is to provide a rational system for evaluating, protecting, and enhancing the County's historic and architectural heritage for the benefit of present and future generations. It serves to highlight the values that are important in maintaining the individual character of the County and its communities.

Summary

Historic resources within the boundaries of this Germantown Plan were designated in 1989 in the Approved and Adopted Germantown Master Plan. Other historic resources in the Germantown Planning Area were designated in the following documents:

- the December 2008 *Amendment to the Historic Preservation Master Plan;*
- Individual Historic Resources in the 1989 Germantown Master Plan; and
- the 1979 *Master Plan for Historic Preservation*.

As a result of these master plan processes, a total of 15 individual sites and one historic district have been designated on the *Master Plan for Historic Preservation.*

Table 1 (below) provides a summary of Germantown's historic resources and Map 1 (opposite) gives the general location of these properties. This section contains a description and a photograph or map of each master plan site, organized chronologically by date of construction. The section also includes an explanation of the historic preservation designation process and the effects of historic site designation.

Montgomery County Historic Preservation Program

The *Master Plan for Historic Preservation* and the *Historic Preservation Ordinance*, Chapter 24A of the Montgomery County Code, are designed to protect and preserve Montgomery County's historic and architectural heritage. Placement on the *Master Plan for Historic Preservation* officially designates a property as a historic site or historic district and subjects it to further procedural requirements of the ordinance.

Designation of historic sites and districts serves to highlight the values that are important in maintaining the individual character of the County and its communities. It is the intent of the County's preservation program to provide a rational system for evaluating, protecting, and enhancing the County's historic and architectural heritage for the benefit of present and future generations. The accompanying challenge is to weave protection of this heritage into the County's planning program to maximize community support for preservation and minimize infringement on private property rights.

The following criteria, as stated in Section 24A-3 of the *Historic Preservation Ordinance*, shall apply when historic resources are evaluated for designation in the *Master Plan for Historic Preservation*.

(1) Historical and cultural significance:
The historic resource:

- Has character, interest, or value as part of the development, heritage or cultural characteristics of the County, State, or Nation;
- Is the site of a significant historic event;

- Is identified with a person or a group of persons who influenced society; or
- Exemplifies the cultural, economic, social, political or historic heritage of the County and its communities; or

(2) Architectural and design significance:
The historic resource:

- Embodies the distinctive characteristics of a type, period, or method of construction;
- Represents the work of a master;
- Possesses high artistic values;
- Represents a significant and distinguishable entity whose components may lack individual distinction; or
- Represents an established and familiar visual feature of the neighborhood, Community, or County due to its singular physical characteristic or landscape.

Implementing the Master Plan for Historic Preservation

Once designated on the *Master Plan for Historic Preservation*, historic resources are subject to the protection of the County's Historic Preservation Ordinance, Chapter 24A. Any substantial changes to the exterior of a resource or its environmental setting must be reviewed by the Historic Preservation Commission (HPC) and a historic area work permit issued under the provisions of the Ordinance, Section 24A-6. In accordance with the *Master Plan for Historic Preservation* and unless otherwise specified in the amendment, the environmental setting for each site, as defined in Section 24A-2 of the Ordinance, is the entire parcel on which the resource is located as of the date it is designated on the master plan.

Designating the entire parcel provides the County adequate review authority to preserve historic sites in the event of development. It also ensures that, from the beginning of the development process, important features of these sites are recognized and incorporated in the future development of designated properties. In the case of large acreage parcels, the amendment will provide general guidance for the refinement of the setting by indicating when the setting is subject to reduction in the event of development; by describing an appropriate area to preserve the integrity of the resource; and by identifying buildings and features associated with the site that should be protected as part of the setting. It is anticipated that for a majority of the sites designated, the appropriate point at which to refine the environmental setting will be when the property is subdivided.

Public improvements can profoundly affect the integrity of a historic area. Section 24A-6 of the Ordinance states that a Historic Area Work Permit for public or private property must be issued prior to altering a historic resource or its environmental setting. The design of public facilities in the vicinity of historic resources should be sensitive to and maintain the character of the area. Specific design considerations should be reflected as part of the Mandatory Referral review processes.

In the majority of cases, decisions regarding preservation alternatives are made at the time of public facility implementation within the process established in Section 24A of the Ordinance. This method provides for adequate review by the public and governing agencies. To provide guidance in the event of future public facility implementation, the amendment addresses potential conflicts existing at each site and suggests alternatives and recommendations to assist in balancing preservation with community needs.
In addition to protecting designated resources from unsympathetic alteration and insensitive redevelopment, the County's Preservation Ordinance also empowers the County's Department of Permitting Services and the HPC to prevent the demolition of historic buildings through neglect.

The Montgomery County Council passed legislation in September 1984 to provide for a tax credit against County real property taxes in order to encourage the restoration and preservation of privately owned structures located in the County. The credit applies to all properties designated on the *Master Plan for Historic Preservation* (Chapter 52, Art. VI). Furthermore, the HPC maintains up-to-

date information on the status of preservation incentives including tax credits, tax benefits possible through the granting of easements on historic properties, outright grants, and low interest loan programs.

Table 1: Germantown Historic Resources Historic Sites Designated on the *Master Plan for Historic Preservation*

Resource #	Resource Name	Address	Date
18/44	Little Seneca Viaduct	Wisteria Drive Vicinity, Germantown	c1865; 1873; 1896
19/1	Pleasant Fields/Basil Waters House	21200 Waters Road/Milestone Manor Lane	c1790;1890
19/3	William Waters Jr. House Site	Between 20511 & 20553 Shadyside Way	c1785
19/5	Neelsville Presbyterian Church	20701 Frederick Road	1877
19/10	Waring Viaduct	B&O tracks at Great Seneca Creek	1906
19/11	Waring-Crawford Farm	19212 Forest Brook Road	c1850; c1885
19/13	Germantown Historic District	Liberty Mill Road & B&O Railroad Vicinity	c1878+
19/13-1	Madeline V. Waters House	12900 Wisteria Drive	1899-1902
19/13-5	Pumphrey-Mateney House	19401 Walter Johnson Road	c1883
19/13-6	Upton Bowman House	19219 Liberty Mill Road	c1901
19/13-7	Wallich-Heimer House	19120 Mateny Road	1913
19/19	Grusendorf Log House	Seneca State Park near Visitor Center	c1841
19/21	Clopper Mill Ruins	Seneca State Park near Clopper Road-Waring Station Road	c1795;1834
19/27	John H. Gassaway	17200 Riffle Ford Road	c1815; c1840; 1904
19/33	Cider Barrel	20410 Frederick Road	1926
19/40	Stone Culverts & Railroad Bed	Harvest Glen Way Vicinity	c1873

GERMANTOWN HISTORIC SITES

19/13 Germantown Historic District

(c1878+)

Vicinity of Liberty Mill Road, B&O Railroad, and Mateny Hill Road

German farmers settled the Germantown area in the early 1800s. The initial Germantown settlement clustered around the intersection of Clopper and Liberty Mill Roads. After the introduction of the Metropolitan Branch of the B&O Railroad, the community known as Germantown Station grew about one mile north of the original crossroads community. Present-day Liberty Mill and Walter Johnson Roads were the original Germantown Road. The railroad enabled farmers to ship their produce, grain, and milk to Washington, as well as receive fertilizers to enrich the soil for larger yields. *Germantown Station*, built in 1891, replaced an earlier small railroad station located there in 1878. The frame structure was rebuilt, following a 1978 fire, and serves modern-day commuters traveling to jobs downcounty and in Washington, D.C. (photo, far right). The original single track at Germantown once required two telegraph operators to control the switches to double tracks south of town.

The Germantown community became the center of commercial activity when the Bowman Brothers built a new steam-driven flour and corn mill next to the new railroad depot, making obsolete the earlier water-driven mills in the area. *Bowman Brothers' Liberty Mill* was built in 1888 at the south side of Liberty Mill Road along the railroad tracks. The wooden flour mill burned in 1914, but was rebuilt and modernized in 1916 with six huge silos. In 1918 Augustus Selby and his four partners bought the mill, and operated it until 1963. A grain elevator and grain dryer were part of the operation in the 1920s and 30s, but burned in 1972 after the mill had closed. Still standing is a grain scale housed in a small metal shed on Mateny Hill Road, southwest of Blunt Avenue.

Germantown's commercial district grew along Mateny Hill Road between the train station and Liberty Mill Road. In the late 1800s and early 1900s, Germantown had two general stores, a post office, three churches, a bank, doctor's office, barber shop, and school. The *Germantown Bank* (1922)(below, left), 19330 Mateny Hill Road, was funded through sale of shares to residents who wanted to cash their mill paychecks without being charged 15 cents that the General Store demanded for the service. This one-and-a half story brick building has a simple classical facade, and iron bars on its triple windows. At the

southern corner of Blunt Avenue and Mateny Hill Road, a small, board and batten shop with a gable roof, was used at various times as a harness shop, barber shop and post office before it was converted into a house. Numerous other service businesses in this vicinity included a feed store, several warehouses, and a stockyard.

The houses built within this period have strong uniformity and similar architectural details in the simple rural tradition of 19th century Maryland. The homes were built for mill and railroad employees as well as shopkeepers and ministers. Many houses in the historic district still have dependencies such as stables, wash houses, and smokehouses; some with louvered cupolas, contrasting trim, or other architectural details. The generous front and side yards allowed for family gatherings, gardens, and perhaps a few animals, while shade trees and porches helped residents escape the heat of summer. One of the oldest houses in the district is the c1870 *Harris-Allnutt House*, 19390 Mateny Mill Road, which was originally the home of R. E. and Alice Harris who ran a store here. The *Anderson-Johnson House* (1898), 19310 Mateny Mill Road, was first the home of a railroad agent and later Germantown's postmaster. *Rev. Rayfield House* (c1890s), 9215 Blunt Avenue, was the residence of the Baptist Church minister. The homes of influential community leaders (e.g. mill owners, banker, store owners) lined Old Germantown Road on large parcels of land. Bank President A. H. Baker lived in a large estate on Liberty Mill Road where Liberty Heights is now located.

Bowman Brother's or Liberty Mill was at one time the second largest mill in the state. In the 1950s, dairy products replaced grain as the state's primary agricultural output, leading to a decline in the milling business. Popularity of the automobile enabled residents to shop in more distant shopping centers, people became less dependent on the railroad, and growth of the county's population turned cornfields into cul-de-sacs. Commercial businesses are now concentrated closer to I-270. The Germantown Historic District, designated in l989, preserves the heritage of Germantown as a flourishing farming and mill community, while continuing to focus on the B&O Station as a center for today's MARC train commuters.

Individual Sites (listed chronologically)

19/1 Pleasant Fields/Basil Waters House

(c1790s-early 1800s;1890s)
21200 Waters Road/Milestone Manor Lane
(photo below, left)

The Waters family inhabited Pleasant Fields for more than a century. About 1790, Basil Waters established a large tobacco plantation, supported by as many as 22 slaves. The brick sections (center and left) are the earliest, dating from the late 1700s or early 1800s. In the late 1800s, Basil's nephew, Dr. William A. Waters, a general practitioner, had a doctor's office in the house. The house gained its present Italianate appearance under ownership of Charles Waters, son of William. Charles built or expanded the frame section (right) and compatibly redesigned the existing house. The new large central hall was outfitted with an elegant curved staircase. Charles Waters was a successful breeder of racehorses, one of whom set the east coast trotting record (1898). The property, which remained in the Waters family until 1932, includes a bank barn and double corncrib. A small Waters family burial plot is on Hawk's Nest Lane. The restored house and barn, owned by M-NCPPC, are scheduled to be open for community events, run in part by the Montgomery County Historical Society.

19/3 William Waters Jr. House Site

(Late 1700s-Early 1800s)
Demolished Resource—Site Between 20511 & 20553 Shadyside Way
(drawing below, right)

A designated historic site since 1979, the William Waters House no longer stands. The five-bay dwelling was one of the earliest substantial brick residences in the Germantown area. The one-room deep, center-passage house featured recessed 9/6 sash windows with jack arches, a round-arched doorframe with keystone and cornerblocks, and fanlight transom. According to tradition, William Waters, Jr. (1751-1817) built the house after acquiring the property from his father in 1785. William was the brother of Basil Waters who built Pleasant Fields. In the late 1800s, the house was updated with a Gothic-inspired center cross gable, a pointed-arch window and shingle siding. The property, also known as the Horace Waters House, remained in the family until 1962. The foundations of the house have been preserved in the Waters Landing Park.

19/21 Clopper Mill Ruins (c1795; 1834)
Clopper Road at Waring Station Road
(photo, below left)

Located within Seneca Creek State Park, the Clopper Mill Ruins are remnants of the extensive property of Francis C. Clopper, influential businessman in Montgomery County in the mid-1800s. A prosperous owner of a woolen factory and mills, Clopper was a principle backer of the Metropolitan Branch in the 1850s, and was instrumental in persuading the B&O to take over construction of the railroad branch after the original company failed. Clopper donated land both for a nearby railroad station, named in his honor, and for St. Rose of Lima Catholic Church. Clopper's mansion, known as Woodlands, was located near the Visitors Center at Seneca Creek State Park.

These ruins are significant as one of the few remaining distinguishable mills in the county, representing an industry once essential to economic development. Nicholas Sibert built the original mill on this site in the 1770s. About 1795, Zachariah MacCubbin rebuilt the mill, constructing a two-level stone structure. Clopper renovated and expanded the mill in 1834, adding a third story of bricks made at a manufactory on his estate. A stone in the mill's gable read "*F C C 1834*." An undershot water wheel used water from the Great Seneca Creek to turn the millstone. Business at the mill declined after the steam-powered Bowman Brothers Mill opened in 1888, in Germantown. Clopper's Mill was heavily damaged by fire in 1947. The ruins consist of stone and brick walls with no roof. Local fieldstone on the basement and first floor levels has corner quoins and heavy stone lintels.

19/11 Waring-Crawford Farm
(Log section: Mid 1800s; Enlarged Late 19th Century - Early 20th Century)
19212 Forest Brook Road
(photo, below right)

This distinctive log and frame residence represents an evolution of construction materials. The original log house is a two-story side gable structure, which had two rooms on each level. The Waring family (or Warring) probably built the log dwelling. From the heirs of John P. Waring, George Leslie Crawford, in 1881, bought the 214-acre farm with a two-story house and log outbuildings. A wheat and dairy farmer, Crawford expanded the house with a hipped-roof polygonal front ell, with a fanciful turret over the front entry. After George's death in 1925, his descendants continued to run the farm. Besides the house, only a smokehouse remains of the farmstead that once included a bank barn, double corncrib, slave quarters, and a detached kitchen. The main house was built to face the original Waring Station Road, which ran from Clopper Road to Frederick Road but was redirected with construction of I-270.

19/27 John H. Gassaway Farm

(Early 19th Century; c1904)
17200 Riffle Ford Road
(photo right)

This novel frame residence, home of a prosperous farmer and merchant, shows the late acceptance of Romantic Revival architecture found 20-30 years earlier in less remote parts of the Eastern Seaboard. John Hanson Gassaway (1829-1911) was president of the Montgomery County Agricultural Society in the late 1870s and early 1880s, and was railroad agent at Germantown Station where he operated a fertilizer and grain store in Germantown Station. This H-shaped house was built in three main sections. The original part is the south section (left), oriented toward Seneca Creek. John Gassaway's father is believed to have built in the early 1800s the steeply pitched roof house. Wallpaper bears the date of 1815. The center section was built about 1840. About 1904, John Gassaway reoriented the house when he built the north section, with front porch facing north toward Riffle Ford Road.

The elaborately detailed north section of the house incorporates both Gothic Revival and Italianate elements. The north center cross gable and looped bargeboard in all main gables are Gothic Revival in nature, while bracketed door hood, scrolled porch bracket pairs, and window treatments are Italianate. First and second level windows have prominent cornices and footed sills, and attic windows are round-arched lunettes. Rare in the county are cast-iron panels connecting wooden post pairs. Typical of higher style Montgomery County houses of this era (late 1800s-early 1900s), the first level windows allow access to the front porch, in this case with jib-door panels.

The older section was made compatible with the 1904 section, updated with looped bargeboard and 2/2 sash windows. Front parlor mantels of dark green marble were stolen by vandals. Electricity was first installed in 1948, replacing gas lighting. The farmstead includes a log smokehouse with vertical plank siding, corncrib, and a wind pump. The Maryland Historical Trust holds interior and exterior easements on the property.

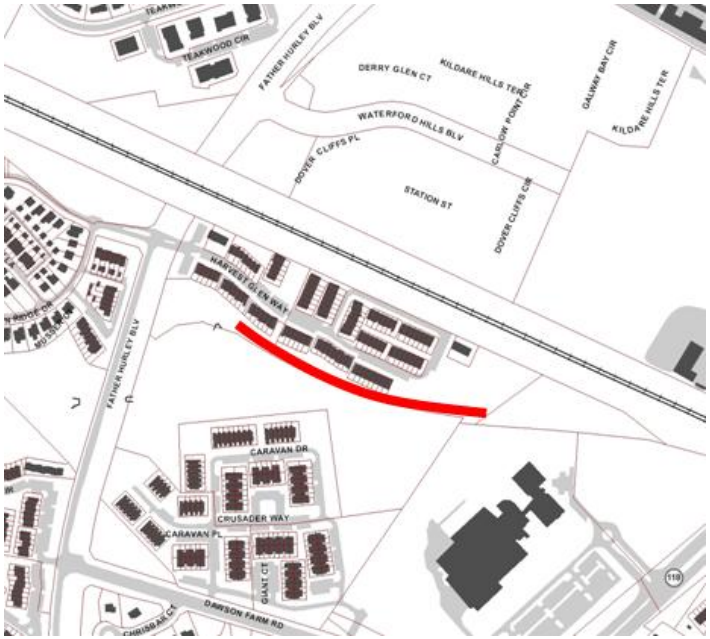
19/19 Grusendorf Log House (Mid-1800s)
Seneca Creek State Park
(below, left)

The Grusendorf Log House was originally located on Clopper Road near Great Seneca Highway. The house represents a wave of German immigrants who settled in Montgomery County in the mid 1800s. Frantz and Hanna Grusendorf, natives of Germany, were among the first to settle in Germantown, buying the property in 1841. Frantz Grusendorf was a stonemason who helped build many Germantown area houses, and Hanna was a midwife. The house, which remained in the Grusendorf family for nearly a century, was moved two miles to Seneca Creek State Park in 1989 to protect it from development.

19/40 Stone Culverts and Railroad Bed
(c1865-73)
Harvest Glen Way Vicinity
(photo, above right; environmental setting, below right)

This resource reflects the history and technology of the B&O Railroad.

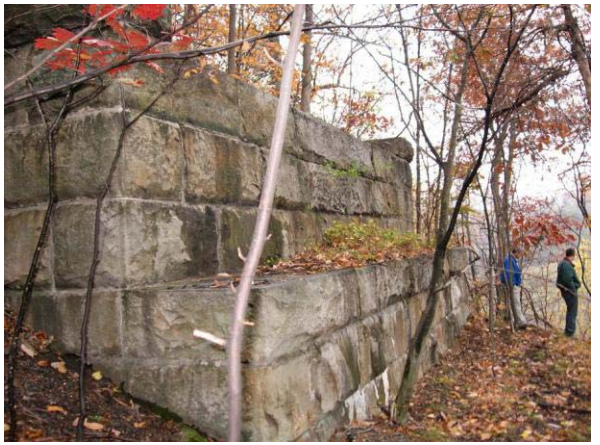
The abandoned railroad bed was the original alignment of the railroad and was in use from 1873 until 1927, when it was double tracked and straightened. The resource includes two stone culverts of granite and Black Rock stone that carried water tributaries under the tracks. The northwest culvert was relocated and reconstructed for the construction of a stormwater management pond. Salvaged stones not used in the reconstruction are in storage will be used at the new Darnestown Heritage Park, and more are available for the Germantown Town Center.

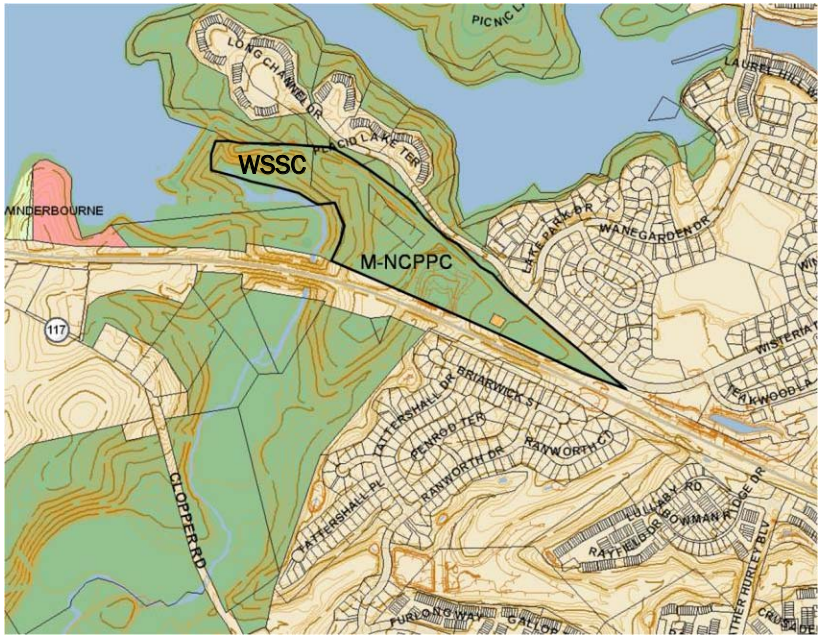


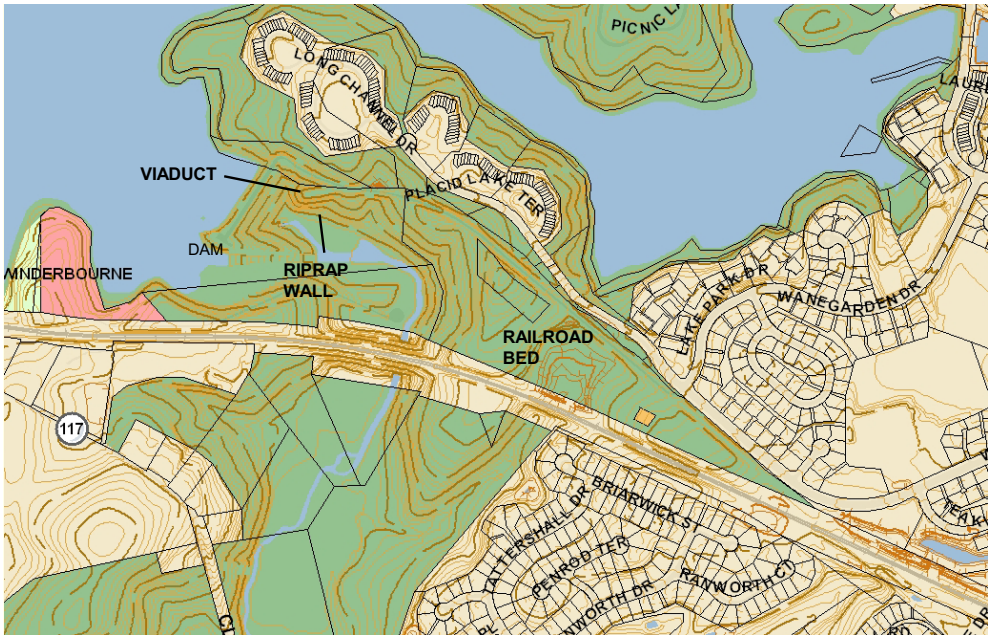
18/44 Little Seneca Viaduct (c1865-73)
Wisteria Drive Vicinity
(photo, right; environmental setting, below)

This resource consists of three elements: a c1865 abandoned railroad bed, c1872 stone rip-rap wall from the foot of the original wood trestle bridge that traversed Little Seneca Creek, and the remains of the 1896 viaduct that replaced the wooden one. The Little Seneca Viaduct was a single-tracked iron bridge that served from 1896 until 1928. During this period of service, the viaduct supported a railroad that gave a powerful surge to Montgomery County's economy. The bridge was abandoned with the advent of double-tracking, and the railroad was rerouted further south when the rail line was straightened. The design of the viaduct, with deck-type girder spans supported by nine bents, arranged in four towers and one stand-alone bent, is highly representative of its time. Unusual was the sharp four-degree curve of the structure. The 480-foot span stood 105 feet above water at its mid-point. The remaining stone abutment is incised with the dates 6-17-96 and 10-13-96. The bridge was designed by John E. Greiner (1859-1942), an accomplished engineer for the B&O Railroad—his later projects included the Havre de Grace bridge over the Susquehanna River.

A wooden trestle bridge predated the metal viaduct. A stone riprap wall located on the east bank of Little Seneca Creek was constructed for this first bridge. The resource includes a section of the original single-track width railroad bed, cut into the hillside. Now used as an access road to service the dam, the road is closed to the public.







19/5 Neelsville Presbyterian Church (1877)
20701 Frederick Road
(photo, right)

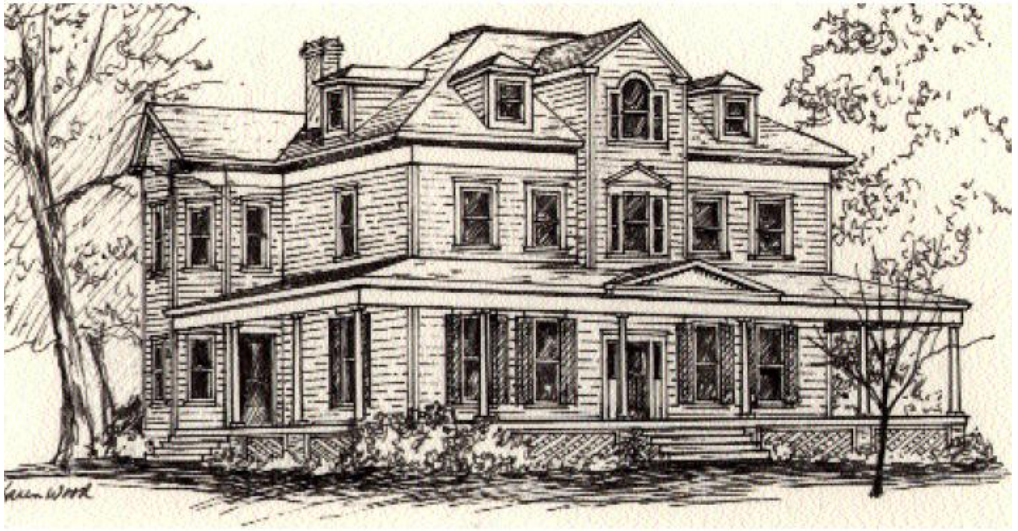
The congregation of the Neelsville Church played an important role in the development of Presbyterianism in Montgomery County. Conservative Presbyterians organized in 1845, and soon built a log church, south of the present church. The present Gothic Revival church dates from 1877. Typical of the style are pointed-arch windows, which have stained glass panes, a king post truss embellishing the front gable, and wooden buttresses, on each facade. The frame church, which faces west, has a patterned slate shingle roof and brick foundation. An entry vestibule and a neon cross in the gable peak were added in the 1930s. A north wing, completed in 1933 to provide a meeting room, is compatible in massing and also has wooden buttresses. A large cemetery lies behind the church, to the east. The congregation, which now holds services in a 1975 brick church to the north, has restored the historic church, which is used for Sunday School classes and community meetings.

19/13-5 Pumphrey-Mateney House (c1883)
19401 Walter Johnson Road
(photo, above right)

After purchasing this property in 1883, Robert H. Pumphrey lived here where he ran a store until a separate building was built next door (no longer standing) in the early l900s. Judging by the asymmetrical five-bay side elevation and by the older nature of the stone foundation, Pumphrey may have substantially rebuilt and/or added onto an earlier structure to create the building seen today. Typical details of the 1880s era include decorative Gothic Revival-influenced trusswork in the gables, window cornices and footed sills, and round-arched third-level windows. Robert's daughter and husband, Henry "Mac" Mateney (ma TEE nee), resided here in the early and mid 1900s.

19/13-1 Madeline V. Waters House
(1899-1902)
Demolished Resource—Site at 12900 Wisteria Drive
(drawing, below right)

A linear park along Wisteria Drive, at Rt. 118, commemorates the Madeline Waters House that was destroyed by arson in 1986. Built in 1899-1902, this roomy frame Colonial Revival house belonged to the owner of Germantown's general store, Horace D. Waters. His stepson Lloyd Dorsey built the house, which was the long-time dwelling of Madeline Waters, daughter of Horace. The residence was the most elaborate house in Germantown, featuring a three-story projecting pavilion with palladian windows, a broad hipped roof with dormers, cornice with dentil molding, and pedimented wrap-around porch with classical columns.



19/13-6 Upton Bowman House
(c1901) 19219 Liberty Mill Road
(photo, upper left)

Located near the Germantown Historic District, this frame residence was the home of Upton Bowman, who helped establish the Bowman Brothers' Mill, later known as Liberty Mill. In 1888, Upton and his brothers Charles and Eldridge opened the steam-powered gristmill, which flourished with its location adjacent to the railroad station. The success of the milling operation led to an economic boom in the Germantown community and the obsolescence of local water-powered mills. The Upton Bowman House was probably built about 1901 when the family purchased the property. The frame house, now covered with stucco, has decorative bargeboards with cross bracing, a two-story polygonal bay on the east side, and a wraparound porch.

19/10 Waring Viaduct (1906)
B&O tracks at Great Seneca Creek
(photo, lower left)

Located about 1,000 feet east of Waring Station Road, this stone viaduct was built to carry the Metropolitan Branch of the B&O Railroad over the Great Seneca Creek. It was the product of a massive modernization campaign of Pennsylvania Railroad's Leonor Loree when he took charge of the B&O in 1901. For its first 30 years of operation, the railroad crossed the waterway on a wooden trestle bridge that was dangerous and expensive to maintain. The stone viaduct was erected in 1906 when the railroad line between Gaithersburg and Germantown was straightened and a second track installed. The massive stonework of the Waring Viaduct, and its larger twin over the Little Monocacy, are uncommon on B&O lines yet more typically found on the Pennsylvania Railroad, evidence of Loree's influence. The 350 foot-long, three-arch viaduct of roughly dressed granite supports the tracks that are about 70 feet above the Great Seneca Creek. Early trains stopped at Waring Station to pick up passengers and freight, and to take on water pumped up from Seneca Creek via a hydraulic ram.

19/13-7 Wallich-Heimer House (1913)
19120 Mateny Road
(photo, upper right)

John Wallich, a local carpenter, built this frame house for his own residence, in 1913. A well-preserved Colonial Revival house typical of the late 1800s and early 1900s, the dwelling has a second story corner turret with polygonal hipped roof. The full-width porch has a pedimented entrance and Doric columns. The house has clapboard siding on the first level and shingle siding on the second and attic levels. The residence is named in part for Glenn and Midge Heimer who lived here from 1959-1981.

19/33 Cider Barrel (1926)
20410 Frederick Road
(photo, lower right)

The Cider Barrel is a well-loved local landmark and a distinctive example of roadside architecture. Andrew Baker built the structure in 1926 as a retail outlet for his cider and fresh apples. The Cider Barrel first became a favorite place for refreshment in the early days of automobile tourism. Baker was a prominent Germantown entrepreneur who spearheaded the move to build the Germantown Bank (1922) and served as one of its first trustees. Baker owned a large house and farm on Liberty Mill Road (near Liberty Heights Court) with an apple orchard next to the Germantown Elementary School (north side). Residents recalled autumns when dozens of farmers with 4-horse team wagons loaded with apples were waiting in line at the cider press located behind Baker's house. The Cider Barrel provided the retail outlet for both the cider and for Baker's own fresh apples.

The barrel is actually a partial cylinder applied to the front of a one-story front-gable building. A bracketed hood shelters an inset counter opening in the barrel facade. Horizontal stripes capping the head and base of the barrel lend a Streamline Moderne effect accentuated by an adjacent curved c1931 apple stand hidden behind a sliding door.

The Atomic Energy Commission Building (1958)
19901 Germantown Road

This resource has not been designated on the Master Plan for Historic Preservation. The Maryland Historical Trust has determined this resource is eligible for listing on the National Register of Historic Places.

Appendix F -

"Strategies for Maintaining Historic Character," excerpt from Vision of Boyds: A Long-Range Preservation Plan

VISION OF BOYDS:
A LONG-RANGE PRESERVATION PLAN

PREPARED BY:

TRACERIES
AND
PMA ASSOCIATES

AUGUST, 1992

A VISION OF BOYDS HISTORIC DISTRICT

Boyds is a small historic rural village located in the most northern outreaches of Montgomery County. Its architecture and physical organization reflect its 18th century plantation heritage and later transformation into a 19th century railroad community. A formal Historic District listed on the Montgomery County Master Plan, Boyds is also a viable residential community set within the ever-growing metropolitan area of Washington, D.C. Threatened by massive public and private industrial development projects, the preservation and protection of Boyds' architectural character and historic pattern is at the foundation of the retention of its significant contribution to the county's heritage.

The Boyds Historic District is composed of 34 properties grouped in two historic areas. The residential area features groups of buildings clustered together at each end of the district and with generous expanses of green space between the buildings. The northern cluster includes nineteen historic sites and a cemetery. The southern cluster includes six historic sites, including the Boyds Negro School building. The commercial area contains a cluster of nine historic sites fronting Barnesville Road. These clusters present the important pattern of sub-communities that formed the crossroads known today as Boyds.

The character of these distinct areas and an understanding of their symbiotic relationship must be observed in future development. The establishment of a buffer area, immediately surrounding the district, will provide some mitigation of potential adverse effects of nearby development; however, the magnitude of the mitigation should be directly proportional to the potential adverse impact of the projects. An understanding of the past and the protection of the elements which create Boyds' unique character will be pivotal to the preservation and enhancement of the historic district in the face of the future.

VISION OF BOYDS:
A LONG-RANGE PRESERVATION PLAN

IV. DEVELOPING A LONG-RANGE PRESERVATION PLAN FOR BOYDS HISTORIC DISTRICT

INTERESTS AND CONCERNS

Identification of Issues, Challenges and Community Ideas

The framework for developing a long-range plan for the historic district of Boyds was established around the specific preservation issues and concerns of the community. An initial workshop was held with residents of the district to identify and determine priorities of the issues, concerns, and problems which citizens face in the preservation of the districts. Following this session, the historic district was analyzed from an historical and planning perspective to identify its character defining features, historical land use patterns, and relationship to the Master Plan. Based on the issues identified in the workshop and the analysis of the characteristics of each district, statements were developed summarizing the preservation challenges to be addressed in long-range preservation planning. A follow-up meeting was conducted with citizens to review these statements and discuss potential ideas for dealing with the preservation challenges. The citizen contribution through this series of meetings helped to establish a framework for developing a preservation plan for the district which is relevant to the interests and concerns of Boyds residents.

Workshops on Preservation Issues

An initial workshop was held the evening of June 2, 1992 for those concerned about the preservation in the historic districts of Clarksburg, Hyattstown, and Boyds. The session provided a forum for residents and property owners to identify the concerns and issues relating to the preservation of the district. Residents from Hyattstown and Boyds formed their own group to identify a list of preservation issues and concerns. At the conclusion of this exercise, the lists posted for everyone to review and identify the higher priority issues. These responses were used to assign priorities to the issues from each group. These issues are listed for in order of descending priority for each of the workshop groups as given in Figure 32: Boyds Issues and Concerns.

Many of the issues identified in the workshops represent conditions or problems which are impeding preservation in the community and require attention and improvement. Some issues are specific in nature and can be addressed by singular actions. Other issues require activity over a long period of time to correct and improve the underlying conditions. Many of the issues relate to the policies and authority of the County government and the Historic Preservation Commission in administering the historic preservation in the districts. Following the workshops, the consultants worked with these issues to identify the primary areas of concern in each community and to translate the issues into "Challenge Statements" which express the broader preservation objectives to be reached. The issues raised in each workshop were analyzed and grouped according to common themes or topics in order to identify the primary areas of concern in the district. Based on these areas of concern and the specific issues

raised, a statement of the general objective, goal, or challenge was formulated which attempts to encompass the range of related concerns and issues. These statements are meant to more clearly define the core issue and as such are general in nature. A second meeting was held for the purpose of reviewing the "Challenge Statements" and discussing ideas and strategies for dealing with specific issues or meeting the broader challenges. Citizen participation in this event was intensive and very productive in producing ideas and strategies relevant to the issues which they had identified previously.

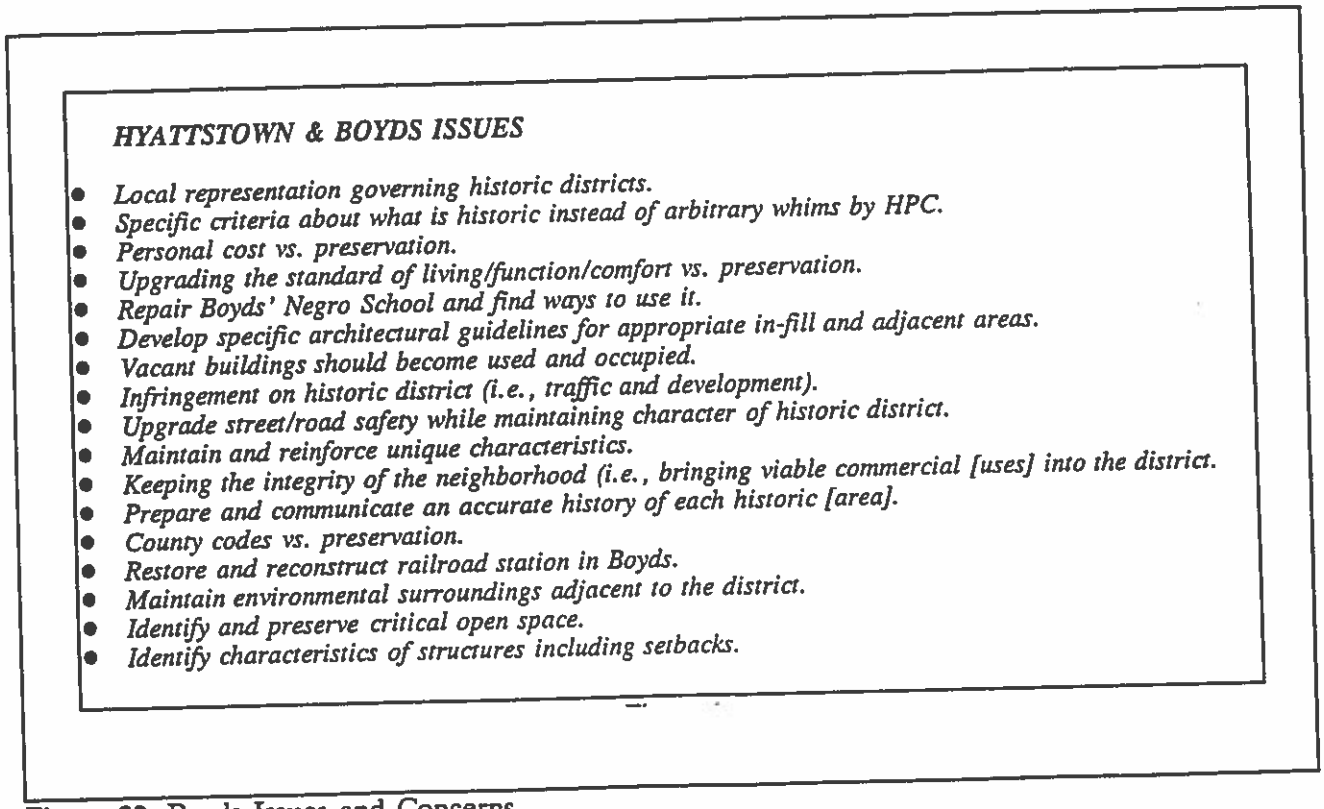


Figure 32: Boyds Issues and Concerns

Workshop Results for the Boyds Historic District

Figure 32: Boyds Issues and Concerns, Figure 33: Issues, Challenges and Strategies Common to Clarksburg, Boyds, and Hyattstown, and Figure 34: Additional Issues, Challenges and Strategies in the Historic Districts of Boyds and Hyattstown present the framework for placing issues into broader planning objectives or challenges, and the ideas and strategies which the community identified. As explained, the issues have been regrouped into thematically related areas of concern. The challenge statements have been developed to address the general long range objective or challenge facing the district. The idea or strategies listed have been stated in somewhat general terms. Specific strategies which are based on these general statements appear in the later discussion of long-range plans for each community.

Issues, Challenges, and Strategies Common to All Rural Districts

Issues	Challenges	Strategies
1. The need for local representation on the Historic Preservation Commission.	A. Establish a method for incorporating local representation into the activities of the Historic Preservation Commission (HPC) and administration of the Historic Preservation Ordinance.	• Add local representatives to the HPC for each district.
2. Use of LAP's for preliminary reviews has not worked well due to local subjectivity and lack of criteria to make evaluations.		• Establish HPC subcommittees for each district or region.
3. The lack of specific criteria about what is historic in each district for use by property owners and HPC in making decisions.	B. Document the historic characteristics of each district and establish criteria and specific characteristics to be preserved in each community.	• Designate primary, secondary, and contributing resources in each community based on clearly established criteria of historical or cultural significance.
		• Develop specific architectural design guidelines which are tailored to the specific conditions of each district
4. Historic structures in each district are being lost to abandonment and neglect.	C. To ensure the continued maintenance and use of historic buildings and properties to avoid their loss.	• Establish less demanding water, sewer, building code, and fire requirements for historic structures which can allow for their reuse without endangering public health and safety.
5. The difficulty of meeting current water and sewer requirements is preventing reuse of some significant historic buildings.		• Establish a county assistance program to provide building materials to owners of historic properties at wholesale cost, and a revolving tool share program for approved maintenance and improvements.
6. The high cost of rehabilitation and maintenance of historic structures discourages preservation.		• Enhance existing incentives, such as local property tax credits for rehabilitation to further encourage rehabilitation.
7. Increase awareness of historic preservation in the community.	D. To establish a better understanding among residents, property owners, and the public of the significance of the historic district and actions affecting it through: + Establishing specific criteria of significance + Establishing an education/awareness program for property owners and real estate. + Notification of property owners about activities and actions affecting the historic district.	• Document and identify the significant characteristics of the historic district.
8. Lack of information on the historic district and its regulation		• Educate the public on the significance of the individual historic resources in the district, the relationships which create the open character of the district, and the overall significance of the district.

Issues, Challenges, and Strategies Common to All Rural Districts

Issues	Challenges	Strategies
9. Notification of property owners, historical society, and other interested parties of activities, actions, and surveys affecting the community		• Notify and include local citizens in action affecting the district
10. Maintain and reinforce the unique identity of each district.	E. To ensure that the identity of each Historic District is maintained and reinforced as the surrounding areas continue to grow:	• Protect and distinguish the special characteristics of each district including but not limited to the following qualities: + Characteristics of open space + Rural village character + Architectural character + Special historic landmarks + Streetscape and trees + Signage controls
		• Buffer each historic district adequately to prevent surrounding development from overwhelming the historic district.
		• Establish criteria for compatible uses within rural historic districts.

Additional Issues, Challenges, and Strategies for the Historic District of Boyds

Issues	Challenges	Strategies
1. Preservation of the rural character of the Boyds Historic District	A. To continue to preserve and protect the rural character of Boyds as defined by the character of its historic homes, churches, and open space between buildings	• Adopt architectural design guidelines to ensure that alterations, additions, and new construction within the district is compatible with the character of the existing historic buildings. • Apply the siting characteristics of existing historic development to control new construction including the following relationships: + Typical pattern of front yard setbacks + Typical rythym of building spacing + Typical patterns for different uses

Additional Issues, Challenges, and Strategies for the Historic District of Boyds

Issues	Challenges	Strategies
2. To further strengthen the identity of the Boyds Historic District.	B. To strengthen and revitalize the identity of the historic district to ensure its long term viability and preservation as a rural community.	• Special attention should be given to preservation and continued use of the significant landmark buildings and characteristic groupings of vernacular buildings in the district. • Reuse of the Train station, Boyds Negro School, and other abandoned buildings should be a top priority to avoid deterioration and permanent loss. • The historic identity of commercial area should be strengthened through application of: + Architectural guidelines + Signage guidelines + Additional compatible commercial uses as appropriate
3. Repair and reuse of local landmarks including the Boyds Negro School and Railroad Station.		
4. Concern over the adverse impacts of noise and pollution from quarrying of the diabase deposit west of the historic district.	• To adequately buffer the historic district to prevent a negative impact from the quarrying operation	• Maintenance of an adequate buffer to prevent unacceptable levels of noise for residential areas.

REACHING TOWARD LONG RANGE PRESERVATION OF BOYDS

Boyds is a small historic rural village reflecting its 18th century plantation heritage and its development as a 19th century railroad community. It is important to recognize that Boyds is and can continue to be a viable historic residential village if the pattern of development and architectural character is preserved and protected.

Two patterns of existing development are identifiable within the historic district. The residential area consists of properties located along Clopper and White Ground Roads within the district and the commercial area consisting of properties located along Barnesville Road at the north end of the district. The residential area features groups of buildings clustered at each end of the district and an expanse of open space between the clusters. The northern cluster includes 19 historic sites and a cemetery. The southern cluster includes six historic sites, including the Boyds Negro School building. The commercial area contains a cluster of nine historic sites fronting Barnesville Road. These clusters represent a pattern of sub-communities within the district. A buffer area can be determined for areas immediately adjacent to the district for use in mitigating the impact of some public or private incompatible land uses, but the magnitude of these operations and services may require further mitigation if they are not to diminish the integrity of the historic district.

STRATEGIES FOR MAINTAINING HISTORIC CHARACTER

Two distinct area have been identified within Boyds Historic District. Strategies for preserving each area are presented below.

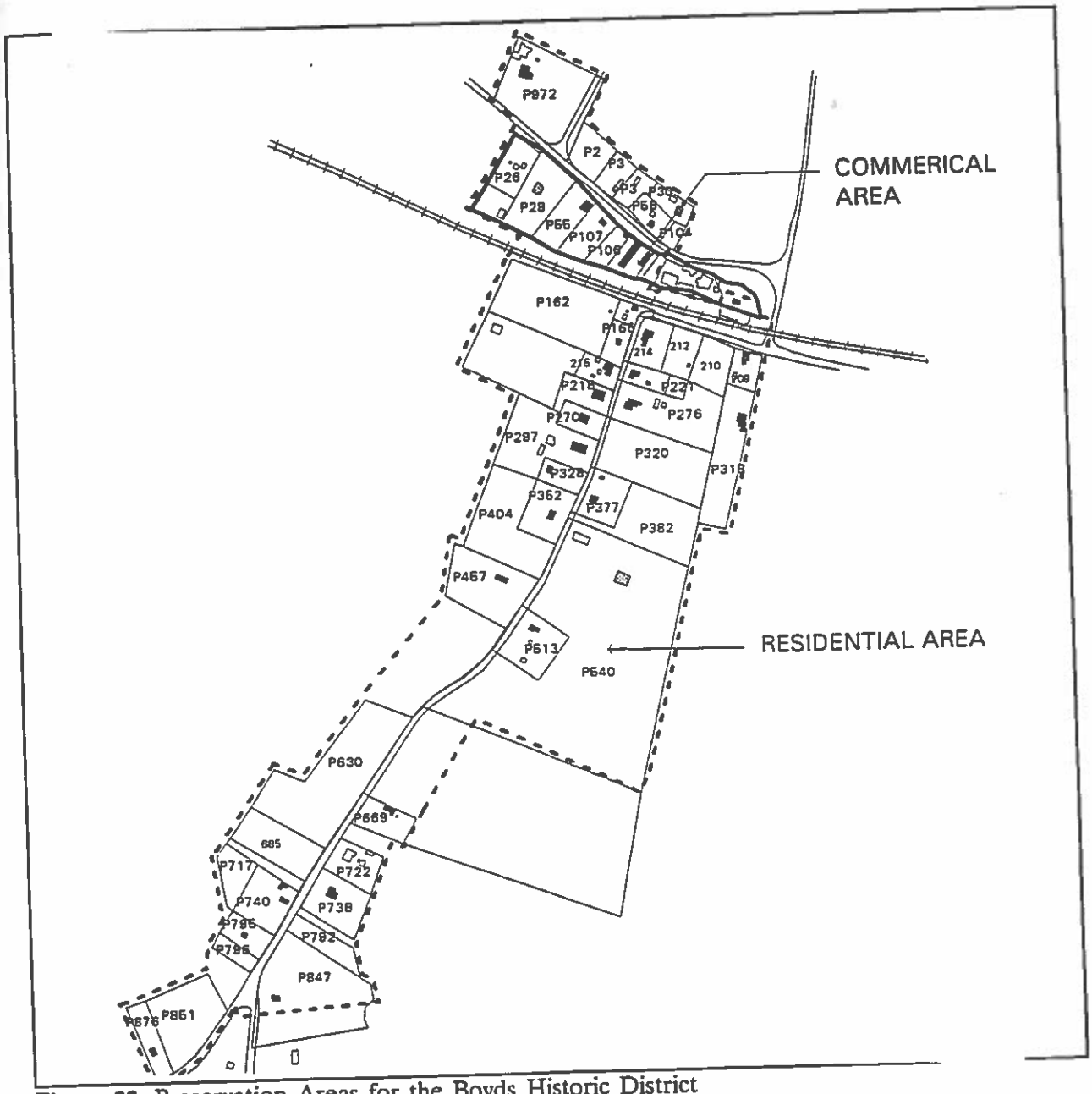


Figure 33: Preservation Areas for the Boyds Historic District

The Residential Area

The Residential Area

The residential area features groups of buildings clustered at each end of the district and an expanse of open space between the clusters.

Strategy 1.1: Satisfy the minimum conditions for water and sewer to ensure the future viability of the community. The long-range goal should be to supply the district with the level of utility service needed to meet necessary health and safety standards. A short-term solution should be found to enable vacant historic resources to be reused to prevent their deterioration. However, since the extension of sewer and water will make it possible for much greater density of development than currently exists within the district, development controls should be secure prior to the availability of services.

Strategy 1.2: Preserve the cluster type pattern of development in the district by (1) encouraging open spaces between the historic building clusters and new construction, (2) encouraging clustering of new development in similar patterns, (3) and maintaining the pattern of building separation and front yard setbacks typical for the district. Based on the analysis of lot characteristics of historic properties in this area the following criteria are suggested for new residential construction to the extent feasible:

+*Lot sizes average about one acre in the district with an average lot occupancy of about 7%.*

+ *Front yard setbacks average 40 feet for primary historic resources and 65 feet for all buildings within the district. Building separation distances average about 140 feet within clusters.*

Strategy 1.3: Develop a rehabilitation program to stabilize and improve deteriorating and substandard buildings in the area. The object of such a program should be to prevent the loss of important historic elements within the district. As envisioned, such a program could involve property owners and the County government to overcome the cost impediments to rehabilitation work.

+Explore the creation of a County assistance program to provide building materials to qualifying owners of historic properties at or near wholesale costs.

+Develop additional incentives to encourage rehabilitation of deteriorating structures considered important to the District.

Strategy 1.4: Develop architectural guidelines for the rural context which address the rural vernacular architecture of the area, issues of the rural quality of Boyds.

Strategy 1.5: A long-range tree preservation and maintenance plan should be developed to ensure that trees which contribute to the character of the historic district are: (1) considered in reviewing applications for work in the district, (2) maintained in good health, and (3) replaced with appropriate varieties when needed.

Strategy 1.6: Encourage the reuse of landmark buildings such as the Boyds Negro School and Train Station to further strengthen the identity of Boyds and prevent the loss of these special resources.

The Commercial Area

The commercial area is almost fully developed with commercial uses on the southern side of Barnesville Road. Properties to the north of Barnesville in residential use. The preservation of this area must recognize this dual quality to this cluster of buildings which are isolated from the southern portion of the district by the railroad. Preservation of this area should focus on strengthening the visual quality of this quaint collection of buildings and preventing future development from negatively impacting the residential area to the north. The following strategies are suggested:

Strategy 2.1: Develop specific architectural guidelines for the commercial area to deal with the different building types, siting relationships, and scales of development characteristic of commercial uses.

Strategy 2.2: Institute model signage guidelines for business identification and advertising signage to enhance the appearance of the district.

Strategy 2.3: Develop a streetscape plan for the commercial area to provide a pedestrian environment through the use of trees, vegetation, sidewalks, and period lighting.

Appendix G -
Policy for Parks

Source: *2017 Park, Recreation, and Open Space Plan (October 2017)* - available online at: ParkPlanning.org

(page 16)

"A POLICY FOR PARKS"

The following *Policy for Parks* was adopted by the Montgomery County Planning Board in the *1988 PROS Plan* and has been re-affirmed and included in every PROS Plan since that date. Its goals and objectives are still valid and should be followed whenever possible. Exceptions may be made by the Planning Board when it is deemed to be in the best public interest. The *Policy for Parks* guides acquisition, development, and management of the Montgomery County Park System. It is listed in its entirety below, with the addition of a new section on public or quasi-public agencies seeking to use parkland for non-park projects:

Goal

To acquire and maintain a system of natural areas, open spaces, and recreation facilities developed in harmony with the County's natural resources to perpetuate an environment fit for life and fit for living.

Objectives

Acquisition of Parkland

The objectives of the program for parkland acquisition shall be:

- Acquisition of land for a balanced park system in the region in order to:
- Provide citizens with a wide choice of both active and passive recreation opportunities as major factors in enhancing the quality of Life
- Provide adequate parklands to accommodate conservation and preservation needs
- Acquisition of parkland based on the following considerations:
- Local and regional demand for public park and recreation facilities based on current need and projected population changes
- Protection and preservation of natural areas
- Protection and preservation of watersheds
- Protection and preservation of cultural and historical sites
- Encouraging the private dedication of land as a means of parkland acquisition.

Development and Management of the Park System

The objectives of the planning, design, construction, and management of the park system shall be based on:

- Meeting the needs of recreation and preservation in a manner that is harmonious with the natural beauty and parkland physiography, reflecting concern for the environment
- A planned and scientific approach to resource management, cognizant of the ecological interdependencies of people, the biota, water and soil

To preserve natural resources, the Department of Parks shall:

- Limit the development of active-use areas in regional parks to no more than 1/3 of their total park acreage, with the remaining acreage designated as natural areas and/or conservation areas. Development in other categories of parks shall be determined on a case-by-case basis with full consideration of the values of the natural features
- Prepare an environmental evaluation as part of park development or rehabilitation plans were deemed appropriate by the Park Commission
- Review as necessary the impact of park use, development, and management practices on parkland

Relationship to Other Public Agencies, Education, and the Private Sector

- The Department of Parks shall encourage other public agencies, as well as the private sector, to assist in providing compatible open spaces, natural areas, and recreation facilities and opportunities in the region
- The Department of Parks shall encourage and support research in the environmental sciences by other public agencies, institutions of higher learning, and the private sector, and support programs in outdoor education and recreation in the school system
- Lands and facilities under the control of The Maryland-National Capital Park and Planning Commission are held as a public trust for the enjoyment and education of present and future generations. The Commission is pledged to protect these holdings from encroachment that would threaten their use as parkland. The Commission recognizes that under rare circumstances non-park uses may be required on park property in order to serve the greater public interest
- For projects that will impact parkland, the policy is that non-parkland alternatives be pursued first for all publicly funded projects – unless environmental, economic, social and engineering impacts to move the project off parkland are proven to be prohibitive. In cases where the Planning Board has deemed that non-park use of parkland is unavoidable and/or serves the greater public interest, The Department of Parks shall:
    - Require the agency to acquire a Park Construction Permit. Through the review process, Parks will require that the agency minimize the impacts to parkland as much as possible.
    - Determine how to make the park system whole through mitigation. Some examples of mitigation may include but are not limited to: reforestation, vegetation enhancements or replacements, tree replacement, impervious surface removal, stormwater management facility retrofit or creation, terrestrial or aquatic habitat restoration, or other measures deemed appropriate for the impact.
    - In instances where the agency must permanently take ownership of parkland, parkland replacement may be required. Parkland impacted by a project must be replaced at equal or greater natural, cultural, and/or recreational value and therefor the parkland replacement mitigation may exceed the acreage impacted by the project. In certain instances, the impacts to parkland caused by public projects may be of such magnitude that the park function affected can never be restored and/or The Department of Parks believes there is no comparable replacement land in the County. When such cases arise, a compensation plan will be developed and agreed upon.

- Neither Mitigation nor Compensation will be considered in place of avoidance, minimization or mitigation and will need to be approved by the Montgomery County Planning Board.

Appendix H -

Pedestrian Road Safety Audit (Middlebrook Road)

Pedestrian Road Safety Audit

Middlebrook Road

From Father Hurley Boulevard to Waring Station Road

December 2017

Prepared for

Montgomery County
Department of Transportation

Prepared by

STV Incorporated
7125 Ambassador Road, Baltimore, Maryland 21244

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1. Introduction

1.1 Objective

The objective of this study was to complete a Pedestrian Road Safety Audit (PRSA) for Middlebrook Road between Father Hurley Boulevard and Waring Station Road in Germantown, Maryland. The study limits are shown in **Figure 1**. For the purpose of this report, Middlebrook Road is assumed to have an east-west orientation. The Corridor was selected for a PRSA based on its inclusion on the Montgomery County Department of Transportation's (MCDOT) list of High Incidence Areas (HIA). Montgomery County has recently adopted the international Vision Zero Initiative which strives to reduce the number of fatal and serious injury crashes to zero. A Two Year Action Plan has been finalized in November 2017 with input from the Pedestrian Bicycle and Traffic Safety Advisory Committee, community organizations, and the public. The audit was conducted to identify safety issues related to pedestrian and bicycle safety in the study area. As a result of the audit, the PRSA team has identified a variety of issues related to pedestrian and bicycle safety and developed a number of suggestions to improve overall safety in the audit area.

1.2 Background

The study area is an approximately 1.4 mile segment of Middlebrook Road located in Germantown, Maryland. The study area includes six signalized intersections at Father Hurley Boulevard, Century Boulevard, Germantown Road, Crystal Rock Drive, Great Seneca Highway, and Waring Station Road. There are three unsignalized intersections at Locbury Drive, Cross Ridge Drive, and Ridgecrest Drive as well as eight commercial driveways within the study area. Pedestrian activity throughout the study area is primarily generated by the adjacent shopping centers, residential land use, Seneca Valley High School at Crystal Rock Drive, and the public transit stops within the corridor.

The Middlebrook Road study area was identified as an HIA for pedestrian-related crashes, as part of the Montgomery County Executives' Pedestrian Safety Initiative. Based on crash data provided by MCDOT, 17 pedestrian crashes occurred during the study period from January 2011 through December 2015. The purpose of this PRSA is to identify safety issues that may be contributing to the reported pedestrian crashes in the study area.

The PRSA was performed on November 9 and November 10, 2016 during daytime and nighttime hours. The PRSA team consisted of nine members with expertise in pedestrian and bicycle safety and traffic engineering, representing:

- MCDOT,
- Montgomery County Division of Transit Services,
- City of Gaithersburg,
- Montgomery County Police Department,
- T3 Design, and
- STV Inc., the PRSA consultant.

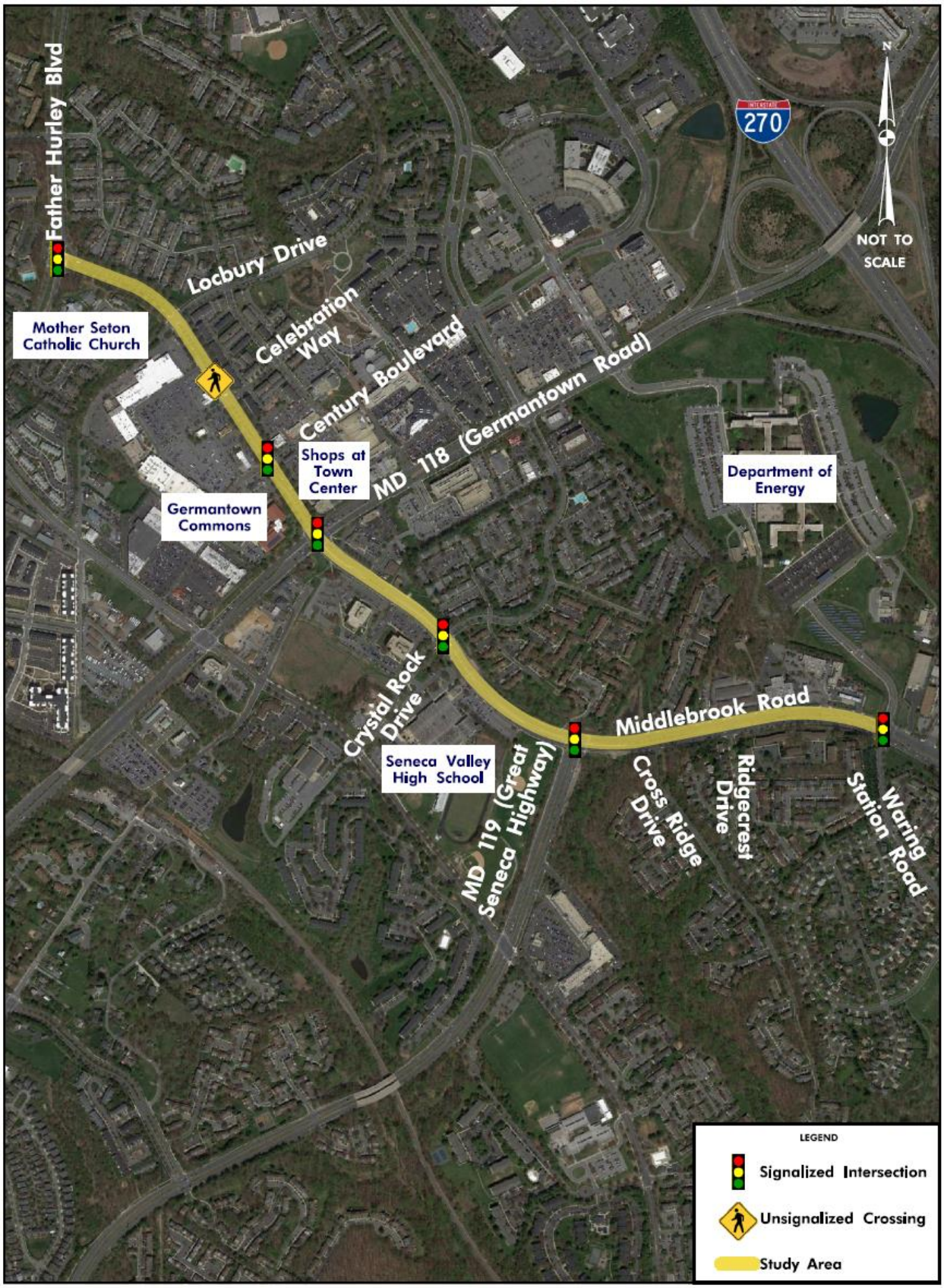


Figure 1: Middlebrook Road PRSA Study Area

1.3 Organization of the Report

This report first presents a description of the existing geometric, operational, and safety conditions for the study area based on field reviews and available data. Next, the report details the existing conditions and general issues throughout the corridor identified by the PRSA team. Finally, the report presents suggestions for pedestrian safety improvements based on the issues identified throughout the corridor.

This report has served as a resource to SHA and MCDOT, as well as other stakeholders for implementing pedestrian safety improvements within the audit area. There has been an ongoing vetting of the suggestions and recommendations in this report with collaboration among agencies and stakeholders to implement short- and intermediate-term recommendations and to assess the feasibility and constructability of long-term projects such as signal timing upgrades or a road diet. Ultimately, as a result of this process, a range of pedestrian safety recommendations will be implemented.

1.4 Existing Conditions

1.4.1 Site Characteristics

Within the study area, Middlebrook Road is classified as a divided business arterial roadway from Father Hurley Boulevard to Germantown Road, and a major highway from Germantown Road to Waring Station Road. The roadway varies from four through lanes west of Germantown Road to six through lanes east of Germantown Road and serves Germantown, Maryland. The posted speed limit on Middlebrook Road is 40 miles per hour throughout the study area. During school hours (6:45 AM – 3:00 PM) the speed limit is 30 miles per hour in the school zone between Germantown Road and Great Seneca Highway. The lane geometry throughout the corridor is shown in **Figure 2**. The study area includes six signalized intersections:

- Middlebrook Road at Father Hurley Boulevard
- Middlebrook Road at Century Boulevard
- Middlebrook Road at Germantown Road
- Middlebrook Road at Crystal Rock Drive
- Middlebrook Road at Great Seneca Highway
- Middlebrook Road at Waring Station Road

Within the study area, there is also one unsignalized intersection with a marked crosswalk on Middlebrook Road which provides access between residential land uses and shopping centers:

- Middlebrook Road at Celebration Way

The roadways intersecting Middlebrook Road are summarized below:

<u>Father Hurley Boulevard</u>

- Four-lane divided roadway that runs in the north-south direction.
- Consists of a dedicated left lane, a through lane, and a shared through/right-turn lane in the north- and southbound directions.
- Connects residential communities north and south of Middlebrook Road. Provides access to I-270 approximately one-mile north of Middlebrook Road

Celebration Way

- Two-lane roadway that runs in the north-south direction.
- Consists of a shared left/through/right-turn lane in the south- and northbound direction.
- Connects shopping centers to the south with the residential neighborhood to the north of Middlebrook Road.

Century Boulevard

- Two-lane roadway that runs in the north-south direction.
- Consists of a shared left/through/right-turn lane in the south- and northbound direction.
- Connects shopping centers north and south of Middlebrook Road.

Germantown Road

- Six-lane divided roadway that runs in the north-south direction.
- Consists of two dedicated left-turn lanes, two through lanes, and one through/right-turn lane in the southbound direction.
- Consists of two dedicated left-turn lanes, three through lanes, and one dedicated right-turn lane in the northbound direction.
- Connects residential communities and shopping centers north and south of Middlebrook Road. Provides access to I-270 approximately 0.5 miles north of Middlebrook Road.

Crystal Rock Drive

- Two-lane roadway that runs in the north-south direction.
- Consists of one left/through/right-turn lane in the south- and northbound directions.
- Connects residential communities north and south of Middlebrook Road. Provides access to Seneca Valley High School on the south side of Middlebrook Road.

Great Seneca Highway

- Four-lane divided roadway that runs in the north-south direction.
- Consists of two dedicated left-turn lanes and one dedicated right-turn lane in the northbound direction.
- Connects residential communities and shopping centers south of Middlebrook Road. Provides access to S. Christa McAuliffe Elementary School 0.4 miles south of Middlebrook Road.

Waring Station Road

- Roadway runs in the north-south direction.
- Three-lane roadway with a through lane in each direction and a Two -Way Left-Turn Lane south of Middlebrook Road.
- Consists of one dedicated left-turn lane and a shared through/right-turn lane in the southbound direction.
- Consists of a shared through/left-turn lane and a dedicated right-turn lane in the northbound direction.
- Connects to the US Department of Energy north of Middlebrook Road and residential communities south of Middlebrook Road.

Middlebrook Road offers a number of pedestrian accommodations including concrete or asphalt sidewalk of varying width along both sides of Middlebrook Road throughout the entire length of the study area. Marked crosswalks and countdown pedestrian signals are provided at each of the signalized intersections. In addition, there is an unsignalized intersection crosswalk providing additional crossing opportunities at Celebration Way. There are bicycle accommodations to the east of Great Seneca Highway with a marked bike lane in both the east- and westbound directions.

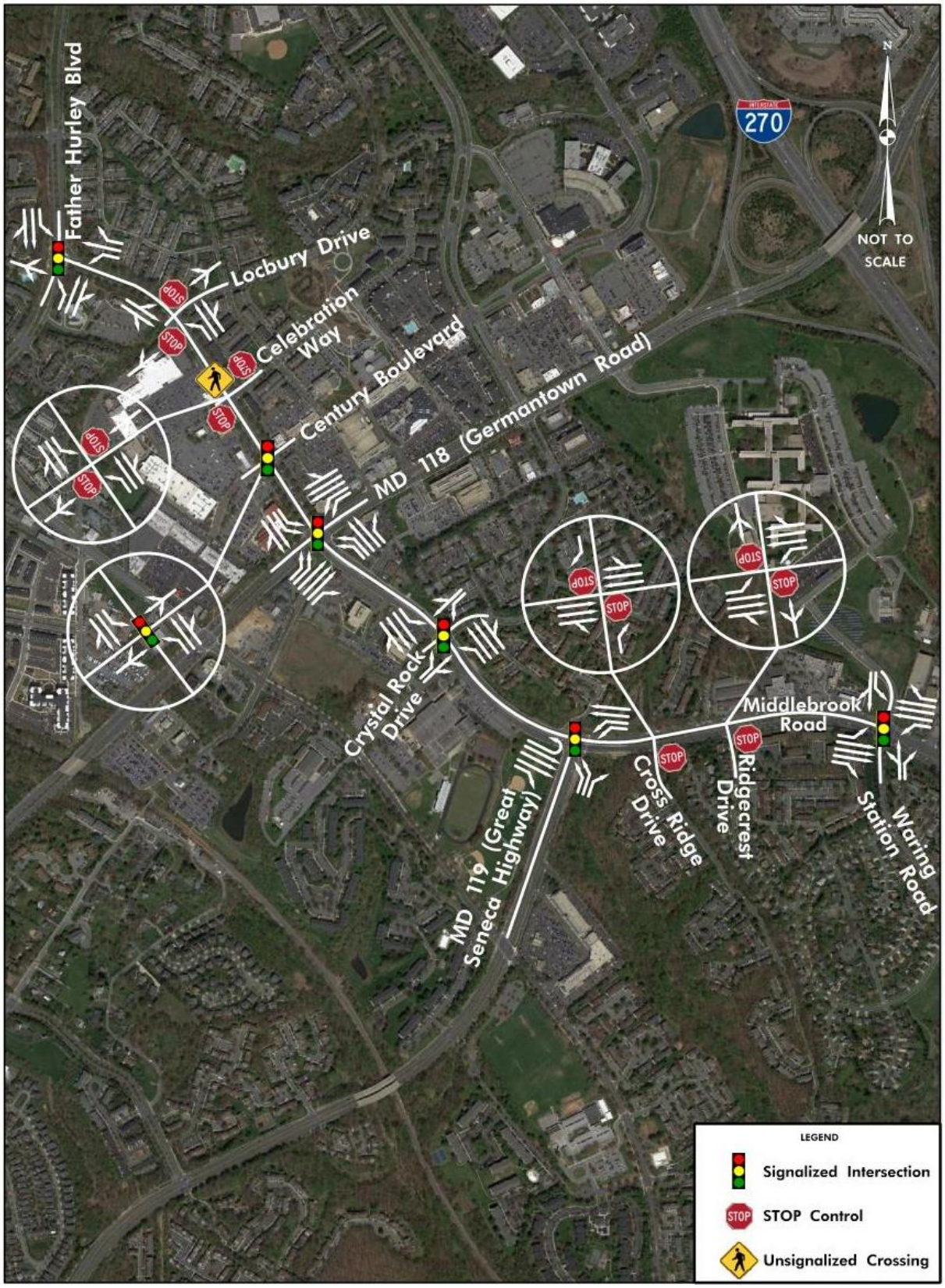


Figure 2: Study Area Lane Geometry

1.4.2 Traffic Data

Average annual daily traffic (AADT) volumes in vehicles per day for Middlebrook Road were obtained from a count conducted at Warning Station Road and is provided in **Table 1**.

Table 1: 2016 AADT

Road	Location	AADT
Middlebrook Road	Waring Station Road	33,670 vpd

Total peak hour vehicular volumes entering the intersections, provided in vehicles per hour (vph), from turning movement counts on Middlebrook Road are shown in **Table 2**.

Table 2: Traffic Count Data

Year	Location	AM Peak Hour	AM Peak Volume	PM Peak Hour	PM Peak Volume
2016	Middlebrook Rd at Father Hurley Blvd	7:15 – 8:15 AM	1,893 vph	5:00 – 6:00 PM	2,269 vph
2016	Middlebrook Rd at Century Blvd	7:30 – 8:30 AM	1,407 vph	6:00 – 7:00 PM	1,967 vph
2016	Middlebrook Rd at Germantown Rd	7:30 – 8:30 AM	3,303 vph	5:00 – 6:00 PM	4,315 vph
2016	Middlebrook Rd at Crystal Rock Dr	7:15 – 8:15 AM	2,137 vph	5:45 – 6:45 PM	2,621 vph
2016	Middlebrook Rd at Great Seneca Hwy	7:15 – 8:15 AM	3,342 vph	5:30 – 6:30 PM	3,741 vph
2016	Middlebrook Rd at Waring Station Rd	7:30 – 8:30 AM	3,463 vph	5:00 – 6:00 PM	3,886 vph

There are 16 bus stops within the study area, eight on the north side and eight on the south side of Middlebrook Road, that serve Montgomery County Ride On bus routes 97 and 74. Route 74 is only accessed by two stops on the corridor located between Crystal Rock Drive and Great Seneca Highway with headways of 27 to 45 minute headways during weekdays, while Route 97 services all 16 bus stops within the study area with headways of 15 to 30 minutes during weekdays. There are no bus stops located between Century Boulevard and Crystal Rock Drive, as buses use these roads to travel to the Germantown Transit Center.

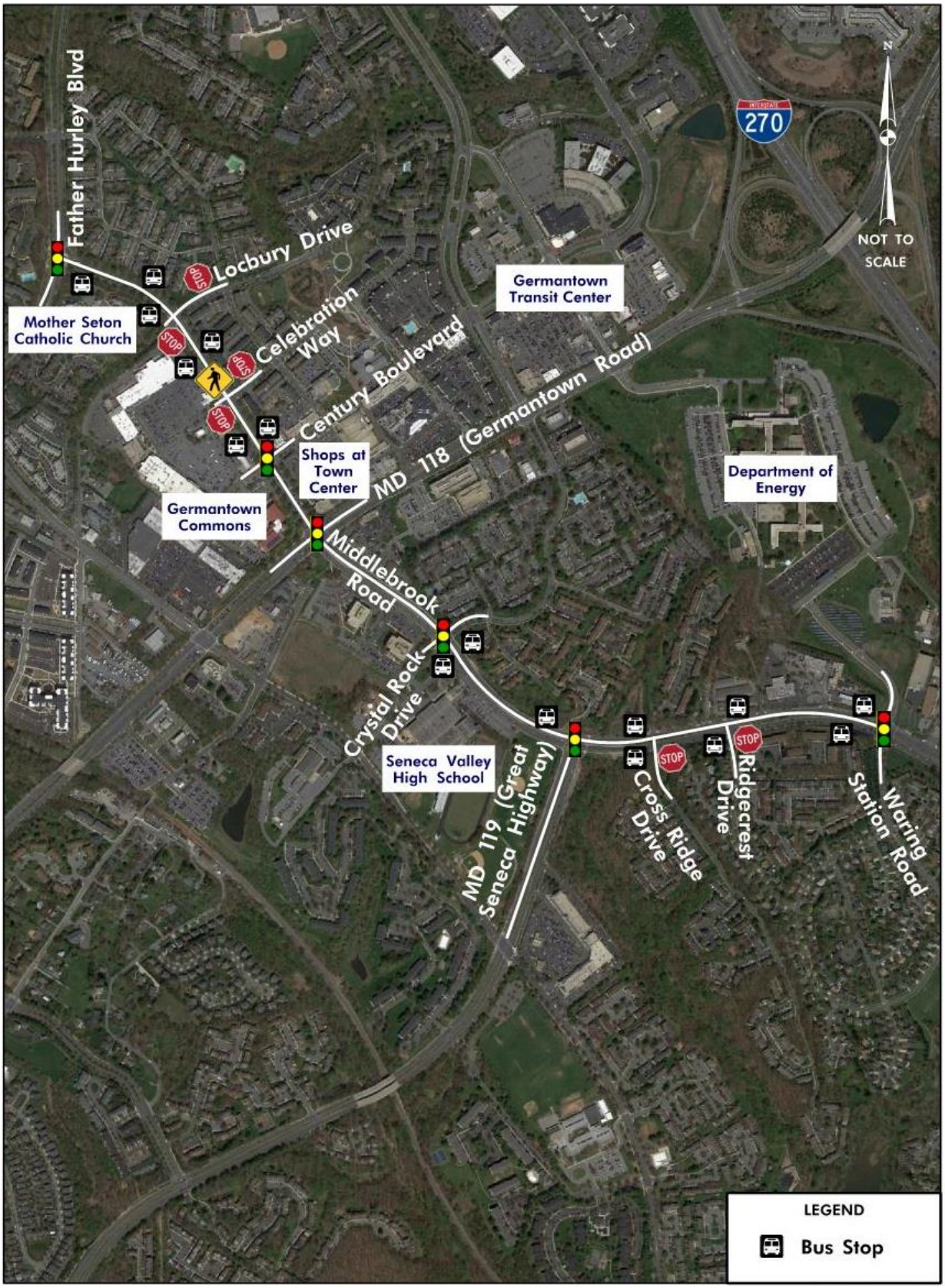


Figure 3: Study Area Bus Stops

1.4.3 Crash Data

The PRSA team reviewed all crash records collected by the Montgomery County Police Department in the study area during the study period from January 2011 through December 2015 to identify the location of all the reported pedestrian and bicycle crashes within the corridor. **Figure 4** summarizes the location, date, time, severity, type, and ambient conditions of each reported pedestrian and bicycle crash.

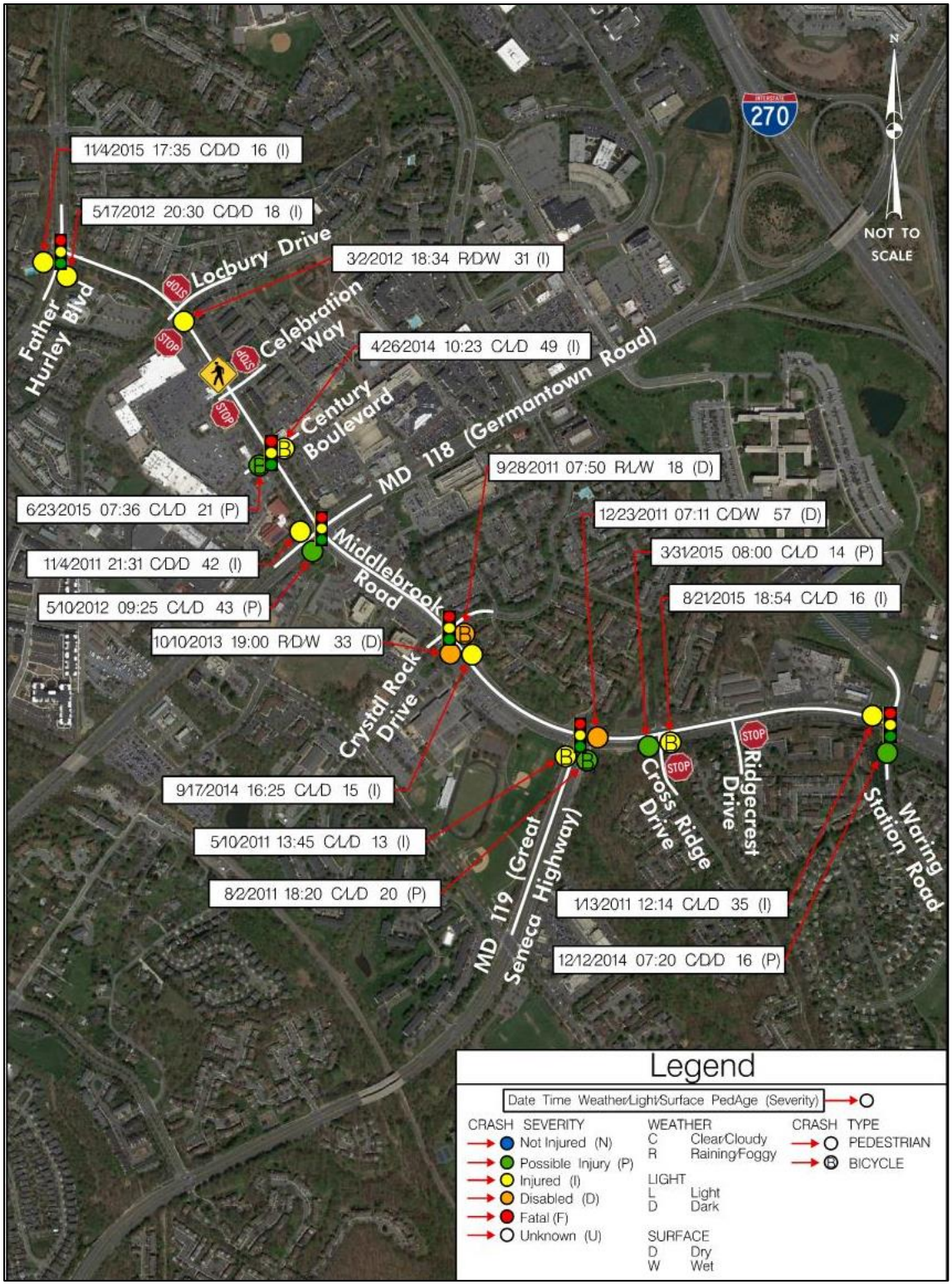


Figure 4: Pedestrian Crashes on Middlebrook Road 2011 – 2015

As shown in **Figure 5**, 17 pedestrian-related crashes occurred during the study period, 6 of which involved cyclists. The bicycle crashes occurred both within the area where bicycle lanes are provided east of Great Seneca Highway and the area where bicycle lanes are not provided west of Great Seneca Highway. There were 302 vehicle crashes within the study limits from 2011 through 2015, of which 53 crashes (18%) occurred at or near the Waring Station Road intersection, 50 crashes (17%) occurred at or near the Great Seneca Highway intersection, and 47 crashes (16%) occurred at or near the Germantown Road intersection. The number of vehicular crashes has varied over the years with no significant pattern over the 5 year study period. Although vehicular crashes are not the focus of this audit, additional future study of vehicular crash patterns at these intersections should be considered.

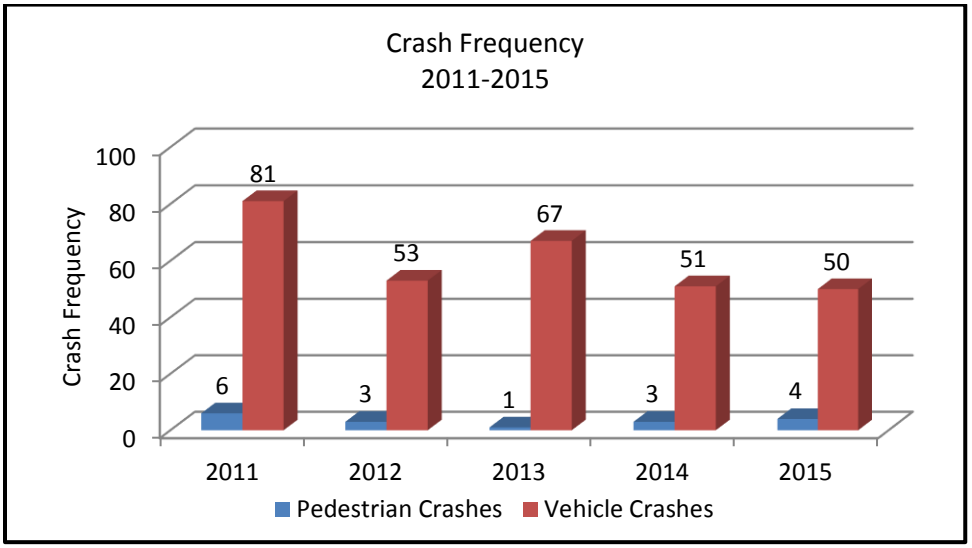


Figure 5: Study Area Crash Frequency

Figure 6 shows the pedestrian crash severity for the seventeen pedestrian crashes. Three of the crashes resulted in disablement of the pedestrian, and nine crashes resulted in injury. The other five pedestrian crashes resulted in possible injury. There were no crashes that resulted in fatalities during the study period.

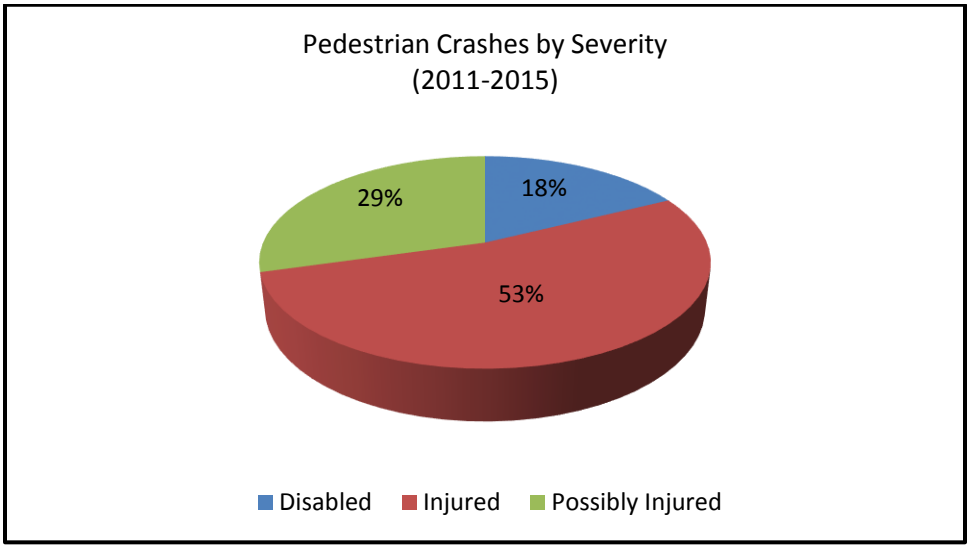


Figure 6: Pedestrian Crashes by Severity

Figure 7 shows the vehicle movements prior to the pedestrian crashes. As shown, 12 of the 17 pedestrians involved in crashes were struck by a vehicle making either a left or right turn. Based on field observations,

there are significant conflicts between turning vehicles and pedestrians in the crosswalk both during the Walk and Flashing Don't Walk phases of the pedestrian signal.

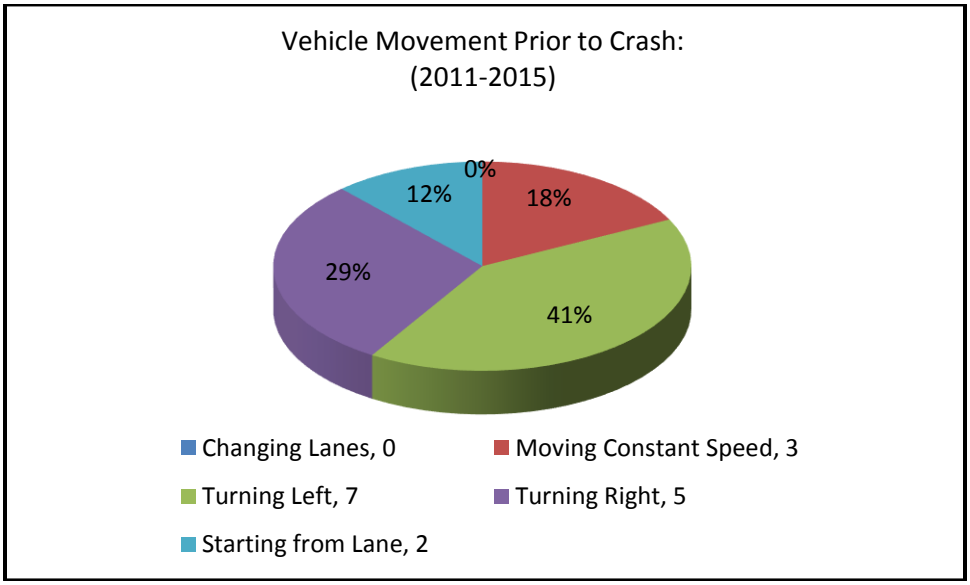


Figure 7: Vehicle Movement Prior to Pedestrian Crash

Figure 8 shows the distribution of pedestrian crashes compared to the distributed frequency of crashes by age group based on study area residential demographics. 2010 Census data (www.census.gov) for the study area zip code was obtained in order to distribute the total number of crashes (17) over the age demographics of the surrounding population. This was done in order to provide a comparison between the actual number of pedestrian crashes by age group (shown in red) and the distributed number of pedestrian crashes by age group based on the census data (shown in blue).Of the 17 pedestrians involved in crashes, eight (47%) were under the age of 20 (ages 13, 14, 15, 16, 16, 16, 18, and 18). When compared to the study area demographics from the census data, the under 20 age group is over-represented in the 2011-2015 pedestrian crash data, while the over 50 age group is under represented. This trend is consistent with field observations and can be attributed to the high school in the study corridor.

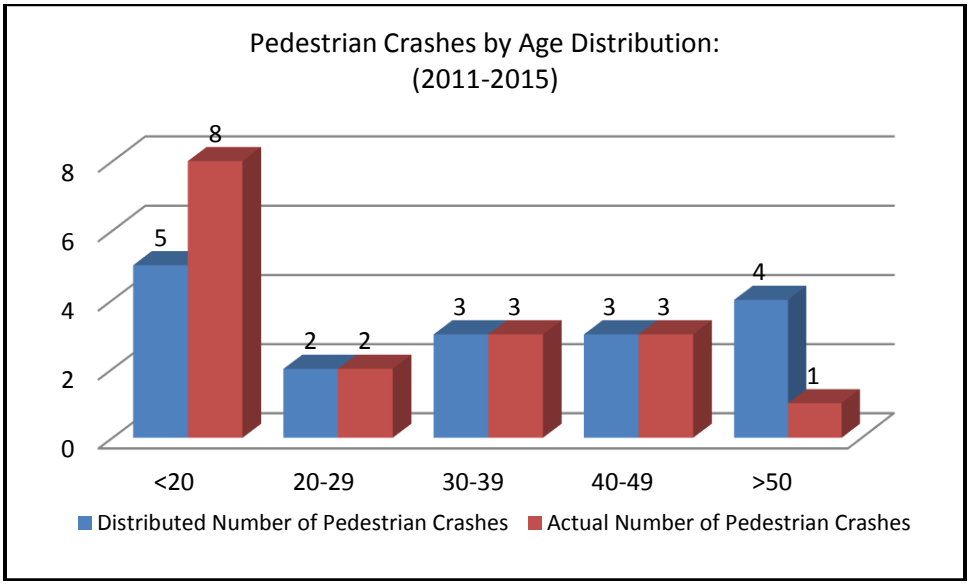


Figure 8: Pedestrian Crashes by Age

As shown in **Figure 9**, the majority of pedestrian crashes were uniformly distributed throughout the day from 6 AM to 12 AM, with no pedestrian crashes occurring during the pre-AM peak hours. Based on this information, time of day was not a significant factor in the pedestrian crashes. However, it should be noted that the high school arrival and dismissal times are currently 7:45 AM and 2:30 PM, respectively, which fall within the AM Peak and Midday categories, though these bell times were implemented in the 2015-2016 school year and were 20 minutes earlier during the earlier years that crash data was analyzed.

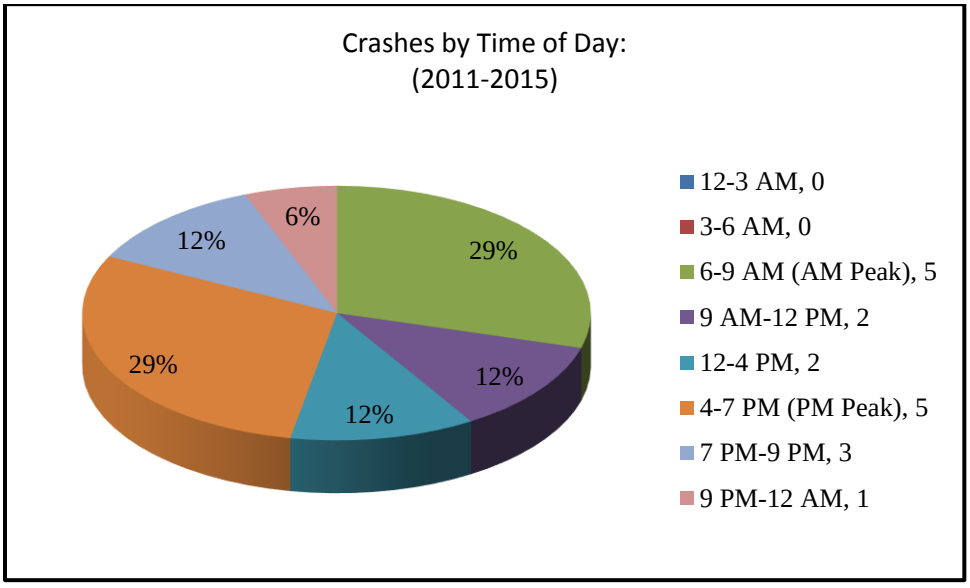


Figure 9: Pedestrian Crashes by Time of Day

Ten of the 17 pedestrian crashes occurred under daylight conditions. The other crashes occurred while dark when street lights were on. While the crash reports did not indicate that lighting was a contributing factor in any of the pedestrian crashes, it should be noted that several locations within the corridor appeared to not be adequately lit based on industry standards during the field audit.

Thirteen of the 17 pedestrian crashes occurred under dry pavement conditions. The crash reports did not indicate that weather was a contributing factor in any of the pedestrian crashes.

2. Road Safety Audit Findings

2.1 Safety Benefits of Existing Roadway Features

Notable existing roadway features that enhance pedestrian safety in the study area include, but are not limited to:

- ***Continuous Sidewalks:*** A concrete or asphalt sidewalk of varying width is present along the north and south sides of Middlebrook Road. A concrete sidewalk is also provided along both sides of Father Hurley Boulevard, Locbury Lane, Celebration Way, Century Boulevard, Germantown Road, Crystal Rock Drive, Great Seneca Highway, Ridgecrest Drive, and the south side of Waring Station Road. Concrete sidewalk is provided along one side of White Saddle Drive and the north side of Waring Station Road. The majority of the sidewalks are five feet in width, but there are some places where they are three feet in width, which is less thatn the five feet required by Montgomery County's Context Sensitive Road Design Standards.

Figure 10: Countdown Pedestrian Signal

- ***Pedestrian Signage:*** Pedestrian crossing and advanced pedestrian signs are located along east- and westbound Middlebrook Road.

- ***Countdown Pedestrian Signals (CPS):*** Countdown pedestrian signals are provided at all six of the study's signalized intersections. Countdown pedestrian signal research has shown that pedestrians easily understand how the signal works, that more pedestrians start during the Walk phase, and that fewer people initiate walking late in the clearance phase. Studies have also shown that few pedestrians remain in crosswalks during the steady Don't Walk phase where countdown signals are used.

- ***Accessible Pedestrian Signals (APS):*** Accessible pedestrian signals are provided at the signalized intersections of Great Seneca Highway and at Germantown Road. Accessible pedestrian signals provide direction through audible and tactile signals which help pedestrians with hearing and visual impairments to cross the street safety.

2.2 Opportunities for Improvements

The Middlebrook Road PRSA team identified a number of pedestrian safety issues in the study area during the audit. These issues were discussed by the team and prioritized to identify the issues presenting the greatest impediments to pedestrian safety in the study area. This section describes the observed safety issues identified by the PRSA team and suggests improvements to address each issue.

Seneca Valley High School

Seneca Valley High School is located at the intersection of Middlebrook Road and Crystal Rock Drive, with two driveway access points east of Crystal Rock Drive along the south side of Middlebrook Road. The student drop off loop and additional parking is accessed from Crystal Rock Drive. Many school students were observed crossing Middlebrook Road at Crystal Rock Drive during school arrival and dismissal times (7:45 AM and 2:30 PM, respectively), and nearly half of the pedestrian crashes (8 of 17) involved high school-aged children. Students were also observed utilizing public transit to travel to and from school.

Seneca Valley High School is being rebuilt on the existing site and is slated to be completed by August 2019. As part of this redevelopment, the vehicular access point to the site are anticipated to change. Current plans show that the parking lot access and student drop off loop will remain on Crystal Rock Drive, while the additional parking areas are proposed to be access from Wisteria Drive, effectively closing the driveway access points on Middlebrook Road. While the reconfiguration of the school access points is expected to reroute pedestrians away from Middlebrook Road, the new school is expected to nearly double the capacity of the existing school (1,300 existing to 2,400 future students), potentially increasing the number of students crossing the street. The audit team recommends that at the completion of construction, the intersection of Middlebrook Road at Crystal Rock Drive be further reviewed to determine how the change in school access points has affected pedestrian travel patterns at this intersection.

Maryland-National Capital Park and Planning Commission (M-NCPPC) Road Diet Study

M-NCPPC, has conducted a road diet feasibility study in support of the MARC Germantown Rail Plan update. The study includes analysis of two proposed cross-sections on Middlebrook Road between Germantown Road and Great Seneca Highway that reduce vehicular travel lanes in order to install bicycle facilities, such

as buffered bike lanes or a protected bike path, which would tie into existing bike lanes provided on Middlebrook Road east of Great Seneca Highway.

Based on the field audit, there appears to be potential available capacity for vehicles on Middlebrook Road between Great Seneca Highway and Germantown Road. The intersection of Middlebrook Road at Crystal Rock Drive is a heavily crossed intersection due to its proximity to Seneca Valley High School, and the wide travel lanes and 6-lane section contribute to a vehicle centered design within this section. Removing travel lanes at this intersection and potentially reducing pedestrian crossing distances would reduce pedestrian exposure to vehicular conflicts and help calm vehicular traffic. Based on discussions with M-NCPPC, the audit team supports further consideration of the recommendation for the road diet which M-NCPPC is scheduled to present to the Planning Board in December 2017.

Pedestrian-Vehicle Conflicts

At multiple locations along the corridor, pedestrians were observed crossing outside of marked crossings or during the Don't Walk phase of the pedestrian signal. Additionally, conflicts between turning vehicles and pedestrians crossing during the Walk phase were observed. The audit team recommends coordination with the MCDOT Pedestrian Safety Coordinator and Seneca Valley High School to increase pedestrian education about where and when to cross and recommends that signal phasing changes, such as protected left-turn phases or Leading Pedestrian Intervals (LPIs), be evaluated where turn conflicts are present.

Left: Pedestrian crosses during Don't Walk phase. Right: Pedestrian crosses outside of marked crosswalk.

Figure 11: Examples of Pedestrian-Vehicle Conflicts

Pedestrian Facility Conditions

A number of issues related to pedestrian facilities were observed during the audit. Examples include lack of crosswalk markings across side-streets, faded crosswalks, and no Accessible Pedestrian Signals (APS) at some intersections.

Left: No marked crosswalks across side streets. Right: Crosswalk markings are faded.

Figure 12: Examples of Pedestrian Facility Issues

The audit team identified a number of suggestions to improve the condition of the existing pedestrian facilities including, but no limited to, the installation of crosswalks across all side-streets, restriping pavement markings for crosswalks and stop bars along Middlebrook Road, and installing APS where applicable.

Maintenance

A number of conditions were observed that may contribute to pedestrian safety issues that could be resolved through maintenance improvements. Such issues include signs that are damaged, sidewalk that is damaged or overgrown with vegetation.

Left: Damaged sidewalk on the south side of Middlebrook Road. Center: Sign is leaning east of Great Seneca Highway. Right: Overgrown vegetation greatly reduces sidewalk width.

Figure 13: Examples of Maintenance Issues

The audit team recommends that all damaged or missing signs be replaced and that all foliage along the sidewalk be trimmed to maintain the full available width of walkable space. The condition of the sidewalk should be assessed along Middlebrook Road and the feasibility of repairs should be evaluated.

Lighting Conditions

While the majority of crashes occurred during daylight, observations during dark conditions indicated that multiple light fixtures were non-functioning and have been reported for repair. Additionally, the unsignalized crossing at Celebration Way did not have dedicated lighting to improve pedestrian visibility at night.

Lighting throughout the study area can be improved by inspecting street lighting for repair. The audit team also recommends evaluating the feasibility of additional street lighting at the unsignalized crosswalk near Celebration Way.

2.3 Summary of Issues and Suggestions

The following section provides a summary of the issues identified during the PRSA process and the suggestions for improvements at each location discussed in this report. The anticipated timeframe for completion [Short Term (ST), Intermediate (I) and Long Term (LT)] is referenced after each suggestion.

Safety Issue	Suggestion(s)
Pedestrian Vehicle Conflicts	▪ Consider installing lane arrow pavement markings along Middlebrook Road and lane usage or shoulder markings, particularly on side streets, where applicable. (ST) ▪ Restripe all faded stop bars along the corridor. (ST) ▪ Consider installing Turning Traffic Yield to Peds signs (R10-15L) at intersections with permissive left turns. (ST) ▪ Work with MCPD to ensure appropriate levels of enforcement of posted speed limits. (I) ▪ Consider coordination with the MCDOT Pedestrian Safety Coordinator to increase pedestrian education and enforcement along Middlebrook Road. (I) ▪ Determine the feasibility of installing a Leading Pedestrian Interval at signalized intersections with high left and right turn conflicts. (LT) ▪ Evaluate the feasibility of adding protected left turn phases for applicable approaches to reduce conflicts. (LT) ▪ Evaluate the traffic signal coordination along Middlebrook Road to help create gaps at unsignalized intersections. (LT) ▪ Consider installing speed limit sign (S5-1) with flashing lights during school hours to better notify vehicles of the speed reduction. (LT) ▪ Evaluate right turn radii, particularly at the Great Seneca Highway and Father Hurley Boulevard intersections, for opportunities to reduce turn radii to reduce crossing distances and vehicular speeds. (LT) ▪ Evaluate the feasibility of a road diet on Middlebrook Road between Crystal Rock Drive and Great Seneca Highway to assist with lowering speeds and reducing crossing distance as discussed in the M-NCPPC study. (LT)

Pedestrian Facility Issues	▪ Consider installing pedestrian warning signs (W11-2) along the north and south sides of Middlebrook Road, where applicable. (ST) ▪ Consider installing Detectable Warning Surfaces (DWS), where necessary, to comply with ADA requirements. (ST) ▪ Consider restriping faded crosswalk markings and updating crosswalk markings to ladder markings where applicable. (ST) ▪ Consider installing crosswalks at unsignalized intersections, where applicable. (ST) ▪ Assess the condition of damaged sidewalk and asphalt path and determine the feasibility of repairs. (I) ▪ Consider relocating pedestrian push buttons to conform to ADA standards. (LT) ▪ Determine the feasibility of reconstructing sidewalk ramps to align with adjacent crosswalks where feasible. (LT) ▪ Consider installing or repairing the Accessible Pedestrian Signals (APS) where applicable. (LT) ▪ Evaluate the pedestrian crossing times at the signalized intersections to ensure that the Flashing Don't Walk interval meets standards. (LT) ▪ Consider the installation of green pavement for conflict areas within the marked bicycle lanes. (LT) ▪ Consider installing Rectangular Rapid Flashing Beacons (RRFB) on the pedestrian warning signs at the unsignalized crosswalk at Celebration Way. (LT)
Maintenance	▪ Trim the foliage blocking signage along the corridor. (ST) ▪ Trim the foliage along and above the sidewalk. (ST) ▪ Replace all damaged or faded signage throughout the study area. Evaluate sign size to prevent vehicular damage to future signs. (ST) ▪ Consider adding route information to the bus stop signs throughout the corridor. (ST) ▪ Consider installing missing Keep Right (R4-7) signs in intersection medians where applicable. (ST) ▪ Consider reinstalling raised pavement markers to the correct height between Great Seneca Highway and Waring Station Road. (LT)
Lighting	▪ Inspect street lighting throughout the corridor and repair or replace as necessary. (ST) ▪ Determine the feasibility of additional street lighting at unsignalized locations where pedestrians cross Middlebrook Road. (LT) ▪ Consider installing higher wattage lights between Germantown Road and Crystal Rock Drive. (LT)

Appendix I -

Germantown MARC Rail Carbon Emissions Analysis

Germantown MARC Rail Carbon Emissions Analysis

Minimizing energy consumption is important for environmental and economic reasons. Most of the proposed new development will be redevelopment of existing built sites with higher density, making better use of limited resources and existing infrastructure. Mixed-use areas near transit reduce vehicle miles traveled, and even eliminate some trips by encouraging people to take the bus and walk to shopping.

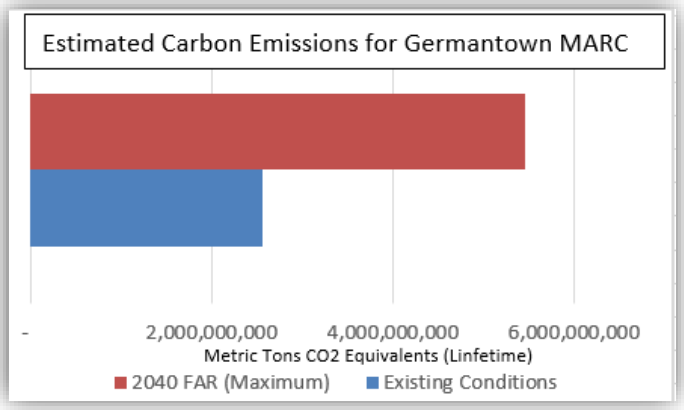
Carbon emissions are directly related to many forms of carbon-based energy production and consumption. Increased carbon emissions have been tied to the human contribution to climate change, thus increasing the importance of minimizing the use of non-renewable energy.

Embodied energy emissions, building energy emissions, and transportation emissions are the three main components of greenhouse gases used in projecting total emissions for an area. Embodied emissions are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance. Building energy emissions are created in the normal operation of a building, including lighting, heating cooling and ventilation, operation of computers and appliances, etc. Transportation emissions are released by the operation of cars, trucks, buses, motorcycles, etc. Recommendations to reduce emissions in these three areas are consistent with recommendations in the Montgomery County Climate Protection Plan (Montgomery County Department of Environmental Protection, January 2009).

Montgomery County Bill 32-07 establishes a goal to stop increasing greenhouse gas emissions by the year 2010, and to reduce emissions to 20 percent of the 2005 levels by the year 2050. Also, Montgomery County law (Bill 34-07) requires the Planning Board to estimate the carbon footprint of areas being master planned, and to make recommendations for carbon emissions reductions. A model to estimate the greenhouse gas emissions, including embodied energy emissions, building energy emissions, and transportation emissions, was run for the existing conditions and the projected buildout of this Plan.

Germantown MARC Greenhouse Gas (GHG) Emissions

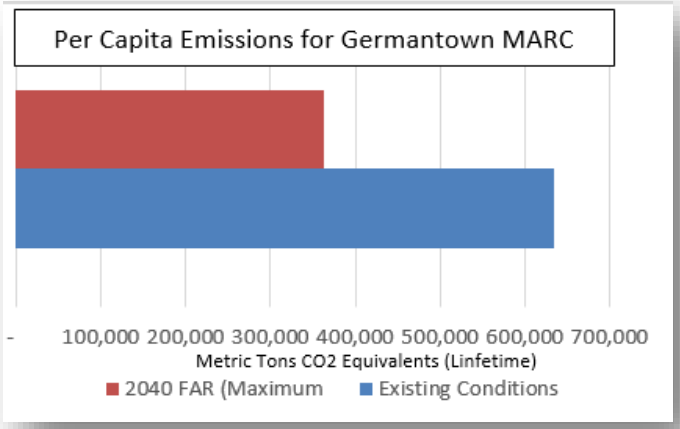
The following tables shows the result of model runs for the Germantown Area of the MARC Rail Plan. Existing Conditions are from 2015. 2040 FAR is a model run for the maximum development scenario considered as part of this master plan process.



Overall greenhouse gas emissions are projected to increase due to increased population and commercial development.

But there is a corresponding decrease in vehicle-related emissions per person due to other buildout factors:

- Concentration of growth around an existing transportation hub, thereby reducing car use.
- Creating apartments and condos, which are more energy efficient than single-family homes;
- Increasing population with only a slight increase in road pavement.



So, although population will increase, vehicle miles travelled per capita will significantly decrease along with a decrease in greenhouse gas per capita.

Efforts to moderate carbon emissions have been applied to the Plan's recommendations and align with the County's 2009 Climate Protection Plan. This Plan addresses carbon reduction by encouraging and supporting Smart Growth principals such as a mix of building types and uses, diverse housing and transportation options, creating walkable and bike-able neighborhoods and encouraging protection and sustainable planting of trees. Further carbon reductions can be achieved through the construction of energy efficient buildings. Comprehensively, significant reductions in greenhouse gas can be achieved with the implementation of these strategies.