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1.0 Introduction

The Montgomery County Department of Transportation (MCDOT), in cooperation with the Maryland State Highway Administration (SHA) and the Maryland Transit Administration (MTA), is proposing a new Bus Rapid Transit (BRT) line along MD 97 (Georgia Avenue) between the Montgomery General Hospital and the Wheaton Metrorail Station in Montgomery County, Maryland. MD 97 (Georgia Avenue) is classified as a Principal Arterial connecting three major activity centers: Olney, the Glenmont Metrorail Station and the Wheaton Metrorail Station. This corridor has one of the highest levels of existing Metrobus transit ridership in Maryland, on top of the ridership provided by Montgomery County's Ride On service along portions of, and across, the Georgia Avenue corridor. This corridor has been identified by several planning and feasibility studies, dating back to the late 1990's, as recommended for some type of enhanced or express busway system.

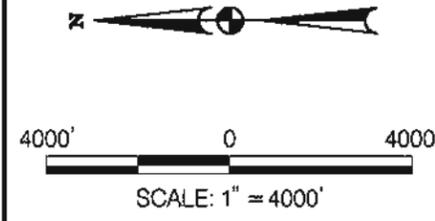
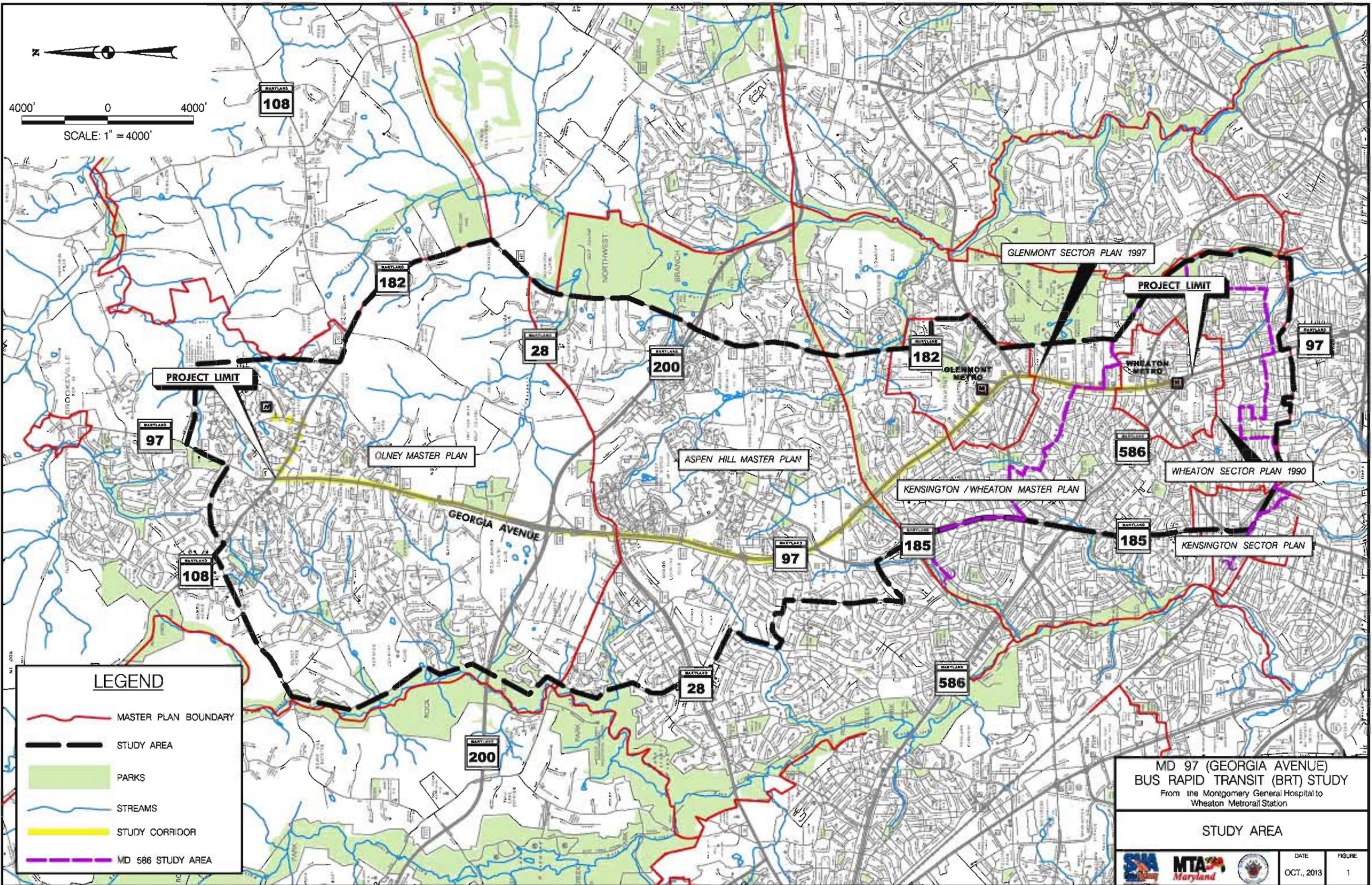
BRT is an integrated, bus-based, rapid transit system typically utilizing highly flexible service (i.e., changes in headways and hours/days of operation can easily be implemented) and advanced technologies to improve customer convenience and reduce delays. BRT combines running ways, specialized buses, stations, and automated information systems into an integrated system with a unique brand identity. BRT stations typically include passenger shelters and loading platforms; level bus boarding; real-time bus arrival information; automated fare purchase with off-board fare collection; and station site treatments such as access, landscaping, and lighting. BRT vehicles are typically specialized buses with low-floors, multiple doors on both sides of the bus, higher capacity through use of articulated buses, increased passenger circulation and bicycle provisions, and brand identity.

BRT service features stations that are spaced farther apart than local bus stops. Buses may operate in dedicated lanes reserved exclusively for BRT or in shared travel lanes used by BRT buses and other traffic. Transit signal priority (TSP), queue jumpers, and station pull-outs may be used in combination with shared traffic lanes and dedicated BRT lanes to improve speed and operations. In cities where BRT has been implemented, it has been described as a bus that offers the convenience of rail transit with a lower capital cost, because it does not require an investment in trains, track, or catenaries.

This Purpose and Need Statement presents the existing and future transportation needs in the MD 97 (Georgia Avenue) study corridor that the project is proposing to address.

1.1 Description of Study Corridor

The MD 97 (Georgia Avenue) BRT study corridor is approximately nine miles long, between the MD 97 (Georgia Ave)/MD 108 (Olney Sandy Spring Road) intersection and the Wheaton Metrorail Station in Montgomery County, Maryland (**Figure 1**). This project will also evaluate feasible bus service improvements to and from Montgomery General Hospital via MD 108.



LEGEND

- MASTER PLAN BOUNDARY
- STUDY AREA
- PARKS
- STREAMS
- STUDY CORRIDOR
- MD 586 STUDY AREA

**MD 97 (GEORGIA AVENUE)
BUS RAPID TRANSIT (BRT) STUDY**
From the Montgomery General Hospital to
Wheaton Metrorail Station

STUDY AREA

			DATE	FIGURE
			OCT., 2013	1

Twenty-six signalized intersections, more than 40 unsignalized intersections, and numerous driveways are located within the study corridor. The MD 97 (Georgia Avenue) cross section varies between four-lane and six-lane segments, and the roadway is divided throughout by a median that varies in width from 4 feet to 50 feet. The median is depressed and open section (no median curb) in some segments with a variable width shoulder. Closed (curbed) section is provided to the outside of both the northbound and southbound roadways throughout the corridor. There is no parking on Georgia Avenue within the study corridor.

Sidewalks are typically present throughout the Georgia Avenue study corridor on both sides of the roadway. Marked crosswalks are located at each of the 26 signalized intersections and at nine of the 40+ unsignalized intersections throughout the corridor. There are no dedicated bicycle lanes or shared use lanes along Georgia Avenue within the study corridor.

1.2 Existing Roadway and Transit Operations

1.2.1 Roadway Operations

Georgia Avenue is classified as a Principal Arterial and carries an Average Daily Traffic (ADT) volume of approximately 30,150 to 50,000 vehicles per day (VPD) within the study corridor. It is one of the most heavily used transportation corridors in Montgomery County and experiences traffic congestion problems.

Table 1 shows a summary of 2012 and 2040 No-Build ADT for various segments of the study corridor. The 2040 No-Build condition assumes all 2040 improvements in the Metropolitan Washington Council of Governments (MWCOG) 2012 Constrained Long Range Plan (CLRP), except the Georgia Avenue corridor within the study limits where no improvements are assumed. The Randolph Road/ MD 97 (Georgia Ave) interchange is assumed as part of the 2040 No-Build condition.

The travel demand analysis was developed using the MWCOG regional travel demand model. MWCOG/TPB staff assisted Maryland SHA staff in refining the regional model and developing a base year model (2007) and a forecast year (2040) no-build model. These refinements consisted mainly of network additions and refinements within the vicinity of the study area. The regional travel demand forecasts were developed using version 2.3.39 of the regional model, along with Round 8.1 Cooperative Forecasts and the 2012 Constrained Long-Range Plan. In addition to these inputs, local data sources such as the Sector Plan and Traffic Impact Studies (TISs) within the vicinity of the study area were also evaluated in order to represent a comprehensive analysis.

Existing traffic volumes were developed by collecting data along the corridor at each of the signalized intersections. Average daily traffic and peak hour traffic volumes were developed using appropriate traffic trend factors and standard volume balancing techniques.

Table 1: MD 97 (Georgia Ave) Average Daily Traffic (ADT)

MD 97 (Georgia Ave) Segment	Segment Length (mile)	ADT			Percent (%) Increase
		2012	2040	Increase	
North of MD 108	--	21,000	26,000	5,000	24
MD 108 to Old Baltimore Rd	1.1	33,350	40,300	6,950	21
Old Baltimore Rd to MD 200	1.3	44,100	53,150	9,050	21
MD 200 to MD 28	0.6	47,100	55,450	8,350	18
MD 28 to MD 185	1.8	44,950	52,600	7,650	17
MD 185 to Glenallen Ave	1.9	37,950	45,400	7,450	20
Glenallen Ave to MD 182	0.3	30,150	35,050	4,900	16
MD 182 to Randolph Rd	0.2	42,200	48,650	6,450	15
Randolph Rd to Shorefield Rd	0.4	50,000	56,450	6,450	13
Shorefield Rd to University Blvd	0.8	44,600	49,600	5,000	11
University Blvd to MD 586	0.4	37,900	40,800	2,900	8
South of MD 586	--	59,300	64,125	4,825	8

Note: Please refer to **Table A-2** in **Appendix A** for Arterial Level of Service (LOS) Analysis results.

The development of the 2040 forecasts were based on methodologies outlined in the NCHRP-255 Report: Highway Traffic Data for Urbanized Area Project Planning and Design, using existing and forecast model outputs. Screenlines were developed to refine the traffic volumes from the regional travel demand model and adjustments were made based on actual counts that were observed. Once the daily traffic volumes (ADTs) were refined using the NCHRP-255 methodologies, the volumes were balanced and the 2040 AM and PM peak hour volumes were developed.

Traffic operations analysis was performed to assess the AM and PM peak hour operations for 2012 Existing and 2040 No-Build conditions. Intersection Level of Service (LOS) analyses were performed using the Critical Lane Volume (CLV) methodology. Level of service (LOS) is a scale measuring the freedom of mobility or severity of congestion experienced by drivers. The LOS scale ranges from A to F. LOS A represents free flow movement of traffic with little or no congestion. LOS F represents failure with stop-and-go conditions and long queues of traffic. LOS D occurs near a critical boundary where traffic flows become unstable. This level is generally considered acceptable during peak hours of traffic flow on streets and highways in urban and suburban areas. At LOS E, the roadway is operating near capacity, and day-to-day delays are very unpredictable. LOS is normally determined for the peak hours of the typical weekday. These levels have been determined through traffic research, and are related to measurable traffic characteristics such as delays, speeds, traffic density or v/c ratios.

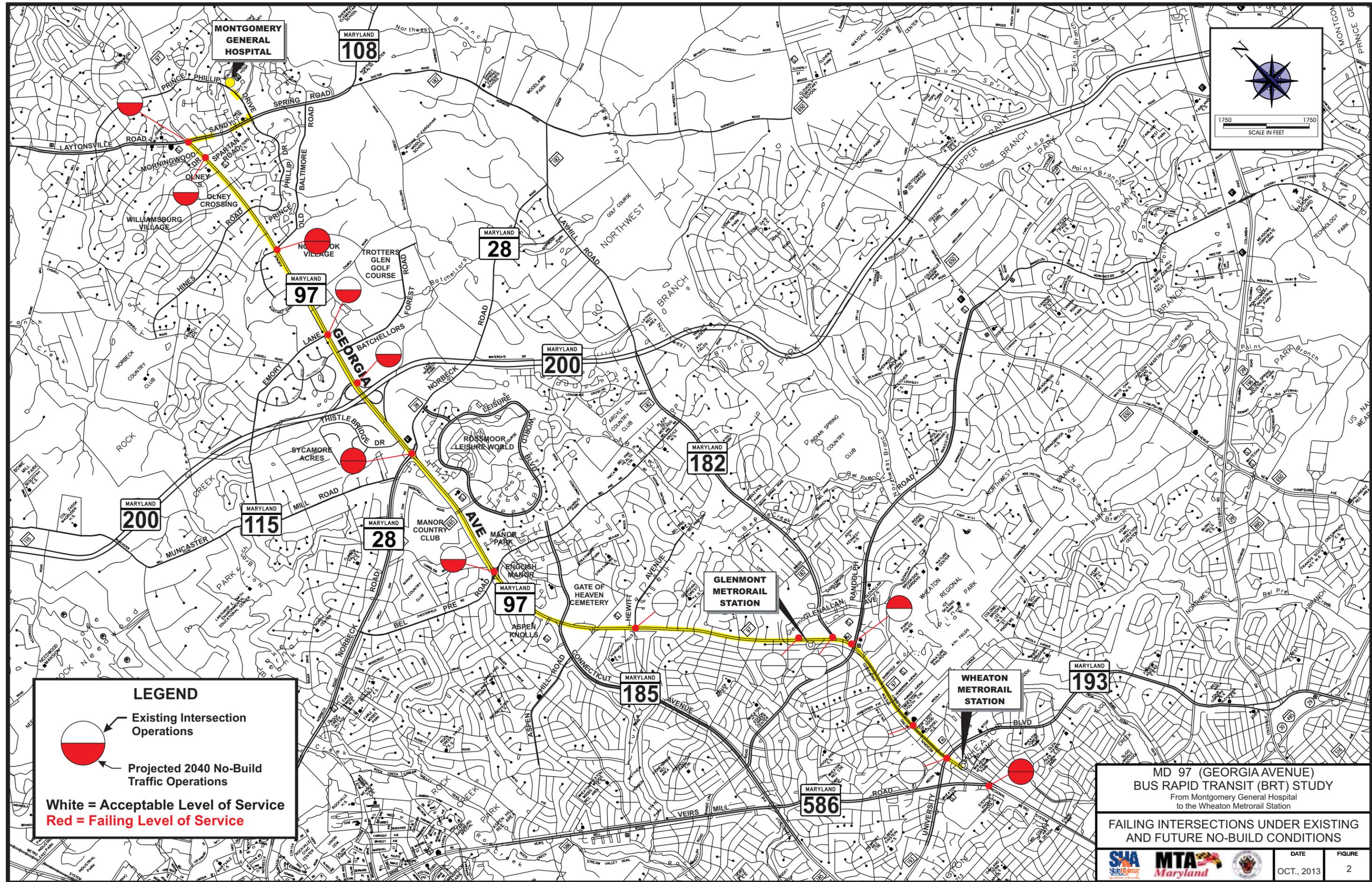
The intersection LOS based on CLV and volume-capacity ratio for 2012 Existing and 2040 No-Build conditions are shown in **Appendix A**. In summary, for the 2012 Existing conditions during the AM Peak, four (4) intersections operate at LOS F and two (2) intersections operate at LOS E, based on CLV; while during the PM peak, two (2) intersection operate at LOS F and two

(2) intersections operate at LOS E. Similarly, based on CLV analysis, under 2040 No-Build conditions (which includes no roadway improvements to the Georgia Avenue corridor beyond routine maintenance and operations), during the AM Peak, seven (7) intersections operate at LOS F and five (5) intersections operate at LOS E; while during the PM peak, four (4) intersections operate at LOS F and nine (9) intersections operate at LOS E. **Figure 2** shows intersection locations along the Georgia Avenue study corridor that are currently experiencing failing conditions, or are projected to reach failing conditions by 2040.

Traffic simulation models were developed using Synchro/SimTraffic v7, incorporating the existing lane use, 2012 AM/PM peak hour volumes and existing signal timing/phasing information. The models were calibrated to reflect 2012 peak hour field conditions by comparing the field travel time to the SimTraffic model travel time. Arterial LOS (i.e., mainline segment LOS beyond the influence of intersections) for MD 97 (Georgia Ave) in both directions between key intersections was also generated under 2012 Existing and 2040 No-Build using SimTraffic. The Arterial LOS is shown in **Appendix A**.

Based on the SimTraffic results, the following Arterial LOS conclusions can be made:

- Along MD 97 (Georgia Ave) northbound:
 - During the AM Peak
 - All segments operate at LOS E or better under 2012 Existing
 - The segment between Bel Pre Road and ICC WB Ramps operates at a failing LOS F under 2040 No-Build conditions.
 - During the PM Peak
 - The segment between Bel Pre Road and MD 28 operates at LOS F in the 2012 Existing condition.
 - The segment between Prince Phillip Drive and MD 108 operates at LOS F in both 2012 Existing and 2040 No-Build conditions.
 - The segment between Old Baltimore Road and Prince Phillip Drive operates at LOS F during 2040 No-Build conditions.
 - The segment between MD 193 and Randolph Road operates at LOS F during the 2040 No-Build condition.



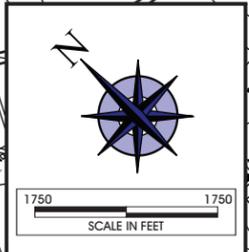
LEGEND



Existing Intersection Operations

Projected 2040 No-Build Traffic Operations

White = Acceptable Level of Service
 Red = Failing Level of Service



**MD 97 (GEORGIA AVENUE)
 BUS RAPID TRANSIT (BRT) STUDY**
 From Montgomery General Hospital
 to the Wheaton Metrorail Station

**FAILING INTERSECTIONS UNDER EXISTING
 AND FUTURE NO-BUILD CONDITIONS**

			DATE	FIGURE
			OCT., 2013	2

- Along MD 97 (Georgia Ave) southbound:
 - During the AM Peak
 - The segments between Queen Elizabeth Drive and MD 108, the ICC WB Ramps and MD 28, as well as between MD 182 (Layhill Road) and Randolph Road operate at LOS F in both 2012 Existing and 2040 No-Build conditions.
 - The segments between Prince Phillip Drive and Old Baltimore Road as well as between Bel Pre Road to MD 185 operates at LOS F during 2040 No-Build conditions
 - During the PM Peak
 - All segments operate at LOS E or better under 2012 Existing and 2040 No-Build conditions except the segment between MD 182 (Layhill Road) and Randolph Road.
 - The segment between MD 182 (Layhill Road) and Randolph Road operates at a LOS F in both 2012 Existing and 2040 No-Build conditions.

The system-wide Measures of Effectiveness (MOEs), such as total delay, delay per vehicle, travel time, average speed, fuel consumed and unserved vehicles were generated under 2012 Existing and 2040 No-Build conditions using SimTraffic. Unserved vehicles are defined as the demand that is unable to pass through a given intersection during the time period being evaluated. The system-wide MOEs are shown in **Appendix A**.

Based on system wide MOEs, during the AM Peak, total delay increases by about 70 percent and unserved vehicles are more than doubled in 2040 No-Build condition as compared to the 2012 Existing condition. During the PM peak, the total delay increases by about 15 percent and unserved vehicles increase by about 20 percent in 2040 (No-Build) as compared to 2012 (Existing).

During the three-year study period from January 1, 2010 to December 31, 2012, 923 crashes were reported along the Georgia Avenue corridor. Overall there was a decrease in the number of reported crashes from 2010 to 2012. The total number of crashes reported along the corridor is not significantly higher than the statewide average. However, side-swipe and pedestrian related collisions crash rates are higher than the statewide average.

Over this three-year period, there were 34 crashes involving pedestrians or bicycles, which represented 4 percent of all crashes in the corridor. The crash rate for these pedestrian and bicycle-related crashes was 8.7 crashes per million vehicle-miles-travelled (VMT), which was significantly higher than the statewide average rate of 6.7 crashes per million VMT.

A summary of the crash data is shown in **Appendix B**.

1.2.2 Rail Operations

Georgia Avenue serves as an important link to the Glenmont and Wheaton Metrorail Stations. Glenmont serves as the northern terminus of the Washington Metropolitan Area Transit Authority's (WMATA) Metrorail Red Line.

The Red Line is a U-shaped route that travels into and out of the District of Columbia along two north-south branches: Rockville Pike/Wisconsin Avenue and Georgia Avenue/B&O Railroad. The Shady Grove and Glenmont Metrorail stations are on opposite ends of the Metrorail Red Line.

Metrorail Red Line service from the Glenmont Station to the south includes Wheaton, Forest Glen, Silver Spring, and District of Columbia destinations to the south. In Fiscal Year 2012 (July 2011 through June 2012), the average weekday Metrorail ridership for the Glenmont Station was approximately 8,770 passengers, with half of those passengers entering the station and half exiting the station. The average weekday Metrorail ridership for the Wheaton Station was approximately 9,285 passengers, with 51 percent of those passengers entering the station and 49 percent exiting the station.

The Glenmont and Wheaton Metrorail Stations provide connections to other WMATA Metrobus and Montgomery County Ride On buses by way of a six bus bay loop east of Georgia Avenue and two bus bay turnout along northbound Georgia Avenue, adjacent to the Glenmont Metrorail Station and a fourteen bus bay facility situated between Georgia Avenue and Veirs Mill Road opposite the Wheaton Metrorail Station.

All Metrorail Stations in Montgomery County have bicycle racks and lockers. The Glenmont and Wheaton Metrorail Stations have a total bicycle parking capacity of 84 and 56 spaces, respectively, both in racks and lockers. According to the 2012 WMATA Bike Parking Census, 28 total bikes were parked in a given day, with 52 bike spaces available at the Glenmont Station and 32 total bikes were parked in a given day, with 34 bike spaces available at the Wheaton Station (16 bikes were parked outside of the provided spaces).

WMATA offers 2,998 all-day parking spaces and 68 short-term metered spaces at the Glenmont Metrorail Station in two separate garages on opposite sides of Georgia Avenue. The second of the two garages, containing 1,200 spaces was just completed in Spring 2012. The November 2012 Staff Draft of the Glenmont Sector Plan estimates that 50 percent of Metro users drive to the Glenmont station. The parking garages operate at approximately 75 percent occupancy, depending on the time of year.

At the Wheaton Metrorail Station, WMATA offers 977 all-day parking spaces but, no short-term park numbering updated metered spaces in the garage located at Veirs Mill Road and Reddie Drive. The 2007 WMATA Rail Ridership Survey estimates that 36 percent of Metro users drive to the Wheaton station. The parking garage operates at approximately 60 percent occupancy, depending on the time of year.

1.2.3 Bus Operations

Local bus service along the Georgia Avenue corridor is currently provided by WMATA's Metrobus and Montgomery County's Ride On. Twenty-six bus routes operate within the MD 97 (Georgia Avenue) BRT study corridor; twelve are operated by WMATA and fourteen by Montgomery County. WMATA's Y lines originate in Silver Spring to the south (or Montgomery General Hospital to the north) and travel the entire MD 97 (Georgia Ave) study corridor between the Wheaton Metrorail Station and Montgomery General Hospital. All other bus routes enter and exit the corridor at various points and use fairly limited and varying length segments of Georgia Avenue. Approximately 70 percent of the bus trips that serve the corridor are provided by WMATA, and 30 percent are provided by Montgomery County. Bus routes along the study limits are presented in **Figure 3**.

Metrobus routes Y5, Y7, Y8 and Y9 operate exclusively on MD 97 (Georgia Avenue) from the Montgomery General Hospital to the Silver Spring Metro Station, including all of the MD 97 (Georgia Ave) BRT Study Corridor. Metrobus route C8 connects to the Glenmont Metrorail Station as a spur off its generally east-west route along Randolph Road. At the Wheaton station, Metrobus routes C2 and C4 (east/west routes along Veirs Mill Road and University Boulevard), and routes Q1, Q2, Q4, Q5 and Q6 (west/south routes along Veirs Mill Road and MD 97 (Georgia Avenue)), travel on MD 97 (Georgia Avenue) to access to the Metrorail station. Approximately 7,130 passengers ride the Y bus routes within the MD 97 (Georgia Avenue) study corridor daily, ranking the Y Line 12th out of 165 in the Metrobus system and one of the highest in Montgomery County. According to the current Y Line schedule, the one-way travel time between the Montgomery General Hospital Wheaton Metrorail Stations is approximately 32 to 53 minutes during peak hours, depending upon the direction in which the bus is traveling.

Ride On bus routes 7, 8, 9, 10, 26, 31, 33, 37, 38, 39, 41, 48, 49, 51, 52 and 53 each travel on a segment of MD 97 (Georgia Avenue) within the study area, and serve a weekday average of 9,559 passengers within the study corridor each day. None of these routes serve the full length of the MD 97 (Georgia Avenue) study corridor. The 51, 52 and 53 routes are the only Ride On routes that use MD 97 (Georgia Avenue) for any appreciable distance within the study area; the others generally crisscross MD 97 (Georgia Avenue), using MD 97 (Georgia Avenue) only to access the Glenmont Metrorail Station from Randolph Road, Glenallen Avenue, Layhill Road or Weller Road or access the Wheaton Metrorail Station from University Boulevard, Reedie Drive or Plyers Mill Road (south of the station).

All Metro buses and most Ride On buses can transport bicycles on racks mounted to the front of the bus.

In addition to the Metrobus and Montgomery County's Ride On bus routes, two ICC commuter bus routes run by MTA are available (Routes 203 and 204), with both providing stops at the Georgia Avenue Park & Ride.

Metro Bus Routes:

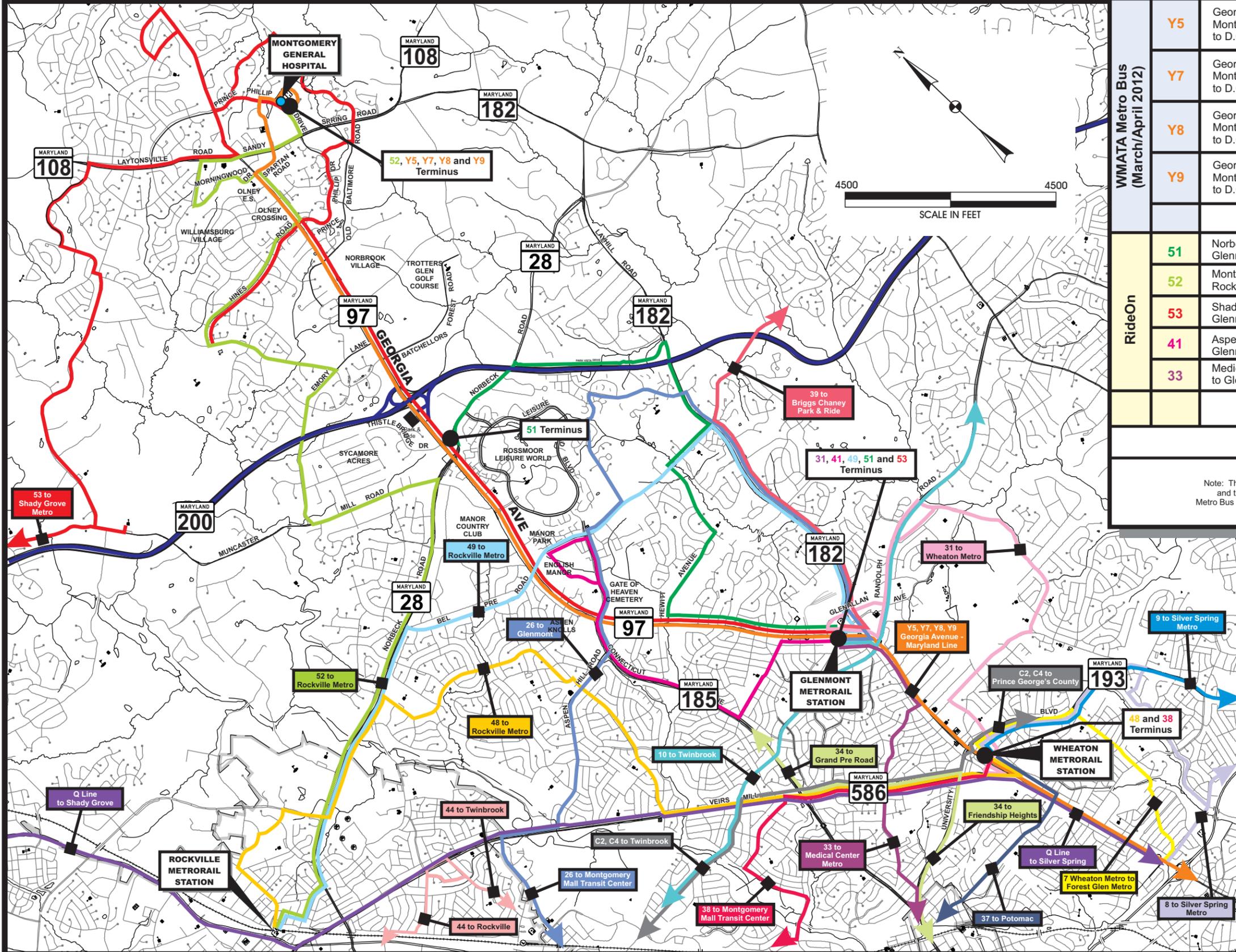
Y5, Y7, Y8, and Y9
C2, C4 and Q (Q1, Q2, Q4, Q5 and Q6)

RideOn Routes:

7, 8, 9, 10, 26, 31, 33, 34,
37, 38, 39, 41, 44, 48, 49,
51, 52, and 53

MTA MD 200 Routes:

203, and 204



MD 97 (Georgia Avenue) Bus Route Ridership				
Route	Route Description	Weekday Service	Weekend Service	
		Average Number of Daily Riders	Average Number of Daily Riders	
WMATA Metro Bus (March/April 2012)	Y5	Georgia Avenue Montgomery General Hospital to D.C./Maryland Line	770	1,188*
	Y7	Georgia Avenue Montgomery General Hospital to D.C./Maryland Line	1,074	46**
	Y8	Georgia Avenue Montgomery General Hospital to D.C./Maryland Line	2,538	2,600
	Y9	Georgia Avenue Montgomery General Hospital to D.C./Maryland Line	3,080	3,292
TOTAL Y5-Y9			7,462	5,938
RideOn	51	Norbeck Road Park & Ride to Glenmont Metro Station	267	No weekend service
	52	Montgomery General Hospital to Rockville Metro Station	66	
	53	Shady Grove Metro Station to Glenmont Metro Station	292	
	41	Aspen Hill to Glenmont Metro Station	677	
	33	Medical Center Metro Station to Glenmont Metro Station	341	
TOTAL Ride-On			1,643	—
TOTAL			9,105	5,938

* Sunday only during weekend ** Saturday only during weekend

Note: The MD 200 routes, the Ride-On 7, 8, 9, 10, 26, 31, 34, 37, 38, 39, 48 and 49 routes and the Metro Bus C2, C4, Q5 and Q6 routes do not make significant use of MD 97, Metro Bus routes Q1, Q2, and Q4 make use of MD 97, but south of the Wheaton Metro Station; therefore, ridership on these routes is not included on the table.

Time Interval Between Buses:

Metro Buses: 10 to 30 minutes
 (all day weekdays and weekends)

Ride-On Buses: 20 to 35 minutes
 (peak hour weekdays)

MTA MD 200 Routes: 30 to 60 minutes
 (peak hour weekdays)

MD 97 (GEORGIA AVENUE) BUS RAPID TRANSIT (BRT) STUDY
 From the Montgomery General Hospital to the Wheaton Metrorail Station

EXISTING TRANSIT OPERATIONS ALONG GEORGIA AVENUE

SNA MTA Maryland

DATE: OCT., 2013 FIGURE: 3

1.3 Project Background

Montgomery County’s Strategic Transit Plans completed in 1993, 1997, and 2004 called for the implementation of BRT services to supplement existing bus services (in the case of MD 97 (Georgia Avenue), the older plans and reports mostly used the term “busway” rather than BRT). Several major corridors, including MD 97 (Georgia Avenue), were considered suitable routes for BRT. MD 97 (Georgia Avenue) has become a primary focus of Montgomery County BRT planning because of its high existing bus ridership. As early as 1999, the MD 97 (Georgia Avenue) BRT project was formally endorsed by the Maryland–National Capital Park and Planning Commission (M-NCPPC) and Montgomery County.

In 2002, the County initiated the multi-billion-dollar *Go Montgomery!* program that endeavored to address worsening congestion and mobility problems throughout the County by undertaking a broad range of roadway, transit, and pedestrian/bicycle infrastructure improvement projects. The Program specifically adopted the MD 97 (Georgia Avenue) BRT project by incorporating it into the County Council’s 10-Year Transportation Plan (2009). In 2003, the WMATA Regional Bus Study Final Report identified the “Georgia Avenue Exclusive Busway to Glenmont” as one of the priority corridors for Montgomery County for the Near Term and Long Term periods.

In July 2011, MCDOT completed the Countywide Bus Rapid Transit Study, which promoted the MD 97 (Georgia Avenue) corridor as a suitable location for BRT services, provided an overview of the proposed route, described the route cross-section, and identified possible locations for BRT stations along the corridor. In February 2011, the County Executive appointed a Transit Task Force including community leaders, elected and appointed officials, and agency transportation and planning professionals. The Transit Task Force was directed to develop a plan for the implementation of a comprehensive and effective rapid transit system for Montgomery County. Released in May 2012, the Transit Task Force’s report identified the MD 97 (Georgia Avenue) corridor from the Glenmont Metrorail Station to Montgomery General Hospital to be included in the first of three phases for implementation of Countrywide BRT service.

WMATA conducted the Metrobus Y Line Study in 2011-2012. The study identified several key issues requiring improvement: passenger crowding, bus bunching, poor schedule adherence, and long travel times. WMATA issued a “Final Recommendations” report in August 2012, outlining short-term (1-2 years), mid-term (3-4 years) and long term (5-6 years) recommendations for bus service improvements. The recommended improvements covered three basic categories: the Y-line’s service structure (e.g., reducing headways), passenger facilities (e.g., bus stop consolidation; improved bus stop information, shelters, benches, etc.) and Y-line corridor traffic operations (e.g., improved signal timing).

In 2013, it was decided by the Montgomery County Planning Board to extend the original MD 97 (Georgia Avenue) BRT project limits from Glenmont to the Wheaton Metrorail Station

in order to provide connectivity to a similar on-going study for a BRT along MD 586 (Veirs Mill Road). The MD 586 BRT study plans a route along MD 586 (Veirs Mill Road) connecting the Rockville and Wheaton Metrorail Stations, as outlined by the 2012 MD 586 – Veirs Mill Road BRT Study from Rockville Metrorail Station to Wheaton Metrorail Station Purpose and Need Statement.

2.0 Purpose and Need

2.1 Purpose of the Project

The purpose of the MD 97 (Georgia Avenue) BRT Study is to provide a new high-speed, high-efficiency bus line along Georgia Avenue between the Wheaton Metrorail Station and the Montgomery General Hospital that will:

- enhance transit connectivity along the corridor and within the regional system;
- improve bus mobility along the corridor with improved operational efficiency and travel times;
- address current and future bus ridership demands;
- integrate service with rail and other bus services;
- attract choice riders (i.e., those who have other readily available, attractive transportation mode choices to satisfy their trip purpose);
- provide safe multi-modal access to transit;
- support Montgomery County plans to implement Bus Rapid Transit along MD 97 (Georgia Avenue);
- support the growth generated from development within the study limits and the County; and
- improve person throughput throughout the MD 97 (Georgia Avenue) corridor.

2.2 Need for the Project

Four specific needs for the project are described in the following sections: system connectivity, mobility, transit demand/attractiveness, and livability.

2.2.1 System Connectivity

A high-quality north-south transit connection is currently lacking between the Olney area and the Wheaton Metrorail Station. Although this segment of MD 97 (Georgia Avenue) BRT and the adjacent communities are served by the WMATA Metro Buses and various Ride On routes, these buses are impeded by congestion along MD 97 (Georgia Avenue), particularly during the peak periods. During the morning and evening peak hours, the average scheduled bus travel time between the MD 97 (Georgia Avenue)/MD 108 intersection and the Wheaton Metro Station

on the Metrobus Y line is 26 to 49 minutes, with an average speed of approximately 15.5 miles per hour. In March 2011, a WMATA Y Line Study determined that approximately 36 percent of AM Peak southbound Y buses are late reaching the Wheaton Station from Montgomery General Hospital and approximately 60 percent of PM Peak northbound buses are late reaching Montgomery General Hospital.

The Metrobus Y Line provides service along the entire MD 97 (Georgia Ave) study corridor, from the Montgomery General Hospital to the Wheaton Metrorail Station, and has the fourth highest Metrobus ridership in Maryland. The most heavily utilized segment of the Y Line, within the study corridor, is the section along MD 97 (Georgia Avenue) between Bel Pre Road and the Glenmont Metrorail Station. The most congested segments with the slowest service of the entire Y Line route is between the Wheaton and Silver Spring Metrorail Stations.

2.2.2 Mobility

The MD 97 (Georgia Avenue) corridor between Olney and the Wheaton Metrorail Station is characterized by traffic congestion that hinders bus mobility and results in unpredictable service and travel times. This congestion also frequently causes Metrobus and Ride On bus service on MD 97 (Georgia Avenue) to fall behind schedule.

The high vehicular traffic volumes cause congestion that disrupts bus schedules and eventually causes the buses to bunch together and arrive in rapid succession. The combination of traffic congestion along the arterial and delay at the signalized intersections causes delays in bus schedules by as much as 15 minutes.

Over the next 20 to 30 years, growth in regional travel will cause traffic conditions throughout the corridor to worsen. The Capital Beltway, I-270, and other regional facilities will experience demand well above their design capacity. Because of the lack of capacity for regional demand on existing facilities, the County's major arterials will absorb more traffic. Fifteen of 26 signalized intersections along the MD 97 (Georgia Avenue) corridor are projected to deteriorate to LOS E or F, in 2040 resulting in significant peak-period traffic problems. Eight of twelve arterial segments are projected to deteriorate to LOS E or LOS F in 2040. **Appendix A** provides detailed LOS by intersection and arterial segment. Under these current and projected traffic conditions, bus performance, including speed, reliability, and passenger comfort, is expected to decline in conjunction with these deteriorating traffic conditions.

When buses are delayed due to the congestion, the bus headways increase and passengers are inconvenienced by excessively long waits for the next bus. As delays increase, the number of passengers waiting at a bus stop also increases. When a delayed bus arrives, it may fill to capacity within a few stops, and buses filled to capacity do not stop to take on additional passengers. Therefore, passengers waiting at later stops are bypassed, further increasing passenger waiting and travel times.

Onboard fare collection is another major source of delay. Longer wait times cause a greater number of passengers to gather at a bus stop. When a large group of passengers boards a bus at one time, fare collection takes longer, buses are further delayed, and travel times are increased.

WMATA conducted a rider survey of Y Line passengers between March 2011 and April 2011 to identify mobility issues. Riders who participated in the survey stated that the three biggest problems on the Y Line, in order by frequency of response, were: buses not arriving according to schedule, frequency of buses and bus crowding. Other concerns identified by Y Line passengers included bus overcrowding, long headways, schedule delays, long travel times, too many stops, and poor-quality bus shelters.

2.2.3 Transit Demand and Attractiveness

US Census (2010) demographic information indicates that approximately 132,091 individuals reside within the study area. The MCDOT's Countywide Bus Rapid Transit Study (2011) found that a BRT network could operate effectively and significantly increase transit use within the County. BRT along MD 97 (Georgia Avenue) could potentially serve the Montgomery General Hospital, the Olney Town Center, Leisure World, MD 200 and Norbeck Road Park & Rides, and Glenmont and Wheaton Metrorail Stations.

Currently, over 9,500 rail passengers enter and exit the Glenmont Metrorail Station on a typical weekday. There are 2,100 daily boardings/alightings on Metrobus and 9,559 boardings/alightings on Ride On bus at this station. The number of passengers boarding trains at Glenmont has increased about 3.5 percent per year since the station opened in 1998. In a typical weekday, on average, 34 buses depart the Glenmont Metrorail Station during the peak hours, and approximately 285 Metrobus passengers and 573 Ride On passengers transfer to Metro.

Over 9,285 rail passengers enter and exit the Wheaton Metrorail Station on a typical weekday. There are 9,121 daily boardings/alightings on Metrobus and 3,302 boardings/alightings on Ride On bus at this station. According to the Transit Ridership Trends and Markets report dated March 2009 and ridership statistics from 2008 through 2010, train ridership has increased by approximately 10 percent at the Wheaton station between 2002 and 2010. In a typical weekday, on average, 55 buses depart in the A.M. and 49 buses in the P.M. from the Wheaton Metrorail Station during the peak hours, and approximately 391 Metrobus passengers and 222 Ride On passengers transfer to Metro.

Proposed Transit-Oriented Development (TOD) in the Glenmont and Wheaton Metrorail Station areas would increase the number of potential transit commuters living within walking distance of the stations (see **Section 3.0**). For example, according to a Metropolitan Washington Council of Governments (MWCOG) document, *Regional Activity Centers and Clusters*, the Silver Spring/Takoma Park/Wheaton Activity Center, which encompasses most of the MD 97 (Georgia Avenue) corridor from Glenmont south, is projected to result in nearly 8,000 new jobs and 14,000 new households between 2005 and 2030.

The MD 97 (Georgia Avenue) study corridor is unique in its transit demand characteristics; passenger demand remains relatively steady throughout the day, without marked changes in ridership volumes during weekday peak periods or other times of the day. Similarly, ridership levels remain relatively unchanged from weekdays to weekends. As demonstrated by the Y Line Survey, bus crowding is already an issue. As bus ridership increases, bus overcrowding will remain a significant issue along the MD 97 (Georgia Avenue) corridor.

The growing demand for transit in the region, coupled with the reliability issues (i.e. adherence to schedule, bus bunching, and slow travel times), creates an unacceptable level of service for those individuals who rely on public transit as their primary mode of transportation (i.e., transit-dependent riders). Furthermore, the issues associated with the current bus service do not make it attractive to those individuals who, with access to alternate transportation modes, could elect to take the bus if it offered comfort and convenience (i.e., choice riders). A higher-quality transit service is needed to attract these choice riders.

The “Final Recommendations” report for the Y Line Study, published by WMATA in August 2012, stated the following regarding the capacity and attractiveness issues:

“Currently, the Y Line is equipped with 60’ articulated buses. The additional capacity on these buses relative to 40’ coaches allow for required Y Line capacity to be met with relatively infrequent headways (15 minutes in the peak and 20 minutes in the off-peak). While these infrequent headways utilizing articulated buses do provide sufficient capacity on the line, they are not attractive from a customer convenience point of view. This is especially true given the high ridership on the line and the importance of the line to Montgomery County.”

As identified in the Countywide Bus Rapid Transit Study (2011), Montgomery County seeks to enhance the existing and planned transit and transportation options throughout the County. In order to maintain or improve transit modal share, a higher level of transit service is needed to attract new transit riders, including those who would regularly drive between points along the study corridor, or those who would benefit from longer trips and fewer stops, as offered by BRT. Generally, choice riders are attracted to transit services that reduce travel times, increase reliability, are comfortable, and feel safe.

As shown in **Table 2**, observed data along the MD 97 (Georgia Avenue) study corridor shows transit ridership within the corridor to be approximately 8,630 riders per day. Combined with the transit boardings at the Wheaton and Glenmont stations, total daily ridership is approximately 19,370.

Transit demand analysis along the MD 97 (Georgia Avenue) corridor shows that total transit ridership is expected to grow 45 percent along the corridor by 2040, while bus ridership is expected to grow 84 percent. This growth represents the 2040 no-build condition, with BRT added to the corridor future growth in bus ridership increases 36 percent from the 2040 no-build scenario.

**Table 2:
Summary of Observed Transit Ridership
(Average Weekday, 2007)**

	Ridership (No.)
Total “Y” Route Buses	7,133
Total Ride On Buses	1,496
Total Bus Boardings	8,629
Wheaton Station	4,803
Glenmont Station	5,937
Total Metro Boardings	10,740
Total Transit Boardings	19,369

*Source: MD 97 (Georgia Avenue) BRT
Study Operations Safety Memo, July 2013*

2.2.4 Livability

The Wheaton Metro Station is also the termini for the MD 586 BRT study (shown in **Figure 2**). The MD 97 (Georgia Avenue) corridor has a strong transit ridership base with approximately 19,500 total transit riders (including metro riders). Regional travel demand model outputs estimate total ridership along the corridor to potentially reach 35,000 daily riders. When evaluating the raw model outputs, the new BRT service is estimating daily ridership to be 3,000-3,500 riders, however some of these riders are existing transit riders on other services running along the corridor. There appears to be some synergy that results when the MD 97 (Georgia Avenue) BRT route is tied into the MD 586 BRT route (at the Wheaton Station).

Transit improvements are needed throughout the MD 97 (Georgia Avenue) corridor, from Olney to Wheaton, in order to create a more reliable, integrated, and accessible transportation network that enhances choices for transportation users; provides easy access to affordable housing, employment, and other destinations; and promotes positive effects on the surrounding community.

The US Department of Transportation (US DOT) has developed a policy of transportation planning and programs as a way of improving community quality of life, enhancing environmental performance, and increasing transportation and housing choice while lowering costs and supporting economic vitality. US DOT’s six principles of livability strive to:

- Provide more transportation choices to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health.

- Expand location- and energy-efficient housing choices for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- Improve economic competitiveness of neighborhoods by giving people reliable access to employment centers, educational opportunities, services and other basic needs.
- Target federal funding toward existing communities – through transit-oriented and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes.
- Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.
- Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods, whether rural, urban or suburban.

Following multiple BRT studies as described in **Section 1.3**, the MD 97 (Georgia Avenue) corridor has become a primary focus for Montgomery County to provide BRT service as a transit option and support the livability concepts outlined above. BRT along this corridor could benefit low-income families by offering additional public transit choices and supporting the potential for proximate affordable housing. This could translate to improved access to healthcare, education, and employment opportunities, as well as greater mobility and reduced commuting costs.

According to the 2006-2010 US Census Bureau data, residents of approximately 5.9 percent of households within the study area live below the poverty level. While the percentage of households below the poverty level was almost 30 percent lower than the state average, it was approximately 5 percent higher than the Montgomery County average. According to the May 2007 FTA and U.S. Department of Housing and Urban Development publication, *Realizing the Potential: Expanding Housing Opportunities Near Transit*, families that live near transit spend just 9 percent of their household income on transportation compared to 25 percent of income for families who live in auto-dependent neighborhoods, thereby reserving more of the family income for other costs. The Glenmont and Wheaton Metrorail Stations are planned to have affordable housing within walking distance of the stations. As stated in the specific master plans throughout the study area, each master plan supports Montgomery County's housing policy, known as the Moderately Priced Dwelling Unit (MPDU) program, adopted by the County in 1974 to increase the supply of moderately priced housing in Montgomery County.

Another potential element to support livability is TOD, defined as compact, mixed-use development near transit facilities and high-quality walking environments. The goal of TOD is to create sustainable communities where people of all ages and incomes have transportation and housing choices, increasing location efficiency where people can walk, bike, within a comfortable walk of a transit station. In addition, TOD projects have demonstrated an increase in local transit ridership and a reduction in automobile congestion, providing value for both the

public and private sector. TOD projects are currently on-going at both the Glenmont and Wheaton Metrorail Stations.

A December 2008 report from the Task Force on the Future for Growth and Development in Maryland, *Where Do We Grow From Here?*, advised that, by 2030, the State of Maryland could lose 650,000 acres of rural land to development unless growth policies change to encourage more-compact, walkable communities that are easily accessible and in close proximity to employment, retail, and services. BRT along MD 97 (Georgia Avenue) would support the planned development and growth around the Wheaton Metrorail Station, Glenmont Metrorail Station and Olney Town Center, thus capitalizing on public investments in transit by producing local and regional benefits. Direct benefits of this urban design could include increased ridership, revitalization of neighborhoods, financial gains for joint development opportunities, increases in the supply of affordable housing, and profits to those who own land and businesses near transit stops. Secondary benefits include congestion relief, land conservation, reduced outlays for roads, and improved safety for pedestrians and cyclists (US DOT, 2012).

Transit has numerous societal benefits, and it can also reduce traffic congestion, fuel consumption, and air pollution. Transit increases mobility, reduces time spent in congestion, and increases foot traffic and customers for area businesses.

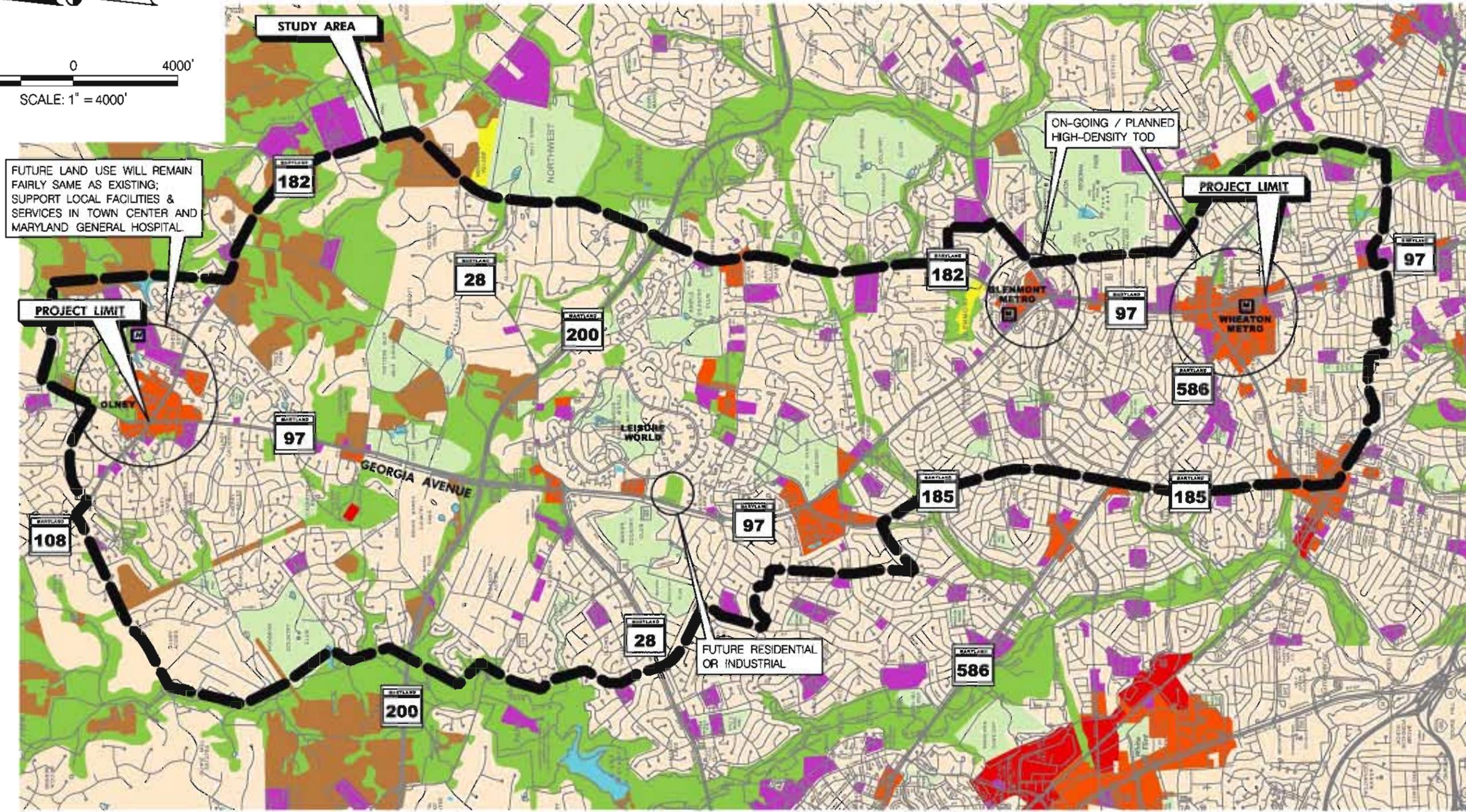
3.0 Land Use and Development

The MD 97 (Georgia Avenue) study corridor passes north-to-south through portions of the Olney Planning Area, the Aspen Hill Planning Area, the Glenmont Sector Plan Area, and the Kensington-Wheaton Planning Area, and includes both urban and suburban land uses. As shown in **Figure 4**, most of the study corridor is currently comprised of diverse residential communities interspersed with pockets of retail, office, recreational, and institutional uses. Future land use maps from area Master and Sector plans are included in **Appendix C**. The Olney, Glenmont and Wheaton areas, located at the northern, middle, and southern portions of the study area respectively, have the largest commercial zones in the study area and the greatest potential for additional development, transit-oriented and otherwise. The entire MD 97 (Georgia Ave) study corridor is located within a Priority Funding Area (PFA), with the exception of an approximately one mile long segment between Emory Lane and Norbeck Road (MD 28), encompassing the MD 200 (Intercounty Connector)/MD 97 (Georgia Ave) interchange.

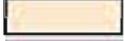
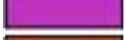
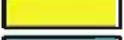
The Olney Planning Area is subdivided into “northern” and “southern” zones, with the northern zone (outside of the study area) comprised mostly of agricultural and open space, and the southern zone containing a range of low and medium density residential areas. The Olney Planning Area’s southern zone covers the northern end of the MD 97 (Georgia Avenue) study area, which in addition to residential areas, contains the commercialized Olney Town Center centered around the intersection of MD 97 (Georgia Avenue) and MD 108. Olney’s land use and development decisions are guided by the concept of Olney being a satellite community,



4000' 0 4000'
SCALE: 1" = 4000'



LEGEND

	AGRICULTURAL		OPEN URBAN LAND
	RESIDENTIAL		FOREST
	INSTITUTIONAL		BARE GROUND
	COMMERCIAL		WETLANDS / WATER
	INDUSTRIAL		

MD 97 (GEORGIA AVENUE)
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From the Montgomery General Hospital to
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LAND USE

supporting local facilities and services in the Town Center and Montgomery General Hospital as the major employer in Olney, but relying on the District of Columbia, the I-270 and I-95 corridors, and other locations for employment, specialty shopping, and regional services. Land use in Olney is mainly residential; all other uses, including retail and service uses, are meant primarily to support housing in the area.

The Aspen Hill community, is mostly developed, with the predominant land use being housing. The residential communities in aspen Hill are characterized by a wide variety of housing types, ranging from detached homes on large and small lots to townhouses, garden apartments and high-rises. Aspen Hill has a number of conveniently located neighborhood shopping centers. Leisure World, a planned retirement community, is one of the most prominent features in the area. Future land use objectives for this area encourage protection, enhancement, and continuation of current land us patterns. The Aspen Hill Master Plan includes a forested area near Leisure World as being converted to either a water sewage treatment plant (owned by WSSC) or additional housing for Leisure World (see **Figure 4**).

The MD 97 (Georgia Avenue) BRT study corridor near the Glenmont Metrorail Station area is included within the northern portion of the Kensington – Wheaton Planning Area. This portion of the Kensington – Wheaton Planning Area is similar to the Aspen Hill Planning Area in terms of the prevalence and variety of residential uses, generally within the low-to-medium density range. The Master Plan recommends that this character be maintained; there are relatively few opportunities for additional development in the northern portion of this planning area.

The Glenmont Sector Plan Area is located south of MD 185 surrounding the Glenmont Metrorail Station, and is one of five sector plan areas within the Kensington – Wheaton Planning Area boundary. Existing and proposed land uses are transit-oriented. MD 97 (Georgia Avenue) forms the spine from upon which key parcels have undergone or will undergo Transit-Oriented Development (TOD). High-density TOD being implemented in the vicinity of the Glenmont Metrorail Station consist of a compatible mix of uses: housing and retail at Glenmont Metrocentre; retail, professional offices, and possibly housing at the Glenmont Shopping Center and the Layhill Triangle; and housing and some offices at MD 97 (Georgia Avenue) West. The 1997 Sector Plan’s recommended zoning allowed up to 1.5 million square feet of commercial space and up to 5,430 housing units. To date, less than 20 percent of the maximum allowable commercial space exists on the ground, and the Plan area has only approximately 3,100 units. However, land use projections in the 2012 Draft Sector Plan Update indicate that, under an aggressive best possible market scenario, non-residential square footages could quadruple, housing units could more than double, and jobs could triple what exist today in the Glenmont Sector Plan Area.

The Wheaton Sector Plan Area is located at the southernmost end of the MD 97 (Georgia Avenue) study corridor and is also one of the five sector plan areas within the Kensington-Wheaton Planning Area boundary. The major goals of the Wheaton Sector Plan revolve around creating a vibrant urban space that has efficient transportation and is pedestrian friendly. At the

center of this planning area is the Wheaton Metrorail Station. The Wheaton Central Business District (CBD) and Vicinity Sector Plan (2012) state the Wheaton Metrorail Station should be the focus of Wheaton's transportation infrastructure and taken into consideration in project planning. To support this recommended focus, MDOT's April 16, 2012 list of Maryland Designated TODs includes the Wheaton Metro Station.

The Kensington Sector Plan covers the southwestern corner of the MD 97 (Georgia Avenue) BRT study area, but does not intersect the BRT study corridor. The goal of this plan is to promote a mixed-use Town Center with pedestrian-friendly connections to Kensington's neighborhoods. While making these improvements, the plan calls for protection of Kensington's historic character and residential neighborhoods.

4.0 Related Plans and Projects

The MD 97 (Georgia Avenue) BRT study is consistent with the Montgomery County Strategic Transit Plans completed in 1993, 1997, and 2004, and with the County's current 10-Year Transportation Plan. The study is also consistent with local master plans throughout the corridor, including the Olney Master Plan (2005), the Kensington-Wheaton Master Plan (1989), the Aspen Hill Master Plan (1994), the Wheaton CBD and Vicinity Sector Plan (2012), and the Sector Plan for the Glenmont Transit Impact Area and Vicinity, Approved and Adopted in 1997 and currently undergoing an update, with the Staff Draft released in November 2012.

In 2011, M-NCPPC began developing a Countywide Transit Corridors Functional Master Plan. The purpose of the plan is to develop a BRT network throughout the County, recommend rights-of-way for individual transit corridors to accommodate bus lanes, queue jumpers to assist bus operations at intersections, station locations for the proposed transit network, and additional turn lanes at intersections as necessary. The Master Plan will also make recommendations on the allocation of roadway space for traffic, transit, pedestrians, and bicycles. One of the corridors under study for inclusion in the Master Plan is MD 97 (Georgia Avenue) from the Wheaton Metrorail Station to the Montgomery General Hospital.

Several current or recently completed studies and projects have addressed the need for transportation improvements within and proximate to the MD 97 (Georgia Avenue) BRT study corridor. Specifically, BRT projects connecting to the Rockville Metrorail Station vicinity are being considered in the West Montgomery Avenue and MD 355 corridors. BRT projects connecting to the Wheaton Metrorail Station vicinity are being studied in the Veirs Mill Road (MD 586) and MD 193/University Boulevard corridors, located at the eastern limit of the Veirs Mill Road BRT study corridor. The southeastern end of the MD 586 BRT corridor is proposed to stop at the Wheaton Metrorail Station, which will enhance connectivity to areas along both its corridor and the MD 97 (Georgia Avenue) BRT corridor.

The Corridor Cities Transitway would provide transit on a dedicated right-of-way from Shady Grove Metrorail Station to the former COMSAT facility just south of Clarksburg, Maryland.

The 15-mile transitway would include the creation of 16 transit stations. BRT was identified as the preferred alternative for this project.

The Purple Line is a proposed 16-mile rapid transit line extending from Bethesda in Montgomery County to New Carrollton in Prince George's County. It would provide a direct connection to the Metrorail Red, Green, and Orange lines at Bethesda, Silver Spring, College Park, and New Carrollton. The Purple Line would also connect to MARC, AMTRAK, and local bus services. Light rail was identified as the preferred alternative for this project.

MCDOT is planning an eastward extension of Montrose Parkway, which would intersect Veirs Mill Road at Gaynor Avenue. SHA is undertaking the grade separation of the Georgia Avenue/Randolph Road intersection, a severely congested intersection that inhibits bus mobility.

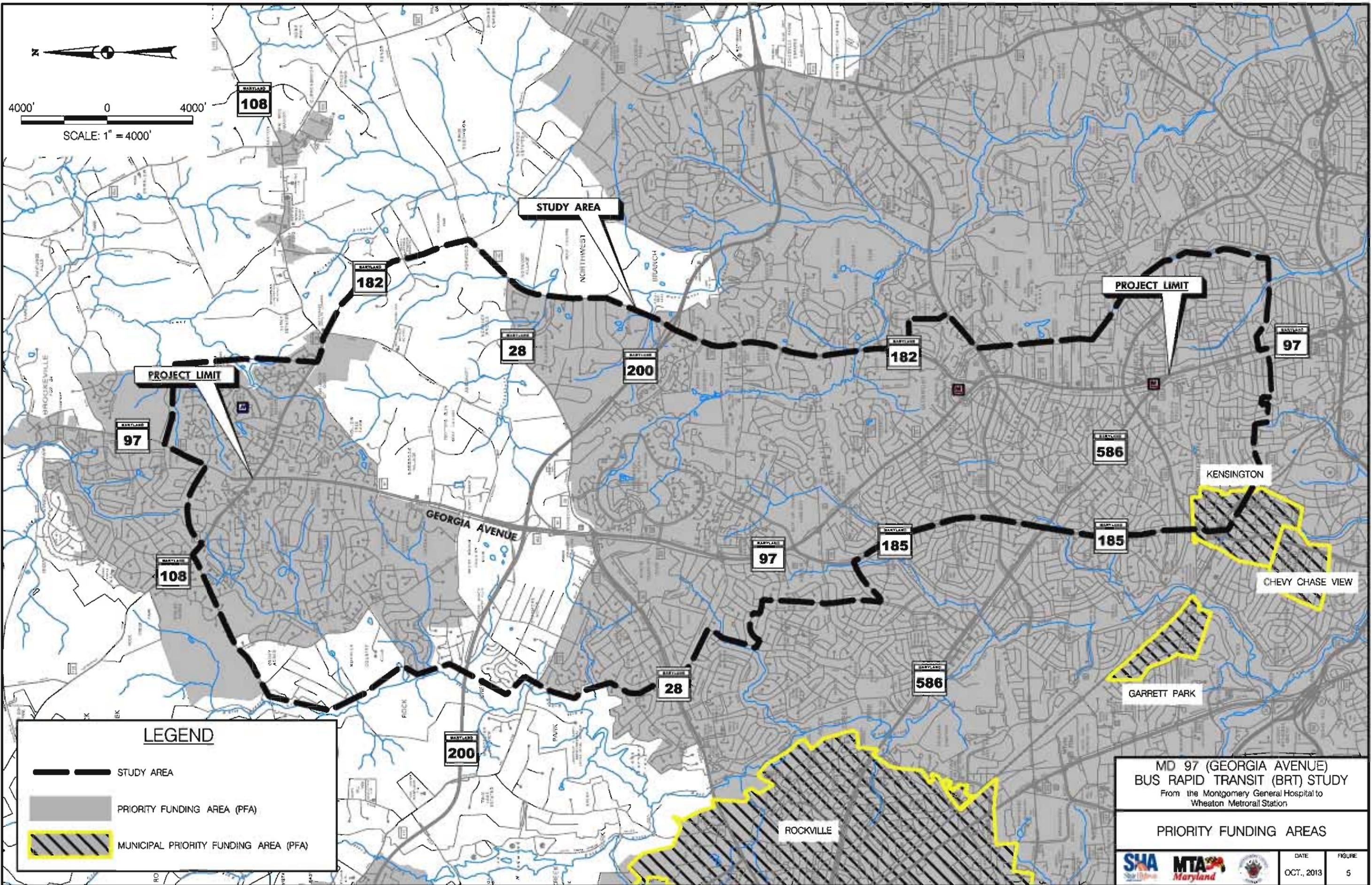
5.0 Environmental Inventory

The MD 97 (Georgia Avenue) BRT corridor is dominated by urban and suburban land uses, comprised of diverse residential communities interspersed with pockets of retail, office, recreational, and institutional uses. Residential uses range from multi-family housing to larger-lot single family homes. Multifamily housing is located throughout the study area, including key activity centers such as the Wheaton Metro Station at the Southern end of the corridor, the Glenmont Metro Station, the age-restricted Leisure World community, and the Olney Town Center and Maryland General Hospital at the northern end of the corridor. The MD 97 (Georgia Avenue) corridor is situated between the crossroads of MD 108/MD 182 and the Montgomery General Hospital to the north, and the Wheaton Metrorail Station near the intersection of MD 97 (Georgia Avenue) and MD 586 (Veirs Mill Road) to the south.

The proposed BRT services would improve access to a range of shopping, civic, recreational, and employment opportunities. Commercial retail (primarily strip malls), office and institutional uses are clustered near the Glenmont and Wheaton Metrorail Stations, the Leisure World community, and the Olney Town Center. Higher intensity commercial areas are found near the Wheaton Metro Station. Medical offices and social service organizations are concentrated near the Maryland General Hospital, in commercial areas surrounding Leisure World, and at the Westfield Wheaton North Tower and Mid-County Regional Services Center near the Wheaton Metro Station. Major community centers along the corridor include the Mid-County Regional Services Center across from the Wheaton Metro Station and the Wheaton Regional Library located between the Glenmont and Wheaton metro stations.

Land Use

The entire MD 97 (Georgia Avenue) corridor within the project limits is located within a Priority Funding Area (PFA), with the exception of a small (one-mile) area north of Norbeck Road (MD 28), encompassing the MD 200 (Intercounty Connector)/MD 97 (Georgia Avenue) interchange (**Figure 5**). Under the 1997 Priority Funding Areas Act—Maryland's smart growth legislation—PFAs are designated by local governments for residential and employment growth and



LEGEND

-  STUDY AREA
-  PRIORITY FUNDING AREA (PFA)
-  MUNICIPAL PRIORITY FUNDING AREA (PFA)

**MD 97 (GEORGIA AVENUE)
BUS RAPID TRANSIT (BRT) STUDY**
From the Montgomery General Hospital to
Wheaton Metrorail Station

PRIORITY FUNDING AREAS

prioritized for state infrastructure projects. The proposed BRT route is consistent with the smart growth legislation, because it supports targeted growth along MD 97 (Georgia Avenue).

The MD 97 (Georgia Avenue) BRT corridor is governed by three master plans (i.e., Olney, Aspen Hill and Kensington/Wheaton) and three sector plans (i.e., Glenmont, Wheaton and Kensington) as detailed in **Section 3.0**. Each plan calls for improved public transportation along MD 97 (Georgia Avenue) in order to improve non-automotive access to key destinations and regional transit hubs, and to alleviate traffic congestion along the corridor. The County's future land use within the MD 97 (Georgia Avenue) BRT corridor will include enhanced transit improvements throughout the area to accommodate TOD near the Glenmont Metrorail Station.

Several new developments are emerging along the proposed BRT alignment. Two construction sites, one just north of Norbeck Road along the northbound side of MD 97 (Georgia Avenue) and the other between Hermitage Avenue and Blueridge Avenue, appear to be upcoming apartment and townhome developments. New developments immediately surrounding the Wheaton Metro Station include the new Costco at Westfield Shopping Center, the MetroPointe Apartments at Reddie Drive and MD 97 (Georgia Avenue), and the Exchange at Wheaton Station, a mixed-use project that includes high-rise apartments over a Safeway (supermarket).

Among several public and private parks providing recreational amenities within the vicinity of the proposed MD 97 (Georgia Avenue) BRT line, six publically owned public parks are immediately adjacent to MD 97 (Georgia Avenue), including Carroll Knolls Local Park, Evans Parkway Neighborhood Park, Olney Manor Recreational Park, Harmony Hills Neighborhood Park, Matthew Henson State Park and Trail, and Glenmont Greenway Urban Park. These spaces provide recreational amenities, including ball fields, playgrounds, skate parks, dog parks, and swimming facilities. Beyond their recreational uses, parks serve as buffers between existing residential communities and the more intensive transit-supporting uses within the study area.

The largest concentrated natural area within the MD 97 (Georgia Avenue) BRT corridor is within the M-NCPPC and State-owned (Department of Natural Resources) Matthew Henson State Park and Trail, located south of Aspen Hill Road. The State-owned portion of the Matthew Henson State Park and Trail (Park Unit #2; 37 acres) is located along southbound MD 97 (Georgia Avenue), while the M-NCPPC-owned portion (Park Unit#3; 56 acres) is located along northbound MD 97 (Georgia Avenue). This linear park provides a naturalized buffer to Turkey Branch, a tributary to Rock Creek, and recreational opportunities to the local community, including a 4.2-mile, 8-foot-wide hard surface trail for pedestrians and bicyclists. The trail begins at the intersection with the Rock Creek Hiker-Biker Trail at Winding Creek Local Park on Dewey Road, runs northeast through Matthew Henson State Park near Hewitt Avenue and Bel Pre Elementary School, and continues east across Layhill Road to Alderton Road. Matthew Henson Trail crosses MD 97 (Georgia Avenue) at-grade via a marked pedestrian crosswalk at the intersection of MD 97 (Georgia Avenue) and Hewitt Avenue.

The following four public parks are owned by M-NCPPC, and like Matthew Henson State Park and Trail, are located adjacent to MD 97 (Georgia Avenue) within the project limits. Any use of

a publicly-owned and used park/recreation area/associated trail and/or significant historic site or archeological resource would require evaluation under Section 4(f) of the US DOT Act of 1966.

- Evans Parkway Neighborhood Park (7.6 acres) – located east of NB MD 97 (Georgia Avenue), at 2001 Evans Parkway
- Olney Manor Recreational Park (61 acres) – located east of NB MD 97 (Georgia Avenue), at 16601 Georgia Avenue, 1.5 miles south of Olney and 0.25-mile north of MD 200;
- Harmony Hills Neighborhood Park (2.6 acres) – located southwest of MD 97 (Georgia Avenue), at 13505 Loyola Street and Aspen Hill; and
- Glenmont Greenway Urban Park (3.0 acres) – located west of MD 97 (Georgia Avenue), north of Randolph Road at Glenmont-Wheaton.

Beyond the immediate MD 97 (Georgia Avenue) corridor, there are several private golf courses, and there are regional parks, which are major recreational destinations that could benefit from enhanced transit. Regional parks include Rock Creek Regional Park (Meadowside Nature Center is located 1.5 miles west of MD 97 (Georgia Avenue) on Muncaster Mill Road) and Wheaton Regional Park (located roughly 0.5 mile from both the Glenmont and Wheaton Metrorail stations).

Community Facilities

A number of public education facilities were identified within the MD 97 (Georgia Avenue) BRT corridor; with Olney Elementary School being directly adjacent to MD 97 (Georgia Avenue). Seventeen religious facilities were identified along MD 97 (Georgia Avenue), including two large cemeteries. At least two facilities (The Catholic Charities Archdiocese of Washington and Church of the Atonement) provide services for non-English speaking populations. There is one pet cemetery, which is also an historic site, along MD 97 (Georgia Avenue). Additionally, the Leisure World and Leisure World Finance Post Offices, two Park and Ride Lots, the Kensington and Sandy Spring Volunteer Fire Stations, and Montgomery County General Hospital are located along the proposed MD 97 (Georgia Avenue) BRT alignment. Additionally, the Olney Post Office and two Park and Ride Lots are along MD 97 (Georgia Avenue), the Kensington Volunteer Fire Station No. 18 is currently located at the MD 97 (Georgia Avenue)/Randolph Road intersection, and Montgomery County General Hospital is located along MD 108 (Olney Laytonsville Road), just east of the MD 97 (Georgia Avenue) project limit. The following is a compilation of community facilities that were identified near the proposed MD 97 (Georgia Avenue) BRT route:

Public Schools

- Olney Elementary School (3401 Queen Mary Drive, Olney, MD 20832)

Transportation Facilities

- Georgia Avenue Park & Ride, ((MD 200 (Intercounty Connector) and MD 97 (Georgia Avenue));
- Glenmont Metrorail Station and Parking Garage (12501 Georgia Avenue, Silver Spring, MD 20906);
- Norbeck Road Park & Ride (Norbeck Road and MD 97 (Georgia Avenue)); and
- Wheaton Metro Station and Parking Facility (Reedie Drive and MD 97 (Georgia Avenue).

Police and Emergency Response Services

- Kensington Fire Station Volunteer Fire Department #18 (12251 Georgia Avenue, Silver Spring, MD 20902);
- Sandy Spring Volunteer Fire Department #40 (16911 Georgia Avenue, Silver Spring, MD 20902);
- Wheaton-Glenmont Police Station (2300 Randolph Road, Wheaton, MD 20902);
- Wheaton Volunteer Rescue Squad (11435 Grandview Avenue, Wheaton, MD 20902) – *being relocated to 2400 Arcola Ave*; and
- Montgomery General Hospital (18101 Prince Philip Drive, Olney, MD).

Religious Facilities

- Judean-Norbeck Memorial Park (16225 Batchellors Forest Road, Olney, MD 20832);
- Gate of Heaven Cemetery (13801 Georgia Avenue, Silver Spring, MD 20906);
- Aspen Hill Memorial Park (Pet Cemetery) (historic) (13730 Georgia Avenue, Silver Spring, MD 20906);
- Glenmont Methodist Church (12901 Georgia Avenue, Silver Spring, MD 20906);
- First Assembly of God (12805 Georgia Avenue, Silver Spring, MD 20906);
- Catholic Charities Archdiocese of Washington (12247 Georgia Avenue, Silver Spring, MD 20902);
- Oakdale-Emory United Methodist Church (historic) (3425 Emory Church Road, Olney, MD);
- Olney Baptist Church (17525 Georgia Avenue, Olney, MD 20832);
- Olney Church of Christ (17020 Georgia Avenue, Olney, MD 20830);
- Hughes United Methodist Church (10700 Georgia Avenue, Wheaton, MD 20902);
- Church of the Atonement (10613 Georgia Avenue, Silver Spring, MD 20902);
- Word of Hope Fellowship (12705 Epping Rd, Silver Spring, MD 20906);
- Shaare Tefila Congregation (16620 Georgia Avenue, Olney, MD 20832);
- St. Peter's Catholic Parish and School (2900 Olney Sandy Spring Road, Olney, MD 20832);
- St. Matthew's Presbyterian Church (4001 Bel Pre Road, Silver Spring, MD 20906);

Legend

- Study Area
- Proposed BRT Alignment
- Senior Community
- High-Density Residential Area Within Study Area

Census Block Group Intersecting Study Area

- High Minority (>60%)
- Other Census Block Group

Census Tract Intersecting Study Area

- Low-Income and High Public Transportation Use
- High Public Transportation Use (>15.0%)
- Low-Income (>10.7% Poverty)
- Other Census Tract

Elementary School

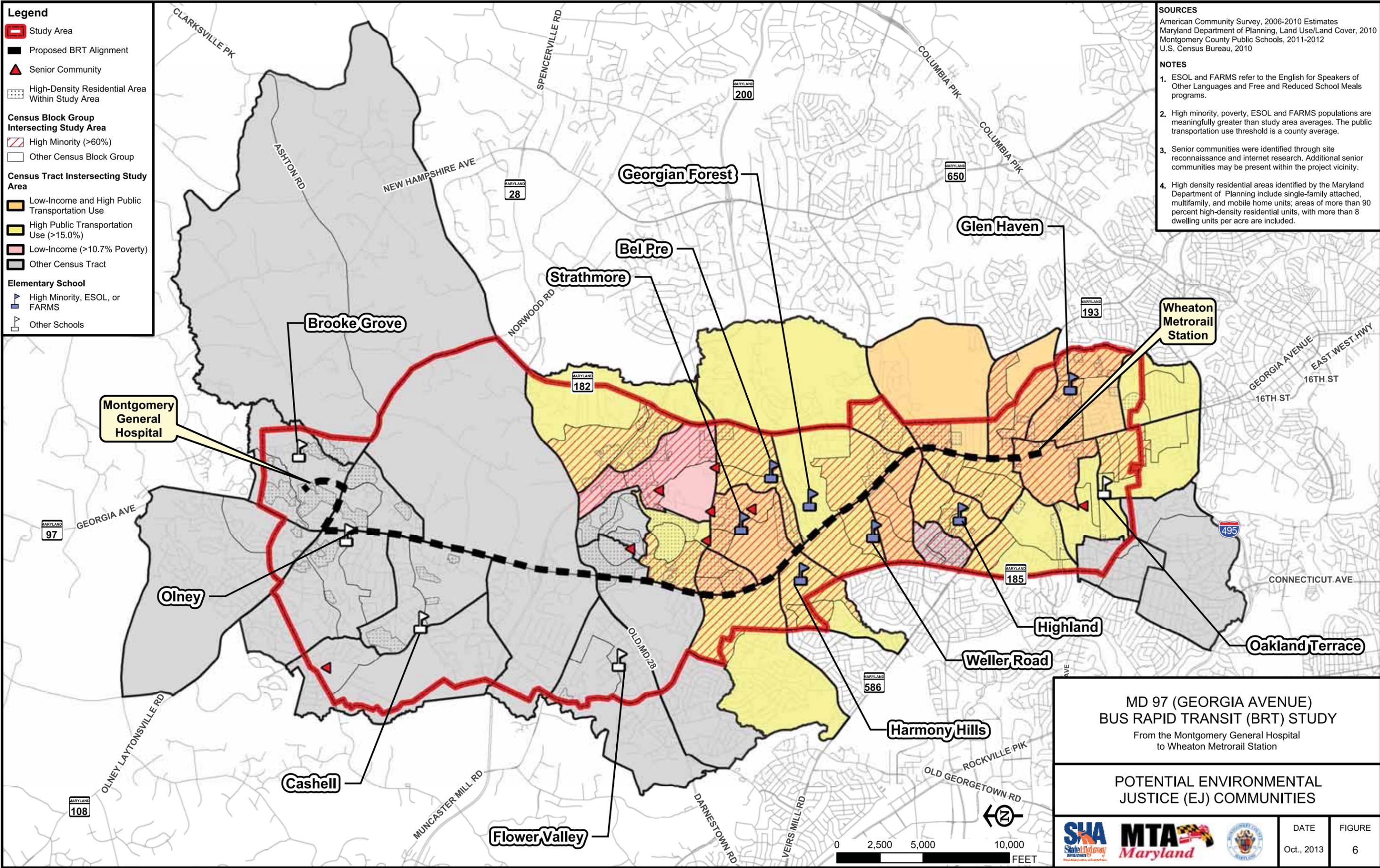
- High Minority, ESOL, or FARMS
- Other Schools

SOURCES

American Community Survey, 2006-2010 Estimates
 Maryland Department of Planning, Land Use/Land Cover, 2010
 Montgomery County Public Schools, 2011-2012
 U.S. Census Bureau, 2010

NOTES

- ESOL and FARMS refer to the English for Speakers of Other Languages and Free and Reduced School Meals programs.
- High minority, poverty, ESOL and FARMS populations are meaningfully greater than study area averages. The public transportation use threshold is a county average.
- Senior communities were identified through site reconnaissance and internet research. Additional senior communities may be present within the project vicinity.
- High density residential areas identified by the Maryland Department of Planning include single-family attached, multifamily, and mobile home units; areas of more than 90 percent high-density residential units, with more than 8 dwelling units per acre are included.



**MD 97 (GEORGIA AVENUE)
 BUS RAPID TRANSIT (BRT) STUDY**
 From the Montgomery General Hospital
 to Wheaton Metrorail Station

**POTENTIAL ENVIRONMENTAL
 JUSTICE (EJ) COMMUNITIES**

			DATE	FIGURE
			Oct., 2013	6

- Global Mission Church/Harmony Hills Community Church (13421 Georgia Avenue, Silver Spring, MD 20906); and
- Georgia Avenue Baptist Church (12525 Georgia Avenue, Silver Spring, MD 20906).

Environmental Justice

Based on 2010 Census data, minority, low-income, and limited-English-proficient (LEP) populations have been identified throughout the study area. Overall, high-minority and low-income populations appear to be concentrated south of MD 28 (Norbeck Road) (**Figure 6**).

Additional preliminary indicators provide evidence to support the likelihood of encountering environmental justice (EJ) (minority, low-income, and LEP) populations. For instance, of the twelve public elementary schools identified within the study area, seven (Bel Pre, Georgian Forest, Glen Haven, Harmony Hills, Highland, Strathmore, and Weller Road) have either shares of minority students or shares of low-income students participating in the Free and Reduced Meals Program (FARMS) that are meaningfully greater¹ than the study area average. Five elementary schools (Highland, Weller Road, Harmony Hills, Bel Pre, and Glen Haven) have shares of students who are identified as speaking English as a second language (ESOL) that exceed the study area average by 5 percent. Similar to the low-income and high-minority Census geographies, all of the above-mentioned schools are located south of MD 28 (Norbeck Road).

Field reconnaissance has also identified facilities that suggest the presence of EJ populations and limited-English-proficient (LEP) populations within the study area. These include, but are certainly not limited to, religious facilities providing Hispanic and Swahili ministries, as well as ethnic specialty food stores such as a Brazilian/African bakery and an Asian market. Further research of socioeconomic resources and characteristics, including a Title VI analysis based on the FTA's Title VI Circular (4702.1B), will be conducted. Additionally, evaluation of the location, needs, and concerns of these groups will be conducted to ensure that the project would not disproportionately or adversely affect any EJ populations.

Hazardous Materials Site Inventory

A preliminary hazardous materials site inventory was completed to identify properties with underground storage tanks (USTs) and/or leaking storage tanks (LUSTs), properties that may be of concern (e.g., dry cleaning facilities, vacant lots), and any reported spills of oil and hazardous substances within the MD 97 (Georgia Avenue) BRT study corridor. M-NCPPC records from April 2008 and July 2010 revealed two oil spills originating from the Exxon gas station on the

¹ The threshold for “meaningfully greater” shares of potential EJ populations was based on the methodology used in the MD 586 (Veirs Mill Road) Socioeconomic Inventory report. For racial/ethnic data, the EJ threshold was the study area’s average minority percentage plus five (5) percent. For socioeconomic data, the threshold was set at 1.5 times the study area’s average percentage.

northeast corner of MD 97 (Georgia Avenue) and Connecticut Avenue. During a field review conducted in June 2013, two vacant parcels along MD 97 (Georgia Avenue) near Randolph Road were noted as areas that could possibly present a property of concern. Results of a freedom of information (FOI) request to the Maryland Department of the Environment (MDE) for LUSTs and/or other areas of concern under their jurisdiction resulted in identification of three properties (gas stations) within the study area. Based on the MDE records review for these three properties, no LUSTs or areas of concern were identified, and all three gas stations appear to be in compliance with current MDE regulations.

Once project-specific plans are developed, this research will be supplemented with additional investigations to make an assessment of the type and quantity of hazardous waste materials that could be impacted along the corridor.

Cultural Resources

The archeological survey area within the Area of Potential Effect (APE) is defined as the limits of construction where ground disturbance would occur. The worst case limit of disturbance (LOD) for the project would extend approximately 50 feet beyond the edge of the roadway for any build alternative. Based on prior archeological surveys that have been conducted along sections of the MD 97 (Georgia Avenue) BRT corridor, five archeological sites have been identified that would need to be evaluated for NRHP eligibility. In addition, there may be archeological remains associated with several historic properties located along the corridor or in previously untested areas. A combined Phase I/II study may be required to examine untested areas and determine the eligibility of existing archeological sites in the APE.

Five historic properties have been identified within the study area, including one NRHP-listed property, the Hammond Wood Historic District (NR-1387), and four NR-eligible properties: Glenmont Forest (Americana Glenmont Apartments) (M:31-43); the Oakdale-Emory United Methodist Church (UMC) (M:23-106); White's Hardware Store (M:23-113-4); and Aspin Hill Pet Cemetery (M: 27-17) (**Figures 7a and 7b**). The Glenmont Forest, Oakdale-Emory UMC, White's Hardware Store and Aspin Hill Pet Cemetery properties are immediately adjacent to SHA's right-of-way for MD 97 (Georgia Avenue).

Natural Resources

The MD 97 (Georgia Avenue) BRT corridor closely mimics the division line between Rock Creek Watershed to the west and Anacostia River Watershed to the east. However, a small portion of MD 97 (Georgia Avenue) at the northeastern portion of the project limits at MD 108/MD 182 is within the Rocky Gorge Dam Reservoir Watershed. Based on a desktop search using the Watershed Resources Registry (WRR) and available SHA GIS layers, the following streams and tributaries were identified within the study area, including:

- James Creek and associated tributaries (Use IV-P);
- unnamed tributaries to North Branch Rock Creek (Use III);
- unnamed tributaries to Northwest Branch Anacostia River (Use IV);

- Batchellor’s Run and associated tributaries (Use IV);
- Bel Pre Creek and associated tributaries (Use IV);
- Turkey Branch (Use I);
- Sligo Creek (Use I);
- unnamed tributary to Sligo Creek (Use I);
- Lutes Run (Use IV); and an
- unnamed tributary to Rock Creek (Use I).

Turkey Branch, a tributary to Rock Creek, appears to be the only stream that crosses the MD 97 (Georgia Avenue) BRT corridor, and is contained within the Matthew Henson State Park. Delineations of water resources, including streams, will be conducted, which will provide exact locations of streams and potential stream crossings within the project limits. The stream use designations will be coordinated more closely with Maryland Department of Natural Resources (DNR) and US Fish and Wildlife Service (USFWS); however, it should be noted streams designated as Use III are used for the growth and propagation of trout fish, and streams designated as Use IV and IV-P are recreational trout waters. The project does not lie within a designated Special Protection Area (SPA).

A review of National Wetland Inventory (NWI) and DNR non-tidal wetland mapping indicates that palustrine wetlands are located within the MD 97 (Georgia Avenue) BRT corridor, mostly near the MD 200 (Intercounty Connector) interchange. A small wetland area was also identified just east of the Wheaton Metro station. During recent field reviews, potential wetland areas were identified to verify and supplement wetland and stream data within the MD 97 (Georgia Avenue) BRT corridor. Features identified included a perennial stream (Turkey Branch), and potential palustrine emergent (PEM) wetlands just north of MD 185, south of MD 28, north of MD 28, north of Emory Church Road, south of Cherry Valley Road, and between MD 28 (Norbeck Road) and MD 200, per the Cowardin Classification System. A few roadside ditches within the corridor included wetland vegetation; a formal delineation would be required to determine if these areas are classified as wetlands, waters of the U.S., or roadside ditches. No wetlands of special state concern have been identified within the MD 97 (Georgia Avenue) BRT corridor. Further reconnaissance will determine the extent of streams and wetlands preliminarily identified within the study area. A portion of the MD 97 (Georgia Avenue) BRT study corridor lies within the 100-year floodplain associated with Turkey Branch, based on a review of FEMA flood insurance rate (FIRM) mapping. Should there be any disturbance to wetlands, waterways or floodplain, permits will be coordinated with MDE and the U.S. Army Corps of Engineers (USACE).

Numerous forest stands with potential specimen trees exist throughout the MD 97 (Georgia Avenue) BRT study corridor. Thick forests border Rock Creek on both sides of MD 97 (Georgia Avenue); however, based on SHA-GIS, Forest Interior Dwelling Species (FIDS) bird habitat is not present adjacent to the MD 97 (Georgia Avenue) BRT corridor. A formal forest stand

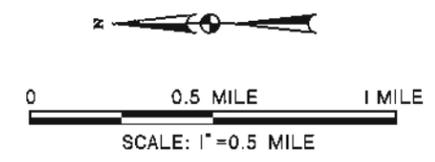
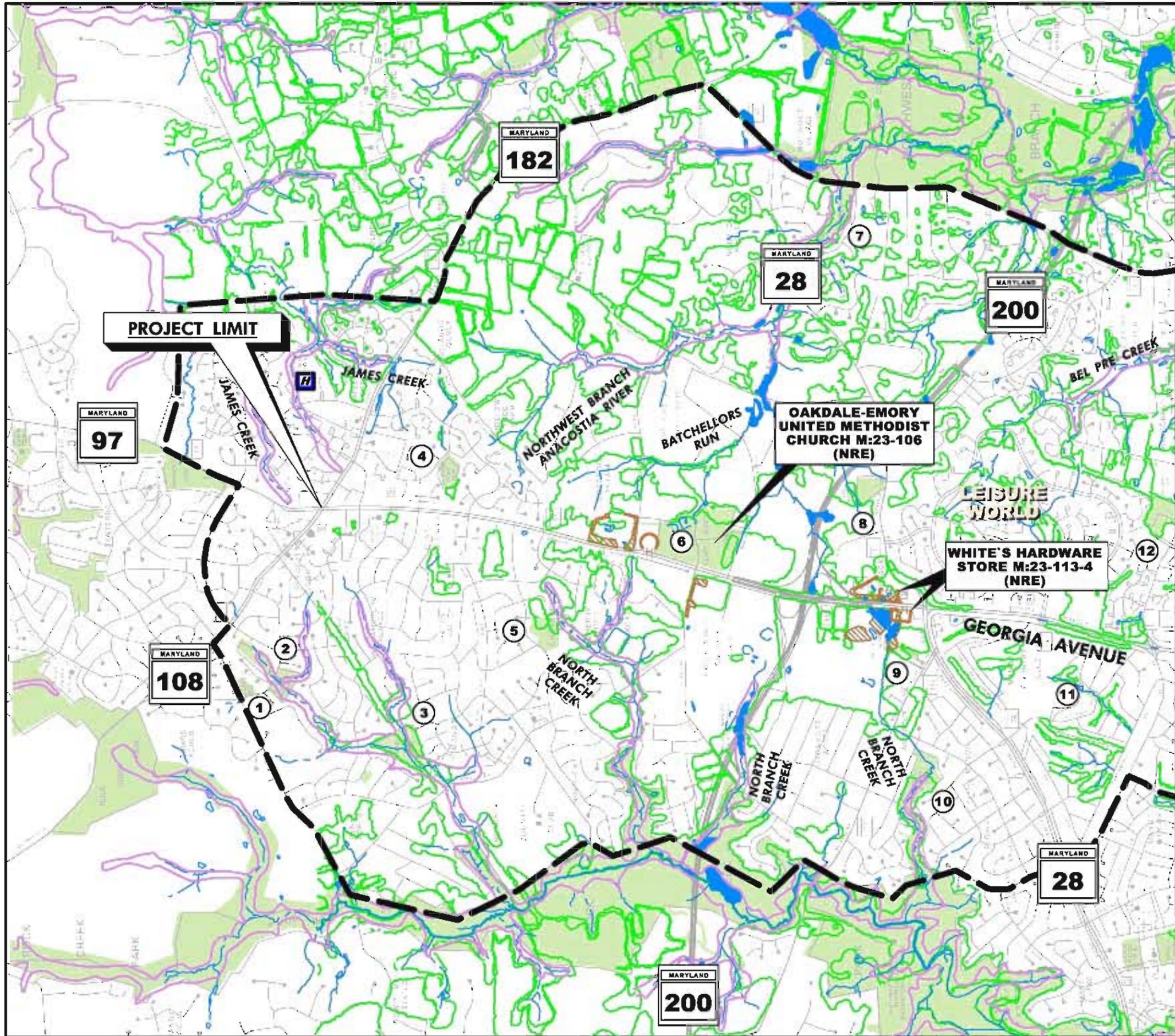
delineation and/or roadside tree survey will be required to fully assess the potential for impacts on trees and vegetation within the MD 97 (Georgia Avenue) BRT corridor.

Coordination with USFWS, DNR-Environmental Review Unit (ERU) and DNR-Wildlife and Heritage Services (WHS) was initiated to identify the presence of any federal or state-listed rare, threatened, or endangered species within the MD 97 (Georgia Avenue) BRT corridor. In July/August 2013, USFWS and DNR-WHS indicated no state or federally rare, endangered or threatened species are known to exist within the study area. A response from DNR-ERU is anticipated to be received within the coming months.

An environmental overview map is included in this report as **Figure 7(a and b)**.

Air Quality

The entire MD 97 BRT study area is within ozone and PM_{2.5} non-attainment areas, and the portion of the study area within Montgomery County Election District 13 (between Olney and Wheaton), is within a CO maintenance area.



LEGEND

- WOODLAND
- 100-YEAR FLOODPLAIN
- STUDY AREA
- PARKS
- 1 Olney Oaks Park
- 2 Olney Square Park
- 3 Cashell Rd Park
- 4 Southeast Olney Stolen Park
- 5 Cherrywood Park
- 6 Olney Manor Recreational Park
- 7 Norwood Park
- 8 Bradford Park
- 9 Wintersweet Park, Norbeck Park
- 10 Flower Valley Park
- 11 Beverly Park
- 12 Aquarius Local Park
- FOREST CONSERVATION EASEMENT
- STREAM
- WETLAND BOUNDARY
- MATTHEW HENSON TRAIL
- HISTORIC SITE
NR=NATIONAL REGISTER
NRE=NATIONAL REGISTER ELIGIBLE

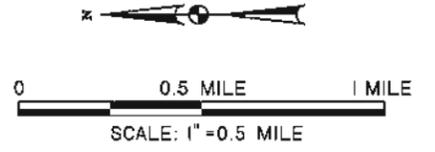
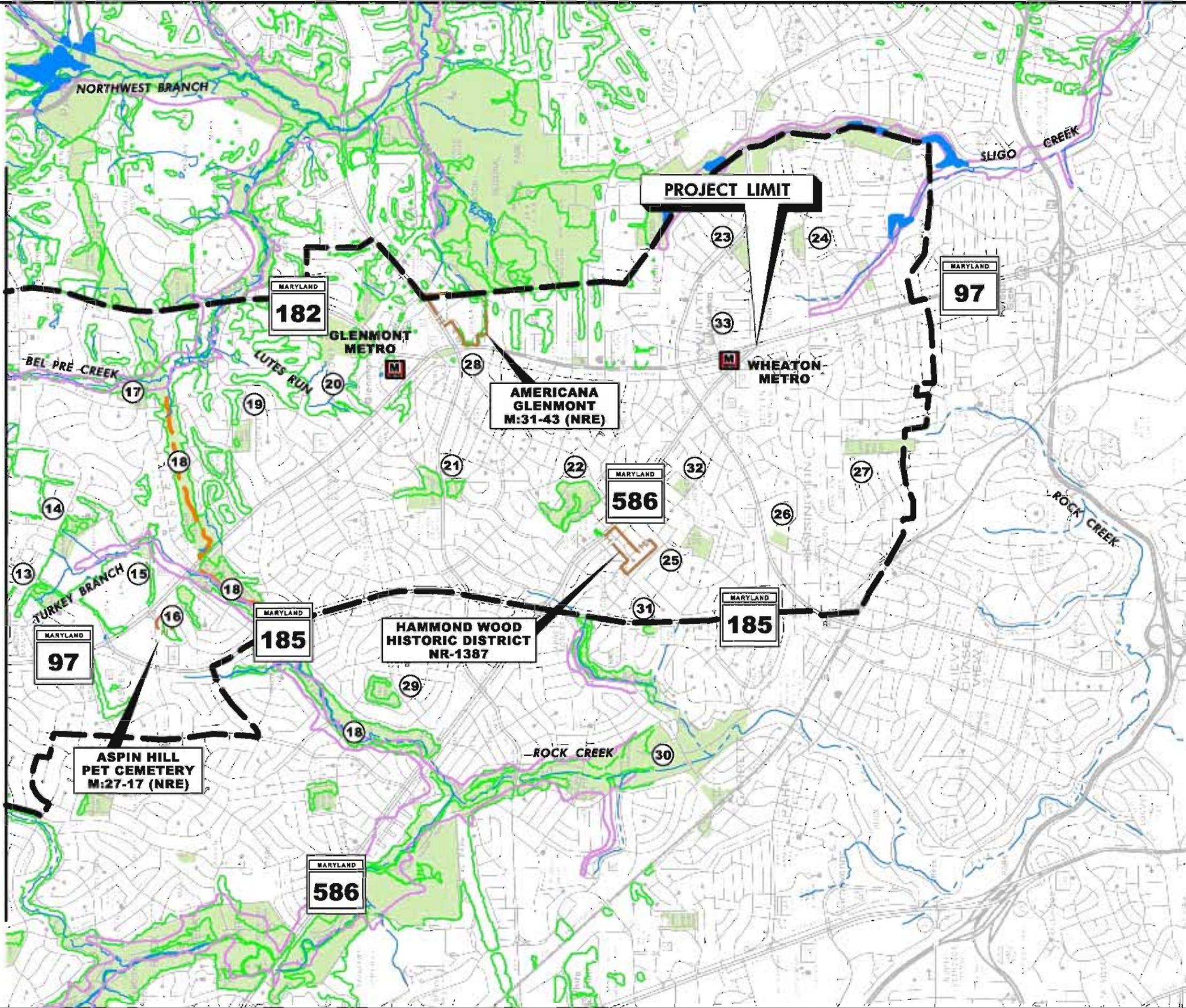
MATCH LINE TO FIGURE 7b

MD 97 (GEORGIA AVENUE)
BUS RAPID TRANSIT (BRT) STUDY
From the Montgomery General Hospital to
Wheaton Metrorail Station

ENVIRONMENTAL OVERVIEW MAP

		DATE	FIGURE
		OCT., 2013	7a

MATCH LINE TO FIGURE 7a



LEGEND

- WOODLAND
- 100-YEAR FLOODPLAIN
- STUDY AREA
- PARKS /RECREATIONAL FACILITIES

- 13 Northgate Park
- 14 Strathmore Park
- 15 Beret Neighborhood Conservation Area
- 16 Harmony Hill Neighborhood Park
- 17 Bel Pre Park
- 18 Matthew Hensen State Park
- 19 Georgian Forest Park
- 20 Glenfield Park
- 21 Glenmont Local Park
- 22 Wheaton Claridge Local Park
- 23 Wheaton Forest Local Park
- 24 Glen Haven Neighborhood Park
- 25 Newport Mill Park
- 26 Kensington Heights Park
- 27 Homewood Capital View Park
- 28 Glenmont Greenway Urban Park
- 29 Stoneybrook Park
- 30 Rock Creek Stream Valley Park
- 31 Connecticut Ave. Neighborhood Park
- 32 Pleasant Valley Local Park
- 33 Wheaton Veterans Park

- FOREST CONSERVATION EASEMENT
- STREAM
- WETLAND BOUNDARY
- MATTHEW HENSON TRAIL
- HISTORIC SITE
NR = NATIONAL REGISTER
NRE = NATIONAL REGISTER ELIGIBLE

MD 97 (GEORGIA AVENUE)
BUS RAPID TRANSIT (BRT) STUDY
From the Montgomery General Hospital to
Wheaton Metrorail Station

ENVIRONMENTAL OVERVIEW MAP

			DATE	FIGURE
			OCT., 2013	7b

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APPENDIX A

INTERSECTION AND ARTERIAL LEVEL OF SERVICE

Traffic operations analysis was performed to assess the AM and PM peak hour operations for 2012 Existing and 2040 No-Build conditions. Intersection levels of service (LOS) analysis were performed using the Critical Lane Volume (CLV) methodology. The intersection LOS based on CLV and volume-capacity ratio for 2012 Existing and 2040 No-Build conditions are shown in Table A-1 below.

Table A-1: MD 97 BRT Study CLV Analyses Results					
Signalized Intersections - LOS (v/c ratio)					
Int. #	Intersection LOS (v/c ratio)	2012 Existing		2040 No-Build	
		AM	PM	AM	PM
1	MD 97 @ MD 586	F (1.27)	F (1.59)	F (1.67)	F (2.13)
2	MD 97 @ Reddie Dr	B (0.70)	B (0.65)	D (0.81)	C (0.76)
3	MD 97 @ MD 193	D (0.82)	B (0.67)	E (0.98)	C (0.81)
4	MD 97 @ Blue Ridge Ave	A (0.60)	A (0.61)	B (0.72)	C (0.73)
5	MD 97 @ Arcola Ave	C (0.76)	C (0.78)	D (0.88)	E (0.94)
6	MD 97 @ Shorefield Rd	D (0.87)	C (0.73)	E (0.99)	E (0.95)
7	MD 97 at Randolph Rd*	F (1.02)	F (1.12)	D (0.88) [^]	C (0.74) [^]
				E (0.93) ^{^^}	E (0.97) ^{^^}
8	MD 97 at MD 182 (Layhill Rd)	B (0.68)	B (0.69)	C (0.80)	C (0.81)
9	MD 97 at Glenmont Metro Access Rd_Urbana Dr	A (0.39)	A (0.42)	A (0.46)	A (0.52)
10	MD 97 at Glenallen Ave_Park & Ride Access	A (0.52)	C (0.75)	A (0.61)	E (0.93)
11	MD 97 at Hathaway Dr	B (0.68)	A (0.59)	D (0.86)	C (0.77)
12	MD 97 at Hewitt Ave	A (0.56)	B (0.70)	C (0.74)	D (0.85)
13	MD 97 at Aspen Hill Rd_Gate of Heaven Cemetry	A (0.58)	B (0.69)	C (0.78)	C (0.78)
14	MD 97 at MD 185	B (0.64)	C (0.78)	D (0.86)	E (0.91)
15	MD 97 at Bel Pre Rd	E (0.95)	D (0.82)	F (1.14)	E (0.96)
16	MD 97 at Rossmoor Blvd	C (0.74)	B (0.70)	E (0.91)	D (0.83)
17	MD 97 at International Dr	B (0.66)	C (0.72)	D (0.83)	C (0.80)
18	MD 97 at MD 28	F (1.13)	E (0.96)	F (1.34)	F (1.10)
19	MD 97 at Park & Ride_On-Ramp to ICC EB	B (0.64)	A (0.60)	C (0.79)	C (0.73)
20	MD 97 at ICC WB Ramps	E (0.96)	C (0.81)	F (1.12)	E (0.98)
21	MD 97 at Emory Lane	D (0.88)	E (0.94)	F (1.03)	F (1.12)
22	MD 97 at Old Batimore Rd	F (1.03)	C (0.73)	F (1.23)	E (0.91)
23	MD 97 at Hines Rd_Prince Phillip Dr	C (0.80)	B (0.69)	E (0.94)	D (0.88)
24	MD 97 at King William Dr	C (0.73)	B (0.68)	D (0.88)	D (0.86)
25	MD 97 at Spartan Rd_Morningwood Dr	C (0.76)	D (0.9)	D (0.90)	F (1.11)
26	MD 97 at MD 108	D (0.85)	C (0.79)	F (1.01)	E (0.95)
27	MD 97 at Queen Elizabeth Dr_Prince Phillip Dr	C (0.77)	C (0.74)	E (0.94)	F (1.01)
28	MD 108 at Village Center Dr	A (0.36)	A (0.44)	Data Unavailable	
29	MD 108 at Spartan Rd	A (0.54)	A (0.50)		
30	MD 108 at Prince Phillip Dr	A (0.48)	A (0.45)		
31	MD 182 (Layhill Rd) at Glenallen Ave	A (0.54)	B (0.65)	B (0.66)	C (0.77)
32	Randolph Rd at Glenallen Ave	E (0.91)	D (0.85)	F (1.03)	D (0.85)
33	Randolph Rd at Glenmont Circle	B (0.65)	B (0.68)	A (0.60)	B (0.71)

*Under 2040 No-Build, MD 97 @ Randolph Road is assumed to be reconstructed as an interchange

[^]LOS for EB Ramps intersection within Randolph Road interchange

^{^^}LOS for WB Ramps intersection within Randolph Road interchange

Traffic simulation models were developed using Synchro/SimTraffic v7 incorporating the existing lane use, 2012 AM/PM peak hour volumes and existing signal timing/phasing information. The models were calibrated to reflect 2012 peak hour field conditions by comparing the field travel time to the SimTraffic model travel time.

Arterial LOS for MD 97 (Georgia Avenue) in both directions between key intersections was also generated under 2012 Existing and 2040 No-Build using SimTraffic. The Arterial LOS is shown in **Table A-2** below.

Table A-2: MD 97 BRT Study Arterial Levels of Service Analyses Results				
Arterial Level of Service	2012 Existing		2040 No-Build	
	AM	PM	AM	PM
MD 97 Northbound				
MD 586 to MD 193	C	C	D	D
MD 193 to Randolph Rd	D	E	E	F
Randolph Rd to MD 182 (Layhill Rd)	D	C	C	E
MD 182 (Layhill Rd) to Glenallan Ave	E	D	D	C
Glenallan Ave to MD 185	C	C	C	D
MD 185 to Bel Pre Rd	C	E	B	C
Bel Pre Rd to MD 28	E	F	F	E
MD 28 to ICC WB Ramps	C	C	F	C
ICC WB Ramps to Old Baltimore Rd	C	C	B	D
Old Baltimore Rd to Prince Phillip Dr	B	D	C	F
Prince Phillip Dr to MD 108	C	F	D	F
MD 108 to Queen Elizabeth Dr	A	B	A	C
MD 97 Southbound				
Queen Elizabeth Dr to MD 108	F	C	F	D
MD 108 to Prince Phillip Dr	C	B	C	C
Prince Phillip Dr to Old Baltimore Rd	D	B	F	B
Old Baltimore Rd to ICC WB Ramps	C	C	D	B
ICC WB Ramps to MD 28	F	E	F	D
MD 28 to Bel Pre Rd	D	C	C	C
Bel Pre Rd to MD 185	E	D	F	C
MD 185 to Glenallan Ave	B	C	E	C
Glenallan Ave to MD 182 (Layhill Rd)	D	B	D	B
MD 182 (Layhill Rd) to Randolph Rd	F	F	F	F
Randolph Rd to MD 193	C	D	D	E
MD 193 to MD 586	C	E	D	E

The System wide Measures of Effectiveness (MOEs), such as total delay, delay per vehicle, travel time, average speed, fuel consumed and unserved vehicles were generated under 2012 Existing and 2040 No-Build using SimTraffic. The system wide MOEs are shown in **Table A-3** below.

Table A-3: MD 97 BRT Study Systemwide Simtraffic MOE's Results				
System	2012 Existing		2040 No-Build	
	AM	PM	AM	PM
Total Delay (hrs)	2,178	3,744	4,526	5,200
Delay/veh (secs)	307	478	608	634
Travel Time (hrs)	3,188	4,765	5,544	6,253
Average Speed (mph)	15	15	12	13
Fuel consumed (gal)	1,872	2,235	2,411	2,624
Unserved Vehicles (veh)	1,330	3,328	4,602	5,589

APPENDIX B

CRASH DATA SUMMARY

SHA provided the crash data reported during a three year period from January 1, 2010 to December 31, 2012 along the study corridor. A summary of the data is shown in **Table B-1** and **Table B-2** below.

Table B-1: Reported Crash Summary (2009 - 2011)													
Year	Light		Severity			Surface		Driver		Time		Day	
	Day	Night	Property	Injury	Fatal	Wet / Snow / Ice	Dry	Non-Alcohol	Alcohol	Peak*	Off-Peak	Weekday (Mon - Fri)	Weekend (Sat - Sun)
2010	259	104	198	164	1	56	307	346	17	128	235	263	100
2011	187	86	147	124	2	56	217	258	15	97	176	210	63
2012	197	90	147	139	1	40	247	276	11	108	179	208	79
Total	643	280	492	427	4	152	771	880	43	333	590	681	242

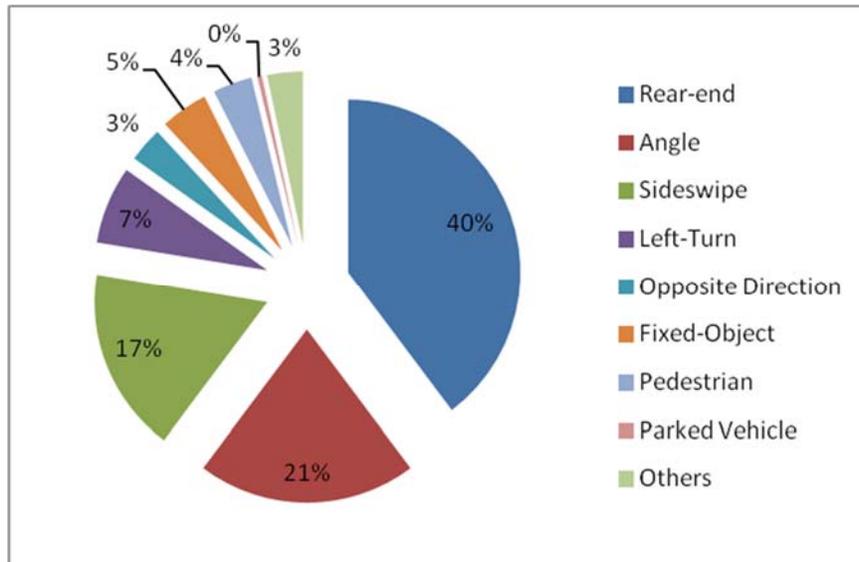
*Peak period defined as 7:00 AM – 9:00 AM and 4:00 – 6:00 PM.

Table B-2: Reported Crash Types Summary (2010 - 2012)											
Year	Collision Type										Total
	Rear-end	Angle	Sideswipe	Left-Turn	Opposite Direction	Fixed-Object	Pedestrian	Parked Vehicle	Others		
2010	133	68	69	30	17	20	15	0	11	363	
2011	107	55	47	22	6	9	13	2	12	273	
2012	127	66	44	15	7	12	6	2	8	287	
Total	367	189	160	67	30	41	34	4	31	923	

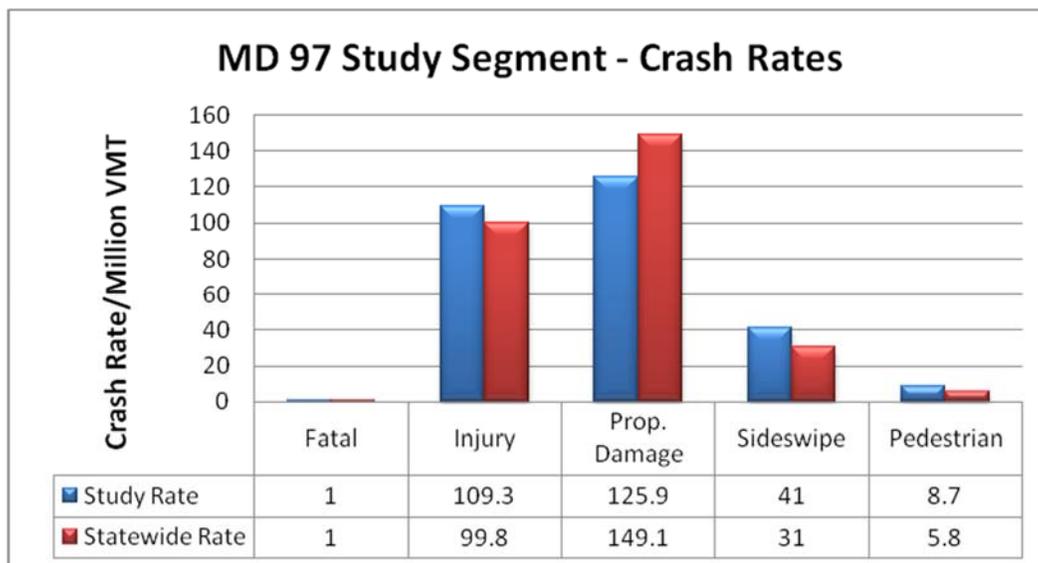
Analysis of the crash data along the study corridor revealed the following trends during the three-year study period from 2010 through 2012:

- 923 crashes were reported along the corridor during the study period. Overall, there was a decrease in the number of reported crashes from 2010 to 2012.
- The total number of crashes reported along the corridor is not significantly higher than the statewide average. However, side-swipe (41 percent), pedestrian (8.7 percent) and other (7.9 percent) related collisions crash rates are higher than the statewide average.
- Four (4) fatalities were reported during the study period.
- Forty-six percent (46 percent) of the crashes resulted in an injury.
- Thirty percent (30 percent) of the crashes reported during the study period occurred at night.
- Sixteen percent (16 percent) of the crashes occurred on wet pavement surface.
- Rear-end collisions were the most predominant collision type reported during the study period that accounted for forty percent (40 percent, 367 crashes) of the total crashes followed by Angle collisions (21 percent, 189 crashes).
- Thirty-six percent (36 percent) of the crashes occurred during peak hours (7am to 9am and 4pm to 6pm).
- Five percent (5 percent) of the crashes reported were related to the use of alcohol.
- The most probable cause reported during the entire study period was “Failure to give full attention” (249 crashes) followed by “Failure to yield right-of-way” (152 crashes).
- The month with the highest number of reported crashes was December (95 crashes).
- MD 97 (Georgia Avenue) at Reddie Drive (mile point 3.27) has the maximum number of reported crashes for the three year time period (35 crashes).

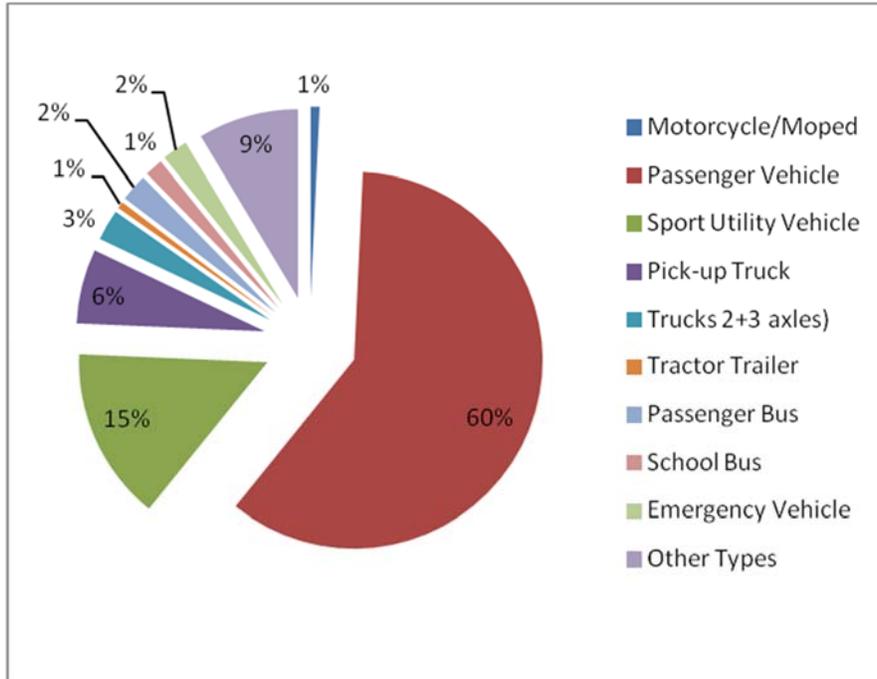
The following chart shows the percent distribution of *crash types* through the study period along the corridor. As seen in the chart below, the dominant crash type along the study corridor is rear-end crashes (40 percent). Four (4) percent were reported as pedestrian or bicycle-related crashes. A cluster of pedestrian collisions were reported at Randolph Road and within its 0.1 mile radius (5 crashes). Another cluster of pedestrian collisions were reported in the vicinity of Aspen Hill Road within its 0.1 mile radius (6 crashes).



The following chart shows the crash rates along the study corridor as compared to the statewide average. As seen in the chart below, the crash rates for sideswipe (41 crashes/Million VMT) and pedestrian (8.7 crashes/Million VMT) crashes along the study corridor are significantly higher than statewide average.

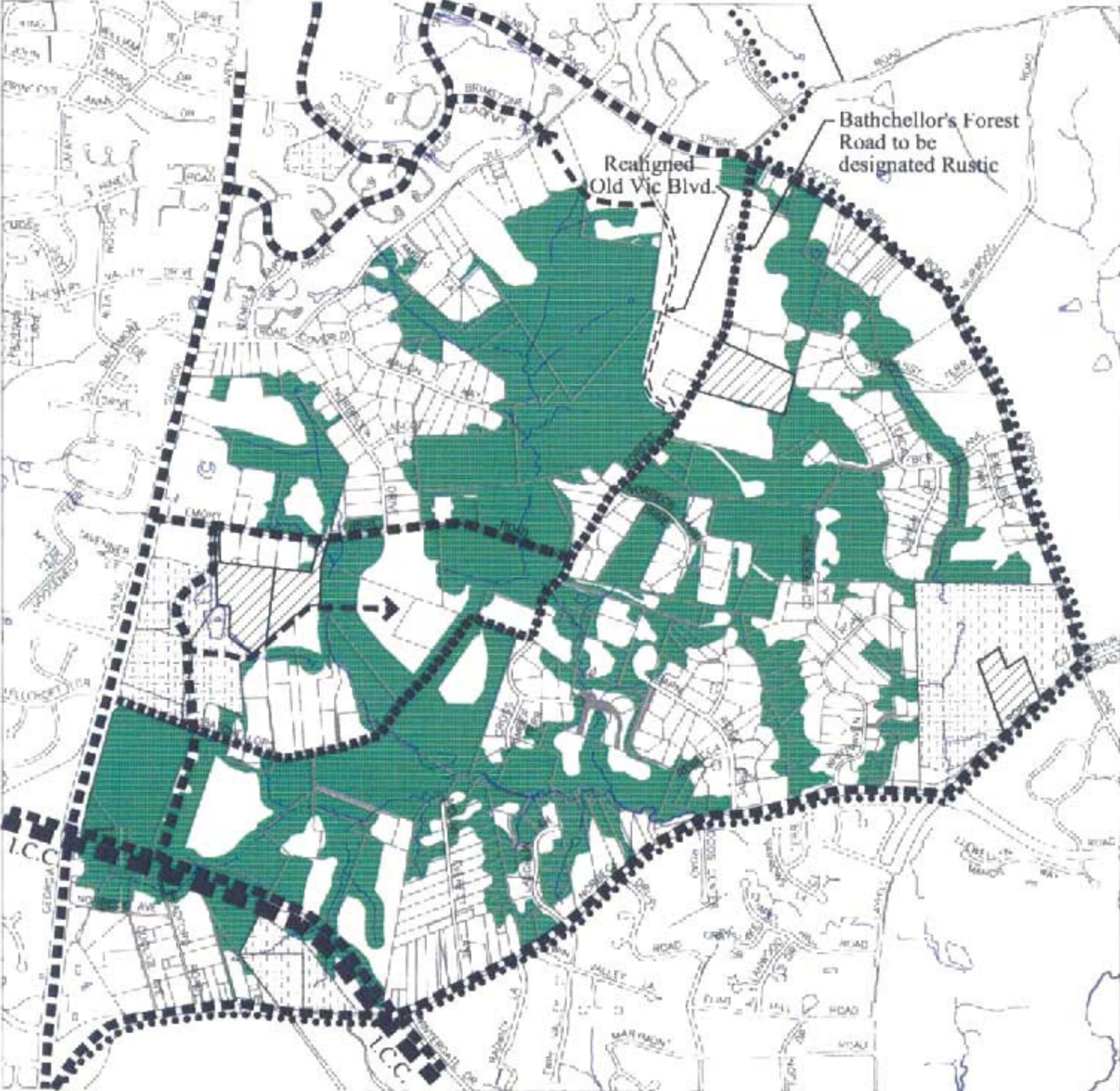


The following chart shows the percent distribution of *vehicle types* that were involved in crashes through the study period along the corridor. As seen in the chart below, 2 percent (2 percent, 44 passenger buses) and 1 percent (1 percent, 29 school buses) were the transit related vehicle types that were involved in crashes reported during the study period. The dominant vehicle type involved in crashes along the study corridor is passenger cars (60 percent).



APPENDIX C
FUTURE LAND USE MAPPING

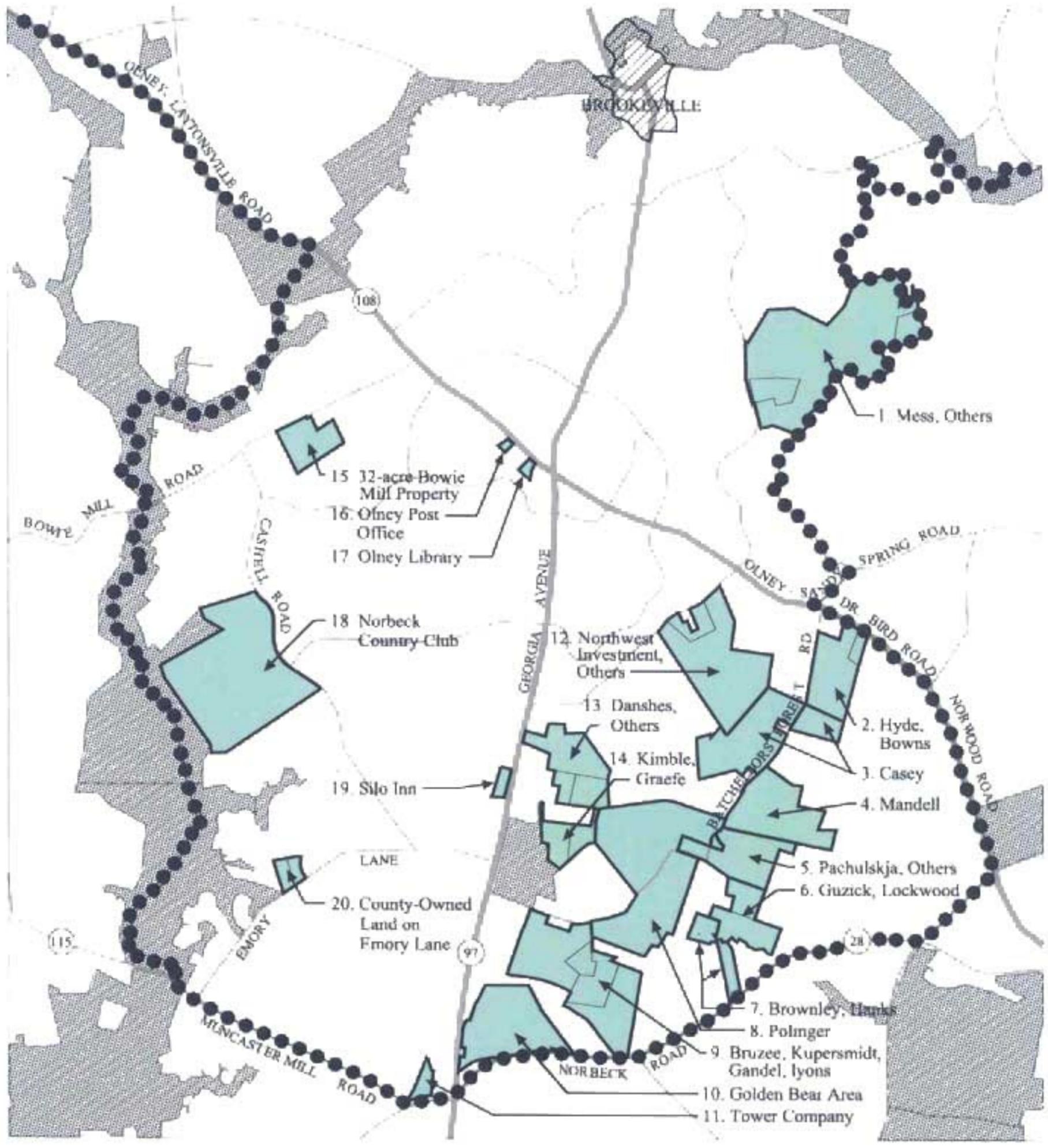
Proposed Southeast Quadrant Concept



-  Existing Parkland
-  Proposed Parkland
-  Potential Bike Path Connections
-  Proposed Master Plan Bikeway Network
-  Planning Area Boundary
-  Public and Private Open Space



Specific Properties



- Specific Properties With Land Use Recommendations
- Parkland
- Incorporated Areas
- Master Plan Area Boundary



A Master Plan for the Communities of
Aspen Hill
 Planning Area

SIGNIFICANT PARCELS

PARCELS OR AREAS

-  WITH CHANGES IN USE OR DENSITY
- 1 RIGHT-OF-WAY FOR THE FORMER RELOCATED MUNCASTER MILL ROAD
- 2 FORMER VITRO CORPORATION SITE
- 3 LEE DEVELOPMENT GROUP OFFICE BUILDING SITE
- 4 MOBIL SERVICE STATION AND THE ASPEN VIEW CENTER OFFICE BUILDING
- 5 NORBECK ROAD/BAILEY'S LANE AREA
- 6 WASHINGTON SUBURBAN COMMISSION (WSSC) SITE
- 7 HOMECREST ROAD AREA
- 8 BEL PRE ROAD AREA
- 9 SAINTS CONSTANTINE AND HELEN GREEK ORTHODOX CHURCH PROPERTY
- 10 LAYHILL SHOPPING CENTER
- 11 SANDY SPRING BANK
- 12 WESTERN HEWITT AVENUE PARCELS
- 13 RIGHT-OF-WAY FOR THE FORMER ROCKVILLE FACILITY
-  WITH COMMENTS
- 14 ROBERT E PERRY HIGH SCHOOL
- 15 ROCK CREEK VILLAGE SHOPPING CTR.
- 16 GREEN STRIP AT MANOR COUNTRY CLUB
- 17 ASPEN HILL SHOPPING CENTER
- 18 MATTHEW HENSON STATE PARK
- 19 PRC- AGE RESTRICTED AREA
- 20 PRC- UNRESTRICTED PORTIONS
- 21 GATE OF HEAVEN CEMETERY
- 22 HOANG PROPERTY
- 23 EASTERN HEWITT AVENUE PARCELS
- 24 ARGYLE COUNTRY CLUB
- 25 ALLENWOOD/GAYFIELDS/WILSON HILLS/GAYWOOD AREA
- 26 PLAZA DEL MERCARDO SHOPPING CTR.

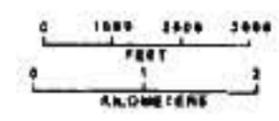


FIGURE 9

**Master Plan for
the Communities of
Kensington Wheaton**
Montgomery County, Maryland

*Parcels and Areas
Reviewed by This Plan*

..... PLANNING AREA BOUNDARY

● PARCELS AND AREAS WITH
RECOMMENDED CHANGES
(SEE TABLE 4-1)

○ PARCELS AND AREAS WITH NO
COMMENTS OR RECOMMENDED
CHANGES (SEE APPENDIX "C")

**NW
QUADRANT**

**NE
QUADRANT**

**SW
QUADRANT**

**SE
QUADRANT**

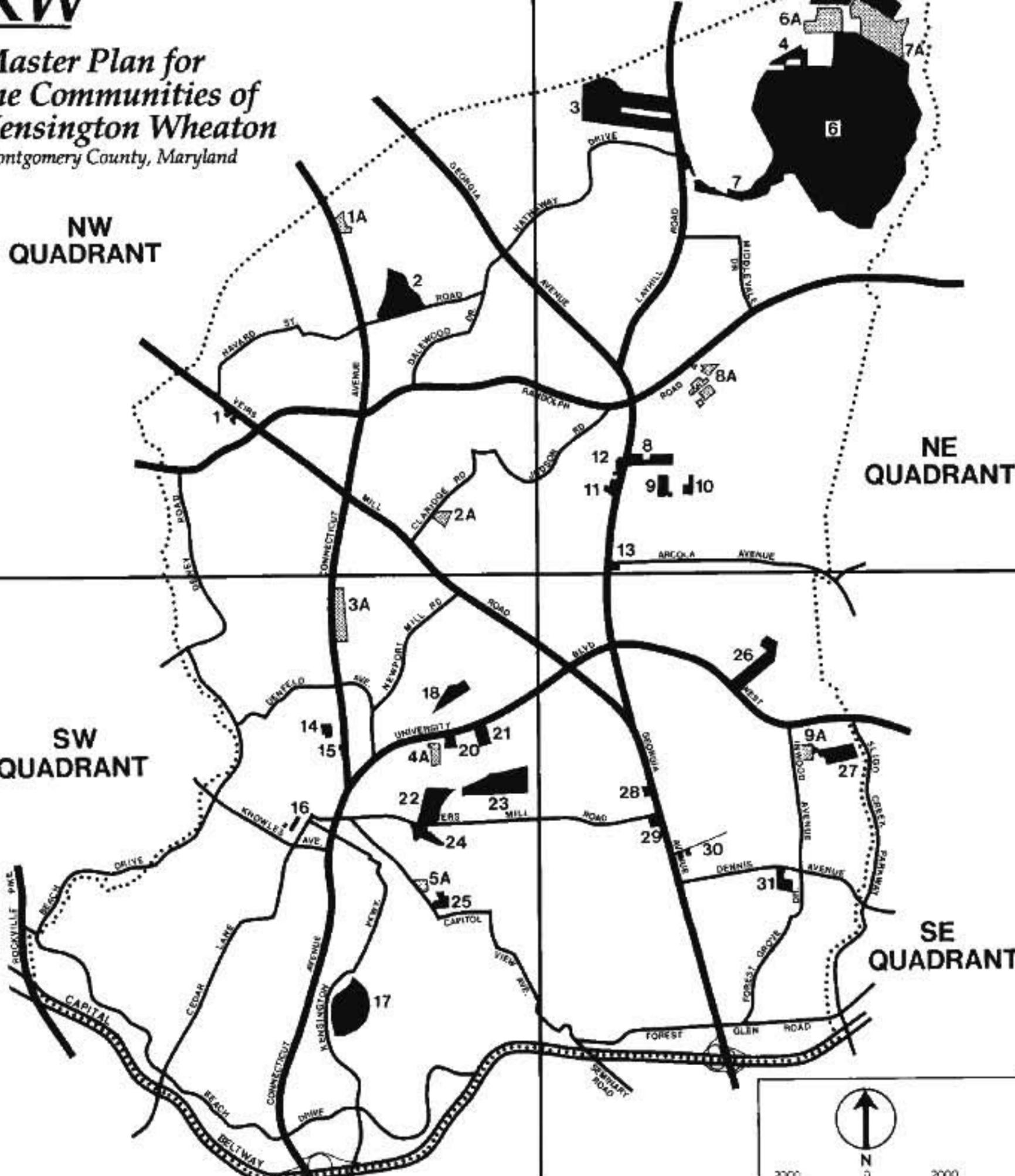
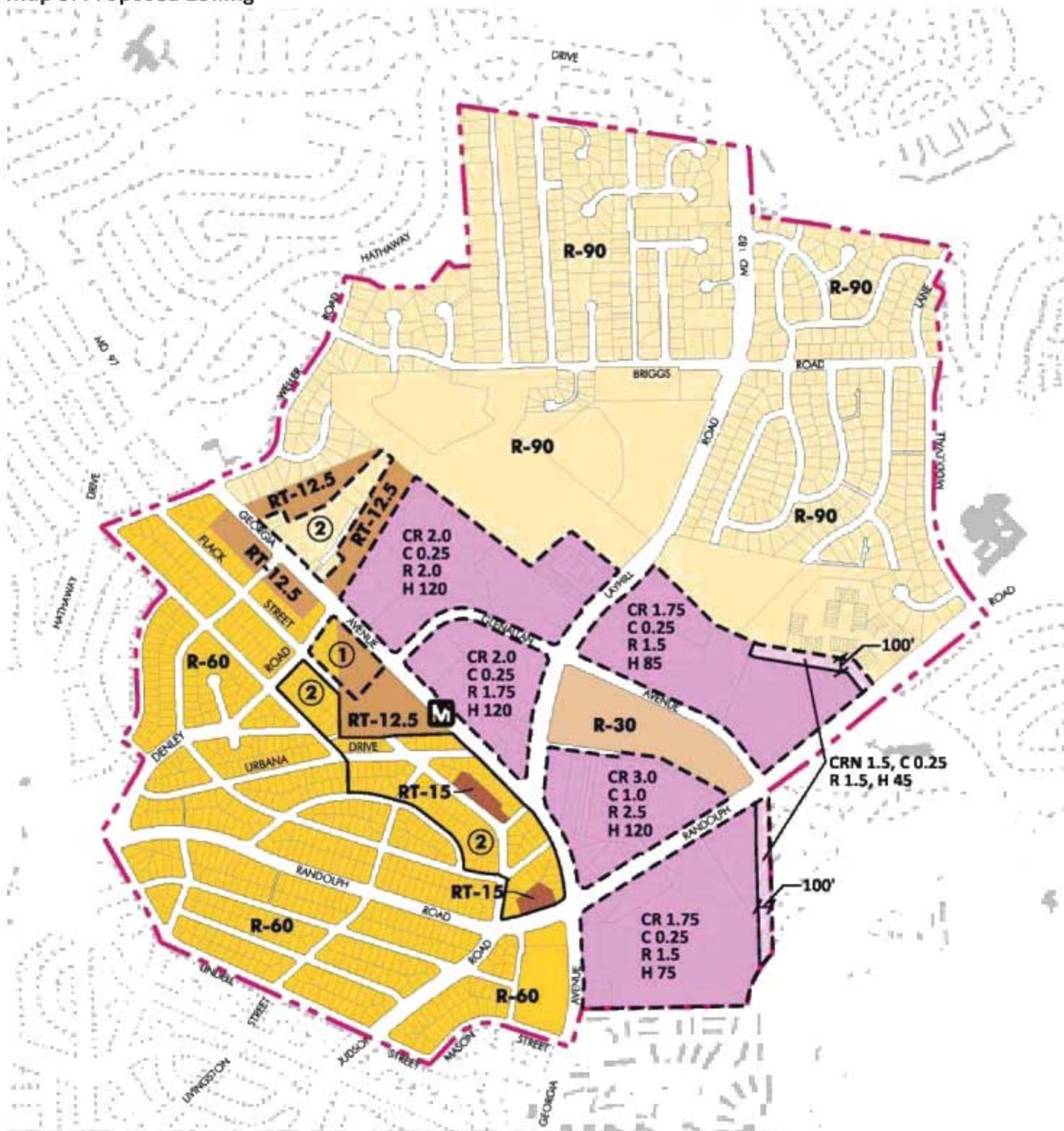


Illustration 4-1

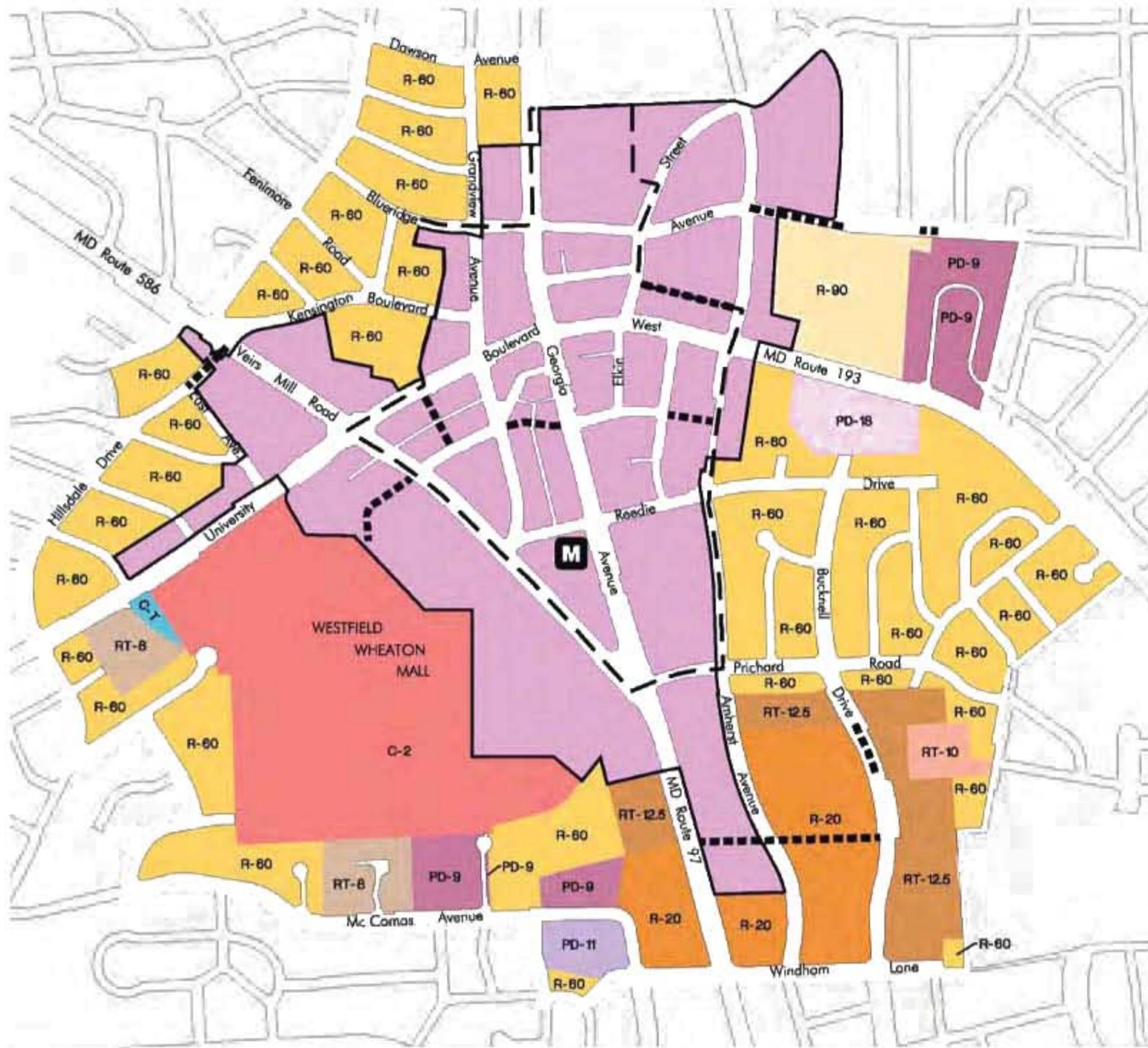
Map 5: Proposed Zoning



- M** Metro Station
- 1** Suitable for Mixed-Use Zone
- 2** Suitable for Townhouse Zone
- Sector Plan Boundary
- - - Areas with Proposed Zoning Changes



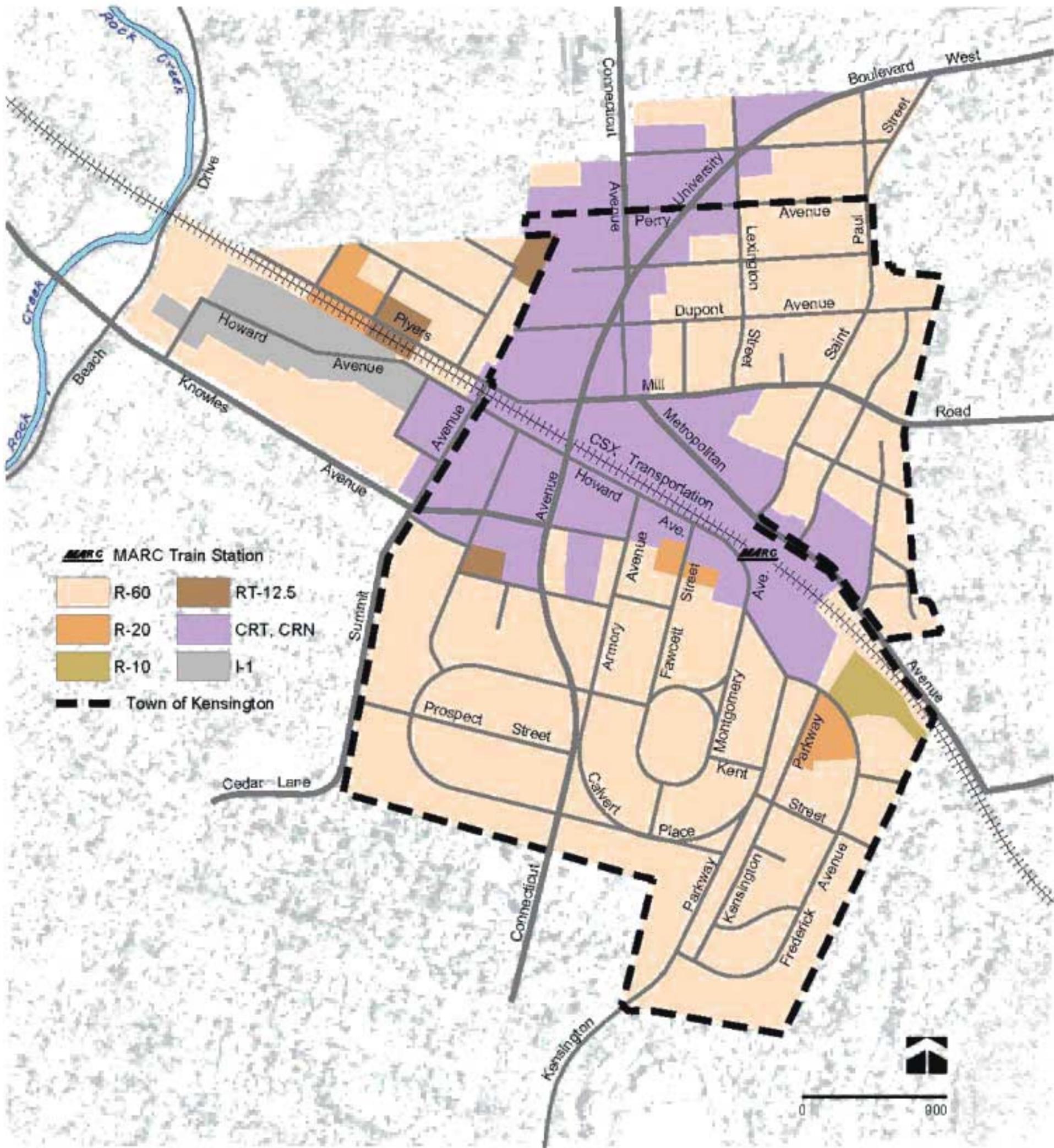
Map 14 Proposed Zoning



- M** Wheaton Metro Station
- Central Business District
- Proposed Street
- CR Zones (Refer to Proposed CR Zoning map for details)



Map 12 Proposed Zones



The CR Zones are based on a total allowed floor area ratio (FAR) maximum non-residential FAR, maximum residential FAR, and maximum building height.