

## APPENDIX 5: Major Studies

Sections of the following studies are included:

*Anne Arundel County Corridor Growth Management Plan*

*Major Intersections/Important Facilities Study Report*

*Central Maryland Transit Development Plan*

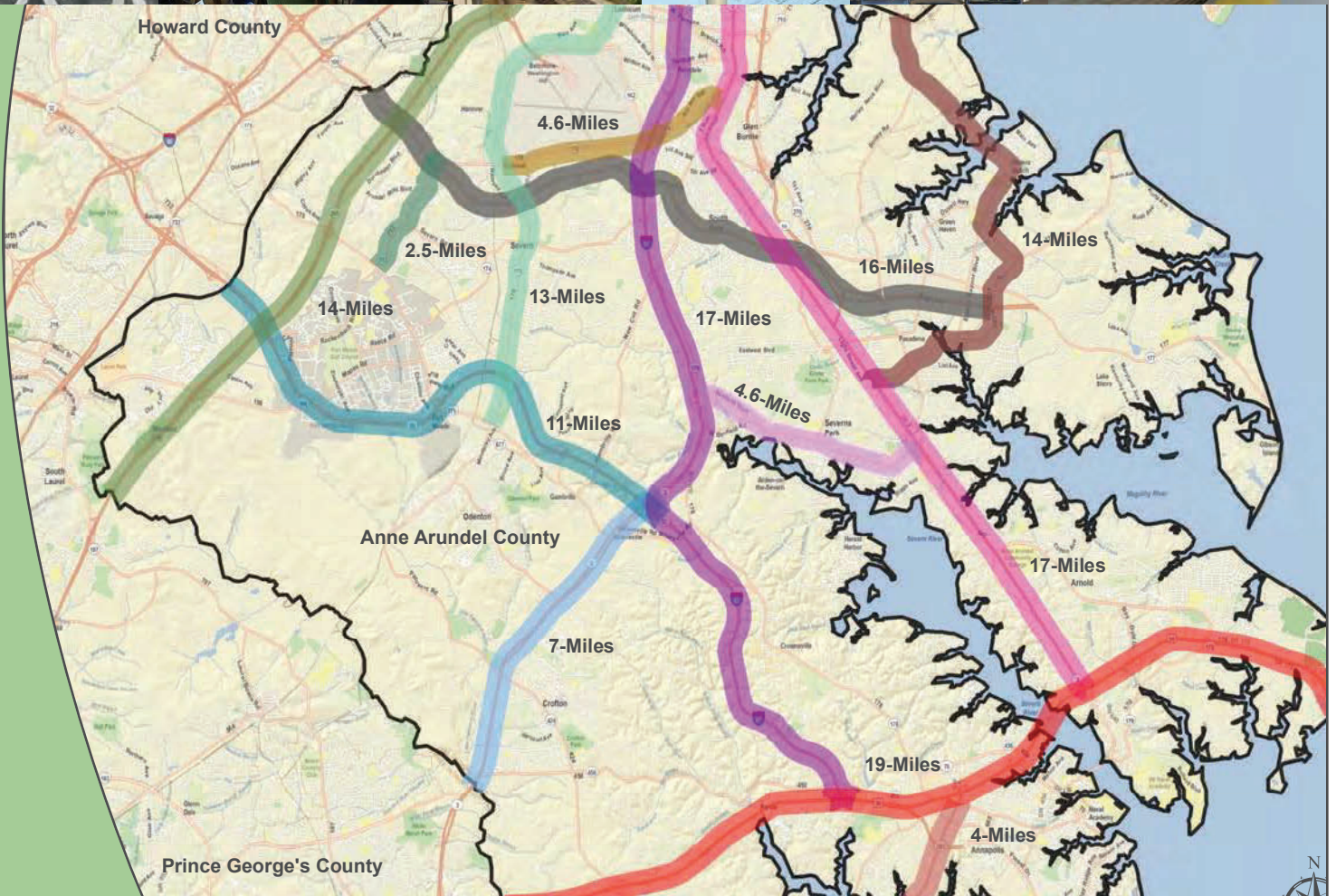
*Complete Streets Guidance*

*Anne Arundel County Pedestrian and Bicycle Master Plan: 2013 Plan Update*

# FINAL REPORT

## Anne Arundel County Corridor Growth Management Plan

July 20, 2012



Prepared by:



SABRA, WANG & ASSOCIATES, INC.



Gannett Fleming

a Joint Venture

## CHAPTER 1: EXECUTIVE SUMMARY

### 1.1 OVERVIEW

The Corridor Growth Management Plan is a response to the 2009 General Development Plan which observed that growth in employment and households is projected to continue over the next 20 years, which will create additional travel demand while the ability to add roadway capacity is limited. As the County continues to experience growth in population and employment, it faces both challenges to mobility and quality of life that are associated with that growth. The objective of this report is to develop transportation solutions for viable alternative modes of travel, with concept-level impacts and costs. The goal of these recommendations is to enhance mobility and accessibility for residents, commuters and businesses in order to preserve economic vitality and quality of life within the County. A map of these corridors is shown on the next page. A glossary of terms is provided in **Appendix U**.

This report presents specific recommendations, for mobility improvements based on changes in travel demand for the year 2035 forecasts, in nine key corridors throughout the County:

1. US 50: Prince George's County Line to the Chesapeake Bay Bridge – 19 miles
2. MD 2 North: US 50 to I-695 – 17 miles
3. MD 2 South: Central Avenue (MD 214) to West Street (MD 450) – 4 miles
4. I-97: US 50 to I-695 – 17 miles
5. MD 32: I-97 to the Howard County Line – 11 miles
6. MD 100: MD 648 to Howard County Line – 5 miles
7. Baltimore-Washington Parking/ MD 295: Prince George's County Line to I-695 – 14 miles
8. MD 3: Prince George's County Line to MD 32 – 7 miles
9. Magothy Bridge Road to Hog Neck Road (MD 607) to Ft. Smallwood Road (MD 173) to the Baltimore City Line – 14 miles

These nine corridors represent the busiest roadways in the County, carrying 70% of the total daily vehicle traffic volumes within the County, and also experience recurring rush hour congestion. Four secondary corridors were also studied to develop recommendations for toolbox strategies to provide enhanced management of day-to-day roadway/ traffic operations, as well as travel demand:

1. Benfield Blvd: I-97 to MD 2
2. MD 176 (Dorsey Rd) from MD 170 to MD 2
3. MD 170 (Aviation Blvd/Telegraph Rd) from MD 2 to MD 175,
4. MD 713/ Ridge Rd from MD 176 (Dorsey Rd) to MD 175

### 1.1.1 Purpose and Scope

This document and the proposed recommendations will assist County and State planners, land developers, and decision makers regarding future investments and priorities for improvements in highway, transit and non-motorized facilities. The recommendations have been carefully analyzed and vetted through the use of advanced travel forecasting software models, extensive coordination with local, state and regional transportation planners, as well as input from an 8-member appointed Citizen Advisory Committee. The recommendations focus on balancing the need for added roadway capacity with right-of-way and environmental constraints, and the need to provide for additional choices within each corridor other than travel by private automobile. As appropriate alternative modes of travel such as carpool, rail, bus, cycling and walking were identified in each corridor, the feasibility of each mode was tested. The selected recommendations represent "smart" transportation improvements that aim to:

- provide reliable travel times,
- decrease congestion along each corridor,
- enhance travel choices,
- improve safety for vehicles, bicyclists, and pedestrians, and
- support County land use plans while maintaining the character of the corridor.

For each corridor, the recommendations for roadway, transit, bicycle/ pedestrian facilities, and land use, along with toolbox strategies to provide enhanced management of day-to-day roadway/ traffic operations, as well as travel demand are presented in Figure 1-1. Capital and operating costs for all improvements are also presented.

### 1.1.2 Project Costs

Planning level capital construction cost and operating cost estimates were developed for all roadway and transit improvements, based on costing guidance provided by the Maryland State Highway Administration and Maryland Transit Administration. The raw roadway costs include construction costs such as pavement widening, interchange upgrades, bridge structure upgrades, environmental mitigation, traffic control, as well as design fees but do not include the costs of purchases of lane for additional rights-of-way. The raw transit operating costs include the major components of fuel, labor and maintenance but do not include farebox recovery, park-and-ride lot construction/ expansion or maintenance garages. It is impractical at this time to estimate these later costs in the absence of a completed design. The total estimated cost to implement this plan on the nine primary corridors is **\$3.6 billion**. See Table 1-1.

### 1.1.3 Alternatives Tested

Throughout the study, several alternatives were developed and tested for all corridors, including:

Figure 1-1: Corridor Key Map

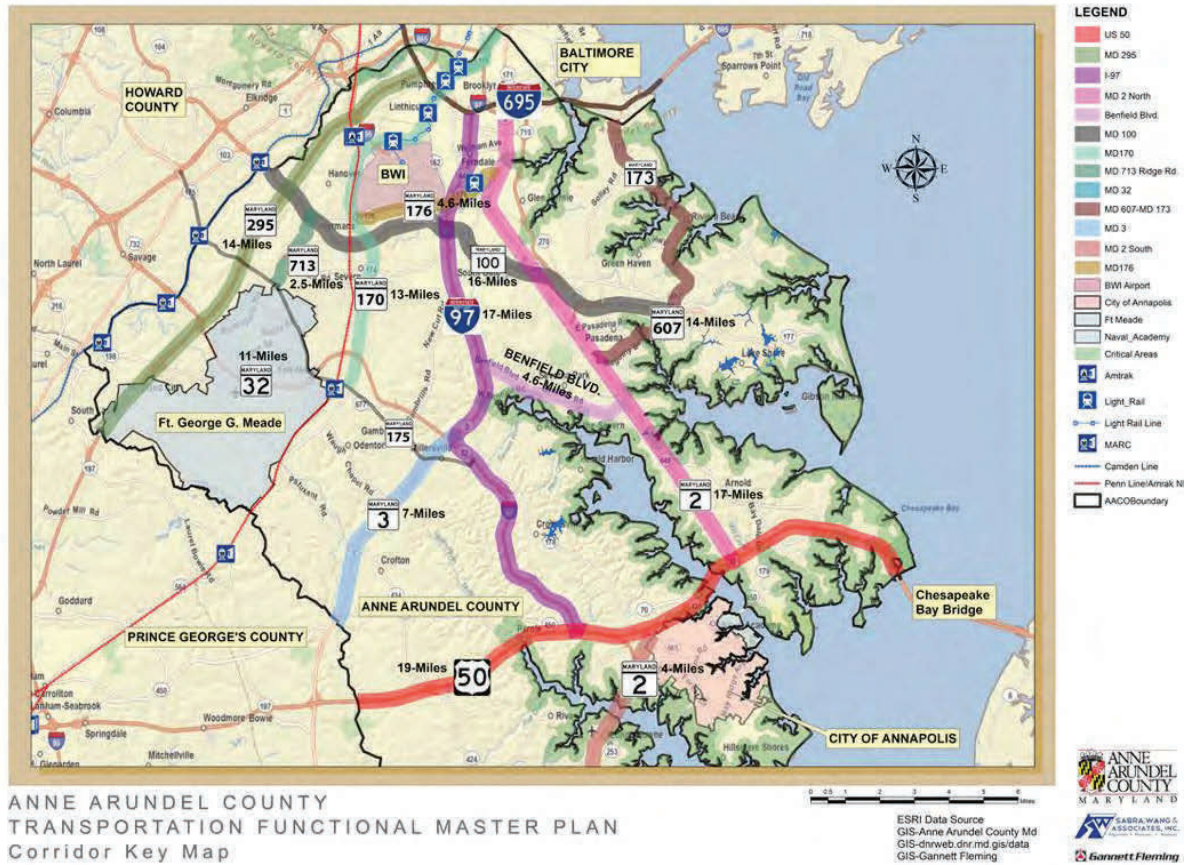


Table 1-1: Project Costs

Corridor	Roadway Cost	Transit Operating Costs (15-year service life)
US 50	\$778,500,000	\$189,887,000
MD 2 North	\$100,800,000	\$98,207,900
MD 2 South	\$0	\$0
I-97	\$283,300,000	\$51,916,200
MD 32	\$665,150,000	\$0
MD 100	\$326,500,000	\$28,002,600
BW Parkway/ MD 295	\$48,000,000	\$0
MD 3	\$30,000,000	\$37,433,700
Magothy Bridge/ Fort Smallwood	\$0	\$462,000
<b>Transit Fleet Cost (Hybrid)</b>		<b>\$22,950</b>
<b>GRAND TOTAL</b>	<b>\$3,180,700,000</b>	<b>\$428,859,500</b>

1. A No Build Alternative. Only constructing roadways that are currently funded for construction, with no transit or carpool lane improvements.
2. A Roadway Widening Only Alternative. Only constructing roadways that are currently proposed to be widening in the Baltimore Region's Constrained Long Range Plan, with no transit or carpool lane improvements.
3. A Managed Lane Only Alternative. Only constructing new travel lanes on the existing corridors to provide priority carpool (High Occupancy Vehicle) and/ or general purpose traffic via tolled access (Express Toll/ High Occupancy Toll).
4. An Enhanced Transit Only Alternative. Providing new bus transit service in each corridor without necessarily providing new exclusive rights-of-way or priority treatments.

Based on the results of the alternatives analysis, the final and preferred alternative developed, tested, and recommended herein is a hybrid combination of the optimal roadway widening, managed lanes, and transit service with supporting select transit priority treatments and transit-oriented land use changes. Additional transit modes considered but not evaluated in detail are discussed in Chapter 5.

#### **1.1.4 Priorities**

Based on projected benefits, in travel time reliability, level of service, travel choices, and construction impact and feasibility it is recommended to construct US 50 and I-97 improvements initially, followed by a second tier priority of MD 295, MD 100 and M32, and lastly MD 3 and MD 2 North and South.

#### **1.1.5 Next Steps**

This document is a stand-alone report that is intended to justify advancing each of these corridors into detailed project planning and preliminary engineering, and identifying and securing funding commitments in partnership with appropriate State, Federal and private partners. This document builds on elements of the recently *adopted General Development Plan (2009) Chapters 7, 9, 11 and 12; GDP Background Report on Transportation, (2008) and the currently underway Anne Arundel County Pedestrian and Bicycle Master Plan, (2012)*. This report, along with future studies of additional secondary corridors, and new policy and design guidelines for developing Complete Streets that incorporate all modes of travel, will be integrated into a single Countywide Transportation Master Plan Document.

## **1.2 US 50**

US 50 (John Hanson Highway) is a six to eight lane expressway that is projected to carry up to 200,000 vehicles per day by the year 2035, an increase of up to 40% over existing daily traffic

volumes. The corridor serves a diverse traffic mix including local traffic in the Annapolis area, long-distance commuter traffic destined for downtown Washington, D.C. and regional traffic destined to the Eastern Shore.

The recommendations for US 50 include roadway improvements, widening of the Severn River Bridge, new premium transit service and improved intermodal connections. See Table 1-2.

**Table 1-2: Recommendations for US 50**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• <b>Widen from 6 to 8 lanes between I-97 and the Chesapeake Bay Bridge including widening the Severn River Bridge</b></li> <li>• Extend the existing carpool (HOV 2 or more persons) lanes from the Prince George’s County Line to I-97</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Operation of all-day weekday high quality transit service (four routes) along this corridor with stops in Annapolis, Navy Stadium Park &amp; Ride lot, Parole Town Center, Davidsonville, Bowie and continued service to key destinations in downtown Washington, D.C. The transit service would be permitted to run in the carpool lanes at all times. This service would be in addition to the existing MTA express bus services (922 and 950)</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Bicycles and pedestrians will remain prohibited along US 50</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Develop an intermodal hub in the Parole Town Center area, with direct access to/ from US 50 and expanded park and ride capacity</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Configure separate express and local travel lanes between I-97 and MD 2</li> <li>• Implement ramp metering between MD 665 and MD 2</li> <li>• Enhance Active and Event Traffic Management through implementation of variable speed limits, dynamic lane marking, Variable Message Signs, and enhanced traveler information systems</li> </ul>

**Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan**

The provision of carpool lanes reduces daily general purpose traffic volumes by up to 10% in some segments in comparison to a roadway widening-only option, and the provision of premium bus service increases transit ridership in this corridor by up to 150% over existing conditions. Typical roadway cross-sections of this alternative are illustrated in Figure 1-2 along with a schematic route map of proposed location of transit nodes and intermodal connections in Figure 1-3.

The Maryland Transportation Authority, which owns and operates the Chesapeake Bay Bridge, has been a key technical partner in the development of improvements along US 50. While the Authority is undertaking short-term studies to consider enhanced bus service, variable toll pricing, and improved incident response services on the bridge, no formal initiation of the required federal environmental studies for an improved or additional Bay Crossing is currently

Figure 1-2: US 50 Proposed Roadway Cross-Sections

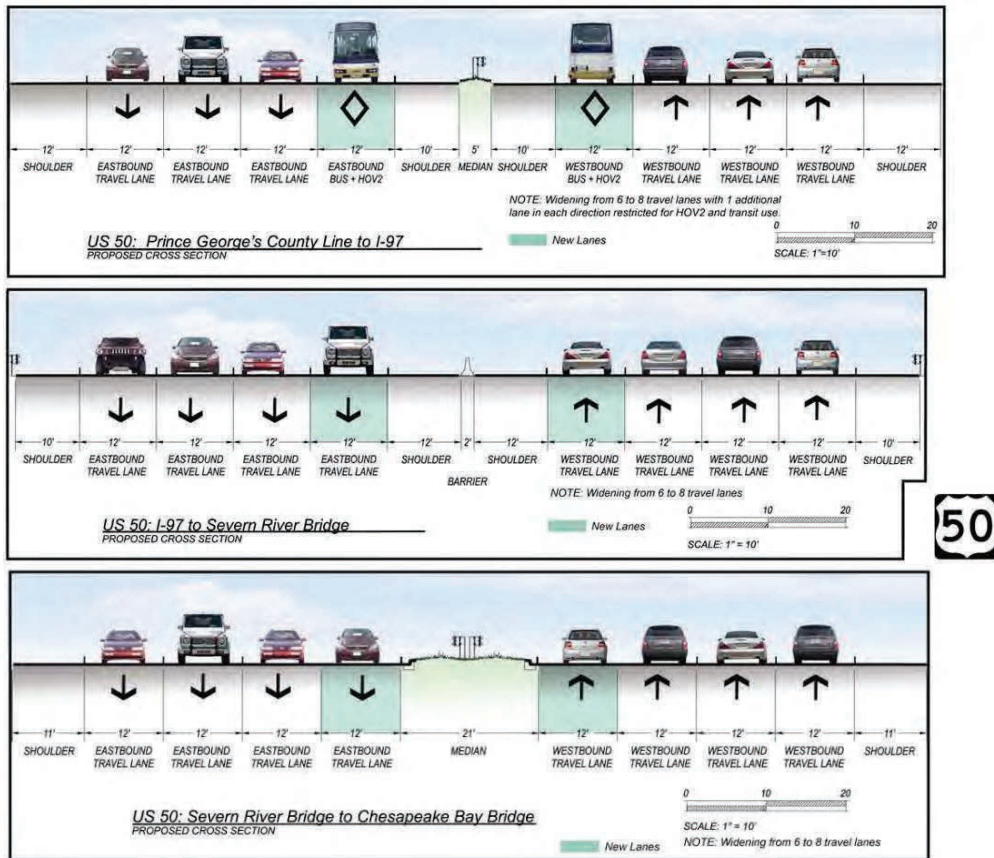
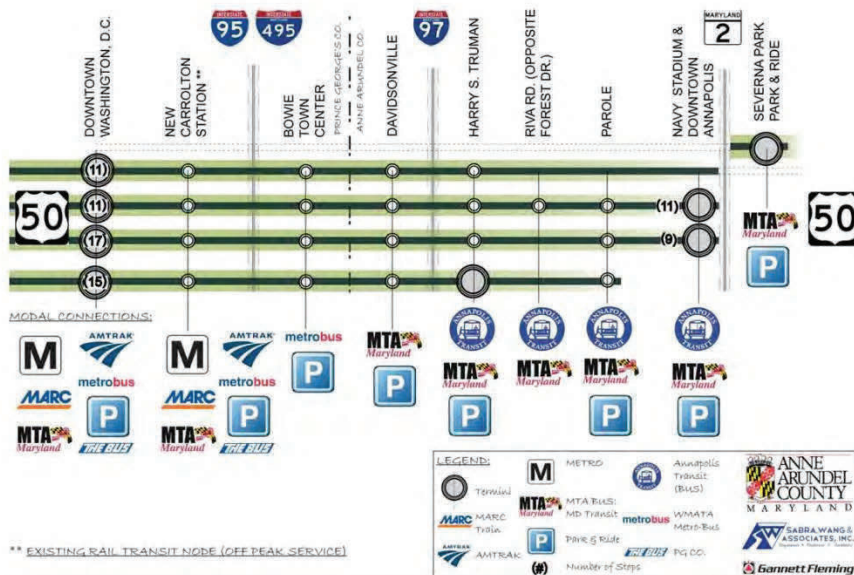


Figure 1-3: US 50 Proposed Transit Route Map, Nodes and Intermodal Connections





planned. The Authority has been fully engaged with the County in long-range land use and transportation planning and has pledged to carefully consider the recommendations developed for this study in developing their own improvements for additional roadway capacity across the Chesapeake Bay. It is recommended that the Authority initiate necessary environmental and engineering studies to determine location and design feasibility of an additional Bay crossing

**1.3 MD 2 - NORTH**

Maryland Route 2 (Governor Ritchie Highway) is a four to six-lane arterial roadway that is projected to carry up to 76,000 vehicles per day by the year 2035, an increase of up to 26% over existing daily traffic volumes. The corridor serves both local traffic in the Annapolis, Severna Park, Pasadena and Glen Burnie areas, as well as long-distance commuter traffic destined for downtown Baltimore.

The recommendations for MD 2 include roadway improvements, new premium transit service, new sidewalks, and permitting land use densities that support transit in select locations where redevelopment might occur. See Table 1-3.

**Table 1-3: Recommendations for MD 2 North**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• <b>Widen from 4 to 6 lanes between US 50 and MD 10</b></li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Operation of all-day weekday high quality limited stop transit service along this corridor with stops at the Navy Stadium Park and Ride lot, Anne Arundel Community College, Jones Station Park and Ride, Severna Park Plaza, Marley Station, Glen Burnie Town Center and key destinations in downtown Baltimore. This service would not replace the existing MTA local bus route #14</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• New sidewalk on both sides of MD 2</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Allow for transit-oriented development in Severna Park Marketplace, Harundale Plaza, Marley Station Mall and Glen Burnie Town Center</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Implement bus priority treatments such as queue jumps, signal priority and enhanced signal coordination</li> <li>• Provide additional park and ride capacity</li> </ul>

**Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan**

The additional land use density increased projected daily traffic volumes by 10% in one segment, but resulted in overall only one additional failing segment than a roadway-only widening option. However, the plan recommendation for this corridor significantly increased walking and biking trips, and increased transit ridership by up to 125% over existing levels.

Typical roadway cross-sections of this alternative are illustrated in Figure 1-4, along with a schematic route map of proposed location of transit nodes and intermodal connections (Figure 1-5).

Figure 1-4: MD 2 Proposed Roadway Cross Sections

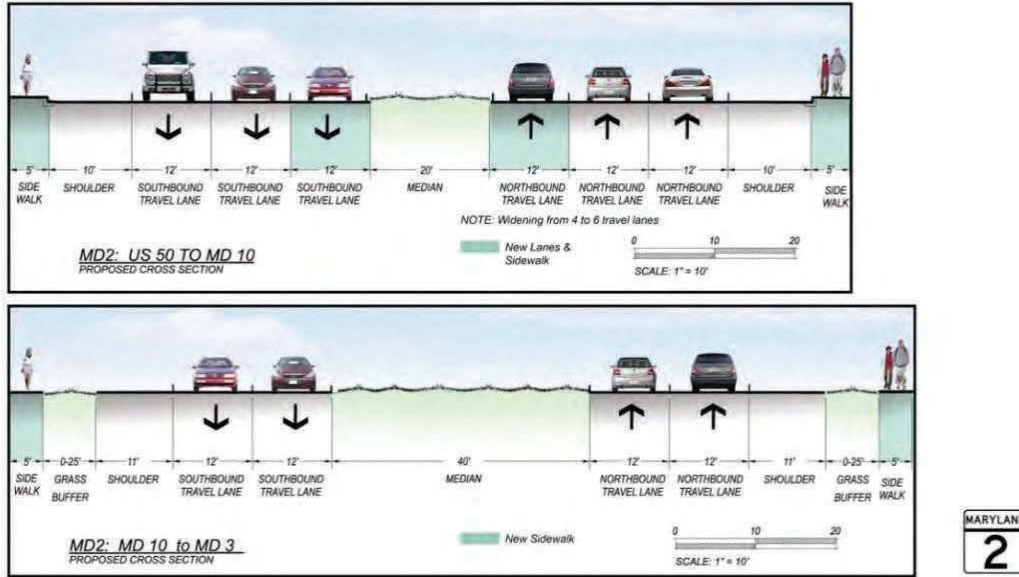
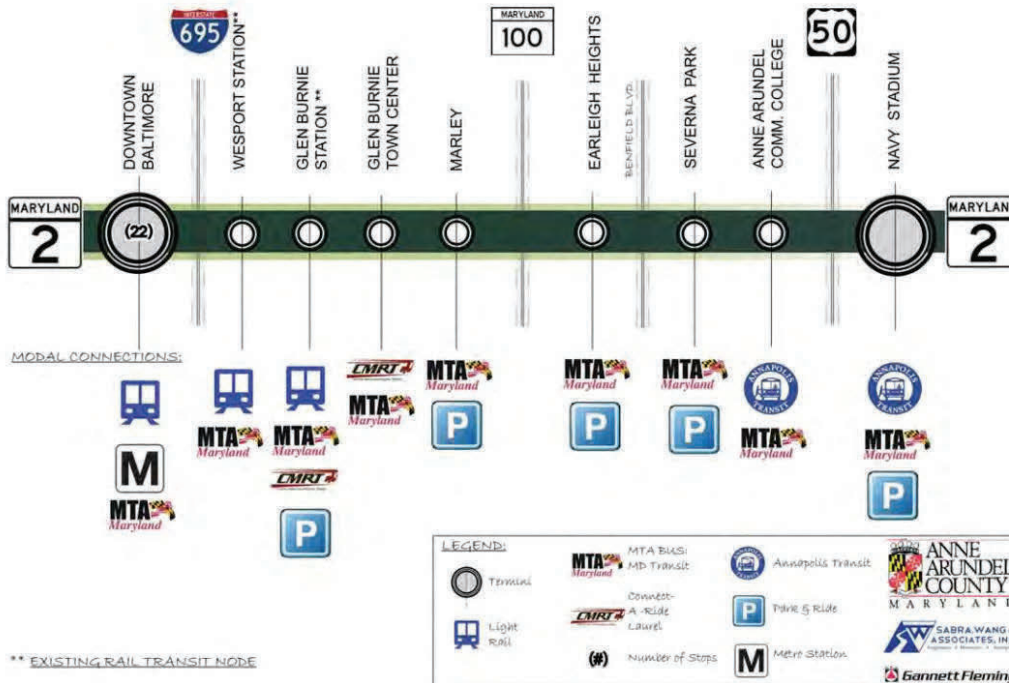


Figure 1-5: MD 2 Proposed Transit Route Map, Nodes and Intermodal Connections



**1.4 MD 2 - SOUTH**

Maryland Route 2 (Solomon’s Island Road) is a four to six-lane arterial roadway that is projected to carry up to 63,000 vehicles per day by the year 2035, an increase of up to 46% over existing daily traffic volumes. The corridor serves both local traffic in the Annapolis area, as well as long-distance commuter traffic from South County.

The recommendations for MD 2 include primarily pedestrian and bicycle improvements and toolbox strategies to better manage congestion. See Table 1-4.

**Table 1-4: Recommendations for MD 2 South**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• none</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• no new service but improve existing service frequency, span, and upgrade bus stops with real-time transit information, shelters, lighting and benches</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• construct missing sidewalks, evaluate feasibility to add bike lanes and/ or signed routes along side streets, parallel routes or MD 2</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• incorporate improved site design to orient new buildings to the street and encourage more walkable frontage</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Implement bus priority treatments such as queue jumps, signal priority and enhanced signal coordination</li> <li>• Develop improved access controls such as frontage road creation and streetscape treatments as redevelopment occurs to create a boulevard style cross-section</li> <li>• Evaluate the need for improvements to connecting roadways such as MD 214 to improve intersection level of service</li> <li>• Evaluate MD 2 South from Aris T. Allen Blvd to and including the South River Bridge</li> </ul>

Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan

The proposed roadway cross-sections and transit routing remains unchanged from existing conditions.

**1.5 I-97**

I-97 is a four to six lane expressway that is projected to carry up to 150,000 vehicles per day by the year 2035, an increase of up to 30% over existing daily traffic volumes. The corridor serves a diverse traffic mix including local traffic in the Millersville, Severna Park and Glen Burnie area, and commuter traffic destined for downtown Baltimore and Annapolis.

The recommendations for I-97 include roadway improvements, and new premium transit service. See Table 1-5.

**Table 1-5: Recommendations for I-97**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>Widen from 4 to 6 lanes between US 50 and MD 32</li> </ul>
Transit	<ul style="list-style-type: none"> <li>Operation of all-day weekday high quality transit service along this corridor with stops in Parole Town Center, Benfield Blvd, Glen Burnie Town Center, Glen Burnie Light Rail Station, BWI Airport and Arundel Mills Mall</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li><b>Bicycles and pedestrians will remain prohibited along I-97</b></li> </ul>
Land Use	<ul style="list-style-type: none"> <li>No land use changes are proposed</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>Enhance Active and Event Traffic Management through implementation of variable speed limits, dynamic lane marking, Variable Message Signs, and enhanced traveler information systems</li> <li>Provide additional park and ride capacity</li> </ul>

Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan

The roadway widening proved to provide adequate levels of service in all but one segment near the MD 3 Business interchange, and the provision of high quality bus service reduced daily traffic volumes by 1% in some segments.

Typical roadway cross-sections of this alternative are illustrated in **Error! Reference source not found.**, along with a schematic route map of proposed location of transit nodes and intermodal connections (Figure 1-7).

**1.6 MD 32**

MD 32 is a four to six lane expressway that is projected to carry up to 93,000 vehicles per day by the year 2035, an increase of up to 55% over existing daily traffic volumes. The corridor serves a diverse traffic mix including local traffic in the Savage, Odenton and Millersville areas, and commuter traffic destined for Ft. Meade, NSA job centers as well as Annapolis.

The recommendations for MD 32 include roadway improvements. The carpool lanes reduce daily traffic volumes from a roadway-widening only option by up to 12% in some segments. Volumes on the carpool lanes are projected to reach up to 19,000 vehicles per day. See Table 1-6.

Typical roadway cross-sections of this alternative are illustrated in Figure 1-8.

Figure 1-6: I-97 Proposed Roadway Cross Sections

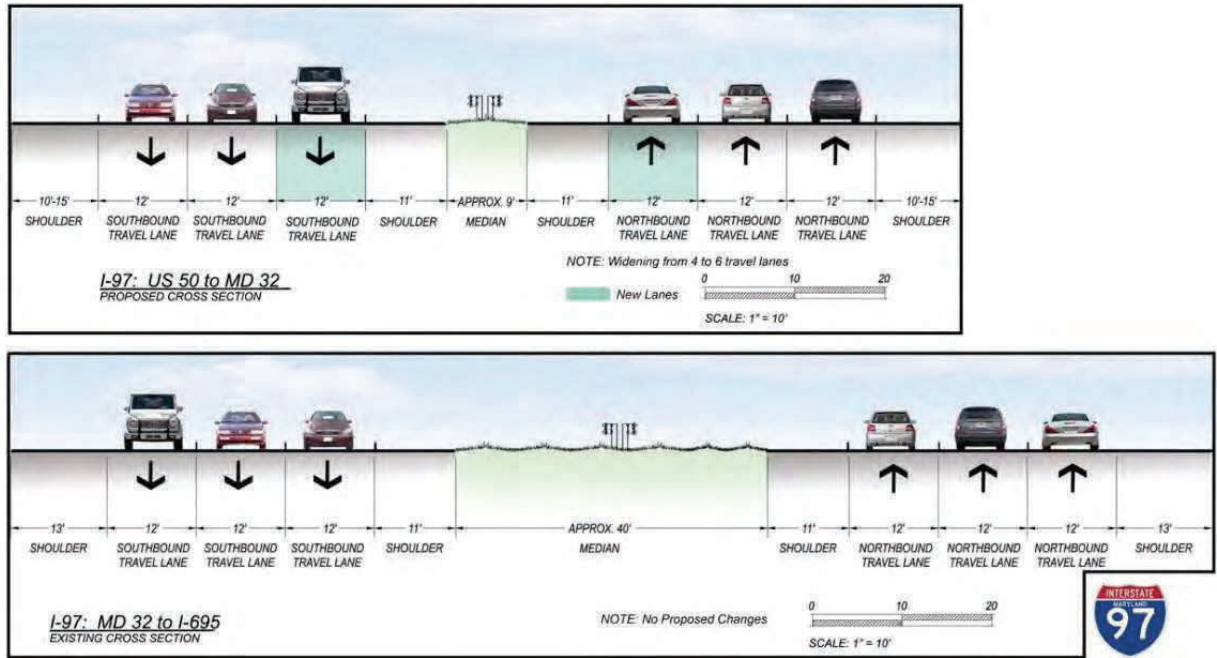


Figure 1-7: I-97 Proposed Transit Route Map, Nodes and Intermodal Connections

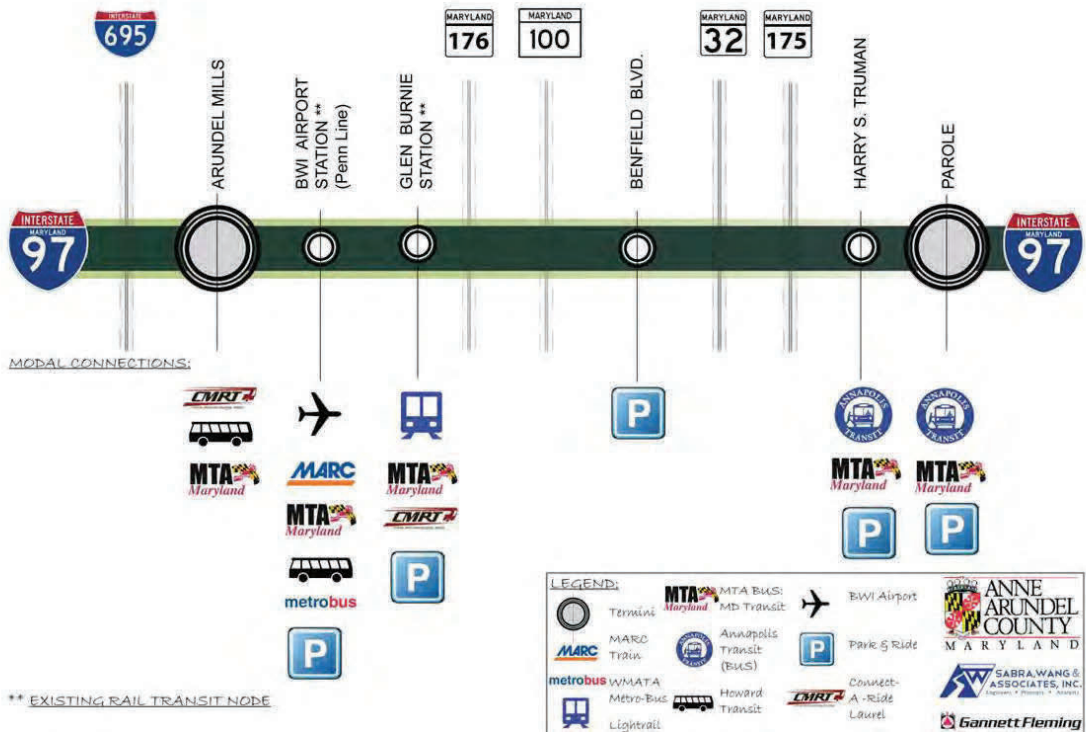
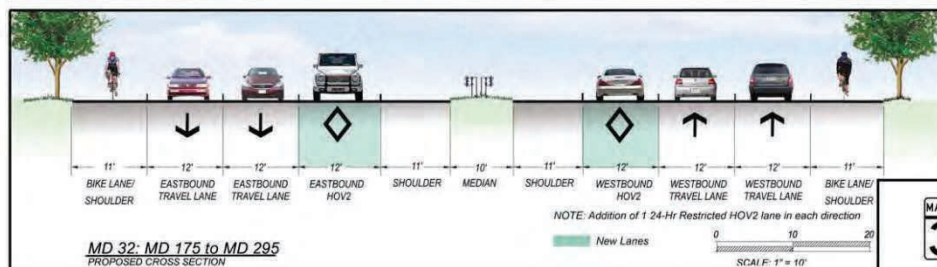
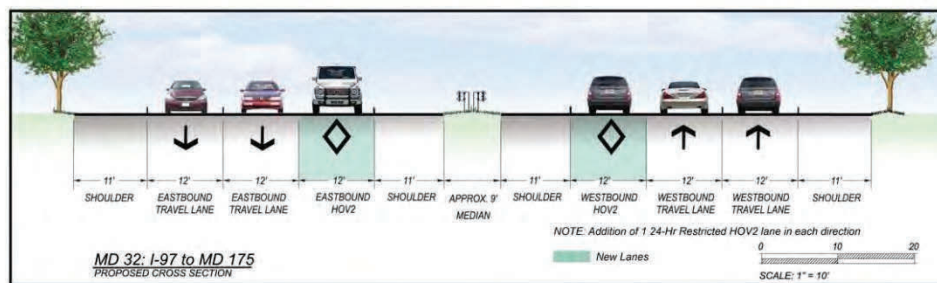
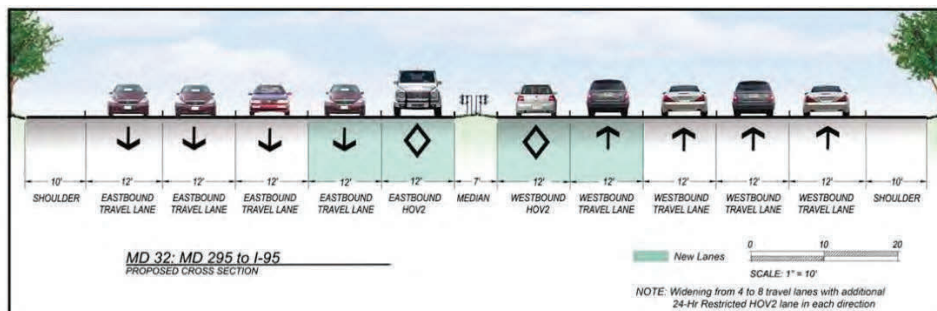


Table 1-6: Recommendations for MD 32

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>Widen to 8 lanes (between I-95 and MD 295)</li> <li>Construct new carpool (HOV 2 or more persons) lanes from I-95 to I-97</li> </ul>
Transit	<ul style="list-style-type: none"> <li>Provide subscription transit services and eventually express bus service</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>None other than where located today</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>No land use changes are proposed due to federal ownership of land on both sides of the roadway</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>Evaluate operation of subscription (van pool) and local bus service, and having those vehicles use the HOV lanes</li> </ul>

Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan

Figure 1-8: MD 32 Proposed Roadway Cross Sections



### 1.7 MD 100

MD 100 is a four to six lane expressway that is projected to carry up to 112,000 vehicles per day by the year 2035, an increase of up to 37% over existing daily traffic volumes. The corridor serves a diverse traffic mix including local traffic in the Dorsey, Glen Burnie and Lake Shore, and traffic destined for major activity centers such as BWI Airport, Arundel Mills Mall, and the Maryland Live casino.

The recommendations for MD 100 include roadway improvements, and new premium transit service. See Table 1-7.

**Table 1-7: Recommendations for MD 100**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• <b>Widen from 4 to 6 lanes between I-95 and I-97</b></li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Operation of all-day weekday high quality transit service along this corridor with stops in Marley Station, BW Medical Center, MD 170 (potential future MARC Station), Arundel Mills, Dorsey MARC Station, Snowden River Park &amp; Ride, and Long Gate Park &amp; Ride/ Ellicott City</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Bicycles and pedestrians will remain prohibited along MD 100</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Allow for transit-oriented development around the MD 170 interchange to support a future infill commuter rail station</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Configure separate express and local lanes between I-97 and MD 2</li> <li>• Implement ramp metering between MD 295 and MD 2</li> <li>• Enhance Active and Event Traffic Management through implementation of variable speed limits, dynamic lane marking, Variable Message Signs, and enhanced traveler information systems</li> <li>• Evaluate interchange improvements such as extended acceleration/ deceleration lanes to enhance merging and weaving between I-97 and Catherine Ave</li> <li>• Provide additional park and ride capacity</li> </ul>

**Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan**

The roadway widening proved to provide adequate levels of service in all segments west of I-97, and the transit-oriented development along with the high quality transit service also projected over 2,300 transit trips per day.

Typical roadway cross-sections of this alternative are illustrated in Figure 1-9, along with a schematic route map of proposed location of transit nodes and intermodal connections (Figure 1-10).

Figure 1-9: MD 100 Proposed Roadway Cross Sections

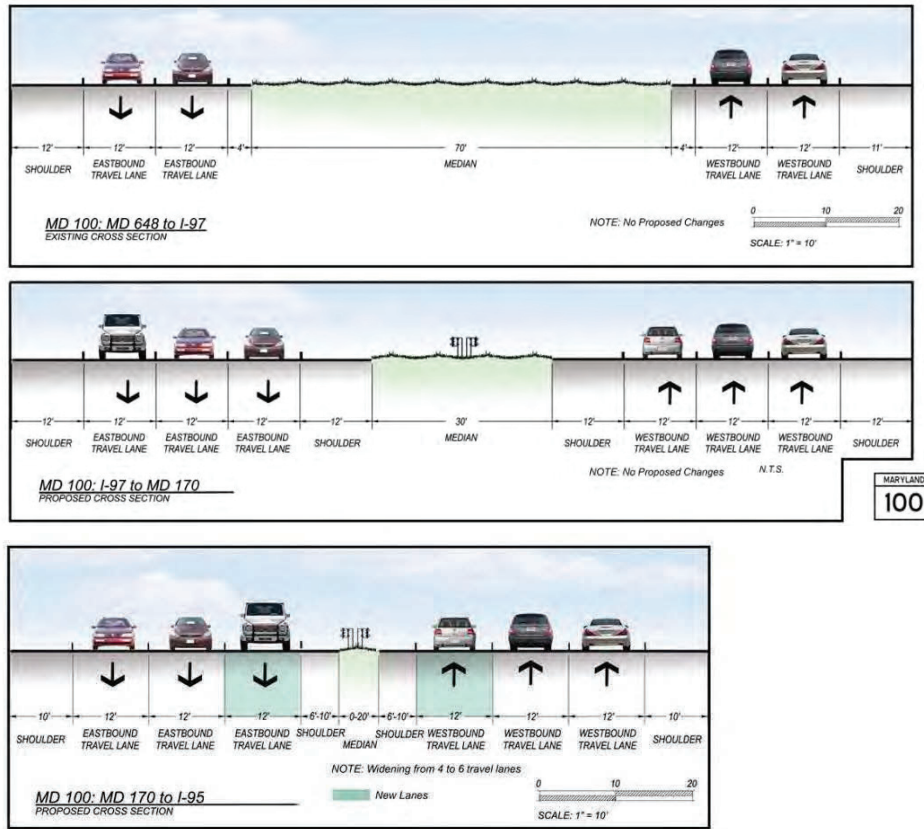
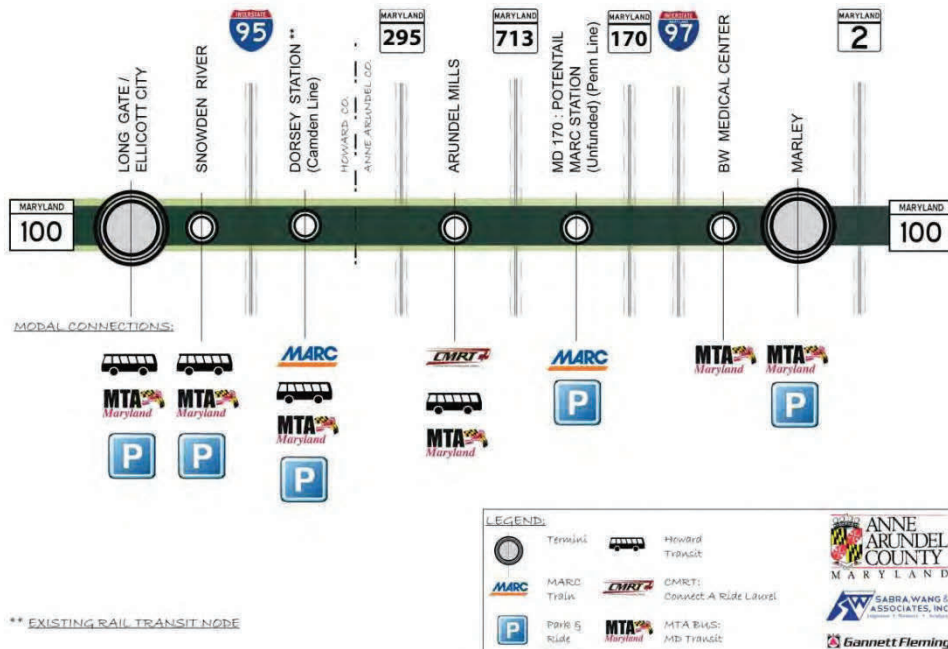


Figure 1-10: MD 100 Proposed Transit Route Map, Nodes and Intermodal Connections





**1.8 BALTIMORE-WASHINGTON PARKWAY/ MD 295**

The Baltimore-Washington Parkway (MD 295 north of MD 175) is a four to six-lane expressway that is projected to carry up to 130,000 vehicles per day by the year 2035, an increase of up to 44% over existing daily traffic volumes. The corridor serves a diverse traffic mix including local traffic in the Savage, Jessup, and Linthicum areas, long-distance commuter traffic destined for downtown Washington, D.C., Baltimore and regional traffic destined to major activity centers such as Fort Meade/ NSA, Arundel Mills, the Maryland Live casino and BWI Airport.

The recommendations for US 50 include roadway improvements, and new local transit service. See Table 1-8.

**Table 1-8: Recommendations for MD 295**

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>● <b>Widen from 4 to 6 lanes between MD 100 and I-195</b></li> </ul>
Transit	<ul style="list-style-type: none"> <li>● Operation of new local transit service in parallel corridors such as MD 176 and MD 713</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>● Bicycles and pedestrians will remain prohibited along MD 295</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>● none</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>● enhance signal coordination on parallel corridors such as MD 713, MD 170</li> <li>● Evaluate improved local road connectivity west of MD 295</li> <li>● Improvements to Race Road, Brock Bridge, Ridge Road and US 1 to carry additional local traffic</li> </ul>

**Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan**

The Baltimore-Washington Parkway/ MD 295 corridor is owned and maintained by the National Park Service (NPS) south of MD 175. A recent NPS planning study recommended no widening, carpool lanes or new transit service south of MD 175.

Typical roadway cross-sections of this alternative are illustrated in Figure 1-11.

**1.8.1 MD 3**

MD 3 is a four to six lane expressway that is projected to carry up to 109,000 vehicles per day by the year 2035, an increase of up to 38% over existing daily traffic volumes. The corridor serves a diverse traffic mix including local traffic in the Millersville and Crofton areas, regional traffic destined for Bowie and points south in southern Maryland, and long-distance traffic destined to other states.

The recommendations for MD 3 include roadway improvements, and new premium transit service. See Table 1-9.

Figure 1-11: BW Parkway/ MD 295 Proposed Roadway Cross Section

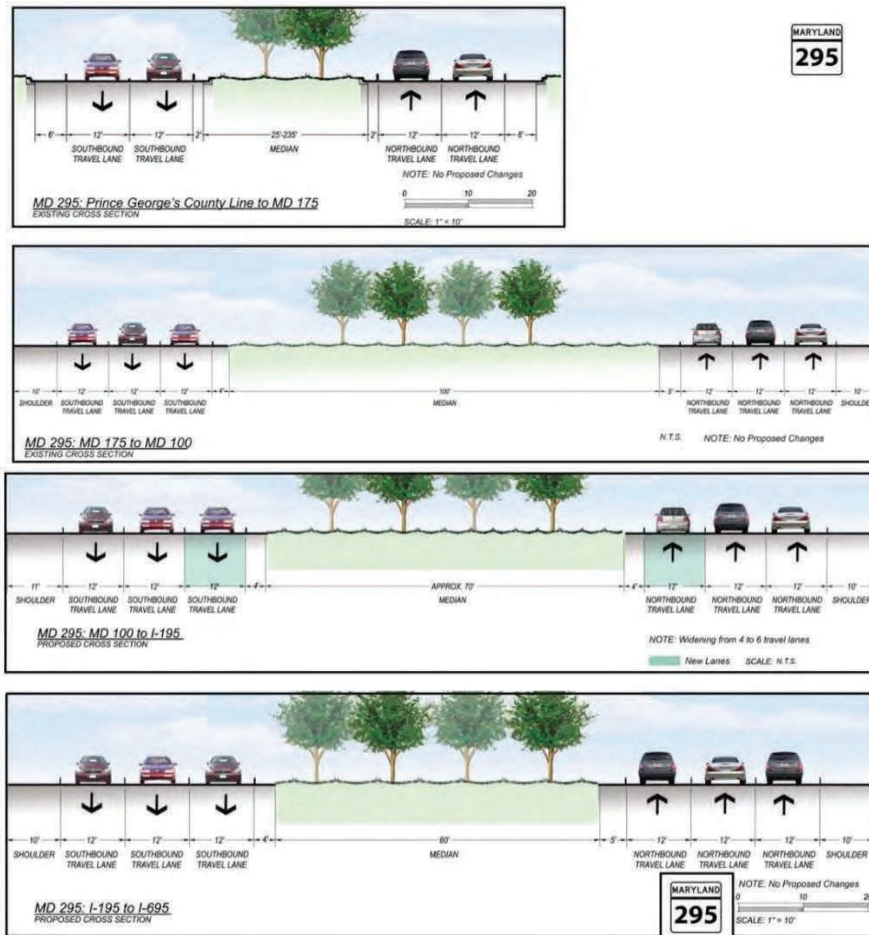


Table 1-9: Recommendations for MD 3

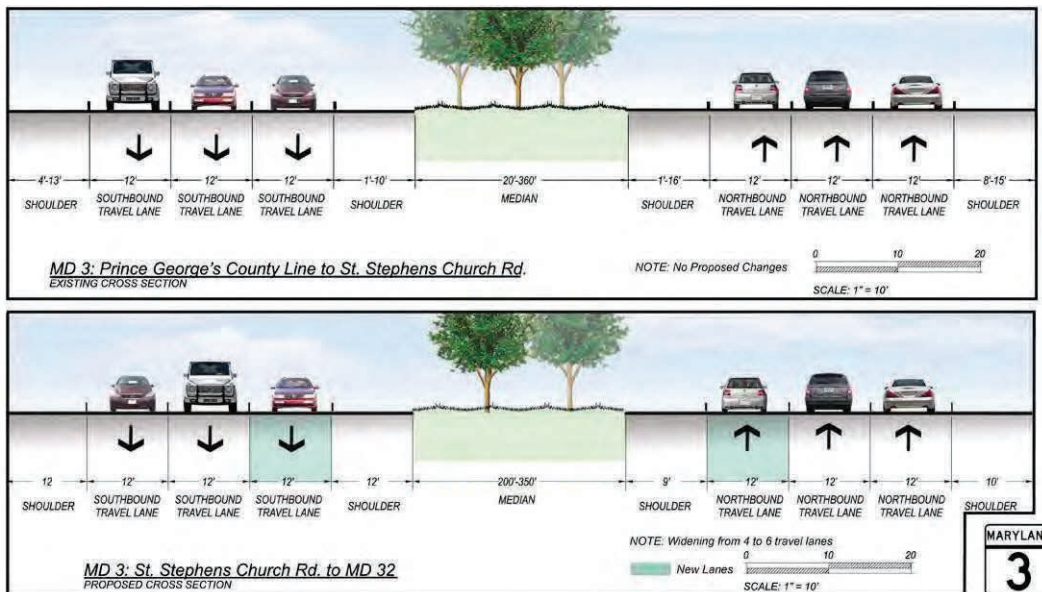
Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>Widen from 4 to 6 lanes between the Prince George's County line and MD 32</li> </ul>
Transit	<ul style="list-style-type: none"> <li>Operation of all-day weekday high quality transit service along this corridor with stops in Bowie MARC, Bowie Town Center, Crofton, Waugh Chapel, Odenton, Benfield Blvd, Glen Burnie Light Rail, BWI Airport and Arundel Mills</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>Construct a new sidewalk and trail between MD 450 and MD 32 (per NEPA documentation)</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>none</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>upgrade all signalized intersections to interchanges</li> <li>Priority bus treatments such as queue jumps, signal priority as enhanced/upgraded transit services are provided.</li> <li>Access management/ driveway consolidation and frontage road creation for bicycle and pedestrian access as redevelopment occurs</li> <li>Provide additional park and ride capacity</li> </ul>

Recommendations in bold are currently part of the Baltimore Metropolitan Council’s Constrained Long Range Plan

The roadway widening will still result in some rush hour congestion in the peak direction; however, the provision of premium bus service in this corridor reduces daily traffic volumes by 1%.

Typical roadway cross-sections of this alternative are illustrated in Figure 1-12 along with a schematic route map of proposed location of transit nodes and intermodal connections (Figure 1-13).

**Figure 1-12: MD 3 Proposed Roadway Cross Sections**



**1.9 MAGOTHY BRIDGE ROAD/ HOG NECK ROAD/ FORT SMALLWOOD ROAD**

Magothy Bridge Road/ Hog Neck Road (MD 607) and Fort Smallwood Road (MD 173) are two to four lane arterials that are projected to carry up to 27,000 vehicles per day by the year 2035, an increase of up to 14% over existing daily traffic volumes. The corridor serves local traffic in the Pasadena, Lake Shore and Riviera Beach areas.

The recommendations for MD 3 include extended local transit service and improved access for pedestrians, bicycles, and transit users. See Table 1-10.

The roadway cross-section remains unchanged from existing conditions.

**1.10 SECONDARY CORRIDORS**

Four secondary corridors were also studied to develop recommendations for toolbox strategies to provide enhanced management of day-to-day roadway/ traffic operations, as well as travel demand.

Figure 1-13: MD 3 Proposed Transit Route Map, Nodes and Intermodal Connections

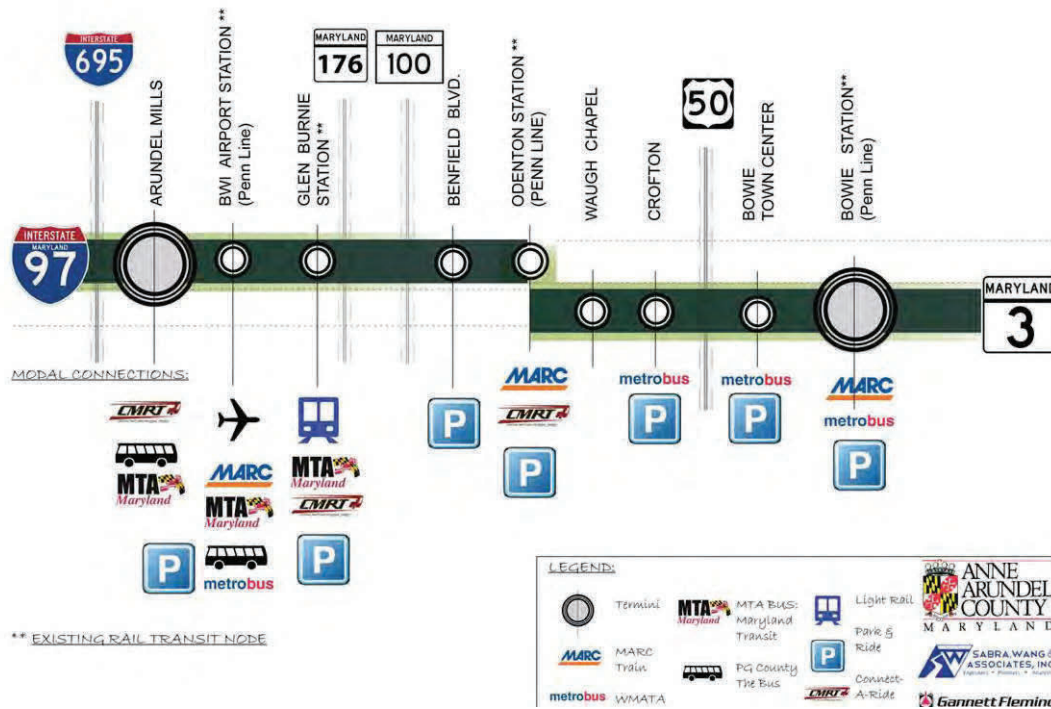


Table 1-10: Recommendations for Magothy Bridge, Hog Neck, & Ft Smallwood Roads

Mode/ Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• none</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Extend the existing MTA bus route #64 to Chesterfield Plaza and increase peak hour headways</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Construct new sidewalks and evaluate feasibility for bicycle lanes or signed routes along the corridor</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• None</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Improve amenities for transit users including shelters, benches, lighting and provision of real-time transit information</li> <li>• Evaluate developer-funded intersection improvements along Magothy Bridge Road</li> </ul>

1. Benfield Blvd: I-97 to MD 2
2. MD 176 (Dorsey Rd) from MD 170 to MD 2

3. MD 170 (Aviation Blvd/Telegraph Rd) from MD 2 to MD 175,
4. MD 713/ Ridge Rd from MD 176 (Dorsey Rd) to MD 175

No detailed technical analysis of traffic forecasts were performed for these corridors, but a summary of improvements is presented in Table 1-11.

**Table 1-11: Secondary Corridor improvements**

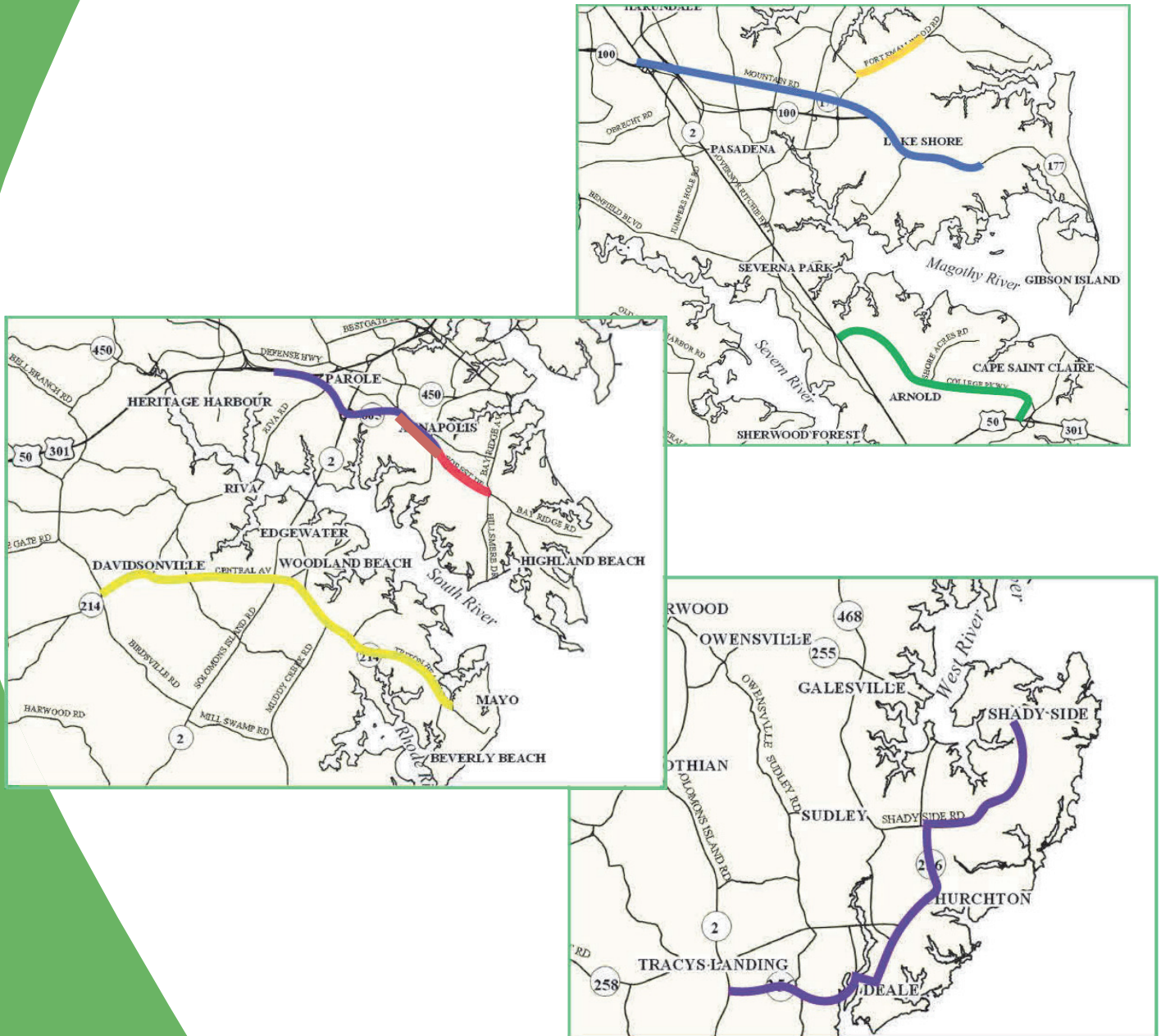
<b>Benfield Blvd</b>
<ul style="list-style-type: none"> <li>• Improve the cross-section to accommodate bicycles and pedestrians, including designated bike lanes/ route signing</li> <li>• Implement access management/ driveway consolidation in the more commercial area</li> <li>• Implement a demand-responsive shuttle service between the Benfield Park &amp; Ride and the Jones Station Park &amp; Ride to connect with proposed high quality transit along MD 2 and I-97</li> <li>• Implement bike shares and car shares at the Benfield Park &amp; Ride and the Jones Station Road Park &amp; Ride</li> </ul>
<b>MD 176</b>
<ul style="list-style-type: none"> <li>• Improve bicycle and pedestrian facilities such as sidewalks and bicycle lanes/ signed routes</li> <li>• Implement access management</li> <li>• Implement new site design guidelines/ overlay district to provide a more walkable streetscape/ building frontage</li> <li>• Implement shared parking requirements</li> </ul>
<b>MD 170</b>
<ul style="list-style-type: none"> <li>• <b>Widen from 2 lanes to 4 lanes from MD 175 to MD 100</b></li> <li>• Implement subscription bus service and install amenities for transit users such as shelters, benches, lighting and real-time transit information</li> </ul>
<b>MD 713/ Ridge Road</b>
<ul style="list-style-type: none"> <li>• <b>Widen from 2 lanes to 4 lanes from MD 175 to Arundel Mills Blvd to relieve MD 295 traffic</b></li> <li>• <b>Widen from 4 lanes to 6 lanes from Arundel Mills Blvd to MD 176 to relieve MD 295 traffic</b></li> <li>• Provide more frequent local transit service and install transit amenities for transit users such as shelters, benches, lighting and real-time transit information,</li> <li>• Improve bicycle and pedestrian facilities such as bicycle lanes/ signed routes</li> <li>• Implement new site design guidelines/ overlay district to provide a more walkable streetscape/ building frontage</li> </ul>

**Recommendations in bold are currently part of the Baltimore Metropolitan Council's Constrained Long Range Plan**



# MIIF Study Report

FINAL - June 2016



Major Intersections/Important Facilities (MIIF) Study Final Report

## CHAPTER 1: EXECUTIVE SUMMARY

### 1.1 OVERVIEW

The Major Intersection/Important Facilities Study is the final component of the response to the 2009 General Development Plan which observed that growth in employment and households is projected to continue over the next 20 years in Anne Arundel County, which will create additional travel demand while the ability to add roadway capacity is limited. As the County continues to experience



Designing within existing constraints is a key aspect of context sensitive design

growth in population and employment, it faces both challenges to mobility and quality of life that are associated with that growth. Some of the study corridors are located in lower density and/or rural locations of the county where preserving the rural character is a primary motivation for many of its residents. This reinforces the need for context-sensitive transportation solutions that minimize the impacts to the natural environment while maintaining the same traffic level of service.

The objective of this report is to develop transportation solutions for viable alternative modes of travel, with concept-level impacts

and costs. The goal of these recommendations is to enhance mobility, safety, and accessibility for all travel modes in order to preserve the economic vitality and quality of life within the peninsula areas of the County. A map of these corridors is shown on the next page. A glossary of terms and listing of acronyms is provided in **Appendix T**.

This report presents specific recommendations for mobility improvements based on increases in travel demand by the year 2035 in seven key corridors throughout the County:

1. College Parkway: MD 2 to MD 179 – 4.8 miles
2. Forest Drive: Chinquapin Round Road to Bay Ridge Avenue – 2.3 miles
3. MD 173 (Fort Smallwood Road): MD 607 to Bayside Beach Road – 1.7 miles
4. MD 177 (Mountain Road): MD 2 to Lake Shore Drive – 7.8 miles
5. MD 214 (Central Avenue): MD 424 to Shoreham Beach Road – 7.5 miles
6. MD 256 (Deale Road) & MD 468 (Shady Side Road): MD 2 to Snug Harbor Road – 8.1 miles
7. MD 665 (Aris T. Allen Boulevard): US 50 to Chinquapin Round Road – 2.7 miles

These seven corridors represent the busiest roadways in the peninsula areas of the County, and serve as either the primary route or only route into these areas. Several of the study corridors have traffic volumes that lead to recurring rush hour congestion. Improving access is critical to these communities, particularly for emergency response units and during evacuation events.

### 1.1.1 Purpose and Scope

This document and the proposed recommendations will assist County and State planners, land developers, and decision-makers regarding future investments and priorities for improvements in highway, intersection, transit and non-motorized facilities. The recommendations have been carefully analyzed and vetted through the use of advanced travel forecasting and traffic analysis software models and extensive coordination with local, state, and regional transportation planners. The recommendations focus on intersection improvements which reduce corridor delays while minimizing the right-of-way and environmental impacts, and the need to provide for additional choices within each corridor other than travel by private automobile on the primary routes. These choices also include implementing the County's Complete Streets policy to improve the parallel connections in these study corridors and add redundancy to the transportation system. As appropriate alternative modes of travel such as carpool, rail, bus, cycling, and walking were identified in each corridor, the feasibility of each mode was evaluated. The selected recommendations represent "smart" transportation improvements that aim to:

- provide parallel connections in peninsula areas of county,
- reduce vehicle delays along each corridor,
- enhance travel choices,
- improve regional mobility,
- improve access to peninsula areas of counties,
- improve emergency vehicle access,
- improve safety for vehicles, bicyclists, and pedestrians, and
- support County land use plans while maintaining the character of the corridor.

For each corridor, the recommendations for roadway, transit, bicycle/pedestrian facilities, and land use, along with toolbox strategies to provide enhanced management of day-to-day roadway/traffic operations, as well as travel demand are presented in **Figure 2**. Capital costs for all improvements are also presented.

### 1.1.2 Project Costs

Planning level construction cost estimates were developed for all roadway, bicycle, and pedestrian improvements, based on costing guidance provided by the Maryland State Highway Administration (MSHA). The raw roadway costs include construction costs such as pavement widening, intersection upgrades, structure upgrades, environmental mitigation, traffic control, and design fees, but do not include the costs of purchases of land for additional rights-of-way. The total estimated construction cost to implement this plan on the seven corridors is **\$130.5 million**. These costs exclude the costs for constructing the Mountain Road Corridor Study improvements from MD 648 (Waterford Rd) to Edwin Raynor Road (estimated at over \$34 million), as these improvements are currently funded in the FY 17-22 County CIP. See **Table 1**.



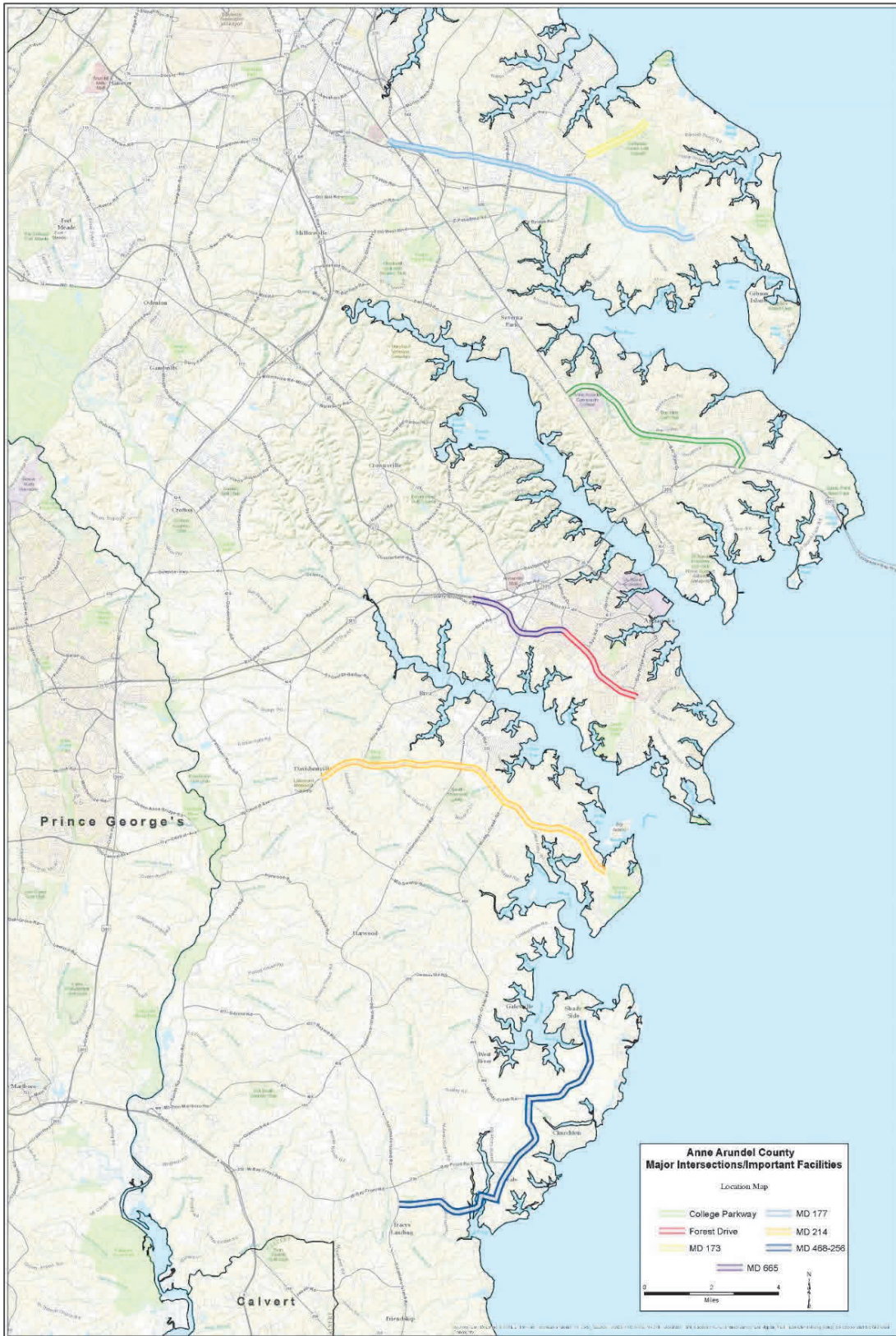
### 1.1.3 Alternatives Tested

Throughout the study, two alternatives were developed and tested for all corridors, including:

1. A No Build Alternative- Only constructing roadways that are currently funded for construction, with no transit or bike/pedestrian improvements.
2. A Build Alternative- Constructing roadway and intersection improvements along each of the study corridors along with transit improvements and bike/pedestrian improvements.

Based on the results of the future conditions analysis, the final and preferred alternative developed, tested, and recommended for each study corridor focused on bicycle, pedestrian, and intersection improvements with an emphasis on Transportation System Management (TSM) strategies which can be implemented with minimal cost and right-of-way impacts.

Figure 2: Corridor Key Map



**Table 1: Project Costs**

Corridor	Roadway Cost
College Parkway	\$38,200,000
Forest Drive	\$36,700,000
MD 173	\$300,000
MD 177	\$21,700,000*
MD 214	\$26,700,000
MD 256/468	\$6,900,000
MD 665	\$0
<b>GRAND TOTAL</b>	<b>\$130,500,000</b>

\*Excludes the costs from Mountain Road Corridor Study

**1.1.4 Priorities**

Based on a combination of projected benefits in travel time reliability, level of service improvement, introduction of travel choices, and construction impacts and feasibility, the projects were prioritized as near-term (projects that can be implemented with minimal design and construction), mid-term (projects that can be feasibly constructed within a 5-10 year timeframe), and long-term (corresponds with projects that need substantial construction funding and coordination with MSHA and/or BMC and would likely be implemented as a part of the long range planning process). The study recommendations are prioritized below.

**Near-Term**

- MD 173 bike lanes
- MD 256 & MD 468 bike lanes
- MD 256 sidewalks

**Mid-Term**

- MD 177 widening including bike lanes and sidewalks
- MD 214 bike lanes
- MD 214 sidewalks
- College Parkway at MD 2 intersection improvement
- College Parkway at MD 179 intersection improvement

**Long-Term**

- College Parkway widening
- College Parkway bike lane/sidewalks (incorporate in widening project)
- Forest Drive bike lanes/sidewalks (incorporate in future reconstruction)

### 1.1.5 Next Steps

This document is a stand-alone report that is intended to justify advancing each of these corridors into either final design/construction of Near-Term improvements or into a detailed project planning and preliminary engineering process, including identifying and securing funding commitments in partnership with appropriate State, Federal and private partners. This document builds on elements of the *General Development Plan (2009)*; *GDP Background Report on Transportation (2008)*, *The Corridor Growth Management Plan (2012)*, the *Anne Arundel County Pedestrian and Bicycle Master Plan (2012)*, and *Complete Streets Guidelines (2014)*. This report will serve as the final component of the Countywide Transportation Master Plan Document and will be used to develop priorities for that document.

## 1.2 Corridor Analysis

A corridor Level of Service (LOS) analysis was conducted using the AATrVM travel demand model. The AATrVM travel demand model results were compared to existing and forecast roadway capacity which was used to determine the LOS at the highway link level.

### 1.2.1 College Parkway

College Parkway is projected to carry up to 36,000 vehicles per day in the year 2035 west of Jones Station Road and almost 22,000 vehicles per day east of Jones Station Road, which is over the daily capacity of 20,000 for a two lane arterial. College Parkway provides service to Anne Arundel Community College and is often used as a bypass route for traffic destined to the Chesapeake Bay Bridge. The roadway currently experiences some congestion at the intersections of MD 2 and MD 179, and the segment from west of Jones Station Road (where existing four lane highway tapers to two lanes) to MD 179 is projected to deteriorate to a Level of Service (LOS) F in the year 2035.

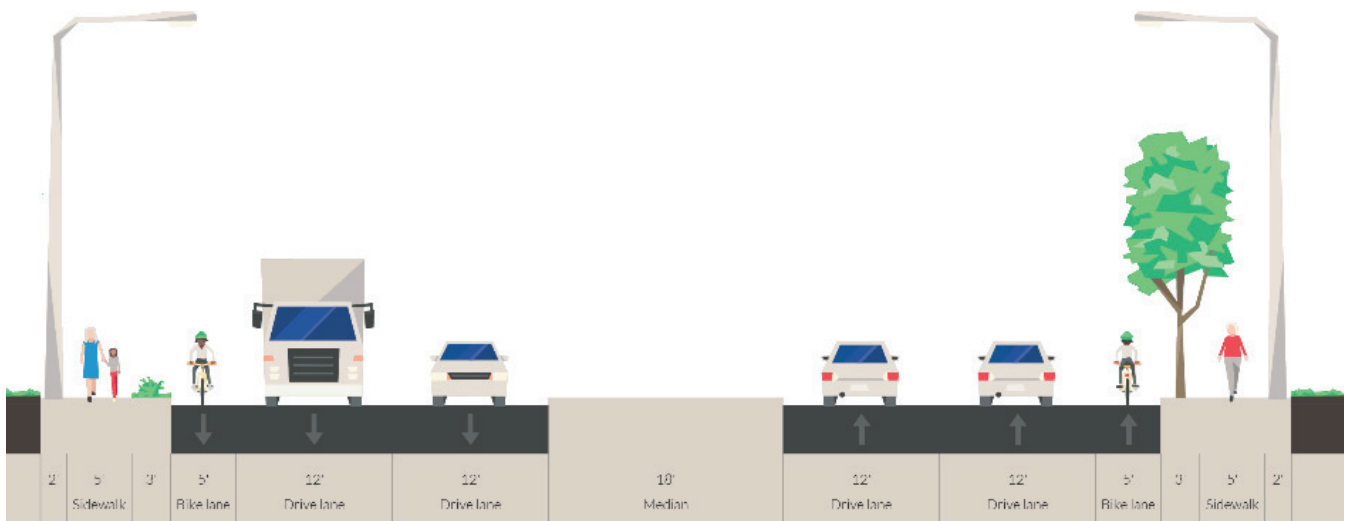
The recommendations for College Parkway include roadway widening improvements, intersection improvements, and bicycle and pedestrian improvements. See **Table 2**.

**Table 2: Recommendations for College Parkway**

Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• Widen from 2 to 4 lanes from west of Jones Station Road to MD 179</li> <li>• Add additional southbound left turn lane on MD 2 at College Parkway intersection</li> <li>• Add additional eastbound left turn lane on College Parkway at MD 179 intersection</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Evaluate the extension of Annapolis Transit Gold Line service in future</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Extend Broadneck Trail to Baltimore/Annapolis Trail</li> <li>• Add Bicycle Lanes on College Parkway</li> <li>• Connect missing sidewalk gaps on College Parkway</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Future development should occur in New Urbanism fashion with complete streets network, no cul-de sacs</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Signal System coordination and optimization</li> <li>• Special Event/evacuation signal timing plan</li> <li>• Anne Arundel Community College sponsored vanpool</li> <li>• Pedestrian and Bicycle connections</li> <li>• Complete Streets/development of parallel connections</li> </ul>

The provision of an additional lane in each direction on College Parkway reduces the forecast volume to capacity ratio from 1.10 to 0.57. Typical roadway cross-sections of this alternative are illustrated in **Figure 3**.

**Figure 3: College Parkway Proposed Roadway Cross Section**



**1.2.2 Forest Drive**

Forest Drive is projected to carry up to 40,000 vehicles per day east of Spa Road and over 60,000 vehicles per day between Hilltop Lane and Chinguapin Round Road in 2035. It provides an important connection from a number of peninsula areas of the County to MD 665, US 50, and the rest of the Baltimore/Washington region. This roadway experiences congestion between Chinguapin Round Road and Hilltop Lane, as a number of shopping centers are located on the south side of Forest Drive east of Chinguapin Round Road. This leads to large numbers of turning vehicles, effectively reducing the capacity of this roadway segment, which lead to significant delays in the corridor. A previous study conducted by the City of Annapolis using traffic micro-simulation indicated that the intersection of Forest Drive and Chinguapin Round Road would experience congested conditions in the future based on queuing captured in the simulations. The recommendations from the City of Annapolis study included an additional left turn lane on the southbound approach of Chinguapin Round Road at Forest Drive which would alleviate the future congestion at this intersection.

Additional recommendations for Forest Drive include improved transit service and amenities, bicycle lanes on Forest Drive, Access Management on Forest Drive, and connecting sidewalk gaps. See **Table 3**.

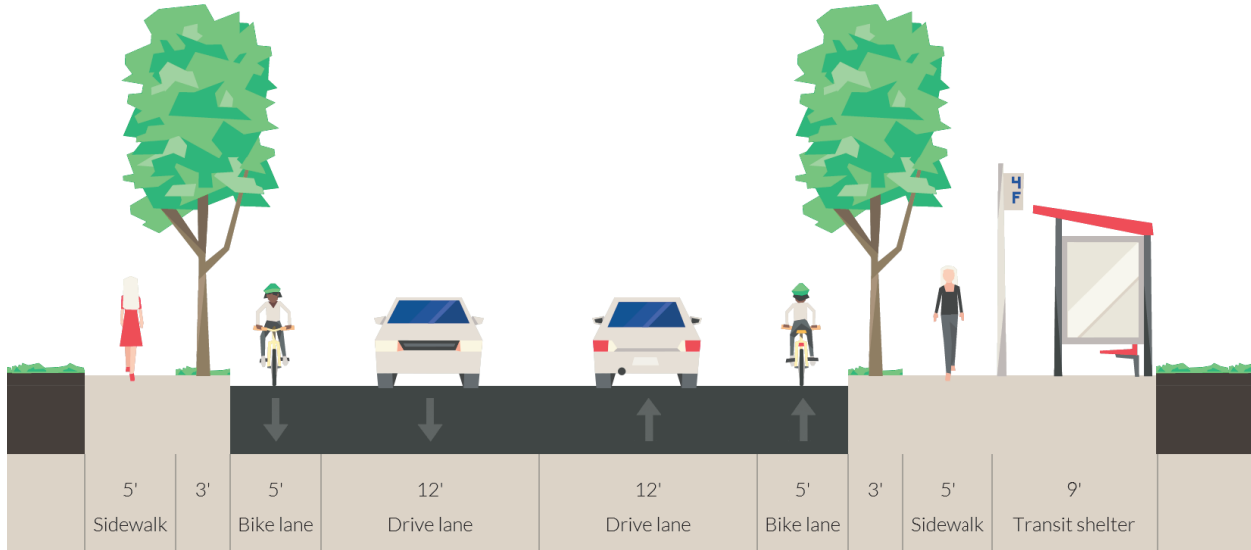
**Table 3: Recommendations for Forest Drive**

Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>No new travel lanes</li> </ul>
Transit	<ul style="list-style-type: none"> <li>Extension of existing MTA commuter bus service from Riva Road Park &amp; Ride lot to Bay Ridge Avenue</li> <li>Improve transit amenities including bus shelters, real time bus information, and improved sidewalk connections</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>Add bicycle lanes on Forest Drive including segment from MD 2 to Chinguapin Round Road</li> <li>Construct missing sidewalk connections</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>Allow for increased density and transit-oriented development in Annapolis Towne Center area</li> <li>Future development should occur in New Urbanism fashion with complete streets network</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>Signal System coordination and optimization</li> <li>Real Time Travel Time Information on Changeable Message Signs</li> <li>Special Event/evacuation signal timing plan</li> <li>Annapolis Towne Center shuttle service</li> <li>Improved Transit service and amenities</li> <li>Conduct Future Origin-Destination study in study area to determine framework for carpool/vanpool service</li> <li>Pedestrian and Bicycle connections</li> <li>Complete Streets/development of parallel connections</li> <li>Access Management Plan</li> <li>Reversible Lanes</li> </ul>

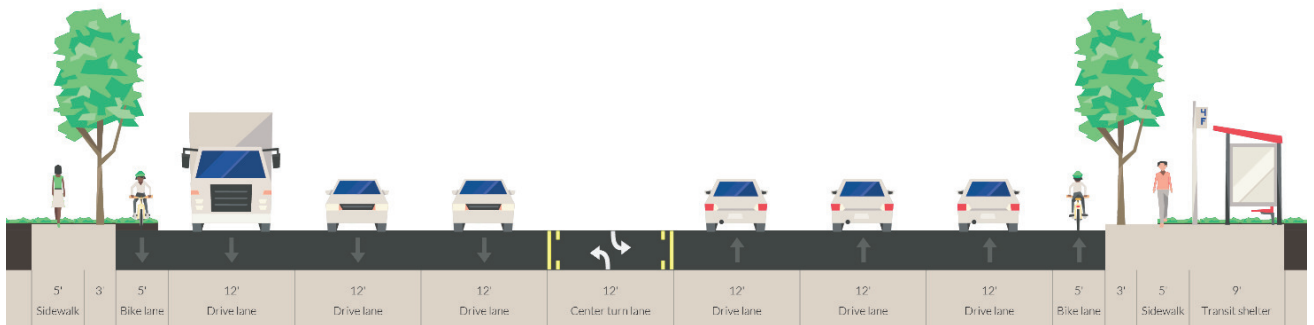
Typical roadway cross-sections of this alternative are illustrated in **Figure 4**.

**Figure 4: Forest Drive Proposed Roadway Cross Sections**

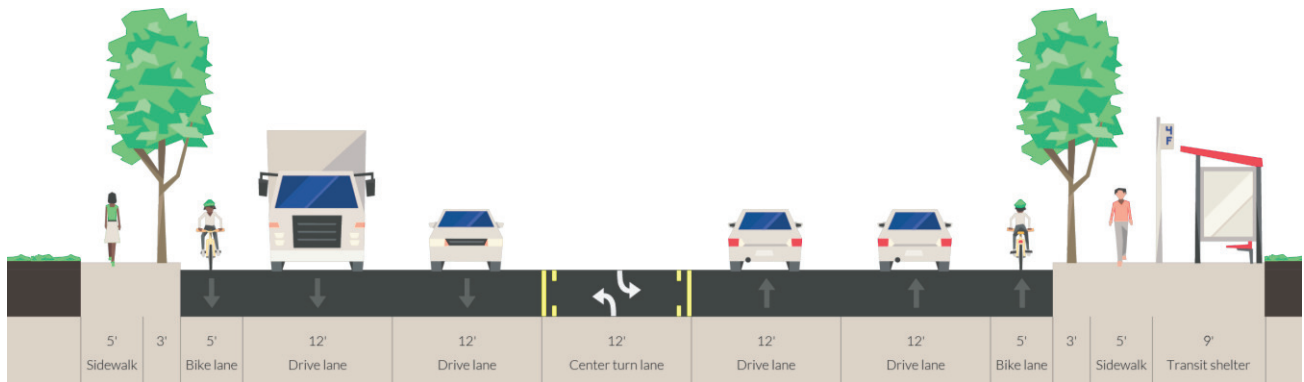
Two Lane- From Old Solomons Road to Chinquapin Round Road



Six Lane- From Chinquapin Round Road to East of Hilltop Lane



Four Lane- From East of Hilltop Lane to East of Hillsmere Drive



**1.2.3 MD 173 (Fort Smallwood Road)**

MD 173 (Fort Smallwood Road) is projected to carry over 17,000 vehicles per day by 2035. It serves local peninsula area traffic primarily. The corridor is currently not experiencing congestion throughout its entire length during both the morning and afternoon peak periods. Congestion during special events at the pier located at the end of the corridor was cited as a concern during the public meeting.

The recommendations for MD 173 include primarily pedestrian and bicycle improvements and toolbox strategies to better manage congestion during special events at the County pier on weekends. See **Table 4**.

**Table 4: Recommendations for MD 173 (Fort Smallwood Road)**

Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>Shoulder resurfacing and striping</li> </ul>
Transit	<ul style="list-style-type: none"> <li>Study feasibility of future bus service if density increases in corridor</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>Construct missing sidewalks between Hog Neck Road and Edwin Raynor Boulevard</li> <li>Stripe bicycle lanes on existing shoulders of MD 173 between Hog Neck Road and Bayside Beach Road</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>No land use changes are proposed</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>Signal Timing optimization at MD 173 and Hog Neck Road</li> <li>Special Event/evacuation plan</li> <li>Improved bicycle connectivity</li> </ul>

The proposed roadway cross-sections remain unchanged from existing conditions.



**1.2.4 MD 177 (Mountain Road)**

MD 177 is projected to carry up to 33,000 vehicles per day by 2035. It connects MD 2 near Marley Station Mall to the peninsula areas of Pasadena. The corridor serves local traffic in Pasadena and Glen Burnie as well as long distance commuters traveling to Baltimore and Annapolis. The roadway has numerous access points and is near capacity between Jumpers Hole Road and MD 648 which leads to congestion in this segment.

The recommendations for MD 177 include roadway improvements, new local bus transit service, bicycle and pedestrian improvements. See **Table 5**.

**Table 5: Recommendations for MD 177**

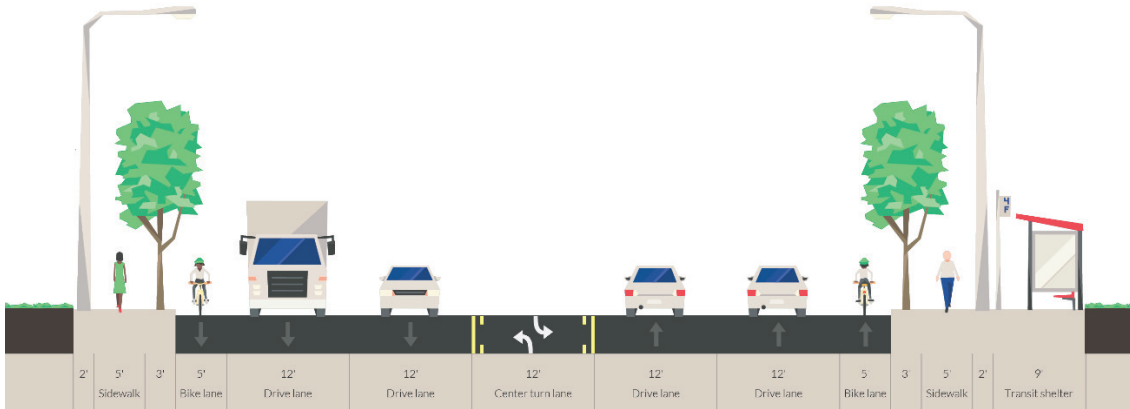
Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• Widen from 2 to 4 lanes between MD 648 (Baltimore-Annapolis Boulevard/Jumpers Hole Road) and MD 648 (Waterford Road)</li> <li>• County’s Mountain Road Study Improvements from MD 648 (Waterford Road) to Edwin Raynor Boulevard</li> <li>• Existing County Capital Improvement Projects</li> <li>• Widen from 2 to 3 lanes between Edwin Raynor Road and MD 100</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Operation of local bus transit service along this corridor</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Bicycle lanes on MD 177 and connect missing sidewalk connections</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• No land use changes are proposed</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Signal System Coordination and Optimization</li> <li>• Special Event/evacuation signal timing plan</li> <li>• Improved Transit service and amenities</li> <li>• Pedestrian and Bicycle connections</li> <li>• Complete Streets/development of parallel connections</li> <li>• Access Management Plan</li> </ul>

The roadway widening proved to provide adequate levels of service in the future year 2035. The volume to capacity ratio is forecast to be 0.72 in the build condition compared to 1.31 in the no build conditions.

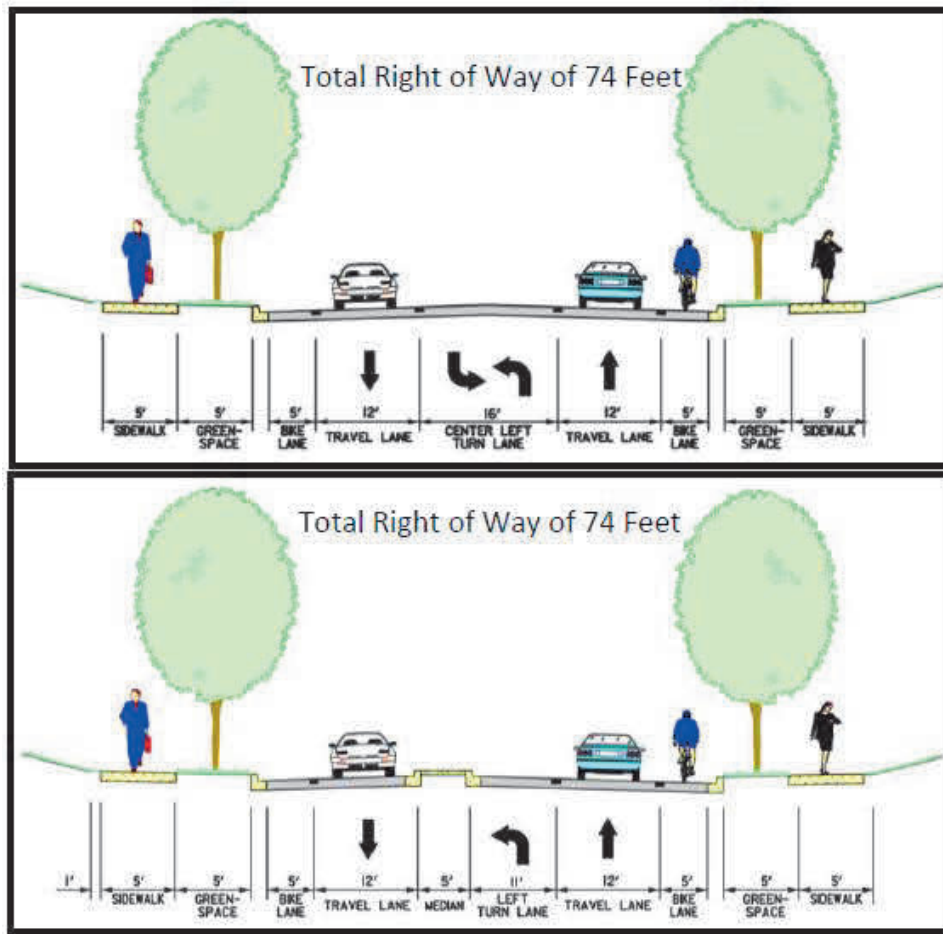
Typical roadway cross-sections of this alternative are illustrated in **Figure 5**.

**Figure 5: MD 177 Proposed Roadway Cross Sections**

Four Lane Section; Jumpers Hole Road to MD 648/Waterford Road

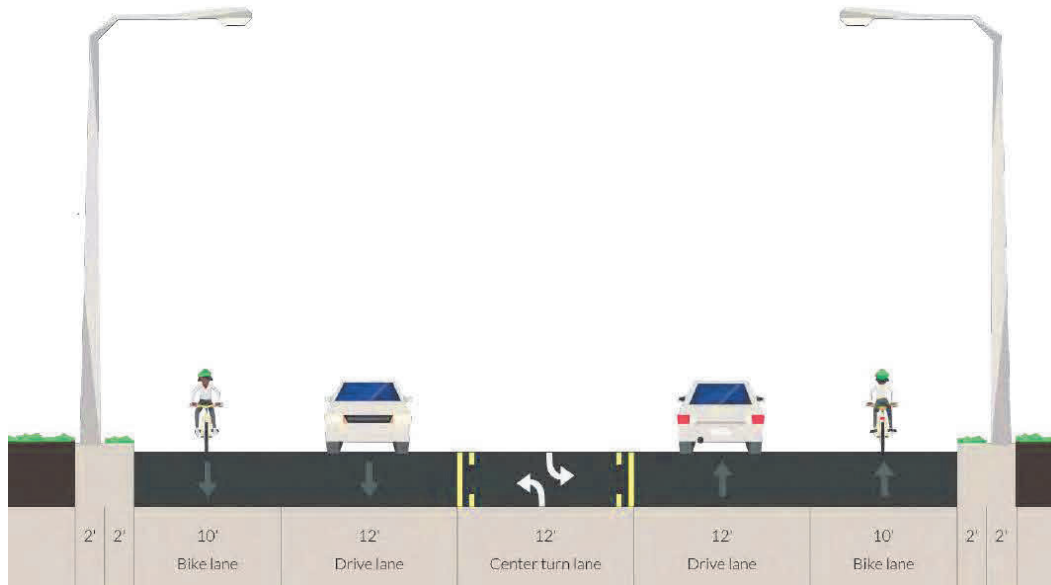


Three Lane Section; MD 648/Waterford Road to MD 100

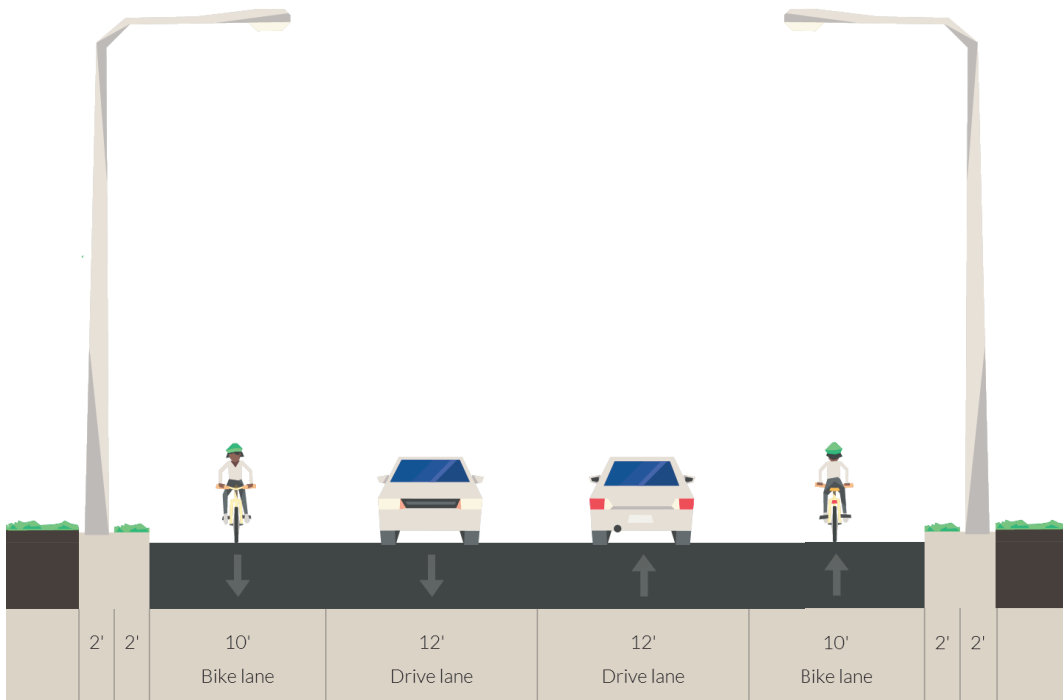


Source: Mountain Road Corridor Study

Three Lane- From MD 100 to South Carolina Ave



Two Lane- East of South Carolina Ave



**1.2.5 MD 214 (Central Avenue)**

MD 214 is projected to carry up to 27,000 vehicles per day by 2035. MD 214 provides an essential link between the Edgewater area to the rest of the County and Washington D.C. It serves local traffic in Edgewater as well as commuters traveling to job centers in Washington D.C., Fort Meade, the NSA, and Annapolis. The corridor currently experiences congestion at the intersection of MD 468; however, this section is programmed for a capacity improvement which will mitigate this congestion in the future.

The recommendations for MD 214 include travel lane extensions east of MD 2, bicycle improvements throughout most of the corridor and pedestrian improvements in segments. The intersections of MD 214 at Riva Road and MD 214 at Stepneys Lane are recommended to have a traffic signal warrant assessment conducted.

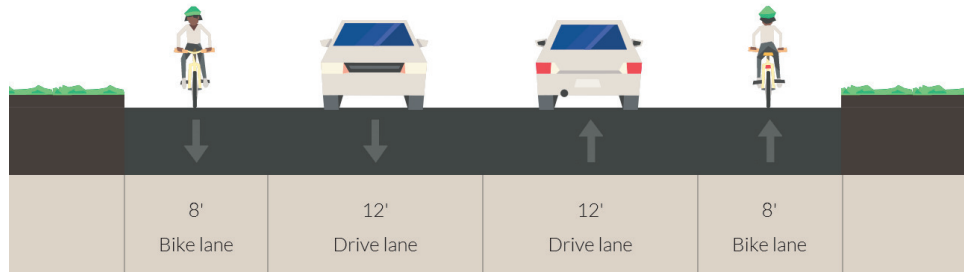
Typical roadway cross-sections of this alternative are illustrated in **Figure 6**.

**Table 6: Recommendations for MD 214**

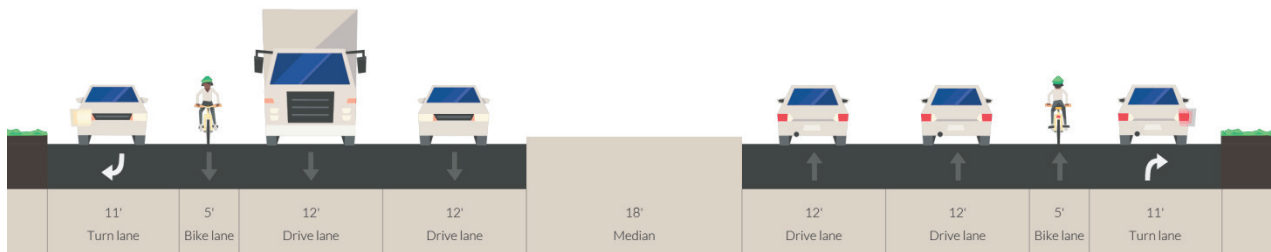
Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• Eastbound travel lane extension to MD 468</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• None</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Bicycle lanes on shoulders from MD 424 to west of Pike Ridge Road and MD 468 to Shoreham Beach Road; bicycle lanes on proposed curb and gutter cross section from west of Pike Ridge Road to MD 468</li> <li>• Sidewalks on proposed cross section from west of Pike Ridge Road to MD 468</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• No land use changes are proposed</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Signal System coordination and optimization</li> <li>• Special Event/evacuation signal timing plan</li> <li>• Improve Pedestrian and Bicycle compatibility</li> </ul>

**Figure 6: MD 214 Proposed Roadway Cross Sections**

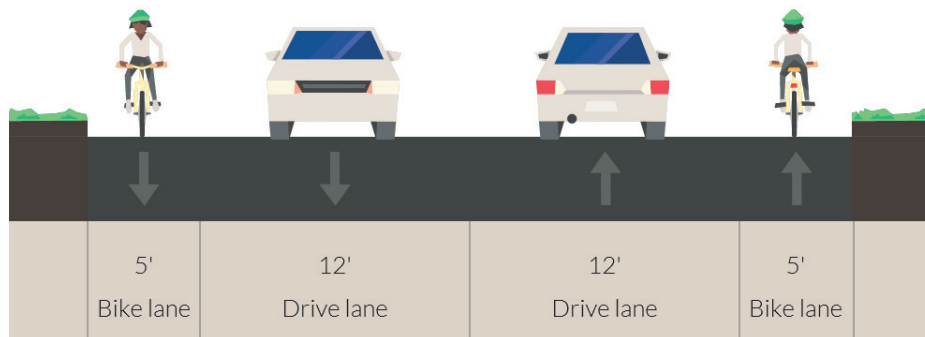
Two Lane from MD 424 to Pike Ridge Road



Four Lane from West of MD 2 to MD 468



Two Lane from MD 468 to Shoreham Beach Road



**1.2.6 MD 256 (Deale Road) & MD 468 (Shady Side Road)**

MD 256 & MD 468 are projected to carry up to 13,000 vehicles per day by 2035. This corridor provides an essential link between the Shady Side and Deale peninsula areas to MD 2. It serves local traffic in these areas primarily. The corridor currently does not experience peak hour congestion.

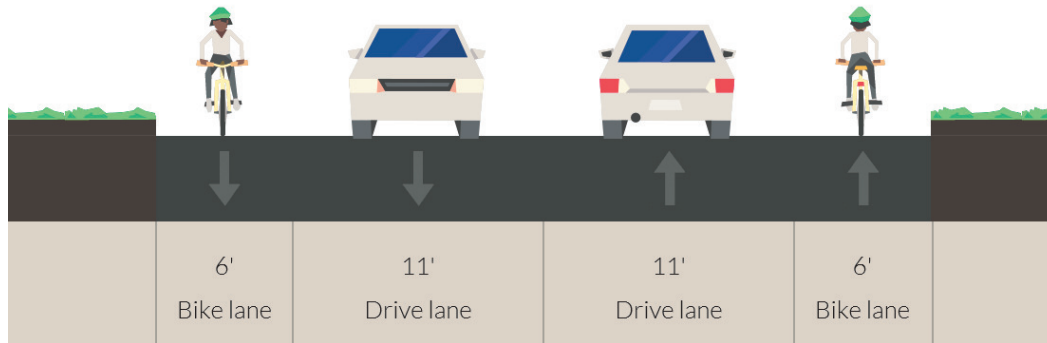
The recommendations for MD 256 & MD 468 include a potential roundabout at MD 2 and MD 256, sidewalks in the central Deale area, and bicycle lanes on the shoulders of MD 256 & MD 468. See **Table 7**.

**Table 7: Recommendations for MD 256 & MD 468**

Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• Potential roundabout at MD 2 and MD 256</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• None</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Bicycles lanes on shoulders and sidewalks in central Deale</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• No land use changes are proposed</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Signal optimization at the intersection of MD 256 and MD 468</li> <li>• Improve bicycle and pedestrian connectivity</li> </ul>

Typical roadway cross-sections of this alternative are illustrated in **Figure 7**.

**Figure 7: MD 256 & MD 468 Proposed Typical Cross Section**



**1.2.7 MD 665 (Aris T. Allen Boulevard)**

MD 665 is projected to carry over 65,000 vehicles per day by 2035. This corridor provides an essential link between Forest Drive and US 50/I-97. It serves a combination of local and regional traffic in these areas including commuters to and from Annapolis, Baltimore, Fort Meade/NSA, and Washington, DC. The corridor experiences peak hour congestion associated with queuing and weaving conditions on US 50.

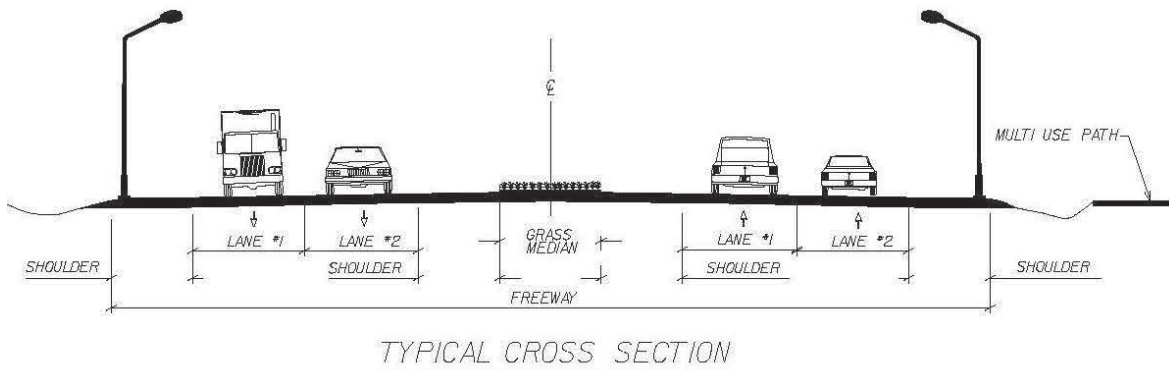
While there were no recommendations developed for MD 665, this corridor is recommended for detailed study as a part of a larger US 50 corridor study which should be conducted in the future based on the recommendations from the Corridor Growth Management Plan. See **Table 8**.

**Table 8: Recommendations for MD 665**

Mode/Strategy	Description
Roadway	<ul style="list-style-type: none"> <li>• Future Study Recommended</li> </ul>
Transit	<ul style="list-style-type: none"> <li>• Potential commuter rail to Washington DC with terminus at Annapolis Towne Center</li> <li>• Potential bus rapid transit or light rail with Annapolis Towne Center as the focal point</li> </ul>
Bicycle and Pedestrian	<ul style="list-style-type: none"> <li>• Potential multi-use path parallel to MD 665</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Increase density in Annapolis Towne Center and adjacent areas to support high-quality transit service</li> </ul>
Toolbox Elements	<ul style="list-style-type: none"> <li>• Real Time Travel Time information</li> <li>• Carpools and vanpools sponsored by Annapolis Towne Center employers</li> <li>• Improve pedestrian and bicycle network on parallel routes such as Forest Drive</li> </ul>

Typical roadway cross-sections of this alternative are illustrated in **Figure 8**.

**Figure 8: MD 665 Proposed Typical Cross Section with Multi-Use Path**



# Chapter 1

## Introduction

### INTRODUCTION

This report documents the results and recommendations of the short-range (five-year) Transit Development Plan (TDP) for the Central Maryland area including Anne Arundel County (except the City of Annapolis<sup>1</sup>), Howard County, and Northern Prince George's County including the City of Laurel. The Maryland Transit Administration (MTA) requires the Locally Operated Transit Systems (LOTS) in Maryland to conduct a TDP update every five years. The LOTS use their TDPs as a basis for preparing their Annual Transportation Plans (ATPs) that serve as their Annual Grant Application (AGP) for transit funding. The TDP planning process builds on or formulates the county's or region's goals and objectives for transit, reviews and assesses current transit services, identifies unmet transit needs, and develops an appropriate course of action to address the objectives in the short-range future, typically a five-year horizon. A completed TDP serves as a guide for the local transit system, providing a roadmap for implementing service and/or organizational changes, improvements, and/or potential expansion during the five-year period.

This particular TDP is a significant development in the planning process for transit in this region. Previously TDPs were developed separately for Howard County, Anne Arundel County, and for Connect-a-Ride (now RTA) services in Prince George's County. In addition, the staff of the RTA (and predecessor organizations) and the counties performed a great deal of short-range operational planning as the organizational changes in the region progressed. The previous TDPs for Howard and Anne Arundel Counties were separate plans, but they were done at the same time with the thought that they could be joined at the match lines to result in a regional plan. To an extent, the *Fort Meade BRAC Transit and Ridesharing Planning Study* of 2010 was the first regional transit plan to combine the local service plans. However this current *Central Maryland Transit Development Plan* will be the first fully regional transit plan to encompass this unique multi-jurisdictional region.

The fully regional nature of this TDP is reflected in the scoping process that led to the final Scope of Work. A scoping committee including representatives of the MTA, Howard County, Anne Arundel County Planning and Zoning, the Baltimore Metropolitan Planning Organization, the RTA, and the consultant met three times and provided comments on draft scope and budget documents. While there is a standard set of tasks included in a TDP and the MTA has a framework that must be followed, there is significant latitude within these guidelines. This scoping committee provided direction that was reflected in the final scope of services and eventually in this Central Maryland Transit Development Plan document.

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<sup>1</sup> A separate TDP is being conducted for the transit services operated by the City of Annapolis, but this study does include recommendations for the routes operated by Annapolis Transit with support from Anne Arundel County.



## Project Process

This study was guided through the participation of the public and agencies affected by public transit services primarily by a Technical Advisory Committee (TAC), which included representatives from the RTA, Anne Arundel County, Howard County, Prince George’s County, the City of Laurel, and the MTA. The role of TAC members included provision and validation of data, input on process, assistance in public outreach, review and comment on draft products and recommendations, and assistance in the final presentation and review process with key decision-makers. A broader Study Advisory Committee (SAC) was initially involved in the transition from the scoping process to the study and members of this group were informed during the study tasks. The TAC was a substantial subset of the SAC, which also included representatives of the Baltimore Metropolitan Commission (BMC) and the MTA. It should be noted that MTA staff provided data and contributed significantly to the development of service alternatives and recommendations, particularly for the Howard County routes.

## Review of Previous Studies and Data

An initial task involved review of recent studies and plans in the region to gain a better understanding of previous planning efforts, local trends, and directions that key participants will be taking. This review included:

- Recent and historic transportation studies for Anne Arundel, Howard and Prince George’s Counties and the City of Laurel, including the current regional Baltimore Region Coordinated Public Transit – Human Services Transportation Plan, Bus Rapid Transit (BRT) studies for Route 29 and Route 1, plans for the Downtown Columbia Transit Center, and the recent analysis of Anne Arundel County Department of Aging and Disabilities paratransit services.
- RTA passenger count data.
- Operating reports and performance data for systems under study, including MTA Form 2A reports.
- Land use or development plans for the area under study, including plans for downtown Columbia; the recently adopted Odenton Town Center Master Plan; and any other plans that have been adopted or are in force.
- Other regional plans or studies such as the Baltimore Regional Transit Needs Assessment, Baltimore Metropolitan Council (BMC) BWI Workforce Development Study, MTA Baltimore Link plan, and the Fort Meade Regional Growth Management Committee Comprehensive Regional Plan Addressing Growth Impacts.

- Previous and current funding for local transit systems.
- Progress on implementation of previous TDPs.

## Demographic Analysis and Land Use

In order to determine locations of major origins for transit ridership, a population profile was developed to identify areas of the region that are likely to have higher transit needs and the density that is required to support different types of transit services. The analysis used 2010 Census and American Community Survey updates. The analysis focused on the density of potentially transit dependent populations by Census block group. The transit dependent population included:

- Persons age 60 and older
- Persons with disabilities
- Zero car households
- Youth population
- Persons living below poverty level

In addition, overall population densities at the block group level were mapped to indicate whether or not the existing transit network was serving locations of sufficient density to support fixed-route service, or to identify areas of density lacking transit service.

In order to identify regional travel patterns, data was obtained from the BMC regional travel demand model. An analysis focusing on significant levels of home-based work trip productions/attractions resulted in tables and maps showing the key regional flows—for all modes. In addition, the study team collaborated with Sidewalk Labs (a subsidiary of Google) to attempt to use cell phone location data to identify regional travel patterns, which did not yield data usable for transit travel pattern analysis.

As transit can have a major role in providing access to jobs for those who are unemployed or underemployed, the density and location of employment was mapped, and combined with information on the percentage of households in poverty. This information was mapped to help identify the adequacy of current transit coverage and the need for new transit links.

Finally, land use information was obtained from the counties to identify new or recent major developments to confirm that existing or planned transit services provide adequate access.

The results of these analyses are presented in Chapter 2.

## Public and Stakeholder Outreach

A substantial effort was made to collect public and stakeholder input as part of the process of developing this plan. In the public and stakeholder input subtask, the consultants worked with the counties, the city and RTA to obtain public input regarding the issues and concerns to be addressed in the study by identifying and interviewing stakeholders. The stakeholders, typically public agency representatives, were identified jointly with county staff, and were interviewed by telephone, email, and in meetings.

A single project website was developed and linked to the RTA website and to each jurisdiction's website, providing an overview of the study process. It included a link to an open-ended community survey that could be completed online. The RTA and the counties publicized the project and survey. The project website included high-level summaries of draft products and links to technical memoranda, and also included contacts available for any public input or questions. Presentations and other materials from the public meetings were also made available on the website.

The consulting team worked with the RTA and the jurisdictions to conduct public meetings. An initial round of public meetings presented the purpose of the study and was designed to solicit input regarding needs. The consultant developed the materials and content, and conducted a meeting in each jurisdiction—Howard County used the materials to conduct an additional two meetings. A second round of public meetings was held to present service alternatives.

Finally, user surveys were developed to solicit the input of riders. For fixed-route services, a printed survey was developed, distributed and collected on buses with significant assistance from the RTA staff and operators. The survey was also available to users electronically through the website. A second survey was designed primarily for users of demand-response services, and it was mailed to current users. All surveys were made available in English, Spanish, and Korean.

Results of the outreach process are presented in Chapter 3 of this report.

## Existing Public Transit System

Chapter 4 of the study included an assessment of existing RTA fixed-routes, RTA demand-response services, and Anne Arundel Department of Aging and Disabilities (DOAD)<sup>2</sup> demand-response services. This task involved collection and calculation of basic route and service level performance data to allow an assessment of current routes and services and evaluate performance against the MTA's established performance standards. For RTA services, initially MTA Form 2a performance data was used, but subsequent analyses

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<sup>2</sup> Responsibility for these Anne Arundel County demand-response services was shifted to the new Ann Arundel County of Office of Transportation during the course of the study.

conducted by the counties and the RTA to update cost-allocation to RTA partners resulted in data that better reflected the current service and ridership, so this information was included in the analysis. The result provided a route-level analysis of key performance indicators.

In addition, data was collected from the RTA's Nextbus system to develop estimates of activity by stop for each route. Because this equipment is only working on a portion of the fleet, and the fact that many buses move from route to route during the course of a day, a considerable effort was needed to reassemble this information to provide a good approximation of the on-off information. The performance and ridership data was combined with the user survey data to present a route profile for each route.

Separate analyses of RTA and Anne Arundel County demand-response services were included, focusing on basic service productivity and costs. The RTA fare structure was also reviewed.

Information on other transit providers in the TDP service area, including routes, schedules, fares and connectivity with local services, was collected and presented. This included MTA local routes, MTA commuter bus services, MTA light rail, MARC commuter rail services, and WMATA Metrobus routes. These also included new services developed by MTA as part of the Baltimore Link restructuring of Baltimore's bus transit network. Information on other providers, including human service agencies, is also presented in Chapter 4. City of Annapolis routes and services connecting the City and County were included in this inventory.

## **Transit Service Alternatives**

The first three tasks of the TDP lay the foundation for development of the recommended plan. In Chapter 5, the needs identified in the previous task are used as a basis for detailed alternatives.

For each service option a route map is provided showing the existing service and potential changes in routing. Text is used to describe changes in frequency or span, or to describe the proposed frequency or span for new expansion services. Summary tables include planning estimates of operating costs. Similarly, for vehicle capital a proposed alternative is presented to address the vehicle replacement needs for the RTA, and to address fare collection.

These alternatives were presented at a series of meetings in the RTA service area in summer and fall of 2017, and the comments and input received were used to revise the alternatives for inclusion in the TDP.

## **Recommended Plan**

Chapter 6 presents the recommended plan, based on the previous analyses and the input received on the alternatives described in Chapter 5. The plan includes conceptual routes and schedules structure for planned modifications to existing services, and for proposed

expansion services. The plan is presented as a phased plan over the five years, though the specific year of implementation may change depending on the resources available and local opportunities. Budget information is provided for the plan, with greater detail for the initial year and more generalized cost estimates for the out years.

A capital plan is included, reflecting vehicle replacement needs and the planned expansion of services. It addresses capital requirements for a new fare collection system for the RTA and Central Maryland.

## **Vision—Beyond the TDP**

Chapter 7, the final chapter, presents information on additional transit initiatives that are likely to emerge in the final years of this plan. These include the development of bus rapid transit options in Howard County, implementation of a new intermodal bus terminal in Columbia, (potentially) a high-frequency east-west transit corridor connecting key activity centers in Howard County, and development of a high-frequency shuttle between Arundel Mills and Baltimore Washington International airport (BWI).



# Complete Streets Guidance

Case Study: MD 648  
Baltimore-Annapolis Boulevard

November, 2013



Office of Planning and Zoning

# URS

# Complete Streets Guidance

## 1. Background

The 2009 General Development Plan (GDP) forecasts show that travel demand in Anne Arundel County and the region will continue to grow. This growth will result in increased levels of congestion and fewer opportunities to provide facilities for transit, pedestrians, and bicyclists. Both the GDP and the Corridor Growth Management Plan (CGMP) include the conclusion that opportunities to physically expand highway capacity are extremely limited and cannot keep pace with demand. Furthermore, building new roads and/or widening existing roads often result in unacceptable fiscal, land use, environmental, and community impacts. Good planning practices must create options to meet existing and anticipated travel demand. There is clear evidence that members of the traveling public are seeking other options for mobility beyond the automobile. Accordingly, it is important for the County to identify, promote, and design better use of available right-of-way and road sections to optimize use by all modes, not merely single occupant autos, which is the predominant mode.



**Anne Arundel County, MD**

Complete Streets policies and strategies offer a way to effectively focus investments in transportation infrastructure. Experience in other jurisdictions indicates it may be possible to at least partially mitigate traffic congestion, reduce conflicts, and encourage use of alternative modes by implementing Complete Streets strategies. As travel demand grows, it will be important to promote and support more efficient reliance on multiple travel modes such as ridesharing, rail and bus transit, bicycling, and walking.

## 2. Purpose of the Complete Streets Guidance

Historically, road design was focused almost solely on cars and trucks while giving less attention to pedestrians, bicyclists and the mobility challenged. By implementing a Complete Streets Policy, the road building process (planning through construction and maintenance) would be

expanded to include pedestrian, bicycle, freight, and transit accommodations as core elements of roadway retrofits and improvements that best complement the needs of the communities and the land uses they serve.

This project builds upon the County's Unified Planning Work Program (UPWP) funded CGMP which uses a "tool box" approach to identify ways to increase person throughput for thirteen key regional and connector road corridors in the County.

With that as a basis, it is intended that the lessons learned from the Complete Street Guidance study will be applied elsewhere in the County, region, and State. It is also intended that the Complete Street Guidance will lead to the implementation of standard policies, parameters, and prototypes for how to apply Complete Street strategies.

### 3. Case Study

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Anne Arundel County's Office of Planning and Zoning has identified MD 648 (Baltimore-Annapolis Boulevard) as a case study to support the Complete Streets Guidance. The intent of the case study is to explore the feasibility, affordability, and applicability of applying Complete Streets templates along the following five segments of MD 648, a prototypical arterial (see **Figure 1**):

- Segment 1: MD 168 (Nursery Road) to MD 170 (Camp Meade Road)
- Segment 2: MD 176 (Dorsey Road) to MD 2 (Business Route)
- Segment 3: Marley Neck Blvd to MD 177 (Mountain Road)
- Segment 4: Magothy Bridge Road to MD 2 (Ritchie Highway)
- Segment 5: Cyprus Creek Road to Jones Station Road.



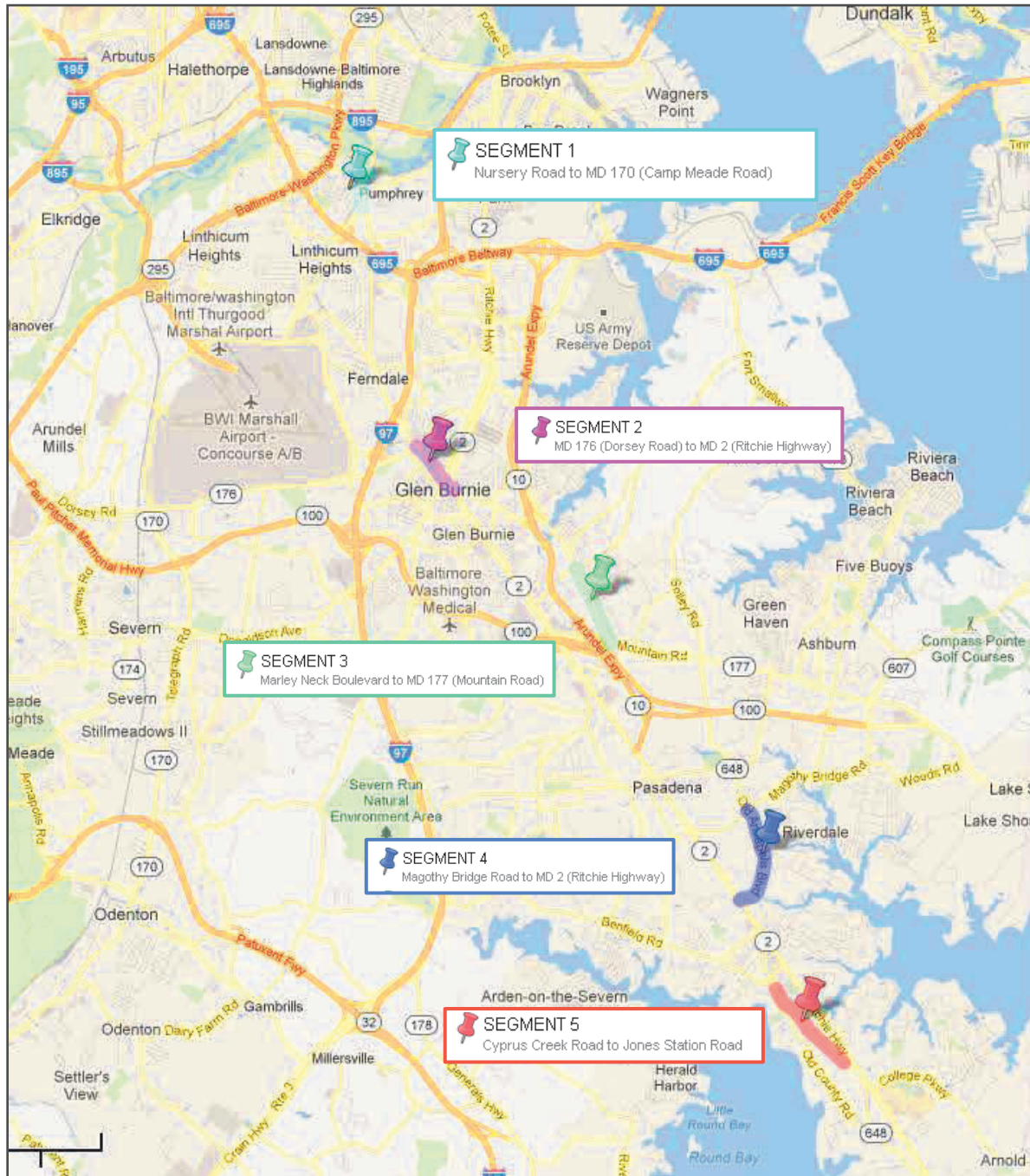


Figure 1- Study Area Map (Source: Google Maps 2013)

### a) Existing Features

Technical Memorandum #1 (TM1), found in **Appendix A**, provides an inventory of existing features along the five segments of MD 648 (Baltimore-Annapolis Boulevard). It includes the surrounding land use patterns; existing roadway, bicycle, and pedestrian facilities; as well as traffic, transit, and accident data. It also documents the gaps and deficiencies in the current

transportation network and the transit and transportation amenities. The existing conditions data collected for this study indicates the need for improving and upgrading the existing infrastructure.

The data shows that there are opportunities to apply the principles and objectives of the Complete Streets approach to road building. The information presented in TM1 was also used to assist the County in better understanding the challenges faced in modifying or expanding existing infrastructure.

### **b) Improvement Options**

Technical Memorandum #2 (TM2) which can be found in **Appendix B**, summarizes the assessment of a series of potential roadway improvements (templates) for the five selected segments of MD 648 (Baltimore-Annapolis Boulevard). The roadway improvements stem from a wide range of possible Complete Street strategies identified by the study team. The intent of the template approach is to provide roadway improvement recommendations for the MD 648 corridor that conform with the recommendations outlined in local small area plans and that support the County's goals for optimizing person throughput.

### **c) Potential Strategies**

Technical Memorandum #2 also provides potential strategies for implementation along similar arterial roadways in the region. Using a combination of templates and proposed improvements, agencies and developers can relatively accurately and quickly assess improvement potential and estimate impacts and costs. They can also use the strategies to identify the connectivity needs of the area and apply the appropriate Complete Streets strategies to satisfy compatibility with local small area plans and address travel demand.

The specific Complete Streets design applications and elements that were considered can be grouped into the following four major categories:

- Traffic calming measures to lower speeds of motorized vehicles, including a road/travel lane narrowing, raised medians, shorter curb corner radii, elimination of free-flow right-turn lanes, angled/face-out parking, roundabout/traffic circle, landscaping, and roadway lighting.
- Pedestrian infrastructure include Americans with Disabilities Act (ADA) of 1990 compliant facilities such as sidewalks, traditional and raised crosswalks, refuge median, curb ramps, curb cut consolidation, curb extensions, signals, and driveway modifications.
- Bicycle accommodations, such as protected or dedicated on-road bicycle lanes, sharrows (wider shared travel lanes), wide paved shoulders, and bicycle parking.
- Oversize vehicle (Transit, Emergency, Freight, etc.) accommodations, such as bus stops, bus rapid transit, bus pull-offs, transit signal priority, bus shelters and amenities, dedicated bus lanes, Park and Ride lots, shared center turn lanes for emergency vehicles, and freight stops.

There are other proven measures (such as roundabouts or off-road shared use paths) available for consideration as Complete Street elements. Under the scope of this study, only measures were considered that were found appropriate for a typical arterial roadway at these locations (see **Appendix B**).

### **Benefits of Potential Strategies**

The study team has developed Complete Streets strategies, applications, and specific recommendations for each of the segments of the MD 648 corridor with the intention of providing an optimal combination of safety enhancements, connectivity, and improved throughput for all modes of travel and all members of the traveling public. Efforts were made to ensure that community and commercial business needs were met, while attempting to keep improvements, costs, and related impacts to a minimum. The benefits associated with the proposed strategies along the five segments include the following:

1. Enhanced pedestrian safety and connectivity through improved ADA compatible sidewalk conditions, from new or improved pavement markings and crosswalks, raised curbs, and median refuge areas
2. Improved connectivity and safety for bicycle traffic through the addition of delineated 5-foot bicycle lanes throughout the segment. These bicycle lanes provide network connectivity options for local bicyclists as well as those that use light rail to reach the Baltimore & Annapolis Trail running parallel to this segment
3. Streetscape beautification and traffic calming through vegetated buffers and street trees
4. Improved accessibility and comfort through enhancements to transit facilities
5. Increased mobility for non-drivers through efforts to increase transit service
6. Adding bicycle amenities like lockers and racks would encourage more people to bicycle between destinations
7. Resurfaced roadways provide an improved surface quality for motor vehicles and bicyclists, and potential noise reductions
8. Improved drainage and curb and gutter, reducing road hazards during storm events, and providing a barrier between the sidewalks and travel lanes, therefore enhancing pedestrian safety
9. Overall improved connectivity meeting the local area plan goals of connecting neighborhoods to shopping areas, schools, parks, public transit, and other major destinations and improving the overall access for all modes of travel
10. Implementation efficiency and cost savings by implementing multiple elements at the same time.

### **Typical Right-of-Way and Cross Sections of Potential Strategies**

To account for the varying existing conditions and needs within each segment of the MD 648 corridor, more than one typical section per segment was recommended. To meet driver expectancy, changes to these elements occur at intersections or other visual breaks (such as overpasses). The example MD 648 typical sections shown in **Figures 2, 3, and 4** illustrate how the elements fit within the available typically 80 feet existing right-of-

way wherever possible. The suggested typical minimum right-of-way widths are shown for the roadway and shoulder portions only. Additional right-of-way may be required to accommodate utilities, stormwater management, and other design features where applicable and necessary. Additional details on the typical sections and how elements were selected is available in **Appendix B**.

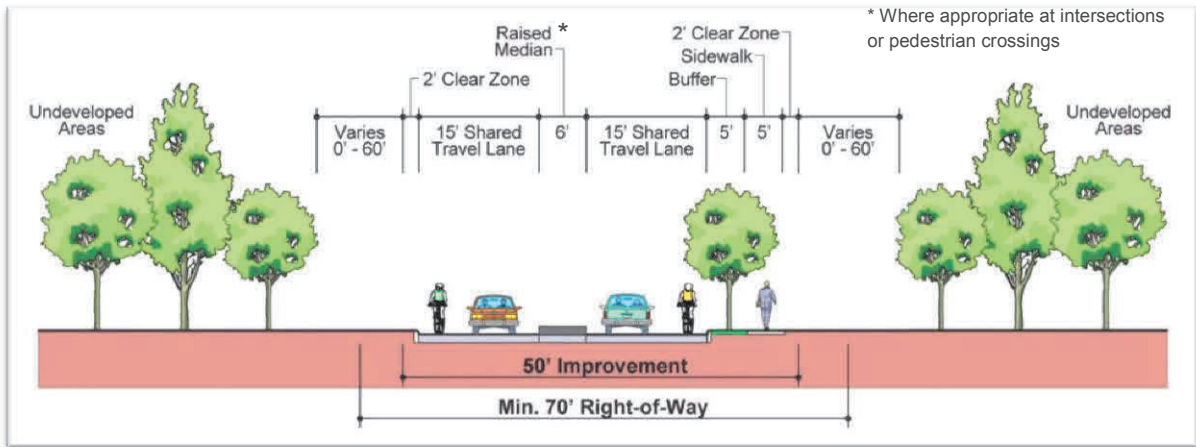


Figure 2 – Typical Section from Magothy Bridge Road to Ritchie Highway (MD 2) – (Segment 4)

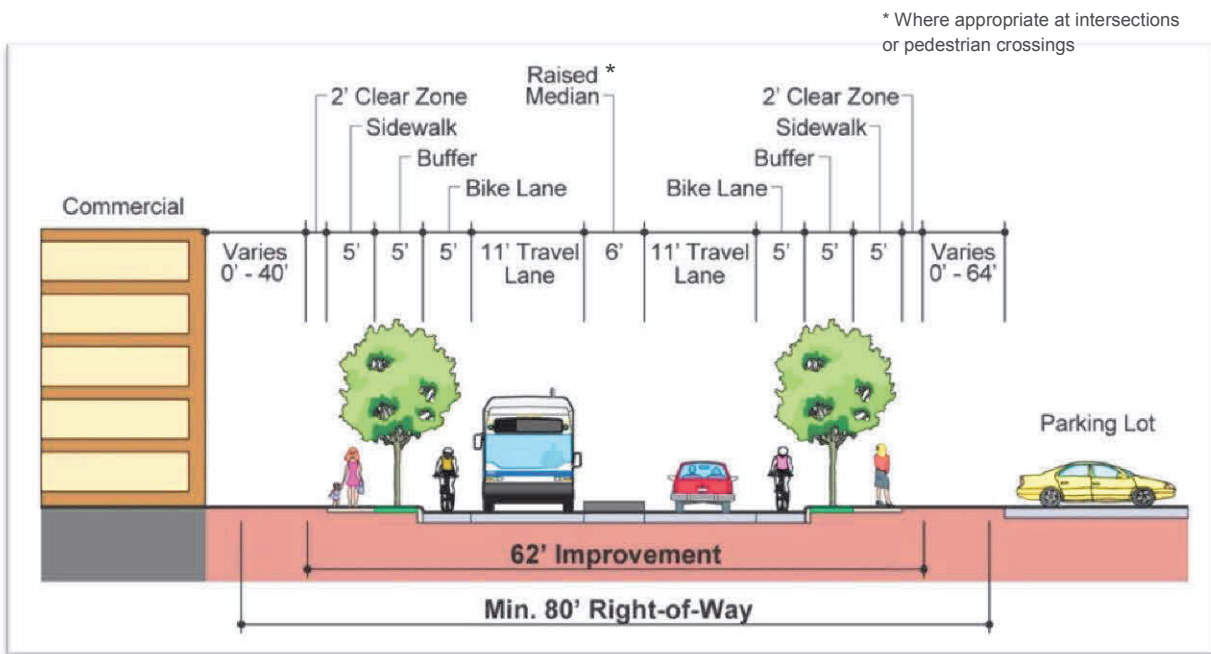
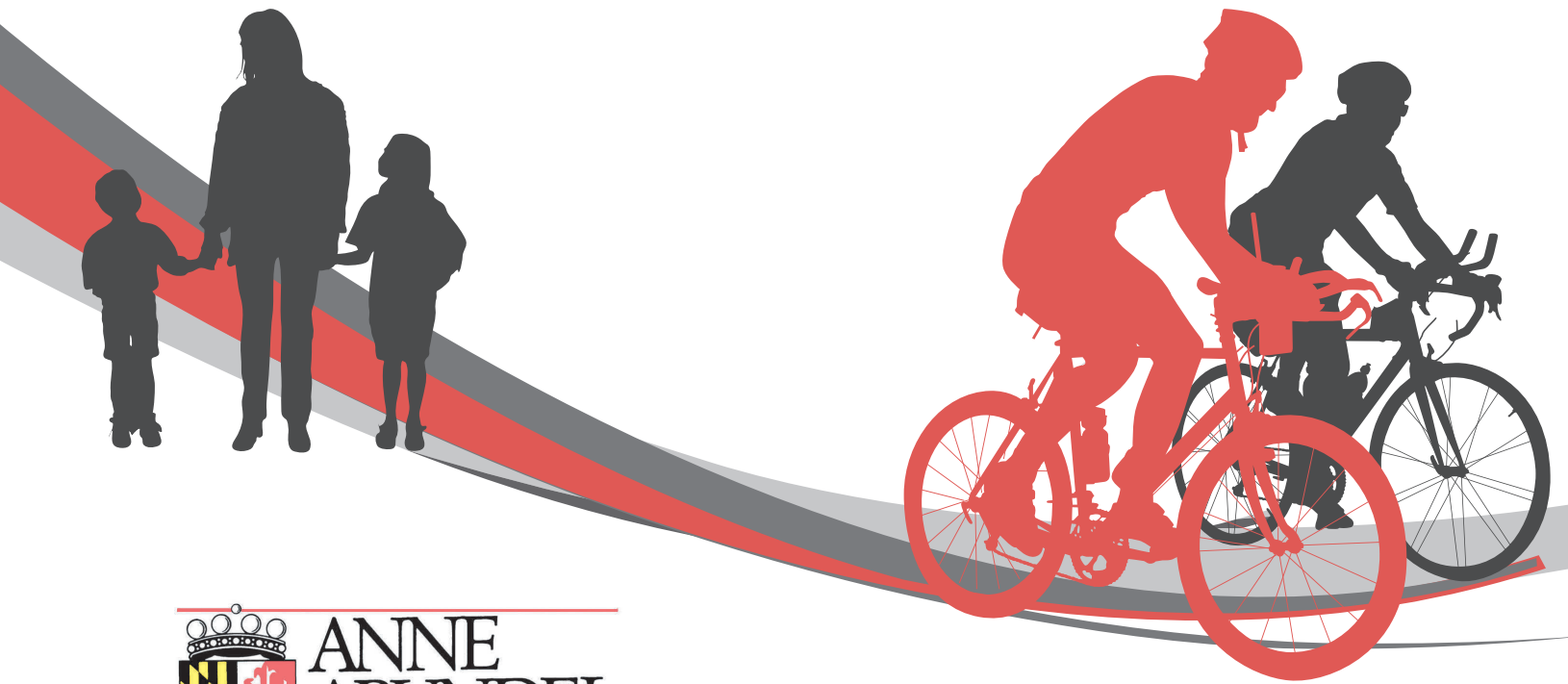


Figure 3 - Typical Section from the rail overpass to Camp Meade Road (MD 170) – (Segment 1)



Anne Arundel County Pedestrian and Bicycle Master Plan:

# 2013 Plan Update

for Anne Arundel County Office of Planning and Zoning Transportation Division

This report is funded in part through a Federal Grant under the Unified Planning Work Program (UPWP) prepared for the Baltimore Regional Transportation Board.

**FINAL**

June 2013



## Executive Summary

The Anne Arundel County Office of Planning and Zoning (OPZ) has undertaken the task of updating the 2003 Pedestrian and Bicycle Master Plan. The purpose of the 2013 Pedestrian and Bicycle Master Plan (2013 PBMP) is to identify improvement opportunities which increase the potential for safe trip-making by walking and bicycling while diminishing the need for single-occupant vehicle (SOV) trips. While the 2003 Pedestrian and Bicycle Master Plan (2003 PBMP) focused upon pedestrian and bicycle improvements in targeted geographic improvement areas, the 2013 PBMP focuses on pedestrian and bicycle improvements which create transportation alternatives for Anne Arundel County residents within the urbanized areas. Funding for this planning effort was provided through the Baltimore Regional Transportation Board (BRTB) through the execution of a Federal grant under the Unified Planning Work Program (UPWP).

Improvement opportunities developed as part of the 2013 Master Plan include both infrastructure and non-infrastructure improvements. Infrastructure improvements include potential pedestrian and bicycle facility projects such as new sidewalks, bicycle lanes or shared-use path facilities. Non-infrastructure improvements include policy recommendations, strategic coordination with other agencies and jurisdictions, and safety and educational outreach.

**“Transportation alternatives”**  
refers to facilities which support non-motorized forms of transportation such as sidewalks, bicycle lanes and shared-use paths.

A key element of this plan, as opposed to the 2003 PBMP, is the identification of specific pedestrian and bicycle related infrastructure projects deemed credible of consideration for construction. Although the projects are stratified by a tier ranking system, it should be noted that all of the projects listed are worthy of advancement to the project development stage. The overriding intent in identifying these projects is the advancement to construction whenever an opportunity arises; be it through Federal/State funding, County Capital Project funding or as a condition of developmental approval. Proposed changes in County regulations introduced in this Plan, and if adopted, will also introduce the opportunity for construction of projects through the use of impact fees and/or off-site private construction mitigation projects. The opportunity to provide pedestrian and bicycle facilities in more densely populated areas of the County, in lieu of roadway improvements could further promote changes in travel behavior and mode use. The identification of these projects is essential to ultimately improving pedestrian and bicycle connectivity within the higher density/populated portions of Anne Arundel County.

The pedestrian and bicycle infrastructure recommendations were compiled from the previous Master Plan, Small Area Plans for the urbanized areas, Public Listening Sessions, input from the Project Management Team and Citizens Advisory Committee, and field visits. A list of Evaluation Criteria addressing **Service**, **Structure**, and through them, inherently addressing **Safety** concerns, was developed for use on each of the improvements. With the criteria and

associated prioritization process addressing the concerns of the areas where facilities were most needed due to concentrations of high potential pedestrian and bicyclist users (origins) as well as concentrations of dense activity zones (destinations), a total list of projects ordered by priority was developed. This list did not take into account construction costs as a part of the prioritization process as funding opportunities may arise from numerous sources. Projects were evaluated for their ability to enhance the overall network.

Non-infrastructure improvements were developed through the review of County documents, listening sessions, and “best practices” research from other municipalities around the region, identifying the policies, codes, and other efforts that have allowed them to successfully implement and evaluate pedestrian and bicycle facilities in the pursuit of a complete network.

The recommendations developed as part of the 2013 PBMP will be carried forward and included in the County’s Transportation Functional Master Plan. Efforts are currently underway for this comprehensive planning document focused on transportation with a targeted completion date of Fall, 2014. Other elements of the TFMP include the 2012 Corridor Growth Management Plan (CGMP), a Complete Streets Policy, and a Major Intersections and Important Facilities Study for the County.

The following tables provide a summary of recommendations included in the 2013 PBMP. **Tables ES-1 and ES-2** provide the overall number of infrastructure projects by Prioritization Tier and Small Planning Area. Projects are identified by ownership of the roadway along which the proposed project is located. The development and full description of Prioritization Tiers is discussed in detail in Chapter IV of the 2013 PBMP. **Figure ES-1** illustrates the Small Planning Area boundaries for Anne Arundel County.

Much of the Crownsville, Deale/Shadyside and South County Small Planning Areas are located outside of the Planned Water and/or Sewer Areas of the County (outside of the urbanized area) which makes them outside of the study area for the 2013 PBMP. While no specific projects have been identified in these areas, a number of countywide non-infrastructure recommendations and other implementation strategies are included which will facilitate pedestrian and bicycle improvements throughout the entire county.

**Table ES-1: Infrastructure Projects by Prioritization Tier**

Prioritization Tier	Number of County Projects	Number of State Projects	Total Number of Projects
Tier I	18	23	41
Tier II	39	34	73
Tier III	17	15	32

**Table ES-2: Infrastructure Projects by Small Planning Area**

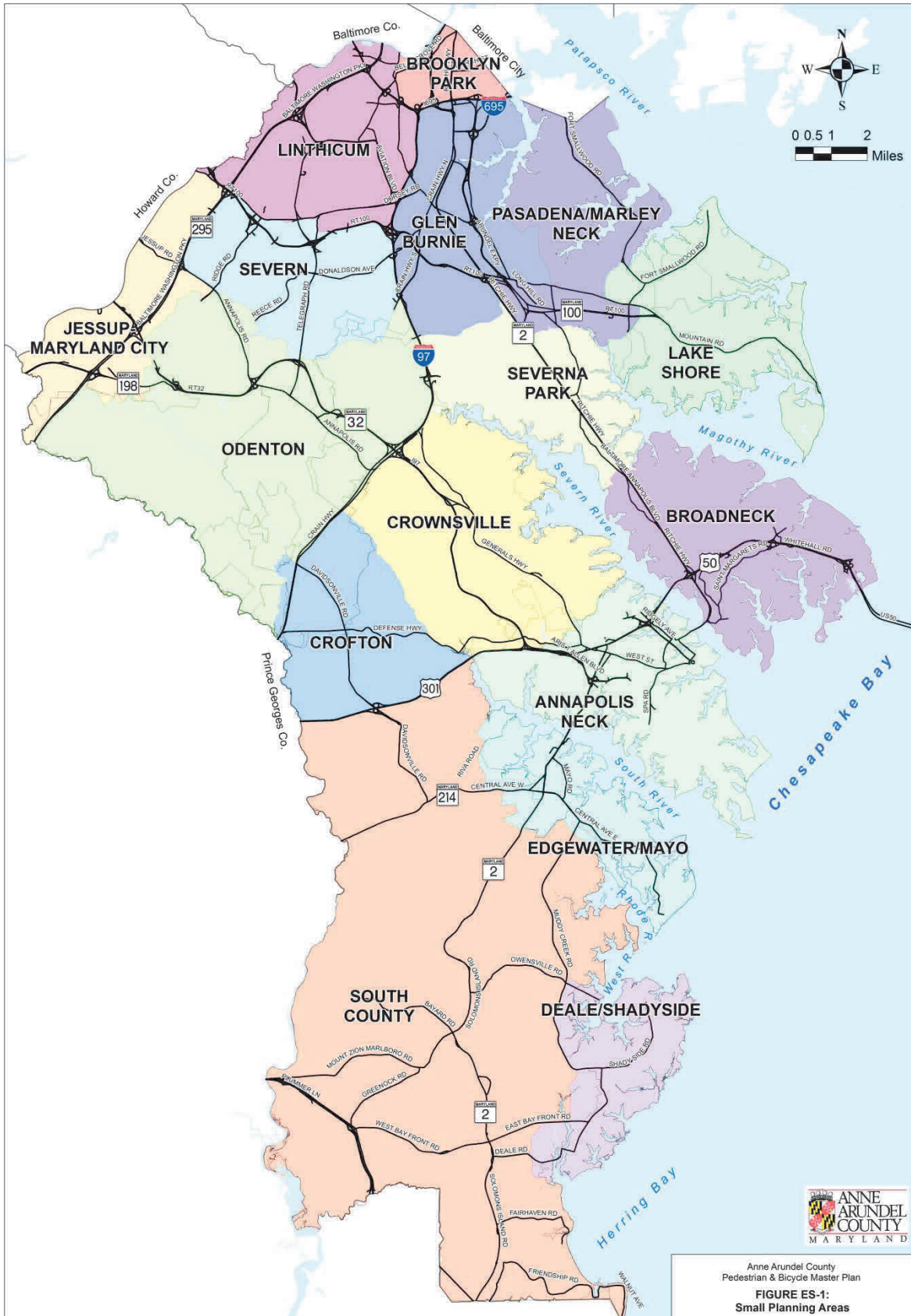
Small Planning Area	# Projects		
	County Projects	State Projects	Total Projects
Annapolis Neck	11	8	19
Broadneck	16	4	20
Brooklyn Park	0	4	4
Crofton	1	4	5
Crownsville	0	0	0
Deale/Shadyside	0	0	0
Edgewater/Mayo	0	3	3
Glen Burnie	2	13	15
Jessup/Maryland City	0	5	5
Lake Shore	1	3	4
Linthicum	4	5	9
Odenton	18	5	23
Pasadena/Marley Neck	2	8	10
Severn	1	5	6
Severna Park	18	5	23
South County	0	0	0

An additional limiting factor for many roadways in the non-urbanized areas is their classification as “Scenic and Historic Roads”. Legislation protects the scenic and historic fabric of the landscape of Anne Arundel County through regulating development along designated Scenic and Historic Roads. Development along roads designated as “scenic and historic” is guided by legislation which the Office of Planning & Zoning uses while working closely with developers, engineers, and traffic planners to ensure that historic and scenic roads are preserved while maintaining applicable safety standards. Compliance with Scenic and Historic Roads regulations is managed by the Cultural Resources Program.

Scenic and Historic Roads are identified in Anne Arundel County on an official map maintained by the Office of Planning and Zoning and by Ordinance 21-06. Generally, the County is limited in its ability to modify the current roadway of those facilities identified as Scenic and Historic unless the change in the roadway is directly associated with a safety issue. Many of these roadways are low-volume, rural collector-type facilities, however, other roadways such as Solomon’s Island Road (MD 2), a principal arterial roadway connecting Annapolis with Calvert County and located south of Central Avenue, is also identified as Scenic and Historic. The designation can limit the County’s ability to add pedestrian and bicycle supporting infrastructure or design changes.

**Table ES-3** includes a summary of highlights from all recommendations within the 2013 PBMP.





Anne Arundel County  
Pedestrian & Bicycle Master Plan  
**FIGURE ES-1:**  
Small Planning Areas

## Table ES-3: Summary of Pedestrian and Bicycle Master Plan Highlights

### Infrastructure Recommendations

Implement pedestrian and bicycle improvement projects throughout the County according to the projects identified in the 2013 Pedestrian and Bicycle Master Plan (2013 PBMP).

### Policy Recommendations

#### Design Manual

Adopt a set of design guidelines for pedestrian and bicycle facilities for inclusion in the Design Manual.

Require a minimum clear width sidewalk of 5-feet for all County sidewalks.

Update the Standard Details for roadway typical sections to reflect the inclusion of different pedestrian and bicycle facility types (e.g. shared-use roadway, on-road bicycle lane, and shared-use path).

Update the Design Manual to refer to a Complete Streets Policy and Design Criteria for guidance designing roadway improvements to be safe efficient routes for travel by all modes.

### County Code

#### Subdivision and Development Regulations (Article 17)

Update the General Provisions (Article 17 §2-102) to include a provision for the consideration of all modes of travel to include accessible pedestrian and bicycle facilities as viable transportation alternatives.

Update the Site Development Plan outlined in Article 17 §4-202 to include a more robust description of pedestrian and bicycle connectivity, including at the preliminary plan stage.

Incorporate pedestrian and bicycle facilities into Title 5 which discusses the need to include Adequate Public Facilities in accordance with “General Development Plan growth objectives” to ensure connection to the existing pedestrian and bicycle system and to connect the planned facilities in the appropriate width and with the proper grades and cross slopes.

Update Article 17 Subtitle 4 which discusses “Adequate Road Facilities” to include specific reference to pedestrian and bicycle facilities.

Include the establishment of a “Pedestrian/Bicycle Fee in Lieu of Construction” type program within Title 5 to create a County fund for use in implementing pedestrian and bicycle facilities.

Provide a strong clear discussion of the need to provide right-of-way and construction of Complete Streets with accessible pedestrian and bicycle facilities compliant with the Pedestrian and Bicycle Master Plan in Title 6, Article 17 §6-103 through a site development plan.

Amend Article 17 §11-209 to explicitly state that pedestrian and bicycle facilities fall within the eligible capital improvements which can be paid for through the use of impact fees.

#### Zoning (Article 18)

Amend Title 3 to include a requirement for bicycle parking as well as establishing the number of required bicycle parking spaces.

<b>Landscape Manual</b>
Include bicycle parking requirements for additional zoning districts.
Amend Section Q, Recreational Facilities, to include the provision of bicycle parking.
Include a list of approved and/or recommended bicycle parking types in the Appendices of the Manual.
<b>Complete Streets Policy</b>
Develop and adopt a Complete Streets Policy for Anne Arundel County to guide designers, developers and government officials in the implementation of roadways which include comfortable facilities for motorists, pedestrians, bicyclists and transit vehicles.
Integrate the Complete Streets Policy into the County Code, Subdivision and Development Regulations, Design Manual and Landscape Manual where appropriate to ensure that roadway projects and developments completed in the County provide the equitable inclusion of facilities for all modes at all stages of the planning, design and construction processes.
<b>Administrative</b>
Create a Pedestrian and Bicycle Coordinator permanent staff position within the department where it will be most effective. The overarching responsibility of the Pedestrian and Bicycle Coordinator should be to oversee the planning, prioritization, coordination and implementation of pedestrian and bicycle projects throughout the County.
<b>Facility Maintenance</b>
Include any roadway with a bicycle facility (shared-use roadway, shoulder or bicycle lane) on the County's Street Sweeping list.
Streamline facility maintenance requests from citizens through an online form available on the County website.
The Pedestrian and Bicycle Coordinator should complete field reviews of pedestrian and bicycle facilities in high use areas and in areas where issues have been reported by citizens.
Develop a maintenance process for shared-use facilities which addresses issues such as maintenance responsibility, hours of operation, funding, snow removal, staffing and equipment needs.
<b>Non-Infrastructure Recommendations</b>
<b>Education and Safety Programs</b>
Complete updates to the Basic Driving section of the Maryland Driver's Manual to increase awareness for pedestrians and bicyclists.
Continue to utilize education programming and funding available through Safe Routes to School.
Anne Arundel County Public Schools should adopt National Highway Traffic Safety Administration (NHTSA) Pedestrian Safety Curriculum as part of the school physical education curriculum.
Continue to coordinate with the Baltimore StreetSmart program for available partnership opportunities, resources, and events. Consider new partnerships specifically through the Office of Planning and Zoning with Baltimore StreetSmart.

***MOVE ANNE ARUNDEL!***  
*COUNTY TRANSPORTATION*  
*MASTER PLAN*

