Abstract

This document contains an examination of and recommendations for transit, bicycle, and pedestrian infrastructure that will help create complete transportation options. With the approval and adoption of this functional plan, the *Master Plan of Highways* will become the *Master Plan of Highways and Transitways*.

Source of Copies
The Maryland-National Capital Park and Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20910

Online at: www.MontgomeryPlanning.org/transportation/highways/brt.shtm
Approved and Adopted

Countywide Transit Corridors Functional Master Plan

prepared by
Montgomery County Planning Department
December 2013
CERTIFICATION OF APPROVAL AND ADOPTION

COUNTYWIDE TRANSIT CORRIDORS FUNCTIONAL MASTER PLAN

This comprehensive amendment to the General Plan (On Wedges and Corridors) for the Physical Development of the Maryland-Washington Regional District in Montgomery and Prince George's Counties, as amended; the Aspen Hill Master Plan; the Bethesda CBD Sector Plan; the Bethesda-Chevy Chase Master Plan; the Clarksburg Master Plan; the East Silver Spring Master Plan; the Fairland Master Plan; the Forest Glen Sector Plan; the Four Corners Master Plan; the Friendship Heights Sector Plan; the Gaithersburg and Vicinity Master Plan; the Germantown Employment Area Sector Plan; the Germantown Master Plan; the Glenmont Sector Plan; the Grosvenor Sector Plan; the Kensington/Wheaton Master Plan; the North and West Silver Spring Master Plan; the North Bethesda/Garrett Park Master Plan; the Olney Master Plan; the Potomac Subregion Master Plan; the Shady Grove Sector Plan; the Silver Spring CBD Sector Plan; the Takoma/Langley Crossroads Sector Plan; the Takoma Park Master Plan; the Twinbrook Sector Plan; the Wheaton CBD Sector Plan; the White Flint Sector Plan; the White Oak Master Plan; the Master Plan of Highways within Montgomery County, as amended; the Countywide Bikeways Functional Master Plan, as amended; and the Purple Line Functional Plan has been approved by the Montgomery County Council, sitting as the District Council, by Resolution and has been adopted by the Maryland-National Capital Park and Planning Commission by Resolution No. 13-31 on December 18, 2013 after a duly advertised public hearing as required by Land Use Article, Division II of the Annotated Code of Maryland.

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

Elizabeth M. Hewlett
Chairman

Françoise M. Carrier
Vice-Chair

Joseph Zimmerman
Secretary-Treasurer
RESOLUTION

WHEREAS, under the Maryland Land Use Article The Maryland-National Capital Park and Planning Commission is authorized to make, adopt, amend, extend, and add to The General Plan for the Physical Development of the Maryland-Washington Regional District, and in Montgomery and Prince George’s Counties; and

WHEREAS, on May 16, 2013, the Montgomery County Planning Board of The Maryland-National Capital Park and Planning Commission held a public hearing on the Public Hearing Draft of the Countywide Transit Corridors Functional Master Plan, being also a comprehensive amendment to the General Plan (On Wedges and Corridors) for the Physical Development of the Maryland-Washington Regional District in Montgomery County, as amended; the Aspen Hill Master Plan; the Bethesda CBD Sector Plan; the Bethesda-Chevy Chase Master Plan; the Clarksburg Master Plan; the East Silver Spring Master Plan; the Fairland Master Plan; the Forest Glen Sector Plan; the Four Corners Master Plan; the Friendship Heights Sector Plan; the Gaithersburg and Vicinity Master Plan; the Germantown Employment Area Sector Plan; the Germantown Master Plan; the Glenmont Sector Plan; the Grosvenor Sector Plan; the Kensington/Wheaton Master Plan; the North and West Silver Spring Master Plan; the North Bethesda/Garrett Park Master Plan; the Olney Master Plan; the Potomac Subregion Master Plan; the Shady Grove Sector Plan; the Silver Spring CBD Sector Plan; the Takoma/Langley Crossroads Sector Plan; the Takoma Park Master Plan; the Twinbrook Sector Plan; the Wheaton CBD Sector Plan; the White Flint Sector Plan; and the White Oak Master Plan; the Master Plan of Highways within Montgomery County, as amended; the Countywide Bikeways Functional Master Plan, as amended; and the Purple Line Functional Plan, as amended; and

WHEREAS, on July 25, 2013, the Montgomery County Planning Board, after public hearing and due deliberation, approved the Planning Board Draft of the Countywide Transit Corridors Functional Master Plan, forwarded it to the County Executive for review, and recommended that the District Council approve it; and

APPROVED AS TO LEGAL SUFFICIENCY

[Signature]
M-NCPPC Legal Department

Date 10/14
WHEREAS, on September 24, 2013, the Montgomery County Executive transmitted to the District Council a fiscal impact analysis for the Planning Board Draft of the Countywide Transit Corridors Functional Master Plan; and

WHEREAS, on September 24 and 26, 2013, the Montgomery County Council, sitting as the District Council for the portion of the Maryland-Washington Regional District lying within Montgomery County, held public hearings and heard testimony concerning the Planning Board Draft of the Countywide Transit Corridors Functional Master Plan; and

WHEREAS, on November 26, 2013, the District Council approved the Planning Board Draft of the Countywide Transit Corridors Functional Master Plan, subject to certain modifications set forth in Resolution No. 17-952; and

NOW, THEREFORE, BE IT RESOLVED that the Montgomery County Planning Board hereby adopts the Countywide Transit Corridors Functional Master Plan as approved by the District Council in the attached Resolution No. 17-952, which amends: the Master Plan of Highways, and renames it the Master Plan of Highways and Transitways; the General Plan (On Wedges and Corridors) for the Physical Development of Maryland-Washington Regional District, in Montgomery and Prince George’s Counties, as amended; the Aspen Hill Master Plan; the Bethesda CBD Sector Plan; the Bethesda-Chevy Chase Master Plan; the Clarksburg Master Plan; the East Silver Spring Master Plan; the Fairland Master Plan; the Forest Glen Sector Plan; the Four Corners Master Plan; the Friendship Heights Sector Plan; the Gaithersburg and Vicinity Master Plan; the Germantown Employment Area Sector Plan; the Germantown Master Plan; the Glenmont Sector Plan; the Grosvenor Sector Plan; the Kensington/Wheaton Master Plan; the North and West Silver Spring Master Plan; the North Bethesda/Garrett Park Master Plan; the Olney Master Plan; the Potomac Subregion Master Plan; the Shady Grove Sector Plan; the Silver Spring CBD Sector Plan; the Takoma/Langley Crossroads Sector Plan; the Takoma Park Master Plan; the Twinbrook Sector Plan; the Wheaton CBD Sector Plan; the White Flint Sector Plan; and the White Oak Master Plan; and

BE IT FURTHER RESOLVED that copies of the Countywide Transit Corridors Functional Master Plan must be certified by The Maryland-National Capital Park and Planning Commission and filed with the Clerk of the Circuit Court of each of Montgomery and Prince George’s Counties, as required by law.
This is to certify that the foregoing is a true and correct copy of Resolution 13-174 adopted by the Montgomery County Planning Board of the Maryland-National Capital Park and Planning Commission, on motion of Commissioner Anderson, seconded by Commissioner Dreyfuss, with Chair Carrier, Vice Chair Wells-Harley, and Commissioners Anderson and Dreyfuss voting in favor of the motion, and Commissioner Presley absent at its regular meeting held on December 5, 2013.

Françoise M. Carrier, Chair
Montgomery County Planning Board

This is to certify that the foregoing is a true and correct copy of Resolution No. 13-31 adopted by The Maryland-National Capital Park and Planning Commission on motion of Commissioner Anderson, seconded by Commissioner Dreyfuss, with Chair Hewlett, Vice Chair Carrier, and Commissioners Anderson, Bailey, Dreyfuss, Shoaf, and Wells-Harley voting in favor of the motion, and Commissioners Geraldo, Washington, and Presley absent during the vote, at its meeting held on Wednesday, December 18, 2013, in Riverdale, Maryland

Patricia Colihan Barney
Executive Director
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Online Appendix
(available online at www.MontgomeryPlanning.org/transportation/highways/brt.shtm)
Executive Summary

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commuting times exceeding 35 minutes. Additionally, travel forecasts show that roadway congestion in the County is predicted to increase by 70% by 2040. While population and employment opportunities are forecasted to grow significantly over time, options for building new roads or expanding existing ones are limited given their impact on existing neighborhoods and businesses.

Expanding transit infrastructure through more efficient use of public rights-of-way is essential if current and future congestion is to be mitigated. In addition to reducing Countywide travel time for drivers, an expanded transit network is necessary to support the County’s land use, environmental, and economic development goals and make transit a reliable alternative to driving in the County’s developed core.

This Plan recommends implementing a 102-mile bus rapid transit network comprising 10 corridors and the Corridor Cities Transitway, and expanding right-of-way for the CSX Metropolitan Branch to allow for enhanced MARC commuter rail service. It also designates 24 additional Bicycle–Pedestrian Priority Areas.

Public rights-of-way are a critically important and scarce resource. Like any scarce resource, they need to be used in the most efficient manner possible. Therefore, an important goal of this Plan is to increase person-throughput, the number of people that can be accommodated within these rights-of-way, as well as increasing the modes of transportation that can be accommodated safely.

This principle was used in determining rights-of-way while making every effort to limit impacts to existing communities. For the most part, the property required to accommodate this Plan fits within previously approved master-planned rights-of-way. In the few instances where the Plan recommends reserving more right-of-way than is currently master-planned, it is largely to accommodate future enhancements or new construction of master-planned bikeways and sidewalks. An overriding County objective is to provide enhanced mobility for all users of the transportation system.

Transit maximizes person-throughput. For transit to truly succeed, and to achieve the desired ridership, it must have (1) an extensive network and (2) dedicated lanes. The bottom line must be that the system will produce a significant improvement in travel time for many that already use transit and that it will attract new riders that would otherwise drive. Indeed, over half of the projected riders of this bus rapid transit network are anticipated to be new transit users. However, it is not only transit users who will benefit from this Plan. Drivers should experience better conditions than they will otherwise face with a well-functioning, high-performing transit network.

At the heart of this Plan is the recommendation to create dedicated lanes for bus transit. Only a system that is primarily characterized by dedicated lanes can deliver on the promise of “rapid” in bus rapid transit. Of the approximately 102 corridor-miles recommended in this Plan, about 79% of this network is comprised of dedicated lanes. In most instances, where the Plan calls for dedicated lanes, it is the result of adding transit lanes within previously approved master-planned rights-of-way. In some instances, dedicated lanes may be created from existing or planned general purpose lanes. Lane repurposing may be implemented where the number of forecasted transit users exceeds the general purpose lane capacity and/or general traffic demand would not exceed capacity. There are only about 21 miles in this network that anticipate buses running in mixed traffic. It is understood that where a
route is dominated by mixed traffic, it will not be rapid. However, it will have enhanced station facilities and service, and it will be part of a larger network that is rapid.

This Plan does not endorse specific “treatments” since considerably more study will be conducted by the State Highway Administration and/or the County’s Department of Transportation to determine whether, for example: a dedicated lane should be in the median or on the curb; whether the right-of-way could accommodate bi-directional bus rapid transit, or if a single reversible lane could achieve the same objective; or whether dedicated lanes achieved by repurposing are warranted and achievable given further detailed traffic analysis and ridership forecasts.

These studies will be done using the State’s or County’s standard facility planning process, which includes significant community outreach, opportunities for public input including but not limited to public hearings, and will ultimately come back before the County Council for review. In this respect, this Plan is not different from other road projects recommended in master plans for which alternatives are reviewed and subject to considerable community feedback. While this Plan recommends a robust transit network to maximize the potential of transit to serve a more significant part of the County’s future transportation needs, it will be achieved in a way that responds to the needs of the communities it passes through, and addresses traffic impacts.

Insofar as the goal of this transit network is to increase the efficiency of predominately State roads, the County expects the State will be a full partner in this enterprise. Moreover, this Plan anticipates additional cooperation and collaboration with our regional partners – the residents of Howard, Prince George’s and Fairfax Counties, and the District of Columbia all have a stake in an interconnected, efficient transit system. Finally, it is understood that this 102-mile network will be constructed in stages over a number of years based on available resources, priorities, and need.

Illustration 1 Community Transit (Swift), Snohomish County, Washington

Photo credit: www.metro-magazine.com
Introduction

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commute times exceeding 35 minutes.

Growth is expected to continue in Montgomery County, largely through redevelopment, so options for building new roads or expanding existing ones are limited. Population and employment are forecast to grow significantly, while lane-miles of roadway will not. Even as the County urbanizes, the growth in vehicle trips will outpace the growth in transit trips for commuters. An expansion of frequent, reliable transit service will be needed to move greater numbers of people to and from jobs, homes, shopping, and entertainment areas, reducing the gap between transportation demand and supply and providing County residents a viable and reliable alternative to travel by auto on congested roadways. If this service is not provided, auto congestion will be significantly worse, degrading the quality of life and economic vitality of the County.

To accomplish this, a more efficient use of our public rights-of-way is essential. This Plan provides enhanced opportunities for travel by transit to support our economic development and mobility goals in an environmentally sustainable way, and in a way that preserves our existing communities.

Table 1 Montgomery County Demographic and Travel Forecast

<table>
<thead>
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<th></th>
<th>2013</th>
<th>2040</th>
<th>difference</th>
<th>percent difference</th>
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<tbody>
<tr>
<td>Population</td>
<td>997,884</td>
<td>1,203,643</td>
<td>205,759</td>
<td>21%</td>
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<tr>
<td>Employment</td>
<td>529,267</td>
<td>737,364</td>
<td>208,097</td>
<td>39%</td>
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<tr>
<td>Transit work trips</td>
<td>165,121</td>
<td>198,513</td>
<td>33,392</td>
<td>20%</td>
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<td>Vehicle work trips</td>
<td>376,269</td>
<td>461,248</td>
<td>84,979</td>
<td>23%</td>
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<tr>
<td>Truck trips</td>
<td>83,024</td>
<td>100,344</td>
<td>17,320</td>
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<td>VMT</td>
<td>21,952,932</td>
<td>26,795,176</td>
<td>4,842,244</td>
<td>22%</td>
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<tr>
<td>VMT per capita</td>
<td>22.0</td>
<td>22.3</td>
<td>0.3</td>
<td>1%</td>
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<tr>
<td>Lane-miles*</td>
<td>2,592</td>
<td>2,721</td>
<td>129</td>
<td>5%</td>
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<tr>
<td>Lane-miles of congestion</td>
<td>376</td>
<td>639</td>
<td>263</td>
<td>70%</td>
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</table>

Source: MWCOG

* Modeled lane miles include freeways, arterials, and many collectors, but few local roads.

By 2040, the Metropolitan Washington Council of Governments (MWCOG) projects the region’s population to increase by 30 percent and employment to grow by 39 percent.¹ Within Montgomery County, significant changes at the Walter Reed National Military Medical Center, White Flint, U.S. Food and Drug Administration (FDA), the Life Sciences Center, and other commercial and employment centers are expected to impact travel conditions for many.

¹ Growth Trends to 2040: Cooperative Forecasting in the Washington Region, 2010
Planning Context

Making more efficient use of our existing rights-of-way is not a new approach. Almost 40 years ago, the U.S. Department of Transportation (USDOT) directed Metropolitan Planning Organizations to develop Transportation System Management (TSM) Plans to provide guidance on ways to better utilize existing rights-of-way through means that are less capital intensive and have less impact than building new roads or lanes of traffic. Analysis of a “TSM alternative” is a requirement for major capital projects in urban areas with a population of greater than 200,000.

There are a number of locations within the County today where TSM improvements are in place and providing more efficient use of the right-of-way, such as:

- HOV lanes on I-270;
- managed lanes on Colesville Road in Silver Spring north of the CBD and on Georgia Avenue in Montgomery Hills;
- off-peak parking on Colesville Road and Georgia Avenue in the Silver Spring CBD and Wisconsin Avenue in the Bethesda CBD that restricts roadway capacity to support economic activity;
- longer traffic signal cycles during peak hours to accommodate commuters on the major roadways; and
- the recent introduction of traffic-signal priority on portions of MD 355 to facilitate transit service.

Enhanced transit service—including service consisting of many elements of BRT, but short of dedicated lanes requiring heavy construction—is also a recognized TSM strategy. Examples include the MetroExtra service operated by WMATA (which provides limited stop service in mixed traffic), other related near-term improvements planned as part of the WMATA Priority Corridor Network program, and the Ride On Route 100 non-stop service operating via the I-270 HOV lanes.

The provision of dedicated lanes for enhanced transit service is the focus of this update to the County’s Master Plan of Highways. This Plan used as its starting point for evaluation the 150-mile bus rapid transit (BRT) network described in the MCDOT Feasibility Study Report, completed in August 2011, as well as the later recommendations of the County Executive’s Transit Task Force, whose final recommendations were delivered in May 2012. This Plan uses an expanded approach to meeting transportation challenges however, addressing primarily the needs of a BRT system, but also the designation of bicycle-pedestrian priority areas and the need for expanded MARC commuter rail service to support a transportation network that is better integrated.

BRT service can be provided via a variety of transitway treatments: a dedicated two-lane median or side transitway, a dedicated one-lane median transitway, dedicated curb lanes, or running in mixed traffic. Dedicated lanes can be achieved either by expanding the right-of-way and pavement or by repurposing existing travel lanes.

Frequent, reliable bus service is most easily provided on a network of dedicated bus lanes, and the attractiveness of transit to the potential patron depends on how well his or her entire trip can be made, but the optimal size of this network must be weighed against physical and right-of-way impacts. This Plan identifies additional rights-of-way for certain corridor segments, where needed, to ensure a good balance between overall transit network integrity and impacts on adjacent properties. It recommends the more efficient use of existing rights-of-way along other corridor segments by repurposing existing travel lanes for transit where the value of doing so is confirmed through more detailed facility studies.
and operational planning. This Plan does not envision that full-time dedicated bus lanes will be implemented as a first step in most locations.

Since a large part of the initial ridership for BRT service will come from existing transit users whose numbers do not warrant a high level of treatment at this time, it is likely that there will be an incremental introduction of priority treatments and features that, with actual operating and ridership experience, ultimately lead to the maximum level of treatment appropriate for the specific corridor in question.

MCDOT report:  
http://www.montgomerycountymd.gov/content/dot/MCBRTStudyfinalreport110728.pdf  
Transit Task Force report:  
http://www6.montgomerycountymd.gov/Apps/cex/transit/reportfinal.asp

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<th>Service</th>
<th>Market</th>
<th>Examples</th>
<th>Speed</th>
<th>Frequency</th>
<th>Span</th>
<th>Stop Spacing</th>
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<tr>
<td>Commuter rail</td>
<td>commuters</td>
<td>MARC Brunswick Line</td>
<td>very high</td>
<td>Low</td>
<td>peak period</td>
<td>very high</td>
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<tr>
<td>Metrorail</td>
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<td>Red Line</td>
<td>high</td>
<td>High</td>
<td>all day</td>
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<td>Light rail</td>
<td>all trips</td>
<td>Purple Line</td>
<td>moderate</td>
<td>High</td>
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<td>BRT—Activity Center Corridor</td>
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<td>Corridor Cities Transitway</td>
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<td>Metrobus, Ride On</td>
<td>low</td>
<td>Low</td>
<td>varies</td>
<td>low</td>
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Travelers in Montgomery County currently have the following transit options:

- high-speed/high-capacity heavy rail systems (Metrorail or MARC) largely built for commuters;
- local and regional bus services that connect commuters from residential areas to employment centers via express buses along the interstates (MTA express bus and commercial commuter buses); and
- local buses that move slowly along increasingly congested roadways and make frequent stops (Metrobus and Ride On).

Plans are underway to create two additional high-capacity transit corridors—the Purple Line and Corridor Cities Transitway (CCT)—where high development densities and a mix of land uses are either present or planned. However, much of the County will still lack reliable, high-quality transit service that provides a viable alternative to driving an automobile and that provides connectivity among multiple County activity centers.

BRT service on the recommended transit corridor network will provide service between dense redeveloping areas inside the Beltway, emerging mixed-use activity centers, and commuter corridors. BRT is a flexible service with a number of potential combinations of attributes. Some BRT corridors include an exclusive transitway with little or no conflicts with other vehicles. Other corridors may take advantage of off-board fare payment, traffic signal priority, and/or increased distance between stops,
but not other attributes most often associated with BRT. A single corridor may evolve over time from one with fewer attributes to one with an exclusive transitway as facilities are designed and tested over time.

The transit corridors recommended in this Plan are intended to facilitate the following three types or levels of BRT service.

- **BRT—Activity Center Corridor**, defined by moderate-speed, high-frequency, all-day transit service. It is most appropriate on activity center corridors that connect multiple dense mixed-use areas.
- **BRT—Express Corridor**, defined by high-speed, moderate-frequency, peak-period service. It is most appropriate on access-controlled express corridors that connect commuters at park-and-ride lots to employment centers.
- **BRT—Commuter Corridor**, defined by moderate-speed, moderate-frequency, limited-stop transit service during peak periods. It is most appropriate on commuter corridors that connect moderate density residential areas to employment centers.

This Plan recommends an extensive network of enhanced transit corridors based on a broad analysis of travel patterns Countywide. The rights-of-way recommended for these corridors reflect the footprint required by the typical roadway sections developed for various levels of transit treatment, and by specific corridor segment locations in urban or suburban areas of the County.

More detailed analysis is required to determine the final treatment and typical section, the slope impacts required to build that typical section, and the number of travel lanes and turn lanes required to provide an adequate level of traffic service. The final rights-of-way required for the recommended transit corridors must be determined during facility planning and design for individual corridors, at which time the cost of construction must also be determined. A vital facet of facility planning is to receive input and feedback from affected property owners, civic and business groups, and transit riders and road users, including public forums and workshops, electronic newsletters, and other forms of outreach. No County funding for transit corridor implementation nor additional rights-of-way, as proposed in this Plan or in subsequent studies, will be considered until the Council is satisfied that this fundamental public engagement requirement has been fulfilled and a Council public hearing solely for each corridor or combination of connected corridors is held. Accordingly, a citizens advisory group comprised of residents, business owners and other relevant stakeholders must be created for each corridor which enters into facility planning to make recommendations to the County on the design, construction and proposed station locations for the transit corridor.

The County’s Service Planning and Integration Study will determine the general relationship between BRT and local bus service; incorporating that study’s recommendations may require a different set of stations as a result of facility planning. More detailed analysis is required after the completion of that study to determine the specific location and size of transit stations.

Most of the BRT corridors pass through residential areas and in addition to serving the transportation function of moving people, the system should be implemented in such a way that it enhances the surrounding area and minimizes negative impacts to the extent possible. Overhead signage should be kept to the minimum necessary and minimize obtrusiveness. Stations must be identifiable but should be designed to complement the surrounding neighborhood.
A transit corridor network that supports high-quality bus service will improve accessibility and mobility to serve the development envisioned by the County’s adopted land use plans. Implementing this Functional Plan will help further the General Plan’s transportation goal, which is to:

“Enhance mobility by providing a safe and efficient transportation system offering a wide range of alternatives that serve the environmental, economic, social, and land use needs of the County and provide a framework for development.” (page 63)

This Plan recommends a transit corridor network and makes recommendations for stations (located by the nearest intersection) to accommodate BRT service. The Plan recommends rights-of-way to accommodate these facilities and in some cases, changes in the number of travel lanes to achieve this transit corridor network.

There are many other elements of BRT service however that are beyond the scope of the Plan but are important to its future success, including:

- implementing each corridor’s treatment;
- implementing elements such as queue-jumpers and/or transit signal priority to improve vehicle operating speeds along selected segments of the network;
- providing express and limited stop service to and from key activity centers; the greater spacing of stops reduces the amount of time buses must stop to pick up and drop off customers;
- providing off-board fare collection and level boarding to reduce the time it takes passengers to enter and exit a bus; and
- multiple bus doors that are level with the station platform to reduce the dwell time at stops by allowing riders—including children, the elderly, and persons with disabilities—to enter and exit more quickly.

This Plan also makes no recommendations regarding the operation of BRT such as: the frequency, hours, and span of service; fare structure and system financing; bus size and fuel source; details of the station design; transfers with other transit services; and the potential redeployment of local buses.

The County is focusing new planned development in compact, mixed-use areas that reduce the need for driving and enhance its pedestrian, bicycle, and transit network with sustainable, cost-effective solutions. A key support for this development pattern is a high-quality, reliable transit system that enables people to leave their cars at home. This system will connect these activity centers with existing and other planned development. While light rail is an appropriate system to connect high-density activity centers, such as the Purple Line between Bethesda and Silver Spring, it is not cost-effective for most of the County’s transit corridors.

BRT works where development densities may be lower than those that warrant light rail, but where greater transit speed and efficiency is needed beyond what standard local bus service can provide. This Plan recommends a network of additional BRT transit corridors that will be integrated with the Corridor Cities Transitway (CCT), now in preliminary design as a BRT facility. This Plan anticipates that the recommended transit network also can be adapted and will therefore evolve over time to meet the particular transit needs and operating characteristics of each corridor segment and activity center.

To support this changing land use policy direction, transportation success must be measured differently. For example, rather than focusing on the number of cars that can move through an intersection, a typical transportation system performance assessment, the County should focus on person-throughput: providing as many people as possible with reliable travel options along its major transportation corridors.
and where feasible, providing a travel advantage to those who use transit and reducing the growth of traffic congestion into the future.

**person-throughput**: the number of persons that can be carried in a particular lane or roadway in one hour  
**corridor**: a public right-of-way for transportation that contains one or more of the following: a roadway, transitway, bikeway, or pedestrian facilities  
**transit corridor treatment**: the physical space in the public right-of-way intended to be used by BRT service  
**bus route**: a designated set of roadway segments used by a regularly scheduled bus service

Nationwide, BRT systems have proved to be beneficial for travelers, reducing travel time and increasing service reliability. The experience of those systems was used to determine where additional right-of-way should be identified and protected for the construction of future transitways and transit stations. Two successful examples of BRT lines, the EmX in Eugene, Oregon and the HealthLine in Cleveland, Ohio are discussed below.

*EmX (Eugene, OR)*

The Lane Transit District (LTD) system currently operates the Emerald Express (EmX) BRT service within the Eugene-Springfield metropolitan area of Lane County, Oregon. After receiving approval in 2001, the first portion of the route—the Green Line—opened in 2007. This pilot corridor links downtown Eugene and downtown Springfield via popular destinations such as the University of Oregon and Sacred Heart Medical Center.

*Illustration 2 Emerald Express (EmX), Eugene, Oregon*

The EmX, 60 percent of which features dedicated bus lanes, also includes 60-foot articulated vehicles, hybrid electric propulsion, double-sided boarding, on-board wheelchair and bicycle space, as well as both median and curbside stations that provide weather protection for riders.
Within a year of the Green Line’s opening, ridership along the corridor had doubled, a statistic largely driving the City’s honorable mention recognition for a 2008 Sustainable Transport Award. The continued success of the EmX pushed LTD’s decision to expand service to connect Eugene and Springfield to the region’s Gateway area via the Gateway Line extension, which opened in 2011.

HealthLine (Cleveland, OH)
The Greater Cleveland Regional Transit Authority (RTA) operates the HealthLine BRT service (formerly referred to as both the Silver Line and Euclid Corridor Transportation Project). Opened in 2008 and subsequently renamed as a result of a partnership with the Cleveland Clinic and University Hospital, the system runs along Cleveland’s Euclid Avenue from the downtown area’s Public Square to East Cleveland’s University Circle.

Illustration 3 HealthLine, Cleveland, Ohio

The line covers 58 stations and contains dedicated bus lanes (with advanced signal technology to coordinate with cars), off-board fare collection (at both median and curbside stations), diesel-electric hybrid motors on articulated vehicles, and adjacent bike lanes along the route.

Originally billed as a link between hotels, employers, cultural institutions, and other popular destinations, within a year of the project’s opening, the HealthLine’s success was evident; indeed, ridership had risen by nearly 50 percent over that of the Route 6 Euclid Avenue bus, which was formerly the most heavily used route in the RTA system.
Summary Recommendations

Functional plans provide the intermediate level of planning detail between the General Plan and area master plans, in this case, providing the legal basis for securing adequate rights-of-way to accommodate the desired facilities. This Plan’s focus is to:

- identify the corridors needed to accommodate the desired BRT network, facilitating superior transit service along many of the County’s major roadways;
- identify the corridor segments where lanes would be dedicated for BRT, but without designating the specific treatment;
- recommend a minimum public right-of-way for each affected roadway and any changes to the planned number of travel lanes; and
- identify recommended station locations by the nearest intersection.

This Plan recommends a network of ten transit corridors (see Map 1), with specified rights-of-way, in addition to the Corridor Cities Transitway.
Corridor 1: Georgia Avenue North
Corridor 2: Georgia Avenue South
Corridor 3: MD 355 North
Corridor 4: MD 355 South
Corridor 5: New Hampshire Avenue
Corridor 6: North Bethesda Transitway
Corridor 7: Randolph Road
Corridor 8: University Boulevard
Corridor 9: US 29
Corridor 10: Veirs Mill Road
Corridor CCT: Corridor Cities Transitway
The Plan also recommends:

- designating Bicycle-Pedestrian Priority Areas around major stations to promote safe, convenient access for transit patrons; and
- adding a third track on a portion of the MARC Brunswick Line to promote regional transit service improvements.

This Plan’s recommended transit corridor network is intended to serve current and planned land use in adopted master and sector plans. No changes to land use or zoning are recommended in this Functional Plan.

This Plan establishes the direction for more detailed work to be done in project planning along individual transit corridors. The corridor alignment and station locations are subject to modification during these more detailed planning and engineering phases of project development and implementation, bearing in mind that the goal is to create a high-quality BRT system that will offer frequent, reliable service.

**Background**

The first *Master Plan of Highways* (MPOH) was approved and adopted in 1931, shortly after the creation of the Maryland-National Capital Park and Planning Commission in 1927. The last comprehensive update to the MPOH was approved and adopted in 1955 (see Illustration 4). It covered the Maryland-Washington Regional District as it existed at the time, Montgomery County’s portion of which was about one-third of the County’s current area—east of Georgia Avenue, east and south of the City of Rockville, and the southeast portion of Potomac.
Illustration 4 Master Plan of Highways, 1955
Rather than a comprehensive update, the MPOH has been updated periodically, focusing on specific projects or geographic areas. Area master plans were revised in the 1970s to include the Metrorail Red Line, but the MPOH map was not revised to include transitways until 1986. Transitways now included in the MPOH are:

- Purple Line Light Rail;
- Corridor Cities Transitway;
- North Bethesda Transitway; and
- Georgia Avenue Busway.

Since 1955, there have been updates and amendments to the MPOH through various approved and adopted functional, master, and sector plans. The most significant Countywide update since 1955 was the creation of the Rustic Roads Functional Master Plan (RRFMP) in 1996, which sought to preserve many of the roads in the rural area of the County to reflect and further the goals of the 1980 Functional Master Plan for the Preservation of Agricultural and Rural Open Space.

This Plan complements the RRFMP by reflecting the growing urbanization of the I-270 corridor and the down-County area. It will provide the mobility needed to accommodate that growth while minimizing the adverse impacts on quality of life for those who live, work, and patronize the businesses along major roadways.

The General Plan recommends “an interconnected transportation system that provides choices in the modes and routes of travel.” A BRT system would better enable transit riders to travel on a network of corridors with few transfers and with reliable service, helping to fulfill the General Plan’s transportation vision.
Vision

This Plan will greatly increase the extent of high-quality transit service to the County’s most densely developed areas, areas planned for redevelopment, and areas planned for new dense development. As parts of the County urbanize, BRT will provide the transit service needed to move more people to and from jobs, homes, shopping, and entertainment areas. Transit’s more efficient use of public rights-of-way will support economic development in an environmentally sustainable way and in a way that preserves existing communities.

Why Bus Rapid Transit?

With exclusive or dedicated lanes, signal priority, and greater spacing between stops, BRT will:
- provide better service to existing transit passengers whose travel time would be reduced;
- provide a fast, convenient, reliable alternative to the single-occupant vehicle and increasingly congested roads;
- move more people in the same space as a general purpose lane at a higher average level of service;
- act as a bridge between rail transit and extensive local bus service; and
- potentially intercept many non-County residents before they reach the County’s more heavily developed areas, allowing roadway capacity to better serve planned development within the County.

BRT can be implemented more easily and quickly than light rail, at a lower capital cost, and is far more flexible. BRT routes can use a single transit corridor or parts of multiple corridors, which can also accommodate local buses that are included in the County’s bus service plan for the network.

This Plan makes recommendations for transit corridors within Montgomery County. These corridors are intended to accommodate transit services both within the County and those that extend beyond the County line. The recommended transit corridors are not intended to be viewed as bus routes that terminate at the County line.

Finally, BRT can be implemented in phases, integrating improvements in vehicles, stations, and runningways as operating and capital funds become available, and as the related varying levels of transit-supportive densities materialize along segments of the corridors.

Fitting BRT into the County’s Transportation Network

Metrorail is the backbone of the County’s transit network, providing transit service via the Red Line within the County and to downtown Washington, D.C. It provides service to about three-quarters of a million passengers system-wide on an average weekday, significantly reducing the peak-hour travel burden on the region’s roadway network.

The Purple Line, planned as Light Rail Transit (LRT) will provide the next layer of transit service, connecting down-County activity centers, the two Red Line corridors, and Montgomery County with Prince George’s County. The Corridor Cities Transitway, a busway, will connect to up-County activity centers in the portions of Gaithersburg and Germantown west of I-270, and to Clarksburg. The 10 additional BRT corridors in this Plan would form the next layer of transit service. Local, circulator or shuttle, limited-stop, and commuter/express bus routes and MARC commuter rail complete the network.
In addition to serving activity centers directly, BRT on the recommended transit corridors will serve as feeders to Metrorail and MARC stations, and local bus service and shuttles will feed into the recommended corridors. Montgomery County has one of the largest suburban bus services in the country, providing thirty million trips per year. Ride On’s extensive network of local routes will continue to provide access to both the BRT and Metrorail systems, as will the Metrobus network.

This Plan recommends that segments of MD 355 and Georgia Avenue that are already served by Metrorail also be served by the recommended transit corridors. One-half of the forecast BRT patrons are expected to be new transit riders. Since BRT will serve as an intermediate level of transit service between Metrorail and local buses, the other half will migrate from other transit services because of the greater service area, the potential for one-seat rides, and connections to the Purple Line.

The introduction of extensive high-quality transit service on the County’s roadways will provide an attractive alternative to private automobiles. In addition to recommendations in the General Plan and many master plans to increase the percentage of residents using transit, specific mode share goals of up to 50 percent non-single-occupant vehicle travel are already in place in several areas of the County. The recommended transit network would provide the superior transit facilities necessary to help achieve these goals.

At the same time, BRT service on the transit corridor network recommended by this Plan should improve the overall operation of the roadway network for drivers still using the roads by increasing average travel speeds and reducing the growth in congestion Countywide. The impacts on individual corridors will depend greatly on the final transit corridor treatment selected by the implementing agency and must be determined during detailed project planning and service planning following the adoption of this Functional Plan.

This Plan makes no recommendations for adding park-and-ride facilities. While adding park-and-ride lots could increase ridership, the locations of these lots should be carefully considered to match the function of each recommended BRT corridor.

- **BRT—Activity Center Corridors:** because these corridors connect multiple dense, mixed-use areas, all station areas should prioritize pedestrian, bicycle, and transit access; park-and-ride lots should be discouraged.
- **BRT—Express Corridors:** because these corridors connect park-and-ride lots to employment centers, park-and-ride BRT stations should prioritize vehicular and transit access; pedestrian, bicycle, and transit access should be the focus at all other stations.
- **BRT—Commuter Corridors:** because these corridors connect moderate density residential areas to employment centers, most station areas should prioritize pedestrian, bicycle, and transit access. Park-and-ride lots may be appropriate at some locations, especially end-of-the-line stations and connections to interstates and expressways, but multi-modal access should be provided.

This Plan recommends that additional park-and-ride lots be considered in future area master plans.

The Plan recommends sufficient rights-of-way for safe, adequate access along the transit corridors, improvements to existing bicycle and pedestrian facilities in the areas around recommended stations, and the designation of Bicycle-Pedestrian Priority Areas at major transit stations.
Guiding Principles

The 1993 General Plan Refinement shifted the County’s transportation goal toward meeting travel demand by providing good alternatives to the single-occupant vehicle:

The 1969 Circulation Goal was to “provide a balanced circulation system which most efficiently serves the economic, social, and environmental structures of the area.” The General Plan Refinement renames the goal to the Transportation Goal. One important conceptual change in this goal is the movement away from accommodating travel demand and toward managing travel demand and encouraging the availability of alternatives to the single-occupant vehicle. The Refinement effort thus abandons phrases such as “carry the required volume” and “accommodate travel demand” because the demand for single-occupant vehicle travel will usually outstrip the County’s ability to meet it. (page 61)

The Refinement further recommends:

“Making better use of the transportation system already in place, getting more people into trains, cars, and buses in future right-of-way, and creating an environment conducive to walking and biking are all necessary elements to achieve an affordable balance between the demand for, and supply of, transportation.” (page 60)

“A key aspect of making the County more accessible by transit and walking is that it can reduce travel by car. Favoring transit can make more efficient use of the existing roadway network and can reduce air pollution.” (page 17)

To further the transportation goal, this Plan recommends:

- designating exclusive or dedicated bus lanes, wherever there is sufficient forecast demand to support their use and where subsequent analysis shows that acceptable traffic operations can be achieved, to promote optimal transit speeds in urban areas and surrounding suburban areas;
- implementing transit facilities and services where and when they would serve the greatest number of people on individual corridors and where there would be an improvement to the overall operation of the County’s transportation network;
- expanding regional rail transit service;
- supporting policies and programs that increase the comfort and safety of pedestrians and bicyclists traveling to and from transit facilities; and
- minimizing the construction of additional pavement to limit impacts on the environment and on adjacent communities.

A strong transit network is essential to support economic development in planned growth areas. The recommended transit corridors will facilitate BRT and other high-quality transit services as well as potentially accommodate other bus services such as Metrobus and Ride On and provide connections to Metrorail, the Purple Line, and MARC.
Potential BRT Treatments

Future facility planning studies will develop detailed ridership projections and traffic forecasts, will evaluate the specific conditions for each corridor segment and the system as a whole, and will include the following considerations:

- Are dedicated lanes warranted?
- Should the dedicated lanes be at the curb or in the median?
- Can existing travel lanes be repurposed as dedicated bus lanes?
- What segments of the recommended transit network can be implemented without adversely affecting current planned land use or general traffic operations? What segments require further study as part of an area master plan effort?

Dedicated Lanes

The ridership used to determine when a dedicated bus lane is warranted can vary nationally depending on the jurisdiction but is typically around 1,200 passengers per peak hour in the peak direction (ppphpd). This Plan’s recommendations generally are based on a lower threshold of 1,000 pphpd to reflect:

- the high level of analysis of the large network studied;
- the long time frame of the Functional Plan, which accommodates build-out of current planned land use beyond the 2040 forecast year; and
- hard-to-measure model attributes that may significantly increase forecast ridership. Preliminary modeling work done for the Veirs Mill Road Corridor indicated that the forecast ridership could be undercounted by up to 30 percent because of these attributes, which include
  - service branding
  - reliability
  - span of service hours
  - comfort
  - protection from weather
  - the chances of finding a seat
  - other passenger amenities.

Where forecast BRT ridership was less than the 1,000 pphpd threshold, it was combined with forecast local bus ridership to identify corridor segments where dedicated lanes could improve bus travel for all transit users. Corridor segments that fell below 1,000 pphpd in combined BRT and local bus ridership were generally not recommended for inclusion in the Plan. In select cases, largely because of network integrity considerations, some lower-ridership segments were retained, most often as mixed traffic operations.

Median busways have dedicated rights-of-way and provide the highest level of BRT accommodation. They are generally recommended where the peak hour forecast ridership is very high. For example, the *Transit Capacity and Quality of Service Manual* sets consideration of a median busway at 2,400 people in the peak hour in the peak direction; however some jurisdictions have set that threshold between 1,500-1,700 pphpd for policy reasons. This is a reasonable approach for Montgomery County to consider as well, for the same reasons outlined in Dedicated Lanes above.

Higher bus ridership forecasts make a median busway more desirable since it provides the highest level of service for riders, even though it requires a wider right-of-way and may make left-turns for general
traffic more difficult. A supporting street grid however, makes accommodating a median busway easier by giving options for parallel routes and turning movements, e.g. the White Flint Sector Plan area.

Illustration 5 Proposed White Flint Street Grid

The existing and proposed street grid in White Flint provides alternative routes to MD 355. Proposed redevelopment will add mixed-uses, open spaces, and travel options.

Future area master plan updates, particularly in station areas, should consider ways to enhance the street grid at critical locations. More detailed planning will be required during implementation to determine location-specific solutions to the traffic challenges posed by a median busway.

Corridors with lower forecast BRT ridership but with high combined BRT and local bus ridership are better suited to curb lane operations. Dedicated curb lanes may be shared with express and limited-stop bus services, as well as other bus services, to provide faster, more dependable bus service for all transit patrons in the corridor. Dedicated curb lanes may also be the best interim treatment where a median busway is desired but where obtaining sufficient right-of-way is not possible in the near term without excessively adverse impacts.

Dedicated curb lanes would be open to use by emergency vehicles and would likely be open to use by right-turning vehicles and by on-road bicyclists who do not otherwise have dedicated space in the roadway.
This Plan identifies the rights-of-way necessary to facilitate the development of a network of dedicated transit lanes. It recognizes, however, that the final decision on treatment in each transit corridor must be made at the time of implementation when a transit service plan is in place and:

- the benefits of accommodating BRT and/or other bus services in the dedicated lanes can be quantified;
- the traffic impacts of implementing curb lanes vs. a median busway can be more closely studied; and
- the impacts on adjacent properties can be determined.

This Plan is intended to provide flexibility for the implementing agency to make the choice of a curb or median busway as the best way to achieve dedicated lanes.

**Lane Repurposing**

After determining whether dedicated median or curb lanes are warranted on a corridor, the next step is to determine how to achieve them: whether to repurpose existing travel lanes, use the median where it’s wide enough to accommodate the desired treatment, or identify additional right-of-way.

An important goal of this Plan is to increase person-throughput, the number of people that can be accommodated within our often constrained public rights-of-way. Lane-repurposing—designating an existing travel lane for bus use only—provides the most efficient use of available transportation facilities. In addition to Central Business District areas where constructing additional lanes is most often not practical, lane repurposing may be implemented where the number of forecast transit riders exceeds the general purpose lane capacity and/or where general traffic demand would not exceed capacity.

In many segments of the proposed BRT corridors, the 2040 forecast bus ridership surpasses, and in some cases far surpasses, the person-throughput of a single general purpose traffic lane. Implementing necessary and more efficient transit facilities should reflect the priority given to transit in the General Plan (see Guiding Principles).

Where bus rapid transit would move people most efficiently in a corridor, the dedicated space needed to accommodate transit should be provided; the remaining lanes would continue to be available for general traffic. The recommended bus lanes would provide a greater level of person-throughput, potentially at a higher average level of service for all users of the road.

Where lane repurposing is considered, a thorough traffic analysis should be performed as part of facility planning to identify what transportation improvements could be implemented to mitigate the impacts of lane repurposing, ensuring that the overall operation of the transportation network will operate acceptably. This analysis should not be confined to the specific transit corridor only, but should also consider what changes are needed, if any, in the surrounding area to ensure an acceptable operation for traffic that would be diverted from the corridor being studied.

Because of heavy traffic demands, future congestion may still be unacceptably high in the remaining lanes. The desirability of providing additional general traffic lanes should then be considered along with...
the impacts associated with constructing the additional pavement. Should additional travel lanes be
needed, an amendment to this Plan or to the appropriate area master plan should be pursued.

The desire to reduce congestion by providing more roadway capacity must be weighed against the
benefits of increasing transit ridership. However, the transportation modeling performed for this Plan
forecasts an overall improvement in traffic speeds with the introduction of BRT over the no-build
condition. More detailed planning will be required during implementation to determine location-
specific impacts on traffic in areas where lane-repurposing is recommended.

In addition to the person-throughput measure of whether a bus lane or a general traffic lane can move
the most people, lane-repurposing should also be considered where it would result in the greatest
improvement in level-of-service for all users of the roadway. Where the forecast BRT ridership on a
congested roadway is greater than the capacity of a general traffic lane, the lane-repurposing test is
met. But while the general traffic lanes may experience the same poor level of service, the bus lane
carries a greater number of people in fewer vehicles with a far higher level of service, significantly
increasing the average level of service for all users of the roadway.

This Plan recommends that the facility planning process for individual transit corridor projects should
consider improvements in the weighted average level of service for all users of the roadway when
evaluating the costs and benefits of constructing additional pavement to achieve the recommended
transit facilities.
Illustrative Treatments

This Plan makes recommendations for a network of 82 miles of BRT in addition to the Corridor Cities Transitway. There are several potential treatments in each corridor; these will be determined during the facility planning stage of project development. The cross-sections on the following pages illustrate these treatments generically.

Map 2 Recommended Transit Corridor Network
**Illustration 6**  **Illustrative Corridor Segment Treatment: Two-Lane Median Busway**
One lane dedicated to BRT service on either side of the roadway median, with a two-foot-wide striped buffer separating the bus lanes from general traffic.

**Illustration 7**  **Illustrative Corridor Segment Treatment: Two-Lane Side Busway**
A two-lane busway to serve BRT on one side of the roadway, with a landscaped buffer and sidewalk separating the bus lanes from general traffic.

**Illustration 8**  **Illustrative Corridor Segment Treatment: One-Lane Median Busway**
One lane dedicated to BRT service in the center of the roadway separated from general traffic by a median on either side. This lane would in most cases accommodate BRT service in one direction only, but could accommodate bi-directional BRT service if provided with adequate passing lanes.
Illustration 9  Illustrative Corridor Segment Treatment: Managed Lanes
One lane dedicated to BRT service during peak hours in the peak direction of travel only on roads that have a reversible-lane operation.

Illustration 10  Illustrative Corridor Segment Treatment: Curb Lanes
Outside lanes adjacent to the curb (nearest the sidewalk) dedicated to BRT service, either during peak hours or all day.

Illustration 11  Illustrative Corridor Segment Treatment: Mixed Traffic
No dedicated space provided for BRT service. Buses would typically operate as they do now but some additional accommodation at intersection could be provided, such as queue jumpers (short passing lanes) and/or traffic-signal priority.
Recommended Corridors

This Plan recommends the following ten corridors:
Corridor 1: Georgia Avenue North
Corridor 2: Georgia Avenue South
Corridor 3: MD 355 North
Corridor 4: MD 355 South
Corridor 5: New Hampshire Avenue
Corridor 6: North Bethesda Transitway
Corridor 7: Randolph Road
Corridor 8: University Boulevard
Corridor 9: US 29
Corridor 10: Veirs Mill Road

The recommendations for each corridor and segment include:
- dedicating public rights-of-way for several transit corridors
- changes in the number of master planned travel lanes
- whether or not there would be one or more lanes dedicated for transit use
- intersections near which transit stations should be located.

These recommendations represent the maximum number of added lanes (including improved bikeways and sidewalks) in each corridor segment, without predetermining the treatment to be employed. For example, where the Plan recommends adding one dedicated lane to the cross-section, this would leave open the option of not adding a lane but simply repurposing existing lanes, or, if even repurposing is not feasible, merely having the BRT service run in mixed traffic.

Stations are identified by the station type and right-of-way, but the specific location of the station and associated right-of-way should be determined during facility planning. The number of stations may also be increased or decreased during facility planning.

Recommended rights-of-way should be considered minimum rights-of-way and additional right-of-way may also be required for stations and at some intersections to accommodate turn lanes.

Recommendations within Prince George’s County and the Cities of Rockville and Gaithersburg are offered as policy guidance for future area master or sector plan updates in these jurisdictions, which must pursue their own master plan processes to determine the ultimate recommended rights-of-way, station locations, and number of travel lanes.
Corridor 1: Georgia Avenue North

Georgia Avenue North is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. The corridor has several activity nodes, notably the commercial centers at Wheaton and Glenmont, and their respective Metrorail stations. Aspen Hill and Olney are at the northern end, with residential uses in between.

The corridor includes the Georgia Avenue Busway, a long-planned transitway in the wide median between Glenmont and Olney recommended in the 1997 Glenmont Sector Plan, 1994 Aspen Hill Master Plan, and 2005 Olney Master Plan.

Since congestion tends to occur in the peak direction of traffic, a single dedicated transit lane is sufficient for achieving a travel speed consistent with commuter BRT service.

Corridor recommendations, from north to south:

- Along Prince Phillip Drive from the planned Olney Transit Center to Olney-Sandy Spring Road, a mixed traffic transitway.
- Along Olney-Sandy Spring Road from Prince Phillip Drive to Georgia Avenue, a mixed traffic transitway.
- Along Georgia Avenue from Olney-Sandy Spring Road in Olney to Reedie Drive in Wheaton, a dedicated lane.
- Along Reedie Drive from Georgia Avenue to Veirs Mill Road, a mixed traffic transitway.

This Plan also recommends implementing a cycle track to achieve a bicycle facility that avoids the driveway interruptions of the more typical location at the side of the roadway and permit cyclists to travel safely at a higher speed. The higher quality of such a path negates the need for on-road bike lanes. The cycle track will end at Glenallan Avenue where users can transfer to the Glenmont Metro Station or the Glenmont Greenway.

Station Locations

Montgomery General Hospital
MD 97 and MD 108
MD 97 and Hines Road
ICC park-and-ride
MD 97 and Norbeck Road park-and-ride
MD 97 and Rossmoor Boulevard
MD 97 and Bel Pre Road
MD 97 and MD 185
MD 97 and Hewitt Avenue
Glenmont Metro Station
MD 97 and Randolph Road
MD 97 and Arcola Avenue
Wheaton Metro Station
Table 3  
Corridor 1 Recommendations, Georgia Avenue North

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prince Phillip Dr</td>
<td>Brooke Farm Dr</td>
<td>MD 108</td>
<td>No</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Olney-Sandy Spring Rd</td>
<td>Prince Phillip Dr</td>
<td>Georgia Ave</td>
<td></td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>MD 108</td>
<td>Spartan Rd</td>
<td></td>
<td>121</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Spartan Rd</td>
<td>Old Baltimore Rd</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Old Baltimore Rd</td>
<td>Emory Ln</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Emory Ln</td>
<td>MD 28</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>MD 28</td>
<td>Matthew Henson State Park</td>
<td>No</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Matthew Henson State Park</td>
<td>Weller Rd</td>
<td>Yes</td>
<td>130</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Weller Rd</td>
<td>Denley Rd</td>
<td></td>
<td>135</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Denley Rd</td>
<td>Layhill Rd</td>
<td></td>
<td>145</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Layhill Rd</td>
<td>500 ft south of Randolph Rd</td>
<td></td>
<td>170</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>500 ft south of Randolph Rd</td>
<td>Mason St</td>
<td></td>
<td>124</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Mason St</td>
<td>400 ft north of Blueridge Ave</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>400 ft north of Blueridge Ave</td>
<td>Reedie Drive</td>
<td></td>
<td>129</td>
<td>1</td>
</tr>
<tr>
<td>Reedie Drive</td>
<td>Georgia Ave</td>
<td>Veirs Mill Rd</td>
<td>No</td>
<td>70</td>
<td>0</td>
</tr>
</tbody>
</table>

* Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.

Table 4  
Corridor 1 Recommendations, Georgia Avenue North Cycle Track

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Name</th>
<th>Type</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-2</td>
<td>Georgia Ave</td>
<td>Cycle Track</td>
<td>Queen Mary Drive to Glenallan Ave</td>
</tr>
</tbody>
</table>
Corridor 2: Georgia Avenue South

Like the segment to the north, Georgia Avenue South is a commuter corridor, with most traffic (and congestion) flowing southbound in the morning and northbound in the evening. The corridor has several activity nodes, notably the Wheaton and Silver Spring CBDs with their respective Metrorail stations, the Forest Glen Metrorail station, and the Montgomery Hills commercial center, with residential uses in between.

Corridor recommendations, from north to south:

- Along Georgia Avenue from Veirs Mill Road to 16th Street, a mixed traffic transitway.
- Along Georgia Avenue from 16th Street to Colesville Road, dedicated lanes.
- Along Wayne Avenue from Georgia Avenue to Colesville Road, a mixed traffic transitway.
- Along Georgia Avenue from Wayne Avenue to the DC line, dedicated lanes. This transitway could accommodate BRT and/or a potential extension of the DC streetcar line planned for Georgia Avenue.

Station Locations

- Wheaton Metro Station
- MD 97 and Dexter Avenue
- Forest Glen Metro Station
- MD 97 and Seminary Road
- MD 97 and Cameron Street
- Silver Spring Transit Center
- MD 97 and East West Highway
- MD 97 and Eastern Avenue/Burlington Avenue/Montgomery College – Silver Spring/Takoma Park Campus
### Table 5  
**Corridor 2 Recommendations, Georgia Avenue South**

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia Avenue</td>
<td>Veirs Mill Rd</td>
<td>Dennis Ave</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Dennis Ave</td>
<td>I-495</td>
<td>No</td>
<td>110</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>I-495</td>
<td>Flora Ln</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Flora Ln</td>
<td>16th St</td>
<td>Yes</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>16th St</td>
<td>Spring St</td>
<td>Yes</td>
<td>126</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Spring St</td>
<td>Colesville Rd</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Wayne Avenue</td>
<td>Colesville Rd</td>
<td>Georgia Ave</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Wayne Ave</td>
<td>Blair Mill Rd</td>
<td>Yes</td>
<td>125-140</td>
<td>0</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Blair Mill Rd</td>
<td>DC Line</td>
<td>Yes</td>
<td>125</td>
<td>0</td>
</tr>
</tbody>
</table>

* Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 3: MD 355 North

MD 355 North is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. The corridor has several major existing and planned activity nodes, including Rockville and Gaithersburg. It is also characterized by heavy congestion and high transit ridership potential.

Corridor recommendations, from north to south:

- Along MD 355 from Redgrave Place to Shakespeare Boulevard, a mixed traffic transitway is recommended.

Dedicated lanes are recommended:

- Along Seneca Meadows Parkway from the Corridor Cities Transitway to Observation Drive.
- Along Shakespeare Boulevard from Observation Drive to MD 355.
- Along MD 355 from Shakespeare Boulevard to Rockville Metro Station.
- Along Seneca Meadows Parkway from the Corridor Cities Transitway to MD 118.
- Along Goldenrod Lane from MD 118 to Observation Drive.
- Along Observation Drive from Goldenrod Lane to Middlebrook Road.
- Along Middlebrook Road from Observation Drive to MD 355.

It is also recommended to delete the master-planned link of the Corridor Cities Transitway’s East Branch between Century Boulevard and Seneca Meadows Parkway.

Station Locations

The Shops at Seneca Meadows
Seneca Meadows Corporate Park
Montgomery College -- Germantown Campus
Holy Cross Hospital/Pinkney Life Science Park
MD 355 and Redgrave Place
MD 355 and Shawnee Lane
MD 355 and Foreman Boulevard
MD 355 and Little Seneca Parkway
MD 355 and West Old Baltimore Road
MD 355 and Ridge Road
MD 355 and Shakespeare Boulevard
MD 355 and MD 118
MD 355 and Middlebrook Road
MD 355 and Professional Drive
MD 355 and Watkins Mill Road
MD 355 and MD 124
MD 355 and Odendhal Avenue
MD 355 and Brookes Avenue
MD 355 and Education Boulevard
MD 355 and Shady Grove Road
MD 355 and King Farm Boulevard
MD 355 and Gude Drive
MD 355 and Mannakee Street/Montgomery College – Rockville Campus
Rockville Metro Station

Note that stations within the Cities of Gaithersburg and Rockville must be confirmed in their respective master plans.
Table 6     Corridor 3 Recommendations, MD 355 North

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD 355</td>
<td>Redgrave Place</td>
<td>Little Seneca Creek</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>MD 355</td>
<td>Little Seneca Creek</td>
<td>Shakespeare Blvd</td>
<td></td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>Seneca Meadows Pkwy</td>
<td>Corridor Cities Transitway</td>
<td>Observation Dr</td>
<td>Yes</td>
<td>130</td>
<td>2</td>
</tr>
<tr>
<td>Shakespeare Blvd</td>
<td>Observation Dr</td>
<td>MD 355</td>
<td>Yes</td>
<td>123</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>Shakespeare Blvd</td>
<td>MD 118</td>
<td></td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>MD 355</td>
<td>MD 118</td>
<td>Game Preserve Rd</td>
<td>Yes</td>
<td>250</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>Game Preserve Rd</td>
<td>Just south of O'Neil Dr</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD 355</td>
<td>just south of O'Neil Dr</td>
<td>1,250 ft south of Shady Grove Rd</td>
<td>Yes</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>1,250 ft south of Shady Grove Rd</td>
<td>Ridgemont Ave</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD 355</td>
<td>Ridgemont Ave</td>
<td>Indianola Drive</td>
<td>Yes</td>
<td>123</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>Indianola Drive</td>
<td>1,000 ft south of Indianola Drive</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD 355</td>
<td>1,000 ft south of Indianola Drive</td>
<td>270 ft north of N. Campus Dr</td>
<td>Yes</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>270 ft north of N. Campus Dr</td>
<td>Church St</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

And:

| Seneca Meadows Parkway       | East Branch of Corridor Cities Transitway | MD 118 | Yes | 100 | 0  |
| Goldenrod Lane               | MD 118                                    | Observation Drive | Yes | 80  | 0  |
| Observation Drive            | Goldenrod Lane                            | Middlebrook Road | Yes | 80  | 0  |
| Middlebrook Road             | Observation Drive                         | MD 355 | Yes | 150 | 0  |

*Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 4: MD 355 South

MD 355 South is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. It is characterized by shorter trips representing a wide variety of travel purposes (shopping and recreation, in addition to commuting). The corridor has several planned or existing activity nodes, including Rockville, Twinbrook, White Flint, National Institutes of Health/Walter Reed National Military Medical Center, and the Bethesda CBD. It is also characterized by very heavy congestion and high transit ridership potential.

Corridor recommendations, from north to south:
• From Rockville Metro Station to Bethesda Metro Station, dedicated lanes.

Station Locations
Rockville Metro Station
MD 355 and Edmonston Drive
MD 355 and Templeton Place
MD 355 and Halpine Road
MD 355 and Hubbard Drive
White Flint Metro Station
MD 355 and Security Lane
Grosvenor Metro Station
MD 355 and Pooks Hill Road
MD 355 and Cedar Lane
Medical Center Metro Station
MD 355 and Cordell Avenue
Bethesda Metro Station

Stations within the City of Rockville must be confirmed in the City’s master plan.

If and when the District of Columbia incorporates into its master plan (or equivalent) dedicated BRT lanes from Friendship Heights to the National Cathedral area and Georgetown, then an extension of the MD 355 South corridor from the Bethesda Metro Station to Western Avenue is included the Countywide Transit Corridors Functional Master Plan. This extension would be in dedicated lanes with no additional transit lanes, and include stations in the vicinity of MD 355/Bradley Boulevard and the Friendship Heights Metro Station. It would be in a master-planned right-of-way of 122 feet between the Bethesda Metro Station and Nottingham Drive, 120 feet between Nottingham Drive and Oliver Street, and 122 feet between Oliver Street and Western Avenue.
<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD 355</td>
<td>Church Street</td>
<td>Halpine Rd</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD 355</td>
<td>Halpine Rd</td>
<td>250 ft south of Twinbrook Pkwy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD 355</td>
<td>250 ft south of Twinbrook Pkwy</td>
<td>200 ft south of Hoya St</td>
<td></td>
<td>150 (162)**</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>200 ft south of Hoya St</td>
<td>Edson Ln</td>
<td></td>
<td>150 (162)**</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>Edson Ln</td>
<td>Hillery Way</td>
<td></td>
<td>150 (162)**</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>Hillery Way</td>
<td>Grosvenor Ln</td>
<td></td>
<td>150</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>Grosvenor Ln</td>
<td>I-495</td>
<td>Yes</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>MD 355</td>
<td>I-495</td>
<td>Cedar Ln</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>Cedar Ln</td>
<td>Woodmont Ave</td>
<td></td>
<td>123</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>Woodmont Avenue</td>
<td>Chestnut St</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>MD 355</td>
<td>Chestnut Street</td>
<td>Bethesda Metro</td>
<td></td>
<td>122</td>
<td>1</td>
</tr>
</tbody>
</table>

*Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.

** The Rockville Pike 150-foot right-of-way can be expanded to 162 feet (additional space to be obtained through reservation).
Corridor 5: New Hampshire Avenue

New Hampshire Avenue is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. Activity centers are located at Takoma/Langley Crossroads and the emerging mixed-use center at White Oak. The City of Takoma Park has been advancing a concept plan adopted locally in 2008 to convert New Hampshire Avenue, from University Boulevard to Eastern Avenue, into a more pedestrian-friendly, multi-way boulevard that accommodates multiple modes of transportation, while serving as a destination.

Corridor recommendations, from north to south:
- From Colesville park-and-ride to Lockwood Drive, a mixed traffic transitway.
- From Lockwood Drive to the District line, dedicated lane(s). During facility planning, however, curb lanes or mixed traffic treatments should be considered from Sligo Creek Parkway to the District line, as outlined in the City of Takoma Park’s New Hampshire Avenue Corridor Concept Plan.

Station Locations
- Colesville park-and-ride
- MD 650 and Randolph Road
- MD 650 and Valleybrook Drive
- MD 650 and Jackson Road
- White Oak Transit Center
- FDA White Oak Campus
- MD 650 at Hillandale
- MD 650 and Oakview Drive
- MD 650 and Northampton Drive
- Takoma/Langley Transit Center
- MD 650 and MD 410
- MD 650 and Eastern Avenue

Stations within Prince George’s County must be confirmed in that County’s master plan.
### Table 8  
**Corridor 5 Recommendations, New Hampshire Avenue**

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*****</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire Ave</td>
<td>Colesville park-and-ride</td>
<td>Lockwood Dr</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Lockwood Dr</td>
<td>Oaklawn Drive</td>
<td></td>
<td></td>
<td>130*</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Oaklawn Drive</td>
<td>Powder Mill Road</td>
<td>Yes</td>
<td>120-130*</td>
<td>1</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Powder Mill Road</td>
<td>I-495</td>
<td></td>
<td>130*</td>
<td>1</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>I-495</td>
<td>Northampton Dr</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Northampton Dr</td>
<td>University Blvd</td>
<td>Yes **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>University Blvd</td>
<td>East West Highway</td>
<td>Yes***</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>East West Highway</td>
<td>D.C. Line</td>
<td>Yes****</td>
<td>150 in MC</td>
<td>0</td>
</tr>
</tbody>
</table>

* A bi-directional cycle track plus sidewalk should be considered in place of on-road bike lanes plus shared use path. In areas where severe right-of-way constraints exist however, consideration should be given to accommodating cyclists and pedestrians via a shared use path only.

**2040 forecast ridership for the segments of MD 650 within Prince George’s County warrant a one-lane busway, however this Functional Plan cannot make changes or require dedication within that jurisdiction. The busway recommendation can only become effective upon adoption of a subsequent master plan update that would include recommendations on the right-of-way and the number of travel lanes.

*** The design of the typical section in this segment should be coordinated with the City of Takoma Park to ensure consistency with its New Hampshire Avenue Corridor Concept Plan to the extent possible.

**** The existing right-of-way for this segment is in Prince George’s County, but the Takoma Park Master Plan’s 150-foot right-of-way extends into Montgomery County. The lesser Prince George’s County right-of-way would need to be revised in their Master Plan to implement the ultimate typical section, which should be coordinated with the City of Takoma Park to ensure consistency with its New Hampshire Avenue Corridor Concept Plan to the extent possible.

***** Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 6: North Bethesda Transitway

The North Bethesda Transitway was originally conceived as a spur from the Metrorail Red Line to the Rock Spring office park area and to Montgomery Mall in the 1992 North Bethesda/Garrett Park Master Plan. At its eastern end, the transitway terminates at the Grosvenor Metrorail Station. At its western end, it terminates at a planned transit center at Montgomery Mall. Much of the right-of-way along Rock Spring Drive, Fernwood Road, and Tuckerman Lane is currently available through easements and dedications provided through the development review process. Most of the planned route between Rockville Pike and Old Georgetown Road is not suitable as a BRT route, however, and so this portion of the North Bethesda Transitway is deleted from the master plan.

Corridor recommendations, from west to east:
- At the Fernwood Road bridge, high-occupancy-vehicle (HOV) ramps connecting with the HOV lanes on the I-270 West Spur, both to and from the north and south. The ramp to/from the north exists; the ramp to/from the south would become part of continuous pair of master-planned transit lanes connecting Montgomery and Fairfax Counties.
- Along Westlake Terrace, Fernwood Road, and Rock Spring Drive between the I-270 West Spur and Old Georgetown Road, two additional dedicated lanes.
- Along Old Georgetown Road, from Rock Spring Drive to Tuckerman Lane, an additional dedicated lane.

There are two alternative routes in the easternmost portion of the corridor. One alternative is in dedicated lanes following Tuckerman Lane to the Grosvenor Metro Station. The other alternative would proceed north on Old Georgetown Road in a dedicated lane to the western leg of Executive Boulevard, and then east on Old Georgetown Road in mixed traffic to Rockville Pike and the White Flint Metro Station.

Station Locations

Montgomery Mall Transit Center
Rock Spring Drive and Fernwood Road
Rockledge Drive and Rock Spring Drive
Rock Spring Drive and MD 187
MD 187 and Tuckerman Lane

And either:
MD 187 and Edson Lane/Poindexter Lane
MD 187 and Executive Boulevard/Hoya Drive
White Flint Metro Station

Or:
Grosvenor Metro Station
### Table 9  Corridor 6 Recommendations, North Bethesda Transitway

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W. **</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the segment between the Red Line and Old Georgetown Road/Tuckerman Lane, either:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>White Flint Metro Station</td>
<td>Executive Blvd at Hoya Drive</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>Executive Blvd</td>
<td>Nicholson Ln</td>
<td>Yes</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>Nicholson Ln</td>
<td>Tuckerman Ln</td>
<td></td>
<td>126</td>
<td>1</td>
</tr>
<tr>
<td>Or:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuckerman Lane</td>
<td>Grosvenor Metro Station</td>
<td>Old Georgetown Road</td>
<td>Yes</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>Tuckerman Ln</td>
<td>I-270</td>
<td>Yes</td>
<td>130</td>
<td>1</td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>I-270</td>
<td>Rock Spring Dr</td>
<td>Yes</td>
<td>126</td>
<td>1</td>
</tr>
<tr>
<td>Rock Spring Drive</td>
<td>Old Georgetown Rd</td>
<td>Fernwood Rd</td>
<td></td>
<td>80*</td>
<td>2</td>
</tr>
<tr>
<td>Fernwood Road</td>
<td>Rock Spring Dr</td>
<td>Rockledge Dr</td>
<td>Yes</td>
<td>80*</td>
<td>2</td>
</tr>
<tr>
<td>Westlake Terrace</td>
<td>Rockledge Dr</td>
<td>I-270</td>
<td></td>
<td>80*</td>
<td>2</td>
</tr>
<tr>
<td>Ramps to/from northbound and southbound I-270 West Spur HOV lanes</td>
<td>Fernwood Road/Westlake Terrace</td>
<td>I-270 West Spur</td>
<td>Yes</td>
<td>300</td>
<td>2</td>
</tr>
</tbody>
</table>

* Plus additional 40-foot-wide easement for side-running transitway.

** Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 7: Randolph Road

Randolph Road is a commuter corridor with traffic and congestion in the westbound direction in the morning and the eastbound direction in the evening. Major activity centers include White Flint, Glenmont, and the emerging mixed-use center at White Oak. Residential uses fill in the gaps between these areas.

While ridership forecasts are low for the corridor, it does provide important linkages to other BRT corridors. Therefore, because this corridor is important for the integrity of the BRT network, but the ridership potential is limited and the potential impacts to residential properties are high, this Plan recommends a mixed traffic transitway.

There are two alternative routes in the westernmost portion of the corridor. One alternative is in dedicated right-of-way following the Veirs Mill Road BRT line (Corridor 10) from Randolph Road to its station at Parkland Drive, then proceeding west along Montrose Parkway over Rock Creek, Parklawn Drive (where there would be a station), and the CSX Metropolitan Branch, joining the MD 355 South BRT line (Corridor 4) to the White Flint Metro Station. The other alternative would proceed in mixed traffic west on Randolph Road (and a station at Lauderdale Drive), south on Parklawn Drive, and west on Nicholson Lane to the White Flint Metro Station. A sub-option of this second alternative would use Nebel Street rather than Parklawn Drive if the at-grade Randolph Road crossing of the CSX tracks is retained.

This corridor has greater ridership potential if a higher level of land use is approved as part of the White Oak Science Gateway Master Plan.

Station Locations

- White Flint Metro Station
- Montrose Parkway and Parklawn Drive, and Montrose Parkway and Veirs Mill Road, or Randolph Road and Lauderdale Drive
- Randolph Road and MD 586
- Randolph Road and MD 185
- Randolph Rd and Bluhill Road
- Randolph Road and MD 97
- Glenmont Metro Station
- Randolph Road and Glenallan Avenue
- Randolph Road and MD 650
- Randolph Road and Fairland Road
- US 29 and Tech Road
## Table 10  
Corridor 7 Recommendations, Randolph Road

<table>
<thead>
<tr>
<th>Road</th>
<th>from</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randolph Road</td>
<td>US 29</td>
<td>Fairland Rd</td>
<td>No</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Randolph Road</td>
<td>Fairland Rd</td>
<td>Glenallan Ave</td>
<td></td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Glenallan Avenue</td>
<td>Randolph Rd</td>
<td>Layhill Rd</td>
<td></td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Glenallan Avenue</td>
<td>Layhill Rd</td>
<td>Georgia Ave</td>
<td></td>
<td>90</td>
<td>0</td>
</tr>
<tr>
<td>Randolph Road</td>
<td>Georgia Ave</td>
<td>Judson Rd</td>
<td>No</td>
<td>140</td>
<td>0</td>
</tr>
<tr>
<td>Randolph Road</td>
<td>Judson Rd</td>
<td>Veirs Mill Rd</td>
<td></td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Randolph Road</td>
<td>Veirs Mill Rd</td>
<td>Dewey Rd</td>
<td></td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Randolph Road</td>
<td>Dewey Rd</td>
<td>Parklawn Dr</td>
<td></td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Parklawn Drive</td>
<td>Randolph Rd</td>
<td>Nebel St</td>
<td></td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Nicholson Lane</td>
<td>Nebel St</td>
<td>MD 355</td>
<td></td>
<td>90</td>
<td>0</td>
</tr>
</tbody>
</table>

Or, west of Veirs Mill:

<table>
<thead>
<tr>
<th>Road</th>
<th>from</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.*</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veirs Mill Road (Corridor 10)</td>
<td>Randolph Rd</td>
<td>Parkland Dr</td>
<td>Yes</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Montrose Parkway</td>
<td>Veirs Mill Rd</td>
<td>MD 355</td>
<td>Yes</td>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>MD 355 (Corridor 4)</td>
<td>Montrose Pkwy</td>
<td>White Flint Metro</td>
<td>Yes</td>
<td>162</td>
<td>2</td>
</tr>
</tbody>
</table>

* Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 8: University Boulevard

University Boulevard is a commuter corridor, with traffic flowing westbound in the morning and eastbound in the evening. It has activity centers in Wheaton, Four Corners, Long Branch, and Takoma/Langley Crossroads.

While University Boulevard does not have a very strong ridership, this corridor provides east-west connectivity that is important to the integrity of a network that has many corridors converging in Wheaton. Its duplication with the Purple Line between Piney Branch Road and New Hampshire Avenue is reasonable given the connection to a New Hampshire Avenue transitway and the location of the Takoma/Langley Transit Center at the intersection of New Hampshire Avenue and University Boulevard.

Corridor recommendations, from west to east:
- Along University Boulevard from Georgia Avenue to Lorain Avenue, a dedicated right-of-way.
- Along University Boulevard from Lorain Avenue to Williamsburg Drive, a mixed traffic transitway.
- Along University Boulevard from Williamsburg Drive to New Hampshire Avenue, a dedicated right-of-way.

Station Locations
Wheaton Metro Station
MD 193 and Amherst Avenue
MD 193 and Inwood Avenue
MD 193 and Arcola Avenue
MD 193 and Dennis Avenue
MD 193 and Dennis Avenue
MD 193 and US 29
MD 193 and E Franklin Avenue
MD 193 and E Franklin Avenue
Takoma/Langley Transit Center
Table 11: Corridor 8 Recommendations, University Boulevard

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.****</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Boulevard</td>
<td>Georgia Ave</td>
<td>Amherst Ave</td>
<td>Yes</td>
<td>129</td>
<td>1</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Amherst Ave</td>
<td>Dayton St</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Dayton St</td>
<td>Easecrest Dr</td>
<td></td>
<td>124</td>
<td>1</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Easecrest Dr</td>
<td>Lorain Avenue</td>
<td></td>
<td>124</td>
<td>1</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Lorain Ave</td>
<td>Williamsburg Dr</td>
<td>No</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Williamsburg Dr</td>
<td>Piney Branch Rd</td>
<td></td>
<td>124</td>
<td>1</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Piney Branch Rd</td>
<td>Gilbert St</td>
<td></td>
<td>163**</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Gilbert St</td>
<td>Seek Ln</td>
<td>Yes*</td>
<td>150**, ***</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Seek Ln</td>
<td>Bayfield St</td>
<td></td>
<td>141**, ****</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Bayfield St</td>
<td>Carroll Ave</td>
<td></td>
<td>142**</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Carroll Ave</td>
<td>Prince George’s County line (east of 14th Avenue)</td>
<td></td>
<td>120 (150)** in Montgomery County</td>
<td>0</td>
</tr>
</tbody>
</table>

*The right-of-way of University Boulevard from approximately 100 feet east of Merrimac Drive to New Hampshire Avenue is divided between Montgomery and Prince George’s Counties.
** Additional right-of-way requirements for the Purple Line will be determined either at the time of final design for the Purple Line or at the time of subdivision using latest project-level plans available for the Purple Line.
***Up to an additional 10 feet is needed to accommodate wider medians and/or turn lanes at the intersections of University Boulevard/Gilbert Street and University Boulevard/Seek Lane.
****Up to an additional 10 feet is needed for a median at the intersection of University Boulevard/Seek Lane.
*****Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Corridor 9: US 29

The US 29 corridor is an express corridor north of New Hampshire Avenue and a commuter corridor south of New Hampshire Avenue, with most traffic flowing southbound in the morning and northbound in the evening. Much of the traffic is long distance trips, passing through the corridor on the way to other places. For many people it is an alternative to I-95, drawing people from northern Montgomery County and Howard County to jobs in the I-270 corridor, the District of Columbia, and Northern Virginia.

US 29 north of the New Hampshire Avenue interchange is classified as a controlled major highway, with interchanges ultimately replacing all existing at-grade intersections. It has a wide median that can accommodate a busway, and the three existing interchanges—at Randolph Road/Cherry Hill Road, Briggs Chaney Road, and Spencerville Road (MD 198)—can all accommodate a median busway. Activity centers in this corridor segment are located in Burtonsville and White Oak.

South of New Hampshire Avenue, US 29 is classified as a major highway and has a very different character, passing through very congested areas in Four Corners and the Silver Spring CBD with very limited opportunities to expand the right-of-way.

Corridor recommendations, from north to south:
- Along US 29 from MD 198 to Stewart Lane, up to two additional dedicated lanes.
- Along Stewart Lane and Lockwood Drive, a mixed traffic operation.
- Along US 29 from Stewart Lane to Sligo Creek Parkway, dedicated lanes.
- Along US 29 from Sligo Creek Parkway to Georgia Avenue, a dedicated lane in the peak-hour peak-direction.
- Along US 29 from Georgia Avenue to Sixteenth Street, dedicated lanes.

Station Locations
- Burtonsville park-and-ride
- Briggs Chaney park-and-ride
- US 29 and Fairland Road
- US 29 and Tech Road
- White Oak Transit Center
- Lockwood Drive and Oak Leaf Drive
- US 29 and Hillwood Drive
- US 29 and MD 193
- US 29 and Franklin Avenue
- US 29 and Fenton Street
- Silver Spring Transit Center
### Table 12: Corridor 9 Recommendations, US 29

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.**</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 29</td>
<td>MD 198</td>
<td>Stewart Ln</td>
<td>Yes</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>Stewart Lane</td>
<td>US 29</td>
<td>Lockwood Drive</td>
<td>No</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Lockwood Drive</td>
<td>Stewart Ln</td>
<td>New Hampshire Ave</td>
<td>No</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Lockwood Drive</td>
<td>New Hampshire Ave</td>
<td>US 29</td>
<td>No</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>US 29</td>
<td>Stewart Lane</td>
<td>Lockwood Drive</td>
<td>Yes</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>US 29</td>
<td>Lockwood Dr</td>
<td>Southwood Ave</td>
<td>Yes</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>US 29</td>
<td>Southwood Ave</td>
<td>Sligo Creek Pkwy</td>
<td>Yes</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>US 29</td>
<td>Sligo Creek Pkwy</td>
<td>Fenton St</td>
<td>Yes*</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>US 29</td>
<td>Fenton St</td>
<td>Georgia Ave</td>
<td>Yes</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Colesville Road</td>
<td>Georgia Ave</td>
<td>East West Hwy</td>
<td>Yes</td>
<td>125</td>
<td>0</td>
</tr>
<tr>
<td>Colesville Road</td>
<td>East West Hwy</td>
<td>16th St</td>
<td>Yes</td>
<td>125</td>
<td>0</td>
</tr>
</tbody>
</table>

*The six existing general purpose lanes in these segments currently operate during peak hours as four in the peak direction and two in the off-peak direction; in off-peak hours, they operate as three lanes in each direction. This Plan recommends that the operation in peak hours there be a dedicated lane in the peak direction.

**Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
**Corridor 10: Veirs Mill Road**

Veirs Mill Road is a commuter corridor, with the flow of traffic largely balanced in the eastbound and westbound directions between the two, large central business districts, Wheaton and Rockville. Smaller commercial districts exist at Randolph Road and just west of Twinbrook Parkway. Residential uses fill in much of the rest of the corridor. Service roads that provide access to residential properties exist along many sections of the roadway, consuming a significant part of the right-of-way.

The Veirs Mill Road corridor experiences some of the highest existing transit volumes in Montgomery County and for that reason has long been considered for bus enhancements. However, opportunities to increase ridership are limited because development outside of the CBDs is constrained.

The corridor recommendation is for one or more dedicated lanes between the Rockville and Wheaton Metro Stations, where feasible.

**Station Locations**

Rockville Metro Station  
MD 586 and Norbeck Road  
MD 586 and Broadwood Drive  
MD 586 and Twinbrook Parkway  
MD 586 and Aspen Hill Road  
MD 586 and Parkland Drive  
MD 586 and Randolph Road  
MD 586 and MD 185  
MD 586 and Newport Mill Road  
MD 586 and MD 193  
Wheaton Metro Station

Stations within the City of Rockville must be confirmed in the City’s master plan.
<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Dedicated Lane(s)?</th>
<th>R.O.W.**</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veirs Mill Road</td>
<td>MD 355</td>
<td>Meadow Hall Dr</td>
<td>Yes*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Meadow Hall Drive</td>
<td>Twinbrook Pkwy</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Twinbrook Pkwy</td>
<td>Parkland Dr</td>
<td></td>
<td>150</td>
<td>2</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Parkland Dr</td>
<td>Turkey Branch</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Turkey Branch</td>
<td>Gridley Rd</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Gridley Rd</td>
<td>Randolph Rd</td>
<td>Yes</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Randolph Rd</td>
<td>Ferrara Ave</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Ferrara Ave</td>
<td>Connecticut Ave</td>
<td></td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Connecticut Ave</td>
<td>Newport Mill Rd</td>
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<tr>
<td>Veirs Mill Road</td>
<td>Newport Mill Rd</td>
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<td>120</td>
<td>1</td>
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<tr>
<td>Veirs Mill Road</td>
<td>Galt Ave</td>
<td>Ennalls Ave</td>
<td></td>
<td>129</td>
<td>1</td>
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<tr>
<td>Veirs Mill Road</td>
<td>Ennalls Ave</td>
<td>Wheaton Metro Station</td>
<td></td>
<td>129</td>
<td>1</td>
</tr>
</tbody>
</table>

* 2040 forecast ridership for the segment of Veirs Mill Road within the City of Rockville warrants a one-lane busway, however this Functional Plan cannot make changes or require dedication within that jurisdiction. The busway recommendation can only become effective upon adoption of a subsequent City master plan update that would include recommendations on the right-of-way and the number of travel lanes.

** Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Implementation

The purpose of the transit corridor network is to facilitate a bus rapid transit service that supports the County’s mobility, land use, and economic development goals. The right-of-way designations for transit corridors in this amendment to the Master Plan of Highways represent what is needed to ensure network integrity and achieve the County’s vision, which is to make transit a viable and reliable alternative to driving in the County’s developed core. These right-of-way designations are intended to support the development of a BRT network that improves the performance of the overall transit network as measured by the traffic tests contained in the Subdivision Staging Policy.

A guiding standard is needed to ensure that a high quality of system performance is ultimately achieved. While adequate right-of-way designations are essential to accommodate the infrastructure needed to support a level of speed and reliability that will make BRT an attractive travel option, operational decisions such as the use of signal prioritization, off-board fare collection, and similar questions must also take performance quality standards into account.

Therefore, the Council directs the Planning Board, with assistance from the Department of Transportation, to develop -- and recommend for the Council’s consideration for adoption as an amendment to the Subdivision Staging Policy -- minimum performance standards to guide the implementation of the BRT network to ensure that it will be an attractive alternative to driving. The transit network that is achieved by the sum of the final treatments on individual corridor segments should produce a significant improvement in travel time by transit when compared to the no-build scenario, resulting in a net increase in transit riders and a net decrease in vehicle-miles of travel across the County.
Bicycle and Pedestrian Accommodation and Safety

To accommodate transit stations, good bicycle and pedestrian access is needed to all BRT stations. The highest level of accommodation for pedestrians and bicyclists is needed in the areas where pedestrians are most prevalent, such as transit-oriented development areas, established or developing activity centers, areas around Metro stations, and transfer points between BRT routes.

Ensuring Pedestrian Safety and Accessibility

Safe and adequate pedestrian accommodation is needed both along and across the roadways included in the recommended transit corridors. The typical sections used to determine recommended rights-of-way:

- include six-foot-wide minimum sidewalks to ensure good pedestrian accommodation to and from all stops along transit corridors
- include landscape buffers of a sufficient width to achieve sidewalks and handicap ramps that can meet ADA Best Practices
- include a six-foot-wide median where feasible to accommodate a pedestrian refuge to ensure that transit patrons can safely cross the roadway to and from transit stops and that the general public can safely cross the roadway at all intersections.

While additional traffic signals are not specifically recommended in this Plan, it is likely that there will be more signalized crossings at BRT stops, which would assist all pedestrian crossings. The adequacy of pedestrian crossing times at stations should be evaluated and the need for advance walk signals that would give pedestrians a head start on traffic should be considered.

Bike Accommodation

This Plan supports the provision of on-road accommodation for bicyclists on all the recommended transit corridors, but right-of-way constraints limit the ability to achieve this goal on some corridor segments.

- Where a facility for bicyclists is already recommended in a master plan, the appropriate space is included in the recommended right-of-way recommendations.
- Where on-road bicyclists can reasonably be accommodated on additional corridors, this Plan includes the appropriate space in the recommended right-of-way.
- Where constraints limit the ability to achieve the on-road bike accommodation beyond what is recommended in current master plans, this Plan identifies the alternative recommended bike accommodation for each corridor segment.

The work leading to the Countywide Transit Corridor Functional Master Plan evaluated bikeway accommodations along all links recommended for a dedicated transitway (such as median lanes, curb lanes, or side-of-road lanes). Three policies were considered to determine whether the Functional Plan should recommend rights-of-way that would accommodate modifications or additions to planned bike facilities. Since right-of-way is constricted along most of the proposed BRT corridors, priority was given to these policies as follows.
The first priority was to include the master planned bikeway recommendation, whether this is a signed shared roadway, or a shared use path, bike lanes, or cycle tracks. This Functional Plan retains all master plan recommended bikeways.

The second priority was to include bike lanes based on the Planning Board’s bikeway policy. This draft standard was recommended by the Planning Board on September 18, 2008 as part of the Context Sensitive Road Design Standards discussion. It states:

- **Urban Major Highways, Arterials, and Minor Arterials**
  - 5.5-foot wide bike lanes should be provided if specified in a Master Plan.
  - 14-foot wide curb lanes should be provided on all other major highways, arterials, and minor arterials.

- **Suburban Major Highways, Arterials, and Minor Arterials**
  - 5.5-foot wide bike lanes should be provided if specified in a Master Plan and should be provided on roads with average daily traffic (ADT) of 20,000 vehicles per day or posted speeds of 45 mph or greater.
  - 14-foot wide curb lanes should be provided on all other major highways, arterials, and minor arterials.

- **Rural Major Highways, Arterials, and Minor Arterials**
  - 5.5-foot wide bike lanes should be provided.

The third priority was given to accommodating the State Highway Administration’s *Policy on Marked Bicycle Lanes* (revised November 2011), which states on page 5 that “All projects that involve widening or new construction shall meet the preferred widths...for marking Bicycle Lanes.” Bike lanes vary between 4 and 6 feet wide depending on the posted speed limit and the truck volumes. Most of the corridors in the recommended transit network are State highways.

This Plan also recommends designating new Bicycle-Pedestrian Priority Areas (BPPAs) to enhance the access to BRT.
Bicycle-Pedestrian Priority Areas

Section 2-604 of the Annotated Code of Maryland allows the designation of Bicycle-Pedestrian Priority Areas (BPPAs) in the State’s Bicycle-Pedestrian Master Plan, if jointly agreed to by the State and local jurisdiction. BPPAs are defined in Section 8-101(d): “Bicycle and pedestrian priority area” means a geographical area where the enhancement of bicycle and pedestrian traffic is a priority.

The legislation is intended to promote better pedestrian and bicyclist accommodation in these priority areas. The White Flint and Wheaton CBD Sector Plan areas have been designated as BPPAs and White Flint has been confirmed by the State.

The Maryland Department of Transportation is currently updating the State’s Bicycle-Pedestrian Master Plan and is expected to include recommendations for plans of improvement for BPPAs. In the interim, listed below are a number of elements that should be included in a plan of improvements for BPPAs. These improvements should also be considered for any area where pedestrians and bicyclists are a significant proportion of the traveling public. These elements are structured into a baseline condition for all areas where pedestrians and bicyclists are permitted, for Business and Urban Districts as defined by the Maryland Vehicle Law, and for BPPAs.

Baseline Improvements for Bicyclists and Pedestrians

**Accommodation during construction:** Strict adherence to the Maryland Manual on Uniform Traffic Control Devices (MD-MUTCD) recommendations for minimizing pedestrian and bicyclist inconvenience during construction should be made an explicit part of the plan. Sidewalks and bike facilities should be closed only as a last resort.

In addition to the normal maintenance-of-traffic issues, the construction sequencing of work should be addressed in the plan. For example, curb ramp relocations should only be done when the adjacent crosswalks can be striped in the new location within the next week.

**Lane striping:** Lane striping should reflect the guidance of the MD-MUTCD rather than repeating the existing lane striping pattern. Often the normal lane striping on State highways is extended through unsignalized intersections in Montgomery County, but this practice is not in conformance with MD-MUTCD Section 3B.08:

> “Where highway design or reduced visibility conditions make it desirable to provide control or to guide vehicles through an intersection or interchange, such as at offset, skewed, complex, or multilegged intersections, or where multiple turn lanes are used, dotted lane markings should be used to extend longitudinal line markings through an intersection or interchange area.”

The extension of normal lane striping often occurs even on straight, flat roads that are not complex in any way that would warrant lane extensions per guidance in the MD-MUTCD. In locations where extensions are needed, the different pattern presented by dotted lane markings would more clearly alert drivers to the presence of an intersection.

Using normal lane striping for this purpose obscures the presence of intersections, making drivers entering the roadway from a side street an unexpected occurrence. Pedestrians crossing from these streets also may appear to the driver as a surprise, or even that they’re not supposed to be crossing at
that location even though pedestrians have the right-of-way at unsignalized intersections. A break in the normal striping pattern at intersections, as recommended by the MD-MUTCD, alerts drivers on the main road and improves safety. Transit patrons and other pedestrians in areas along State highways would benefit from closer adherence to MD-MUTCD guidance in this regard.

**Bus stops:** Bus stops within the project limits should be shown in the contract documents of every project. Safe ADA-accessible crossings should be provided to all bus stops and wherever possible, and median refuges should be provided at intersections and mid-block bus stop locations that are to be retained.

**Sidewalks:** Sidewalks should be constructed or reconstructed to standard where appropriate as part of all access permits.

**Additional Improvements for Bicyclists and Pedestrians in Business and Urban Districts**

**SHA’s Bicycle Pedestrian Design Guidelines:** SHA should adopt its guidelines as SHA policy in areas where pedestrians and bicyclists are a significant proportion of the traveling public. These guidelines were created in 2006 as a very progressive document intended to promote bicycle and pedestrian access and safety. Because of their status as guidelines however, their use has been limited, missing the opportunity to create roadway designs that better accommodate pedestrians and bicyclists at little or no additional cost. This best practice document should become part of the engineer’s standard toolbox, promoting the goal of safely and efficiently accommodating all users of the public right-of-way.

**ADA accommodation:** Crosswalks, marked or unmarked, exist at the intersection of all public streets per Maryland Vehicle Law. Therefore, all intersections, including unsignalized and T-intersections, and intersections on divided roadways where the median is not broken for vehicular movement, should be made ADA-accessible. Where an ADA-accessible crossing cannot be provided, the crossing should be posted to prohibit the crossing to everyone.

ADA best practices should be used to provide the best accommodation for all users, including the provision of dual directional curb ramps at corners and a straight, level sidewalk that is not interrupted by driveway slopes. Where this cannot be achieved, the reasons should be documented.

**Accommodation during construction:** Signs should be posted at worksites with contact information for the inspector who can then be quickly and easily notified of any problems. Special attention should be paid to winter closures where work may be left unfinished for perhaps months at a time. A month in advance of the normal winter closure period, a shutdown plan should be created for all work in progress and open worksites minimized.

**Resurfacing projects:** Resurfacing projects should include a safety evaluation of the locations of all curb ramps and crosswalks, which should be relocated and reconstructed as necessary to conform to SHA’s Bicycle-Pedestrian Design Guidelines and ADA best practices.

**Re-evaluation of speed limits:** While Montgomery County continues to urbanize, the posted speeds of adjacent roadways are often not reassessed unless the roadway is being rebuilt. Posted speed limits in BPPAs and other Business and Urban Districts should be re-evaluated and waivers documented for limits in excess of the statutory speed limits. Design speeds for projects in these areas should not exceed the approved posted speed.
Pedestrian crossings of commercial driveways: A level sidewalk should be maintained across commercial driveways. Where this cannot be achieved and ramps must be provided, detectable warnings should be provided at the bottom of the ramps to alert blind pedestrians to potential vehicular conflicts. Detectable warnings should also be provided at all signalized commercial driveway crossings.

Further Improvements in Bicycle-Pedestrian Priority Areas

Prohibiting right-turn on red. Within BPPAs, right-turn on red signal phases should be prohibited, unless for safety reasons this is not feasible.

Pedestrian signal phases. Within BPPAs, all traffic signals should be timed so that there is adequate time for slower-moving pedestrians to cross a street during a single phase. The assumption should be that pedestrians will walk at a pace no faster than 3.5 feet per second.

Minimizing disruption to pedestrian travel: SHA should ensure that construction affecting pedestrian and bike accessibility in BPPAs be expedited to the extent practicable. For example, utility work in BPPAs, such as pole relocations and valve adjustments, should be prioritized so that the utility companies know that these work items are more important than those outside BPPAs.

Access for during snow emergencies: A definite timeline should be set for curb ramps at intersections to be cleared of snow after a snowstorm. When roadways get plowed on intersecting streets, the area in front of the circular curb—where most curb ramps are—are often blocked with snow, reducing access for persons least likely to be able to climb over the resulting snow mounds.

An extra pass by a snowplow around the corner in priority areas would greatly improve pedestrian accessibility and winter safety, as well as providing basic accommodation for all users. While property owners in Montgomery County are required to clear the snow from sidewalks within 24 hours after a snow storm, there is no requirement for them to shovel snow in the street, particularly the large mounds of snow that end up in front of the circular curb. While this is a problem with both County and State roads, the majority of our transit routes are on State roads, increasing the need to correct this problem.

Signing and striping: Crosswalk striping in BPPAs should be inspected quarterly to ensure that they are in good condition. Where these crosswalks are impacted by utility work, they should be inspected upon completion of the work to ensure that they remain in good condition.

Intersections: Where an intersection in a BPPA meets any traffic signal warrant, a traffic signal should be provided to facilitate safe pedestrian and bicyclist movement. Signalized intersections should have marked crosswalks on each leg of the intersection, per SHA’s Bicycle-Pedestrian Design Guidelines. Curb ramp designs in BPPAs should be coordinated with pedestrian access points to adjacent properties to facilitate travel to, through, and around the ramps.

All projects along State highways in BPPAs should be reviewed by SHA’s Office of Environmental Design to address the higher level of urban design that is required in these areas. One example is a coordinated and consolidated design of traffic signal poles, signs, lights, and other equipment at intersections near curb ramps. These facilities should be combined where possible and use the fewest number of poles to minimize obstructions where the greatest number of pedestrians congregate. Also, the bases of the
poles, including Audible Pedestrian Signal poles, should be countersunk where possible to minimize the footprint of these obstructions, thereby maximizing the pedestrian circulation area.

**Lighting:** Lighting in BPPAs should meet AASHTO standards; this is particularly true for intersections. Care should be taken to locate lighting fixtures at crosswalks so that the light source is between the vehicle and the pedestrian wherever possible, maximizing contrast. Increasing the contrast between pedestrians and the road ahead has been shown to provide a general benefit to drivers but most particularly to elderly drivers, an increasing percentage of the population. Requiring developers to bring adjacent intersections to current lighting standards should be a requirement of their access permit.

**Optimize traffic signal timing for pedestrians:** There are many places where pedestrians are unnecessarily prevented from crossing the roadway because the “DON’T WALK” light is on when it doesn’t need to be. The traffic signal timing and phasing in BPPAs should be reviewed and revised as necessary to maximize pedestrian mobility.

**Curb height:** Curb height on State highways in BPPAs should be six inches rather than the SHA standard eight inches to reduce the required curb ramp length. In addition to making it easier for all users to navigate in more urban areas, a shorter ramp length ensures a greater level area behind the ramp so that pedestrians not crossing are not unnecessarily required to traverse the ramp and negotiate that grade.

**Area-specific BPPA plans:** BPPA plans should include all master or sector plan-recommended pedestrian and bike improvements within the BPPA.

**Map 13 Recommended Bicycle-Pedestrian Priority Areas**
This Functional Plan designates all current Road Code-defined Urban areas as additional BPPAs:

- Silver Spring CBD Sector Plan area
- Twinbrook Sector Plan area
- Bethesda CBD Sector Plan area
- Friendship Heights Sector Plan area
- Glenmont Metro Station Policy area
- Grosvenor Metro Station Policy area
- Shady Grove Metro Station Policy area
- Olney Town Center
- Clarksburg Town Center
- Germantown Town Center
- Damascus Town Center
- Montgomery Hills
- Flower/Piney Branch
- Cloverleaf District
- LSC Central, LSC West, LSC North, and Belward Districts in the Great Seneca Science Corridor

The Takoma/Langley Crossroads and Kensington Sector Plan areas are defined in their respective plans.

This Plan also designates proposed BRT station areas as BPPAs where there is sufficient planned density to generate significant pedestrian and bicyclist activity (see Maps 14 through 23):

- Montgomery Mall/Rock Spring
- Piney Branch/University Boulevard Purple Line Station area
- Medical Center Metro Station area, including the NIH and NMMC campuses
- Veirs Mill Road/Randolph Road
- Aspen Hill (Georgia Avenue/Connecticut Avenue)
- Colesville (Randolph/New Hampshire)
- Forest Glen Metro Station area (contiguous with Montgomery Hills)
- Silver Spring CBD West (west of 16th Street to Rosemary Hills Drive, plus Spring Center)
- Four Corners

The designation of additional BPPAs should be considered as part of future master and sector plan updates.
Map 20 Forest Glen Metro Station Area BPPA
MARC Brunswick Line Expansion

MARC commuter rail’s Brunswick Line serves the broadest regional transportation function of the County’s transit network, performing a similar function as that of an interstate highway in the roadway network. It has 7,000 daily passengers and serves eleven stations in Montgomery County while connecting West Virginia and Frederick County, MD with Washington, D.C. The Brunswick Line also connects to five of the transit corridors recommended in this Plan—MD 355, Veirs Mill Road, Randolph Road, Georgia Avenue, and US29/Colesville Road—as well as to the Corridor Cities Transitway, Purple Line, and Metrorail Red Line.

This Plan recommends that a third track be constructed on the Brunswick Line between the Frederick County line and the Metropolitan Grove station to reduce conflicts with freight service and enabling the expansion of MARC service. This additional capacity would accommodate a tripling of ridership and include:

- more frequent service
- all-day service
- weekend service
- one-seat rides to Northern Virginia
- service to planned MARC stations at Shady Grove and White Flint.

This MARC expansion to full-time service will improve east-west connectivity across the County, connecting with the rest of the transit network recommended by this Plan and increasing its utility for County residents and commuters.

To accommodate a third track, this Plan recommends that the master-planned right-of-way be widened by 25’ in this segment.
Carbon Emissions Analysis

Montgomery County Bill number 32-07 establishes a goal to stop increasing greenhouse gas (GHG) emissions by the year 2010, and to reduce emissions to 20 percent of 2005 levels by the year 2050. Another Montgomery County law (Bill number 34-07) requires the Planning Board to estimate the carbon footprint of master plan recommendations, and to make recommendations for carbon emissions reductions.

Staff evaluated the peak-hour carbon emissions reductions compared against the no-build scenario. Vehicle Miles Traveled reduction estimates were converted to gallons of gasoline saved and carbon dioxide equivalent amounts (CO2e) based on factors used in the King County, Washington Greenhouse Gas Emissions Worksheet version 1.7. This model has been adapted by the Planning Department to estimate GHG emissions for its master plan work. The results are presented in the table below.

Table 14  Carbon Emissions Analysis
Annual Peak Hour Estimated Gasoline Savings and Green House Gas (GHG) Emissions Reductions (Year 2040 Projections)

<table>
<thead>
<tr>
<th>Energy and GHG Benefit vs. No-Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>gasoline savings (gal/yr)</td>
</tr>
<tr>
<td>CO2e reduction (lbs/yr)</td>
</tr>
<tr>
<td>CO2e reduction (metric tons/yr)</td>
</tr>
</tbody>
</table>

This methodology assumes that all vehicles are gasoline-powered. Changes in automotive technology and the fuel chosen for the BRT vehicles will affect the results.

Achieving the County’s GHG reduction goals will be challenging. Estimates from Montgomery County’s Climate Protection Plan\(^2\) project a need to reduce overall Countywide GHG emissions by 10.995 million metric tons by 2040 compared to baseline (2005) emissions.

The Climate Protection Plan also shows that emissions from transportation form the largest percent share of current emissions. Staff analysis indicates that reductions from a broad range of activities must play a part in achieving the County’s GHG reduction goals. As shown above, implementing BRT in the County can contribute significant GHG reductions.

BRT would accomplish all or part of two transportation goals identified in the Climate Protection Plan: T-3 (Support the Ridership Growth Initiative by 2020 by implementing bus rapid transit on Veirs Mill Road and Georgia Avenue, and study and implement, where appropriate, light rail transit and bus rapid transit systems in other corridors) and T-7 (Explore ways to reduce vehicle travel to schools by expanding walking, bicycling, and use of buses).

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Executive Summary

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commuting times exceeding 35 minutes. Additionally, travel forecasts show that roadway congestion in the County is predicted to increase by 70% by 2040. While population and employment opportunities are forecasted to grow significantly over time, options for building new roads or expanding existing ones are limited given their impact on existing neighborhoods and businesses.

Expanding transit infrastructure through more efficient use of public rights-of-way is essential if current and future congestion is to be mitigated. In addition to reducing commute time for drivers, an expanded transit network is necessary to support the County’s land use, environmental, and economic development goals and make transit a reliable alternative to driving in the County’s developed core.

This Plan recommends implementing a 102-mile bus rapid transit network comprising 10 corridors and the Corridor Cities Transitway, and expanding right-of-way for the CSX Metropolitan Branch to allow for enhanced MARC commuter rail service. It also designates 24 additional bicycle-pedestrian priority areas.

Public rights-of-way are a critically important and scarce resource. Like any scarce resource, they need to be used in the most efficient manner possible. Therefore, an important goal of this Plan is to increase person-throughput, the number of people that can be accommodated within these rights-of-way, as well as increasing the modes of transportation that can be accommodated safely.

This principle was used in determining rights-of-way while making every effort to limit impacts to existing communities. For the most part, the property required to accommodate this Plan fits within previously approved master-planned rights-of-way. In a few instances where the Plan recommends reserving more right-of-way than is currently master-planned, it is largely to accommodate future enhancements or new construction of master-planned bikeways and sidewalks. An overriding County objective is to provide enhanced mobility for all users of the transportation system.

Transit maximizes person-throughput. For transit to truly succeed, and to achieve the desired ridership, it must have (1) an extensive network and (2) dedicated lanes. The bottom line must be that the system will produce a significant improvement in travel time for many that already use transit and that it will attract new riders that would otherwise drive. Indeed, over half of the projected riders of this bus rapid transit network are anticipated to be new transit users. However, it is not only transit riders who will benefit from this Plan. Drivers should experience better conditions as they will otherwise face with a well-functioning, high-performance transit network.

At the heart of this Plan is the recommendation to create dedicated lanes for bus transit. Only a system that is primarily characterized by dedicated lanes can deliver on the promise of "rapid" in bus rapid transit. Of the approximately 102 corridor miles recommended in this plan, about 79% of this network is comprised of dedicated lanes. In most instances, where the Plan calls for dedicated lanes, it is the result of adding transit lanes within previously approved master-planned right-of-way. In some instances, dedicated lanes may be created from existing or planned general purpose lanes. Lane repurposing may be implemented where the number of forecasted transit riders exceeds the general purpose lane capacity and/or general traffic demand would not exceed capacity. There are only about 21 miles in this network that anticipate buses running in mixed traffic. It is understood that where a route is dominated by mixed traffic, it will not be rapid. However, it will have enhanced station facilities and service, and it will be part of a larger network that is rapid.

This Plan does not endorse specific “treatments” since considerably more study will be conducted by the State Highway Administration and/or the County’s Department of Transportation to determine whether, for example: a dedicated lane should be in the median or on the curb; whether the right-of-way could accommodate bi-directional bus rapid transit, or if a single reversible lane could achieve the same objective; or whether dedicated lanes achieved by repurposing are warranted and achievable given further detailed traffic analysis and ridership forecasts.

These studies will be done using the State’s or County’s standard facility planning process, which includes significant community outreach, opportunities for public input including but not limited to public hearings, and will ultimately come back before the County Council for review. In this respect, this Plan is not different from other road projects recommended in master plans for which alternatives are reviewed and subject to considerable community feedback. While this Plan recommends a robust transit network to maximize the potential of transit to serve a more significant part of the County’s future transportation needs, it will be achieved in a way that respects the needs of the communities it passes through, and addresses traffic impacts.

Insofar as the goal of this transit network is to increase the efficiency of predominately State roads, the County expects the State will be a full partner in this enterprise. Moreover, this Plan anticipates additional cooperation and collaboration with our regional partners—the residents of Howard, Prince George’s and Fairfax Counties, and the District of Columbia—all have a stake in an interconnected, efficient transit system. Finally, it is understood that this 102-mile network will be constructed in phases over a number of years based on available resources, priorities, and need.
and operational planning. This Plan does not envision that full-time dedicated bus lanes will be implemented as a first step in most locations.

Since a large part of the initial ridership for BRT service will come from existing transit users whose numbers do not warrant a high level of treatment at this time, it is likely that there will be an incremental introduction of priority treatments and features that, with actual operating and ridership experience, ultimately lead to the maximum level of treatment appropriate for the specific corridor in question.

Task Force report:
http://www.montgomeryplanning.org/viewer.shtm
http://www.montgomerycountymd.gov/content/dot/MCORTStudyFinalReport10728.pdf

MCDOT report:
http://www6.montgomerycountymd.gov/Apps/CES/TRANS/REPORT/FINAL.asp

### Table 2. Transit Service Typology

<table>
<thead>
<tr>
<th>Service</th>
<th>Market</th>
<th>Examples</th>
<th>Speed</th>
<th>Frequency</th>
<th>Span</th>
<th>Stop Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter rail</td>
<td>NABE</td>
<td>MDAC, Busway Line</td>
<td>Very high</td>
<td>Low</td>
<td>Peak period</td>
<td>Very high</td>
</tr>
<tr>
<td>Metrorail</td>
<td>All trips</td>
<td>Red Line</td>
<td>High</td>
<td>High</td>
<td>All day</td>
<td>High</td>
</tr>
<tr>
<td>Light rail</td>
<td>All trips</td>
<td>Purple Line</td>
<td>Moderate</td>
<td>High</td>
<td>All day</td>
<td>Moderate</td>
</tr>
<tr>
<td>BRT—Activity Center Corridor</td>
<td>All trips</td>
<td>Corridor Cities Transitway</td>
<td>Moderate</td>
<td>High</td>
<td>All day</td>
<td>Moderate</td>
</tr>
<tr>
<td>BRT—Express Corridor</td>
<td>Commuters</td>
<td>US 29</td>
<td>High</td>
<td>Moderate</td>
<td>Peak period</td>
<td>Moderate</td>
</tr>
<tr>
<td>BRT—Commuter Corridor</td>
<td>All trips</td>
<td>MD Transit, Metrorail</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Peak period</td>
<td>Moderate</td>
</tr>
<tr>
<td>Local bus</td>
<td>All trips</td>
<td>Metrorail, Red Line</td>
<td>Low</td>
<td>Low</td>
<td>Varies</td>
<td>Low</td>
</tr>
</tbody>
</table>

Travelers in Montgomery County currently have the following transit options:
- high-speed/high-capacity heavy rail systems (Metrorail or MARC) largely built for commuters;
- local and regional bus services that connect commuters from residential areas to employment centers via express buses along the interstates (MTA express bus and commercial commuter buses); and
- local buses that move slowly along increasingly congested roadways and make frequent stops (Metrobus and Ride On).

Plans are underway to create two additional high-capacity transit corridors—the Purple Line and Corridor Cities Transitway (CCT)—where high development densities and a mix of land uses are either present or planned. However, much of the County will still lack reliable, high-quality transit service that provides a viable alternative to driving an automobile and that provides connectivity among multiple County activity centers.

BRT service on the recommended transit corridor network will provide service between dense redeveloping areas inside the Beltway, emerging mixed-use activity centers, and commuter corridors. BRT is a flexible service with a number of potential combinations of attributes. Some BRT corridors include an exclusive transitway with little or no conflicts with other vehicles. Other corridors may take advantage of off-board fare payment, traffic signal priority, and/or increased distance between stops, but not other attributes most often associated with BRT. A single corridor may evolve over time from one with fewer attributes to one with an exclusive transitway as facilities are designed and tested over time.

The transit corridors recommended in this Plan are intended to facilitate the following three types or levels of BRT service:
- BRT—Activity Center Corridor, defined by moderate-speed, high-frequency, all-day transit service. It is most appropriate on activity center corridors that connect multiple dense mixed-use areas.
- BRT—Express Corridor, defined by high-speed, moderate-frequency, peak period service. It is most appropriate on access-controlled express corridors that connect commuters at park-and-ride lots to employment centers.
- BRT—Commuter Corridor, defined by moderate speed, moderate-frequency, limited stop transit service during peak periods. It is most appropriate on commuter corridors that connect moderate density residential areas to employment centers.

This Plan recommends an extensive network of enhanced transit corridors based on a broad analysis of travel patterns countywide. The rights-of-way recommended for these corridors reflect the footprint required by the typical roadway sections developed for various levels of transit treatment, and by specific corridor segment locations in urban or suburban areas of the County.

More detailed analysis is required to determine the final treatment and typical section, the slope impacts required to build that typical section, and the number of travel lanes and turn lanes required to provide an adequate level of traffic service. The final rights-of-way required for the recommended transit corridors must be determined during facility planning and design for individual corridors, at which time the cost of construction must also be determined. A vital facet of facility planning is to receive input and feedback from affected property owners, users, and groups, and neighboring transit riders and road users, including public forums and workshops, electronic newsletters, and other forms of outreach. No County funding for transit corridor implementation nor additional rights-of-way, as proposed in this Plan or in subsequent studies, will be considered until the County is satisfied that this fundamental public engagement requirement has been fulfilled and a Council public hearing solely for each corridor or combination of connected corridors is held. Accordingly, a citizens advisory group comprised of residents, business owners and other relevant stakeholders must be created for each corridor which enters into facility planning to make recommendations to the County on the design, construction and proposed station locations for the transit corridor.

The County’s Service Planning and Integration Study will determine the general relationship between BRT and local bus service. Incorporating that study’s recommendations may require [that additional] a different set of stations [be added during] as a result of facility planning. More detailed analysis is required after the completion of that study to determine the specific location and size of transit stations.

Most of the BRT corridors pass through residential areas and in addition to serving the transportation function of moving people, the system should be implemented in such a way that it enhances the surrounding area and minimizes negative impacts to the extent possible. Overhead signage should be
The EMX, 60 percent of which features dedicated bus lanes, also includes 60-foot articulated vehicles, hybrid electric propulsion, double-sided boarding, on-board wheelchair and bicycle space, as well as both median and curbside stations that provide weather protection for riders.

Within a year of the Green Line's opening, ridership along the corridor had doubled, a statistic largely driven by the City's honorable mention recognition for a 2008 Sustainable Transport Award. The continued success of the EMX pushed LTD's decision to expand service to connect Eugene and Springfield to the region's Gateway area via the Gateway Line extension, which opened in 2011.

HealthLine (Cleveland, OH)
The Greater Cleveland Regional Transit Authority (RTA) operates the Healthline BRT service (formerly referred to as both the Silver Line and Euclid Corridor Transportation Project). Opened in 2008 and subsequently renamed as a result of a partnership with the Cleveland Clinic and University Hospital, the system runs along Cleveland's Euclid Avenue from the downtown area's Public Square to East Cleveland's University Circle.

Illustration 2 Healthline, Cleveland, Ohio

Photo credit: www.flickr.com

The line covers 58 stations and contains dedicated bus lanes (with advanced signal technology to coordinate with cars), off-board fare collection (at both median and curbside stations), diesel-electric hybrid motors on articulated vehicles, and adjacent bike lanes along the route.

Originally billed as a link between hotels, employers, cultural institutions, and other popular destinations, within a year of the project's opening, the Healthline's success was evident. Indeed, ridership had risen by nearly 50 percent over that of the Route 6 Euclid Avenue bus, which was formerly the most heavily used route in the RTA system.

Summary Recommendations
Functional plans provide the intermediate level of planning detail between the General Plan and area master plans, in this case, providing the legal basis for securing adequate rights-of-way to accommodate the desired facilities. This Plan's focus is to:
- identify the corridors needed to accommodate the desired BRT network, facilitating superior transit service along many of the County's major roadways;
- identify the corridors segments where lanes would be dedicated for BRT, but without designating the specific treatment;
- recommend a minimum public right-of-way for each affected roadway and any changes to the planned number of travel lanes; and
- identify recommended station locations by the nearest intersection.

This Plan recommends a network of ten transit corridors (see Map 1), with specified rights-of-way [and treatments].
Rather than a comprehensive update, the MPOH has been updated periodically, focusing on specific projects or geographic areas. Area master plans were revised in the 1970s to include the Metrorail Red Line, but the MPOH map was not revised to include transitways until 1986. Transitways now included in the MPOH are:

- Purple Line [Transitway] Light Rail;
- Corridor Cities Transitway;
- North Bethesda Transitway; and
- Georgia Avenue Busway.

Since 1955, there have been updates and amendments to the MPOH through various approved and adopted functional, master, and sector plans. The most significant countywide update since 1955 was the creation of the Rustic Roads Functional Master Plan (RRFMP) in 1996, which sought to preserve many of the roads in the rural area of the County to reflect and further the goals of the 1980 Functional Master Plan for the Preservation of Agricultural and Rural Open Space.

This Plan complements the RRFMP by reflecting the growing urbanization of the I-270 corridor and the Down-County area. It will provide the mobility needed to accommodate that growth while minimizing the adverse impacts on quality of life for those who live, work, and patronize the businesses along major roadways.

The General Plan recommends “an interconnected transportation system that provides choices in the modes and routes of travel.” A BRT system would better enable transit riders to travel on a network of corridors with few transfers and with reliable service, helping to fulfill the General Plan’s transportation vision.
Guiding Principles

The 1993 General Plan Refinement shifted the County’s transportation goal toward meeting travel demand by providing good alternatives to the single-occupant vehicle.

The 1969 Circulation Goal was to “provide a balanced circulation system which most efficiently serves the economic, social, and environmental structures of the area.” The General Plan Refinement renamed the goal to the Transportation Goal. One important conceptual change in this goal is the movement away from accommodating travel demand and toward managing travel demand and encouraging the availability of alternatives to the single-occupant vehicle. The Refinement effort thus abandons phrases such as “carry the required volume” and “accommodate travel demand” because the demand for single-occupant vehicle travel will usually outstrip the County’s ability to meet it. (page 61)

The Refinement further recommends:

“Making better use of the transportation system already in place, getting more people into trains, cars, and buses in future right-of-way, and creating an environment conducive to walking and biking are all necessary elements to achieve an affordable balance between the demand for, and supply of, transportation.” (page 60)

“A key aspect of making the County more accessible by transit and walking is that it can reduce travel by car. Favoring transit can make more efficient use of the existing roadway network and can reduce air pollution.” (page 17)

To further the transportation goal, this Plan recommends:

- designating exclusive or dedicated bus lanes, wherever there is sufficient forecast demand to support their use and where subsequent analysis shows that acceptable traffic operations can be achieved, to promote optimal transit speeds in urban areas and surrounding suburban areas;
- implementing transit facilities and services where and when they would serve the greatest number of people on individual corridors and where there would be an improvement to the overall operation of the county’s transportation network;
- expanding regional rail transit service;
- supporting policies and programs that increase the comfort and safety of pedestrians and bicyclists traveling to and from transit facilities;
- and minimizing the construction of additional pavement to limit impacts on the environment and on adjacent communities.

A strong transit network is essential to support economic development in planned growth areas. The recommended transit corridors will facilitate BRT and other high-quality transit services as well as potentially accommodate other bus services such as Metrobus and Ride On and provide connections to Metrorail, the Purple Line, and MARC.
stop bus services, as well as other bus services, to provide faster, more dependable bus service for all transit patrons in the corridor. Dedicated curb lanes may also be the best interim treatment where a median busway is desired but where obtaining sufficient right-of-way is not possible in the near term without excessively adverse impacts.

Dedicated curb lanes would be open to use by emergency vehicles and would likely be open to use by right-turning vehicles and by on-road bicyclists who do not otherwise have dedicated space in the roadway.

[The treatments recommended in this Plan are intended to determine] This Plan identifies the rights-of-way necessary to facilitate the development of a network of dedicated transit lanes. This Plan recognizes, however, that the final decision on treatment in each transit corridor must be made at the time of implementation when a transit service plan is in place and:

- the benefits of accommodating BRT and/or other bus services in the dedicated lanes can be quantified;
- the traffic impacts of implementing curb lanes vs. a median busway can be more closely studied; and
- the impacts on adjacent properties can be determined.

This Plan is intended to provide flexibility for the implementing agency to make the choice of a curb or median busway as the best way to achieve dedicated lanes.

Lane Repurposing

After determining whether dedicated median or curb lanes are warranted on a corridor, the next step is to determine how to achieve them: whether to repurpose existing travel lanes, use the median where it's wide enough to accommodate the desired treatment, or identify additional right-of-way.

An important goal of this Plan is to increase person-throughput, the number of people that can be accommodated within our often constrained public rights-of-way. Lane repurposing—designating an existing travel lane for bus use only—provides the most efficient use of available transportation facilities. In addition to Central Business District areas where constructing additional lanes is most often not practical, lane repurposing [is recommended] may be implemented where the number of forecast transit riders exceeds the general purpose lane capacity and/or where general traffic demand would not exceed capacity.

In many segments of the proposed BRT corridors, the 2040 forecast bus ridership surpasses, and in some cases far surpasses, the person-throughput of a single general purpose traffic lane. Implementing necessary and more efficient transit facilities should reflect the priority given to transit in the General Plan (see Guiding Principles, page 22).

Where bus rapid transit would move people most efficiently in a corridor, the dedicated space needed to accommodate transit should be provided; the remaining lanes would continue to be available for general traffic. The recommended bus lanes would provide a greater level of person-throughput, potentially at a higher average level of service for all users of the road.

Where lane repurposing is [recommended] considered, a thorough traffic analysis should be performed as part of facility planning to identify what transportation improvements could be implemented to mitigate the impacts of lane repurposing, ensuring that the overall operation of the transportation network will operate acceptably. This analysis should not be confined to the specific transit corridor only, but should also consider what changes are needed, if any, in the surrounding area to ensure an acceptable operation for traffic that would be diverted from the corridor being studied.

Because of heavy traffic demands, future congestion may still be unacceptably high in the remaining lanes. The desirability of providing additional general traffic lanes should then be considered along with the impacts associated with constructing the additional pavement. Should additional travel lanes be needed, an [Amendment to this Plan or to the appropriate [Amendment plan should be pursued.

The desire to reduce congestion by providing more roadway capacity must be weighed against the benefits of increasing transit ridership. However, the transportation modeling performed for this Plan forecasts an overall improvement in traffic speeds with the introduction of BRT over the no-build condition. More detailed planning will be required during implementation to determine location-specific impacts on traffic in areas where lane repurposing is recommended.

In addition to the person throughput measure of whether a bus lane or a general traffic lane can move the most people, lane repurposing should also be considered where it would result in the greatest improvement in level-of-service for all users of the roadway. Where the forecast BRT ridership on a congested roadway is greater than the capacity of a general traffic lane, the lane repurposing test is met. But while the general traffic lanes may experience the same poor level of service, the bus lane carries a greater number of people in fewer vehicles with a far higher level of service, significantly increasing the average level of service for all users of the roadway.

This Plan recommends that the facility planning process for individual transit corridor projects should consider improvements in the weighted average level of service for all users of the roadway when evaluating the costs and benefits of constructing additional pavement to achieve the recommended transit facilities.
Illustration 5 [Recommended] Illustrative Corridor Segment Treatment: Two-Lane Median Busway
One lane dedicated to BRT service on either side of the roadway median, with a two-foot-wide striped buffer separating the bus lanes from general traffic.

Illustration 6 [Recommended] Illustrative Corridor Segment Treatment: Two-Lane Side Busway
A two-lane busway to serve BRT on one side of the roadway, with a landscaped buffer and sidewalk separating the bus lanes from general traffic.

Illustration 7 [Recommended] Illustrative Corridor Segment Treatment: One-Lane Median Busway
One lane dedicated to BRT service in the center of the roadway separated from general traffic by a median on either side. This lane would in most cases accommodate BRT service in one direction only, but could accommodate bi-directional BRT service if provided with adequate passing lanes.

Illustration 8 [Recommended] Illustrative Corridor Segment Treatment: Managed Lanes
One lane dedicated to BRT service during peak hours in the peak direction of travel only on roads that have a reversible-lane operation.

Illustration 9 [Recommended] Illustrative Corridor Segment Treatment: Curb Lanes
Outside lanes adjacent to the curb (nearest the sidewalk) dedicated to BRT service, either during peak hours or all day.

Illustration 10 [Recommended] Illustrative Corridor Segment Treatment: Mixed Traffic
No dedicated space provided for BRT service. Buses would typically operate as they do now but some additional accommodation at intersection could be provided, such as queue jumpers (short passing lanes) and/or traffic-signal priority.
Carbon Emissions Analysis

Montgomery County Bill number 32-07 establishes a goal to stop increasing greenhouse gas (GHG) emissions by the year 2010, and to reduce emissions to 20 percent of 2005 levels by the year 2050. Another Montgomery County law (Bill number 34-07) requires the Planning Board to estimate the carbon footprint of master plan recommendations, and to make recommendations for carbon emissions reductions.

Staff evaluated the peak-hour carbon emissions reductions compared against the no-build scenario. Vehicle Miles Traveled reduction estimates were converted to gallons of gasoline saved and carbon dioxide equivalent amounts (CO2e) based on factors used in the King County, Washington Greenhouse Gas Emissions Worksheet version 1.7. This model has been adapted by the Planning Department to estimate GHG emissions for its master plan work. The results are presented in the table below.

**Table 14 Carbon Emissions Analysis**
Annual Peak Hour Estimated Gasoline Savings and Green House Gas (GHG) Emissions Reductions (Year 2040 Projections)

<table>
<thead>
<tr>
<th></th>
<th>Energy and GHG Benefit vs. No-Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>gasoline savings (gal/yr)</td>
<td>3.0-3.5 million</td>
</tr>
<tr>
<td>CO2e reduction (lbs/yr)</td>
<td>73-86 million</td>
</tr>
<tr>
<td>CO2e reduction (metric tons/yr)</td>
<td>33-39 million</td>
</tr>
</tbody>
</table>

This methodology assumes that all vehicles are gasoline-powered. Changes in automotive technology and the fuel chosen for the BRT vehicles will affect the results.

Achieving the County’s GHG reduction goals will be challenging. Estimates from Montgomery County’s Climate Protection Plan\(^2\) project a need to reduce overall Countywide GHG emissions by 10.995 million metric tons by 2040 compared to baseline (2005) emissions.

The Climate Protection Plan also shows that emissions from transportation form the largest percent share of current emissions. Staff analysis indicates that reductions from a broad range of activities must play a part in achieving the County’s GHG reduction goals. As shown above, implementing BRT in the County can contribute significant GHG reductions.

BRT would accomplish all or part of two transportation goals identified in the Climate Protection Plan: T-3 (Support the Ridership Growth Initiative by 2020 by implementing bus rapid transit on Veirs Mill Road and Georgia Avenue, and study and implement, where appropriate, light rail transit and bus rapid transit systems in other corridors) and T-7 (Explore ways to reduce vehicle travel to schools by expanding walking, bicycling, and use of buses).


Action

The County Council for Montgomery County, Maryland, sitting as the District Council for that portion of the Maryland-Washington Regional District in Montgomery County, Maryland, approves the following resolution:

The Planning Board Draft Countywide Transit Corridors Functional Master Plan, dated July 2013, is approved with revisions. County Council revisions to the Planning Board Draft Countywide Transit Corridors Functional Master Plan are identified below. Deletions to the text of the Plan are indicated by [brackets], additions by underscore. The maps in this resolution have been updated to be consistent with the text.
Executive Summary

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commuting times exceeding 35 minutes. Additionally, travel forecasts show that roadway congestion in the County is predicted to increase by 76% by 2040. While population and employment opportunities are forecasted to grow significantly over time, options for building new roads or expanding existing ones are limited given their impact on existing neighborhoods and businesses.

Expanding transit infrastructure through more efficient use of public rights-of-way is essential if current and future congestion is to be mitigated. In addition to reducing countywide travel time for drivers, an expanded transit network is necessary to support the County's land use, environmental, and economic development goals and make transit a reliable alternative to driving in the County's developed core.

This Plan recommends implementing a 102-mile bus rapid transit network comprising 10 corridors and the Corridor Cities Transitway, and expanding right of-way for the CSX Metropolitan Branch to allow for enhanced MARC commuter rail service. It also designates 24 additional bicycle-pedestrian priority areas.

Public rights-of-way are a critically important and scarce resource. Like any scarce resource, they need to be used in the most efficient manner possible. Therefore, an important goal of this Plan is to increase the value of transit through the use of rights-of-way, as well as increasing the modes of transportation that can be accommodated safely.

This principle was used in determining rights-of-way while making every effort to limit impacts to existing communities. For the most part, the property required to accommodate this Plan fits within previously approved master-planned rights-of-way. In few instances where the Plan recommends reserving more right-of-way than a currently master-planned, it is largely to accommodate future enhancements or new construction of master-planned bikeways and sidewalks. An overarching County objective is to provide enhanced mobility for all users of the transportation system.

Transit maximizes person-throughput, and to achieve the desired ridership, it must have (1) an extensive network and (2) dedicated lanes. The bottom line must be that the system will produce a significant improvement in travel time for many that already use transit and that it will attract new riders that would otherwise drive. Indeed, over half of the projected riders of this bus rapid transit network are anticipated to be new transit users. However, it is not only transit riders who will benefit from this Plan. Drivers should experience better conditions than they will otherwise face with a well-functioning, high-performance transit network.

At the heart of this Plan is the recommendation to create dedicated lanes for bus transit. Only a system that is primarily characterized by dedicated lanes can deliver on the promise of "rapid" in bus rapid transit. Of the approximately 102 corridor-miles recommended in this plan, about 79% of this network is comprised of dedicated lanes. In most instances, where the Plan calls for dedicated lanes, it is the result of adding transit lanes within previously approved master-planned right-of-way. In some instances, dedicated lanes may be created from existing or planned purpose facility capacity. In these cases, repurposing may be implemented where the number of forecasted transit riders exceeds the general purpose lane capacity and/or general traffic demand would not exceed capacity. There are only about 21 miles in this network that anticipate buses running in mixed traffic. It is understood that where a route is dominated by mixed traffic, it will not be rapid. However, it will have enhanced station facilities and service, and it will be part of a larger network that is rapid.

This Plan does not endorse specific "treatments" since considerably more study will be conducted by the State Highway Administration and the County's Department of Transportation to determine whether, for example: a dedicated lane should be in the median or on the curb; whether the right-of-way could accommodate bi-directional bus rapid transit, or if a single reversible lane could achieve the same objective; or whether dedicated lanes achieved by repurposing are warranted and achievable given further detailed traffic analysis and ridership forecasts.

These studies will be done using the State's or County's standard facility planning process, which includes significant community outreach, opportunities for public input including but not limited to public hearings, and will ultimately come back before the County Council for review. In this respect, this Plan is not different from other road projects recommended in master plans for which alternatives are reviewed and subject to considerable community feedback. While this Plan recommends a robust transit network to maximize the potential of transit to serve a more significant part of the County's future transportation needs, it will be achieved in a way that responds to the needs of the communities it serves through, and addresses traffic impacts.

Insofar as the goal of this transit network is to increase the efficiency of predominantly State roads, the County expects the State will be a full partner in this enterprise. Moreover, this Plan anticipates additional cooperation and collaboration with our regional partners - the residents of Howard, Prince George's, and Fairfax Counties, and the District of Columbia - all of which are in an interconnected, efficient transit system. Finally, it is understood that this 102-mile network will be constructed in stages over a number of years based on available resources, priorities, and need.
Introduction

The Washington, D.C. region is consistently rated among the most congested in the nation, with average commute times exceeding 35 minutes.

Growth is expected to continue in Montgomery County, largely through redevelopment, so options for building new roads or expanding existing ones are limited. Population and employment are forecast to grow significantly, while lane-miles of roadway will not. Even as the County urbanizes, the growing in vehicle trips will outpace the growth in transit trips for commuters. An expansion of frequent, reliable transit service will be needed to move greater numbers of people to and from jobs, homes, shopping, and entertainment areas, reducing the gap between transportation demand and supply and providing County residents a viable and reliable alternative to travel by auto on congested roadways. If this service is not provided, auto congestion will be significantly worse, degrading the quality of life and economic vitality of the County.

To accomplish this, a more efficient use of our public rights of way is essential. This Plan provides enhanced opportunities for travel by transit to support our economic development and mobility goals in an environmentally sustainable way, and in a way that preserves our existing communities.

Table 1 Montgomery County Demographic and Travel Forecast

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2040</th>
<th>difference</th>
<th>percentage difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>997,884</td>
<td>1,203,643</td>
<td>205,759</td>
<td>21%</td>
</tr>
<tr>
<td>Employment</td>
<td>579,267</td>
<td>737,184</td>
<td>208,004</td>
<td>23%</td>
</tr>
<tr>
<td>Transit work trips</td>
<td>165,121</td>
<td>198,543</td>
<td>33,422</td>
<td>21%</td>
</tr>
<tr>
<td>Vehicle work trips</td>
<td>376,209</td>
<td>461,248</td>
<td>84,979</td>
<td>23%</td>
</tr>
<tr>
<td>Truck trips</td>
<td>83,021</td>
<td>100,384</td>
<td>17,363</td>
<td>21%</td>
</tr>
<tr>
<td>VMT</td>
<td>21,952,537</td>
<td>26,795,176</td>
<td>4,842,644</td>
<td>22%</td>
</tr>
<tr>
<td>VMT per capita</td>
<td>22.0</td>
<td>22.3</td>
<td>0.3</td>
<td>1%</td>
</tr>
<tr>
<td>Lane-miles</td>
<td>2,590</td>
<td>2,721</td>
<td>0.3</td>
<td>5%</td>
</tr>
<tr>
<td>Lane-miles of congestion</td>
<td>376</td>
<td>639</td>
<td>263</td>
<td>70%</td>
</tr>
</tbody>
</table>

Source: MWCOG

* Modeled lane miles include freeways, arterials, and many collectors, but few local roads.

By 2040, the Metropolitan Washington Council of Governments (MWCOG) projects the region's population to increase by 30 percent and employment to grow by 35 percent. Within Montgomery County, significant changes at the Walter Reed National Military Medical Center, White Flint, U.S. Food and Drug Administration (FDA), the Life Sciences Center, and other commercial and employment centers are expected to impact travel conditions for many.

Planning Context

Making more efficient use of our existing rights of way is not a new approach. Almost 40 years ago, the U.S. Department of Transportation (USDOT) directed Metropolitan Planning Organizations to develop Transportation System Management (TSM) Plans to provide guidance on ways to better utilize existing rights of way through means that are less capital intensive and have less impact than building new roads or lanes of traffic. Analysis of a "TSM Alternative" is a requirement for major capital projects in urban areas with a population of greater than 200,000.

There are a number of locations within the County today where TSM improvements are in place and providing more efficient use of the right-of-way, such as:

- HOV lanes on I-270,
- managed lanes on Colesville Road in Silver Spring north of the CBD and on Georgia Avenue in Montgomery Hills,
- off-peak parking on Colesville Road and Georgia Avenue in the Silver Spring CBD and Wisconsin Avenue in the Bethesda CBD that restricts roadway capacity to support economic activity,
- longer traffic signal cycles during peak hours to accommodate commuters on the major roadways; and
- the recent introduction of traffic signal priority on portions of MD 355 to facilitate transit service.

Enhanced transit service—including service consisting of many elements of BRT, but short of dedicated lanes requiring heavy construction—is also a recognized TSM strategy. Examples include the MetroExtra service operated by WMATA (which provides limited stop service in mixed traffic), other related near-term improvements planned as part of the WMATA Priority Corridor Network program, and the Ride On Route 100 non-stop service operating via the I-270 HOV lanes.

The provision of dedicated lanes for enhanced transit service is the focus of this update to the County's Master Plan of Highways. This Plan uses as its starting point for evaluation the 150-mile bus rapid transit (BRT) network described in the MCDOT Feasibility Study Report, completed in August 2011, as well as the later recommendations of the County Executive's Transit Task Force, whose final recommendations were delivered in May 2012. This Plan uses an expanded approach to meeting transportation challenges however, addressing primarily the needs of a BRT system, but also the designation of bicycle-pedestrian priority areas and the need for expanded MARC commuter rail service to support a transportation network that is better integrated.

BRT service can be provided via a variety of transitway treatments: a dedicated two lane median or side transitway, a dedicated one lane median transitway, dedicated curb lanes, or running in mixed traffic. Dedicated lanes can be achieved either by extending the right-of-way or by repurposing existing travel lanes.

Frequent, reliable bus service is most easily provided on a network of dedicated bus lanes, and the attractiveness of transit to the potential patron depends on how well his or her entire trip can be made, but the optimal size of this network must be weighed against physical and right-of-way impacts. This Plan identifies additional rights-of-way for certain corridor segments, where needed, to ensure a good balance between overall transit network integrity and impacts on adjacent properties. It recommends the more efficient use of existing rights of way along other corridor segments by repurposing existing travel lanes for transit where the value of doing so is confirmed through more detailed facility studies.
and operational planning. This Plan does not envision that full time dedicated bus lanes will be implemented as a first step in most locations.

Since a large part of the initial ridership for BRT service will come from existing transit users whose numbers do not warrant a high level of treatment at this time, it is likely that there will be an incremental introduction of priority treatments and features that, with actual operating and ridership experience, ultimately lead to the maximum level of treatment appropriate for the specific corridor in question.

Task Force report:

MCDOT report:

<table>
<thead>
<tr>
<th>Table 2 Transit Service Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service</strong></td>
</tr>
<tr>
<td>Commuter rail</td>
</tr>
<tr>
<td>Metrorail</td>
</tr>
<tr>
<td>Light rail</td>
</tr>
<tr>
<td>BRT—Activity Center Corridor</td>
</tr>
<tr>
<td>BRT—Express Corridor</td>
</tr>
<tr>
<td>BRT—Commuter Corridor</td>
</tr>
<tr>
<td>Local bus</td>
</tr>
</tbody>
</table>

Travelers in Montgomery County currently have the following transit options:
- High-speed/high-capacity heavy rail systems (Metrorail or MARC), largely built for commuters;
- Local and regional bus services that connect commuters from residential areas to employment centers via express buses along the interstates (MTA express bus and commercial commuter buses), and
- Local buses that move slowly along increasingly congested mainways and make frequent stops (Metrobus and Ride On).

Plans are underway to create two additional high-capacity transit corridors—the Purple Line and Corridor Cities Transitway (CCT)—where high development densities and a mix of land uses are either present or planned. However, much of the County will still lack reliable, high-quality transit service that provides a viable alternative to driving an automobile and that provides connectivity among multiple County activity centers.

BRT service on the recommended transit corridor network will provide service between dense redeveloping areas inside the Beltway, emerging mixed-use activity centers, and commuter corridors. BRT is a flexible service with a number of potential combinations of attributes. Some BRT corridors include an exclusive transitway with little or no conflicts with other vehicles. Other corridors may take advantage of off-board fare payment, traffic signal priority, and/or increased distance between stops, but not other attributes most often associated with BRT. A single corridor may evolve over time from one with fewer attributes to one with an exclusive transitway as facilities are designed and tested over time.

The transit corridors recommended in this Plan are intended to facilitate the following three types or levels of BRT service:
- BRT—Activity Center Corridor, defined by moderate-speed, high-frequency, all-day transit service. It is most appropriate on activity center corridors that connect multiple dense mixed-use areas.
- BRT—Express Corridor, defined by high-speed, moderate-frequency, peak-period service. It is most appropriate on access-controlled express corridors that connect commuters at park and ride lots to employment centers.
- BRT—Commuter Corridor, defined by moderate-speed, moderate-frequency, limited-stop transit service during peak periods. It is most appropriate on commuter corridors that connect moderate density residential areas to employment centers.

This Plan recommends an extensive network of enhanced transit corridors based on a broad analysis of travel patterns countywide. The right-of-way recommended for these corridors reflect the footprint required by the typical roadway sections developed for various levels of transit treatment, and by specific corridor segment locations in urban or suburban areas of the County.

More detailed analysis is required to determine the final treatment and typical section, the slope impacts required to build that typical section, and the number of travel lanes and turn lanes required to provide an adequate level of traffic service. The final right-of-way required for the recommended transit corridors must be determined during facility planning and design for individual corridors, at which time the cost of construction must also be determined. A vital facet of facility planning is to receive input and feedback from affected property owners, civic and business groups, and transit riders and road users, including public forums and workshops, electronic newsletters, and other forms of outreach. No County funding for transit corridor implementation nor additional rights-of-way, as proposed in this Plan or in subsequent studies, will be considered until the Council is satisfied that this fundamental public engagement requirement has been fulfilled and a Council public hearing solely for each corridor or combination of connected corridors is held. Accordingly, a citizens advisory group comprising of residents, business owners and other relevant stakeholders must be created for each corridor which enters into facility planning to make recommendations to the County on the design, construction and unimpeded station locations for the transit corridor.

The County’s Service Planning and Integration Study will determine the general relationship between BRT and local bus service, incorporating that study’s recommendations may require that additional stations be added during as a result of facility planning. More detailed analysis is required after the completion of that study to determine the specific location and size of transit stations.

Most of the BRT corridors pass through residential areas and in addition to serving the transportation function of moving people, the system should be implemented in such a way that it enhances the surrounding area and minimizes negative impacts to the extent possible. Overhead signage should be
kept to the minimum necessary and minimize obtrusiveness. Stations must be identifiable but should be designed to complement the surrounding neighborhood.

A transit corridor network that supports high-quality bus service will improve accessibility and mobility to serve the development envisioned by the County’s adopted land use plans. Implementing this Functional Plan will help further the General Plan’s transportation goal, which is to:

“Enhance mobility by providing a safe and efficient transportation system offering a wide range of alternatives that serve the environmental, economic, social, and land use needs of the County and provide a framework for development.” (page 63)

This Plan recommends a transit corridor network with a variety of transitway treatments, including dedicated median and curb bus lanes as well as mixed traffic operations, and makes recommendations for stations (located by the nearest intersection) to accommodate BRT service. The Plan recommends rights-of-way to accommodate these facilities and in some cases, changes in the number of travel lanes to achieve this transit corridor network.

There are many other elements of BRT service however that are beyond the scope of the Plan but are important to its future success, including:

- Implementing each corridor’s treatment;
- Implementing [treatments] elements such as queue jumpers and/or transit signal priority to improve vehicle operating speeds along selected segments of the network;
- Providing express and limited stop service to and from key activity centers; the greater spacing of stops reduces the amount of time buses must stop to pick up and drop off customers;
- Providing off-board fare collection and level boarding to reduce the time it takes passengers to enter and exit a bus, and
- Multiple bus stops that are level with the station platform to reduce the dwell time at stops by allowing riders—including children, the elderly, and persons with disabilities—to enter and exit more quickly.

This Plan also makes no recommendations regarding the operation of BRT such as: the frequency, hours, and span of service; fare structure and system financing; bus size and fuel source; details of the station design; transfers with other transit services; and the potential redeployment of local buses.

The County is focusing new planned development in compact, mixed-use areas that reduce the need for driving and enhance its pedestrian, bicycle, and transit network with sustainable, cost-effective solutions. A key support for this development pattern is a high-quality, reliable transit system that enables people to leave their cars at home. This system will connect these activity centers with existing and other planned development. While light rail is an appropriate system to serve high density activity centers, such as the Purple Line between Bethesda and Silver Spring, it is not cost-effective for most of the County’s transit corridors.

BRT works where development densities may be lower than those that warrant light rail, but where greater transit speed and efficiency is needed beyond what standard local bus service can provide. This Plan recommends a network of additional BRT transit corridors that will be integrated with the Corridor Cities Transitway (CCT), now in preliminary design as a BRT facility. This Plan anticipates that the recommended transit network also can be adapted and will therefore evolve over time to meet the particular transit needs and operating characteristics of each corridor segment and activity center.
The EMX, 60 percent of which features dedicated bus lanes, also includes 60-foot articulated vehicles, hybrid electric propulsion, double-sided boarding, on-board wheelchair and bicycle space, as well as both median and curbside stations that provide weather protection for riders.

Within a year of the Green Line's opening, ridership along the corridor had doubled, a statistic largely driving the City's honorable mention recognition for a 2008 Sustainable Transport Award. The continued success of the EMX pushed LTD's decision to expand service to connect Eugene and Springfield to the region's Gateway area via the Gateway Line extension, which opened in 2011.

HealthLine (Cleveland, OH)
The Greater Cleveland Regional Transit Authority (RTA) operates the HealthLine BRT service (formerly referred to as both the Silver Line and Euclid Corridor Transportation Project). Opened in 2008 and subsequently renamed as a result of a partnership with the Cleveland Clinic and University Hospital, the system runs along Cleveland's Euclid Avenue from the downtown area's Public Square to East Cleveland's University Circle.

Illustration 2 HealthLine, Cleveland, Ohio

The line covers 59 stations and contains dedicated bus lanes (with advanced signal technology to coordinate with cars), off-board fare collection (at both median and curbside stations), diesel-electric hybrid motors on articulated vehicles, and adjacent bike lanes along the route.

Originally billed as a link between hotels, employers, cultural institutions, and other popular destinations, within a year of the project's opening, the HealthLine's success was evident. Indeed, ridership had risen by nearly 50 percent over that of the Route 6 Euclid Avenue bus, which was formerly the most heavily used route in the RTA system.

Summary Recommendations
Functional plans provide the intermediate level of planning detail between the General Plan and area master plans, in this case, providing the legal basis for securing adequate rights-of-way to accommodate the desired facilities. This Plan's focus is to:
- identify the corridors needed to accommodate the desired BRT network, facilitating superior transit service along many of the County's major roadways;
- identify the corridor segments where lanes would be dedicated for BRT, but without designating the specific treatment;
- recommend a minimum public right-of-way for each affected roadway and any changes to the planned number of travel lanes; and
- identify recommended station locations by the nearest intersection.

This Plan recommends a network of ten transit corridors [see Map 1], with specified rights-of-way [and treatments].
The Plan also recommends:
- designating Bicycle-Pedestrian Priority Areas around major stations to promote safe, convenient access for transit patrons; and
- adding a third track on a portion of the MARC Brunswick Line to promote regional transit service improvements.

This Plan's recommended transit corridor network is intended to serve current and planned land use in adopted master and sector plans. No changes to land use or zoning are recommended in this Functional Plan.

This Plan establishes the direction for more detailed work to be done in project planning along individual transit corridors. The corridor segment treatment, length, alignment, and station locations are subject to modification during these more detailed planning and engineering phases of project development and implementation, bearing in mind that the goal is to create a high-quality BRT system that will offer frequent, reliable service.

Background

The first Master Plan of Highways (MPOH) was approved and adopted in 1931, shortly after the creation of the Maryland-National Capital Park and Planning Commission in 1927. The last comprehensive update to the MPOH was approved and adopted in 1955 (see Illustration [13]). It covered the Maryland-Washington Regional District as it existed at the time, Montgomery County's portion of which was about one-third of the County's current area - east of Georgia Avenue, east and south of the City of Rockville, and the southeast portion of Potomac.
Rather than a comprehensive update, the MPOH has been updated periodically, focusing on specific projects or geographic areas. Area master plans were revised in the 1970s to include the Metrorail Red Line, but the MPOH map was not revised to include transitways until 1986. Transitways now included in the MPOH are:

- Purple Line (Transitway) Light Rail;
- Corridor Cities Transitway;
- North Bethesda Transitway; and
- Georgia Avenue Busway.

Since 1955, there have been updates and amendments to the MPOH through various approved and adopted functional, master, and sector plans. The most significant countywide update since 1955 was the creation of the Rustic Roads Functional Master Plan (RRFMP) in 1996, which sought to preserve many of the roads in the rural area of the County to reflect and further the goals of the 1980 Functional Master Plan for the Preservation of Agricultural and Rural Open Space.

This Plan complements the RRFMP by reflecting the growing urbanization of the I-270 corridor and the downtown area. It will provide the mobility needed to accommodate that growth while minimizing the adverse impacts on quality of life for those who live, work, and patronize the businesses along major roadways.

The General Plan recommends "an interconnected transportation system that provides choices in the modes and routes of travel." A BRT system would better enable transit riders to travel on a network of corridors with few transfers and with reliable service, helping to fulfill the General Plan's transportation vision.
Vision

This Plan will greatly increase the extent of high-quality transit service to the County's most densely developed areas, areas planned for redevelopment, and areas planned for new dense development. As parts of the County urbanize, BRT will provide the transit service needed to move more people to and from jobs, homes, shopping, and entertainment areas. Transit's more efficient use of public rights-of-way will support economic development in an environmentally sustainable way and in a way that preserves existing communities.

Why Bus Rapid Transit?

With exclusive or dedicated lanes, signal priority, and greater spacing between stops, BRT will:
- provide better service to existing transit passengers whose travel time would be reduced;
- provide a fast, convenient, reliable alternative to the single-occupant vehicle and increasingly congested roads;
- move more people in the same space as a general purpose lane at a higher average level of service;
- act as a bridge between rail transit and extensive local bus service; and
- potentially intercept many non-County residents before they reach the County's more heavily developed areas, allowing roadway capacity to better serve planned development within the County.

BRT can be implemented more easily and quickly than light rail, at a lower capital cost, and is far more flexible. BRT routes can use a single transit corridor or parts of multiple corridors, which can also accommodate local buses that are included in the County's bus service plan for the network.

This Plan makes recommendations for transit corridors within Montgomery County. These corridors are intended to accommodate transit services both within the county and those that extend beyond its boundaries. The recommended transit corridors are not intended to be viewed as bus routes that terminate at the county line.

Finally, BRT can be implemented in phases, integrating improvements in vehicles, stations, and runningways as operating and capital funds become available, and as the related varying levels of transit-supportive densities materialize along segments of the corridors.

Fitting BRT into the County's Transportation Network

Metrorail is the backbone of the County's transit network, providing transit service via the Red Line within the County and to downtown Washington, D.C. It provides service to about three-quarters of a million passengers system-wide on an average weekday, significantly reducing the peak-hour travel burden on the region's roadway network.

The Purple Line, planned as Light Rail Transit (LRT) will provide the next layer of transit service, connecting down County activity centers, the two Red Line corridors, and Montgomery County with Prince George's County. The Corridor Cities Transitway, a busway, will connect to out-County activity centers in the regions of Gaithersburg and Germantown west of I-270, and to Clarksburg. The 10 additional BRT corridors in this plan will form the next layer of transit service.

Local, circulator or shuttle, limited-stop, and commuter/express bus routes and MARC commuter rail complete the network.

In addition to serving activity centers directly, BRT on the recommended transit corridors will serve as feeders to Metrorail and MARC stations, and local bus service and shuttles will feed into the recommended corridors. Montgomery County has one of the largest suburban bus services in the country, providing thirty million trips per year. Ride On's extensive network of local routes will continue to provide access to both the BRT and Metrorail systems, as well the Metrobus network.

This Plan recommends that segments of MD 355 and Georgia Avenue that are already served by Metrorail also be served by the recommended transit corridors. One-half of the forecast BRT patrons are expected to be new transit riders. Since BRT will serve as an intermediate level of transit service between Metrorail and local buses, the other half will migrate from other transit services because of the greater service area, the potential for one-seat rides, and connections to the Purple Line.

The introduction of extensive high-quality transit service on the County's roadways will provide an attractive alternative to private automobiles. In addition to recommendations in the General Plan and many master plans to increase the percentage of residents using transit, specific mode share goals of up to 50 percent non-single-occupant vehicle travel are already in place in several areas of the County. The recommended transit network would provide the superior transit facilities necessary to help achieve these goals.

At the same time, BRT service on the transit corridor network recommended by this Plan should improve the overall operation of the roadway network for drivers still using the roads by increasing average travel speeds and reducing the growth in congestion countywide. (Appendix B shows the results for the three transit corridor networks modeled.) The impacts on individual corridors will depend greatly on the final transit corridor treatment selected by the implementing agency and must be determined during detailed project planning and service planning following the adoption of this Functional Plan.

This Plan makes no recommendations for adding park-and-ride facilities, so BRT access would be via existing parking facilities, biking, and walking. While adding park-and-ride lots could increase ridership, the locations of these lots should be carefully considered to match the function of each recommended BRT corridor:
- BRT—Activity Center Corridors: because these corridors connect multiple dense, mixed-use areas, all station areas should prioritize pedestrian, bicycle, and transit access; park-and-ride lots should be discouraged.
- BRT—Express Corridors: because BRT stations connect park-and-ride lots to employment centers, park-and-ride BRT stations should prioritize pedestrian and transit access; though pedestrian, bicycle, and transit access should be a focus at all other stations.
- BRT—Commuter Corridors: because these corridors connect moderate density residential areas to employment centers, most station areas should prioritize pedestrian, bicycle, and transit access. Park-and-ride lots may be appropriate at some locations, especially ends-of-line stations and connections to interstates and expressways, but multi-modal access should be provided.

This Plan recommends that additional park-and-ride lots be considered in future area master plans:
- as an interim use where transit-oriented redevelopment is an appropriate long-term goal, or
• as a long-term use where transit-oriented development would not be feasible or would otherwise be inconsistent with the master plan's objectives.

The Plan recommends sufficient rights of way for safe, adequate access along the transit corridors, improvements to existing bicycle and pedestrian facilities in the areas around recommended stations, and the designation of Bicycle-Pedestrian Priority Areas at major transit stations.

The need for additional bus storage and maintenance facilities will need to be explored in a future master plan once the County's bus service plan is complete, but it is likely that such a facility will be needed in the eastern part of the county.

Guiding Principles

The 1993 General Plan Refinement shifted the County's transportation goal toward meeting travel demand by providing good alternatives to the single-occupant vehicle:

The 1969 Circulation Goal was to "provide a balanced circulation system which most efficiently serves the economic, social, and environmental structures of the area." The General Plan Refinement renames the goal to the Transportation Goal. One important conceptual change in this goal is the movement away from accommodating travel demand and toward managing travel demand and encouraging the availability of alternatives to the single-occupant vehicle. The Refinement effort thus abandons phrases such as "carry the required volume" and "accommodate travel demand" because the demand for single-occupant vehicle travel will usually outstrip the County's ability to meet it. (page 61)

The Refinement further recommends:

"Making better use of the transportation system already in place, getting more people into trains, cars, and buses in future right-of-way, and creating an environment conducive to walking and biking are all necessary elements to achieve an affordable balance between the demand for, and supply of, transportation." (page 60)

"A key aspect of making the County more accessible by transit and walking is that it can reduce travel by car. Favoring transit can make more efficient use of the existing roadway network and can reduce air pollution." (page 17)

To further the transportation goal, this Plan recommends:

• designating exclusive or dedicated bus lanes, wherever there is sufficient forecast demand to support their use and where subsequent analysis shows that acceptable traffic operations can be achieved, to promote optimal transit speeds in urban areas and surrounding suburban areas;
• implementing transit facilities and services where and when they would serve the greatest number of people on individual corridors and where there would be an improvement to the overall operation of the county's transportation network;
• expanding regional rail transit service;
• supporting policies and programs that increase the comfort and safety of pedestrians and bicyclists traveling to and from transit facilities; and
• minimizing the construction of additional pavement to limit impacts on the environment and on adjacent communities.

A strong transit network is essential to support economic development in planned growth areas. The recommended transit corridors will facilitate BRT and other high-quality transit services as well as potentially accommodate other bus services such as Metrobus and Ride On and provide connections to Metrorail, the Purple Line, and MARC.
[Determining] Potential BRT Treatments

The transit corridors in MCDOT’s Feasibility Study Report and those recommended by the County Executive’s Transit Task Force were analyzed to consider:

- forecast transit ridership
- general traffic volumes and patterns
- existing roadway development
- planned land use.

This Plan’s corridor treatment recommendations are tailored to reflect future facility planning studies that develop detailed ridership projections and traffic forecasts, will evaluate the specific conditions for each corridor segment and the system as a whole, and will include the following considerations:

- Are dedicated lanes warranted?
- Should the dedicated lanes be at the curb or in the median?
- Can existing travel lanes be repurposed as dedicated bus lanes?
- What segments of the recommended transit network can be implemented without adversely affecting current planned land use or general traffic operations? What segments require further study as part of an area master plan effort?

[Appendix C includes a detailed description of the specific conditions in each corridor and the rationale behind the treatment recommended. The following discussion summarizes the basis for these decisions.]

Dedicated Lanes

The ridership used to determine when a dedicated bus lane is warranted can vary nationally depending on the jurisdiction but is typically around 1,200 passengers per peak hour in the peak direction (pphpd). This Plan’s recommendations generally are based on a lower threshold of 1,000 pphpd to reflect:

- the high level of analysis of the large network studied,
- the long time frame of the Functional Plan, which accommodates build-out of current planned land use beyond the 2040 forecast year; and
- hard-to-measure model attributes that may significantly increase forecast ridership. Preliminary modeling work done for the Veirs Mill Road Corridor indicated that the forecast ridership could be underestimated by up to 30 percent because of these attributes, which include:
  - service branding
  - reliability
  - span of service hours
  - comfort
  - protection from weather
  - the chances of finding a seat
  - other passenger amenities.

Where forecast BRT ridership was less than the 1,000 pphpd threshold, it was combined with forecast local bus ridership to identify corridor segments where dedicated lanes could improve bus travel for all transit users. Corridor segments that fell below 1,000 pphpd in combined BRT and local bus ridership were generally not recommended for inclusion in the Plan. In select cases, largely because of network integrity considerations, some lower ridership segments were retained, most often as mixed traffic operations.

[Median vs. Curb Lanes]

Median busways have [exclusive] dedicated rights-of-way and provide the highest level of BRT accommodation. They are generally recommended where the peak hour forecast ridership is very high. For example, the Transit Capacity and Quality of Service Manual sets consideration of a median busway at 2,400 people in the peak hour in the peak direction[1]; however, some jurisdictions have set a threshold between 1,500 - 1,700 pphpd for policy reasons. This is a reasonable approach for Montgomery County to consider as well, for the same reasons outlined in Dedicated Lanes above, and this Plan uses a threshold of 1,600 pphpd to determine where median busways are desirable.

Higher bus ridership forecasts make a median busway more desirable since it provides the highest level of service for riders, even though it requires a wider right-of-way and may make left-turns for general traffic more difficult. A supporting street grid however, makes accommodating a median busway easier by giving options for parallel routes and turning movements, e.g. the White Flint South area.

Illustration 4 Proposed White Flint Street Grid

The existing and proposed street grid in White Flint provides alternative routes to MD 355. Proposed redevelopment will add mixed-use, open spaces, and travel options.

Future area master plan updates, particularly in station areas, should consider ways to enhance the street grid at critical locations. More detailed planning will be required during implementation to determine location-specific solutions to the traffic challenges posed by a median busway.

Corridors with lower forecast BRT ridership but with high combined BRT and local bus ridership are better suited to curb lane operations. Dedicated curb lanes may be shared with express and limited-
stop bus services, as well as other bus services, to provide faster, more dependable bus service for all transit patrons in the corridor. Dedicated curb lanes may also be the best interim treatment where a median busway is desired but where obtaining sufficient right of way is not possible in the near term without excessively adverse impacts.

Dedicated curb lanes would be open to use by emergency vehicles and would likely be open to use by right-turning vehicles and by on-road bicyclists who do not otherwise have dedicated space in the roadway.

The treatments recommended in this Plan are intended to determine this Plan identifies the rights-of-way necessary to facilitate the development of a network of dedicated transit lanes. This Plan] It recognizes, however, that the final decision on treatment in each transit corridor must be made at the time of implementation when a transit service plan is in place and:

- the benefits of accommodating BRT and/or other bus services in the dedicated lanes can be quantified;
- the traffic impacts of implementing curb lanes vs. a median busway can be more closely studied; and
- the impacts on adjacent properties can be determined.

This Plan is intended to provide flexibility for the implementing agency to make the choice of a curb or median busway as the best way to achieve dedicated lanes.

Lane Repurposing

After determining whether dedicated median or curb lanes are warranted on a corridor, the next step is to determine how to achieve them: whether to repurpose existing travel lanes, use the median where it’s wide enough to accommodate the desired treatment, or identify additional right-of-way.

An important goal of this Plan is to increase person-throughput, the number of people that can be accommodated within our often constrained public rights-of-way. Lane repurposing—designating an existing travel lane for bus use only—provides the most efficient use of available transportation facilities. In addition to Central Business District areas where constructing additional lanes is most often not practical, lane repurposing [as recommended] may be implemented where the number of forecast transit riders exceeds the general purpose lane capacity and/or where general traffic demand would not exceed capacity.

In many segments of the proposed BRT corridors, the 2040 forecast bus ridership surpasses, and in some cases far surpasses, the person-throughput of a single general purpose traffic lane. Implementing necessary and more efficient transit facilities should reflect the priority given to transit in the General Plan (see Guiding Principles, page 221).

Where bus rapid transit would move people most efficiently in a corridor, the dedicated space needed to accommodate transit should be provided, the remaining lanes would continue to be available for general traffic. The recommended bus lanes would provide a greater level of person-throughput, potentially at a higher average level of service for all users of the road.
Recommended Corridors and Illustrative Treatments

This Plan makes recommendations for a network of [R1] 82 miles of BRT [BRT corridors] in addition to the Corridor Cities Transitway [and includes treatments warranted by current zoning and related 2040 forecast bus ridership that can be accomplished without major impacts on existing development, such as requiring the removal of buildings, slope impacts within ten feet of buildings, or eliminating off-street parking for residential properties]. There are several potential treatments in each corridor, these will be determined during the facility planning stage of project development. The cross-sections on the following pages illustrate these treatments generally.

Appendix A identifies greater corridor treatments that may be warranted if pursued in conjunction with potential land use changes in future area master or sector plan updates. These treatments require additional study to confirm the recommended treatment and right-of-way in these master and sector plan updates. The potential impacts of these greater corridor treatments can be determined in detail as part of an area master plan.

Recommendations within Prince George's County and the Cities of Rockville and Gaithersburg are offered as policy guidance for future area master or sector plan updates in these jurisdictions, which must pursue their own master plan processes to determine the ultimate recommended rights-of-way and number of travel lanes.

Future area master or sector plan updates should consider the relationship of building locations and heights to the ultimate roadway width to ensure a transit-oriented development pattern that promotes pedestrian safety. The concurrent creation of urban design guidelines should be considered for all recommended transit corridors with greater than six lanes to establish minimum building heights and build back requirements.

Map 2 Recommended Transit Corridor Network

[includes right-of-way and lane changes to be made as part of this Functional Plan]

Typical sections of transit corridor treatments on a six lane roadway are shown in Illustrations 3 through 8.}
Illustration 5 [Recommended] Illustrative Corridor Segment Treatment: Two-Lane Median Busway
One lane dedicated to BRT service on either side of the roadway median, with a two-foot-wide striped buffer separating the bus lanes from general traffic.

Illustration 6 [Recommended] Illustrative Corridor Segment Treatment: Two-Lane Side Busway
A two-lane busway to serve BRT on one side of the roadway, with a landscaped buffer and sidewalk separating the bus lanes from general traffic.

Illustration 7 [Recommended] Illustrative Corridor Segment Treatment: One-Lane Median Busway
One lane dedicated to BRT service in the center of the roadway separated from general traffic by a median on either side. This lane would in most cases accommodate BRT service in one direction only, but could accommodate bi-directional BRT service if provided with adequate passing lanes.

Illustration 8 [Recommended] Illustrative Corridor Segment Treatment: Managed Lanes
One lane dedicated to BRT service during peak hours in the peak direction of travel only on roads that have a reversible-lane operation.

Illustration 9 [Recommended] Illustrative Corridor Segment Treatment: Curb lanes
Outside lanes adjacent to the curb (nearest the sidewalk) dedicated to BRT service, either during peak hours or all day.

Illustration 10 [Recommended] Illustrative Corridor Segment Treatment: Mixed Traffic
No dedicated space provided for BRT service. Buses would typically operate as they do now but some additional accommodation at intersections could be provided, such as queue jumpers (short passing lanes) and/or traffic-signal priority.
Recommended Corridors

This Plan recommends the following ten corridors:
Corridor 1: Georgia Avenue North
Corridor 2: Georgia Avenue South
Corridor 3: MD 355 North
Corridor 4: MD 355 South
Corridor 5: New Hampshire Avenue
Corridor 6: North Bethesda Transitway
Corridor 7: Randolph Road
Corridor 8: University Boulevard
Corridor 9: US 29
Corridor 10: Veirs Mill Road

The recommendations for each corridor and segment include:
- dedicating public rights-of-way for several transit corridors
- [specific treatments for each corridor segment]
- changes in the number of master planned travel lanes
- whether or not there would be one or more lanes dedicated for transit use
- intersections [at] near which transit stations should be located.

These recommendations represent the maximum number of added lanes (including improved bikeways and sidewalks) in each corridor segment, without predetermining the treatment to be employed. For example, where the Plan recommends adding one dedicated lane to the cross-section, this would leave open the option of not adding a lane but simply repurposing existing lanes, or, if even repurposing is not feasible, merely having the BRT service run in mixed traffic.

Stations are identified by the station type and right-of-way, but the specific location of the station and associated right of way should be determined during facility planning. The number of stations may also be increased or decreased during facility planning.

Recommended rights-of-way should be considered minimum rights-of-way and additional right-of-way [will] may also be required for stations and at some intersections to accommodate turn lanes. [The typical rights-of-way associated with stations and turn lanes at intersections are shown in Online Appendix 11.]

[Within jurisdictions that have independent planning authority, the widths of public rights of way, number of travel lanes, transit corridor treatments, and the number of transit stations and their locations should be included in the appropriate local master plan, in consultation with the appropriate Executive agencies.]

Recommendations within Prince George's County and the Cities of Rockville and Gaithersburg are offered as policy guidance for future area master or sector plan updates in these jurisdictions, which must pursue their own master plan processes to determine the ultimate recommended rights-of-way, station locations, and number of travel lanes.

This Plan is anticipated to be reviewed by the County Council at the same time as the White Oak Science Gateway Master Plan (WOSG). Land use decisions made as part of the approval of WOSG may require an upgrade in treatment on portions of the following corridors: US29, New Hampshire Avenue, and Randolph Road, including an extension of the last along Cherry Hill Road. Any upgrades or extensions should be reflected in the final approved Functional Plan.

[Plan Appendix C contains a summary of the changes in recommended rights-of-way and number of travel lanes from the current master plan, as well as the forecast ridership for each recommended corridor.]

[Plan Appendix E shows the relationship of the recommended transit corridor network to 2040 forecast jobs and housing.]
Corridor 1: Georgia Avenue North

Georgia Avenue North is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. The corridor has several activity nodes, notably the commercial centers at Wheaton and Glenmont, and their respective Metrorail stations. Aspen Hill and Olney are at the northern end, with residential uses in between.

The corridor includes the Georgia Avenue Busway, a long-planned transitway in the wide median between Glenmont and Olney recommended in the 1997 Glenmont Sector Plan, 1994 Aspen Hill Master Plan, and 2005 Olney Master Plan.

Since congestion tends to occur in the peak direction of traffic, a single dedicated transit lane is sufficient for achieving a travel speed consistent with commuter BRT service.

Corridor [treatment] recommendations, from north to south:
- Along Prince Phillip Drive from the planned Olney Transit Center to Olney-Sandy Spring Road, a mixed traffic transitway.
- Along Olney Sandy Spring Road from Prince Phillip Drive to Georgia Avenue, a mixed traffic transitway.
- Along Georgia Avenue from Olney Sandy Spring Road in Olney to Reedie Road in Wheaton, a reversible one-lane median transitway.
- Along Reedie Road from Georgia Ave to Veirs Mill Road, a mixed traffic transitway.

This Plan also recommends implementing a cycle track [in the median] to achieve a bicycle facility that avoids the driveway interruptions of the more typical location at the side of the roadway and permit cyclists to travel safely at a higher speed. The higher quality of such a path negates the need for on-road bike lanes. The cycle track will end at Glenallan Avenue where users can transfer to the Glenmont Metro Station or the Glenmont Greenway.

Station Locations:
- Montgomery General Hospital
- MD 109 and MD 97
- MD 97 and Hines Road
- ICC park and ride
- MD 97 and Norbeck Road park and ride
- MD 97 and Bel Pre Road
- MD 97 and Rossmoor Boulevard
- MD 97 and MD 185
- MD 97 and Hewitt Avenue
- Glenmont Metro Station
- MD 97 and Randolph Road
- MD 97 and Arcola Avenue
- Wheaton Metro Station
Table 3 Corridor Recommendations, Georgia Avenue North

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment] Dedicated Lanes</th>
<th>R.O.W.S.</th>
<th>[Maximum Additional Transit Lanes]</th>
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<td>MD 108</td>
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<td>Georgia Avenue</td>
<td>Spartan Rd</td>
<td>Old Baltimore Rd</td>
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<td>130</td>
<td>[4-1-1]</td>
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<td>Georgia Avenue</td>
<td>Old Baltimore Rd</td>
<td>Emory Ln</td>
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<td>150</td>
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<td>Georgia Avenue</td>
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<tr>
<td>Georgia Avenue</td>
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<td>Reedie Rd</td>
<td>[Mixed Traffic] Rd</td>
<td>120</td>
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* Reflects the minimum right of way, and may not include land needed for spot improvements such as turn lanes and stations.

Table 4 Corridor Recommendations, Georgia Avenue North Cycle Track

<table>
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<th>Route Number</th>
<th>Name</th>
<th>Type</th>
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<tr>
<td>CT-2</td>
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<td>Cycle Track</td>
<td>Queen Mary Dr to [Glenallen]</td>
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### Table 5: Corridor Recommendations, Georgia Avenue South

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<thead>
<tr>
<th>Road</th>
<th>From</th>
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<th>[Treatment]</th>
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<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia Avenue</td>
<td>Venus Mill Rd</td>
<td>Dennis Ave</td>
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<td>120</td>
<td>[4 + 2 bus]</td>
</tr>
<tr>
<td>Georgia Avenue</td>
<td>Dennis Ave</td>
<td>I-495</td>
<td>[Mixed Traffic]</td>
<td>110</td>
<td>[4 + 2 bus]</td>
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<tr>
<td>Georgia Avenue</td>
<td>I-495</td>
<td>Blarta Ln</td>
<td></td>
<td>120</td>
<td>[4 + 2 bus]</td>
</tr>
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<td>Georgia Avenue</td>
<td>Blarta Ln</td>
<td>26th St</td>
<td></td>
<td>120</td>
<td>[4 + 2 bus]</td>
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<tr>
<td>Georgia Avenue</td>
<td>36th St</td>
<td>Spring St</td>
<td>[Curb Lanes]</td>
<td>122</td>
<td>[4 + 2 bus]</td>
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<tr>
<td>Georgia Avenue</td>
<td>Spring St</td>
<td>Colesville Rd</td>
<td>Yes</td>
<td>126</td>
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<td>Wayne Avenue</td>
<td>Colesville Rd</td>
<td>Georgia Ave</td>
<td></td>
<td>120</td>
<td>[4 + 2 bus]</td>
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<tr>
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<td>Blarta Mill Rd</td>
<td>[Curb Lanes]</td>
<td>125-140</td>
<td>[4 + 2 bus]</td>
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<tr>
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<td>DC Line</td>
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<td>135</td>
<td>[4 + 2 bus]</td>
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</table>

* Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and signal boxes.
Corridor 3: MD 355 North

MD 355 North is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. The corridor has several major existing and planned activity nodes, including Rockville and Gaithersburg. It is also characterized by heavy congestion and high transit ridership potential.

Corridor [treatment] recommendations, from north to south:
- Along MD 355 from Redgrave Place to Shakespeare Boulevard, a mixed traffic transitway is recommended.
- [A two-way median transitway is] Dedicated lanes are recommended:
  - Along Seneca Meadows Parkway from the Corridor Cities Transitway to Observation Drive.
  - Along Shakespeare Boulevard from Observation Drive to MD 355.
  - Along MD 355 from Shakespeare Boulevard to Rockville Metro Station.
  - Along Seneca Meadows Parkway from the Corridor Cities Transitway to MD 118.
  - Along Goldenrod Lane from MD 118 to Observation Drive.
  - Along Observation Drive from Goldenrod Lane to Middlebrook Road.
  - Along Middlebrook Road from Observation Drive to MD 355.

Delete the master-planned link of the Corridor Cities Transitway’s East Branch between Century Boulevard and Seneca Meadows Parkway.

Station Locations:
The Shops at Seneca Meadows
Seneca Meadows Corporate Park
Montgomery College—Germantown Campus
Holy Cross Hospital/Linkney Life Science Park
MD 355 and Redgrave Place
MD 355 and Shawnee Lane
MD 355 and Foreman Boulevard
MD 355 and Little Seneca Parkway
MD 355 and West Old Baltimore Road
MD 355 and Ridge Road
MD 355 and Shakespeare Boulevard
MD 355 and MD 118
MD 355 and Middlebrook Road (Montgomery College—Germantown Campus)
MD 355 and Professional Drive
MD 355 and Watkins Mill Road
MD 355 and MD 124
MD 355 and Odemithal Avenue
MD 355 and Boulger Avenue
MD 355 and Education Boulevard
MD 355 and Shady Grove Road
MD 355 and King Farm Boulevard
MD 355 and Gude Drive
MD 355 and Mamakake Street/Montgomery College—Rockville Campus
Rockville Metro Station.

Note that stations within the Cities of Gaithersburg and Rockville must be confirmed in their respective master plans.
### Table 6: Corridor Recommendations, MD 355 North

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment] Dedicated Lanes [%]</th>
<th>R.O.W.</th>
<th>Maximum Additional Transit Lanes</th>
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<tr>
<td>MD 355</td>
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<td>[440]</td>
<td>0 [4 x 2 bus]</td>
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<td>Little Seneca Creek</td>
<td>Shakespeare Blvd</td>
<td>[Two Lane Median] Yes</td>
<td>[120]</td>
<td>0 [4 x 2 bus]</td>
</tr>
<tr>
<td>Seneca Meadows Parkway</td>
<td>Corridor Civic Transitway</td>
<td>Observation Dr</td>
<td>MD 355</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>Shakespeare Blvd</td>
<td>Observation Dr</td>
<td>Shakespeare Blvd</td>
<td>[Green Preserve Rd] MD 228</td>
<td>250</td>
<td>0 [4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>MD 118</td>
<td>Green Preserve Rd</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>0 [4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Game Preserve Rd</td>
<td>just south of O'Neal Dr</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>0 [4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>just south of O'Neal Dr</td>
<td>1.250 ft south of Shady Grove Rd</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>1.250 ft south of Shady Grove Rd</td>
<td>Ridley Ave</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Ridley Ave</td>
<td>Indianola Rd</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Indianola Rd</td>
<td>1.000 ft south of Indianola Rd</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>1.000 ft south of Indianola Rd</td>
<td>230 ft north of N. Campus Dr</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>230 ft north of N. Campus Dr</td>
<td>Church St</td>
<td>[Two Lane Median] Yes</td>
<td>130</td>
<td>[4 x 2 bus]</td>
</tr>
</tbody>
</table>

**Note:** EMD forecast ridership for the segments of MD 355 within the Cities of Rockville and Gaithersburg warrants a two-lane median busway, however this Functional Plan cannot make changes or require dedication within these jurisdictions. The median busway recommendation can only become effective upon master plan changes made by those jurisdictions that would include recommendations on the right-of-way and the number of travel lanes. Reflects the minimum right-of-way and may not include land needed for stop improvements such as turn lanes and stations.

### Corridor 4: MD 355 South

MD 355 South is an activity center corridor planned for a high level of development that will support all-day travel throughout the corridor. It is characterized by shorter trips representing a wide variety of travel purposes (shopping and recreation, in addition to commuting). The corridor has several planned or existing activity nodes, including Rockville, Twinbrook, White Flint, NIH/WHNMMC, and the Bethesda CBID and Friendship Heights CBID. It is also characterized by very heavy congestion and high transit ridership potential.

**Corridor [treatment] recommendations, from north to south:**
- From Rockville Metro station to [Bradley Boulevard, a two-way median transitway] Bethesda Metro station, dedicated lanes.
- [From Bradley Boulevard to Western Avenue, a curb lane transitway.]

### Station Locations

- Rockville Metro Station
  - MD 355 and Edmonston Drive
  - MD 355 and Templeton Place
  - MD 355 and Halpine Road
  - MD 355 and Hubbard Drive
  - White Flint Metro Station
  - MD 355 and Security Lane
  - Grosvenor Metro Station
  - MD 355 and Pooles Hill Road
  - MD 355 and Cedar Lane
  - Medical Center Metro Station
  - MD 355 and Cordell Avenue
  - Bethesda Metro Station
  - [Bradley Boulevard and MD 355]
  - [Friendship Heights Metro]

Stations within the City of Rockville must be confirmed in the City's master plan.
Table 7  Corridor Recommendations, MD 355 South

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment] Dedicated Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD 355</td>
<td>Church St.</td>
<td>Halsey Blvd.</td>
<td>[Two-Lane Median] Yes</td>
</tr>
<tr>
<td>MD 355</td>
<td>Halsey Rd</td>
<td>250 ft south of Twinbrook Pkwy</td>
<td>[Two-Lane Median] Yes</td>
</tr>
<tr>
<td>MD 355</td>
<td>250 ft south of Twinbrook Pkwy</td>
<td>200 ft south of Hoya St</td>
<td>150 ([160]*</td>
</tr>
<tr>
<td>MD 355</td>
<td>200 ft south of Hoya St</td>
<td>Edmon Dr.</td>
<td>150 ([160]*</td>
</tr>
<tr>
<td>MD 355</td>
<td>Edmon Dr.</td>
<td>Halsey Wy</td>
<td>150 ([160]*</td>
</tr>
<tr>
<td>MD 355</td>
<td>Halsey Wy</td>
<td>Grosvenor Ln</td>
<td>150 ([160]*</td>
</tr>
<tr>
<td>MD 355</td>
<td>Grosvenor Ln</td>
<td>1.4 mi</td>
<td>200 ([160]*</td>
</tr>
<tr>
<td>MD 355</td>
<td>1.4 mi</td>
<td>Cedar Ln</td>
<td>120 ([4 + 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Cedar Ln</td>
<td>Woodmont Ave</td>
<td>123 ([4 + 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Woodmont Ave</td>
<td>Chestnut St</td>
<td>130 ([4 + 2 bus]</td>
</tr>
<tr>
<td>MD 355</td>
<td>Chestnut St</td>
<td>Bynosdale Metro</td>
<td>132</td>
</tr>
<tr>
<td>[MD 355]</td>
<td>[Chestnut St]</td>
<td>[Bredley Blvd]</td>
<td>[77] ([4 + 2 bus]</td>
</tr>
<tr>
<td>[MD 355]</td>
<td>[Bredley Blvd]</td>
<td>[Northwood Dr]</td>
<td>[122] ([4 + 2 bus]</td>
</tr>
<tr>
<td>[MD 355]</td>
<td>[Northwood Dr]</td>
<td>[Olive Dr]</td>
<td>[80] ([4 + 2 bus]</td>
</tr>
<tr>
<td>[MD 355]</td>
<td>[Olive Dr]</td>
<td>[Western Ave]</td>
<td>[123] ([4 + 2 bus]</td>
</tr>
</tbody>
</table>

* 2040 forecast refresh for the segments of MD355 within the City of Rockville warrant a two-lane median busway; however, this functional plan cannot make changes or require dedication within that jurisdiction. The median busway recommendation can only become effective upon adoption of the current draft Rockville's Pikesville or subsequent City master plan update that would include recommendations on the right-of-way and the number of travel lanes. Reflects the minimum rank-of-way and may not include land needed for spot improvements such as turn lanes and stations.

** The Rockville Pike 350 foot right-of-way can be expanded to 162 feet additional space to be obtained through reservations.
Corridor 5: New Hampshire Avenue

New Hampshire Avenue is a commuter corridor, with most traffic flowing southbound in the morning and northbound in the evening. Activity centers are located at Takoma/Langley Crossroads and the emerging mixed-use center at White Oak. The City of Takoma Park has been advancing a concept plan adopted locally in 2008 to convert New Hampshire Avenue, from University Boulevard to Eastern Avenue, into a more pedestrian-friendly, multi-way boulevard that accommodates multiple modes of transportation, while serving as a destination.

Corridor treatment recommendations, from north to south:
- From Colesville park-and-ride to Lockwood Drive, a mixed traffic transitway.
- From Lockwood Drive to University Boulevard, a reversible one-lane median transitway.
- From University Boulevard to the District line, a two-lane median transitway dedicated lane(s).

During facility planning, however, curb lanes or mixed traffic treatments should be considered from Sligo Creek Parkway to the District line, as outlined in the City of Takoma Park's New Hampshire Avenue Corridor Concept Plan.

Station Locations:
- Colesville park-and-ride
- MD 650 and Randolph Road
- MD 650 and Valleybrook Drive
- MD 650 and Jackson Road
- White Oak Transit Center
- FDA White Oak Campus
- MD 650 [and Powder Mill Road] at Hillandale
- MD 650 and Oakview Drive
- MD 650 and Northampton Drive
- Takoma/Langley [Park] Transit Center
- MD 650 and MD 410
- MD 650 and Eastern Avenue

Stations within Prince George's County must be confirmed in that County's master plan.
### Table 8 Corridor Recommendations, New Hampshire Avenue

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Treatment</th>
<th>Dedicated Lanes?</th>
<th>R.O.W.</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire Ave</td>
<td>Coleridge Park and ride</td>
<td>Lockwood Dr</td>
<td>Mixed Traffic</td>
<td>Yes</td>
<td>120</td>
<td>4 (2)</td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Lockwood Dr</td>
<td>Oldebrook Dr</td>
<td>130*</td>
<td>[6+1] [bus]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Oldebrook Dr</td>
<td>Powder Mill Road</td>
<td>120* [130*]</td>
<td>[6+1] [bus]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Powder Mill Road</td>
<td>I-495</td>
<td>130*</td>
<td>[6+1] [bus]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>I-495</td>
<td>Northampton Dr</td>
<td>160</td>
<td>[6+1] [bus]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire Ave</td>
<td>Northampton Dr</td>
<td>University Blvd</td>
<td>Reversible One Lane Median</td>
<td>Yes**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| New Hampshire Ave | University Blvd            | East West Highway          | Two Lane Median | Yes*** | 150    | 4+2 bus [9]                  |
| New Hampshire Ave | East West Highway          | D.C. Lane                  | Two Lane Median | Yes*** | 150 in MTC [4+2 bus] [9]     |

* A bi-directional cycle track plus sidewalk should be considered (on the east side) in place of one-car bike lanes plus shared use path. In areas where average right-of-way constraints exist, however, consideration should be given to accommodating cyclists and pedestrians via a shared use path only.

** The existing right-of-way for this segment is in Prince George's County, but the Takoma Park Master Plan's 150-foot right-of-way extends into Montgomery County. The Issac Prince George's County right-of-way would need to be revised in their Master Plan to implement the ultimate right-of-way extent, which should be coordinated with the City of Takoma Park to ensure consistency with the New Hampshire Avenue Corridor Concept Plan to the extent possible.

*** Reference the map for geographic details of designated transit lines, and related improvements such as bus lanes and stations.
Station Locations
Montgomery Mall Transit Center
Rock Spring Drive and Fernwood Road
Rockledge Drive and Rock Spring Drive
Rock Spring Drive and MD 187
MD 187 and Tuckerman Lane

And either:
MD 187 and Edson Lane/Poindexter Lane
MD 187 and Executive Boulevard/Hoya Drive
White Flint Metro Station

Or:
Grosvenor Metro Station
Table 9 Corridor Recommendations, North Bethesda Transitway

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>Treatment Dedicated Land?</th>
<th>R.O.W. **</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the segment between the Bag Line</td>
<td>Rockville Pike White</td>
<td>Executive Blvd at</td>
<td>Mixed Traffic, 120</td>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>and Old Georgetown Road/Tuckerman Lane</td>
<td>First Metro Station</td>
<td>Hoey Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Georgetown Road</td>
<td>Executive Blvd</td>
<td>Nicholas Ln</td>
<td>Reversible, 150</td>
<td>6-1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nicholas Ln</td>
<td>Tuckerman Ln</td>
<td>Median, Yes, 126</td>
<td>6-1</td>
<td>1</td>
</tr>
<tr>
<td>Or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuckerman Lane</td>
<td>Governor Metro Station</td>
<td>Old Georgetown Road</td>
<td>Yes, 80</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

| Old Georgetown Road                   | Tuckerman Ln                  | 1-270                     | Reversible, One Lane, Yes | 120       | 6-1                              |
|                                       |                               |                           | Median, Yes, 126          |           |                                  |
| Old Georgetown Road                   | 1-270                         | Rock Spring Dr           | Two Lane, Yes, 90         | 4-1       | 1                                |
| Rock Spring Drive                     | Old Georgetown Rd             | Ferwood Rd               |                           |           |                                  |
| Ferwood Rd                            | Rock Spring Dr                | Rockridge Dr             |                           |           |                                  |
| Westlake Terrace                      | Rockridge Dr                  | 1-270                     |                           |           |                                  |
| Metro p/b From northbound and southbound (270-290) | Ferwood Road, Westlake Terrace |                           |                           |           |                                  |

* Plus additional 40 feet wide pavement for side running transitway.

** Reflects the minimum right-of-way and may not include land needed for spot improvements such as bus lanes and stations.

Corridor 7: Randolph Road

Randolph Road is a commuter corridor with traffic and congestion in the westbound direction in the morning and the eastbound direction in the evening. Major activity centers include White Flint, Glennmont, and the emerging mixed-use center at White Oak. Residential uses fill in the gaps between these areas.

While ridership forecasts are low for the corridor, it does provide important linkages to other BRT corridors. Therefore, because this corridor is important for the integrity of the BRT network, but the ridership potential is limited and the potential impacts to residential properties are high, this Plan recommends a mixed traffic transitway.

There are two alternative routes in the [The] westernmost portion of the corridor [segment] that would serve the planning White Flint MARC commuter rail station in addition to the Metro rail station. One alternative is a dedicated right-of-way following the Veirs Mill Road BRT line (Corridor 10) from Randolph Road to its station at Parkland Drive, then proceeding west along Montgomery Parkway over Rock Creek, Parkland Drive (where there would be a station), and the CSX Metropolitan Branch, joining the MD 355 South BRT line (Corridor 3) to the White Flint Metro Station. The other alternative would proceed in mixed traffic west on Randolph Road (and a station at Lauderdale Drive), south on Parkland Drive, and west on Nicholson Lane to the White Flint Metro Station. [During project planning, and alternative alignment along] A sub-option of this second alternative would use Nebel Street rather than Parkland Drive (should be considered) if the at-grade Randolph Road crossing of the CSX tracks is retained.

This corridor has greater ridership potential if a higher level of land use is approved as part of the White Oak Science Gateway Master Plan.

Station Locations

- White Flint Metro Station
- Montgomery Parkway and Parkland Drive, and Montgomery Parkway and Veirs Mill Road, or Randolph Road and Lauderdale Drive
- Randolph Road and MD 586
- Randolph Road and MD 185
- Randolph Rd and Bluff Hill Road
- Randolph Road MD 97
- Wheaton Metro Station
- Randolph Road Gloyell Avenue
- Randolph Road and MD 650
- Randolph Road and Fairland Road
- US 29 and Tech Road
Corridor 8: University Boulevard

University Boulevard is a commuter corridor, with traffic flowing westbound in the morning and eastbound in the evening. It has activity centers in Wheaton, Four Corners, Long Branch, and Takoma/Langley Crossroads.

While University Boulevard does not have a very strong ridership, this corridor provides east-west connectivity that is important to the integrity of a network that has many corridors converging in Wheaton. Its duplication with the Purple Line between Piney Branch Road and New Hampshire Avenue is reasonable given the connection to a New Hampshire Avenue transitway and the location of the Takoma/Langley Transit Center at the intersection of New Hampshire Avenue and University Boulevard. [Buses will likely not be permitted to share the Purple Line transitway since the benefits for the relatively low ridership on this corridor would likely not outweigh the adverse operational impacts on the Purple Line.]

Corridor treatment recommendations, from west to east:
- Along University Boulevard from Georgia Avenue to Lorain Avenue, a [one-lane median reversible transitway] dedicated right-of-way.
- Along University Boulevard from Lorain Avenue to [New Hampshire Avenue] Williamsburg Drive, a mixed traffic transitway.
- Along University Boulevard from Williamsburg Drive to New Hampshire Avenue, a dedicated right-of-way.

Station Locations:
Wheaton Metro Station
MD 193 and Amherst Avenue
MD 193 and Inwood Avenue
MD 193 and Arcola Avenue
MD 193 and Dennis Avenue
MD 193 and US 29
MD 193 and E. Franklin Avenue
MD 193 and Gilbert Street
Takoma/Langley [Park] Transit Center
<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment] Dedicated Lanes?</th>
<th>R.O.W. C</th>
<th>Minimum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Boulevard</td>
<td>Georgia Ave</td>
<td>Ambrose Ave</td>
<td></td>
<td>3/29</td>
<td>[8.11-1.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Ambrose Ave</td>
<td>Dayton St</td>
<td>[Inversible One Lane Median]</td>
<td>17/0</td>
<td>[8.11-1.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Dayton St</td>
<td>Easer Rd</td>
<td>YES</td>
<td>8/4</td>
<td>[8.11-1.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Easer Rd</td>
<td>Loran Avenue</td>
<td></td>
<td>12/4</td>
<td>[8.11-1.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Loran Ave</td>
<td>Williamsburg Dr</td>
<td>No</td>
<td>1.20</td>
<td>0</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>[Loran Avenue]</td>
<td>Williamsburg Dr</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Pinney Branch Rd</td>
<td>Gilbert St</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Gilbert St</td>
<td>Seek Ln</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Seek Ln</td>
<td>Bayfield St</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Bayfield St</td>
<td>Carroll Ave</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>Carroll Ave</td>
<td>Prince Georges County line (east of 14th Avenue)</td>
<td>[Mixed Traffic]</td>
<td>1.00 [150]**</td>
<td>[8.2-2.0] [bus]</td>
</tr>
</tbody>
</table>

*The right-of-way of University Boulevard from approximately 100 feet east of Meritman Drive to New Hampshire Avenue is divided between Montgomery and Prince George's Counties.
**Additional right-of-way requirements for the Purple Line will be determined either at the time of final design for the Purple Line or at the time of submission using latest project-level plans available for the Purple Line.
***Up to an additional 10 feet is needed for a median at the intersections of University Boulevard/Gilbert Street and University Boulevard/Seek Lane.
****Up to an additional 10 feet is needed for a median at the intersection of University Boulevard/Seek Lane.
*****Reflects the minimum right-of-way, and may not include land needed for spot improvements such as pedestrian and bicycle stations.

Corridor: US 29

The US 29 corridor is an express corridor north of New Hampshire Avenue and a commuter corridor south of New Hampshire Avenue, with most traffic flowing southbound in the morning and northbound in the evening. Much of the traffic is long distance trips, passing through the corridor on the way to other places. For many people it is an alternative to I-95, drawing people from northern Montgomery County and Howard County to jobs in the I-270 corridor, the District of Columbia, and Northern Virginia.

US 29 north of the New Hampshire Avenue interchange is classified as a controlled major highway, with intersections having all existing at grade intersections. A wide median that can accommodate a bus lane, and the three existing interchanges—at Randolph Road/Cherry Hill Road, Briggs Chaney Road, and Spencerville Road (MD 198)—can accommodate a median busway. Activity centers in this corridor segment are located in Burtonsville and White Oak.

South of New Hampshire Avenue, US 29 is classified as a major highway and has a very different character, passing through very congested areas in Four Corners and the Silver Spring CBD with very limited opportunities to expand the right-of-way.

Corridor [treatment] recommendations, from north to south:

- Along US 29 from MD 198 to Stewart Lane, a two-lane median busway up to two additional dedicated lanes.
- Along Stewart Lane and Lockwood Drive, a mixed traffic operation. (A mixed traffic operation is recommended along Stewart Lane and Lockwood Drive, but this recommendation is not intended to inhibit the continuation of express bus service along US 29 through the New Hampshire Avenue interchange.)
- Along US 29 from [Lockwood Drive] Stewart Lane to [Southwood Avenue] Sligo Creek Parkway, [curb lanes via lane-repurposing] dedicated lanes.
- Along US 29 from Southwood Avenue to Sligo Creek Parkway, a mixed traffic operation. (A mixed traffic operation is recommended in this segment because of potential operational problems with curb bus lanes in the vicinity of the I-495 interchange, however the extension of dedicated lanes through this segment should be considered during facility planning.)
- Along US 29 from Sligo Creek Parkway to Georgia Avenue, [managed lanes via lane-repurposing] a dedicated lane in the peak-hour peak-direction.
- Along US 29 from Georgia Avenue to Sixteenth Street, [curb lanes via lane-repurposing] dedicated lanes.

Section Locations:
- Burtonsville park and ride
- Briggs Chaney park and ride
- US 29 and Fairland Road
- US 29 and Tech Road
- White Oak Transit Center
- Lockwood Drive and Oak Leaf Drive
- US 29 and Hildwood Drive
- US 29 and MD 193
- US 29 and Franklin Avenue
- US 29 and Fenton Street
- Silver Spring Transit Center
<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment] Dedicated Lanes</th>
<th>R.O.W. **</th>
<th>Maximum Additional Transit Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 29</td>
<td>MD 198</td>
<td>Stewart Ln</td>
<td>[Two Lane Median] Yes</td>
<td>165[190]</td>
<td>[4 + 2 bus]</td>
</tr>
<tr>
<td>Stewart Lane</td>
<td>US 29</td>
<td>Lockwood Drive</td>
<td></td>
<td>80</td>
<td>[3]</td>
</tr>
<tr>
<td>Lockwood Drive</td>
<td>New Hampshire Ave</td>
<td>US 29</td>
<td></td>
<td>80</td>
<td>[3]</td>
</tr>
<tr>
<td>US 29</td>
<td>Stewart Lane</td>
<td>Lockwood Drive</td>
<td>[Curb Lanes] Yes</td>
<td>123</td>
<td>[4 + 2 bus]</td>
</tr>
<tr>
<td>US 29</td>
<td>Lockwood Dr</td>
<td>Southwood Ave</td>
<td>[Curb Lanes] Yes</td>
<td>123</td>
<td>[4 + 2 bus]</td>
</tr>
<tr>
<td>US 29</td>
<td>Southwood Ave</td>
<td>Sign Creek Pkwy</td>
<td>[Mixed Traffic] Yes[*]</td>
<td>120</td>
<td>[3]</td>
</tr>
<tr>
<td>US 29</td>
<td>Sign Creek Pkwy</td>
<td>Fenton St</td>
<td>[Managed Lanes] Yes[*]</td>
<td>120</td>
<td>[4 off-peak + 3 peak - 1 bus]</td>
</tr>
<tr>
<td>US 29</td>
<td>Fenton St</td>
<td>Georgia Ave</td>
<td></td>
<td>120</td>
<td>[4 off-peak + 3 peak - 1 bus]</td>
</tr>
<tr>
<td>Collewsle Road</td>
<td>Georgia Ave</td>
<td>East West Hwy</td>
<td>[Curb Lanes] Yes</td>
<td>126</td>
<td>[4 + 2 bus]</td>
</tr>
<tr>
<td>Collewsle Road</td>
<td>East West Hwy</td>
<td>16th St</td>
<td></td>
<td>126</td>
<td>[4 + 2 bus]</td>
</tr>
</tbody>
</table>

[*] Dedicated lanes are desirable in these segments and the potential for lane repurposing to achieve dedicated lanes should be considered during facility planning.

[**] The six existing general purpose lanes in these segments currently operate during peak hours as four in the peak direction and two in the off peak direction; in off-peak hours, they operate as three lanes in each direction. This Plan recommends that the operations in peak hours there be changed to one dedicated bus + 2 dedicated lanes in the peak direction; three general purpose lanes in the peak direction, and two general purpose lanes in the off-peak direction.

[**] Refers to the maximum right of way, and may not include land needed for future improvements such as turn lanes and stations.
Corridor 10: Veirs Mill Road

Veirs Mill Road is a commuter corridor, with the flow of traffic largely balanced in the eastbound and westbound directions between the two large central business districts, Wheaton and Rockville. Smaller commercial districts exist at Randolph Road and just west of Twinbrook Parkway. Residential uses fill in much of the rest of the corridor. Service roads that provide access to residential properties exist along many sections of the roadway, consuming a significant part of the right-of-way.

The Veirs Mill Road corridor experiences some of the highest existing transit volumes in Montgomery County, and for that reason has long been considered for bus enhancements. However, opportunities to increase ridership are limited because development outside of the CBDs is constrained.

To accommodate a balanced flow of traffic in a constrained right-of-way, this plan recommends a bi-directional one-lane median transitway. This recommended treatment is unique to this corridor, anticipating that bus travel will be accommodated in both directions in a single lane at the same time. Operational strategies must be determined by the implementing agency, but this plan envisions expanding to a two-way median transitway at stations and/or other designated areas where vehicles operating in opposite directions would be able to pass each other.

The corridor recommendation is for one or more dedicated lanes between the Rockville and Wheaton Metro Stations, where feasible.

Station Locations

- Rockville Metro Station
- MD 586 and Norbeck Road
- MD 586 and Broadwood Drive
- MD 586 and Twinbrook Parkway
- MD 586 and Aspen Hill Road
- MD 586 and Parkland Drive
- MD 586 and Randolph Road
- MD 586 and MD 185
- MD 586 and Newport Mill Road
- MD 586 and MD 193
- Wheaton Metro Station

Stations within the City of Rockville must be confirmed in the City’s master plan.
Table 13 Corridor Recommendations, Veirs Mill Road

<table>
<thead>
<tr>
<th>Road</th>
<th>From</th>
<th>To</th>
<th>[Treatment]</th>
<th>R.O.W.**</th>
<th>Maximum Additional Transit Lanes</th>
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</thead>
<tbody>
<tr>
<td>Veirs Mill Road</td>
<td>MD 355</td>
<td>Meadow Hall Dr</td>
<td>Bi-directional/One Lane Median</td>
<td>Yes*</td>
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<tr>
<td>Veirs Mill Road</td>
<td>Meadow Hall Dr</td>
<td>Twinbrook Plwy</td>
<td>150</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Twinbrook Plwy</td>
<td>Parkland Dr</td>
<td>150</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Parkland Dr</td>
<td>Turkey Branch</td>
<td>150</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Turkey Branch</td>
<td>Gridley Rd</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Gridley Rd</td>
<td>Randolph Rd</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Randolph Rd</td>
<td>Ferrara Ave</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Ferrara Ave</td>
<td>Connecticut Ave</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Connecticut Ave</td>
<td>Newport Mill Rd</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
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<td>Newport Mill Rd</td>
<td>Gall Ave</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
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<td>Emory Av</td>
<td>120</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
<tr>
<td>Veirs Mill Road</td>
<td>Emory Av</td>
<td>Venable Metro Station</td>
<td>Yes</td>
<td>[4 to 6, 4-1 Bus]</td>
<td></td>
</tr>
</tbody>
</table>

* 2040 forecast ridethrough for the segment of Veirs Mill Road within the City of Rockville warrants a one lane [median] busway, however the Functional Plan cannot make changes or require dedication within that jurisdiction. The [median] busway recommendation can only become effective upon adoption of a subsequent City master plan update that would include recommendations on the right-of-way and the number of travel lanes.

** Reflects the minimum right-of-way, and may not include land needed for spot improvements such as turn lanes and stations.
Implementation

The purpose of the transit corridor network is to facilitate a bus rapid transit service that supports the county’s mobility, land use, and economic development goals. The recommended transit corridors represent what is needed to ensure network integrity and achieve the plan vision, which is to make transit a viable and reliable alternative to driving in the county’s developed core, especially the I-270 corridor and Urban Ring, as defined in the General Plan.

Minimum performance standards must be created to guide the implementation of the proposed BRT network to ensure that it will be an attractive alternative to driving. BRT has the ability to greatly expand the people-moving capacity of a travel lane, either all day or during peak periods, and can be a highly effective way to decrease dependence on single-occupant vehicles and the resultant congestion on our roads.

While this Plan addresses the essential elements of infrastructure that will influence speed and reliability in the choice of mode in trip-making, operational decisions such as the use of signal prioritization, off-board fare collection, and similar questions must also take performance quality standards into account.

More detailed facility planning may result in modifications to the recommended treatment in specific corridors or segments, but a guiding document is needed to ensure that the key objective of subsequent facility planning and detailed engineering should be that the resulting end-state transit corridor treatments (i.e., treatments generally attainable within the recommended rights-of-way) for individual corridors and the overall network should be consistent with the minimum level of service that would be provided by the recommended transit corridor treatments in this Plan.

These transit corridor treatments should support the operation of a BRT network that improves the performance of the overall transit network as measured by the Transportation Policy Area Review included in the Subdivision Staging Policy. The Subdivision Staging Policy should be amended to incorporate standards for transit service in the recommended BRT network area that are consistent with the minimum level of service that would be provided by this Plan’s recommended transit corridor treatments.

The purpose of the transit corridor network is to facilitate a bus rapid transit service that supports the county’s mobility, land use, and economic development goals. The right-of-way designations for transit corridors in this amendment to the Master Plan of Highways represent what is needed to ensure network integrity and achieve the County’s vision, which is to make transit a viable and reliable alternative to driving in the County’s developed core. These right-of-way designations are intended to support the development of a BRT network that improves the performance of the overall transit network as measured by the traffic tests contained in the Subdivision Staging Policy.

A guiding standard is needed to ensure that a high quality of system performance is ultimately achieved. While adequate right-of-way designations are essential to accommodate the infrastructure needed to support a level of speed and reliability that will make BRT an attractive travel option, operational decisions such as the use of signal prioritization, off-board fare collection, and similar questions must also take performance quality standards into account.

Therefore, the Council directs the Planning Board, with assistance from the Department of Transportation, to develop and recommend for the Council’s consideration for adoption an amendment to the Subdivision Staging Policy—minimum performance standards to guide the implementation of the BRT network to ensure that it will be an attractive alternative to driving.

The transit network that is achieved by the sum of the final treatments on individual corridor segments should produce a significant improvement in travel time by transit when compared to the no-build scenario, resulting in a net increase in transit riders and a net decrease in vehicle-miles of travel across the county.
Bicycle and Pedestrian Accommodation and Safety

Good bicycle and pedestrian access is needed to all BRT stations. The highest level of accommodation for pedestrians and bicyclists is needed in the areas where pedestrians are most prevalent, such as transit-oriented development areas, established or developing activity centers, areas around Metro stations, and transfer points between BRT routes.

Ensuring Pedestrian Safety and Accessibility

Safe and adequate pedestrian accommodation is needed both along and across the roadways included in the recommended transit corridors. The typical sections used to determine recommended rights-of-way:

- Include six-foot-wide minimum sidewalks to ensure good pedestrian accommodation to and from all stops along transit corridors
- Include landscape buffers of a sufficient width to achieve sidewalks and handicap ramps that can meet ADA Rest Practices
- Include a six-foot-wide median where feasible to accommodate a pedestrian refuge to ensure that transit patrons can safely cross the roadway to and from transit stops and that the general public can safely cross the roadway at all intersections.

While additional traffic signals are not specifically recommended in this Plan, it is likely that there will be more signalized crossings at BRT stops, which would assist all pedestrian crossings. The adequacy of pedestrian crossing times at stations should be evaluated and the need for advance walk signals that would give pedestrians a head start on traffic should be considered.

Bike Accommodation

This Plan supports the provision of on-road accommodation for bicyclists on all the recommended transit corridors, but right-of-way constraints limit the ability to achieve this goal on some corridor segments (See Appendix B).

- Where a facility for bicyclists is already recommended in a master plan, the appropriate space is included in the recommended right-of-way recommendations.
- Where on-road bicyclists can reasonably be accommodated on additional corridors, this Plan includes the appropriate space in the recommended right-of-way.
- Where constraints limit the ability to achieve the on-road bike accommodation beyond what is recommended in current master plans, this Plan identifies the alternative recommended bike accommodation for each corridor segment.

The work leading to the Countywide Transit Corridor Functional Master Plan evaluated bikeway accommodations along all links recommended for a dedicated transitway (such as median lanes, curb lanes, or side-of-road lanes). Three policies were considered to determine whether the Functional Plan should recommend rights-of-way that would accommodate modifications or additions to planned bike facilities. Since right-of-way is constrained along most of the proposed BRT corridors, priority was given to these policies as follows:

The first priority was to include the master planned bikeway recommendation, whether this is a signed shared roadway, or a shared use path, bike lanes, or cycle tracks. This Functional Plan retains all master plan recommended bikeways.

The second priority was to include bike lanes based on the Planning Board’s bikeway policy. This draft standard was recommended by the Planning Board on September 18, 2004 as part of the Context Sensitive Road Design Standards discussion. It states:

- Urban Major Highways, Arterials, and Minor Arterials
  - 5.5-foot wide bike lanes should be provided if specified in a Master Plan.
  - 14-foot wide curb lanes should be provided on all other major highways, arterials, and minor arterials.
- Suburban Major Highways, Arterials, and Minor Arterials
  - 5.5-foot wide bike lanes should be provided if specified in a Master Plan and should be provided on roads with average daily traffic (ADT) of 20,000 vehicles per day or posted speeds of 45 mph or greater.
  - 14-foot wide curb lanes should be provided on all other major highways, arterials, and minor arterials.
- Rural Major Highways, Arterials, and Minor Arterials
  - 5.5-foot wide bike lanes should be provided.

The third priority was to accommodate the State Highway Administration’s Policy on Marked Bicycle Lanes (revised November 2011), which states on page 5 that: “All projects that involve widening or new construction shall meet the preferred widths... for marking bicycle lanes.” Bike lanes vary between 4 and 5 feet wide depending on the posted speed limit and the truck volumes. Most of the corridors in the recommended transit network are State highways.

This plan also recommends designating new Bicycle-Pedestrian Priority Areas (BPPAs) to enhance the access to BRT.
Bicycle-Pedestrian Priority Areas

Section 2-604 of the Annotated Code of Maryland allows the designation of Bicycle-Pedestrian Priority Areas (BPPAs) in the State’s Bicycle-Pedestrian Master Plan, if jointly agreed to by the State and local jurisdictions. BPPAs are defined in Section 8-101(d); “Bicycle and pedestrian priority area” means a geographical area where the enhancement of bicycle and pedestrian traffic is a priority.

The legislation is intended to promote better pedestrian and bicyclist accommodation in these priority areas. [Appendix 6 details what accommodation should be provided in BPPAs.] The White Flint and Wheaton CBD Sector Plan areas have been designated as BPPAs and White Flint has been confirmed by the State.

The Maryland Department of Transportation is currently updating the State’s Bicycle-Pedestrian Master Plan and is expected to include recommendations for plans of improvement for Bicycle-Pedestrian Priority Area (BPPAs). In the interim, listed below are a number of elements that should be included in a plan of improvements for BPPAs. These recommendations should also be considered for any area where pedestrians and bicyclists are a significant proportion of the traveling public. These elements are structured into a baseline condition for all areas where pedestrians and bicyclists are permitted, for business and urban districts as defined by the Maryland Vehicle Law, and for BPPAs.

Baseline Improvements for Bicyclists and Pedestrians

Accommodation during construction: Strict adherence to the Maryland Manual on Uniform Traffic Control Devices (MD-MUTCD) recommendations for minimizing pedestrian and bicyclist inconvenience during construction should be made a part of the plan. Sidewalks and bike facilities should be closed only as a last resort.

In addition to the normal maintenance-of-traffic issues, the construction sequence of work should be addressed in the plan. For example, curb ramp relocations should only be done when the adjacent crosswalks can be striped in the new location within the next week.

Lane striping: Lane striping should reflect the guidance of the MD-MUTCD rather than repeating the existing lane striping pattern. Often the normal lane striping on State highways is extended through unsignalized intersections in Montgomery County, but this practice is not in conformance with MD-MUTCD Section 308.02.

“Where roadway design or reduced visibility conditions make it desirable to provide control or to guide vehicles through an intersection or interchange, such as at offset, skewed, complex, or multilevel intersections, or where multiple turn lanes are used, dotted lane markings should be used to extend longitudinal line markings through an intersection or interchange area.”

The extension of normal lane striping often occurs on straight, flat roads that are not complex in any way that would warrant lane extensions per guidance in the MD-MUTCD. In locations where extensions are needed, the different pattern presented by dotted lane markings would more clearly alert drivers to the presence of an intersection.

Using normal lane striping for this purpose obscures the presence of intersections, making drivers entering the roadway from a side street an unexpected occurrence. Pedestrians crossing from these streets also may appear to the driver as a surprise, or even that they’re not supposed to be crossing at that location even though pedestrians have the right-of-way at unsignalized intersections. A break in the normal striping pattern at intersections, as recommended by the MD-MUTCD, alerts drivers on the main road and improves safety. Transit patrons and other pedestrians in areas along State highways would benefit from closer adherence to MD-MUTCD guidance in this regard.

Bus stops: Bus stops within the project limits should be shown in the contract documents of every project. Safe ADA-accessible crossings should be provided to all bus stops and wherever possible, median refurbishment should be provided at intersections and mid-block bus stop locations that are to be retained.

Sidewalks: Sidewalks should be constructed or reconstructed to standard where appropriate as part of all access permits.

Additional Improvements for Bicyclists and Pedestrians in Business and Urban Districts

SHA’s Bicycle Pedestrian Design Guidelines: SHA should adopt its guidelines as SHA policy in areas where pedestrians and bicyclists are a significant proportion of the traveling public. These guidelines were created in 2006 as a very progressive document intended to promote bicycle and pedestrian access and safety. Because of their status as guidelines however, their use has been limited, missing the opportunity to create roadway designs that better accommodate pedestrians and bicyclists at little or no additional cost. This best practice document should become part of the engineer’s standard toolbox, promoting the goal of safety and efficiently accommodating all users of the public right-of-way.

ADA accommodation: Crosswalks, marked or unmarked, exist at the intersection of all public streets per Maryland Vehicle Law. Therefore, all intersections, including unsignalized and T-intersections, and intersections on divided roadways where the median is not broken for vehicular movement, should be made ADA-accessible. Where an ADA-accessible crossing cannot be provided, the crossing should be posted to prohibit the crossing to everyone.

ADA best practices should be used to provide the best accommodation for all users, including the provision of dual directional curb ramps at corners and a direct, level sidewalk that is not interrupted by driveway slopes. Where this cannot be achieved, the reasons should be documented.

Accommodation during construction: Signs should be posted at worksites with contact information for the inspector who can then be quickly and easily notified of any problems. Special attention should be paid to winter closures where work may be left unfinished for many months at a time. A month in advance of the normal winter closure period, a shutdown plan should be created for all work in progress and open workstations minimized.

Resurfacing projects: Resurfacing projects should include a safety evaluation of the locations of all curb ramps and crosswalks, which should be relocated and reconstructed as necessary to conform to SHA’s Bicycle Pedestrian Design Guidelines and ADA best practices.

Re-evaluation of speed limits: While Montgomery County continues to urbanize, the posted speeds of adjacent roadways are often not re-evaluated unless the roadway is being rebuilt.Posted speeds limits in BPPAs and other Business and Urban Districts should be re-evaluated and waivers documented for limits
in excess of the statutory speed limits. Design speeds for projects in these areas should not exceed the approved posted speed.

**Pedestrian crossings of commercial driveways:** A level sidewalk should be maintained across commercial driveways. Where this cannot be achieved and ramps must be provided, detectable warnings should be provided on the top of the ramps to alert blind pedestrians to potential vehicular conflicts. Detectable warnings should also be provided at all signalized commercial driveway crossings.

**Further Improvements in Bicycle-Pedestrian Priority Areas**

Prohibiting right-turn on red: Within BPPAs, right turn on red signal phases should be prohibited, unless for safety reasons this is not feasible.

Pedestrian signal phases: Within BPPAs, all traffic signals should be timed so that there is adequate time for slower-moving pedestrians to cross a street during a single phase. The assumption should be that pedestrians will walk at a pace no faster than 3.5 feet per second.

Minimizing disruption to pedestrian travel: SHA should ensure that construction affecting pedestrian and bike accessibility in BPPAs is expedited to the extent practicable. For example, utility work in BPPAs, such as pole relocations and valve adjustments, should be prioritized so that the utility companies know that these work items are more important than those outside BPPAs.

Access for during snow emergencies: A definite timeline should be set for curb ramps at intersections to be cleared of snow after a snowstorm. When roadways get plowed on intersecting streets, the area in front of the circular curb—where most curb ramps are—are often blocked with snow, reducing access for persons least likely to be able to climb over the resulting snow mounds.

An extra pass by a snowplow around the corner in priority areas would greatly improve pedestrian accessibility and winter safety, as well as providing basic accommodation for all users. While property owners in Montgomery County are required to clear the snow from sidewalks within 24 hours after a snow storm, there is no requirement for them to shovel snow in the street, particularly the large mounds of snow that end up in front of the circular curb. While this is a problem with both County and State roads, the majority of our transit routes are on State roads, increasing the need to correct this problem.

Signage and striping: Crosswalk striping in BPPAs should be inspected quarterly to ensure that they are in good condition. Where these crosswalks are impacted by utility work, they should be inspected upon completion of the work to ensure that they remain in good condition.

**Intersections:** Where an intersection in a BPPA meets any traffic signal warrant, a traffic signal should be provided to facilitate safe pedestrian and bicyclist movement. Signaled intersections should have marked crosswalks on each leg of the intersection, per SHA’s Bicycle-Pedestrian Design Guidelines. Curb ramp designs in BPPAs should be coordinated with pedestrian access points to adjacent properties to facilitate travel to, through, and around the ramps.

All projects along State highways in BPPAs should be reviewed by SHA’s Office of Environmental Design to address the higher level of urban design that is required in these areas. One example is a coordinated and consolidated design of traffic signal poles, signs, lights, and other equipment at intersections near curb ramps. These facilities should be combined where possible and use the fewest number of poles to minimize obstructions where the greatest number of pedestrians congregate. Also, the bases of the poles, including Audible Pedestrian Signal poles, should be countersunk where possible to minimize the footprint of these obstructions, thereby minimizing the pedestrian circulation area.

**Lighting:** Lighting in BPPAs should meet AASHTO standards; this is particularly true for intersections. Care should be taken to locate lighting fixtures at crosswalks so that the light source is between the vehicle and the pedestrian whenever possible, maximizing contrast, increasing the contrast between pedestrians and the road ahead has been shown to provide a general benefit to drivers but most particularly to elderly drivers, an increasing percentage of the population. Requiring developers to bring adjacent intersections to current lighting standards should be a requirement of their access permit.

**Optimize traffic signal timing for pedestrians:** There are many places where pedestrians are unnecessarily prevented from crossing the roadway because the "DON'T WALK" light is on when it doesn't need to be. The traffic signal timing and phasing in BPPAs should be reviewed and revised as necessary to maximize pedestrian mobility.

**Curb height:** Curb height on State highways in BPPAs should be six inches rather than the SHA standard eight inches to reduce the required curb ramp length. In addition to making it easier for all users to navigate in more urban areas, a shorter ramp length ensures a greater level of safety behind the ramp so that pedestrians not crossing are not unnecessarily required to traverse the ramp and negotiate that grade.

**Area-specific BPPA plans:** BPPA plans should include all master or sector plan-recommended pedestrian and bike improvements within the BPPA.

**Map 13 Recommended Bicycle-Pedestrian Priority Areas**
This Functional Plan designates all current Road Code-defined Urban areas as additional BPPAs:
- Silver Spring CBD Sector Plan area
- Twinbrook Sector Plan area
- Bethesda CBD Sector Plan area
- Friendship Heights Sector Plan area
- Glenmont Metro Station Policy area
- Grosvenor Metro Station Policy area
- Shady Grove Metro Station Policy area
- Olney Town Center
- Clarksburg Town Center
- Germantown Town Center
- Damascus Town Center
- Montgomery Hills
- Flower/Piney Branch
- Cloverleaf District
- LSC Central, LSC West, LSC North, and Belward Districts in the Great Seneca Science Corridor

The Takoma/Langley Crossroads and Kensington Sector Plan areas are defined in their respective plans.

This Plan also designates proposed BRT station areas as BPPAs where there is sufficient planned density to generate significant pedestrian and bicyclist activity (see Maps 15 through 23):
- Montgomery Mall/Rock Spring
- Piney Branch/University Boulevard Purple Line Station area
- Medical Center Metro Station area, including the NIH and NMMI campuses
- Veirs Mill Road/Randolph Road
- Aspen Hill (Georgia Avenue/Connecticut Avenue)
- Colesville (Randolph/New Hampshire)
- Forest Glen Metro Station area (contiguous with Montgomery Hills)
- Silver Spring CBD West (west of 16th Street to Rosemary Hills Drive, plus Spring Center)
- Four Corners

The designation of additional BPPAs should be considered as part of future master and sector plan updates.
MARC Brunswick Line Expansion

MARC commuter rail's Brunswick Line serves the broadest regional transportation function of the County's transit network, performing a similar function as that of an interstate highway in the roadway network. It has 7,000 daily passengers and serves eleven stations in Montgomery County while connecting West Virginia and Frederick County, MD with Washington, D.C. The Brunswick Line also connects to five of the transit corridors recommended in this Plan—MD 355, Veirs Mill Road, Randolph Road, Georgia Avenue, and US29/Colesville Road—as well as to the Corridor Cities Transitway, Purple Line, and Metrorail Red Line.

This Plan recommends that a third track be constructed on the Brunswick Line between the Frederick County line and the Metropolitan Grove station to reduce conflicts with freight service and enable the expansion of MARC service. This additional capacity would accommodate a triping of ridership and include:

- more frequent service
- all-day service
- weekend service
- one-seat rides to Northern Virginia
- service to planned MARC stations at Shady Grove and White Flint.

This MARC expansion to full-time service will improve east-west connectivity across the County, connecting with the rest of the transit network recommended by this Plan and increasing its utility for County residents and commuters.

[This Plan recommends that implementation of a third track, but the right-of-way necessary to accommodate this expansion should be determined during project planning and confirmed in a future area or functional master plan update.] To accommodate a third track, this Plan recommends that the master-planned right-of-way be widened by 25' in this segment.
Carbon Emission Analysis

Montgomery County Bill number 32-07 establishes a goal to stop increasing greenhouse gas (GHG) emissions by the year 2010, and to reduce emissions to 20 percent of 2005 levels by the year 2050. Another Montgomery County law (Bill number 34-07) requires the Planning Board to estimate the carbon footprint of master plan recommendations, and to make recommendations for carbon emissions reductions.

Staff evaluated the peak-hour carbon emissions reductions for the three BRT build alternatives, compared against the no-build scenario. VMT reduction estimates were converted to gallons of gasoline saved and carbon dioxide equivalent amounts (CO2e) based on factors used in the King County Washington Greenhouse Gas Emissions Worksheet version 1.7. This model has been adapted by the Planning Department to estimate GHG emissions for its master plan work. The results are presented in the table below.

Table 14 Carbon Emissions Analysis
Annual Peak Hour Estimated Gasoline Savings and Green House Gas (GHG) Emissions Reductions [of Three BRT Scenarios] (Year 2040 Projections)

<table>
<thead>
<tr>
<th>[Energy and GHG Benefit vs. No-Build]</th>
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<tr>
<td>[Energy and GHG Benefit vs. No-Build]</td>
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<td>gas saved (gal/yr)</td>
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<td>CO2 reduction (lbs/yr)</td>
<td>[82,627,302]</td>
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<tr>
<td>CO2 reduction (metric tons/yr)</td>
<td>[37,473]</td>
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</table>

This methodology assumes that all vehicles are gasoline-powered. Changes in automotive technology and the fuel chosen for the BRT vehicles will affect the results.

Achieving the County’s GHG reduction goals will be challenging. Estimates from Montgomery County’s Climate Protection Plan project a need to reduce overall countywide GHG emissions by 10.995 million metric tons by 2040 compared to baseline (2005) emissions.

The Climate Protection Plan also shows that emissions from transportation form the largest percent share of current emissions. Staff analysis indicates that reductions from a broad range of activities must play a part in achieving the County’s GHG reduction goals. As shown above, implementing BRT in the County can contribute significant GHG reductions.

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The Plan Process
A plan provides comprehensive recommendations for the use of publicly and privately owned land. Each plan reflects a vision of the future that responds to the unique character of the local community within the context of a countywide perspective. Together with relevant policies, plans should be referred to by public officials and private individuals when making land use decisions.

The STAFF DRAFT PLAN is prepared by the Montgomery County Planning Department for presentation to the Montgomery County Planning Board. The Planning Board reviews the Staff Draft Plan, makes preliminary changes as appropriate, and approves the Plan for public hearing. After the Planning Board’s changes are made, the document becomes the Public Hearing Draft Plan.

The PUBLIC HEARING DRAFT PLAN is the formal proposal to amend an adopted master plan or sector plan. Its recommendations are not necessarily those of the Planning Board; it is prepared for the purpose of receiving public testimony. The Planning Board holds a public hearing and receives testimony, after which it holds public work sessions to review the testimony and revise the Public Hearing Draft Plan as appropriate. When the Planning Board’s changes are made, the document becomes the Planning Board Draft Plan.

The PLANNING BOARD DRAFT PLAN is the Planning Board’s recommended Plan and reflects their revisions to the Public Hearing Draft Plan. The Regional District Act requires the Planning Board to transmit a master plan or sector plan to the County Council with copies to the County Executive who must, within sixty days, prepare and transmit a fiscal impact analysis of the Planning Board Draft Plan to the County Council. The County Executive may also forward to the County Council other comments and recommendations.

After receiving the Executive’s fiscal impact analysis and comments, the County Council holds a public hearing to receive public testimony. After the hearing record is closed, the relevant Council committee holds public work sessions to review the testimony and makes recommendations to the County Council. The Council holds work sessions, then adopts a resolution approving the Planning Board Draft, as revised.

After Council approval, the plan is forwarded to The Maryland-National Capital Park and Planning Commission for adoption. Once adopted by the Commission, the plan officially amends the master plans, functional plans, and sector plans cited in the Commission’s adoption resolution.
ACKNOWLEDGMENTS

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