


ACHIEVING THE VISION



This section of the Bicycle Master Plan offers recommendations on how to achieve the plan's vision. It includes concrete actions that government, property owners, stakeholders and the public can take to fulfill the vision. Recommendation for a network of bikeways and bicycle parking, and bicycling-supportive programs and policies are included in this section.

BIKEWAYS

BICYCLE PARKING

PROGRAMS

POLICIES

Bicycle-supportive infrastructure focuses on a highly-connected and low-stress **bikeway network**. This network includes physical improvements on higher stress roads so that the 75 percent of roads and trails in Montgomery County that are already appropriate for people of all ages and bicycling abilities can be connected.

Bicycle-supportive infrastructure also includes abundant and secure **bicycle parking**, since many people will not ride a bicycle if they are concerned that their parked bicycle will be damaged or stolen. This infrastructure includes privately maintained bicycle parking spaces at residential and commercial buildings, and publicly maintained parking spaces at activity centers, such as transit stations, employment centers and commercial areas.

Bicycle programs encourage bicycling by identifying bicycle-supportive events, services, opportunities and projects. They include bikeway funding programs, the county's bikeshare program and a proposed BikeMontgomery outreach program.

Bicycle policies guide actions taken by the government that affect bicycling, including laws, policies, regulations, standards and guidelines. They include Montgomery County's context-sensitive road design standards and local land use laws.

The more commuter options available in a development equates to a more attractive project for potential tenants and their employees. Bicycle facilities in a project provide a healthy, economic alternative to the single occupant vehicle.”

ALAN H. GOTTLIEB, CHIEF OPERATING OFFICER, LERNER ENTERPRISES

BIKEWAYS

Although many trips are short enough to be made by bicycle, most are made by private vehicles¹. One barrier to bicycling is what is known as “traffic stress.”² The concept of traffic stress is that people have a certain tolerance for bicycling near traffic, and if that tolerance is exceeded even for a short distance, they may be deterred from bicycling. In order to attract the broadest segment of the population to bicycle, Montgomery County will need to create a bicycling network that does not exceed most people’s tolerance for traffic stress and does not require an excessive level of detour.

While currently about 75 percent of street mileage in Montgomery County is low-stress, these streets largely represent “islands of connectivity” that are separated by arterial roads and environmental features. The Bicycle Master Plan addresses Goal 2 and Goal 3 by recommending a network of low-stress bikeways to connect residential communities to the places that people want to go in Montgomery County, including transit stations, employment centers, stores, public facilities and other destinations.

Recent national surveys separate people into different traffic stress tolerance levels³. Those who tolerate a high level of traffic stress are comfortable bicycling on most streets, including major highways. These so-called “strong and fearless” bicyclists account for about 7 percent of the population. Those who tolerate a moderate level of traffic stress are comfortable bicycling on major highways and arterial roads with bike lanes. These “enthused and confident” bicyclists account for about 5 percent of the population. Those who tolerate a low level of traffic stress are comfortable on residential streets, trails and major highways / arterial roads with bikeways that are separated from traffic. These “interested but concerned” bicyclists account for about 51 percent of the population and include children. About 37 percent of the population is not interested in bicycling for various reasons.

THE FOUR TYPES OF TRANSPORTATION CYCLISTS

7%

STRONG & FEARLESS

Very comfortable on non-residential streets without bike lanes.

5%

ENTHUSED & CONFIDENT

Very comfortable on non-residential streets with bike lanes.

51%

INTEREST BUT CONCERNED

Less than very comfortable on non-residential streets with or without bike lanes.

37%

NO WAY, NO HOW

Everyone else.

¹ The median trip per the 2007 / 2008 regional household survey is 3.5 miles or less – about a 20 to 25-minute bike ride for most people.

² The concept of traffic stress is described and quantified in Mekuria, Maaza, Peter G. Furth, and Hilary Nixon, Low-Stress Bicycling and Network Connectivity, San Jose, CA: Mineta Transportation Institute, 2012. A modified version of the Level of Traffic Stress methodology used for the analysis in this master plan is available in Appendix D.

³ Jennifer Dill and Nathan McNeil, “Revisiting the Four Types of Cyclists: Findings from a National Survey,” Transportation Research Record: Journal of the Transportation Research Board, Volume 2587, 2017.



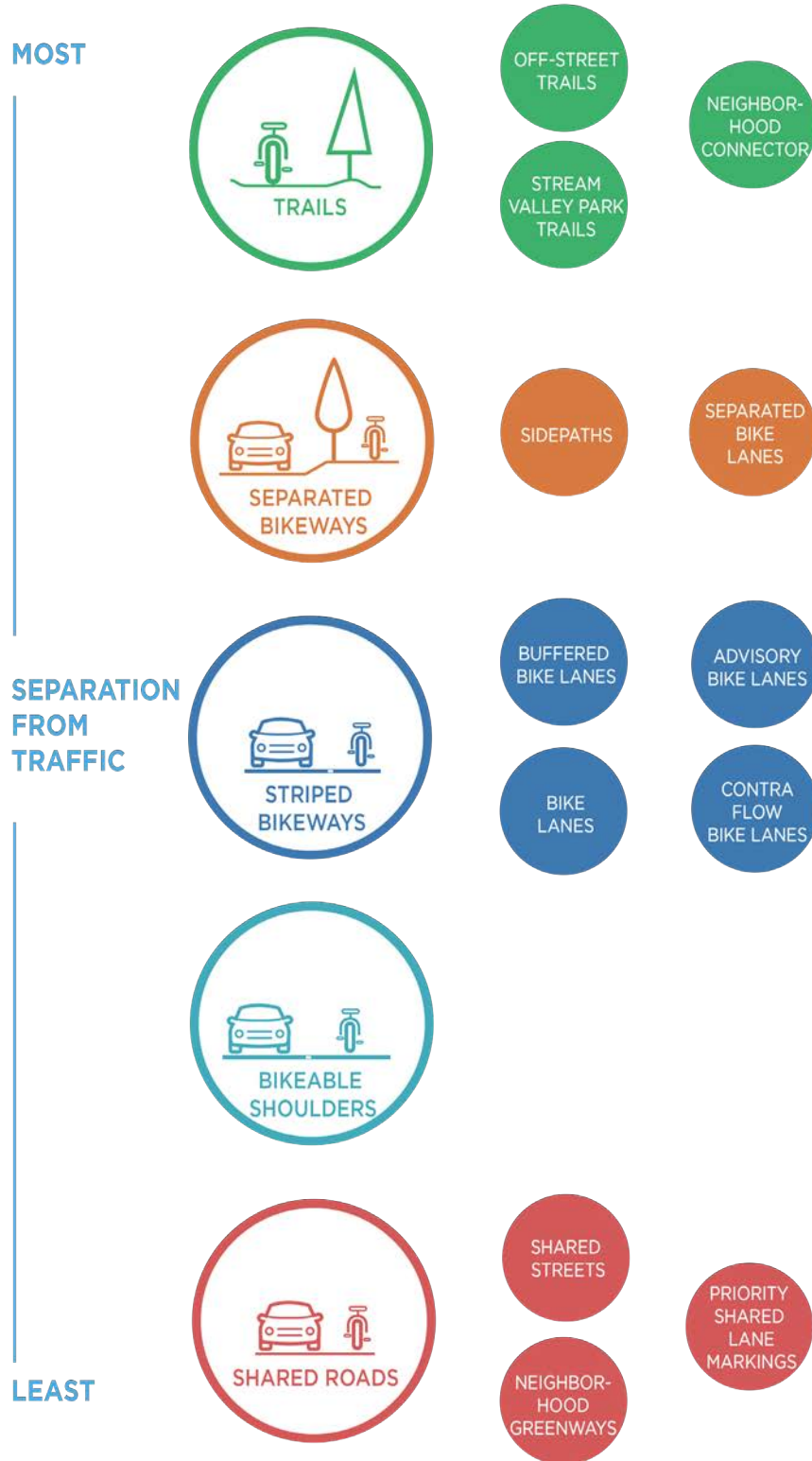
A low-stress bicycling network will increase both perceived and actual safety. When a separated bike lane is constructed in an urban environment, most people will perceive that they are safer bicycling in the bike lane, because it is separated from traffic. Perceived safety increases actual safety when it attracts greater bicycling. Due to the “safety in greater numbers” effect, motorists become more vigilant as they become conditioned to look for bicyclists.

To execute a network of low-stress bikeways that is appropriate for the diverse communities in Montgomery County, the Bicycle Master Plan is organized around five main types of bicycling trips:

- **Trips between activity centers** tend to be longer distance and, in the plan, will be centered on the Breezeway Network. This high-capacity, multispeed network of arterial bikeways enables faster bicyclists to comfortably, conveniently and safely travel with slower bicyclists and pedestrians.
- **Trips to activity centers** from suburban areas will typically be less than 3 miles and will focus on getting people from residential areas to commercial centers and transit stations on a network largely consisting of neighborhood greenways and sidepaths. This network will be complemented by abundant and secure bicycle parking at transit stations and commercial locations.
- **Trips within urban areas** will typically be less than 1 mile and will include travel to work, shopping, entertainment and transfers to transit stations on a network of separated bike lanes and trails. These trips will include bicycle parking at transit stations and commercial locations as well as the county’s bikeshare program.
- **Trips to county facilities**, such as schools, libraries, recreation centers and parks, will focus on providing safe accommodation for children and, therefore, will require a very low level of traffic stress. These bikeways consist of a network of sidepaths, neighborhood greenways and trails in suburban areas, and separated bike lanes and trails in urban areas. These trips will include abundant and secure bicycle parking at all public facilities.
- **Recreational trips**, especially those in rural areas, will often include long-distance trips by individuals and groups where bikeable shoulders of consistent widths are particularly appealing.

BIKEWAY FACILITY CLASSIFICATIONS

A new bikeway facility classification system is proposed for Montgomery County as part of this plan. This system organizes bikeways into five facility classifications based on their level of separation from traffic. These five classifications are then subdivided into bikeway types and are explained on the following pages and in Appendix B.







Trails

Trails are paths that are located outside of the road right-of-way. They provide two-way travel designated for walking, bicycling, jogging and skating.

Trails are typically 10 feet wide, but can vary between 8 feet (in very constrained locations) and 14 feet wide (where usage is likely to be higher). On trails with very high levels of walking and bicycling, spaces for pedestrians and bicyclists are often separated to reduce conflicts and improve comfort. In these situations, trails can be widened to between 15 and 24 feet wide.

Trails include **off-street trails, stream valley park trails and neighborhood connectors.**

Photo: Capital Crescent Trail



Bethesda Trolley Trail

Off-Street Trails



Off-street trails are shared use paths located outside of the road right-of-way that provide two-way travel for people walking, bicycling and using other non-motorized modes.

Benefits

- Provide a bicycling environment suitable for all ages and abilities.
- Tend to have fewer at-grade crossings than other bikeways.

Typical Application

- Often located within existing or unused railroad rights-of-way or utility rights-of-way, land dedicated for planned but unbuilt “paper” streets and through public land.

Examples in Montgomery County

- Bethesda Trolley Trail
- Capital Crescent Trail



Rock Creek Trail

Stream Valley Park Trails



Stream valley park trails are shared use paths located within a Maryland-National Capital Park and Planning Commission (M-NCPPC) stream valley park that provide two-way travel for people walking, bicycling and using other non-motorized modes of transportation.

Benefits

- Provide a bicycling environment suitable for all ages and abilities.
- Tend to have fewer at-grade crossings than other bikeways.

Typical Application

- Located along stream valley parks.

Examples in Montgomery County

- Rock Creek Trail
- Sligo Creek Trail
- Matthew Henson Trail



A neighborhood connector on Hempstead Avenue

Neighborhood Connectors



Neighborhood connectors are short paths that provide critical connections in the residential walking and bicycling network. They create short-cuts and often bypass or minimize the amount of travel along higher-stress streets. In most instances, neighborhood connectors are owned by private entities, especially homeowner associations. About one-third of neighborhoods connectors are in the public right-of-way or owned by the Montgomery County Board of Education or the Maryland-National Capital Park and Planning Commission. Many neighborhood connectors need to be upgraded, by paving a dirt or a gravel surface, repaving a surface that has deteriorated over time or widening the pathway to meet the requirements of the Americans with Disabilities Act (ADA).

Benefits

- Provide a short path for walking and bicycling.

Typical Application

- Located within residential communities.

Examples in Montgomery County

- See Appendix J



*Photo: Kenneth Woodard
Best Commuter Picture
Bicycle Master Plan Photo Contest*



Separated Bikeways

Separated bikeways provide physical separation from traffic and include sidepaths and separated bike lanes.

In general, separated bike lanes are recommended in higher activity areas. Sidepaths are recommended in lower activity areas. Higher activity areas include those parts of the county zoned Commercial-Residential (CR), Life Sciences Center (LSC) or their floating zone equivalents, or that are located within 0.5 miles of a rail station. Areas that are zoned R-10, R-20, R-30 (multifamily residential zones) and RT (townhouse zones) are considered higher activity areas if they are adjacent to properties that are zoned CR, LSC or floating zones, or located near rail stations. All other areas of the county are considered lower activity areas.

TYPICAL APPLICATION



TRAFFIC LANES
3+ LANES



POSTED SPEED LIMIT
30 MPH OR FASTER



TRAFFIC
6,000+ VEHICLES PER DAY



ON-STREET PARKING
TURNOVER
FREQUENT



BIKE LANE OBSTRUCTION
LIKELY TO BE FREQUENT



DESIGNATED AS TRUCK OR BUS ROUTE



Separated bike lanes on Woodglen Drive, North Bethesda



Sidepath on Key West Avenue in the Life Sciences Center

Sidepaths



SEPARATED
BIKEWAYS



SIDEPATHS



SEPARATED
BIKE
LANES

Sidepaths are shared use paths located parallel to and within the road right-of-way. They provide two-way travel routes designated for walking, bicycling, jogging and skating. Sidepaths are typically 10 feet wide, but can vary between 8 feet (in areas with environmental or historic constraints) and 14 feet wide (where usage is likely to be higher). Sidepaths are separated from motorized traffic by a curb, a barrier or a landscaped panel.

Benefits

- More attractive to a wider range of bicyclists than striped bikeways on higher volume and higher speed roads.

Typical Application

- See page 46.
- Adjacent to the roadway.
- Recommended in lower activity areas (see page 64), with higher traffic volumes and speeds.

Examples in Montgomery County

- MacArthur Boulevard
- Key West Avenue
- Olney-Laytonsville Road
- Briggs Chaney Road



Separated Bike Lanes on Nebel Street, North Bethesda

Separated Bike Lanes



Separated bike lanes are exclusive bikeways that combine the user experience of a sidepath with the on-street infrastructure of a conventional bike lane. They are physically separated from motor vehicle traffic and distinct from the sidewalk. They operate one-way or two-way.

Separated bike lanes can provide different levels of separation, as discussed on pages 123 to 132.

Benefits

- More attractive to a wider range of bicyclists than striped bikeways on higher volume and higher speed roads.
- Eliminate the risk of a bicyclist being hit by an opening car door.
- Prevent motor vehicles from driving, stopping or waiting in the bikeway.
- Provide greater comfort to pedestrians.

Typical Application

- See page 46.
- Adjacent to the roadway.
- Recommended in higher activity areas (see page 64) with higher traffic volumes and speeds.

Examples in Montgomery County

- Woodglen Drive
- Nebel Street
- Spring Street



Striped Bikeways

Striped bikeways are designated spaces for bicycling that are distinguished from traffic lanes and shoulders by striping and pavement markings. Until a few years ago, conventional bike lanes were the gold standard of North American bicycle planning. Over the past few years, a variety of new bike lane types have arisen, including buffered bike lanes and advisory bike lanes. Collectively, this plan refers to the variety of bike lanes as striped bikeways.

While striped bikeways remain a useful tool to reduce traffic stress, they are insufficient to attract “interested but concerned” bicyclists in many environments because they do not provide sufficient separation from traffic and are often obstructed by motorized vehicles.

TYPICAL APPLICATION



TRAFFIC LANES
**3 LANES
OR FEWER**



POSTED SPEED
LIMIT
**30 MPH OR
SLOWER**



TRAFFIC
**9,000
VEHICLES
PER DAY
OR FEWER**



ON-STREET
PARKING
TURNOVER
INFREQUENT



BIKE LANE
OBSTRUCTION
**LIKELY TO BE
INFREQUENT**

**WHERE A
SEPARATED
BIKEWAY IS
INFEASIBLE OR
UNDESIRABLE**



Bike Lanes on Battery Lane, Bethesda



Buffered bike lanes on East Capitol Street SE, Washington, DC

Buffered Bike Lanes



BUFFERED
BIKE LANES

BIKE
LANES

ADVISORY
BIKE LANES

CONTRA
FLOW
BIKE LANES

Buffered bike lanes are conventional bike lanes paired with a designated buffer space separating the bicycle lane from the adjacent vehicle travel lane and/or parking lane to increase the comfort of bicyclists.

Benefits

- Provide greater separation between motor vehicles and bicyclists.
- Provide space for one bicyclist to pass another without encroaching into the adjacent vehicle travel lane.
- Encourage bicyclists to ride outside of the door zone when the buffer is between parked cars and the bike lane.
- Provide a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane.
- Appeal to a wider cross-section of bicycle users.

Typical Application

- See page 50.
- Buffered bike lanes are recommended instead of separated bike lanes where it is desirable to place the bike lane between a travel lane and on-street parking or where blockage by parked vehicles is unlikely to be a problem.

Examples in Montgomery County

- None



Conventional bike lanes on Marinelli Road in White Flint

Conventional Bike Lanes



BUFFERED BIKE LANES

BIKE LANES

ADVISORY BIKE LANES

CONTRA FLOW BIKE LANES

Conventional bike lanes (or simply bike lanes) are portions of the street that have been designated by striping, signage and pavement markings for the preferential or exclusive use of bicyclists. They are typically 5 to 6 feet wide in Montgomery County.

Climbing lanes include a conventional bike lane in the uphill direction and a shared lane in the downhill direction. These lanes are used to improve safety on hills where there is a higher speed differential between bicyclists and motor vehicles.

Benefits

- Increase bicyclist comfort and confidence on busy streets.
- Create separation between bicyclists and automobiles.
- Increase predictability of bicyclist and motorist positioning and interaction.
- Increase total capacities of streets carrying mixed bicycle and motor vehicle traffic.
- Visually remind motorists of bicyclists' right to bicycle in the street.

Typical Application

- See page 50.

Examples in Montgomery County

- Battery Lane
- Bonifant Road
- Dufief Mill Road
- Fairland Road
- Marinelli Road



Advisory bike lanes on Potomac Green Drive, Alexandria, Virginia

Advisory Bike Lanes



BUFFERED
BIKE LANES

BIKE
LANES

ADVISORY
BIKE LANES

CONTRA
FLOW
BIKE LANES

Advisory bike lanes are dashed bike lanes that allow motorists to temporarily enter the bike lane to provide oncoming traffic sufficient space to pass safely on narrow, unlaned roads in residential areas.

Benefits

- Require less space to implement than conventional bike lanes.
- Encourage motorists to safely pass bicyclists.
- Visually remind motorists of bicyclists' right bicycle in the street.
- Removing the center line reduces the speed of motor vehicles.

Typical Application

- Where there is insufficient space for conventional bike lanes and two lanes of traffic.
- Surrounding residential land uses.
- Number of travel lanes: un-laned, bi-directional streets.
- Street width: The un-laned two-way travel space should be 12 to 18 feet wide.
- Posted speed: 30 mph or less.
- Traffic: 2,000 to 4,000 vehicles per day.
- Parking: May be used on streets with or without on-street parking.

Examples in Montgomery County

- None



Contra-Flow bike lane on Cedar Avenue

Contra-Flow Bike Lanes



BUFFERED
BIKE LANES

BIKE
LANES

ADVISORY
BIKE LANES

CONTRA
FLOW
BIKE LANES

Contra-Flow bike lanes are bike lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street: one direction for motor vehicles and bikes, and the other for bikes only.

Benefits

- Enable bicyclists to travel against traffic on one-way streets.

Typical Application

- See page 50.
- One-way streets.

Examples in Montgomery County

- Cedar Street



Bikeable Shoulders

Bikeable shoulders are portions of the roadway that accommodate stopped or parked vehicles, emergency use, bicycles and motor scooters, and pedestrians where sidewalks do not exist.

Bikeable shoulders of at least 4 feet in width can improve comfort on some roadways for some bicyclists. They are most appropriate in rural locations in the county, often where posted speed limits are 40 mph and higher.

Bikeable shoulders do not create a low-stress environment on roads where the posted speed limit exceeds 30 mph.

Benefits

- Provide separation from traffic.
- Intended primarily for recreational bicyclists.

Typical Application

- Primarily found in rural locations.
- Posted speed limit: between 40 and 50 mph.

Examples in Montgomery County

- Clarksburg Road
- River Road
- New Hampshire Avenue from MD 198 to MD 108
- Norwood Road from MD 182 to MD 650





SHARED
STREETS

NEIGHBOR-
HOOD
GREENWAYS

PRIORITY
SHARED
LANE
MARKINGS

Shared Roads

Shared roads are bikeways that share space with automobiles. They include **neighborhood greenways** in suburban areas, **shared streets** in urban areas and **priority shared lane markings** where there is insufficient space for a dedicated bikeway. Of course, all streets where bicycles share space with automobiles are de facto shared roads, but only some are master-planned.





Bell Street, Seattle, Washington (Photo: NACTO)

Shared Streets



Shared streets constitute an urban design approach where pedestrians, bicycles and motor vehicles can comfortably coexist. They prioritize pedestrian and bicycle movement by slowing vehicular speeds and communicating clearly through design features that motorists must yield to all other users. Motorists are considered “guests” in this environment.

Benefits

- Create conditions where pedestrians and bicyclists can walk or ride on the street, and cross at any location.

Typical Application

- Low traffic volume, low traffic speed and high pedestrian volume streets.

Examples in Montgomery County

- None



A neighborhood greenway on SE Lincoln Street in Portland, Oregon

Neighborhood Greenways



Neighborhood greenways are streets with low motorized traffic volumes and speeds, designed and designated to give walking and bicycling priority. They use signs, pavement markings and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient crossings of busy arterial streets.

Neighborhood greenways can incorporate several design elements:

- Traffic diverters at key intersections to reduce through motor vehicle traffic while permitting passage for through bicyclists.
- At two-way, stop-controlled intersections, priority assignment that favors the neighborhood greenway, so bicyclists can ride with few interruptions.
- Neighborhood traffic circles and mini-roundabouts at minor intersections to slow traffic but allow bicyclists to maintain momentum.
- Traffic-calming to lower motor traffic speeds.

Benefits

- Attractive to a wide range of bicyclists.
- Reduce the speed and volume of traffic.
- Prioritize walking and bicycling at minor street crossings.
- Improve safety and reduce delay for walking and bicycling at major street crossings.

Typical Application

- Posted speed limit is 25 mph or slower.
- Context: areas where through traffic can be diverted to parallel streets.
- Street pattern where a continuous route for bicycling is possible.

Examples in Montgomery County

- None
- Wayfinding signs to guide bicyclists along the route and to key destinations.
- Shared-lane markings (sharrows) where appropriate to alert drivers to the path bicyclists need to take on a shared roadway.
- Crossing improvements where the bikeway crosses major streets (including traffic signals, median refuges and curb extensions).



Market Street, San Francisco (Source: Toole Design Group)

Priority Shared Lane Markings



Priority shared lane markings communicate bicyclist priority within a shared lane and guide bicyclists to ride outside of the door zone. Colored backgrounds and more frequent spacing make priority shared lane markings more conspicuous than standard shared lane markings (also known as sharrows). This treatment does not improve most bicyclists' comfort in shared lanes with traffic.

The lane markings can be installed in limited instances on roadways where it is infeasible to install bicycle lanes, separated bike lanes or shared use paths, but where it is desirable to communicate the priority of bicyclists within a shared lane. Priority shared lane markings are only to be used as a retrofit on existing streets where implementing the desired bikeway is infeasible. They are not to be used on new streets.

Benefits

- Make bicyclists more conspicuous in locations where it is not possible to provide a low-stress bikeway.

Typical Application

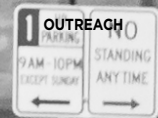
- Narrow streets with high on-street parking turnover, typically those with ground-floor retail and dining, or on low-speed, low-volume frontage roads.
- Separated bike lane mixing zones where a protected intersection is not provided.

Examples in Montgomery County

- None



Photo: Scott Wilets
Best Recreation Picture
Bicycle Master Plan Photo Contest



GENERAL BIKEWAY APPLICATIONS

A countywide master plan cannot anticipate all opportunities to implement bikeways that might arise. The following table provides default bikeway recommendations for streets where the Bicycle Master Plan does not recommend a bikeway.

These default bikeways will be incorporated into transportation facility planning studies conducted by the Montgomery County Department of Transportation (MCDOT), the Maryland State Highway Administration and other government agencies where a bikeway recommendation does not exist. They will also be incorporated into development applications that include non-master planned streets. See Appendix B for a description of each bikeway facility.

The table on the next page recommends a default bikeway type based on the roadway functional classification and whether the area is planned to support higher or lower activities. Higher activity areas include those parts of the county that are zoned Commercial-Residential (CR), Life Sciences Center (LSC) or their floating zone equivalents, or that are located within 0.5 miles of a rail station. Areas that are zoned R-10, R-20, R-30 (multifamily residential zones) and RT (townhouse zones) are considered higher activity areas if they are adjacent to properties that are zoned CR, LSC or floating zones, or near rail stations. All other areas of the county are considered lower activity areas.



ROADWAY CLASSIFICATIONS	NUMBER OF LANES	HIGHER ACTIVITY AREAS	LOWER ACTIVITY AREAS
Controlled Major Highway	4+	Two-Way Separated Bike Lanes (Both Sides of Street)	Sidepath (Both Sides of Street)
		Great Seneca Hwy (South of Sam Eig Hwy)	Great Seneca Hwy (North of Longdraft Rd)
Major Highway*	4+	Two-Way Separated Bike Lanes (Both Sides of Street)	Sidepath
		Rockville Pike (White Flint)	Middlebrook Rd (South of Great Seneca Hwy)
Arterial*	5	Two-Way Separated Bike Lanes (Both Sides of Street)	Sidepath (Both Sides of Street)
		Darnestown Rd (East of Shady Grove Rd)	Bel Pre Rd (East of Connecticut Ave)
	2-4	One-Way Separated Bike Lanes (Both Sides of Street)	Sidepath (One Side of Street)
		Spring St (Silver Spring)	Wilson Ln (Bethesda)
Minor Arterial*	2-3	One-Way Separated Bike Lanes (Both Sides of Street)	Sidepath (One Side of Street)
		Few examples at this time	Few examples at this time
Country Arterials	Any	N/A	Bikeable Shoulders
			Dickerson Rd
Business District Street	2-3	One-Way Separated Bike Lanes (Both Sides of Street)	One-Way Separated Bike Lanes (Both Sides of Street)
		Marinelli St (White Flint)	Westbard Ave (Westbard)
Primary Residential	2	N/A	Sidepath, Bike Lanes (Buffered, Conventional, Advisory)
			Arctic Ave
Secondary Residential	Un-Laned	N/A	On-Road Bikeway
			Gelding Ln (Olney)
Tertiary Residential	Un-Laned	N/A	On-Road Bikeway
			Gelding Ct (Olney)
Utility Corridors	N/A	Trail	Trail

*Where space is available and does not substantially detract from the default bikeway, bike lanes or bikeable shoulder can be added in addition to the default bikeway.



Breezeway Network

Imagine county residents walking and bicycling on safe routes removed from fast-moving cars, trucks and buses, where bicyclists experience less delay, but where all users – including slower moving bicyclists and pedestrians – can safely and comfortably coexist. These special bikeways, called “breezeways,” are an innovative concept for Montgomery County. Based on similar systems in London, Dubai and the Netherlands, the Breezeway Network takes the county to the next level in providing safe, separated routes for longer trips without having to worry about traffic or a bikeway too constricted for easy movement.

To accommodate the full range of cyclists, the Breezeway Network will not only provide a high level of comfort, but also a high level of convenience, safety and efficiency that is attractive and appropriate for bicyclists of all ages and abilities. It will prioritize higher speed bicycle travel between major activity centers, including central business districts, transit stations and job centers, since people are more likely to travel longer distances when the travel time for their trip is closer to that of traveling by automobile.

As a suburban jurisdiction with densifying but still widely spaced activity centers, Montgomery County is the perfect candidate for this network because it can enable people to travel quickly and efficiently between distant activity centers. Much like motorists rely upon higher speed roadways to connect distant activity centers, the Breezeway Network will enable cyclists and pedestrians to “breeze” quickly or leisurely along a protected and separate environment from a roadway without comprising each other’s safety or efficiency. Once fully implemented, the Breezeway Network will make it feasible for cyclists and pedestrians to efficiently travel between activity centers.



The Breezeway Network corridors are the arterials of the bikeway network in that they are envisioned to carry a large number of bicyclists. While many trips on the Breezeway Network will be for longer, faster trips to central business districts (CBDs), transit stations, activity hubs and job centers, these corridors will also be used for shorter and slower trips. The Breezeway Network will comprise trails, sidepaths, separated bike lanes and neighborhood greenways. Local bikeways, including neighborhood greenways, sidepaths, bike lanes and low-volume / low-speed streets, will funnel bicycle traffic to the Breezeways.

Bikeway Types

Trails

Sidepaths

Separated Bike Lanes

Neighborhood Greenways



Visualization of cycle superhighway in London, England (London Cycling Design Standards, 2014)

Five Types of Breezeways:

- 1 Rail and utility corridors, such as the Capital Crescent Trail, which include grade-separated crossings of major roads.
- 2 Freeway trails, such as the Intercounty Connector Trail.
- 3 Modern major highways, such as Great Seneca Highway, that are characterized by wider rights-of-way and greater spacing between intersections and driveways.
- 4 Older major highways, such as Veirs Mill Road and University Boulevard, which could become Breezeways over time with a gradual consolidation of driveways and intersections.
- 5 Neighborhood greenways paralleling older major highways, such as Woodland Drive and Amherst Avenue between Downtown Silver Spring and Wheaton, that provide direct access to destinations, minimize the number of turns and stops, and facilitate safe and direct crossings of major roadways.

Bikeway Network Characteristics

Design Speed: The Breezeway Network will have a design speed of 20 miles per hour in lower activity areas and 12 mph in higher activity areas. Design speed is influenced by the pavement quality and bikeway curvature, among other conditions, and is not an endorsement of bicycling at high speeds in crowded locations.

Separation from Traffic: Providing fixed, continuous separation from traffic, such as curbs or concrete barriers, will increase the comfort of bicycling on the Breezeway Network. Sidepaths or trails that run parallel to a roadway will be separated from the roadway by at least 5 feet. Along high-speed roadways with speed limits of 35 mph or greater, separation greater than 5 feet is desirable to reduce the stress from riding close to traffic.

Separation Between Bicycling and Walking: Separation between pedestrians and bicyclists will increase comfort for users and allow faster users to travel with minimal delay, especially in areas with higher use. On trails and sidepaths in suburban areas, separate spaces for pedestrians and bicyclists can be adjacent to each other, although a buffer between them is preferred. In urban areas where separation is provided using sidewalks and separated bike lanes, busy areas will need to provide more pedestrian space with widened waiting areas and pedestrian refuge islands at intersections, wider sidewalks and dedicated space for those waiting at bus stops.

Breezeways will feature adequate widths for side-by-side bicycle travel and passing, as well as adequate buffers from motor vehicle traffic.

- Trails and Sidepaths: The minimum bikeway width is 11 feet and the minimum pedestrian width is 5 feet. In areas with high pedestrian demand, the pedestrian width is 8 feet or more.
- Two-Way Separated Bike Lanes: the minimum bikeway width is 11 feet, excluding the gutter pan.
- One-Way Separated Bike Lanes: the minimum bikeway width is 8 feet, excluding the gutter pan.

Minimal Intersection Delay: Breezeways feature intuitive and safe intersection and driveway crossings that minimize delay for pedestrians and bicyclists. The crossings are developed to prioritize non-motorized travel by making it easier and safer to travel through intersections. Breezeway crossings include elements that both separate bicycle movements from motor vehicles and make bicyclists and pedestrians more visible to other road users. Crossings will:

- Slow motor vehicle traffic.
- Improve bicyclist and pedestrian visibility.
- Reduce bicyclist and pedestrian exposure.
- Reduce or eliminate conflicts.



Minneapolis' Midtown Greenway delineates separate spaces for bicyclists and pedestrians.

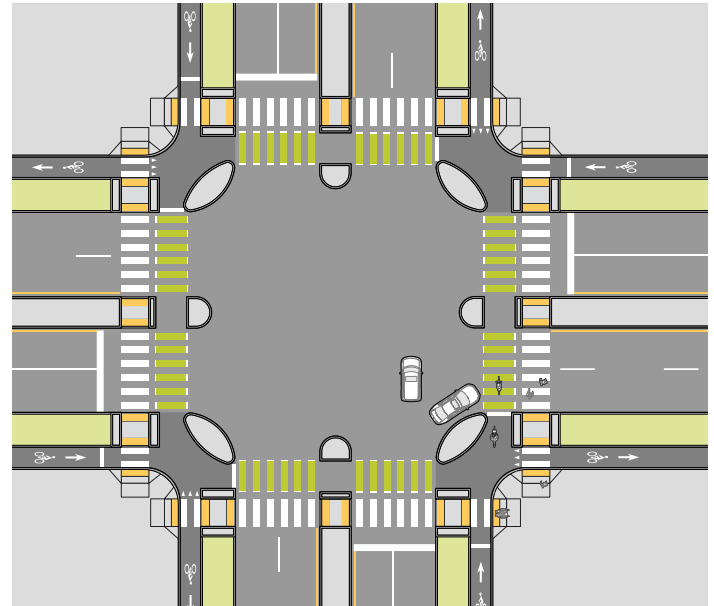
Treatments to facilitate these crossings may include:

- **Protected intersections** reduce the number of potential conflict points between bicyclists and motor vehicles, making these conflicts easier to mitigate.
- **Colored pavement** through intersections delineates bicyclist right-of-way and improves bicyclist visibility.
- **Bike signals** reduce conflicts by allowing bicycle and motor vehicle intersection movements to be separated. These signals have interim approval from the Federal Highway Administration (FHWA) and are in use in many jurisdictions around the country.
- **Leading pedestrian / bicycle intervals** at traffic signals reduce conflicts by allowing bicyclists to enter the intersection ahead of right-turning vehicles, establishing right-of-way and improving motor vehicle yielding.
- **Grade separation**, including underpasses and overpasses, eliminate potential conflicts with automobiles and minimize bicyclist delay by allowing bicyclists to cross over or under motor vehicle traffic without stopping.
- **Narrower curb** radii improve bicyclist visibility by requiring motorists to slow down while turning, widening their field of vision and making it more likely they will see bicyclists proceeding through the intersection.
- **Driveway consolidation** reduces conflicts between motor vehicles and bicyclists by limiting the number of conflict points a bicyclist must traverse.
- **Raised crosswalks** slow driver speeds when crossing the Breezeway from a side street. When motor vehicles travel slower, they have a wider field of vision and are more likely to see bicyclists.

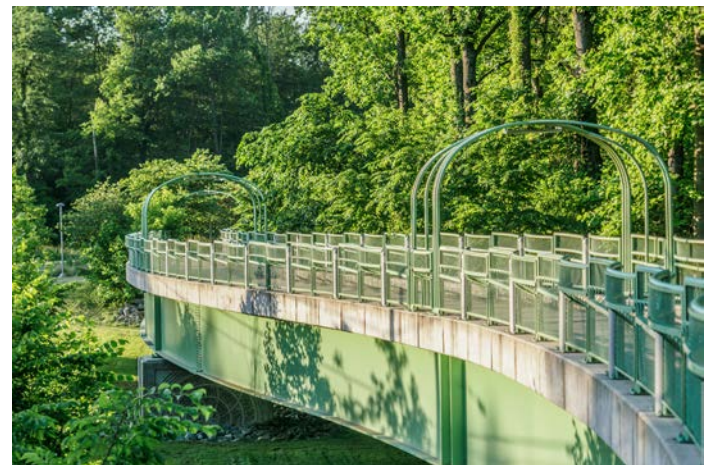
Crossings of Interstates: Due to the high speed of traffic on most freeway on- and off-ramps, crossing freeway ramps is a major safety concern and impediment to both walking and bicycling. Potential approaches to improving crossings at interstates include:

- Traffic control at crossings, including signalized intersections.
- Grade-separated crossings.

Pavement Surface: Breezeways will feature high-quality construction, surface materials and maintenance practices that maximize surface smoothness and pavement life, minimizing potential for pavement cracking and buckling.



A protected intersection. Source: Toole Design Group



Rock Creek Trail Bridge over Veirs Mill Road near the City of Rockville

Specific construction requirements should be adapted to each location in a manner appropriate to local conditions and anticipated wear-and-tear. If maintenance, service or emergency vehicles will need to access the Breezeway, construction methods and materials should take that into account. During Breezeway design, pavement technologies to be investigated include, but are not limited to:

- Fine-grained asphalt and porous asphalt surface courses to reduce road noise.
- Thickened pavement courses to accommodate vehicular loading where necessary and lengthen pavement life.

- Appropriate slope for drainage.
- Special treatments for tree roots.
- Thickened aggregate base courses to accommodate vehicular loading where necessary and lengthen pavement life.
- High-modulus pavements to reduce pavement thickness.
- Higher asphalt content in asphalt base courses to increase durability and fatigue resistance.
- Structural enhancements for poor pavement subgrades to accommodate vehicular loading and lengthen pavement life.
- Perpetual pavement technologies to lengthen pavement life.
- Porous pavement to reduce ice-buildup and water spray from tires.

Breezeways will feature construction practices designed to result in high-quality pavement installation. These practices include improved subgrade preparation and testing, installation of pavements with appropriate lift thicknesses, rigorous asphalt temperature monitoring and thorough compaction for uniform density and smoothness.

Within the bikeway network, Breezeways are prioritized for maintenance in a manner similar to priority arterials within the roadway network. This priority applies to snow removal, resurfacing, sweeping and other general maintenance activities.

Street Infrastructure: In addition to separation from motor vehicle traffic, Breezeways will be free of obstructions, such as utility poles, trees or sign posts. Breezeways will also have corridor-long pedestrian-scale lighting. Lighting will provide continuous illumination along the travelway and immediate wayside areas. In residential areas or sensitive habitat areas, specialized lighting or screens may be required to avoid adverse impacts on the surroundings.

Branding and Wayfinding: Unique branding improves Breezeway Network legibility and helps the network express its own identity as a high-quality transportation option. There are many examples of how this branding might be handled, including using:

- Signage that distinguishes the Breezeway from the rest of the network.
- Pavement markings.
- Different colored surface treatments.

Transitions: Transitions between Breezeways and standard bicycle facilities will be direct, seamless and intuitive. See Appendix B for transitions between separated bike lanes and other bicycle facilities.

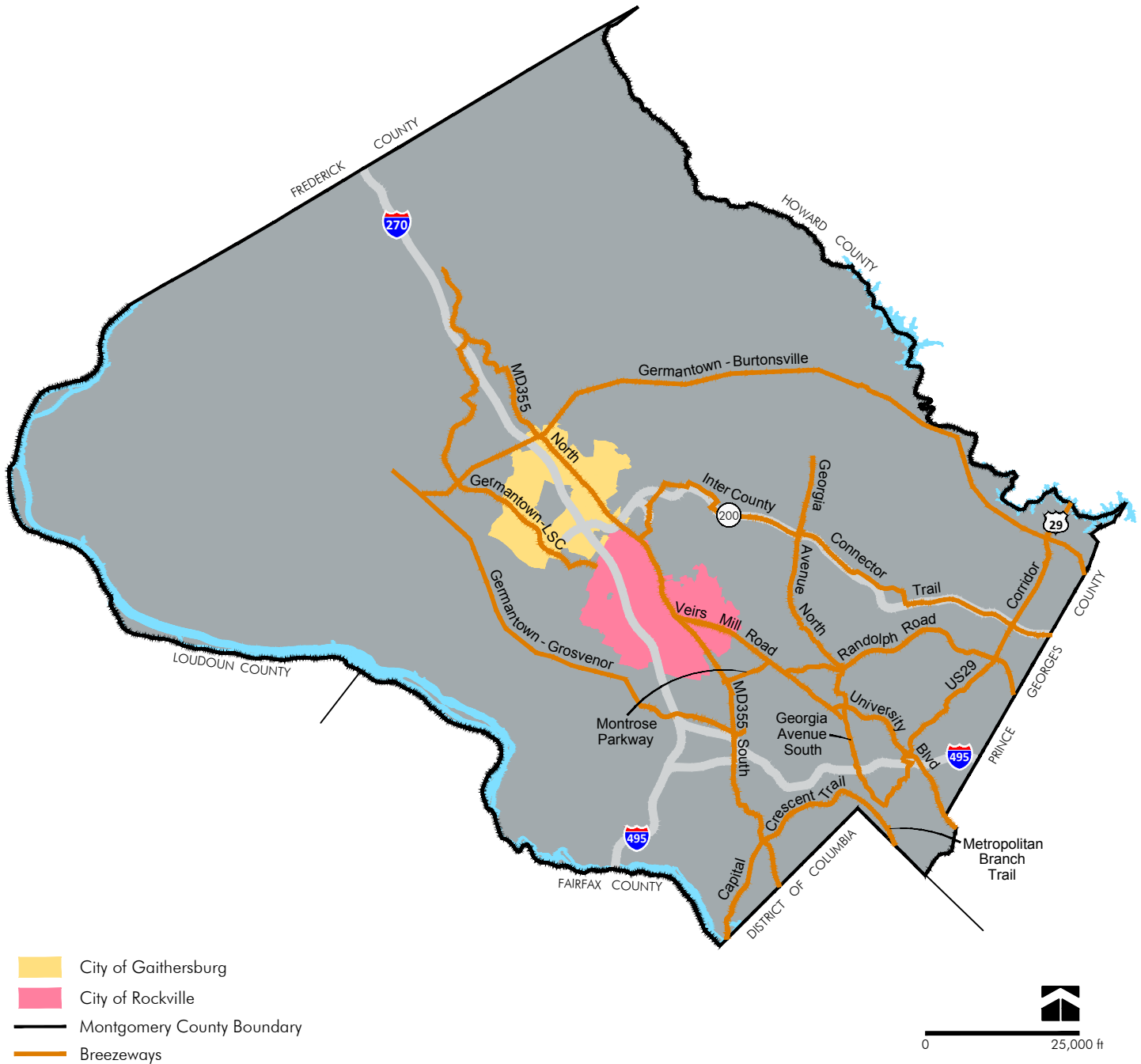
Policy Guidance

Implementing and maintaining the Breezeway Network may require adjusting several existing county and state policies and practices:

- Dedicated design guidelines should be adopted by MCDOT to codify minimum widths and other design standards. Newer intersection treatments may also need to be added to MCDOT's design standards.
- Maintenance practices and policies will need to be revised. New equipment will be required for sweeping, snow removal and emergency response on the county's separated bike lane network and growing trails network.
- A maintenance, snow removal and repaving schedule should be developed for Breezeways. This process may require revisions to the existing prioritization process for maintenance and snow removal. Snow removal laws may require careful attention to bikeways in residential areas where Breezeways run alongside the roadway, as these bikeways will need to be treated by Montgomery County.

Proposed Breezeway Network

Fourteen corridors are proposed for the Breezeway Network, as shown in the map below. A description of each Breezeway and its major infrastructure recommendations is provided on the following pages. See Appendix I for a detailed description of the bikeway recommendations for each Breezeway corridor.



Breezeway Corridors

CORRIDOR	FROM	TO	TPOLOGY
Capital Crescent Trail	District of Columbia	Silver Spring Transit Center	Rail Corridor
Georgia Avenue North	Olney-Laytonville Rd	Glenmont Metrorail Station	Older Major Highway
Georgia Avenue South	Glenmont Metrorail Station	Ellsworth Drive	Older Major Highway
Germantown - Grosvenor	Schaeffer Road	MD 355	Utility Corridor
Germantown - Burtonsville	Utility Corridor	Prince George's County	Utility Corridor
Germantown - Life Sciences Center	Middlebrook Road	City of Rockville	Modern Major Highway
Intercounty Connector Trail	MD 355	Prince George's County	Freeway
MD 355 North	Stringtown Road	City of Gaithersburg	Modern Major Highway
MD 355 South	City of Rockville	District of Columbia	Older Major Highway
Montrose Parkway	Rockville Pike	Veirs Mill Road	Modern Major Highway
Randolph Road	Veirs Mill Road	Columbia Pike	Older Major Highway
University Boulevard	Veirs Mill Road	Prince George's County	Older Major Highway
US 29	Howard County	Fenton Street	Freeway
Veirs Mill Road	City of Rockville	Georgia Avenue	Older Major Highway

Capital Crescent Trail

The Capital Crescent Trail is an off-road shared-use path along a rail corridor that forms a crescent between Georgetown and Silver Spring via Bethesda. Montgomery County purchased the Georgetown Branch right-of-way between the District of Columbia and the Metropolitan Branch just west of Silver Spring in 1988.

The Maryland-National Capital Park and Planning Commission (M-NCPPC) has jurisdiction over the portion between the District of Columbia and Woodmont Avenue in Bethesda, and the MCDOT has jurisdiction over the portion between Woodmont Avenue and Silver Spring. In 1990, the National Park Service acquired the part of Georgetown Branch reaching from Georgetown in the District of Columbia to Montgomery County.

The Capital Crescent Trail is currently paved with asphalt from Georgetown to Bethesda. It will be paved east of Bethesda and extended to the Silver Spring Transit Center as part of the Purple Line light rail project. Major infrastructure projects include:

- Widening the trail to 15 feet with 2-foot-wide shoulders between Massachusetts Avenue and Bethesda Avenue, with a 5-7-foot-wide walkway and an 8-10-foot-wide bikeway.
- Adding lighting along the trail between Bethesda Avenue and the Silver Spring Transit Center.
- Strongly considering trail lighting between River Road and Bethesda Avenue during the facility planning process.
- Studying an improved connection from the Capital Crescent Trail to MacArthur Boulevard.

Georgia Avenue North

The Georgia Avenue North Breezeway runs along the state highway between Olney-Laytonsville Road in Olney and the Glenmont Metrorail Station. It consists of trails, two-way separated bike lanes, sidepaths and neighborhood greenways on the west side of Georgia Avenue, extending along parallel streets where the detour is minimal. Major infrastructure projects include:

- Crossing at the Georgia Avenue-Randolph Road interchange.
- Crossing at the planned Norbeck Road interchange.

Georgia Avenue South

The Georgia Avenue South Breezeway runs along the state highway between the Glenmont Metrorail Station and Ellsworth Drive in Silver Spring. It consists of trails, two-way separated bike lanes, sidepaths and neighborhood greenways on the west side of Georgia Avenue, north of Arcola Avenue and on the east side of Georgia Avenue, south of Arcola Avenue. Major infrastructure projects include:

- Grade separated crossing of I-495 and I-495 ramps on the east side of Georgia Avenue.

Germantown - Grosvenor

The Germantown to Grosvenor Breezeway is a trail as it extends along an electrical transmission corridor between Schaeffer Road and Tuckerman Lane, and separated bike lanes along Tuckerman Lane to Rockville Pike. Major infrastructure along the power lines is to be determined by a PEPCO-Exelon facility planning study.

Germantown - Burtonsville

The Germantown to Burtonsville Breezeway is a trail that extends along an electrical transmission corridor between Germantown and Prince George's County. Major infrastructure projects include new crossings of these major roadways:

- Great Seneca Highway
- CSX railroad tracks
- Interstate-270
- Frederick Road
- Woodfield Road
- US 29

Additionally, pedestrian-scale lighting is recommended on trail portions of this corridor.

Germantown - Life Sciences Center

The Germantown - Life Sciences Center Breezeway connects Germantown Town Center to the Life Sciences Center and consists of separated bike lanes in Germantown and sidepaths along Great Seneca Highway and Key West Avenue. Major infrastructure projects include:

- New bridge on Dorsey Mill Road.

Additionally, pedestrian-scale lighting is recommended on trail portions of this corridor.

Intercounty Connector Trail

The Intercounty Connector Trail Breezeway connects Shady Grove to Prince George's County. It largely consists of a trail that parallels the Intercounty Connector, but includes sidepaths in locations where the trail diverts from the highway. Major infrastructure projects include:

- New crossing of MD 200.
- New bridge over Northwest Branch.
- New bridge over Paint Branch.
- New crossing of US 29.

Additionally, pedestrian-scale lighting is recommended on trail portions of this corridor.

MD 355 North

The MD 355 North Breezeway connects Clarksburg to the City of Gaithersburg. It consists of sidepaths along MD 355 and Observation Drive. Major infrastructure projects include:

- Extension of Observation Drive between Clarksburg and Germantown.

Additionally, pedestrian-scale lighting is recommended on trail portions of this corridor.

MD 355 South

The MD 355 South Breezeway connects the City of Rockville to Friendship Heights and consists of separated bike lanes, sidepaths and trails. Major infrastructure projects include:

- Widening the entire Bethesda Trolley Trail to as much as 23 feet, providing separated space for walking (5 to 8 feet) and bicycling (8 to 11 feet) with shoulders (2 feet each).
- Reconstructing Rockville Pike between the City of Rockville and Marinelli Road with two-way separated bike lanes on the west side.

Montrose Parkway

The Montrose Parkway Breezeway is a trail that will connect White Flint to Veirs Mill Road. Major infrastructure projects include:

- East of White Flint, Montrose Parkway is an unbuilt highway. While current plans include a 10-foot-wide shared use path, this dimension should be increased to reflect the importance of this bikeway within the proposed Breezeway network.

Additionally, pedestrian-scale lighting is recommended on trail portions of this corridor.

Randolph Road

The Randolph Road Breezeway connects Veirs Mill Road and White Oak, and will be composed exclusively of sidepaths. Major infrastructure projects include:

- New bridge over Northwest Branch.
- New bridge over Paint Branch.

University Boulevard

The University Boulevard Breezeway connects Wheaton to Takoma / Langley and White Oak and will be composed of separated bike lanes in urban and urbanizing areas, and sidepaths. Major infrastructure projects include:

- New bridge over Interstate-495.

US 29 Corridor

The US 29 Corridor Breezeway connects Howard County to Fenton Street and will be composed of separated bike lanes, sidepaths, neighborhood greenways and trails. Major infrastructure projects include:

- New bridge over Patuxent River.
- New bridge over Paint Branch.
- New bridge over Northwest Branch.⁵
- New bridge over I-495.

Veirs Mill Road

The Veirs Mill Road Breezeway connects the City of Rockville to Wheaton on the south side of the road. Major infrastructure projects include:

- New crossing of Rock Creek and Turkey Branch.

⁵ Appropriate measures must be taken to minimize impacts to the former WSSC buildings. Any changes to the road cross section may require elevating the roadway out of the floodplain and reconstructing the stream channel upstream and downstream.

BIKEWAY RECOMMENDATIONS

The recommended bicycling network is organized based on geographic areas known as “policy areas,” created as part of the county’s subdivision staging policy. This is the standard categorization of geographic areas for transportation in Montgomery County.

Each policy area is accompanied by a map of recommended bikeways and a detailed table describing the bikeways starting on page 223. The policy area maps display the bicycle facility classification and whether the bikeway is existing or proposed. They also indicate where a bicycle parking station is proposed and whether grade separation between the bikeway and the intersecting street exists or is proposed. The policy area tables indicate the name of the road, where the road segment starts and ends, the bikeway facility classification and the bikeway type for that segment.

While the full bikeway network is extensive and unlikely to be constructed within the life of this plan, such a large network is recommended so that opportunities to implement the bikeway recommendations are not lost when unforeseen circumstances arise. A prioritized list of bikeways is included in the prioritization section of this plan.

Overall, the Bicycle Master Plan recommends about 1,200 miles of bikeways, of which slightly more than one-quarter currently exist. The largest category of bikeways comprises sidepaths (635 miles), followed by trails (189 miles), bike-able shoulders (131 miles), separated bike lanes (101 miles) and neighborhood greenways (50 miles).

A summary of the bikeway recommendations is shown in table on the next page.

Non-Master Planned Roads

Just like motorists and pedestrians, bicyclists travel on all roads where it is legal⁶ to ride a bicycle to access their homes, jobs, shopping and other local destinations. While only a portion of roads in Montgomery County will be master-planned bikeways, all non-master-planned roads where it is legal to bicycle, will be designed with the understanding that people of all ages and bicycling abilities will bicycle on them.

⁶ In Maryland, bicycles are permitted on all roadways except on expressways, unless on adjacent bicycle paths or ways approved by the MDOT / State Highway Administration, or on any other controlled access highway specifically prohibited with signs. However, on roads where the posted speed limit is more than 50 mph, bicycles may use the shoulder adjacent to a roadway and enter the roadway only if making or attempting to make a left turn; crossing through an intersection; or the shoulder is overlaid with a right turn lane, a merge lane, a bypass lane, or any other marking that breaks the continuity of the shoulder.

Summary of Bikeway Recommendations (Miles)

CATEGORY	BIKEWAY TYPE	EXISTING	PROPOSED	TOTAL
Trails	Off-Street Trails	124	65	189
	Stream Valley Park Trails	28	0	28
	Neighborhood Connectors	14	3	17
Separated Bikeways	Shared Use Paths	152	483	635
	Separated Bike Lanes	2	99	101
Striped Bikeways	Buffered Bike Lanes	0	7	7
	Conventional Bike Lanes	14	19	33
	Advisory Bike Lanes	0	0	0
	Contra-Flow Bike Lanes	0	5	5
Bikeable Shoulders	Bikeable Shoulders	0	131	131
Shared Roads	Neighborhood Greenways	0	50	50
	Shared Streets	0	1	1
	Priority Shared Lane Markings	0	5	5
Total		334	868	1,202



See detailed bikeway recommendations on page 223 or at mcatlas.org/bikeplan

Park Trails

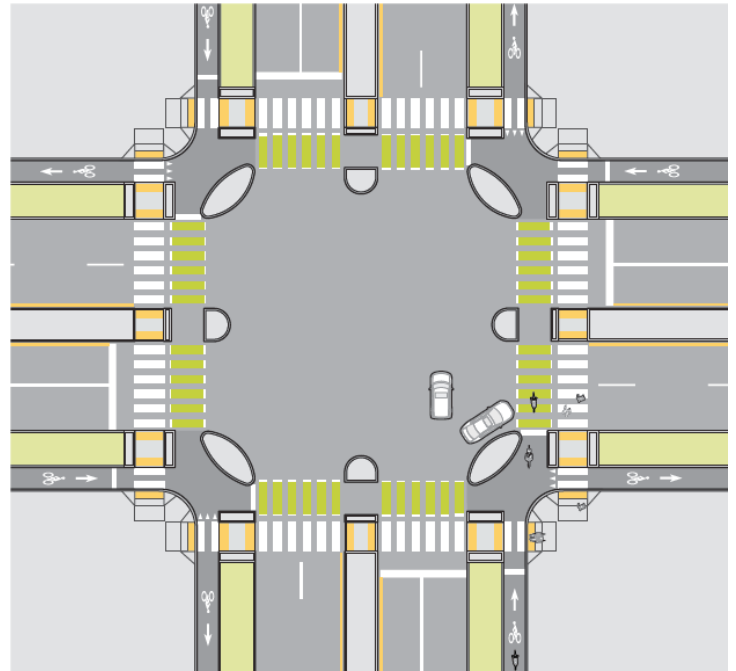
Park trails are the backbone of the existing bicycling network in many areas of Montgomery County. While trails such as the Matthew Henson Trail and Capital Crescent Trail are built to modern standards, older trails such as the Rock Creek Trail and the Sligo Creek Trail are substandard in design in some locations. It is challenging if not impossible to upgrade these trails in many locations due to steep slopes, proximity to streams and other environmental constraints. Where possible, the Montgomery County Department of Parks should upgrade park trails over time to standards set by the American Association of State Highway and Transportation Officials (AASHTO) and American with Disabilities Act (ADA) standards.



Crossings

There is increased potential for crashes between bicyclists and motorists at locations where bikeways cross intersections and driveways. However, since the operation of intersections, including traffic control and the provision of turn lanes, is considered outside of the scope of a master plan, only limited guidance on intersections is included in this plan.

Protected Intersections: Montgomery County should make protected intersections the preferred treatment at all intersections where at least one street is recommended to have a sidepath, separated bike lane, buffered bike lane or conventional bike lane. Protected intersections increase safety by reducing the speed of turning traffic, improving sightlines and designating space for all road users. They reduce conflict points between motor vehicles, pedestrians and bicyclists and can eliminate the remaining conflicts with signalization. There are several different configurations of protected intersections, many of which are illustrated in Appendix B.



A protected intersection with one-way separated bike lanes.

Trail Crossings: Montgomery County should upgrade all mid-block trail crossings where the roadway is three lanes or wider without a median or where the posted speed limit is 30 mph or faster. Potential approaches to improving mid-block crossings include:

- Traffic calming that removes traffic lanes and/or reduces the design speed of the road.
- Reducing conflicts by realigning the trail to an existing signalized intersection where the detour is minimal and convenient for bicyclists, providing a grade separated crossing, or adding new traffic signalization.
- Other improvements that improve the safety and comfort of the crossing.

M-NCPPC will develop a prioritized list of park trail crossings to improve as part of an ongoing study. MCDOT should consider developing a similar list for other trail crossings in the county.

Interstate Ramps: Due to the high speed of traffic on most freeway on- and off-ramps, crossing freeway ramps is a major safety concern and impediment to both walking and bicycling. Potential approaches to improving crossings at interstates include:

- Traffic control at the crossing, including full signalized intersections.
- Grade-separated crossings.

BICYCLE PARKING

The availability of secure and convenient bicycle parking is an important factor when considering making a trip by bicycle. No matter how well connected the bikeway network, many people will forgo bicycling if their destinations lack safe places to secure their bicycles. An adequate supply of bicycle parking encourages bicycling while reducing theft and improper use of trees and street furniture for bicycle parking.

Whether traveling to work, school, shopping or home, people must feel confident that their bicycles will not be stolen or vandalized when stored. The length of time that a bicycle will be parked determines to a large extent the level of security that is needed. The longer the time period, the more secure the bicycle parking needs to be. Bicycle parking is a key component of the Bicycle Master Plan, as incorporated in several objectives of Goal 2.

In 2016, the Montgomery County Police Department's Second District reported 187 thefts of bicycles in Bethesda.

Bicycle parking can be implemented with a combination of public and private investments. The parking table on the next page identifies whether the private sector or government is the likely provider of bicycle parking, based on whether the parking is long-term or short-term, the trip purpose and the destination type. Trip purpose can influence the length of time that is needed and, therefore, the level of security. Destination type influences whether the private sector or government is the primary provider of the bicycle parking.

Appendix K provides bicycle parking guidelines for short-term and long-term bicycle parking.



TYPE OF BIKE PARKING	TRIP PURPOSE	DESTINATION	PROVIDER
Long-Term	Work	Office	Private/Government
		Retail	Private/Government
		Transit	Government
	School	Public Schools	Government
		Private Schools	Government
	Home	Multi-Family	Private
		Single-Family	Private (within dwelling units)
Short-Term	Shopping	Retail	Private/Government
	Entertainment	Libraries	Government
		Recreation Centers	Government
		Parks	Government
		Commercial	Private/Government

Short-Term Bicycle Parking

Short-term bicycle parking is intended to provide **quick access** to briefly visited destinations, such as retail locations and civic facilities, and should be convenient and easy to use. It is typically located in highly visible locations, in front of building entrances and along streets and bikeways, and is available for public use. A common type of secure, short-term bicycle parking is an inverted-u rack.



Short-term bicycle parking in downtown Silver Spring. The inverted U-rack shown here is the preferred short-term parking facility because it provides two points of contact for securing a bicycle; on the frame and on the wheel.

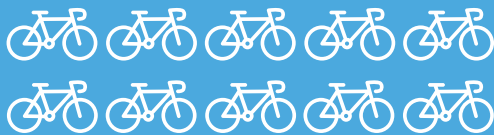
In Montgomery County, short-term bicycle parking is provided by the county government at public facilities, such as parks, libraries, recreational centers and other government services, and sometimes in front of commercial buildings where there is a bicycle parking shortage. As new buildings are constructed by the private sector, owners of these properties are required to install short-term bicycle parking to meet the requirements of the zoning code.

The current standards in the Montgomery County zoning code require short-term bike parking at a prescribed rate per unit (such as square feet) of development, but such requirements have not always been in place. As a result, there is a deficit of short-term bicycle parking in most areas of Montgomery County. New developments must conform to the 2014 changes to the zoning code, which requires more short-term bicycle parking.

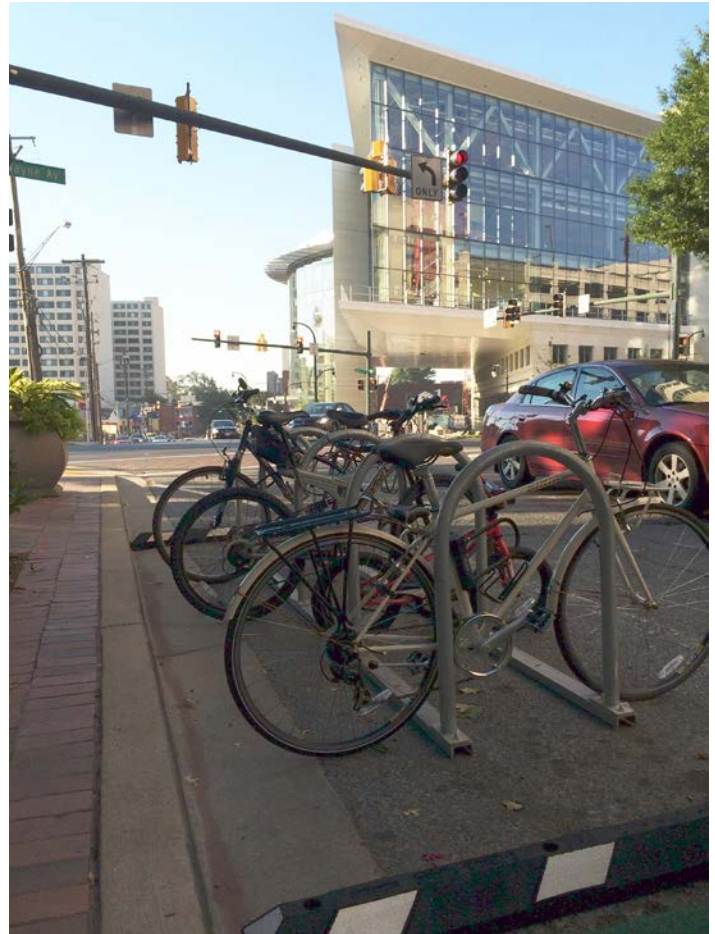
One of the many advantages of bicycle parking is that it takes significantly less space than parking for cars. Up to 10 bicycles can fit in the same space that is needed to park one automobile.

An evaluation of short-term bicycle parking can be found in the Monitoring the Vision section of this plan, as well as Appendix F. Programs and policies to increase the number and quality of bike parking can be found on pages 100, 111 and 114.

ROUGHLY 10 BICYCLE PARKING SPACES CAN OCCUPY THE SAME SPACE AS PARKING FOR ONE AUTOMOBILE



=



Bike corrals can fit 10 bicycles in the spaces of one automobile parking space, as shown in this temporary installation in downtown Silver Spring.

Long-Term Bicycle Parking

Long-term bicycle parking is intended to provide sheltered and secure bicycle storage for residents, students, employees and long-term visitors who are leaving their bicycles for several hours or longer. It is typically provided in a fixed, safe and weather-protected setting, including bike stations, bike rooms or cages inside buildings and stand-alone bike lockers.

In Montgomery County, long-term bicycle parking is provided by the public sector at schools and transit stations. The private sector is responsible for providing long-term bicycle parking in retail settings, office buildings and multi-family housing per the requirements in the zoning code.

There are five types of bicycle parking in residential and commercial buildings:

A **bicycle room located on the ground** floor of a commercial or residential building is the preferred form of long-term bicycle parking because it provides:

- Highly secure bicycle storage in an enclosed facility.
- Direct access to the street or sidewalk.
- Little or no conflict with automobiles.

A **bicycle room located in the parking garage** of a commercial or residential building is the second-best form of long-term bicycle parking because it provides:

- Highly secure bicycle storage within an enclosed facility.
- Indirect access to the street or sidewalk through a parking garage.
- Reduced conflict with automobiles as cyclists navigate through the parking garage.



A bicycle room with stacked bike racks

A **bicycle cage** located in the parking garage of a commercial or residential building is the third best form of long-term bicycle parking because it provides:

- Secure bicycle storage in a facility typically constructed of chain-link fencing, which can be cut and leaves bicycles vulnerable to vandalism and theft.
- Indirect access to the street or sidewalk through a parking garage.
- Some conflict with automobiles as cyclists navigate through the parking garage.



A bike cage in downtown Silver Spring

A secure, locked **bicycle locker** is the fourth best form of long-term bicycle parking because it provides:

- Highly secure bicycle storage in an enclosed box.
- Direct or indirect access to the street or sidewalk depending on whether it is located in a parking garage or at street level.
- Varying amount of conflict with automobiles, depending on whether the locker is located in a parking garage or at street level.
- An inefficient use of space.

Bicycle racks located in a parking garage of a commercial or a residential building are the least preferred form of long-term bicycle parking because they provide:

- Less secure bicycle storage because bicycles are vulnerable to vandalism and theft.
- Indirect access to the street or sidewalk through a parking garage.
- Some conflict with automobiles as cyclists navigate through the parking garage.

As with short-term bicycle parking, there is also a deficit of long-term bicycle parking. While new developments must conform to the 2014 changes to the zoning code, requiring more long-term bicycle parking, many older commercial and multi-family residential buildings offer little or no secure bike parking. While no data exists on long-term bicycle parking at commercial and residential buildings, the Washington Metropolitan Area Transit Authority (WMATA) provides some long-term bicycle parking at Metrorail stations in the form of bike lockers.

Bicycle Parking Stations

Progressive transit agencies and local governments across the country are investing in long-term bicycle parking stations within or directly adjacent to transit stations to increase transit ridership at a fraction of the cost of operating local bus service or constructing and operating parking garages. Secure bicycle parking stations can expand the use of bicycling to transit by attracting people who:

- Live beyond a 10-minute walk of the transit station and outside of the bikeshare service area.
- Are uncomfortable locking their bicycles to a standard inverted u-rack for an extended periods.

Bicyclists in Montgomery County currently have a few options when they arrive at a transit station. They can leave their bicycles at existing bike lockers and bike racks, or bring their bicycles onto Metrorail cars outside of peak periods.

Secure bicycle parking stations could offer transit riders another means to store their bicycles. These enclosed and covered facilities offer high-volume and high-security bicycle parking. Additionally, many bicycle parking stations offer services such as bicycle repair, bicycle rental, bicycle retail, food service, showers and changing rooms, lockers for personal belongings and bicycling information.

Due to capacity issues, most transit operators place limits on bringing bicycles onto buses and rail cars. For example, only folding bikes are allowed on the trains of the MARC Brunswick Line, a commuter service that operates during peak periods only, though MARC is now including bike-only cars on some trips. WMATA permits up to two bicycles per car on Metrorail during weekends and weekdays, except between rush hours of 7 and 10 a.m. and 4 and 7 p.m. All Metrobus and Ride On buses can accommodate bicycles on the front of the vehicles.

Bicycle parking stations can be located in a variety of environments, including dense urban environments, such as the Union Station Metrorail Station in Washington, DC and in suburban areas, such as the Kramer Station in Austin, Texas.

Good locations for bicycle parking are directly adjacent to and visible from station entrances and can be easily monitored by station managers or cameras. These locations are advantageous because they are easy for bicyclists to find and generally more secure than spaces that are tucked away from view. Bicycle parking facilities provided on the paid side of fare gates may be an effective means to deter theft.



An urban bicycle parking station directly adjacent to the Union Station Metrorail Station in Washington, DC



A suburban bicycle parking station at Kramer Station in Austin, Texas

Bicycle Parking Recommendations At Transit Stations

Long-term bicycle parking is recommended at all WMATA Metrorail Red Line stations and at the higher demand MARC, future Purple Line and Corridor Cities Transitway (CCT) stations to increase the numbers of bicyclists traveling to these transit hubs. The following table summarizes the recommended amount of bicycle parking spaces to be provided directly adjacent to each transit station.

Long-term bicycle parking is recommended to be provided in bicycle parking stations. Short-term bicycle parking is recommended to be provided by inverted “U” racks in a covered location. The methodology used to calculate bicycle parking is based on setting a goal for bicycle access and is described in Appendix G. Actual demand may be higher or lower based on factors such as the build-out of the bicycling network and whether bicyclists park their bicycles at transit stations for reasons other than transit access.

Planned stations where detailed engineering has not yet begun, including the proposed White Flint MARC station and the Corridor Cities Transitway Phase 2 stations, are each recommended to have a minimum of 20 long-term spaces and 6 short-term spaces. As ridership estimates become available, these recommendations will be updated.

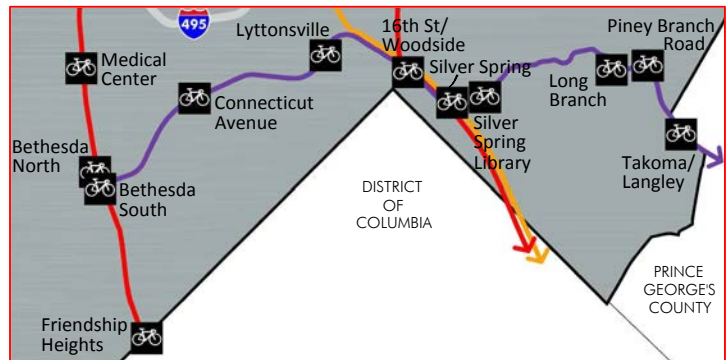
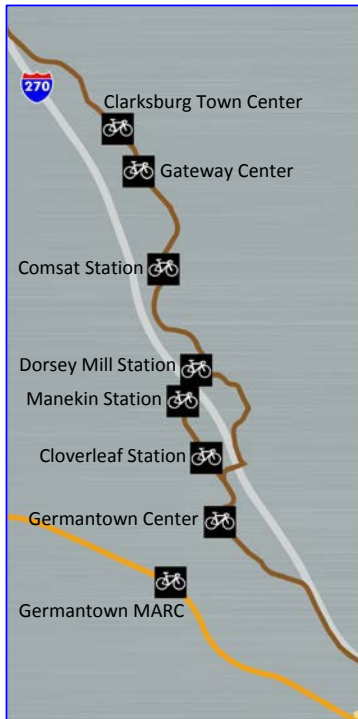
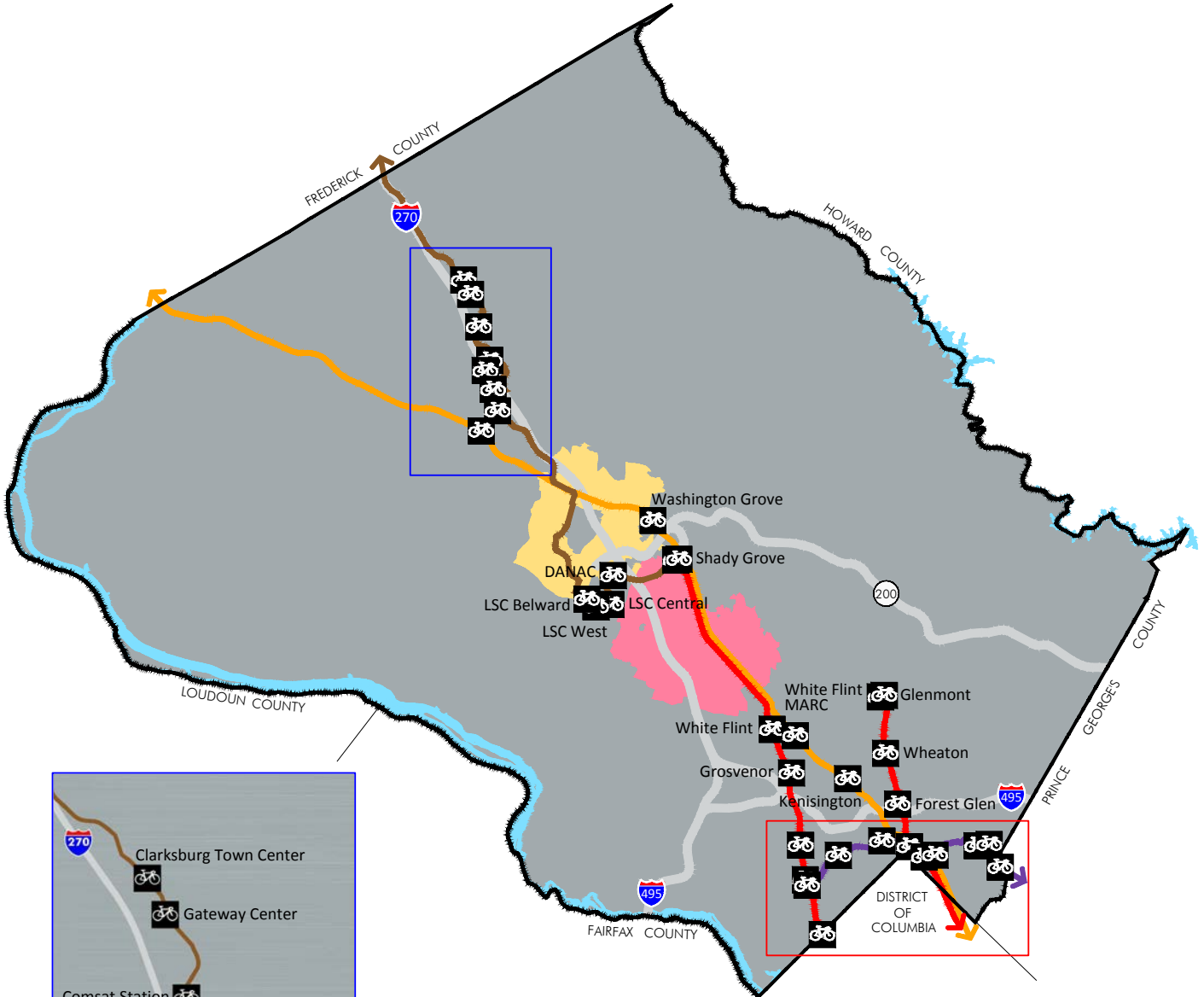
STATION	LONG-TERM (MIN)		SHORT-TERM (MIN)		RECOMMENDED LOCATION
	# OF SPACES	SQUARE FEET	# OF SPACES	SQUARE FEET	
Barnesville	0	0	10	200	Station parking lot.
Bethesda (North)	100	1,100	50	1,200	WMATA property at Wisconsin Ave level and at bus loop level.
Bethesda (South)	330	3,600	130	3,100	Within the Apex Building site and adjacent to the Capital Crescent Trail.
Boyd's	20	200	10	200	Station parking lot.
Connecticut Avenue	20	200	10	200	Gas station site on east side of Connecticut Ave adjacent to Purple Line station.
Dale Drive	0	0	10	200	Adjacent to station.
DANAC	0	0	20	500	Adjacent to station.
Dickerson	0	0	10	200	Station parking lot.
Forest Glen	300	3,200	100	2,400	Redevelopment of WMATA surface parking lot.
Friendship Heights	200	2,200	50	1,200	Redevelopment of 2 Wisconsin Cir (ultimate); Wisconsin Cir retail (interim).
Germantown	30	300	10	200	Station parking lot.
Glenmont	400	4,300	150	3,600	Both sides of the station on WMATA property.
Grosvenor	350	3,800	100	2,400	Redevelopment of WMATA parking lot.
Kensington	30	300	10	200	Station parking lot.

STATION	LONG-TERM		SHORT-TERM		RECOMMENDED LOCATION
	# OF SPACES	SQUARE FEET	# OF SPACES	SQUARE FEET	
Long Branch	30	300	10	200	Redevelopment of Giant Shopping Center site.
LSC Belward	80	900	20	500	Belward Farm site.
LSC Central	60	600	20	500	Hospital site.
LSC West	90	1,000	10	200	PSTA redevelopment site.
Lyttonsville	50	500	10	200	On MTA property along Brookeville Rd, adjacent to proposed pedestrian bridge.
Manchester Place	0	0	10	200	Station parking lot.
Medical Center	200	2,200	50	1,200	Station entrance.
Piney Branch Road	10	100	10	200	Redevelopment of northeast corner of University Blvd and Piney Branch Rd.
Shady Grove	330	3,600	110	2,600	Both sides of the station on WMATA property.
Silver Spring	600	6,500	170	4,100	Beneath Purple Line tracks or station or within WMATA joint development site.
Silver Spring Library	40	400	10	200	At the Silver Spring Library or Wayne Ave garage.
Takoma / Langley	20	200	10	200	Redevelopment of shopping center on west side of University Blvd.
Washington Grove	10	100	10	200	Station parking lot.
Wheaton	400	4,300	100	2,400	Adjacent to the bus loop or as part of redevelopment of the bus loop site.
White Flint (Metrorail)	250	2,700	50	1,200	WMATA property adjacent to existing or proposed station entrance.
White Flint (MARC)	20	200	10	200	Station entrance.
Woodside	20	200	10	200	Redevelopment of shopping center site.
TOTAL	3,990	43,000	1,290	30,300	

Notes:

1. Long-term bicycle parking stations will be located directly adjacent to transit station.
2. Friendship Heights recommendations only include Montgomery County demand and should be adjusted if DC demand is to be considered.

Long-Term Bicycle Parking Stations



- City of Gaithersburg
- City of Rockville
- Montgomery County Boundary
- Corridor Cities Transitway
- MARC Brunswick Line
- Purple Line
- Red Line
- 🚲 Bicycle Parking Stations





BICYCLE-SUPPORTIVE PROGRAMS

This section describes the existing and recommended bicycle-supportive programs that have the greatest potential for advancing the goals of the Bicycle Master Plan. Each program description is aligned with a goal of the Bicycle Master Plan using the following symbols:

GOALS



Increase bicycling rates in Montgomery County.



Create a highly connected, convenient and low-stress bicycling network.



Provide equal access to low-stress bicycling for all members of the community.



Improve the safety of bicycling.

Summary of Bicycle-Supportive Programs

The table on the next page summarizes the existing, expanded and new bicycle-supportive programs recommended in this plan and identifies the Bicycle Master Plan goals supported by each program.

PROGRAMS	GOAL 1: INCREASE BICYCLING RATES	GOAL 2: LOW-STRESS CONNECTIVITY	GOAL 3: EQUITY	GOAL 4: SAFETY
EXISTING PROGRAMS				
1.1 Facility Planning – Transportation	X	X		X
1.2 Stand-Alone Capital Projects	X	X		X
1.3 Bikeshare	X		X	
1.4 Montgomery County Bicycle Action Group	X	X		X
1.5 Safe Routes to School	X	X		X
1.6 Transportation Improvements for Schools	X	X		X
1.7 Neighborhood Traffic Calming Program	X	X		X
1.8 Pedestrian Safety Program	X	X		X
1.9 Bicycle Pedestrian Priority Areas Program	X	X		X
RECOMMENDED EXPANDED PROGRAMS				
2.1 Bikeways Program – Minor Projects	X	X		X
2.2 Roadway and Bikeway Related Maintenance	X			X
2.3 Snow Removal / Wind / Rain Storms	X			X
2.4 Resurfacing: Primary/Arterial AND Sidewalk & Curb Replacement	X	X		X
RECOMMENDED NEW PROGRAMS				
3.1 BikeMontgomery Outreach Program	X		X	
3.2 Bicycle Master Plan Monitoring Report	X	X	X	X
3.3 Neighborhood Greenway Program	X	X		X
3.4 Bicycle Parking Program	X	X		
3.5 Public School Bicycle Education	X			X
3.6 Bicycle Facility Education	X			X
3.7 Bicycle Count Program	X			X
3.8 Countywide Wayfinding Plan	X	X		

Existing Bicycle-Supportive Programs

The following existing bicycle-supportive programs have the greatest potential for advancing the goals of the Bicycle Master Plan.

1.1 Facility Planning - Transportation



Facility planning studies are conducted prior to the establishment of stand-alone transportation projects in Montgomery County's Capital Improvements Program. Phase I facility planning studies determine the purpose and need of the project; identify community, economic, social, environmental and historic impacts; and provide a recommended concept design.

At the completion of Phase I, the Transportation, Infrastructure, Energy and Environment (T&E) Committee of the County Council determines if the project advances to a more detailed Phase II facility planning study. Phase II studies provide preliminary engineering designs to show more detailed features of the project and refine the impact analysis and cost estimates. At the completion of Phase II, the County Executive and County Council hold project-specific public hearings to determine if the proposal merits consideration in the Capital Improvements Program as a funded stand-alone project.

Lead Agency: Montgomery County Department of Transportation

1.2 Stand-Alone Capital Projects



If upon completion of a Phase II facility planning study the County Council decides to fund a bicycle project, it becomes a stand-alone project in the Capital Improvement Program. Existing bicycle projects include the Capital Crescent Trail east of Bethesda, Falls Road East Side Hiker/ Biker Path, Frederick Road Bike Path and Metropolitan Branch Trail.

Lead Agency: Montgomery County Department of Transportation

1.3 Bikeshare



This program administers and operates bikeshare in Montgomery County. More than 50 bikeshare docks are currently provided by Capital Bikeshare within Bethesda, Chevy Chase Lake, Friendship Heights, Life Sciences Center, Rockville, Shady Grove, Silver Spring, Takoma Park and Wheaton. Free memberships are available for those who meet income eligibility requirements under a program called MCLiberty. Montgomery County is also piloting a dockless bikeshare program. The program employs a Bikeshare Program Manager.

Lead Agency: Montgomery County Department of Transportation

1.4 Montgomery County Bicycle Action Group



The Montgomery County Bicycle Action Group (MCBAG) was created in 1996 to engage citizens interested in bicycling issues. The group meets monthly and advises the Montgomery County Department of Transportation on current issues, programs and projects relating to bicycling in the county.

Lead Agency: Montgomery County Department of Transportation

1.5 Safe Routes to School Program



The Safe Routes to School program aims to increase walking and bicycling to school through engineering, education, enforcement and encouragement. The program employs a Safe Routes to School coordinator.

Lead Agency: Montgomery County Department of Transportation

1.6 Transportation Improvements for Schools Program



This program provides transportation improvements, such as intersection modifications, sidewalks, traffic signals and streetlights, necessary for safe pedestrian and vehicular circulation for schools identified in the Montgomery County Public Schools (MCPS) Capital Program.

Lead Agency: Montgomery County Department of Transportation

1.7 Neighborhood Traffic Calming Program



This program provides for the planning, design and construction of physical traffic control features in residential neighborhoods. Traffic calming features, such as traffic circles and islands, curb extensions, speed humps, physical and painted lane narrowing devices, are used to maintain and improve the safety and livability of residential neighborhoods by addressing issues of aggressive driving and excessive speeds and volumes. Traffic calming is an integral part of the neighborhood greenways proposed in the Bicycle Master Plan.

Lead Agency: Montgomery County Department of Transportation

1.8 Pedestrian Safety Program



Improving safety for pedestrians and bicycles is the goal of this program. Methods include constructing and installing new crosswalks, pedestrian refuge islands, sidewalks, bus pull-off areas, fencing to channel pedestrians to safer crossing locations, bicycle signs and markings, relocating, adding or eliminating bus stops, accessible pedestrian signals or warning beacons, and improving signage. The program supports the construction of street improvements around schools identified in the Safe Routes to School program. It audits pedestrian safety in high incidence areas and implements identified physical improvements, as well as oversees educational and outreach programs.

Lead Agency: Montgomery County Department of Transportation

1.9 Bicycle Pedestrian Priority Areas Program



This program is dedicated to the design and construction of bicycle and pedestrian capital improvements in the county's 31 Bicycle-Pedestrian Priority Areas (BiPPAs) identified in master plans and by Council resolution. Implementation of projects in the Silver Spring Central Business District BiPPA began in fiscal year 2016. Implementation of projects in the Grosvenor, Glenmont, Wheaton CBD, Veirs Mill Road/Randolph Road, Flower Avenue/Piney Branch Road, Piney Branch Road/University Boulevard and Takoma-Langley Crossroads BiPPAs began in fiscal year 2017.

Justification: The Tier 1 bikeways recommended in the prioritization section of this plan are focused on substantially implementing networks of separated bike lanes in seven of the county's Bicycle Pedestrian Priority Areas (Bethesda CBD, Friendship Heights CBD, Life Sciences Center, Silver Spring CBD, Wheaton CBD, White Flint and White Oak) within five years of approval of this plan. The Montgomery County Department of Transportation will need additional funding to hire staff and construct these bikeways within this timeframe.

Lead Agency: Montgomery County Department of Transportation

Recommended Expanded Bicycle-Supportive Programs

Existing bicycle-supportive programs recommended for expansion are discussed in this section. Recommended actions to expand existing programs are listed below along with a justification statement for each recommendation.

2.1 Bikeways Program – Minor Projects



Under the annual bikeways program, bikeways, trails and wayfinding signs that cost less than \$1 million are planned, designed and constructed. The program's current implementation schedule includes construction of shared use paths on Rockville Pike at Strathmore (FY18-20), Washington Grove Connector (FY21-22) and Emory Lane (FY21-22). The program employs a bikeways coordinator.

The program should be expanded to fund new neighborhood connectors and upgrade and maintain existing neighborhood connectors. These efforts should be included in the project description form (PDF) for the program. See page 44 and Appendix J for more information on neighborhood connectors.

Justification: Neighborhood connectors provide direct connections to residential streets, but are often poorly maintained. They provide much needed linkages between low-stress traffic streets, thereby allowing bicyclists to avoid higher stress streets.

Lead Agency: Montgomery County Department of Transportation

2.2 Roadway and Bikeway Related Maintenance



The roadway and related maintenance program provides mowing, roadside vegetation clearing, street cleaning and other maintenance activities. It should be expanded to include debris removal and trimming or removing overgrown vegetation from bikeways. Priorities may include bikeways in commercial areas, surrounding transit stations and major connections between activity centers. While bikeway debris clearance should primarily be a government function, use of volunteers as part of an "Adopt a Bikeway" program could be part of this effort.

Justification: Ensuring clear and navigable bikeways improves safety and accessibility.

Lead Agency: Montgomery County Department of Transportation

2.3 Snow Removal / Wind / Rain Storms



The snow removal / wind / rain storms program includes the removal of storm debris within rights-of-way and snow from county roadways. This program includes plowing and applying salt and sand, equipment preparation and clean-up from snow storms, and wind and rain storm cleanup. It should be expanded to include snow removal from bikeways. Priorities may include bikeways in commercial areas, surrounding transit stations and major connections between activity centers. The program should authorize the purchase of specialized equipment to plow separated bike lanes, which in some cases are too narrow for conventional plowing vehicles.

Justification: Snow is an impediment to safe bicycling. Furthermore, during snow storms, people are sometimes more willing to walk or bike than they are willing to drive. Ensuring clear and navigable bikeways improves accessibility and safety.

Lead Agency: Montgomery County Department of Transportation

2.4 Resurfacing: Primary/Arterial AND Sidewalk & Curb Replacement



While Montgomery County has programs to resurface roads and sidewalks, there is no current program focused on repaving bikeways. Both the resurfacing: primary / arterial and the sidewalk and curb replacement programs should be expanded to include bikeways. Resurfacing: primary / arterial would repave bikeways within the road (striped bikeways, separated bikeways, bikeable shoulders, shared roads). The sidewalk & curb replacement program would repave bikeways outside of the road (trails, separated bikeways).

Justification: The quality of the bikeway surface degrades over time and needs to be resurfaced on occasion.

Lead Agency: Montgomery County Department of Transportation

Recommended New Bicycle-Supportive Programs

New bicycle-supportive programs are recommended in this section along with a justification statement for each recommendation.

3.1 BikeMontgomery Outreach Program



The BikeMontgomery Outreach Program encourages more people to bicycle in Montgomery County through community engagement and community building. Its efforts include organizing a Bicycle Ambassador program, maintaining an online bicycling forum, holding bicycling events, such as bike rodeos and thematic bike rides, and conducting tours of new bicycle infrastructure.

Justification: Similar programs, such as the DC Bike Ambassador program and BikeArlington, have helped to expand bicycling in their respective jurisdictions by encouraging communities that strongly support bicycling.

Lead Agency: Montgomery County Department of Transportation

3.2 Bicycle Master Plan Monitoring Report



The Bicycle Master Plan Monitoring Report is a biennial evaluation presented to the County Council. This future document would track the progress of advancing the Bicycle Master Plan's goals and objectives, and summarize new bicycle infrastructure and changes to county bicycling programs and policies. This report would also document available bicycle count data.

Justification: Provides transparent and accountable implementation of the Bicycle Master Plan. Similar monitoring reports are used to evaluate the implementation of plan recommendations for White Flint, the Great Seneca Science Corridor and Shady Grove.

Lead Agency: Montgomery County Planning Department

Supporting Agencies: Montgomery County Department of Transportation, Public Schools, Police Department

3.3 Neighborhood Greenway Program



The program implements the neighborhood greenways recommended in the Bicycle Master Plan. This effort includes marketing the community-wide benefits of neighborhood greenways and developing a toolkit of treatments. Barriers to implementing successful neighborhood greenways are assessed and remedied through legislative and regulatory means. The program oversees construction of the network, including wayfinding and integration into local maps.

Justification: Neighborhood greenways are a cost-effective way to providing low-stress bicycle networks through residential communities. The Tier 1 bikeways recommended in the prioritization section of this plan include neighborhood greenways that feed into seven Bicycle Pedestrian Priority Areas (Bethesda CBD, Friendship Heights CBD, Life Sciences Center, Silver Spring CBD, Wheaton CBD, White Flint and White Oak) and are recommended to be completed within five years of approval of this plan. The Montgomery County Department of Transportation will need additional funding to hire staff and construct these bikeways.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Planning Department

3.4 Bicycle Parking Program



The Bicycle Parking Program increases the supply of short-term and long-term bicycle parking, and replaces sub-standard bike racks with those that conform to industry standards. It will include a bicycle parking implementation plan focused on commercial areas, transit stations, schools, recreation centers, libraries, other public facilities and multi-family dwelling units. The program will maintain a geospatial inventory of public and private short-term and long-term bicycle parking, and a continuous assessment of bicycle parking shortages based on the analysis in Appendix F. Requests for bike racks in certain locations will be tracked through a website. County inspectors will be trained to ensure bicycle parking is installed correctly and coordinate bicycle valet parking for special events in the county. The program will be led by a bicycle parking coordinator.

Justification: Montgomery County has a shortage of bicycle parking, as shown in Appendix F. When people cannot park their bicycles, they are discouraged from bicycling for non-recreational trips. Providing additional bike parking will increase bicycling and will reduce theft and improper use of trees and other street infrastructure for bicycle parking.

Lead Agency: Montgomery County Department of Transportation

Supporting Agencies: Montgomery County Department of General Services, Department of Parks and Department of Permitting Services

3.5 Public School Bicycle Education



The Public School Bicycle Education program incorporates bicycle training and safety curricula into the Montgomery County public school system, including elementary, middle and high schools, similar to the program that the District of Columbia has implemented for second graders.

Justification: Many adults are deterred from bicycling because they did not learn how to ride a bicycle as a child or have not been educated in bicycle safety. Additionally, children are great advocates for supporting bicycling. Learning the rules of the road as children better prepares students to be safer drivers in the future.

Lead Agency: Montgomery County Public Schools

Supportive Agency: Montgomery County Department of Transportation, Police Department

3.6 Bicycle Facility Education



The Bicycle Facility Education program educates motorists, pedestrians and bicyclists on the safe use of new bike-ways. Among other benefits, this program would create public service announcements, provide information and conduct onsite trainings so that all roadway users know how to safely navigate new bicycle infrastructure.

Justification: Public outreach is needed to educate members of the public on the appropriate use of new forms of bicycle infrastructure. It will also educate pedestrians and motorists on how to interact with these new bikeways.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Police Department

3.7 Bicycle Count Program



The Bicycle Count Program conducts pre- and post-implementation studies of new bicycle infrastructure projects to track the frequency at which they are being used. Under this program, permanent bicycle counters are installed at key locations to track the growth of bicycling over time. Annual counts of bicyclists are collected at multiple locations and counts at locations of high crash rates are monitored. Data collected from this initiative will be posted online.

Justification: Enables a data-driven process that tracks bicycling trends in Montgomery County and provides a measure of exposure to support the county's Vision Zero program.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Department of Parks, Planning Department

3.8 Countywide Wayfinding Plan



The Countywide Wayfinding Plan directs bicyclists to major destinations, including commercial areas, transit stations and major public facilities, through signage and visual markers. This plan would identify key destinations, low-stress routes and a consistent, legible and branded protocol for communicating those elements to bicyclists. The plan will be updated every few years.

Justification: With an emerging bicycling network that is not fully connected, wayfinding is needed to direct bicyclists to low-stress bikeways.

Lead Agency: Montgomery County Department of Transportation

BICYCLE-SUPPORTIVE LEGAL AND POLICY FRAMEWORK

This section describes the existing and recommended bicycle-supportive laws, regulations and policies that have the greatest potential for advancing the goals of the Bicycle Master Plan. Each element in this framework is aligned with one or more goals of the Bicycle Master Plan, signified in the list below by the following symbols:

GOALS



Increase bicycling rates in Montgomery County.



Create a highly connected, convenient and low-stress bicycling network.



Provide equal access to low-stress bicycling for all members of the community.



Improve the safety of bicycling.

Summary of Bicycle-Supportive Legal and Policy Framework

This table summarizes the existing and recommended bicycle-supportive laws, regulations and policies recommend in this plan and identifies the Bicycle Master Plan goals supported by them.

PROGRAMS	GOAL 1: INCREASE BICYCLING RATES	GOAL 2: LOW-STRESS CONNECTIVITY	GOAL 3: EQUITY	GOAL 4: SAFETY
EXISTING LEGAL AND POLICY FRAMEWORK				
1.1 Vision Zero				X
1.2 Road Code Urban Areas	X	X		
1.3 Local Land Use Laws	X	X		
RECOMMENDED LAWS, REGULATIONS AND POLICIES				
Roadway Laws and Policies				
2.1 Authorize Lower Posted Speed Limits	X	X		X
2.2 Repeal the Mandatory Use Law				X
2.3 Conduct a "Rules of the Road" Assessment				X
2.4 Replace the State's Marked Bike Lane Policy	X			X
2.5 Develop a County Policy on E-Bikes	X			X
Roadway Laws and Policies				
2.6 Establish Level of Traffic Stress Targets	X			X
2.7 Update Context Sensitive Road Design Standards	X	X		X
2.8 Compare all Designed Projects to Best Practices	X	X		X
2.9 Make Separated Bikeways the Preferred Bikeway Facility	X	X		X
2.10 Make Protected Intersections the Preferred Intersection Type	X	X		X
2.11 Consolidate Driveways along Master-Planned Bikeways		X		X

PROGRAMS	GOAL 1: INCREASE BICYCLING RATES	GOAL 2: LOW-STRESS CONNECTIVITY	GOAL 3: EQUITY	GOAL 4: SAFETY
2.12 Develop a Shared Lane Marking Policy	X			X
2.13 Develop Bicycle Parking Standards for County Facilities	X	X		
2.14 Reassess Road Code Urban Area Boundaries	X			X
2.15 Develop Standards for Trail Crossings at Major Roads	X			X
Maintenance				
2.16 Develop Protocols for Bicycle Facility Closures and Detours	X			X
Other				
2.17 Establish Vision Zero Collision Review Team				X
2.18 Provide Open Access to Crash Data				X
2.19 Update the Zoning Code		X		
2.20 Revise the Bicycle to School Policy	X			

Existing Legal and Policy Framework

The following existing laws, regulations and policies have the greatest potential for advancing the goals of the Bicycle Master Plan.

1.1 Vision Zero



Montgomery County has adopted a policy of zero transportation-related fatalities and serious injuries by 2030. To move toward that vision, the county has released a two-year Vision Zero action plan that includes a set of activities to be undertaken. A 10-year action plan is expected to be released in late 2019. Specific Vision Zero items related to this master plan include evaluating trail crossings and intersections, expanding the low-stress bicycling network and updating county road design standards, among others.

Lead Agency: Montgomery County Department of Transportation

1.2 Urban Road Code Areas



The Montgomery County Code specifies maximum standards for lane widths (10 to 11 feet) and curb radii (15 feet) on urban roads, as well as speed limits when they are not already predetermined in a specific master plan. Narrower streets and curb radii improve bicycling by slowing the speed of traffic and by providing space for bikeways. Lower speed limits create a lower-stress environment for bicyclists and pedestrians.

Lead Agency: Montgomery County Department of Transportation

1.3 Local Land Use Laws



The Maryland-National Capital Park and Planning Commission (M-NCPPC) reviews all development proposals and site plans for consistency with master plans and zoning code requirements. Property owners may be required to dedicate land for transportation facilities, construct bikeways on the site and along the frontage of the property, and/or provide bicycle parking, showers and changing facilities.

Lead Agency: Montgomery County Planning Department

Recommended Laws, Regulations and Policies

The following new bicycle-supportive laws, regulations and policies are likely to have the greatest effect on advancing the goals of the Bicycle Master Plan.

2.1 Authorize Lower Posted Speed Limits



Petition the Maryland General Assembly to lower the default speed limit to 25 mph on all highways in a business district and undivided highways in a residential district in Montgomery County. Reduce the lowest possible speed limit to 10 mph on shared streets and 15 mph on neighborhood greenways in Montgomery County.

Justification: Lower automobile speeds reduce both the number of crashes by increasing the likelihood that motorists will successfully yield at conflict points and lessen the severity of crashes.

Lead Agencies: Montgomery County Government

2.2 Repeal the Mandatory Use Law



Advocate for the repeal of Section 21-1205.1(b)(2) of the Maryland Code's Transportation Article, which requires bicyclists to ride in marked bicycle lanes.

Justification: There is a legacy of poor bicycle lane design in Montgomery County (and much of the country), including narrow bicycle lanes, bicycle lanes that end short of intersections and bicycle lanes that are placed to the right of right-turning traffic. Until safe bicycle facilities are ubiquitous in Montgomery County, bicyclists should have the right to decide where it is safe to bicycle.

Lead Agencies: Montgomery County Government

2.3 Conduct a "Rules of the Road" Assessment



Conduct an analysis of state and county laws, policies and regulations to identify gaps and inconsistencies in the legal framework supporting bicycling. Address those gaps and inconsistencies through changes to legislation, policies and regulations.

Justification: State and county laws, policies and regulations are unclear and often inconsistent.

Lead Agencies: Montgomery County Department of Transportation, Planning Department and Police Department, and Maryland State Highway Administration

2.4 Replace the State's Marked Bike Lane Policy



Pursue replacement of the Maryland State Highway Administration's marked bike lane policy with one that is consistent with achieving a low-stress bicycling network.

Justification: The state's marked bike lane policy⁷ requires that all road projects involving widening or new construction include the installation of conventional bike lanes. In addition, the policy considers installing conventional bike lanes as part of all activities that disturb the paved roadway area, disturb the adjacent curb or adjust lane striping. **While conventional bike lanes are appropriate in some locations, they are a poor use of the public right-of-way when implemented on roads with four or more lanes of traffic, a 30 mph or faster posted speed limit, or a road that is traveled by more than 6,000 vehicles per day, because few people will be comfortable using them.** In many instances, a sidepath or separated bike lane would be the more appropriate, less stressful facility. Additional flexibility in design is needed with the marked bike lane policy.

Lead Agencies: Montgomery County Government

2.5 Develop a County Policy on E-Bikes



Electric bicycles (e-bikes) are the fastest growing market for bicycles in the United States and a consistent policy regarding this type of transportation is needed in Montgomery County.

Justification: E-bikes make bicycling a viable transportation option for more people, reduce barriers for people who travel longer distances, carry heavy loads or passengers, or face other challenges that might preclude using a traditional bicycle to make a trip. At the same time, e-bikes also raise fears among some people that trails and other bike-ways will become speedways. Currently, e-bikes are not permitted on county park trails, but are permitted on National Park Service trails and other shared use paths. The updated policy should establish context-sensitive regulations that are intuitive and consistent.

Lead Agencies: Montgomery County Government

2.6 Establish Level of Traffic Stress Targets



Establish Level of Traffic Stress targets, including a "low" level of traffic stress countywide and a "very low" level of traffic stress within the vicinity of schools, libraries, parks and recreation centers on all roads where it is legal to ride a bicycle.

Justification: A "low" level of traffic stress is appropriate for most adults and a "very low" level of traffic stress is appropriate for most children.

Lead Agencies: Montgomery County Department of Transportation, Planning Department

⁷ Bicycle Policy & Design Guidelines, Maryland State Highway Administration, January 2015.

2.7 Update Context-Sensitive Road Design Standards



Montgomery County's context-sensitive road design standards need to be updated to include all bicycle facility types outlined in the Bicycle Facility Toolkit in Appendix B. These types include separated bike lanes, buffered bike lanes, advisory bike lanes, neighborhood greenways, shared streets and protected intersections. Obsolete bikeways, such as wide outside lanes, should be removed from the standards. Out-of-date bikeway applications, including conventional bike lanes on major highways, arterials and minor arterials, should likewise be removed from the standards.

Justification: Montgomery County road design standards are inconsistent with the recommendations in this plan.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Planning Department

2.8 Compare all Designed Projects to Best Practices



Several capital projects that include bicycle and pedestrian elements were designed years ago and do not reflect best practices. These efforts include the Falls Road and Seven Locks Road Hiker / Biker projects. The Montgomery County Department of Transportation should review and upgrade the design for bikeway projects that have been designed, but have not yet been implemented. The agency should compare current designs to best practices for bikeways.

Justification: Many capital projects with bicycle elements have completed designs that no longer reflect best practices. Montgomery County should revisit these designs rather than proceed with projects that will need to be upgraded later at a higher cost.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Planning Department

2.9 Make Separated Bikeways the Preferred Bikeway Facility



Establish separated bikeways (separated bike lanes and sidepaths) as the preferred bicycle facility classification in Montgomery County's context-sensitive road design standards. This classification applies to roads with four or more lanes of traffic, traffic speeds of 30 mph or faster, with traffic volumes anticipated to exceed 6,000 vehicles per day and on commercial streets with on-street parking.

Justification: Separated bikeways, including separated bike lanes and sidepaths, encourage bicycling on roads with high traffic volumes, high speeds and in commercial areas.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Planning Department

2.10 Make Protected Intersections the Preferred Intersection Type



Revise Montgomery County's context-sensitive road design standards to make protected intersections the preferred type of intersection treatment at all intersections where at least one street is recommended to have a sidepath, separated bike lane, buffered bike lane or conventional bike lane.

Justification: Protected intersections improve safety for all modes of transportation by slowing traffic and consolidating conflicts to a single point so that remaining minimal conflicts can be mitigated.

Lead Agency: Montgomery County Department of Transportation

Supporting Agency: Montgomery County Planning Department

2.11 Consolidate Driveways along Master-Planned Bikeways

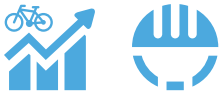


Develop policies to encourage greater consolidation of driveways as part of facility planning and development approvals along master-planned bikeways.

Justification: Driveways create a conflict area between bicyclists and motorists, and stronger policies are needed to require greater driveway consolidation.

Lead Agency: Montgomery County Government

2.12 Develop a Shared Lane Marking Policy



Develop a policy for the use of shared lane markings, also known as sharrows, that indicates when these pavement markings are appropriate. This policy could include low-volume and low-speed streets, such as neighborhood greenways, where sharrows reinforce bicyclists' right to bicycle in the center of the lane and can serve a wayfinding function.

Additionally, the sharrow policy could also be used on an interim basis on streets that are master-planned for other bicycle facilities and serve a critical network function in connecting major destinations, but where implementation of the master-planned bicycle facility may take several years to be completed.

Justification: Montgomery County does not have a policy that specifies when it is appropriate to use shared lane markings. The current implementation of sharrows is confusing to both motorists and bicyclists, as it is not uniformly applied throughout the county.

Lead Agency: Montgomery County Department of Transportation

2.13 Develop Bicycle Parking Standards for County Facilities



Establish short-term bicycle rack standards for use at county facilities based on those outlined in the Association of Pedestrian and Bicycle Professionals *Bicycle Parking Guidelines, 2nd Edition*.

Justification: Public buildings should model best practices in the use of bicycling parking. However, Montgomery County continues to install substandard short-term bicycle parking racks at county facilities.

Lead Agency: Montgomery County Department of General Services

2.14 Reassess Road Code Urban Area Boundaries



The road code urban area designation, identified through master plans and County Council resolution, reduces the design speed of roads by narrowing traffic lanes and reducing turning radii and speed limits. Assess the existing road code urban area boundaries to determine if additional areas should be classified as urban based on existing zoning and proximity to major existing and planned transit stations.

Justification: There are several areas in Montgomery County that are not currently designated as urban, even though they are governed by mixed-use or high density residential zoning that will likely generate high levels of walking and bicycling. Over time, designating additional areas as urban will help to encourage more walking and bicycling, as narrower traffic lanes and slower speeds create a safer and more comfortable walking and bicycling environment. Narrowing traffic lanes can also provide additional space for bicycle and pedestrian infrastructure.

Lead Agency: Montgomery County Planning Department

2.15 Develop Standards for Trail Crossings at Major Roads



Establish a policy of improving trail crossings of roads with three or more lanes of traffic or a posted speed limit of 30 mph or greater. Improvements to trail crossings could be made in a variety of ways, including:

- Traffic calming that removes traffic lanes and / or reduces the design speed of the road,
- Reducing conflicts by realigning the trail to an existing signalized intersection, providing a grade separated crossing, or adding new traffic signalization, and / or
- Other improvements that increase the safety and comfort of the crossing.

Justification: The low-stress bicycling experience that trails provide is interrupted where trails cross high speed or multilane roads.

Lead Agencies: Montgomery County Department of Transportation, Department of Parks

Supporting Agency: Montgomery County Planning Department

2.16 Develop Protocols for Bicycle Facility Closures and Detours



Develop a protocol for bikeway closures and detours to ensure that comparable bikeways are provided to the extent possible, adequate signing is supplied to communicate the detour to bicyclists and the public is given adequate notice of the detour. When a public right-of-way occupancy permit authorizes blockage of a sidewalk or bikeway, the holder of the permit should be required to provide safe accommodation for pedestrians and bicyclists using the same traffic control practices that would be applied when a motor vehicle lane is closed.

Justification: Adequate bicycle and pedestrian facilities should be maintained when bikeway and pedestrian closures and detours are needed.

Lead Agency: Montgomery County Department of Transportation

2.17 Establish Vision Zero Collision Review Team



Form a multi-disciplinary, multi-agency collision review team to analyze and respond to every fatal crash in Montgomery County. This team should identify the causes of the fatality and recommend appropriate street design changes, policy changes and other actions. The team should monitor whether the changes have been addressed, determine the causes of the fatality and recommend additional changes if the causes have not been sufficiently addressed. A publicly available report should be issued for every fatal crash.

Justification: A multi-disciplinary team is needed to identify the causes of a fatal crash, including failure to follow the rules of the road and road design. This team is also recommended in the Vision Zero Two-Year Action Plan.

Lead Agency: Montgomery County Department of Transportation, CountyStat, Maryland State Highway Administration, Montgomery County Planning Department

2.18 Provide Open Access to Crash Data



Publish online, once per quarter, the following data related to each fatal and serious injury crash that occurred in the preceding quarter, including:

- Date and time of the crash.
- Type of motor vehicle or motor vehicles involved in the crash.
- Location and coordinates of the crash.
- Number of fatalities or injuries that result from the crash, disaggregated by fatality or serious injury and mode of transportation.
- Available demographic information about the person or persons involved in the crash.
- Human factors that contributed to the crash, such as intoxication, inattention or distraction, speeding or failure to yield.
- Road design factors, such as infrequently spaced safe crossings, road design speed, number of lanes, etc.

Justification: Accurate, complete, and accessible data will help Montgomery County implement its Vision Zero initiative by identifying high priority locations for safety improvements, analyzing the impacts of street design features, creating more accurate benchmarks for measuring safety improvements over time, promoting transparency and ensuring the public's ready access to important safety information. This data is also recommended in the Vision Zero Two-Year Action Plan.

Lead Agency: Montgomery County Police Department, CountyStat

2.19 Update the Zoning Code



Amend the Montgomery County Zoning Ordinance to improve the bicycle parking and end-of-trip bicycle facility requirements.

Justification: While the zoning code revisions in 2014 introduced major improvements for the provision of bicycle parking, showers and changing rooms, additional updates are needed to clarify existing requirements and to meet industry best practices, including requirements to:

- Incentivize bicycle rooms as the preferred form of long-term bicycle parking in residential and commercial buildings.
- Disallow bicycle lockers and bicycle racks as long-term bicycle parking in residential and commercial buildings.
- Identify performance standards for stacked bike racks.
- Provide repair station requirements in the long-term bicycle parking section of the code.
- Provide a portion of long-term bicycle parking to accommodate larger bicycles, including tandems, bicycles with trailers and cargo bikes.

Justification: Higher-quality bicycle parking encourages more bicycling.

Lead Agency: Montgomery County Planning Department

2.20 Revise the Bicycle to School Policy



Description: Develop a countywide policy that permits children to bicycle to school.

Justification: School principals retain the authority to determine when students can bicycle to school and many prohibit bicycling due to safety concerns.

Lead Agency: Montgomery County Public Schools



*Photo: Lynn Ho
Best Family Picture
Bicycle Master Plan Photo Contest*

