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INTRODUCTION
This memorandum provides recommendations for improving conditions for bicycling and walking in the City of Greenbelt. The memorandum is divided into three sections: General Recommendations, Pedestrian Recommendations, and Bicycling Recommendations. It also includes two appendices. Appendix A includes recommendations and conceptual designs for high-priority corridors identified by the APB. Appendix B provides an overview of design principles.

Although pedestrian recommendations and bicycle recommendations are presented separately, it is important to recognize that recommendations primarily aimed at bicyclists may also have significant benefits for pedestrians and vice versa. For example, installation of a bicycle lane or shared lane marking may benefit pedestrians by calming traffic. Likewise, curb ramps and crosswalks benefit cyclists by improving accessibility at intersections.

The Pedestrian Recommendations and Bicycling Recommendations sections are subdivided into general recommendations and location-specific recommendations. The location-specific recommendations provided in the Pedestrian Recommendations and Bicycle Recommendations sections are presented in both tabular and map formats. These formats are linked by the “Map Key” number; that is, the numbers on the map correspond to the numbers in the “Map Key” field on the table. The tabular format includes fields for criteria that may be used by the city to help prioritize recommendations. The fields include:

- **Stakeholder priority.** This field represents an outcome from the public/stakeholder meeting held in May 2009, i.e. a list of priority issues for accessibility, bicycling, and walking in the City of Greenbelt. Attendees were asked to develop lists of priority issues and then “vote” for the issues they cared about most as a way of identifying the “highest priority” priorities. If a recommendation relates to an issue identified through this process, the number of votes it received is indicated in the “stakeholder priority” field. If the issue was identified but received zero votes, a “0” was entered in this field.

- **Web comments.** This field represents public input gathered through the CommunityWalk website. Visitors to the site were asked to indicate on CommunityWalk the locations of issues and suggested improvements for both pedestrians and bicyclists, for pedestrians only, or for bicyclists only. The CommunityWalk website was viewed more than 400 times before it was transferred over to the city. During that time more than 80 comments, 120 location markers, and 30 paths were added to the map by visitors to the site. If a recommendation relates to an issue identified through this process, the number of comments made on it, including the initial description of the issue or recommended improvement is indicated in the “web comments” field.

- **Identified in previous planning process.** If a recommendation included in this memorandum relates to a recommendation or issue identified through a previous planning processes, that planning process is indicated here. (Note: A comprehensive review of planning processes addressing bicycle and pedestrian conditions in the City of Greenbelt was not possible due to the constraints of this project. We recommend that city staff review and supplement the information in this category before using it for prioritization.)

- **Facilitates access to key destination.** This field indicates whether a particular recommendation would improve access to a key destination either by improving an important route to that destination or by improving an immediate access point. Key destinations include:
  - Roosevelt Center
  - Greenway Center Plaza/ MD Trade Center
• Beltway Plaza/ Greenbelt Road Business District
• Capital Office Park
• Golden Triangle
• Post Office
• NASA Goddard Space Flight Center
• Beltsville Agricultural Research Center
• Schrom Hills Park
• Greenbelt National Park
• Northway Fields
• Buddy Attick Park
• Lake Artemesia
• University of Maryland

• **Facilitates access to school.** This field indicates whether a particular recommendation would improve access to a school either by improving an important bicycle route to the school or by improving an immediate access point. Schools include:
  • Eleanor Roosevelt High School
  • Greenbelt Middle School
  • Greenbelt Elementary School
  • Spring Hill Lake Elementary School

• **Facilitates access to transit hub.** This field indicates whether a particular recommendation would improve access to a transit hub either by improving an important route to the transit hub or by improving an immediate access point. Transit hubs include:
  • Greenbelt Metro Station
  • Roosevelt Center bus stop on Crescent Road
  • Greenway Center Plaza bus stop on Greenbelt Road
  • Beltway Plaza bus stop on Cherrywood Lane

• **Ownership.** This field attempts to identify the owner of the property where the recommended improvements would be located based on tax records made available through PGAtlas. (Note: We recommend this information be verified by city staff prior to using this category for prioritization.)

• **Neighborhood.** This field indicates whether a project proposed in a recommendation would be located in East Greenbelt (EGB), Old Greenbelt (OGB), West Greenbelt (WGB), or not in Greenbelt (NIGB).

Additional criteria the city may wish to consider include:

• How well a recommended improvement fits with the city’s long-term vision;
• How well a recommended improvement fits with the city’s transportation goals; and
• Whether the recommended improvement improves safety and comfort for bicyclists and pedestrians.
Considerations for Proposed Recommendations
The TLC program has an emphasis on providing conceptual approaches that can be replicated region-wide, rather than detailed design improvements for a specific situation. Therefore it should be understood that all proposed changes would require additional detailed design and engineering analysis to develop final plans for each recommendation.

Furthermore, proposed changes may require review and approval agencies outside the City of Greenbelt, including the Maryland State Highway Administration, National Park Service, Prince George’s County Department of Public Works and Transportation, and in certain cases private landowners. Any changes that impact transit stops would require additional coordination with the affected transit agencies, including the Washington Metropolitan Transit Authority (WMATA), Prince George’s County Department of Public Works and Transportation (The Bus), University of Maryland Department of Transportation Services, and the city’s own Greenbelt Connection bus service.
GENERAL RECOMMENDATIONS

The city should establish a long-range vision that prioritizes pedestrian and bicycle travel and establishes specific goals for improving conditions for bicycling and walking.

It is important that bicycling and walking be integrated into an overall vision for the city with specific goals for improving bicycling and walking conditions. Otherwise pedestrian and bicycle issues may not receive the attention they require to effectuate change over the long-term, and connections between bicycling and walking goals and other city priorities may go unrecognized.

The city should incorporate the following principles as the foundation of plans and projects related to the bicycle and pedestrian environment.

The following principles should be incorporated as the foundation of plans and projects related to the bicycle and pedestrian environment. Many of these principles go beyond the realm of responsibility of the City of Greenbelt, and will require coordination with Maryland State Highway Administration, Prince George’s County, Washington Metropolitan Area Transit Authority, Maryland National Capital Park and Planning Commission, and private landowners.

- The street environment should be safe for pedestrians, bicyclists and vehicles
  
  Sidewalks and street crossings should be free of hazards and should minimize conflicts with vehicular traffic. The need to accommodate vehicular traffic flow should be balanced with the need to provide for other users, including pedestrians and bicyclists. Street design policy should reflect this balance.

  On-road bicycle facilities and off-road shared use paths should be free of debris, poor quality pavement, and other defects that impair safe and comfortable bicycling.

- The pedestrian and bicycle network should be accessible to all
  
  Sidewalks and street crossings should provide access for all people, regardless of their physical abilities. Universal design is the foundation for all pedestrian design.

  Appropriate bicycle facilities should be provided for riders of all skill levels, from daily commuters to novice bicyclists and younger riders. This means a system of on-road bike lanes, shared lane markings, side paths and shared use paths that connect to all parts of the City.

- The bicycle and pedestrian network should be easy to use, and should provide direct connections to destinations
  
  The bicycle and pedestrian network should provide continuous and direct connections between destinations, including homes, schools, shopping areas, public services, work places, recreational opportunities and transit. Sidewalks and street crossings should be designed so people can easily find a direct route to a destination, and delays are minimized. Bicycle friendly routes should carry riders to destinations throughout Greenbelt and beyond, and encourage more people to travel by bicycle for short trips.

- The street environment should feel comfortable and inviting to pedestrians and bicyclists
  
  The streetscape should be active and interesting, and good design should enhance the comfort and appeal of the pedestrian and bicycle environment. Consideration should be given to separating pedestrians from vehicular traffic by the use of street trees and other measures. Street trees should provide shade — a critical element for walking trips that are made during the warmer months. An ideal pedestrian environment might also offer resting places and visual elements (such as special paving, street furnishings) that provide a sense of place.
The city should conduct a travel survey to collect additional information on citizen travel patterns and priorities.

Although the public input process pursued through this project produced valuable information on desired connections, barriers to bicycle and pedestrian travel and potential improvements in the City of Greenbelt, additional information is needed to help the city better understand citizen priorities and the effect of planned policy changes and infrastructure investments on citizen travel patterns. Conducting travel surveys at regular intervals could help the city understand such issues better, inform future planning efforts, and help the city evaluate the effects of policy changes and infrastructure investments.

The city should establish a convenient way for citizens to report deficiencies in the bicycle and pedestrian network, for example, through a web page and/or hotline designed to accommodate such reports.

Collecting data on deficiencies in the bicycle and pedestrian network could help guide both long-term planning and routine maintenance and upgrades. Types of data that might be collected include:

- Crashes involving pedestrians and bicyclists
- Locations where the surface quality of pedestrian and bicycle facilities is degraded
- Locations where bicycle and pedestrian facilities are obstructed by debris, vegetation, trash cans, motor vehicles, etc.
- Locations where bicycle parking is needed
- Bicycle thefts

The Community Walk website used in the initial phases of this project could readily be adapted to fulfill this function. Other examples of online include the Pittsburgh Bike Map (http://www.bike-pgh.org/onlinemap2/crashes.php#c=4114;sb=created;desc;p=0;k=) that allows users to report crashes.

The city should ensure that provisions in the Metro Station Development Agreement that would benefit pedestrians and bicyclists are implemented when the North Core and South Core projects around the Greenbelt Metro Station are ultimately developed.

There are numerous provisions in the Metro Station Development Agreement that would benefit bicyclists and pedestrians, including those living within the developments themselves and those living without but wishing to access key destinations such as the Greenbelt Metro Station, Beltway Plaza, Lake Artemesia, and the University of Maryland. Key provisions include:

- Sidewalks on both sides of all proposed and existing roads.
- A wide sidewalk or multi-use trail along the west side of Cherrywood Lane.
- A trail extension from the Cherrywood/Spring Hill Drive intersection connecting to the north core and Greenbelt Metro Station.
- A network of multi-use trails in the south core connecting to a proposed north-south connector road and to Cherrywood Lane and Breezewood Drive opposite Breezewood Drive.
- A pedestrian connection from the proposed north-south connector road to the Greenbelt Metro Station.
- A pedestrian-only promenade integrated with and connecting commercial buildings in the South Core.
The city should commission a wayfinding study to determine where maps, signs, markers, and other wayfinding aids are needed.

With its curvilinear roads and paths, pod-like neighborhoods, limited access roads and other natural and man-made barriers, Greenbelt’s bicycle and pedestrian networks are difficult for users to understand intuitively. To help address this situation, the city should consider undertaking a wayfinding study to determine where maps, signs, markers, kiosks, and other wayfinding aids should be installed. Strategic locations include places where trails come together, bicycle routes cross, or important connections can be made. Wayfinding devices should guide users toward key destinations, such as shopping centers, transit hubs, schools, and parks. A system of named bicycle and pedestrian routes might also assist with wayfinding.

Specific location and treatment recommendations are beyond the scope of this project. However, areas where wayfinding improvements appear to be needed based on public input and targeted fieldwork include:

- Gardenway from Roosevelt Center to pedestrian bridge (directions to Roosevelt Center/Greenway Center Plaza)
- Pedestrian bridge to Hanover Parkway (directions to Roosevelt Center/Greenway Center Plaza/Eleanor Roosevelt High School/NASA Goddard Space Flight Center/Schrom Hills Park)
- Crescent Road from Roosevelt Center to Kenilworth Avenue (directions to Greenbelt Metro Station/Roosevelt Center)
- Intersection of Crescent Road and Kenilworth Avenue at path (directions to Greenbelt Metro Station/Roosevelt Center)
- Intersection of Service Road and Ivy Lane (directions to Greenbelt Metro Station/Roosevelt Center)
- Intersection of Ivy Lane and Greenbelt Metro Drive (directions to Greenbelt Metro Station/Roosevelt Center)
- Intersection of Hanover Parkway and shared-use path south of intersection with Greenbrook Drive (directions to Schrom Hills Park)
- Intersection of Ora Glen Drive and Greenbrook Drive (directions to Schrom Hills Park)
- Intersection of Greenbrook Drive and Winterwood Place (directions to Schrom Hills Park)
- Intersection of Winterwood Place and shared-use path to Schrom Hills Park (directions to Schrom Hills Park)

Additional guidance on wayfinding is provided in Appendix B.

The city should coordinate with Prince George’s County to amend the county zoning code and other development requirements to ensure safer, more comfortable, and more convenient bicycle and pedestrian access and accommodations for new and renovated commercial and retail facilities. The city also should consider providing incentives to owners of commercial and retail properties for improving bicycle and pedestrian access and accommodations.

Greenway Center Plaza and Beltway Plaza are within walking and biking distance for most Greenbelt residents, yet it appears that relatively few choose to bike and walk to these destinations. Those that do report a lack of pedestrian and bicycle facilities along convenient access routes and concern about potential conflicts with vehicular traffic. Barriers to bicycle and pedestrian access have also been noted at Roosevelt Center, including missing sidewalks, a lack of secure bicycle parking and conflicts with motor vehicles.
Greenway Center Plaza and Beltway Plaza were built to standards and codes that prioritize motor vehicle access over access by other modes. There are few connections between the internal sidewalk systems and the surrounding pedestrian network, including sidewalks and transit stops. Furthermore, pedestrians walking to and from their cars are generally required to walk in the drive aisle next to moving vehicles or behind parked cars.

Roosevelt Center was built with the idea that pedestrians and bicyclists would access it primarily through grade separated crossings. For many residents, the existing grade separated crossings are sufficient. However, some people (including bus riders) must access the center from Centerway and there are no convenient accessible pathways. Many people simply walk down the grassy slope from the bus stop to the frontage road, as is evidenced by worn path in the area. However, those who are unable to use this route must travel down the frontage road, often within the vehicle travel lane, to make the connection.

Ensuring that future development results in a pattern that better accommodates bicyclists and pedestrian will require updating standards and codes at the city and county level, and providing incentives to property owners to make changes prior to redevelopment.

A detailed set of recommendations for Roosevelt Center, Greenway Center Plaza, and Beltway Plaza is beyond the scope of this memorandum. However, locations where pedestrian and bicycle accessibility improvements appear to be needed based on public input and targeted fieldwork, along associated recommendations for these locations, include:

Roosevelt Center

Intersection of Crescent Road and Gardenway/Centerway
- Install ADA-compliant curb ramps and high-visibility crosswalks for pedestrians crossing to/from Roosevelt Center on the south and west sides of this intersection.

Centerway between intersection of Crescent Road and Gardenway/Centerway and pedestrian underpass entrance
- Install sidewalk from southwest corner of Crescent road/Gardenway/Centerway intersection to exit of pedestrian underpass. Install pervious surface path from new sidewalk to bus stop on Crescent to facilitate transit access.
- Work with Domino’s owners and law enforcement to ensure that the sidewalk in front of Dominos is not blocked by vehicles.
- Work with Domino’s and waste management service to relocate dumpster to back side of building.

Greenbelt Public Library vicinity
- Install high-visibility crosswalk at parking lot exit. Reposition stop bar, so exiting vehicles are prompted to stop in advance of crosswalk.
- Install bicycle racks on east side of building at main entrance. Replace bicycle racks on north side of building.
Greenway Center Plaza

Greenbelt Road access drive
- Stripe high-visibility crosswalks across access road and access road ramps at intersection with Greenbelt Road. Install pedestrian signals to guide pedestrians crossing the access road.
- Define accessible pedestrian pathway parallel to access drive at Greenway Center Plaza from the internal sidewalk network to sidewalks running along the periphery.

Greenbelt Road and Hanover Parkway
Upon request by the client, the consultant developed a concept plan for significant modifications to this area. Modifications include:
- Converting the outside vehicle travel lanes on Hanover Parkway (Greenbelt Road to Ora Glenn Drive) to buffered bicycle lanes.
- Reconfiguring the slip lanes to reduce vehicle speeds and enhance pedestrian safety.
- Installing raised crosswalks to further vehicle speeds and reduce yielding for pedestrians at crosswalk.
- Installing high visibility pedestrian crossings on all legs of the intersection, including the east leg, where a marked crosswalk is currently lacking.

See Appendix A for additional detail.

From intersection of Hanover Parkway and Ora Glenn Drive to north side of Greenway Center Plaza
- Define accessible pedestrian pathway, possibly through plaza near Pier 1 imports.

Bus stop across Greenbelt Road from Greenway Plaza
- Work with WMATA and Greenway Center Plaza LLC to reroute westbound Greenbelt buses, so that they enter Greenway Plaza and drop passengers off in a safe and accessible location as close as possible to stores.

Multiple locations
- Install additional bicycle racks.

Beltway Plaza

Intersection of Cherrywood Lane and Giant parking lot
Upon request by the client, the consultant developed a concept plan for significant modifications to this area. Modifications include:
- Moving the bus stop crosswalk to the south side of the bus stop to accommodate the pedestrian desire line.
- Signalizing the intersection of formed by parking lot exits and Cherrywood Lane to create more predictable traffic movements.
- Providing a bicycle connection (shared lane markings or bicycle lane) between Breezewood Drive and Greenbelt Road.

See Appendix A for additional detail.
Intersection of Breezeway Drive and Cherrywood Terrace

- Define accessible pathway from marked crosswalk to parking lot on north side of Breezeway Drive. The existing pathway includes stairs.

Intersection of apartment complex parking lot driveway and Breezewood Drive (approximately 300 feet east of intersection of Breezeway Drive and Cherrywood Terrace)

- Stripe high-visibility crosswalk across Breezewood Drive connecting existing curb ramps.

Multiple locations

- Install additional bicycle racks.

These recommendations are also included in the location-specific recommendations tables in the Pedestrian Recommendations section and Bicycling Recommendations section. Design considerations for providing pedestrian and bicycle access to shopping centers are included in Appendix B.

The city should work with the Maryland State Highway Administration to transform Greenbelt Road into a “livable street” that accommodates motorists, bicyclists, pedestrians and transit riders safely and comfortably.

Greenbelt Road is the thread that ties the city together. It is the only road that connects all of Greenbelt’s neighborhoods and the fastest and most direct route to many of its key destinations. Yet, despite its paramount strategic importance for pedestrian and bicycle travel, Greenbelt Road is extremely uncomfortable to navigate by these modes. As a result, people who might otherwise travel by foot and bike choose instead to travel by motor vehicle, contributing to traffic congestion, air pollution, obesity levels, and other ills. In order to create a safer and more comfortable environment for pedestrians and bicycles on Greenbelt Road, we recommend the following:

- Provide continuous, dedicated pedestrian and bicycle facilities along the entire length of Greenbelt Road through the city.
- Slow vehicular speeds both on Greenbelt Road itself and at points where cross-streets and highway on- and –off ramps intersect Greenbelt Road.
- Minimize conflict points through access management.
- Improve the safety and convenience of pedestrian crossings by shortening crossing distances, improving pedestrian visibility, and providing additional crossing opportunities.
- Adjust pedestrian signal timing to ensure adequate crossing time to pedestrians of all abilities. Consider leading pedestrian intervals to increase pedestrian visibility and reduce conflicts between pedestrians and turning vehicles.
- Pursue streetscape enhancements to improve pedestrian and bicyclist comfort. Create buffers to separate vehicular traffic from pedestrian and bicycle traffic. Install trees to provide shade and additional protection from motor vehicles.

Additional guidelines for creating a “livable street” are provided in Appendix B.
Pedestrian Recommendations

General Recommendations

Slow vehicular speeds and improve visibility at locations where paths intersect streets.

The City of Greenbelt is blessed with an abundance of off-street paths; however, locations where paths intersect streets are difficult to see and predict. Visibility and predictability are especially important at mid-block crossing locations, because drivers are unaccustomed to pedestrians crossing at mid-block and are, therefore, less likely to look for and see them or slow in anticipation of their presence. The inconspicuousness of path/street crossings also detracts from awareness of the pathway system.

Residents and visitors whose experience of Greenbelt is largely shaped by what they see from the street may not know that paths exist in certain locations, because they are not visible from the road.

To improve the visibility and predictability of path/street crossings:

- Mark with high-visibility crosswalks, side-of-street pedestrian crossing signs, and in-street pedestrian crossing signs (where sufficient width is available).
- Install curb extensions. Curb extensions would not only enhance the visibility of pedestrians at these crossings but would also slow vehicular speeds, shorten pedestrian crossing distances, and prevent parked vehicles from blocking path entrance and exit points. Where paths intersect sidewalks and streets, and there is no buffer between sidewalk and street, curb extensions could provide enough space for ADA-compliant curb ramps. Otherwise, curb ramps tend to undermine the accessibility of sidewalks by creating vertical discontinuities in the sidewalk that are difficult for visually-impaired pedestrians to predict and mobility-impaired pedestrians to navigate. An example of this condition occurs on Southway between Ridge Road and Crescent Road.

- Install raised crosswalks at path/street crossings children frequent, such as near schools and playgrounds, or at other locations where traffic calming is needed. Raised crosswalks improve pedestrian visibility by elevating pedestrians in motorists’ field of view. This is particularly needed in the case of crossing children, because children are shorter than adults and more difficult to see in the road. Raised crosswalks impact vehicular speeds and volumes in ways similar to speed humps, except that the vertical deflection of a raised crosswalk directly corresponds to the crossing itself. Speed humps are generally less effective at improving pedestrian safety at crossings, because drivers tend to increase speeds between humps to make up for lost time. Raised crosswalks also prevent vehicles from encroaching on the crosswalk and eliminate the need for curb ramps at crossings, which improves access for people with mobility impairments and increases the sidewalk area available to pedestrians waiting to cross the street.

Design guidelines for curb extensions and mid-block crossings are provided in Appendix B.

The city should conduct a study to determine where parking prohibitions may be needed in order to provide good visibility at street intersections and mid-block crossings.

Parked cars can make it difficult for pedestrians and drivers to see each other at mid-block crossings and street intersections. To improve visibility at these locations, the city should conduct a study to determine where parking prohibitions may be needed. Example guidelines are provided in Appendix B.

The city should develop a plan to ensure that new and existing sidewalks, paths, curb ramps, pedestrian crossings, and other pedestrian facilities meet the draft Public Rights-of-Way Accessibility Guidelines (PROWAG).
In the years since the Americans with Disabilities Act was passed, communities have increased mobility and the overall quality of life for people with disabilities through a more accessible pedestrian network. People with mobility impairments include those who use wheelchairs, crutches, canes, walkers, orthotics, and prosthetic limbs. However, there are many people with mobility impairments who do not use assistive devices. Characteristics common to people with mobility limitations include substantially altered space requirements to accommodate assistive device use, difficulty negotiating soft surfaces, and difficulty negotiating surfaces that are not level.

The draft PROWAG was developed by the U.S. Access Board’s Public Rights-of-Way Advisory Committee to define how the Americans with Disabilities Act applies to public rights-of-way. The draft guidelines clarify and expand upon the Americans with Disabilities Act Accessibility Guidelines (ADAAG), which focus on the accessibility of buildings and facilities. A notice published by the U.S. Department of Transportation in 2006 notes that the PROWAG guidelines are not standards until formally adopted by the U.S. Department of Transportation and the U.S. Department of Justice; however, they represent “the state of the practice that could be followed for areas not fully addressed by the present ADAAG standards.”

PROWAG establishes guidelines for:

- Pedestrian access routes
- Pedestrian crossings
- Curb ramps and blended transitions
- Accessible pedestrian signals
- Protruding objects
- Pedestrian signs
- Detectable warning surfaces

The city should conduct a thorough analysis of existing pedestrian facilities to determine where improvements are needed and then develop a plan for implementing them. Issues identified through the public input process and targeted fieldwork include:

- Missing or non-compliant curb ramps
- Uneven surfaces on paths and sidewalks
- Vegetation obstructing paths and sidewalks
- Lack of accessible pedestrian signals

The draft PROWAG is available online at: [http://www.access-board.gov/prowac/draft.htm](http://www.access-board.gov/prowac/draft.htm).

The city should review pedestrian crossings and school areas within city limits for compliance with Maryland Manual for Uniform Traffic Control Devices (MdMUTCD) standards and guidelines, and should develop a plan for achieving compliance in cases where standards and guidelines are not currently being met. The city should also consult the Maryland State Highway Administration’s Bicycle and Pedestrian Design Guidelines.

The MdMUTCD establishes standards and guidelines for the use, placement, design, and maintenance of signals, pavement markings, and other traffic control devices in Maryland. The Bicycle and Pedestrian Design Guidelines provide further detail specifically on the design of bicycle and pedestrian facilities. Targeted fieldwork and public input suggest that in some cases traffic control devices are used in a way

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that is inconsistent and/or does not comply with MdMUTCD standards and guidelines. Where the MdMUTCD offers design leeway, the city should adopt its own standards to ensure consistent design and application throughout the city.

Crosswalks are a case in point. The city contains numerous mid-block crossings locations, but only a few of them are marked with striped crosswalks. However, the MdMUTCD states that crosswalks shall be marked at all mid-block locations. The city also uses several different crosswalk designs. Not only does this make some parts of Greenbelt seem like they belong to a different jurisdiction, it also may confuse drivers. Furthermore, one of the designs, which consists of yellow-painted pavement topped by white crosswalk striping, seems to go against MdMUTCD guidance on colored pavements, which advises: “Colors that degrade the contrast of white crosswalk lines, or that might be mistaken by road users as a traffic control application, should not be used for colored pavement located between crosswalk lines.”

A thorough review of pedestrian crossings and school areas for compliance with the MdMUTCD would help identify similar cases, so that the city could act to ensure that traffic control devices are applied consistently throughout the city and are in compliance with state standards and guidelines.


The city should collaborate with WMATA, commercial property owners and Prince George’s County on the development of a policy for the installation and maintenance of pedestrian accommodations at and near transit stops.

Steps the city can take to improve pedestrian access to transit include:

- Work with Metrobus, Prince Georges County “The Bus”, Shuttle-UM, and the Greenbelt Connection service to ensure that all busses serving the City of Greenbelt are accessible. Accessible busses are designed to facilitate access by people with mobility impairments. Accessible busses include ramps, lifts, “kneeling” features, and other enhancements.

- Work with Metrobus, Prince Georges County “The Bus”, Shuttle-UM, and the Greenbelt Connection service to ensure bus stops provide sufficient space for waiting, embarking, and disembarking. Bus shelters should be provided at as many stops as possible, with those receiving the highest pedestrian volumes prioritized. Bus shelters and bus stop waiting areas should not impede through pedestrian traffic and should be well-lighted.

- Review bus stop locations to determine whether adjustments may improve pedestrian access and safety. In general, bus stops should be located on the far side of intersections, so that pedestrians cross behind the bus rather in front. This arrangement improves pedestrian visibility to oncoming traffic and may also improve bus headways, since busses are not compelled to stop before a green light.

- Assess bus stop locations to determine whether curb ramps, crosswalks, signage, and other traffic calming or traffic control measures may need to be implemented in order to provide safe and convenient crossings for pedestrians traveling to and from the stops.

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2 http://www.sha.state.md.us/businesswithsha/bizStdsSpecs/desManualStdPub/publicationsonline/oots/mmputcd/pdfs/sections/3e.pdf (Page 3E-1)
• Work with Metrorail to provide bicycle lanes, traffic calming, on street lighting and other facilities to enhance bicycle and pedestrian access along Greenbelt Metro Drive leading from Cherrywood Drive to the Metro Station.

Review pathways to transit to ensure accessibility (as defined in the draft PROWAG) and adequate lighting at night. Make changes as necessary.
### Location-Specific Recommendations

(Notes: The following recommendations are for planning purposes only. Further engineering analysis will be required to develop cost estimates and ensure project feasibility.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Recommendation</th>
<th>Identified by Previous Study</th>
<th>Web Comments</th>
<th>Facilitates Access to Key Destination</th>
<th>Facilitates Access to School</th>
<th>Facilitates Access to Transit Stop</th>
<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 1   | Hanover Parkway from Megan Lane to Greenbrook Drive | • Ensure that continuous sidewalk/path connection is provided on both sides of the street.  
• Repave existing path segments and fix existing sidewalk segments to ensure compliance with ADAAG.  
• Ensure accessible connection from to Metrobus stops from sidewalk/path. | 1 | Greenway Center Plaza, Schrom Hills Park | Transit stops on Hanover Parkway | GB | EGB |
| 2   | Intersection of Hanover Parkway and Ora Glen Drive | • Install pushbutton-integrated accessible pedestrian signal for north crossing on the north side of Hanover Parkway. | 3 | Greenway Center Plaza, Post Office | GB | EGB |
| 3   | Intersection of Ora Glen Drive and Post Office/ Lockheed Martin access drives | • Assess intersection for improvements to facilitate pedestrian crossing of Ora Glenn Drive, including marked crosswalks, pedestrian refuge islands, and appropriate signage. | 1 | Post Office | GB | EGB |
| 4   | Intersection of Ora Glen Drive and Ora Glen Court | • Install crosswalk striping on all legs (high-visibility for Ora Glen crossings).  
• Install ADA-compliant curb ramps for Ora Glen crossings. | 1 | Post Office | GB | EGB | Recommendation of the Windsor Green HOA |
| 5   | Intersection of Ora Glen Drive and Greenbrook Drive | • Install crosswalk striping on all legs (high-visibility for Ora Glen crossings). | GB | EGB |
| 6   | Intersection of Ora Glen Drive and Matthew Street | • Install crosswalk striping on all legs (high-visibility for Ora Glen crossings). | GB | EGB |
| 7   | Intersection of Ora Glen Drive and Morrison Drive | • Install crosswalk striping on all legs (high-visibility for Ora Glen crossings).  
• Install ADA compliant curb ramps for east crossing (pedestrian refuge island and south side of Ora Glen). | 1 | GB | EGB | Recommendation of the Windsor Green HOA |
<table>
<thead>
<tr>
<th>Key</th>
<th>Location</th>
<th>Recommendation</th>
<th>Stakeholder priority</th>
<th>Identified by</th>
<th>Facilitates Access to Key Destination</th>
<th>Facilitates Access to School</th>
<th>Facilitates Access to Transit Stop</th>
<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Intersection of Ora Glen Drive and Mandan Road</td>
<td>• Install crosswalk striping on west and south legs (high-visibility for both).</td>
<td>1</td>
<td>Crosswalk Study—Greenbelt East (2004)</td>
<td></td>
<td></td>
<td></td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>9</td>
<td>Sidewalk in field between Frankfort Drive and Morrison Drive</td>
<td>• Extend to Ora Glen Drive.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mandan Road between Ora Glen Drive and Canning Terrace</td>
<td>• Install pedestrian trail between sidewalk on west side of Mandan Road and Windsor Green playground.</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>12</td>
<td>Intersection of Frankfort Road and Morrison Drive</td>
<td>• Install crosswalk striping on all legs.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Intersection of Hanover Parkway and Ora Glen Drive to north side of Greenway Center Plaza</td>
<td>• Define convenient and accessible pedestrian pathway, possibly by establishing a cut-through near Pier 1 Imports.</td>
<td>Ea</td>
<td>Greenway Center Plaza</td>
<td></td>
<td></td>
<td></td>
<td>Greenway Plaza LLC</td>
<td>EGB</td>
</tr>
<tr>
<td>#</td>
<td>Location</td>
<td>Recommendation</td>
<td>Identified by Previous Study</td>
<td>Facilitates Access to Key Destination</td>
<td>Facilitates Access to School</td>
<td>Facilitates Access to Transit Stop</td>
<td>Jurisdiction (GB, PG, SHA)</td>
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<tr>
<td>14</td>
<td>Intersection of Hanover Parkway and Greenbelt Road to Safeway and other stores in Greenway Center Plaza</td>
<td>• Define convenient and accessible pedestrian pathway.</td>
<td>7</td>
<td>Greenway Center Plaza</td>
<td></td>
<td></td>
<td>Greenway Plaza LLC</td>
<td>OGB</td>
<td>Stakeholder votes were for generally improving the connection between Old Greenbelt and Greenway Center Plaza.</td>
</tr>
<tr>
<td>15</td>
<td>Access drive from Greenbelt Road to Greenway Center Plaza (across parking lot)</td>
<td>• Define accessible pedestrian pathway parallel to Greenway Center Plaza access drive.</td>
<td>7</td>
<td>Greenway Center Plaza</td>
<td></td>
<td></td>
<td>Greenway Plaza LLC</td>
<td>OGB</td>
<td>Stakeholder votes were for generally improving the connection between Old Greenbelt and Greenway Center Plaza.</td>
</tr>
<tr>
<td>16</td>
<td>Intersection of Westway and Ridge Road</td>
<td>• Assess intersection of the possibility of installing a neighborhood roundabout to mitigate reported issues of cars disregarding existing stop signs.</td>
<td>1</td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Crescent Road at Greenbelt Public Library</td>
<td>• Install high-visibility crosswalk at parking lot exit. Reposition stop bar, so exiting vehicles are prompted to stop in advance of crosswalk.</td>
<td>1</td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Intersection of Crescent Road and Gardenway/Centerway</td>
<td>• Install ADA-compliant curb ramps and high-visibility crosswalks for pedestrians crossing to/from Roosevelt Center on the north and west sides of this intersection.</td>
<td>4</td>
<td>APB Bike/Ped Trouble Spots, Greenbelt Visioning Sessions (2008)</td>
<td>Roosevelt Center</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td>APB Bike/Ped Trouble Spots document identifies approach to Roosevelt Center, Domino's parking lot, and dumpsters as problems. Visioning session notes suggest crosswalk on Gardenway.</td>
</tr>
<tr>
<td>19</td>
<td>Centerway between intersection of Crescent Road and Gardenway/Centerway and pedestrian underpass entrance</td>
<td>• Install sidewalk from southwest corner of Crescent road/Gardenway/Centerway intersection to exit of pedestrian underpass. Install pervious surface path from new sidewalk to bus stop on Crescent to facilitate transit access.</td>
<td>2</td>
<td>APB Bike/Ped Trouble Spots</td>
<td>Roosevelt Center</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td>APB Bike/Ped Trouble Spots document identifies approach to Roosevelt Center, Domino's parking lot, and dumpsters as problems.</td>
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<td>Facilitates Access to Key Destination:</td>
<td>Facilitates Access to School:</td>
<td>Facilitates Access to Transit Stop:</td>
<td>Jurisdiction (GB, PG, SHA)</td>
<td>Neighborhood Comments</td>
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| 20    | Intersection of path and Crescent Road west of Crescent/Northway intersection (i.e. the St. Hugh’s crossing) | • Install rapid flashing beacons on both approaches.  
• Consider installing raised crosswalk to address concerns about excessive vehicle speed. | 10 2 | St. Hugh’s Crosswalk memorandum | Roosevelt Center | Greenbelt Elementary School |  | GB | OGB |  |
| 21    | Intersection of Northway and Ridge Road                                  | • Install crosswalk striping on north and east crossings (high-visibility for Ridge Road crossing). | 1 |  | Greenbelt Elementary School |  |  | GB | OGB | Stakeholder votes for missing sidewalks on Crescent generally. |
| 22    | Crescent Road from Northway to Gardenway                                   | • Install sidewalk on north side of street.                                      | 0 |  | Greenbelt Elementary School |  |  | GB | OGB |  |
| 23    | Intersection of Ridge Road and Laurel Hill Road                           | • Construct curb extensions with ADA-compliant curb ramps into Ridge Road from all northwest and southwest corners. | 14 1 | Greenbelt Visioning Session (2008), Comprehensive Traffic Calming Study (1998), Traffic Calming Study Reassessment (2003) | Greenbelt Elementary School |  |  | GB | OGB | Stakeholder votes for speeding problems on Ridge Road and lack of sidewalks (Laurel Hill to Lastner).  
Web comment cites bad traffic during drop-off/pick-up. Greenbelt Visioning Sessions identified speeding on Ridge as a problem.  
Comprehensive traffic calming study identified Ridge Road as meeting criteria for active traffic calming measures.  
2003 traffic calming reassessment found that the street still met criteria for active traffic calming. |
| 24    | Crosswalk on Ridge Road at school access path between Research Road and Laurel Hill Road | • Construct raised crosswalk with high-visibility striping, speed hump markings, and school crossing signs with raised-crosswalk subplate.  
Web comment cites bad traffic during drop-off/pick-up. Greenbelt Visioning Sessions identified speeding on Ridge as a problem.  
Consideration of speed humps suggested. Comprehensive traffic calming study identified Ridge Road as meeting criteria for active traffic calming measures.  
2003 traffic calming reassessment found that the street still met criteria for active traffic calming. |
| 25    | Intersection of Ridge Road and Research Road                              | • Construct curb extensions with ADA-compliant curb ramps into Ridge Road from all four corners.  
• Install high-visibility crosswalk striping on south, east, and west crossings. | 14 1 | Greenbelt Visioning Session (2008), Comprehensive Traffic Calming Study (1998), Traffic Calming Study Reassessment (2003) |  |  | GB | OGB | Stakeholder votes for speeding problems on Ridge Road and lack of sidewalks (Laurel Hill to Lastner).  
Web comment cites bad traffic during drop-off/pick-up. Comprehensive traffic calming study identified Ridge Road as meeting criteria for active traffic calming measures.  
2003 traffic calming reassessment found that the street still met criteria for active traffic calming.  
Greenbelt Visioning Sessions identified speeding on Ridge as a problem. |
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<th>Facilitates Access to School</th>
<th>Facilitates Access to Transit Stop</th>
<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood</th>
<th>Comments</th>
</tr>
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</table>
| 26 |     | Ridge Road between Research Road and Lastner Lane | • Ensure that continuous sidewalk/path connection is provided on both sides of the street.  
• Repave existing path segments and fix existing sidewalk segments to ensure compliance with ADAAG. | 0 | 1 | | | | GB | OGB | |
| 27 |     | Cherrywood Lane from Ivy Lane to US Bankruptcy Court entrance | • Ensure continuous sidewalk connection is provided on the north side of Cherrywood Lane. | 1 | | | | | GB | WGB | Web comment cites bad traffic during drop-off/pick-up. |
| 28 |     | Springhill Drive between Cherrywood Terrace and Springhill Lane | • Construct chicanes with pedestrian refuge islands, raised crosswalks, and coordinated signage as indicated in comment field at right. | 1 | Comprehensive Traffic Calming Study (1998) | Spring Hill Lake Elementary School | | | GB | WGB | |
| 29 |     | Intersection of Spring Hill Drive and Springhill Lane | • Install high-visibility crosswalk and ADA-compliant curb ramps for west side crossing. | 1 | Comprehensive Traffic Calming Study (1998) | Spring Hill Lake Elementary School, Greenbelt Middle School | | | GB | WGB | Traffic calming study recommends traffic circles at major intersections, narrowed travel lanes, and chokers on Breezewood Drive, Edmonston Road, and Springhill Drive. |
| 30 |     | Springhill Lane from Springhill Drive to Breezewood Drive | • Install sidewalk on west side.  
• Consider installing traffic calming measures including chicanes (combined with removing select on-street parking), curb extensions at intersections, or roundabouts at intersections. | | | Beltway Plaza | Spring Hill Lake Elementary School, Greenbelt Middle School | | GB | WGB | |
| 31 |     | Intersection of Springhill Lane and Market Street | • Install crosswalk striping on west crossing and south crossing (high-visibility for south crossing).  
• Install crosswalk striping on south side of parallel driveway access road. | | | | Spring Hill Lake Elementary School, Greenbelt Middle School | | GB | WGB | |
<table>
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</table>
| 32  | Intersection of Springhill Lane and Breezewood Court | • Install crosswalk striping on all legs (high-visibility for Springhill Lane crossings).  
• Install curb extensions into parking lanes on Springhill Lane (all four corners) to shorten crossing distance and calm traffic.  
• Install ADA-compliant curb ramps for west crossing. |  |  | Spring Hill Lake Elementary School, Greenbelt Middle School | GB | WGB | Traffic calming study recommends traffic circles at major intersections, narrowed travel lanes, and chokers on Breezewood Drive, Edmonston Road, and Springhill Drive. |
<p>| 33  | Intersection of Springhill Lane and Breezewood Drive | • Install high-visibility crosswalk on north side. | Comprehensive Traffic Calming Study (1998) | Belway Plaza | Greenbelt Middle School | GB | WGB |  |
| 34  | Intersection of apartment complex parking lot driveway and Breezewood Drive (approximately 300 feet east of intersection of Breezeway Drive and Cherrywood Terrace) | • Stripe high-visibility crosswalk across Breezewood Drive connecting existing curb ramps. | 1 | Belway Plaza |  | GB | WGB |  |
| 35  | Intersection of Breezeway Drive and Cherrywood Terrace | • Define accessible pathway from marked crosswalk to parking lot on north side of Breezeway Drive. The existing pathway includes stairs. |  | Belway Plaza |  | GB | WGB |  |
| 36  | Intersection of Cherrywood Lane and Giant parking lot | • Options for reconfiguring this intersection are presented in Fig. 3 (p. 43) and Fig. 4 (p. 44). | 5 2 | Belway Plaza | Bus stop on Cherrywood lane near parking lot exit. | GB | WGB |  |
| 37  | Intersection of 63rd Avenue and Greenbelt Road | • Conduct targeted assessment of intersection to identify improvements to pedestrian safety. | 7 1 | Belway Plaza | Greenbelt Middle School | SHA |  | Summary of ideas from GGI Connectivity workshop includes “put pedestrian bridge over Greenbelt Road.” A precise location is not specified. |
| 38  | Intersection of Edmonston Road and Greenbelt Road | • Construct grade-separated crossing. | GGI Connectivity Workshop | Greenbelt Middle School | SHA |  |  |  |</p>
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<th>No.</th>
<th>Location</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>39</td>
<td>Intersection of Lakecrest Drive and Greenbelt Road</td>
<td>• Reconfigure intersection as indicated in comment field at right.</td>
</tr>
<tr>
<td></td>
<td>Identified by Previous Study</td>
<td>2</td>
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<td></td>
<td>Facilitates Access to Key Destination</td>
<td>Greenway Center Plaza</td>
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<td></td>
<td>Facilitates Access to School</td>
<td>SHA</td>
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<td></td>
<td>Facilitates Access to Transit Stop</td>
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<td>Jurisdiction (GB, PG, SHA)</td>
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<td></td>
<td>Neighborhood</td>
<td>Greenway Center Plaza</td>
</tr>
<tr>
<td></td>
<td>Comments</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan.</td>
</tr>
</tbody>
</table>
| 40  | Intersection of Greenway Center Plaza access drive and Greenbelt Road | • Stripe high-visibility crosswalks across access road and access road ramps at intersection with Greenbelt Road.  
• Define accessible pedestrian pathway parallel to access drive Greenway Center Plaza. |
|     | Identified by Previous Study | 1 |
|     | Facilitates Access to Key Destination | Greenway Center Plaza |
|     | Facilitates Access to School | SHA |
|     | Facilitates Access to Transit Stop | SHA |
|     | Jurisdiction (GB, PG, SHA) | SHA |
|     | Neighborhood | Greenway Center Plaza |
|     | Comments |  |
| 41  | Intersection of Hanover Parkway and Greenbelt Road | • Narrow turn lanes and/or narrow slip lane pork chop to provide space for bicycle storage on south side of intersection.  
• Install crosswalk on east side of intersection.  
• Reconfigure or remove slip lane on southwest corner of intersection to slow turning traffic.  
If slip lane is retained, consider pedestrian actuated signal. |
|     | Identified by Previous Study | 0 |
|     | Facilitates Access to Key Destination | Greenway Center Plaza |
|     | Facilitates Access to School | Eleanor Roosevelt High School |
|     | Facilitates Access to Transit Stop | SHA |
|     | Jurisdiction (GB, PG, SHA) | SHA |
|     | Neighborhood | Greenway Center Plaza |
|     | Comments |  |
| 42  | Intersection of Crescent Road and Kenilworth Avenue | • Provide leading pedestrian interval (LPI) for east-west crossing.  
• Add "No Right Turn on Red" signage for westbound traffic.  
• Move stop bar on east side of intersection westward, closer to the intersection.  
• Repair pavement on westbound approach to intersection. (Bicyclists report deep ruts in the roadway.) |
<p>|     | Identified by Previous Study | 4 |
|     | Facilitates Access to Key Destination | Capitol Office Park |
|     | Facilitates Access to School | Greenbelt Metro Station |
|     | Facilitates Access to Transit Stop | SHA |
|     | Jurisdiction (GB, PG, SHA) | SHA |
|     | Neighborhood | Capitol Office Park |
|     | Comments |  |</p>
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<th>Facilitates Access to Transit Stop</th>
<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood</th>
<th>Comments</th>
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</table>
| 43   | Intersection of Ivy Road and Kenilworth Avenue                          | • Install crosswalk and curb ramps on 'pork chop' island to facilitate crossing Kenilworth Avenue on south side of intersection.  
• Install pushbutton activated pedestrian signals.  
• Install marked crosswalk and appropriate pedestrian signage on slip lane carrying eastbound Ivy Lane traffic onto southbound Kenilworth Avenue. | 1                    | Bicycle Task Force Recommendations (1995)                                             | Capitol Office Park  | Greenbelt Metro Station       | SHA                              | Bicycle Task Force Recommendations recommend that the city should take steps to ensure intersection is safe for pedestrians and bicyclists if traffic light installed (traffic light has been installed). |
| 44   | Path between Crescent Road (near SHA gate) and Service Drive access to Ivy Lane | • Widen and repave.                                                                                                                                                                                             |                      | Capitol Office Park           | Greenbelt Metro Station            | SHA                              |                                   |                                  |                                            |
| 45   | Old Greenbelt Pathway System                                            | • Widen and repave paths designated for shared use on the Greenbelt Trails Map. See Bicycle Recommendations map for detail.                                                                                   |                      | Roosevelt Center              | Greenbelt Elementary School        | Greenbelt Metro Station           | GB                                | OGB                             |                                            |
| 46   | Northway Road from Ridge Road to eastern Terminus                        | • Improve surface quality                                                                                                                                                                                     |                      | NASA                          | GB                                  |                                   |                                   | OGB                             |                                            |
| 47   | Eastern terminus of Northway Road to Explorer Road (NASA)               | • Provide bicycle and pedestrian accommodation across the B/W Parkway.                                                                                                                                       | 24                   | NASA                          | NASA, SHA                          | OGB                              |                                   |                                  |                                            |
| 48   | Path between Winterwood Place and Schrom Hills Park                     | • Widen and repave.  
• Widen and pave connection to Chartwell Place.  
• Widen repave connection to Kara Court.                                                                                                           |                      | Schrom Hills Park             | Greenbrook Estates HOA             | EGB                              |                                   |                                  | Segment identified as bikeway in Greenbelt East Ring and Spine Plan. |
<p>| 49   | Intersection of Mandan Road and Matthew Street to Hanover Parkway and Spring Manor Drive | • Install shared-use path.                                                                                                                                                                                   |                      | Greenbelt East Ring and Spine Plan | NASA                               | Magnolia Elementary School        | PEPCO                            | EGB                             | Segment identified as bikeway in Greenbelt East Ring and Spine Plan. |
| 50   | Intersection of Mandan Road and Matthew Street to Magnolia Elementary School | • Install shared-use path.                                                                                                                                                                                   | 1                    | Magnolia Elementary School    | Magnolia Elementary School        | PEPCO, Board of Education         | EGB                              |                                  | Segment identified as bikeway in Greenbelt East Ring and Spine Plan. |
| 51   | From Brae Brook Village Road to intersection of Mandan Road and Matthew Street | • Install shared-use path.                                                                                                                                                                                   | 1                    | Magnolia Elementary School    | Magnolia Elementary School        | PG County                        | EGB                              |                                  | Segment identified as bikeway in Greenbelt East Ring and Spine Plan. |</p>
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<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood</th>
<th>Comments</th>
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<tbody>
<tr>
<td>52</td>
<td>Greenbelt Road between Cunningham Drive and 62nd Avenue</td>
<td>• Construct sidewalk on the north side of Greenbelt Road between Cunningham Drive and 62nd Avenue.</td>
<td></td>
<td></td>
<td>Beltway Plaza</td>
<td>SHA</td>
<td>EGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Intersection of Greenbelt Metro Drive and Cherrywood Lane</td>
<td>• Construct traffic circle. Special care should be given to enhancing pedestrian visibility, particularly for southbound, right-turning vehicles. Guidelines for maintaining bicycle accessibility in roundabouts are provided in Appendix B.</td>
<td>9</td>
<td>Comprehensive Traffic Calming Study (1998)</td>
<td>Greenbelt Metro Station</td>
<td>GB, WMATA</td>
<td>WGB</td>
<td>Comprehensive Traffic Calming Study (1998)</td>
<td></td>
<td>recommends a traffic circle at this location.</td>
</tr>
<tr>
<td>54</td>
<td>Intersection of Hanover Parkway and Greenway Plaza access drive</td>
<td>• Assess potential for mid-block crossing.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>EGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Greenbelt Road from Southway to bridge over I/W Parkway</td>
<td>• Assess potential for installing sidewalk.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>SHA</td>
<td>OGB</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>56</td>
<td>Intersection of Greenbelt Road and Southway</td>
<td>• Assess potential for installing crosswalks across Greenbelt Road on both sides of intersection.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>SHA</td>
<td>OGB</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>57</td>
<td>Southway between Greenbelt Road and Ridge Road</td>
<td>• Assess potential for sidepath on the west side of Southway.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>OGB</td>
<td></td>
<td></td>
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<tr>
<td>58</td>
<td>Intersection of Southway and Ridge</td>
<td>• Consider installing curb extensions.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>OGB</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>59</td>
<td>Southway between Ridge Road and Crescent Road</td>
<td>• Assess potential for sidepath on the west side of Southway.</td>
<td></td>
<td></td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>OGB</td>
<td></td>
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BICYCLING RECOMMENDATIONS

General Recommendations

*The city should improve bicyclist comfort and safety on the existing bicycling network, and clarify its location and extent, by adding on-road bicycling facilities and improving paths designated for shared use.*

The existing City of Greenbelt Trails Map identifies a bicycling network that is easy to understand and connects key destinations. However, there are locations along the network that may feel uncomfortable or unsafe for bicycling, and the extent of the network and where it may lead are not always discernable to bicyclists. To improve bicyclist comfort and safety, and to make the network easier to understand without a map, the city should:

- **Install additional on-road bicycling facilities.** The Trails Map identifies many Greenbelt roads for bicycle use; however, on-road bicycle facilities are currently provided for only three of them: Crescent Road, Ivy Lane, and Cherrywood Lane. On-road facilities include bicycle lanes and shared lane markings. Guidelines for bicycle lanes and shared lane markings are provided in *Appendix B*. Specific recommendations are included later in this chapter and are indicated on the “Bicycle Recommendations” map.

- **Widen and resurface paths designated for shared use.** The Trails Map identifies a number of paths as shared use “hiker-biker” trails. However, these paths are typically too narrow to accommodate bicyclists and pedestrians comfortably (especially in passing situations), and their surface is often deteriorated, making them uncomfortable for bicycling. These paths are important to the city’s bicycling network both for recreational and utilitarian travel purposes. For example, the paths around Greenbelt Lake might be used by both recreational riders wishing to enjoy the beauty of the lake and by utilitarian riders wishing to travel to Roosevelt Center, Greenbelt Elementary School, or Greenbelt Metro Station from University Square and other locations within Greenbelt. For utilitarian riding, it is important that shared use paths provide a hard, smooth surface and be sufficiently wide. Guidelines for shared use paths are provided in *Appendix B*.

*The city should expand the existing bicycle network to provide additional connections to key destinations.*

While the existing bicycle network connects most of the city’s key destinations, there are locations where new linkages could significantly enhance the network’s utility. New linkages that would primarily benefit bicyclists are included in the recommendations table and map below. It should be noted that successful completion of some of these desired connections may require coordination with private landowners, the National Park Service, and other parties.

*The city should take steps to ensure an adequate supply of well-designed and conveniently-located bicycle parking facilities at shopping centers, office buildings, community facilities, and multi-family residences.*

Just as an adequate supply of conveniently-located motor vehicle parking encourages motor vehicle use, so can an adequate supply of well-designed and conveniently-located bicycle parking encourage bicycle riding. Steps the city can take to ensure adequate bicycle parking throughout the city include:

- Establish standards and guidelines for bicycle parking facilities within the city. These standards should prescribe the appropriate type, design, and location of bicycle parking facilities by land use. Example guidelines are provided in *Appendix B*.
• Install an adequate supply of bicycle racks at all community facilities. The Greenbelt Library was noted by stakeholders as a community facility in need of additional bicycle racks. Providing additional bicycle spaces at the library should be a priority in the immediate term.

• Provide incentives to owners of commercial buildings and multi-family dwellings to encourage them to provide bicycle parking facilities according to city standards and guidelines. Stakeholders identified Greenway Center Plaza and Beltway Plaza as locations where additional bicycle parking facilities are needed. Working with the owners of those properties should be a priority in the immediate term.

• Require new retail, office, community facility, and multi-family residential construction in the city to provide bicycle parking facilities according to city standards and guidelines. New construction would include significant additions or renovations of existing properties.

The city should take steps to improve bicycle access to transit.

Steps the city can take to improve bicycle access to transit include:

• Install bicycle parking facilities at major transportation hubs within the city. An example would be the main bus stop serving Roosevelt Center.

• Work with Metrobus and Prince Georges County “The Bus” to ensure that all busses serving the city are outfitted with bicycle racks.

• Work with the Washington Metropolitan Transit Authority (WMATA) to ensure that adequate secure bicycle parking is available at the Greenbelt Metrorail station. Since bicycles are likely to be left for extended periods of time, bicycle parking facilities should be located within view of a WMATA station attendant and ideally should be covered to protect bicycles from rain, bird droppings and vandalism.

The city should require that driveway aprons be flush with the roadway and work with the appropriate parties to retrofit driveway aprons that fail to meet this requirement.

Driveways to public and private properties are an integral part of the city’s bicycle network. They serve as access points for trails and commercial and community facilities. Yet, many of them are not designed to accommodate bicycles. The typical driveway in many parts of the city has a 1 – 2” high lip where the apron meets the road. When bicyclists attempt to access a driveway apron that is not flush with the road, they risk crashing or damaging their bicycle wheels.

The city should assess drainage grates throughout the city to determine if they are bicycle-safe and replace those that are not.

The safety of the city’s drainage coverage emerged as an issue through the public input process. Greenbelt should conduct an inventory of all drainage grates on all roadways within the city (possibly including private internal circulation routes in larger developments and commercial areas) and replace those that may pose a hazard to bicyclists. Priority should be given to improving drainage grates on roads identified in the city’s bicycle network.
<table>
<thead>
<tr>
<th>Map Key</th>
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<tbody>
<tr>
<td>1</td>
<td>Good Luck Road from Paint Branch Parkway/ Kenilworth Avenue to Hanover Parkway</td>
<td>• Install bike lanes where space allows. Otherwise, provide striped shoulder.</td>
<td>1</td>
<td>Greenbelt Park, University of Maryland</td>
<td>SHA</td>
<td></td>
<td></td>
<td>NIGB</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>2</td>
<td>Intersection of Good Luck Road and Hanover Parkway</td>
<td>• Install bike box (or move stop bars back from crosswalk) to create space for left turns from Good Luck Road onto Hanover Parkway.</td>
<td>1</td>
<td>Greenway Center Plaza</td>
<td>SHA</td>
<td></td>
<td></td>
<td>NIGB</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>3</td>
<td>Hanover Parkway between Good Luck Road and Megan Lane</td>
<td>• Conduct traffic analysis and geometric study to determine whether vehicle lanes can be narrowed and/or removed to allow installation of bicycle lanes.</td>
<td>1</td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td></td>
<td></td>
<td>EGB</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>4</td>
<td>Hanover Parkway between Megan Lane and Greenbrook Road</td>
<td>• Convert striped shoulders to bike lanes. • Use dashing and signage to warn bicyclists that bike lanes end at roundabouts. • Install share the road signage on approaches to roundabouts to alert drivers that they must share the road with cyclists. • Consider providing ramps and wide sidewalks at roundabouts to enable inexperienced cyclists to navigate the intersection. • Guidelines for accommodating bicycles in single-lane roundabouts are provided in Appendix B.</td>
<td>1</td>
<td>Comprehensive Traffic Calming Study (1998)</td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan. Traffic calming study recommends narrowing travel lanes on Hanover Parkway south of Greenbelt Road to 11 feet.</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>5</td>
<td>Hanover Parkway from Greenbelt Drive to Greenbelt Road</td>
<td>• Conduct traffic analysis and geometric study to determine whether vehicle lanes can be narrowed and/or removed to allow installation of bicycle lanes.</td>
<td>1</td>
<td>Greenbelt East Ring and Spine Plan, Comprehensive Traffic Calming Study (1998)</td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan. Traffic calming study recommends narrowing travel lanes on Hanover Parkway south of Greenbelt Road to 11 feet.</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>6</td>
<td>Intersection of Hanover Parkway and Ora Glen Road</td>
<td>• Provide left-turn bike lane to facilitate bicycle access to Greenway Center Plaza from northbound Hanover Parkway.</td>
<td>1</td>
<td>Greenway Center Plaza</td>
<td>GB</td>
<td>EGB</td>
<td></td>
<td>See Hanover Parkway design concept</td>
<td>GB</td>
<td>EGB</td>
</tr>
<tr>
<td>#</td>
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<tr>
<td>7</td>
<td>Hanover Parkway between Greenbelt Road and Mandan Road</td>
<td>• Install bicycle lanes on uphill sections and shared lane markings on downhill sections.</td>
<td></td>
<td>Y</td>
<td>Greenway Center Plaza</td>
<td>Roosevelt High School</td>
<td></td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan.</td>
</tr>
<tr>
<td>8</td>
<td>Mandan Road from Hanover Parkway to Greenbelt Road</td>
<td>• Install bike lanes.</td>
<td></td>
<td></td>
<td>NASA, Roosevelt High School</td>
<td></td>
<td></td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan. Traffic calming study recommends narrowing lanes to slow speeds.</td>
</tr>
<tr>
<td>9</td>
<td>Mandan Road from Greenbelt Road to Matthew Street</td>
<td>• Install bike lanes.</td>
<td></td>
<td></td>
<td>NASA</td>
<td></td>
<td></td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan.</td>
</tr>
<tr>
<td>10</td>
<td>Intersection of Mandan Road and Matthew Street to Hanover Parkway and Spring Manor Drive</td>
<td>• Install shared-use path.</td>
<td></td>
<td></td>
<td>NASA</td>
<td></td>
<td></td>
<td>GB, Potomac Electric Power Company</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan.</td>
</tr>
<tr>
<td>11</td>
<td>Ora Glen Road between Mandan Road and Hanover Parkway</td>
<td>• Install bike lanes.</td>
<td></td>
<td></td>
<td>Greenbelt East Ring and Spine Plan</td>
<td>Greenway Center Plaza</td>
<td></td>
<td>GB</td>
<td>EGB</td>
<td>Segment identified as bikeway in Greenbelt East Ring and Spine Plan. Comprehensive Traffic Calming Study suggests narrowing lanes to reduce speeds on this road.</td>
</tr>
<tr>
<td>12</td>
<td>Hanover Parkway to Greenbelt Road</td>
<td>• Provide connection from BW Parkway overpass trailhead on Hanover Parkway through Roosevelt High School Property to intersection of Frankfort Drive and Greenbelt Road. Potential routes indicated on map.</td>
<td></td>
<td></td>
<td></td>
<td>Roosevelt High School</td>
<td></td>
<td>PG-Board of Education</td>
<td>EGB</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Path between Winterwood Place and Schrom Hills Park</td>
<td>• Widen and repave.</td>
<td></td>
<td></td>
<td></td>
<td>Roosevelt High School</td>
<td></td>
<td>Greenbrook Estates Homeowner’s Association</td>
<td>EGB</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ridge Road from Westway to Lastner Lane</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
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<tr>
<td>15</td>
<td>Crescent Lane from Westway to Parkway</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Crescent Lane from Parkway to and Northway</td>
<td>• Install bike lanes. Also consider installing shared lane markings on Parkway. (This stretch currently has a striped shoulder on the north side of the street that is sometimes used for parking.)</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td>1998 Traffic Calming study recommends narrowing travel lanes and installing painted median. Lanes are currently 12'.</td>
</tr>
<tr>
<td>17</td>
<td>Westway from Lakeshore Drive to Crescent Lane</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Lakecrest Drive from Greenbelt Road to Lakeside Drive</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Lakeside Drive from Lakecrest Drive to Westway</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Southway from Crescent Road to Ridge Road</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center, Greenway Center Plaza</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Southway from Ridge Road to Greenbelt Road</td>
<td>• Install multi-use path on west side.</td>
<td></td>
<td></td>
<td>Roosevelt Center, Greenway Center Plaza</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Gardenway from Crescent to eastern terminus</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Northway Road from Hillside Road to Ridge Road</td>
<td>• Install shared lane markings or possibly &quot;share the road with bicycles&quot; signage.</td>
<td></td>
<td></td>
<td>NASA</td>
<td></td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
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<tr>
<td>24</td>
<td>Northway Road from Ridge Road to eastern Terminus</td>
<td>• Improve surface quality to facilitate connection to Northway Fields and ultimately to a proposed bicycle pedestrian bridge across the B/W Parkway to NASA.</td>
<td>GGI Connectivity Workshop (2009), Greenbelt Visioning (2008)</td>
<td>NASA</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td>Idea proposed at GGI Workshop was to “create a safe pathway to Northway Fields. Narrow the road, if necessary.” Note from Greenbelt Visioning Session: “Don’t pave Northway; no lights on Northway.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Eastern terminus of Northway Road to Explorer Road (NASA)</td>
<td>• Provide bicycle and pedestrian accommodation across the B/W Parkway.</td>
<td></td>
<td>NASA</td>
<td></td>
<td>USA</td>
<td>OGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Hillside Road from Crescent Road to Northway</td>
<td>• Install shared lane markings.</td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Research Road at BARC gate/fence</td>
<td>• Formalize opening in fence to allow bike with panniers to pass through.  • Pave path through gap to facilitate access.</td>
<td></td>
<td>BARC</td>
<td></td>
<td>USA</td>
<td>OGB</td>
<td>Would definitely require coordination/permission from NASA. May or may not be feasible.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Greenhill Road from Crescent Road to Hillside Road</td>
<td>• Install shared lane markings.</td>
<td></td>
<td>Greenbelt Elementary School, BARC</td>
<td></td>
<td>GB</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>29</td>
<td>Lastner Lane from Ridge Road to Crescent Road</td>
<td>• Install shared lane markings.</td>
<td></td>
<td>Roosevelt Center</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Old Greenbelt Pathway System</td>
<td>• Widen and resurface paths designated for shared use on the Greenbelt Trails Map. See Bicycle Recommendations map for detail.</td>
<td></td>
<td>Roosevelt Center</td>
<td>Greenbelt Elementary School</td>
<td>Greenbelt Metro Station</td>
<td>GB</td>
<td>OGB</td>
<td>Maintaining the natural appearance of the interior pathway system, especially in the immediate vicinity of Greenbelt Lake, was identified as a priority during the public input process. All-weather surfaces that might accomplish this goal include decomposed granite, tinted concrete, and ResinPave.</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Path between Crescent Road (near SHA gate) and Service Drive access to Ivy Lane</td>
<td>• Widen and repave.</td>
<td></td>
<td>APB Ped/Bike Trouble Spots</td>
<td>Greenbelt Metro Station</td>
<td></td>
<td>GB</td>
<td>OGB</td>
<td>Identified as problem in APB Bike/Ped Trouble Spots document.</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Intersection of Ivy Lane and Service Road</td>
<td>• Install signage indicating direction to Metro.</td>
<td></td>
<td>Greenbelt Metro Station</td>
<td></td>
<td>GB</td>
<td>WGB</td>
<td></td>
<td></td>
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</table>
| 33      | Ivy Lane from Kenilworth Avenue to Service Road (entrance to new bank building) | • Stripe bike lanes.  
• Add Bike Lane Ahead signage near Kenilworth intersection.  
• To provide sufficient width for bike lane on south side of Ivy Lane, move westbound right turns one lane north, reallocate space presently occupied by dedicated westbound turn lane. Consider landscaped median connecting to pork chop island at Kenilworth. | GB                   | Greenbelt Metro Station                  | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |
<p>| 34      | Intersection of Ivy Lane and Cherrywood Lane                              | • Restripe Ivy Lane approach to Cherrywood Lane to allow space for bicyclists to move into left turn bicycle lane.                                                                                                  | GB                   | Greenbelt Metro Station                  | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |
| 35      | Intersection of Greenbelt Metro Drive and Cherrywood Lane                  | • Explore feasibility of constructing traffic circle to slow motor vehicles in the vicinity of the Metro entrance.                                                                                               | GB                   | Greenbelt Metro Station                  | GB                                    | GB                             | GB                            | GB                          | WGB           | Comprehensive Traffic Calming Study (1998) recommends a traffic circle at this location. Maximizing Transit Access Opportunities (2008) suggests that improved crossing facilities at this intersection would make it safer for residents of Spring Hill Lake to access the Greenbelt Metro Station on foot. |
| 36      | Greenbelt Metro Drive from Greenbelt Metro Station to Cherrywood Lane      | • Install shared lane markings.                                                                                                                                                                               | GB                   | Greenbelt Metro Station                  | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |
| 37      | Cherrywood Lane from Breezewood Drive to Greenbelt Road                    | • Install bike lane when area is redeveloped.                                                                                                                                                                | GB                   | Beltway Plaza                           | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |
| 38      | Edmonston Road from Greenbelt Road to Springhill Drive                     | • Install shared lane markings.                                                                                                                                                                              | GB                   | Greenbelt Middle School                 | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |
| 39      | Intersection of Cherrywood Lane and Greenbelt Road                         | • Install signalized crossings on all legs of the intersection.                                                                                                                                             | SHA                  | SHA                                     | GB                                    | GB                             | GB                            | GB                          | WGB           |                                                                          |</p>
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<tr>
<td>40</td>
<td>Breezewood Drive between Cherrywood Lane and Springhill Lane</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Beltway Plaza</td>
<td></td>
<td></td>
<td>GB</td>
<td>WGB</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Springhill Lane between Breezewood Drive and Springhill Drive</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td>Beltway Plaza</td>
<td>Spring Hill Lake Elementary School, Greenbelt Middle School</td>
<td>Greenbelt Metro Station</td>
<td>GB</td>
<td>WGB</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Springhill Drive between Cherrywood Lane and Edmonston Road</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td></td>
<td>Spring Hill Lake Elementary School, Greenbelt Middle School</td>
<td>Greenbelt Metro Station</td>
<td>GB</td>
<td>WGB</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Path from Chef’s Secret Parking Lot to Branchville Road</td>
<td>• Widen and pave path.</td>
<td>APB Ped/Bike Trouble Spots</td>
<td>University of Maryland, Lake Artemesia</td>
<td></td>
<td></td>
<td>Greenbelt Metropark LLC</td>
<td>WGB</td>
<td>APB Bike/Ped Trouble Spots document identifies path as problem area.</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Branchville Road/Bellew Avenue from Greenbelt Road to Berwyn Road</td>
<td>• Install shared lane markings.</td>
<td></td>
<td></td>
<td></td>
<td>University of Maryland, Lake Artemesia</td>
<td></td>
<td>PG County</td>
<td>WGB</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Intersection of Edmonston Road and Greenbelt Road</td>
<td>• Construct grade-separated crossing.</td>
<td>GGI Connectivity Workshop (2009)</td>
<td></td>
<td>Greenbelt Middle School</td>
<td>Greenbelt Metro Station</td>
<td>SHA</td>
<td>WGB</td>
<td>Summary of ideas from GGI Connectivity workshop includes “put pedestrian bridge over Greenbelt Road.” A precise location is not specified.</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Intersection of Lakecrest Drive and Greenbelt Road</td>
<td>• Reconfigure intersection as indicated in comment field at right.</td>
<td>J</td>
<td></td>
<td>Greenway Center Plaza</td>
<td></td>
<td>SHA, OGB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Recommendation</td>
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<td>Facilitates Access to Key Destination</td>
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</table>
| 47      | Intersection of Hanover Parkway and Greenbelt Road | • Narrow turn lanes and/or narrow slip lane pork chop to provide space for bicycle storage on south side of intersection.  
• Install crosswalk on east side of intersection.  
• Reconfigure or remove slip lane on southwest corner of intersection to slow turning traffic. If slip lane is retained, consider pedestrian actuated signal.  
• See conceptual designs for details. | 3                    | Greenway Center Plaza | Eleanor Roosevelt High School | SHA | EGB | See Hanover Parkway redesign concept  |
| 48      | Greenbelt Road just east of intersection with Mandan Road | • Trim hedge extending into shoulder on westbound approach to Mandan intersection. | 3                    | Greenbelt East Ring and Spine Plan | NASA | Eleanor Roosevelt High School | SHA | EGB | Segment identified as bikeway in Greenbelt East Ring and Spine Plan.  |
| 49      | Intersection of Mandan Road and Matthew Street to Magnolia Elementary School | • Install shared-use path | 1                    | Magnolia Elementary School | PEPCO, Board of Education | EGB |  |
| 50      | From Brae Brook Village Road to intersection of Mandan Road and Matthew Street | • Install shared-use path | 1                    | Greenway Center Plaza | Magnolia Elementary School | Prince George's County | EGB |  |
| 51      | Intersection of Crescent Road and Kenilworth Avenue | • Provide leading pedestrian interval (LPI) for east-west crossing.  
• Add "No Right Turn on Red" signage for westbound traffic.  
• Move stop bar on east side of intersection westward, closer to the intersection.  
• Repair pavement on westbound approach to intersection. (Bicyclists report deep ruts in the roadway.) | 4                    | Capitol Office Park | Greenbelt Metro Station | SHA | OGB |  |
<table>
<thead>
<tr>
<th>Map Key</th>
<th>Location</th>
<th>Recommendation</th>
<th>Stakeholder priority</th>
<th>Identified in Previous Planning Process</th>
<th>Facilitates Access to Key Destination</th>
<th>Facilitates Access to School</th>
<th>Facilitates Access to Transit Stop</th>
<th>Jurisdiction (GB, PG, SHA)</th>
<th>Neighborhood</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 52      | Intersection of Ivy Road and Kenilworth Avenue | • Install crosswalk and curb ramps on ‘pork chop’ island to facilitate crossing Kenilworth Avenue on south side of intersection.  
• Install pushbutton activated pedestrian signals.  
• Install marked crosswalk and appropriate pedestrian signage on slip lane carrying eastbound Ivy Lane traffic onto southbound Kenilworth Avenue. | 1 | Bicycle Task Force Recommendations (1995) | Capitol Office Park | Greenbelt Metro Station | SHA | OGB | Bicycle Task Force Recommendations recommend that the city should take steps to ensure intersection is safe for pedestrians and bicyclists if traffic light installed (traffic light has been installed). |
APPENDIX A: CASE STUDIES
The Greenbelt Advisory Planning Board selected three locations for further study through the development of conceptual designs. These locations are:

- Hanover Parkway between Ora Glen Drive and Greenbelt Road
- Southway between Greenbelt Road and Ridge Road
- Cherrywood Lane between Greenbelt Road and Breezewood Road

The existing design of these locations exemplifies the challenges for pedestrians and bicyclists associated with a transportation system that is primarily designed to accommodate motor vehicles. Brief descriptions of the issues observed at each location, along with recommended solutions, is provided below.

Hanover Parkway between Ora Glen Drive and Greenbelt Road

Issues

Intersection of Greenbelt Road and Hanover Parkway

Issues identified at this intersection include:

- No crosswalk on the east side of the intersection;
- Existing crosswalks could be more visible;
- Right-turning, eastbound traffic sometimes fails to yield to pedestrians crossing between the southwest corner and the ‘pork chop’ island;
- Northbound bicycle traffic is provided insufficient storage space; and
- Turning left from northbound Hanover onto Greenbelt Road is extremely uncomfortable for bicyclists due to the lane configuration at the intersection (three exclusive left turns and one on through lane), the difficulty for bicyclists of getting out ahead of turning traffic where they are visible, the high speeds and volumes on Greenbelt Road combined with a lack of bicycle facilities.

Hanover Parkway from Greenbelt Road to Ora Glen Drive

Issues identified along this road segment include:

- Pedestrians traveling between Greenway Center Plaza and the post office lack a convenient place to cross Hanover Parkway. The signalized crossing at Hanover and Ora Glen is out of the way, so some pedestrians cross Hanover mid-block; however, these pedestrians are not as visible to oncoming traffic as they would be at a formalized mid-block crossing, and drivers may fail to anticipate or yield these pedestrians crossing at this location.
- There is no convenient, accessible pedestrian pathway for pedestrians wishing to access Greenway Center Plaza via the intersection of Hanover Parkway and Greenway Center Plaza.
- The amount of roadway space devoted vehicular traffic may be unnecessary considering observed traffic volumes and may encourage speeding.
- The segment lacks bicycle facilities despite its strategic importance in the bicycle network and relatively high motor vehicle speeds and volumes.
**Intersection of Hanover Parkway and Ora Glen Drive**

Issues identified at this intersection include:

- Existing crosswalks could be more visible;
- Northbound bicycle traffic is provided insufficient storage space; and
- No direct connection from the intersection to the front of Greenway Center Plaza

**Recommendations**

**Intersection of Greenbelt Road and Hanover Parkway**

Highlights of the proposed physical improvements for the Hanover/Greenbelt intersection include:

- Reconfiguring the slip lanes designed to accommodate eastbound, right-turning traffic and northbound, right-turning traffic to reduce vehicle speeds and enhance pedestrian safety.
- Install raised crosswalks between the southeast corner and ‘pork chop’ island and southwest corner and ‘pork chop’ island to further reduce vehicle speeds and reinforce yielding for pedestrians at crosswalk.
- Installing high visibility pedestrian crossings on all legs of the intersection, including the east leg, where a marked crosswalk is currently lacking.

**Hanover Parkway from Greenbelt Road to Ora Glen Drive**

Highlights of the proposed physical improvements for the segment of Hanover from Greenbelt Road to Ora Glen Drive include:

- Evaluating the potential for a pedestrian access route into Greenway Center Plaza from the intersection of Hanover Parkway and Greenway Center Plaza access road.
- Evaluating the potential for formalizing the crossing at the intersection of Hanover Parkway and Greenway Center Plaza access road.
- Evaluating the potential for converting the outside vehicle travel lanes on Hanover Parkway (Greenbelt Road to Ora Glenn Drive) to buffered bicycle lanes.

**Intersection of Hanover Parkway and Ora Glen Drive**

Highlights of the proposed physical improvements for the intersection of Hanover Parkway and Ora Glen Drive include:

- Installing high visibility pedestrian crossings on all legs of the intersection.
- Installing an advanced stop bar to provide bicycle storage space for northbound, left-turning bicycle traffic. (A bike box would also work in this if sufficient width can be acquired, and bike lanes rather than shared lane markings are installed here.)
- Evaluating the potential for defining an accessible pedestrian pathway from Ora Glenn to the front of the plaza, possibly in the corner near old Pier 1 Imports.

The following concept plan (Fig. 1) illustrates the proposed recommendations for improving this corridor.
Southway between Greenbelt Road and Ridge Road

Issues
Issues identified for this corridor include:

- Lack of continuous, accessible pedestrian pathway from Crescent Road to Greenbelt Road.
- Locations where the interior pathway system intersects Southway are difficult to see and predict. Entrances are sometimes blocked by parked cars.
- Bicycling on Southway between Crescent Road and Greenbelt Road is uncomfortable due to lack of designated space for bicycles segment and relatively high vehicular speeds and volumes.
- Generous turning radii at Ridge Road intersection enable relatively high-speed turns, increasing pedestrian and bicyclist exposure. Long crossing distance, especially for Southway crossings.
- Geometry of on- and off-ramps encourages drivers to enter and exit Southway at high speed, increasing pedestrian and bicyclist exposure.
- Crossing Greenbelt Road at Southway is difficult and there is no sidewalk connecting the crossing to Greenway Center Plaza west of the B/W Parkway bridge.

Recommendations
Recommendation highlights include:

- Evaluating the potential for constructing a shared-use path on the west side of Southway to provide a continuous, accessible, and comfortable pathway for bicyclists and pedestrians between Crescent Road and Greenbelt Road.
- Installing curb extensions and a high-visibility crosswalk where the interior pathway system crosses Southway between Crescent Road and Ridge Road to enhance the visibility of the crossing, prevent cars from blocking pathway entrances/exits, and improve the accessibility of the sidewalk on the west side of Southway.
- Installing curb extensions at Ridge Road intersection to discourage high-speed turns and shorten pedestrian crossing distances.
- Reconfiguring on- and off-ramps to slow vehicular traffic as it enters and exits Southway.
- Evaluating the potential for a roundabout at the intersection of the Southway and the B/W Parkway ramps, also as a traffic calming measure.
- Evaluating the potential for installing a sidewalk on the east side of Southway to provide a pedestrian connection from Ridge Road, and from the bus stop on Southway north of the B/W Parkway off-ramp, to the multi-family dwellings on the east side of Southway.
- Evaluating the potential for installing crosswalks at the intersection of Southway and Greenbelt Road.
- Evaluating the potential for installing a sidewalk on the south side of Greenbelt Road to connect the intersection of Southway and Greenbelt Road to the existing sidewalk on at the bridge over B/W Parkway.

The following concept plan (Fig. 2) illustrates the proposed recommendations for improving this corridor.
Cherrywood Lane between Greenbelt Road and Breezewood Road

**Issues**

Issues identified for this corridor include:

- Crosswalk location is not convenient for pedestrians. Many do not cross at crosswalk, which means they are less visible to oncoming traffic.
- Intersection of Cherrywood Lane and Beltway Plaza parking lot access road is complex and, with the exception of a stop sign for right-turning traffic exiting the Giant parking lot, uncontrolled. Large volumes of turning traffic enter Cherrywood Lane from shopping center driveways. Lack of control makes turning movements difficult to predict.
- Designated space for bicycles is not provided along this roadway segment. Further north on Cherrywood, bicycle lanes end abruptly at Breezewood.

**Recommendations**

The following concept plans (see Fig. 3 and Fig. 4) illustrate options for improving this corridor. Highlights include:

- Moving bus stop crosswalk to south side of bus stop to accommodate pedestrian desire line.
- Reconfiguring the intersection of Cherrywood Lane and the Beltway Plaza parking lot access drive as either a signalized intersection (Fig. 3) of a roundabout (Fig. 4).
- Provide bicycle connection (shared lane markings or bicycle lane) between Breezewood Drive and Greenbelt Road.
APPENDIX B: DESIGN GUIDELINES

This appendix is intended to provide an overview of several design principles that facilitate and enhance travel as a pedestrian or a bicyclist. As with many recommendations for facility enhancements in this plan, additional research and evaluation by an engineer familiar with designing bicycle and pedestrian infrastructure must be conducted prior to implementation. Furthermore, many of these recommendations call for improvements to roads or paths that are under the jurisdiction of other entities including the MD State Highway Administration, Prince George's County, Washington Metropolitan Area Transit Authority, Maryland National Capital Park and Planning Commission, and private landowners.

Several documents provide standards and guidelines for facilities that affect bicycle and pedestrian travel, including:

- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- AASHTO Guide for the Design of Bicycle Facilities
- Maryland SHA Bicycle and Pedestrian Design Guidelines
- Manual on Uniform Traffic Control Devices (MUTCD), Current Edition
- AASHTO Green Book
- Highway Capacity Manual

A number of revisions are being proposed to the current MUTCD standards (2003 edition), and the AASHTO Guide for the Design of Bicycle Facilities (2004 edition) which will be incorporated into new versions of these two guides. Many of the proposed changes provide additional clarity to existing standards (i.e. criteria for marking crosswalks or design of roundabouts) or describe new tools or techniques to accommodate pedestrians and bicyclists (i.e. new crosswalk warning signs and the Pedestrian Hybrid Signals). Standards proposed for the new editions of these guides that were determined to be relevant and useful for improving bicycle and pedestrian facilities within the City are included and referred to as changes to the current versions.
Bicycle and pedestrian access to Key Destinations

Parking lots can have a significant impact on the design and quality of the built environment and the ability of pedestrians to access commercial properties. Conflicts with motor vehicles are a significant concern for bicycles and pedestrians.

The following design strategies from the AASHTO (American Association of Highway Traffic Engineers) Pedestrian Guide can help minimize these conflicts:

Location of Parking Spaces
Parking spaces should be located to the side and rear of buildings to allow easy access for pedestrians from adjacent sidewalks.

On-Site Circulation
On-site circulation systems should be designed to reduce conflicts between pedestrians and motor vehicles by clearly defining pedestrian access ways. Striped walkways, raised crosswalks, and walkways within raised parking aisle separator islands are examples of clearly defined pedestrian ways.

Newly constructed pedestrian facilities must be accessible. Using raised crosswalks, speed tables, or other similar traffic calming device in parking areas can reduce vehicle speeds and give priority to pedestrian crossings.

Off-Site Connections
In order to facilitate safe pedestrian travel to off-site destinations, the internal sidewalk system should connect to the surrounding sidewalk and/or pathway network. Emphasis should be placed on providing continuous, direct connections to key points including transit stops, road crossings, and other interim destinations.

Bicycle Parking
Secure, convenient bicycle parking is essential to facilitating bicycle access. Currently, bicycle parking is provided somewhat inconsistently, and is often difficult to find if provided. Several jurisdictions in the region do require bicycle parking as part of most institutional, commercial or multifamily residential developments. For example, Washington DC currently requires that a project provide bicycle parking in an amount equal to at least 5% of the amount of automobile parking required. The city is revising the approach to link required bicycle parking to the square footage of the development rather than number of parking spaces in hopes of obtaining more bicycle parking and reducing the tie to vehicle parking.

Bicycle parking should be located as close as possible to primary entrances, while not blocking accessible access or pedestrian pathways. The parking area should be sheltered from rain and snow, and signage should be placed at key locations in the development to direct bicyclists to the parking area.

![Acceptable Bicycle Rack Designs](https://source.APBP.BicycleParkingGuidelines.jpg)
Guidelines for transforming Greenbelt Road into a “livable street”

**Improve Pedestrian Comfort**

Heavy traffic volumes and high speeds and little space between the roads and sidewalks create an inhospitable environment for pedestrians. As the area redevelops over time, pedestrian space should be separated from automobile space with landscape buffers that include street trees (recommended 5’ minimum), as well as other design approaches.

In addition, pedestrian space should be clearly articulated through design. As properties redevelop, the relocation of existing curb lines should be examined to maximize the length and width of center medians. Center medians provide pedestrian refuge at crossings, improve traffic flow by allowing left turn pockets, and provide a location for landscaping. Sidewalks should be wide enough to accommodate anticipated pedestrian volumes. A 6’ minimum sidewalk width is recommended. Sidewalk surfaces should continue across driveways to clearly delineate the pedestrian space. Curb ramps should be provided for every crosswalk, to ensure safety and accessibility for all.

Automobile travel lanes should be no wider than is necessary to accommodate vehicles at the desired speed limits. Excessively wide lanes encourage drivers to travel at higher speeds and forces pedestrians to cross wider streets, while consuming space that could possibly be used for center medians or bicycle lanes.

In general, design elements should be selected that improve pedestrian safety and naturally calm traffic.

**Encourage Pedestrian-Friendly Land Use and Urban Design**

Mixed-use development can be more convenient and accessible for people on foot, because it often provides more destinations in close proximity to one another.

In the long-term, as large properties with limited connectivity redevelop, emphasis should be placed on improving circulation for all modes (walk, bike, car) by integrating a road grid that connects to the surrounding network. Access should be extended through larger properties, providing an opportunity to create traditional main street areas that tie into an urban street grid. Buildings should be brought to the edge of the property and parking, vehicular access and service entrances should be provided either in structures or at the rear of properties. Sidewalks should be provided along both sides of any new streets and added to existing side streets where missing.

Creating a more finely grained pedestrian network that provides pedestrians with choices about how to get to any location should be a critical element of the long-term vision for the area. This would also create opportunities to move buildings closer to the road and provide parking and access from the back. Development of this nature is more pedestrian friendly because it is at a scale comfortable for those on foot.
Reduce Pedestrian Crossing Distances

Pedestrians should not have to cross more than 60 feet of road width at a time. Center medians should be used for pedestrian refuges. Crosswalks should be brought to and through medians so pedestrians are not forced to choose between a median refuge and a crosswalk. The width of the pedestrian curb ramp through the center median should be as wide as possible (6' minimum) to accommodate users with assistive devices such as wheelchairs or multiple users at one time.

Maximizing the length and width of medians should be considered a priority given the key safety function that they serve. Medians are needed not only at mid-block crossings, but at signalized intersections as well. While each signal should be designed to enable pedestrians to clear the entire width of the road, the median provides a refuge for slower moving pedestrians who may become caught in the center.

![Median Design Illustration]

Source: Maryland SHA Bicycle and Pedestrian Guidelines

The figure above illustrates a typical design for a raised median at a street crossing. According to the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, raised medians, or crossing islands “should be 6 ft or more to provide space for a wheelchair user or more than one pedestrian to wait.” Travel lanes may be narrowed to 10 feet in constrained conditions to provide space for the median. However consideration should be given to traffic volume, speed, vehicle mix and presence of bicycles when narrowing lanes. While not recommended, raised medians may be narrower than 6 feet. However the cut-through width should be widened to accommodate waiting pedestrians or cyclists.
Driveway Width and Access Management

A significant impediment to pedestrian travel along Greenbelt Road is the width and number of existing driveways. Pedestrians must contend with numerous potential conflicting movements and face undue exposure on entrances that are excessively wide. To promote pedestrian travel, state-of-the-practice recommendations from other jurisdictions include 10’ to 15’ for one-way driveways and 22’ to 25’ for two-way driveways. As properties redevelop, driveway widths should be reduced as much as practical.

As properties redevelop, access management techniques should be employed to reduce the number of driveways (i.e., conflicting turning movements). Access management should be thought of as an attempt to balance the need for good mobility for through traffic with the provision of reasonable access to land uses. The use of access management techniques results in better traffic flow, enhanced property access, and improved safety for motorists and pedestrians. Techniques include:

- Driveways located on side streets as opposed to the major roadway.
- Driveways on the major roadway that are well offset from intersections, and are spaced as far apart as possible.
- Restricting movements at driveways such as allowing “right in”, “right out” only. This can be accomplished by raised medians on the major roadway, or channelizing medians at the driveway entrance. This can simplify turning movements, potentially reducing conflict and confusion at busy intersections.

Interconnecting parcels so vehicular movements from one property to another don’t have to occur on the major roadway. This can be accomplished by service roads or connected parking. These connections should include sidewalks and other pedestrian facilities to encourage and accommodate walking for short trips.

Intersections/Interchanges with High Traffic Speeds and Volumes

Section 7.3 of the MD SHA Bicycle and Pedestrian Design Guidelines provides guidance for the design of interchanges in urban areas where bicyclists and pedestrians are likely to be present. Greenbelt Road has three interchanges with high speed roadways: Baltimore Washington Parkway, Washington DC Beltway (I-495/95), and Kenilworth Avenue (MD 201). Many stakeholders commented that the design of these intersections results in an uncomfortable environment for bicyclists and pedestrians due to the high speeds with which cars are able to navigate the on- and off-ramps.

The following language is excerpted from the MD SHA Bicycle and Pedestrian Design Guidelines, Section 7.3 Bicycle and Pedestrian Access at Interchanges:

Interchanges and other locations with on-ramps and off-ramps can be among the most difficult locations for pedestrians and bicycles to navigate. The combination of high speed merging traffic and crossings by pedestrians and bicyclists creates inherent conflicts and can be very uncomfortable for non-motorized users. Particularly in urban and suburban locations where pedestrian and bicycle traffic can be expected to use the roadway, interchange design should account for their needs.

When an intersection is converted to an interchange, pedestrian and bicycle access should be considered in the design of interchange ramps and all other crossings. The most important principle in designing interchanges that accommodate pedestrians and bicyclists is to reduce motor vehicle speeds at locations where pedestrians and bicyclists either cross the road, or (as in the case with bicyclists operating on-road) merge with traffic. For this reason, urban interchange design with conventional 90 degree intersections (instead of merge lanes) is preferable for pedestrian and bicycle safety. Interchange designs that enable motor vehicles to maintain speeds above 30 mph without stopping are not conducive to pedestrian and bicycle access and should be avoided.

The following graphic illustrates the recommended design of free flow turning lanes in urban areas where pedestrians and bicycles are likely to encounter high volumes of turning traffic.
BENEFITS:
- Approach angles between 35-40 degrees discourage high speed turns, thus reducing speeds in the ramp area
- Reduced curb radii
- Reduced pedestrian crossing distances

SUtable Locations:
- Intersections requiring very large turning radii, or with heavy volumes of right turning traffic

Notes:
It may be determined that the slip turn should feed into an acceleration/speed change lane. This is usually based on
indicators such as vehicle width, volume, speed and pedestrian counts. These maneuvers are often
unaccustomed to pedestrians because they are typically designed for higher turning speeds. Therefore, the
level of pedestrian activity and parked vehicles should also be factored when determining the use of acceleration
speed change lanes at slip lanes. If deemed appropriate, a slip or design to that degree above can be used by
driver turning vehicles at this pedestrian crossing, however this may require additional acceleration lane length or the matching
crossing roadway.

Free Flow Right Turn
Source: Maryland SHA Bicycle and Pedestrian Guidelines
Recommendations to Address Barriers to Walking

Pedestrian Countdown Signals

All signalized crossings should include pedestrian countdown signals. Pedestrians typically are unaware that they must press the push button in order for the signal to provide adequate time for a pedestrian clearance. If possible, considering traffic implications, all signal phases should be timed so that they accommodate pedestrian crossings with many turning movements. For example, many stakeholders expressed concern that turning vehicles exiting Crescent Road at Kenilworth Avenue do not yield to bicyclists and pedestrians trying to cross the street.

Signals in Greenbelt should include Accessible Pedestrian Signals (APS)- especially those located where more accessible crossing guidance is needed by pedestrians with vision impairments or in areas of high crossing volumes. APS include a variety of features of these signals is the use of audible tones and/or arrows, tactile maps, and Braille and raised print information. Pushbuttons should be placed in accessible locations near the appropriate crosswalk/curb ramp.
**Rapid Flashing Beacon**

A flashing beacon is a traffic control signal that operates in a flashing mode (flash rate is defined as one flash per second). It is typically a single light, but can be installed in other combinations. A common application is to add a flashing amber signal to the top of a standard pedestrian sign to provide warning of a pedestrian crossing. The flashing signal has also been used on overhead signs at crosswalks, (such as the crossing of Crescent Road near Northway Road). School zones are sometimes identified with flashing beacons that operate during specific periods of the day. Studies have found inconsistent rates of motorist compliance with laws to stop or yield for pedestrians at uncontrolled crosswalks when only flashing beacons were provided.

A modified version of the flashing beacon – a rapid flashing beacon (LED lights result in high rates of motorist compliance with laws to stop or yield for Section 4k of the Manual on Uniform Traffic Control Devices (MUTCD) defines the RFB may apply for the authority to conduct an evaluation of the device. It is recommended that Greenbelt develop a rapid flashing beacon policy and warrant criteria to determine when to use the RFB. Factors to consider may be based on the RFB's effectiveness in increasing motorist compliance to stop for Greenbelt should also develop a policy restricting the use of the standard should be the only device utilized for uncontrolled pedestrian crossings where Greenbelt should pilot test the rapid flashing beacon to evaluate its and vehicles. The pedestrian crossing of Crescent Road near Northway Road location. The City could perform a baseline evaluation of the current system, with flash rates of 60 flashes per second) has undergone evaluation in Washington, DC, Florida, and Colorado. This sign has shown to pedestrians at uncontrolled crosswalks when only rapid flashing beacons were provided.

FHWA issued an interim approval for the RFB device on July 16, 2008. Local governments wishing to implement sign standard for use at uncontrolled crossings to better align with current research and best practices. The City should develop include vehicle volume, roadway cross-section, motorist operating speed, and sight distance. The warrant criteria should be adjusted pedestrians under various conditions.

**Mid-block crossings**

Properly designed mid-block crossings can significantly enhance pedestrian safety and comfort by increasing the predictability of pedestrian movements, providing enhanced protection for pedestrians, and alerting drivers that pedestrians may be crossing the roadway. Section 10.4 of the Maryland SHA Bicycle and Pedestrian Design Guidelines provides guidance on the use of mid-block crossings.

From the MD SHA Bicycle and Pedestrian Design Guidelines:

While every attempt should be made to cross pedestrians at intersections, midblock crossings are a necessary pedestrian movement in many urban, suburban and rural locations. Since pedestrian travel speeds are much slower than other modes of transportation, pedestrians have a particularly strong desire to travel the shortest possible distance between two points.

For example, when faced with the option to cross an 80-foot wide road at a midblock location versus walk 600 feet to the nearest intersection, cross at the crosswalk and walk back down the street, the majority of pedestrians cross midblock. Assuming a walking speed of 4 feet per second, the midblock crossing in this example requires 20 seconds to complete, while the alternative route requires more than 5 minutes.

Provisions for midblock crossings should be carefully considered, because a poorly designed midblock crossing will violate driver expectance and could cause safety problems for pedestrians. In some situations, the flow of traffic created by adjacent timed traffic signals produces highly reliable gaps, one direction at a time, that allow pedestrians to cross the roadway easily. In these locations mid-block crossings may provide a safer alternative to pedestrians that would otherwise have to cross at a busy intersection with conflicting turning movements. In other situations, there may not be enough gaps for pedestrians to cross at the midblock location unless a pedestrian-activated traffic signal is added.

Since no two midblock crossings are alike, there is no single standard design. Engineering judgment must be used, based on the design principles described throughout this design guide. In general, however, midblock crossings should be considered at locations that are already a source of a significant number of midblock crossings, or are anticipated to generate midblock crossings as a result of new development, and/or where the land use is such that a pedestrian is highly unlikely to cross the street at a nearby intersection.

The graphic on the next page, taken from the MD SHA Bicycle and Pedestrian Design Guidelines, illustrates the elements of a mid-block crossing.
Mid-block Crossing with Raised Median Island

Source: Maryland SHA Bicycle and Pedestrian Guidelines
Curb extensions and Corner Radii reductions

The intersection of two roadways requires construction of curves (designated by a curb radius) to allow vehicles to maneuver while turning without driving over the curb line or entering into opposing travel lanes. Large curves are utilized to allow larger vehicles (such as trucks) to turn within the roadway and/or to allow smaller vehicles to turn at higher speeds. Larger curves require more land and lengthen pedestrian crossing distances. The required curb radius for a vehicle to make the turn is known as the effective curb radius. Oftentimes, this differs from the actual constructed curb radius. When roadways are constructed without consideration of the actual required turning radius of the vehicles utilizing them, the curb radius may be constructed to be larger than necessary which lengthens pedestrian crossing distances and increases vehicle turning speeds.

Curb extensions and corner radius reductions can be used to shorten pedestrian crossing distances, minimize exposure and improve sight distances. Several of the local streets in Greenbelt appear to have extra pavement width, particularly those with on-street parking that is restricted near the corners. These locations could be retrofitted with curb extensions that essentially push the curb line into the street the width of the parking and leave approximately 24’ of width for vehicular passage. Curb extensions may also be used in areas where the interior path system intersects with a roadway. This would ensure that cars do not park in front of the path entrance, increasing people’s awareness of these facilities.

Additionally, some intersections appear to have corner radii larger than necessary. These locations could be retrofitted with smaller radii, which slow turning vehicles, reduce pedestrian crossing distances and allow curb ramps and crosswalks to be placed closer to the corner, increasing the visibility of pedestrians. The ultimate feasibility of the proposed curb extensions and radius reductions will be dependent on an engineering analysis considering the turning movements of appropriate design vehicles. In addition, curb extension locations may require the relocation of existing storm drainage inlets. All of these considerations should be included in a detailed feasibility analysis prior to actual design and construction.

Wayfinding Signage

Wayfinding is very beneficial to pedestrians who are trying to navigate the city’s streets and trails. This is especially important in areas where tourists and other people unfamiliar with an area are likely to be walking. At minimum, wayfinding should be utilized to direct travelers to key destinations that are known to the community, such as:

- Greenbelt Metrorail Station
- Schromm Hills Park
- Roosevelt Center
- Eleanor Roosevelt High School
- Greenbelt Library and Municipal Center
- Greenbelt recreational facilities

There is anecdotal evidence that more pedestrians do not use the path network in Old Greenbelt because they are not familiar with the system. Map kiosks illustrating the internal path system would assist travelers in understanding both where they are and where the paths can take them. An integrated wayfinding system can also strengthen connections between the various parts of the City by creating signage that illustrates a unified community with threads that tie the various neighborhoods and destinations together.

There are several excellent sources for information on wayfinding signage, trailheads, and other amenities. For more information, refer to the following publications:


Lighting

Pedestrians are adversely affected by low-light conditions. Two-thirds of pedestrian fatalities occur between dusk and dawn. Lighting is important along sidewalks and walkways in commercial pedestrian districts such as historic downtown as well as at intersections and midblock crossings, particularly in locations near transit stops. Preferred pedestrian-scale lighting is characterized by shorter light poles (i.e. 15-foot tall posts), lower wattages (except at crossings), shorter spacing between lamp posts, more even light distribution, and high pressure sodium vapor or metal halide lamps. Sodium vapor and metal halide lamps produce a better color definition and “white light” to areas with higher pedestrian volumes.
Shorter light poles may place the street light fixtures at eye level in the second floor bedroom window of high-density residential developments. The light fixtures should therefore be a full cut-off design with the bulb recessed within the fixture, or otherwise incorporate the appropriate shielding, in order to prevent light trespass.

Pedestrian light poles should be spaced as specified in the city’s specifications (not reviewed for this plan). Pedestrian light fixtures should in-fill between street light poles. Distinctive pedestrian scale lamp posts could be used to improve the appearance of the streetscape in pedestrian oriented areas. Additional recommendations:

- Light poles should be placed either in the buffer zone, or on the far side of the sidewalk - and not within the through pedestrian zone.
- The required clear width must be maintained per the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- Light fixtures should be placed within reach of a maintenance vehicle parked on the adjacent roadway, to avoid damage to the adjacent sidewalk and landscaped areas.
- Street lampposts, pedestrian lampposts, and landscape plans must be coordinated to assure that the lights are not engulfed in a canopy of trees.
- Crosswalks should be illuminated at each end by a standard street lamp.

**Pedestrian access to transit**

The location and design of bus stops can significantly impact the safety and comfort of pedestrians accessing transit services. Care should be taken to place bus stops in locations that maximize pedestrian safety and convenience. Determining the best location for bus stops involves choosing among far-side, near-side, and mid-block placement. The table on the following page presents the advantages and disadvantages of each bus stop type.

Best practice research indicates that although each site is unique, generally bus stops should be located on the far side of intersections. Far-side bus stops have the safety benefit of encouraging pedestrians to cross the roadway at the intersection behind the bus. This increases the visibility of pedestrians to drivers traveling through or turning at the intersection. In contrast, pedestrians crossing the roadway in front of a near-side bus stop are not as visible to drivers approaching the intersection from behind the bus. The sight lines between pedestrians and these approaching cars are blocked by the stopped bus.

Mid-block stops can reduce the distance pedestrians need to travel however, they may encourage pedestrians to cross roadways at locations where there are fewer crossing treatments. When possible, bus stops should be located at controlled transit stops should be designed to make boarding and pad to be located at all bus stops to allow pedestrians to roadway edge) and a minimum width of five feet. Sidewalks should be constructed from the embarkation Streets within .25 mile of transit stops should have

A level landing pad, Montgomery County, MD
### Bus Stop Types: Advantages and Disadvantages

<table>
<thead>
<tr>
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<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td><strong>Far-Side Stop</strong></td>
<td>• Minimizes conflicts between right turning vehicles and buses</td>
<td>• May result in the intersections being blocked during peak periods by stopping buses</td>
</tr>
<tr>
<td></td>
<td>• Provides additional right turn capacity by making curb lane available for traffic</td>
<td>• May obscure sight distance for crossing vehicles</td>
</tr>
<tr>
<td></td>
<td>• Minimizes sight distance problems on approaches to intersection</td>
<td>• May increase sight distance problems for crossing pedestrians</td>
</tr>
<tr>
<td></td>
<td>• Encourages pedestrians to cross behind the bus</td>
<td>• Can cause a bus to stop far side after stopping for a red light, which interferes with both bus operations and other traffic</td>
</tr>
<tr>
<td></td>
<td>• Creates shorter deceleration distances for buses since the bus can use the intersection to decelerate</td>
<td>• May increase number of rear-end accidents since drivers do not expect buses to stop again after stopping at a red light</td>
</tr>
<tr>
<td></td>
<td>• Results in bus drivers being able to take advantage of the gaps in traffic flow that are created at signalized intersections</td>
<td>• Could result in traffic queued into intersection when a bus is stopped in travel lane</td>
</tr>
<tr>
<td><strong>Near-Side Stop</strong></td>
<td>• Minimizes interferences when traffic is heavy on the far side of the intersection</td>
<td>• Increases conflicts with right-turning vehicles</td>
</tr>
<tr>
<td></td>
<td>• Allows passengers to access buses closest to the crosswalk</td>
<td>• May result in stopped buses obscuring curbside traffic control devices and crossing pedestrians</td>
</tr>
<tr>
<td></td>
<td>• Results in the width of the intersection being available for the driver to pull away from curb</td>
<td>• May cause sight distance to be obscured for cross vehicles stopped to the right of the bus</td>
</tr>
<tr>
<td></td>
<td>• Eliminated the potential of double stopping</td>
<td>• May block the through lane during peak period with queuing buses</td>
</tr>
<tr>
<td></td>
<td>• Allows passengers to board and alight while the bus is stopped at a red light</td>
<td>• Increases sight distance problems for crossing pedestrians</td>
</tr>
<tr>
<td></td>
<td>• Provides driver with the opportunity to look for oncoming traffic, including other buses with potential passengers</td>
<td>• Requires additional distance for no-parking restrictions</td>
</tr>
<tr>
<td><strong>Mid-Block Stop</strong></td>
<td>• Minimizes sight distance problems for vehicles and pedestrians</td>
<td>• Encourages patrons to cross street at mid-block (jaywalking)</td>
</tr>
<tr>
<td></td>
<td>• May result in passenger waiting areas experiencing less pedestrian congestion</td>
<td>• Increases walking distance for patrons to cross at intersections</td>
</tr>
</tbody>
</table>

Recommendations Addressing Bicycling Barriers

Bike lanes

Bike lanes are portions of the roadway that have been designated for the preferential or exclusive use of bicyclists through striping, signage and other pavement markings. On two-way streets, bike lanes should be provided on both sides of the road so that bicyclists can ride in the same direction as adjacent motor vehicle traffic. Bike lanes should be at least four feet wide on roadways with open shoulders and five feet wide on roadways with curb and gutter. Five foot bicycle lanes are typical, but wider lanes (i.e. 6’) are often used on roadways with high motor vehicle traffic volumes. Bicyclists still have the right to use the travel lanes on streets with bicycle lanes.

Bike lanes can provide the following benefits:

- Increase the comfort of bicyclists on roadways
- Increase the amount of lateral separation between motor vehicles and bicycles
- Indicate the appropriate location to ride on the roadway with respect to moving traffic and parked cars, both at mid-block locations and approaching intersections
- Increase the capacity of roadways that carry mixed bicycle and motor vehicle traffic
- Increase predictability of bicyclist and motorist movements
- Increase drivers’ awareness of bicyclists while driving and when opening doors from an on-street parking space
- Pavement markings designate that portion of the roadway for preferential use by bicyclists.
- Markings inform all road users of the restricted nature of the bicycle lane.

The Manual of Uniform Traffic Control Devices (MUTCD) offers the following guidance on making and signing bike lanes:

- Longitudinal pavement markings should be used to define bike lanes.
- If used, the bicycle lane symbol marking shall be placed immediately after an intersection and at other locations as needed.
- The bicycle lane symbol marking shall be white.
- If the bicycle lane symbol marking is used in conjunction with other word or symbol messages, it shall precede them.
- If the word or symbol pavement markings are used, Bicycle Lane signs shall also be used, but the signs need not be adjacent to every symbol to avoid overuse of the signs.
- A through bicycle lane shall not be positioned to the right of a right turn only lane.
- When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should stop at least 100 feet before the beginning of the right turn lane. Through bicycle lane markings should resume to the left of the right turn only lane.
- An optional through-right turn lane next to a right turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.
- Posts or raised pavement markers should not be used to separate bicycle lanes from adjacent travel lanes.
Example of Pavement Markings for Bicycle Lanes on a Two-Way Street
Example of Bicycle Lane Treatment at Parking Lane into a Right Turn Only Lane
Shared lane markings are pavement markings placed along selected roads that alert automobile drivers to the presence of bicyclists and encourage bicyclists to ride outside of the “door zone” of parked cars. They reduce wrong-way bicycling and tend to increase the distance between bicyclists and passing cars. Shared lane markings are generally used where there is not enough space for bicycle lanes. They should not be used on roadways with a speed limit above 35 miles per hour. Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.

Shared lane markings have the following benefits:

- Provide a visible cue to bicyclists and motorists
- Indicate the most appropriate location to ride on the roadway with respect to moving traffic and parked cars
- Can be used on roadways where there is not enough space for standard width bicycle lanes
- Connect gaps between other bicycle facilities

The shared lane pavement marking should be placed:

- A minimum of 11 feet from the face of the curb when used adjacent to a parking lane;
- A minimum of 4 feet from the face of curb or roadway edge when not used adjacent to a parking lane; and
- Immediately following intersections and spaced at intervals up to 250-foot thereafter;
- The shared lane pavement marking shall not be placed in bicycle lanes. The shared lane pavement marking should not be placed on roadways with speed limits posted above 35 mph.

Shared-Use Paths

The Maryland SHA Bicycle and Pedestrian Design Guidelines devotes an entire chapter to the design of off-road bicycle facilities, also called shared use paths or sidepaths (if adjacent to a road). Generally, paths should be asphalt or other hard, all weather surface although alternative treatments may be considered in situations where volumes are anticipated to be light. The minimum recommended width is ten feet with two-foot shoulders for a two-way path, although widths as narrow as eight feet may be used where little pedestrian activity is anticipated or the pathway must be narrowed to squeeze through a constrained area. Wider paths of twelve to fourteen feet or more are recommended if large volumes of bicycle and pedestrian traffic are anticipated. The following graphic illustrates the preferred cross section of a shared use path.
The SHA Design Guidelines provide additional recommendations for the design of intersections with roadways, vertical and horizontal alignment and other elements.
Driveway Aprons

Driveways with a raised 1” to 2” ‘lip’ where the apron meets the roadway are found throughout Greenbelt. Bicyclists trying to navigate these driveways risk flat tires, bent rims and falling off their bicycle due to the sudden impact of hitting the raised lip. Greenbelt should consider developing more bicycle-friendly driveway design standards to mitigate this issue. Care should be taken to ensure that the redesigned driveways do not negatively impact stormwater drainage or vehicle navigation.

The design detail below is from the City of Portland, OR and illustrates a more bicycle-friendly design:

Oregon Standard Drawing, Detail RD740- Separated Sidewalk Driveways
Source: Oregon Department of Transportation

Storm Drain Grates

Storm grates pose a hazard for bicyclists when the openings are parallel to the bicyclists’ direction of travel. Bicycle tires can get caught between the bars of these grates, and cause bicyclists to crash. The photo illustrates, these have the potential to cause significant harm to a bicyclist and damage to their bicycle. The following types. The following Maryland Standard drain inlets are of a bicycle friendly design: MD-374.02-374.27 (standard

Non-bicycle friendly drain grates should be replaced with one of WR/WRM/NR/NRM inlets).

Bicycle-friendly Drain Grates
Source: Maryland SHA Bicycle and Pedestrian Design Guidelines

Bicycle Accommodation in Roundabouts

Several roundabouts currently exist in Greenbelt and others are considered through this or other plans. Single lane roundabouts can provide significant safety benefits for bicyclists when they are designed to meet their needs. At roundabouts, some bicyclists will choose to travel on the roadway, while others will choose to travel on the sidewalk. Roundabouts can be designed to simplify this choice for cyclists. The following discussion is excerpted from the upcoming edition of the AASHTO Guide for the Development of Bicycle Facilities. While this document is not yet formally approved, it is anticipated that this language will remain largely unchanged in the final version. Additional information on roundabout design and marking may be found in the Manual of Uniform Traffic Control Devices (MUTCD). Revisions are currently being made to this portion of the MUTCD. Any new roundabouts or modifications to existing facilities should reference these two documents.

General Roundabout Design Issues

Since typical on-road bicycle travel speeds are between 10 and 20 mph, roundabouts that are designed to constrain the speeds of motor vehicles to similar values will minimize the relative speeds between bicyclists and motorists, and thereby improve safety and usability for bicyclists. Urban single lane roundabouts should have a maximum design speed of 15 mph or 20 mph (25 km/hr or 30 km/hr), depending on the size of the roundabout. As such, it is critical to ensure that the geometric features of a roundabout (e.g. entry and exit radius, entry and exit width, splitter islands, circulatory roadway width, and inscribed circle diameter) combine to constrain motor vehicle speeds.

Single-lane roundabouts are much simpler for bicyclists than multi-lane roundabouts since they do not require cyclists to change lanes, and motorists are less likely to cut off cyclists when they exit the roundabout. Therefore, when designing and implementing roundabouts, authorities should avoid implementing multilane roundabouts before their capacity is needed. If “design year” traffic volumes indicate the need for a multi-lane roundabout, but this need isn’t likely for several years, the roundabout can be built as a single lane roundabout, and designed to be easily reconstructed with additional lanes in the future when and if the traffic volumes do increase. In addition, where a roundabout is proposed at
Designing for Bicycle Travel Within the Roundabout

In general, bicyclists who have the skills to ride in urban traffic can manage single-lane roundabouts with little difficulty. Where appropriate design speeds are used, 10-15 mph within the roundabout, bicyclists can merge into the lane of traffic with little difficulty. Even at multi-lane roundabouts, many bicyclists will be able to travel through roundabouts in the same manner as other vehicles.

Bicycle lanes should be terminated in advance of roundabouts. The full width bicycle lane should normally end at least 100 feet (30 m) before the edge of the circulatory roadway (see figure “Typical Layout of a Roundabout with Bike Lanes”). Terminating the bicycle lane cues bicyclists to merge into the lane of traffic. An appropriate taper should be provided to narrow the sum of the travel lane and bike lane widths down to an appropriate entry width for the roundabout. The taper should end prior to the crosswalk at the roundabout, to achieve the shortest feasible pedestrian crossing distance. A taper rate of 7:1 is recommended to accommodate a design speed of 20 mph (25 km/hr). To taper a 5 to 6 foot (1.5 to 1.8 m) wide bicycle lane, a 40 foot (12 m) taper is recommended. The bicycle lane line should be dotted for 50 to 200 feet (15 to 60 m) in advance of the taper. A longer dotted line encourages cyclists to avail themselves of timely gaps to merge into traffic, rather than delay until a point where, if no gap is available at the moment, the only safe alternative is to pause and wait for one. The bike lane line should be terminated at the start of the taper or where normal bicycle lane width is no longer available.
Bicycle lanes should not be located within the circulatory roadway of roundabouts. This design would suggest that bicyclists should ride at the outer edge of the circulatory roadway, which creates turning conflicts at exits and entrances. At roundabout exits, an appropriate taper should begin after the crosswalk, with a dotted line for the bike lane through the taper. The solid bike lane line should resume as soon as the normal bicycle lane width is available. Currently there are no MUTCD approved signage to alert drivers and other users of merging cyclists. However, some experimental signs have been approved for implementation by the District of Columbia's Department of Transportation.
At multi-lane roundabouts, some on-road bicyclists may not feel comfortable navigating roundabouts on the roadway. Bicycle ramps can be provided to allow access to the sidewalk or a shared-use path at the roundabout. Bicycle ramps at roundabouts have the potential to be confused as pedestrian ramps, particularly for pedestrians who have visual impairments. Therefore, bicycle ramps should only be used where the roundabout complexity or design speed may result in less comfort for some bicyclists. Ramps should not normally be used at urban single lane roundabouts.

Where bicycle ramps are provided at a roundabout, consideration should be given to providing a widened sidewalk at the roundabout. In areas with relatively low pedestrian usage and where bicycle usage of the sidewalks is expected to be low, the normal sidewalk width may be sufficient. In some jurisdictions, state or local laws may prohibit cyclists from riding on sidewalks. In these areas, bicycle ramps may not be appropriate.

Bicycle ramps should be placed at the end of the full width bicycle lane, just before the beginning of the taper for the bicycle lane. Bicyclists approaching the taper and bike ramp will thus be provided the choice of merging left into the travel lane, or moving to the right onto the sidewalk. Where no bicycle lane is present on the approach to a roundabout, a bicycle ramp, if used, should be placed at least 50 feet (15 m) prior to the crosswalk at the roundabout. Bicycle ramps should be placed at a 35° to 45° angle to the roadway to enable cyclists to use the ramp even if pulling a trailer, but to discourage them from entering the sidewalk at high speed. Ideally, the sidewalk approaching the roundabout is separated from the roadway with a planter strip, allowing the ramp to be placed outside of the normal sidewalk area. In this case, the bike ramp can be fairly steep as it is not intended for pedestrian use (up to 20% slope). If placed within the sidewalk area itself, the ramp slope must be built in a manner so that it is not a tripping hazard. A bicycle ramp should not be placed directly in line with the bicycle lane or otherwise placed in a manner that appears to encourage or require their use.

Since bike ramps can be confusing for pedestrians with visual impairments, detectable warnings should be included on the ramp. Where the ramp is placed in a planter strip, the detectable warnings should be placed at the top of the ramp, as the ramp itself is part of the hazardous vehicular area. If the ramp is in the sidewalk itself, the detectable warning should be placed at the bottom of the ramp. Other aspects of the bike ramp design and placement can help keep pedestrians from misconstruing the bike ramp as a pedestrian crossing location. These aspects include the angle of the ramp, the possible steeper slope of the ramp, and location of the ramp relatively far from the roundabout and marked crosswalk location.

Bicycle ramps at roundabout exits should be built with similar geometry and placement as the ramps at roundabout entries. Bike ramps should be placed at least 50 feet (15 m) beyond the crosswalk at the roundabout exit.