

**IMPROVING ACCESS  
TO TRANSIT**

**CITY OF  
GAITHERSBURG**

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# ACKNOWLEDGEMENTS

## CITY OF GAITHERSBURG

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# INTRODUCTION

The City of Gaithersburg is a diverse, dynamic community increasingly aware of the need to connect local and regional amenities with non-automotive transportation options. Part of the City's approach is improving access to public transportation for those who want to bike or walk to the train or bus.

Existing transit services in Gaithersburg include the Frederick/Brunswick Line of the MARC commuter rail service, Metrobus and Ride-On bus services. Planned transit services include Bus Rapid Transit (BRT) along MD 355 and/or the Corridor Cities Transitway.

Currently, transit stations that serve Gaithersburg residents, and people who work, shop or recreate in the City, include the Metropolitan Grove MARC station, the Gaithersburg MARC Station and the Lakeforest Transit Center. These three transit stations serve as transportation service focal points for two Regional Activity Centers identified by the MWCOG<sup>1</sup> (Gaithersburg-Metropolitan Grove and Gaithersburg-Central). Due to the regional nature of the stations, they serve more than just City residents. Adjacent communities, including Montgomery Village, heavily use these transit resources.

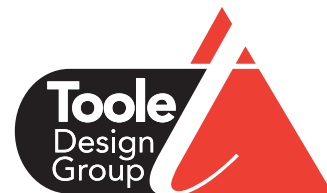
<sup>1</sup> MWCOG - Metropolitan Washington Council of Governments

Recent regional studies conducted by the COG Transportation Planning Board (TPB) and the Washington Metropolitan Area Transit Authority (WMATA) have identified specific bicycle and pedestrian access improvements for Metrorail stations and some other transit centers in the region, however none of these, or other studies, have focused on bicycle and pedestrian access to and from the three transit centers identified above, which are located within the City of Gaithersburg.

For this reason, the City of Gaithersburg has received funding from the MWCOG Transportation-Land Use Connections Program to study ways to improve bicycling and walking conditions for half-mile access and egress from these three transit centers.

Specifically, the objectives of this study are threefold:

- + To determine how the City should enhance, prioritize and fund bicycle and pedestrian travel improvements in two of Gaithersburg's four Regional Activity Centers, thus decreasing the need for single-occupancy vehicle use; increasing transit mode share, and fostering a climate conducive for development, redevelopment and revitalization.
- + To determine how the City can provide more convenient and safer access to transit for low-moderate income households that depend upon public transit for access to employment and other daily travel needs.
- + To determine what impediments to bicycling and pedestrian travel exist that may discourage people from accessing the transit services provided at these stations.



## SCOPE AND METHODOLOGY

Typically, a study of bicycle and pedestrian access to transit will look at bicycling and walking conditions up to three miles from the transit station. However, due to the close proximity these stations have to each other and the limited size of the City of Gaithersburg, it was determined that this study should focus on non-motorized travel conditions within a half-mile radius of each station.

For pedestrian access and egress, this half-mile limit is consistent with transit users typical travel behavior which indicates a willingness to walk  $\frac{1}{4}$  to  $\frac{1}{2}$  miles from a transit station or stop as a part of a trip using that service. Those who bicycle as their means of access or egress will typically be willing to travel a mile or more. As a result, this study does include a few bicycling recommendations that are just outside the half-mile-radius study area, however they are typically within the city limits of Gaithersburg.

Four types of recommendations are presented as a result of this study: a) general recommendations that apply to all three station locations and potentially the whole City of Gaithersburg, b) general recommendations that apply to each individual station area c) development policy guidance related to the City's review of ongoing and future private development in each study area, and d) location-specific infrastructure improvements that will improve conditions around the station for pedestrian and bicycle travel.

While the City alone will be able to address many of the recommendations, some will require close coordination, or partnerships with Montgomery County, the Maryland State Highway Administration, and/or private property owners.

In addition to spending several days doing fieldwork in the study areas, the TDG project team reviewed a number of planning and engineering documents that helped inform the recommendations of this report.

These documents include:

- + The City of Gaithersburg Master Plan: Transportation Element (2009)
- + The Montgomery Village Master Plan (2015)
- + The Lakeforest Transit Center Feasibility Study (2015)
- + MARC Riders Advisory Council Meeting Minutes (April 2016)
- + Casey Property West Schematic Development Plan (2005)
- + Corridor Cities Transitway Preliminary Engineering Submission (2015)
- + Olde Towne Park Plaza Concept Presentation (2016)
- + Olde Towne Traffic Study (2015)



This document is organized around three individual Station Area Reports. Each Station Area Report contains the following elements:

- + A brief introduction, which includes information about upcoming development likely to impact the area's built environment,
- + A description of existing conditions with a focus on development form, street and road configurations, and the presence of existing, planned, or potential pedestrian or bicycle facilities, and
- + A set of recommended bicycle and pedestrian access improvements, with varying time horizons.
  - short-term (<2 years),
  - medium-term (2-5 years), and
  - long-term (>5 years).

A planning-level cost estimate is provided for each of the facility- and location-specific recommendations. Cost estimates are not provided for general or policy-related recommendations. A complete cost estimate table with unit costs can be found in the Cost Appendix. A detailed cost estimate breakdown is on file with City staff.

The recommendations made in this study are focused on meeting the safety and accommodation needs of pedestrians and bicyclists. Modern multi-modal transportation planning principles and practices recognize that bicyclists and pedestrians are the most vulnerable users of the public right-of-way and where possible, need physical protections in shared-mode environments.

In Olde Towne, and other older parts of Gaithersburg, modern transportation demands are often greater than some of the rights-of-way can handle. Along some roads providing minimum standard conditions for every mode, i.e. motor vehicles, commercial trucks, modern buses, trains, new transitways, bicyclists, pedestrians and people with disabilities, may not be possible.

Because setting modal priorities in a constrained environment may require making difficult choices and/or consideration of non-standard, custom or innovative, design treatments, this study recognizes that some recommendations will need more detailed feasibility study prior to implementation. In these studies, impacts on various travel modes, consideration of long range infrastructure plans, and assessment of all current transportation needs will need to be addressed.

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## GENERAL RECOMMENDATIONS – ALL STATION AREAS

After completing a review of each of the three transit station areas, a few global recommendations were apparent. The following considerations apply to some degree to all three station areas and may apply elsewhere throughout the City. They also support the City’s broader goal to make Gaithersburg safer and more attractive for bicycling and walking and foster a culture that is less-oriented to single occupancy motor vehicle use for short trips in the City and surrounding area.

### Bicycle Parking

A necessary component to fostering increased use of the bicycle for transportation is having a safe place to lock your bike at the end of your trip. At each of the three study stations, the City should improve its supply and management of bicycle parking. The Association for Pedestrian and Bicycle Professionals has established national guidance for bicycle parking at rail, bus or intermodal transit stations. For stations in a suburban context, their recommendations include the following:

- + Long-Term (High Security) Bicycle Parking of AM peak period boardings 5%
- + Short-Term Bike Parking (Covered Racks) of AM peak period boardings 1.5%

Currently, available equipment for high security bicycle parking includes standard (pre-assigned) bicycle lockers, on-demand lockers, individual covered racks (bike lids), and limited access bicycle parking storage rooms. Equipment for low security bicycle parking include a wide range of modular covered bicycle racks, as well as racks that can be purchased in individual units and placed under an existing cover or independently-provided “shed.”

Initially, relatively low volumes of bicycle parking will be sufficient to meet current and near future needs. As a result, for each of the stations in this study, a combination of individual covered racks (bike lids) and modular units of covered bicycle racks are recommended. The recommended mix of equipment for each station is addressed in the report for each station.

Ideally, bicycle parking quantities should be driven by AM peak boarding data. However, given the current AM peak boardings at the three transit stations in this study, it is recommended that Gaithersburg start with smaller quantities of higher grade bicycle parking equipment and see how transit users respond to the improved bike parking options. As new bike parking becomes fully utilized, the City should respond in a timely manner with additional equipment to provide



Individual covered bicycle parking type known as a “bike lid”



An indoor bicycle station in San Francisco



Covered bicycle parking

sufficient capacity to meet demand and slightly exceed proven demand. A best practice is to maintain an oversupply of bike parking at any one location that is equal to ~10 percent of total capacity; this way there will always be an available rack, locker, or bike lid available for the new person who needs bicycle access to the station.

In addition to modifying the equipment types and quantities of bicycle parking, it is recommended that the City develop a simple program for management and maintenance of the equipment. The key management task is the periodic gathering of data regarding use of the equipment and determining if and when more capacity may be needed, and of what type of equipment. Additionally, information should be gathered from users to monitor maintenance needs, the security track record, and other customer satisfaction factors.

### Americans with Disabilities Act Compliance

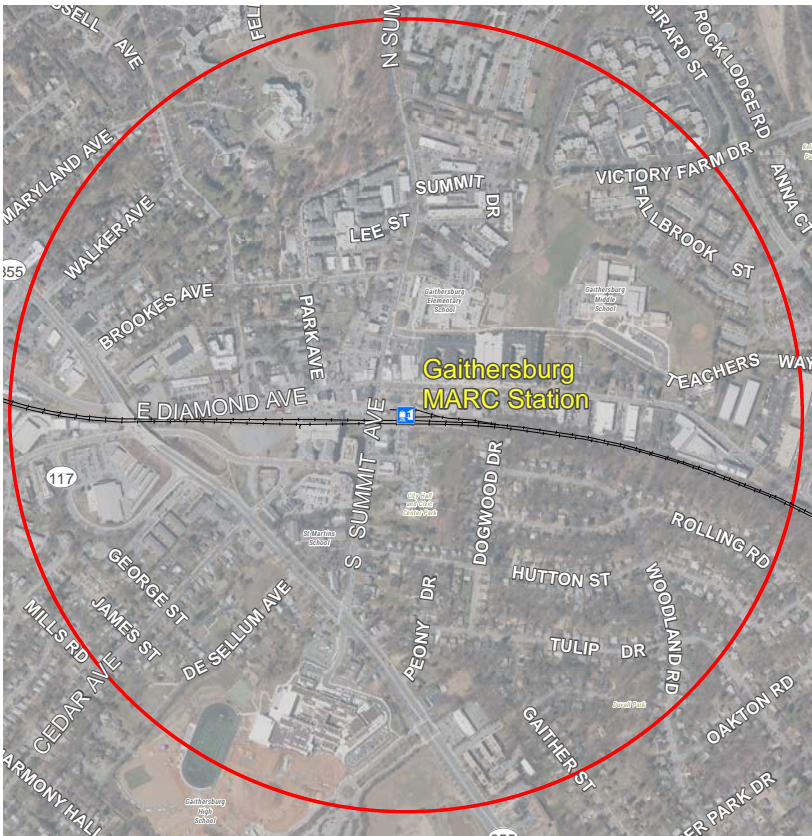
The ADA requires all local and state jurisdictions with public infrastructure to develop a Transition Plan for making their public streets, roads and other facilities ADA compliant. It is recommended that Gaithersburg develop a Transition Plan for City-owned streets and sidewalks and related crosswalks, curb ramps, driveway crossings, and signal equipment, to ensure that over time in an orderly and affordable way, all of the deficient infrastructure is upgraded to current or future standards. The City can also incorporate such a plan in its Pavement Management program.

### Street Design

While the Project Team conducting this study did not undertake a complete review of the City's street design standards, they did notice patterns common to all three of the study areas. It is recommended that the City consider reviewing its street design and traffic safety standards in two areas:

- + Reducing the standard curb radii (and the range of acceptable curb radii) at intersections of local city streets, and local streets with collector and arterial roadways. While access for emergency vehicles must be maintained (and in some areas, access for trucks and buses), in many locations tightening curb radii is a key component of slowing traffic, protecting pedestrians at intersections, and providing the highest quality curb ramps and crosswalks. Large radii force curb ramps to be skewed from the alignment of crosswalks, and facilitate vehicular turns at higher speeds, which reduces motorist yielding to pedestrians and cyclists. The City already addresses curb radii issues as part of the development review process. It should also consider reviewing curb radii on older streets to make sure they are as tight as they can be to improve the pedestrian environment.
- + Providing crosswalks at intersections of local streets and local streets with collectors and minor arterials will help communicate that pedestrian travel and safety is a top city priority. Many crossing locations that can be used on pedestrian routes to these three transit stations are unmarked. While unmarked crossings are still legal, the marking of all crosswalks in the commercial and mixed-use portions of the City that have regular use will, over time, help train motorists to expect pedestrians and yield to them at crossings.

# GAITHERSBURG MARC STATION



1/2 mile radius around the Gaithersburg MARC Station

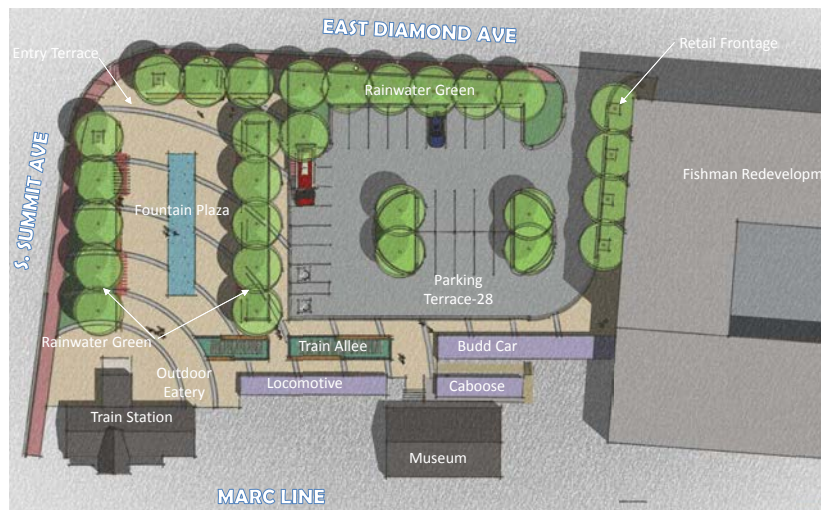


## INTRODUCTION

The Gaithersburg MARC station is located in the center of Olde Towne Gaithersburg just east of South Summit Avenue. Surrounding this station, East Diamond Avenue borders a public parking lot on the north side and Wells Avenue borders a public parking lot just south of the railroad tracks. Within a few blocks of the station is the City Hall, the Post Office, a branch of Montgomery College, three public schools (Gaithersburg ES, MS, and HS), as well as many small businesses, restaurants, and residential neighborhoods.

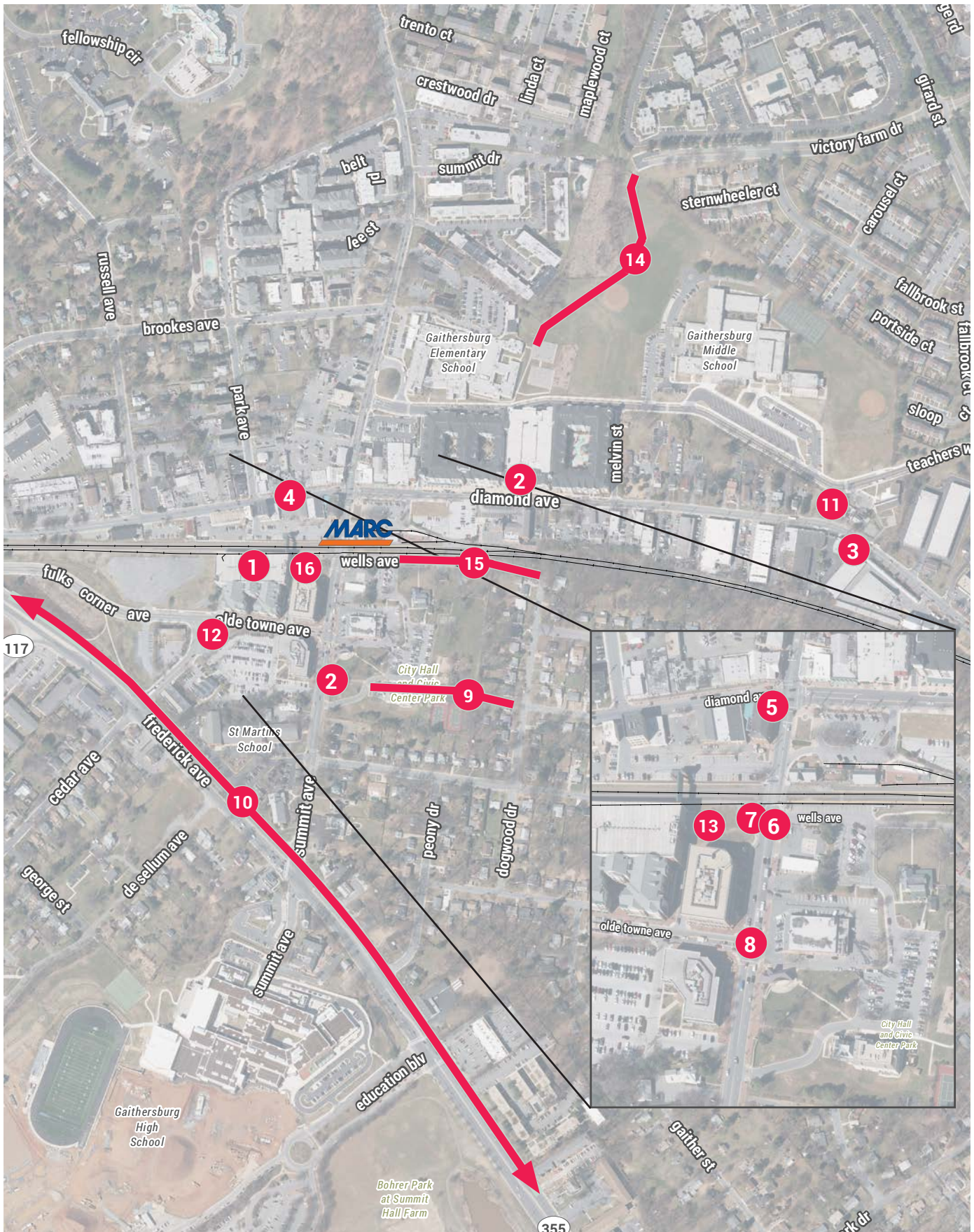
A general estimate of station use can be inferred from boarding counts provided by the Maryland Transit Administration which operates the MARC commuter rail service. On February 10, 2016, **575 boardings** were recorded in the AM and **36 in the PM.**<sup>2</sup>

<sup>2</sup> MARC Riders Advisory Council Meeting. April 21, 2016. <https://mta.maryland.gov/sites/default/files/2016-04-21-1630hrs-Summary-Minutes-with-Handouts.pdf>



Concept drawing for redesigned Olde Towne Park Plaza

Figure 1.1: Gaithersburg MARC Station Existing Conditions



## Parking

The City provides free parking for potential MARC passengers in a 726-space parking structure southwest of the station and immediately adjacent to the CSX tracks (1). All other public parking options in the area are restricted to short-term parking, including the City Hall parking lot and the parking lot between the Shell gas station and the MARC station along Wells Avenue.

**Bolded numbers in parentheses connect specific locations referenced in text to the adjacent map in Figure 1.1.**

## Street Connectivity

Due to the small number of streets crossing the CSX tracks, Summit Avenue, East and West Diamond Avenues and Olde Towne Avenue are the main streets providing access to the station. The intersection of Summit and East Diamond is key for bicycle and pedestrian access from the north, northwest and west of the station. South Summit is key to access from the south and southwest. Pathways through Griffith Park are key to access from the southeast. East Diamond and Teachers Way are key to access from the Northeast.

## Sidewalks, Paths and Crossings

Along the main streets listed above, the existing sidewalk network is mostly complete, however along some road segments the sidewalks are very narrow and obstructed by utility poles. South Summit Avenue in front of City Hall and East Diamond Avenue in front of Gaithersburg Station Apartments have high quality sidewalks that should be considered as a standard for this and other station areas (2).

Off of the main thoroughfares, most of the low-speed residential streets, such as Dogwood Drive and Rolling Road, do not have sidewalks. Where sidewalks are present, for example, along Hutton Street and Peony Drive, they are discontinuous and narrow. Because these streets do not serve through-traffic, it may not be necessary for them to have sidewalks, however if pedestrian safety issues arise, the City may explore engineering, education, and/or enforcement options to make sure streets are safe for all users.



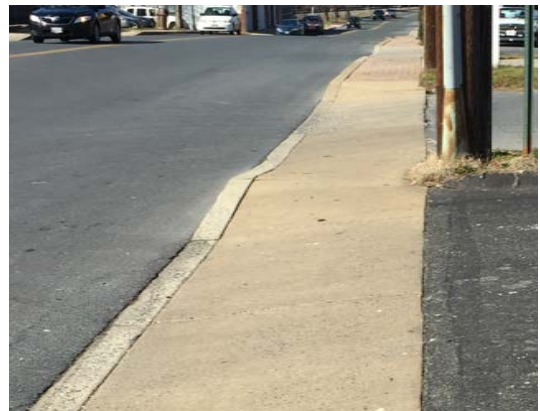
*East Diamond Avenue streetscape in front of Gaithersburg Station Apartments*

### East Diamond Avenue and Melvin Street

There is a short sidewalk gap at 435 East Diamond that should be addressed (3). Redevelopment of parcels on this side of the street will create an opportunity to have developers improve the existing sidewalk network on the south side of East Diamond Avenue.

### East Diamond Avenue and South Summit Avenue

In addition to adding new paths or sidewalks, there are several places where sidewalks should be widened or otherwise improved. On East Diamond Avenue west of South Summit Avenue, especially on the north side of the street, there are narrow, obstructed sidewalks that have cross slopes at numerous driveways and are not ADA-compliant, making it difficult for those with limited mobility to access transit and local businesses (4).



*Narrow sidewalk with cross slopes at driveways along East Diamond Avenue*

The southwest corner of East Diamond Avenue and South Summit Avenue has extremely poor visibility for both

pedestrians and drivers (5). Due to the lack of building setback and utility poles located in the sidewalk, the walkable area narrows to 2.5 feet at the corner, making it nearly impossible for pedestrians and turning drivers to see each other and safely negotiate the intersection. The narrow width, downslope at the corner, lack of pedestrian push buttons, and lack of tactile warnings not only make this intersection non-ADA compliant, but very difficult to traverse for any user.

#### Wells Avenue and South Summit Avenue

The intersection of Wells Avenue and South Summit Avenue is particularly confusing for both pedestrians and drivers (6). There is a rectangular flashing beacon, a marked crosswalk, and also a full traffic signal. The uncertainty brought on by multiple conflicting traffic signals compounds the “multiple-threat” situation brought on by the presence of four travel lanes.

A “multiple-threat” situation occurs if a pedestrian is trying to cross the street and the driver in the nearest lane yields, blocking visibility to and from the inner travel lane, making it difficult for motorists and pedestrians alike to see each other, and increasing the likelihood that a pedestrian could be hit by a non-yielding motorist in the inner travel lane.

Additionally, on the west side of South Summit Avenue, immediately south of the CSX tracks, the wide brick sidewalk narrows to three feet against the curb as it crosses the CSX right-of-way (ROW), putting pedestrians in close contact with potentially high speed traffic (7). This sidewalk is not ADA-compliant because it is too narrow for wheelchair users to make turning maneuvers, and the curb ramp for the Wells Avenue crosswalk creates an unacceptable sidewalk cross-slope.

#### Olde Towne Avenue and South Summit Avenue

At the intersection of Olde Towne Avenue and South Summit Avenue, the TDG Team observed motorists making right turns from South Summit Avenue to Olde Towne Avenue at high speed and poor yielding behavior to pedestrians who have the right of way (8). Orange flags have been placed at this intersection to improve the visibility of pedestrians, however, design improvements are needed to make it easier for pedestrians to be seen crossing South Summit Avenue at the unsignalized marked crosswalks, especially by left-turning traffic from Olde Towne Avenue.



*A Rectangular Flashing Beacon at Wells Avenue and South Summit Avenue confuses pedestrians and motorists when paired with a traffic signal*



*Vehicles turn right at speed from South Summit Avenue to Olde Towne Avenue*



*Pedestrian desire line between the City parking garage and South Summit Avenue*



### Griffith Park at City Hall

There are paths through Griffith Park adjacent to City Hall that connect residential communities to the south and east to the MARC station and the downtown core (9). The current path orientation allows for direct north-south and east-west pedestrian routing, but it is difficult and circuitous for pedestrians to move from southeast to northwest (the prevailing desire line) without crossing through the City Hall parking lot, which does not have complete pedestrian accommodations within or around it.



*Pedestrian desire line between East Diamond Avenue and Teachers Way*

### Frederick Avenue

North and South Frederick Avenue (MD 355) in the study area is a median-divided highway with 2-3 travel lanes in each direction in addition to turn lanes (10). Motorists routinely exceed the posted 30 mph speed limit. Sidewalks in the corridor are either against the curb or separated by a narrow landscape buffer. Wider sidewalks and/or separated bicycle infrastructure are needed here.



*Faded shared lane markings on Girard Street approaching East Diamond Avenue*

### Desire Lines

Fieldwork on March 7th, 2016 identified heavily used desire lines (i.e. well-worn dirt path) in a number of areas, indicating that there are active pedestrian and/or bicycle routes currently unserved by formal paths or sidewalks.

- + There is a desire line near the Gaithersburg Youth Center where pedestrians cut across a vacant lot which links Teachers Way and East Diamond Avenue (11).
- + There is a desire line that cuts across a public green space where Olde Towne Avenue meets Fulks Corner Road (12).
- + The most direct route between the City parking garage and the MARC station is currently a partially improved gravel path that connects to the marked crosswalk at Wells Avenue and South Summit Avenue (13).



*Long-term bicycle parking adjacent to the City parking garage*

### Bicycling Facilities

The only notable on-road bicycle infrastructure near Olde Towne are the shared lane markings on Girard Street and Victory Farm Drive. However, there are three important paved, off-road paths that are used by cyclists and pedestrians:

- + A narrow asphalt path connects Victory Farm Drive to Gaithersburg Elementary School; from which a number of routes are possible to the MARC station. This path is in poor condition, needs curb ramps at either end, and may need to be re-aligned to provide a route that does not require traveling between buildings on the elementary school campus (14).
- + A narrow concrete sidewalk connects Dogwood Drive to the MARC station (15).

Twelve bicycle lockers are provided on the ground floor of the parking garage near South Summit Avenue. No bicycle racks are provided at the station itself or within the adjacent public parking lots surrounding the station (16).

## Wayfinding

Wayfinding signs that provide guidance to the MARC station and MARC parking garage are limited to a few signs on select approach roadways that are primarily oriented for motorists. There are no signs to aid pedestrians and bicyclists that may want to use a minor street route or one of the “cut-through” pathways. There are also no signs directing cyclists to the bicycle lockers, or that identify what the lockers are, and explain how to rent/use one.

## Future Development

The station site and commercial area around it has undergone significant redevelopment and revitalization; and additional redevelopment is ongoing. This development has increased the number of people living in close proximity to the station and strengthened the business climate along East Diamond Avenue. Recent large developments include the Gaithersburg Station Apartments on East Diamond Avenue and Cedar Court on Olde Town Avenue. The Y-Site development next to Cedar Court is ongoing. Redevelopment immediately adjacent to the station (the “Fishman Redevelopment”) is also in the planning stages.

A recent re-visioning process for the Olde Towne Park plaza envisions improvements that include a fountain, seating areas, stormwater-retention landscaping, and a parking lot flush with the streetscape that can be used as an event space.



## RECOMMENDATIONS

This section provides both general and location-specific station area recommendations.

### GENERAL

- + Making all sidewalks and intersections in the Olde Towne area ADA-compliant and PROWAG-compliant<sup>3</sup> should be a top city priority.
- + Zoning and redevelopment regulations should be reviewed to ensure that the City has the ability to require right-of-way dedications and bicycle and pedestrian facility construction as a part of redevelopment activities. Within one half mile of this station, along collectors and arterials in commercial and mixed-use areas, sidewalks provided with redevelopment should be at least 6-foot wide with landscaped buffers of at least 4 feet.
- + The City should work with MDSA to improve conditions and safety for vulnerable road users on North and South Frederick Avenue.<sup>4</sup> Potential options include a lane diet with regained right-of-way being used for wider sidewalks, widening sidewalks through easements from adjacent property owners, or a lane diet and a road diet to create room for sidewalk-level separated bicycle lanes. Future plans for Bus Rapid Transit on this corridor also provide an opportunity to improve pedestrian and bicycle facilities.

### LOCATION-SPECIFIC

#### Short Term

#### Bicycle Parking Improvements

- + **Install additional bicycle parking and relocate bicycle lockers** from the City parking garage to the surface parking lot near the station on the south side of the tracks (**OT11**). Placing bicycle parking in close proximity to the user's destination meets the first criteria for making bicycling a more appealing access or egress transportation option. The City should install five covered inverted "U" racks to provide 10 short-term parking spaces.
- + **Provide signage that identifies the bicycle parking**, and communicates the protocol for reserving/renting a bike locker (**OT8**)
- + **Provide signage that helps cyclists** approaching the Olde Towne area find their way to the bicycle parking options available (**OT10**). Market these services on the City website and on MTA's MARC service website.

Location-specific station area recommendations have a unique identifying code allowing the reader to locate the recommendation on the station area map and the cost estimate table at the end of this section. All recommendations improve access to transit for pedestrians and bicyclists in some way. Some improvements are geared toward making existing infrastructure more apparent to potential users. Others call for the construction of new facilities. These recommendations seek to remedy issues identified in the prior existing conditions section.

Location-specific recommendations are divided into short-term (<2 years), medium-term (2-5 years), and long-term (>5 years) based on project's complexity, cost, and level of inter-jurisdictional coordination required to accomplish it.

<sup>3</sup> ADA - Americans with Disabilities Act

PROWAG - Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way

<sup>4</sup> While this plan was being written, a student at Gaithersburg High School was killed when he hit an obstacle in the sidewalk while riding his bicycle, and he was thrown into the street and hit by a passing car.



Example bicycle wayfinding from Arlington, VA

## Pedestrian Improvements

- + **Build a sidewalk along the desire line** from Fulks Corner Road to Olde Towne Avenue. As appropriate, consider providing seating or additional landscaping along this new sidewalk to create a comfortable environment (OT3).
- + **Upgrade the gravel path** from the City parking garage to South Summit Avenue (OT2). While this path is on private property, it is in the City’s interest to improve convenience and comfort for transit users walking between the parking garage and the MARC station.
- + **Repave and widen the existing path** connecting Victory Farm Drive to North Summit Avenue via the Gaithersburg Elementary School site. Add path segments and curb ramps to create smooth and ADA accessible links at Victory Farm Drive, Brooke Avenue and the sidewalk Teachers Way (OT18).
- + **Eliminate the 10-foot long sidewalk gap** on the south side of East Diamond Avenue at 435 East Diamond near the Gaithersburg Youth Center (OT6).
- + **Work with the property owner to construct a temporary gravel path** until the site is redeveloped. If a permanent bike/pedestrian link on the edge of this property cannot be provided with redevelopment, provide wayfinding to enable bicyclists and pedestrians to use the public linkage provided at the Gaithersburg Youth Center in Olde Towne (OT7).



*Pedestrian desire line between Olde Towne Avenue and Fulks Corner Avenue*



*Eroded gravel path connecting the City parking garage to South Summit Avenue*

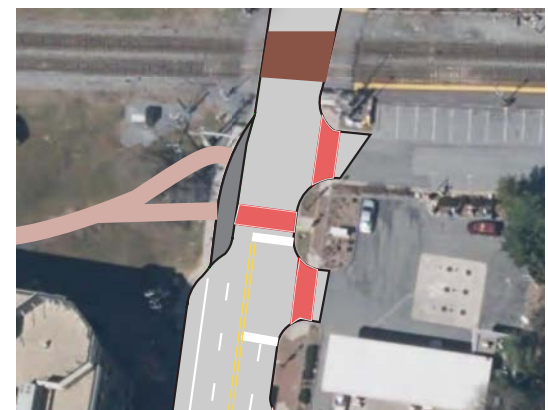
## Medium Term

### Bicycle Parking Improvements

- + **Install five bike lids and five more covered inverted “U” racks** in the station area (OT21). This recommendation builds on the short-term bike parking recommendation. If demand is sufficient to warrant adding additional bike parking, consider these types and quantities.

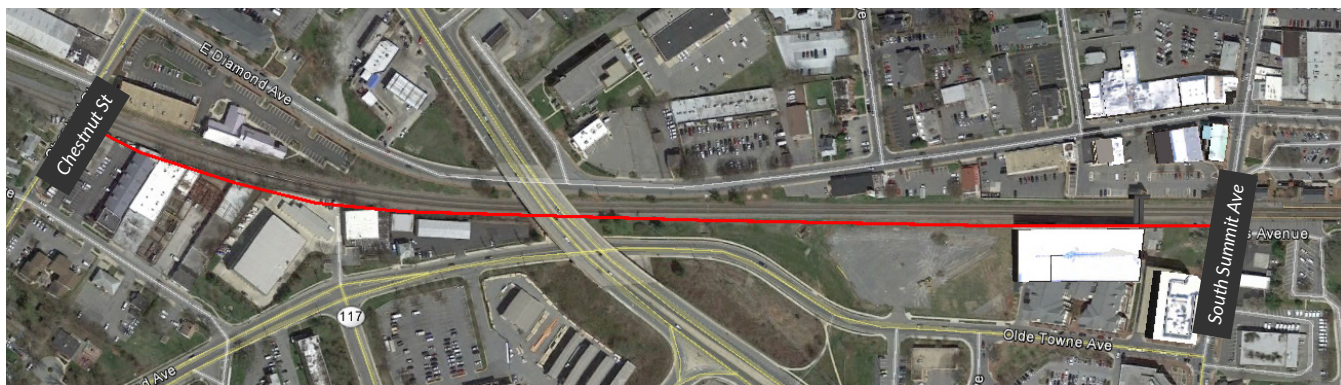
## Pedestrian Improvements

- + **Reconstruct the sidewalk** on the north side of East Diamond Avenue from Summit Avenue west to 2 East Diamond. (OT5).
- + **Widen the sidewalk** on the west side of South Summit Avenue immediately south of the CSX tracks and narrow the roadway to make the corridor more walkable and reduce pedestrian crossing distance at the intersection with Wells Avenue (OT4). This can be accomplished if the road taper from one northbound lane to two begins south of the Wells Avenue marked crosswalk instead of to its north.



*Conceptual drawing of the proposed South Summit Avenue sidewalk widening (OT4). Widened sidewalk shown in dark grey.*

- + **Construct a shared-use path** along the south side of the CSX tracks from South Summit Avenue to the MD 355 overpass or all the way to Chestnut Street. This path will help residents living west and southwest of the MARC station directly access the station and its surroundings. Right-of-way appears sufficient for a trail. The City should reach out to CSX with a concept plan for the trail and start a conversation about feasibility, cost, and timeline (**OT19**).



Proposed shared-use path along CSX railroad from Chestnut Street to South Summit Avenue shown in red (**OT19**)

## Intersection Improvements

- + **Repave and restripe the crosswalk** at Wells Avenue. When deteriorated, existing brick should be replaced with stamped concrete or decorative asphalt to improve long term durability and pedestrian comfort (**OT12**). Concrete and asphalt are both more durable than brick. The decorative option of both of these materials allows the City to perpetuate the placemaking nature of the markings in a more durable way.
- + **Install an actuated or full traffic signal** with pedestrian countdown timers and crosswalks on both legs at the intersection of North Frederick Avenue and Fulks Corner Road/Cedar Avenue (**OT20**). It is more than a half mile between the crossings at Summit Avenue and Chestnut Street. Contact SHA to begin a discussion about what warrants are necessary for signal installation.
- + **Reconfigure the intersection** of South Summit Avenue and East Diamond Avenue.
  - **Construct small curb extensions** at the severely constrained southwest and northeast corners to create additional room for pedestrians and to improve lane alignment. There is currently ample room to extend the aforementioned curbs into the parking lanes in the east and westbound directions without affecting traffic lane width (**OT14**).
  - Restricting southbound left turns at the intersection also allows for more receiving space for northbound vehicles. This makes it possible to reduce traffic signal cycle length from 150 seconds to 120 seconds, improving pedestrian convenience and safety. Would-be southbound left-turning vehicles can instead turn left onto Teachers Way.
  - **Move utility poles and the traffic mast arm** on the western side of South Summit Avenue as it approaches East Diamond Avenue to the eastern side of the street to increase the usable sidewalk area. The traffic mast arm in particular takes up about half the sidewalk width (**OT16**).
- + **Add an actuated pedestrian crossing phase** when there are no conflicting southbound vehicle movements to reduce pedestrian and motorist confusion about correct right of way at Wells Avenue and South Summit Avenue (**OT17**). The City should study how this can best be accomplished at some point in the future. The Rectangular Rapid Flashing Beacons at this location should be removed and replaced with pedestrian signals and countdown clocks if the actuated crossing phase is added.

- + **Reduce the northwest corner curb radius** at South Summit Avenue and Olde Towne Avenue to slow motorist turning speeds and improve pedestrian safety. This can be accomplished with a mountable apron to facilitate truck and transit vehicle turning movements. Additionally, it may make sense to install Rectangular Rapid Flashing Beacons to aid pedestrians crossing South Summit Avenue. A raised crosswalk across Olde Towne Avenue could also be effective in slowing turning traffic and improving yielding behavior (**OT13**).

## *Long Term*

### **Pedestrian Improvements**

- + **Construct a shared-use path** along the south side of the CSX tracks connecting the Gaithersburg MARC station to the Washington Grove MARC station (**OT9**). This path will contribute to the beautification of the rail corridor, and enhance property values. It will also provide provide a key segment of a longer shared-use path needed between Olde Towne Gaithersburg and the Shady Grove metro station.

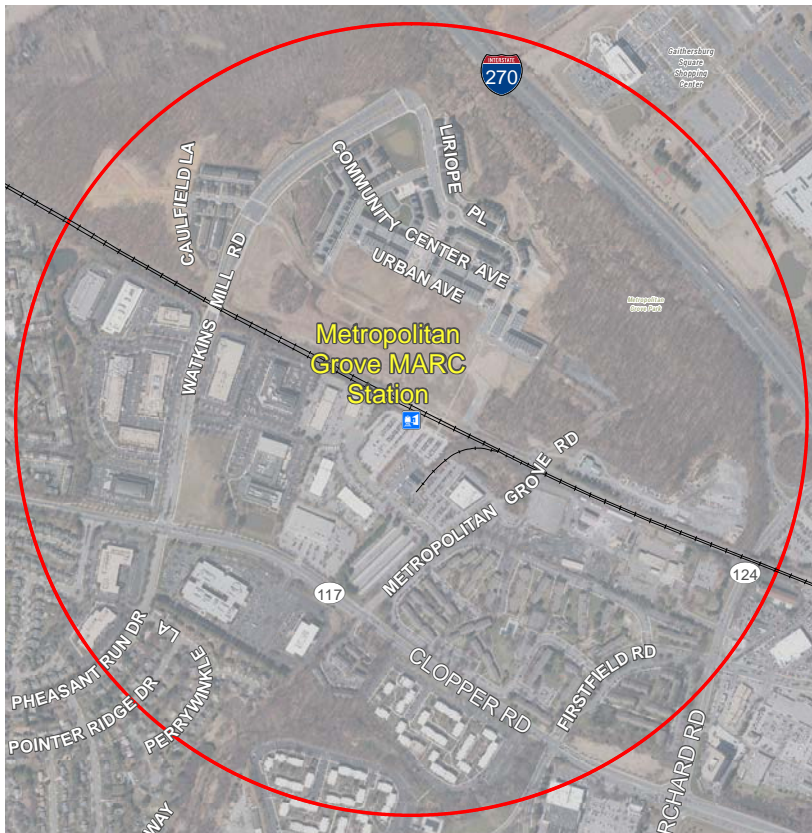


**Table 1: Gaithersburg MARC Station Recommendations**

Rec Code	Improvement Type	Location	Description	Timeframe	Responsibility	Cost
OT2	Path	Path from City parking garage to South Summit Avenue	Pave this path. Ensure motorized vehicles can't use it.	Short	Private/City	\$20,598
OT3	Sidewalk	Desire line from Olde Towne Avenue to Fulks Corner Road	Construct sidewalk along desire line. Create landscaped area with benches toward the middle.	Short	City	\$28,228
OT10	Wayfinding	Various locations around Olde Towne	Add bicycle parking wayfinding signage in station area.	Short	City	\$1,661
OT8/ OT11	Bicycle Parking	Wells Avenue	Move long-term bicycle parking from parking garage to Wells Avenue. Add additional long-term and short-term bicycle parking. Publicize how to access bicycle parking in station area.	Short	City	\$12,275
OT18	Path	Path from Gaithersburg Elementary School to Victory Farm Road	Repave and widen path.	Short	City/MCPS	\$153,694
OT4	Sidewalk	South Summit Avenue from brick sidewalk to railroad tracks	Widen sidewalk to 8 feet.	Medium	City/Private	\$7,690
OT5	Sidewalk	East Diamond Avenue from Frederick Avenue to North Summit Avenue	Construct wider sidewalks. Build bulbouts to define parking area and provide flat sidewalks with driveways ramping down to street after pedestrian space.	Medium	City/Private	\$320,000-\$10M
OT6	Sidewalk	In front of 435 East Diamond Avenue	Fill in sidewalk gap	Medium	City	\$15,573
OT7	Sidewalk	Desire line from East Diamond Avenue to Teachers Way	Construct path on desire line	Medium	City/Private	\$24,301
OT12	Intersection	South Summit Avenue just south of railroad tracks	Restripe crosswalk.	Medium	City	\$778
OT13	Intersection	Olde Town Avenue at South Summit Avenue	Reduce NW curb radius. Install RRFB across S Summit Ave. Raise Olde Towne Avenue crosswalk.	Medium	City	\$46,775
OT14	Intersection	East Diamond Avenue at South Summit Avenue	Reconfigure intersection. Provide sidewalk space with NE and SW bulbouts.	Medium	City	\$50,000
OT16	Sidewalk	SE corner of South Summit Avenue at East Diamond Avenue	Move traffic mast arm from SW sidewalk to SE sidewalk.	Medium	City	\$12,500
OT17	Intersection	South Summit Avenue just south of railroad tracks	Provide actuated pedestrian phase with pedestrian signals and countdown clocks.	Medium	City	\$8,015
OT19	Path	Along the south side of the CSX tracks from South Summit Avenue to Chestnut Street	Build shared-use trail.	Medium	City/Private/ MTA/CSX	\$319,830
OT20	Intersection	Fulks Corner Road at North Frederick Road	Construct full or actuated traffic signals with pedestrian countdowns. Two crosswalks.	Medium	City/MDSHA	\$380,175
OT21	Bicycle Parking	Station Area	Install five bike lids and 5 covered inverted "U" racks	Medium	City/MTA	\$15,000
OT9	Path	South of MARC tracks from Gaithersburg station to Washington Grove station	Build shared-use path.	Long	City/Private/ MTA/CSX	\$478,881



# METROPOLITAN GROVE MARC STATION



1/2 mile radius around the Metropolitan Grove MARC Station



## INTRODUCTION

The Metropolitan Grove MARC station is located in a commercial/industrial area on the western side of Gaithersburg near the intersection of Clopper and Watkins Mill Roads. Primary motor vehicle access is from Clopper Road on the south side of the station, using Metropolitan Grove Road and Metropolitan Court. On the south side of the railroad tracks, land uses in the immediate vicinity of the station include a Maryland Motor Vehicle Administration facility, biotechnology businesses and other light industrial activities. A number of multi-family residential developments are also nearby along Clopper Road. On the north side of the tracks there are a variety of developable parcels and the first phase of the Parklands residential development. Watkins Mill Road is the primary street access to properties on the north side of the tracks; the only other access is an at-grade crossing at the north end of Metropolitan Grove Road.

A general estimate of station use can be inferred from boarding counts provided by the Maryland Transit Administration which operates the MARC commuter rail service. On February 10, 2016, **273 AM boardings** were recorded; **11 in the PM.**<sup>5</sup>

<sup>5</sup> MARC Riders Advisory Council Meeting. April 21, 2016. <https://mta.maryland.gov/sites/default/files/2016-04-21-1630hrs-Summary-Minutes-with-Handouts.pdf>

Figure 2.1: Metropolitan Grove MARC Station Existing Conditions



## Parking

There are 355 free car parking spaces immediately adjacent to the station in an MTA-operated lot (1). Currently, the lot has sufficient parking for all MARC passengers. Due to its proximity to the Gaithersburg Motor Vehicle Administration building, driver training is offered in unused areas of the station parking lot.

## Street Connectivity

The Metropolitan Grove area has limited internal street connectivity, which makes it difficult to access the station without using Clopper Road; which is generally uncomfortable for bicyclists and pedestrians. There are few pedestrian and bicycle “cut-through” paths that link nearby commercial and residential development to the station. For example, a path that divides the parking lots of two buildings connects to Watkins Mill Road at one end, but at the other it ends at a property line and does not connect to the sidewalk along Metropolitan Court that leads into the MARC station (2).

Most developments, whether residential, commercial, or industrial, do not connect with adjacent development. Streets are provided solely for motor vehicles to gain access to parking lots and have little sense of place or public presence.

## Sidewalks, Paths & Crossings

Sidewalks in the Parklands development are good; they are wide and buffered with landscaping. However, the temporary path connecting the development to the MARC station could be improved. The drop-off from the paved surface to the surrounding earth is too severe in places, and should be smoothed out. The steep drop-off is potentially hazardous to those in wheelchairs or other wheeled vehicles.

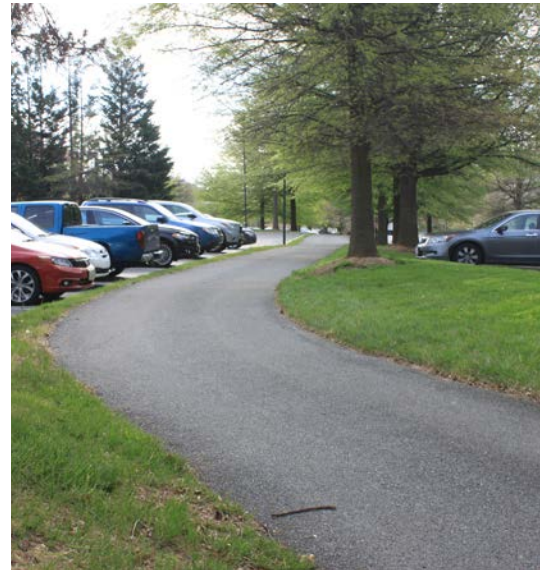
Additionally, at the end of the path, there is no curb ramp, making it difficult for those with limited mobility to access the MARC station (3).

The majority of roads in the study area have sidewalks or paved paths on at least one, if not both sides, however most sidewalks are fairly narrow, 3-5 feet, and not suitable for mixed bicycle and pedestrian travel. A portion of sidepath along Clopper Road is crumbling, buckling, and in need of repair (4). Sidewalks on Watkins Mill Road are in excellent condition, but their intersection approaches are too steep and not ADA-compliant (5).

## Bicycle Facilities

Bicycle parking is provided at the MARC station in the form of uncovered bicycle racks located near the entrance walkways to the platforms (6). Bike parking that offers higher security from theft and weather protection is necessary at commuter rail stations to provide users the peace-of-mind that their bike will still be at the station when they return at the end of the day.

**Bolded numbers in parentheses connect specific locations referenced in text to the adjacent map in Figure 2.1.**



*This path connects to the sidewalk on Watkins Mill Road, but it stops short of connecting to sidewalks on Metropolitan Court.*



*Path from MARC station to Parklands development missing curb ramp*

## Wayfinding

Signs directing motorists to the MARC station are provided along Clopper Road. They can be easily seen by travelers using all modes (7).

## Future Development

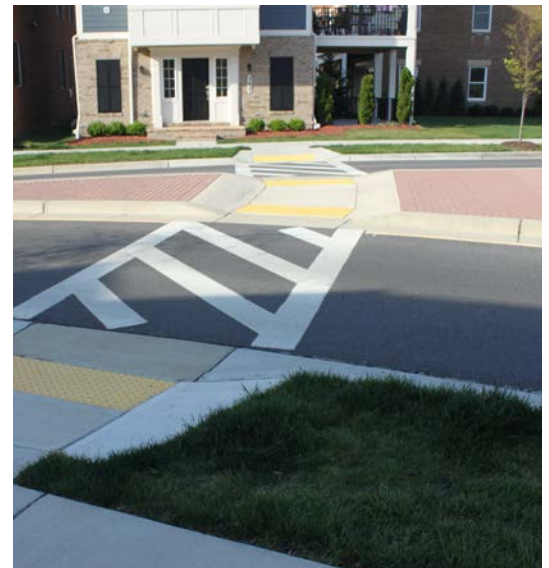
The Parklands residential development north of the Metropolitan Grove MARC station is the first phase of the Watkins Mill Town Center (WMTCC). A future phase will bring new multifamily residential, commercial and office space immediately adjacent to the CSX tracks, increasing the potential pool of MARC riders boarding and alighting at Metropolitan Grove (8). The WMTCC development project was approved several years ago, and it is likely that the developer will seek changes in the approved plans. This provides the City an opportunity to work with the developer to make the development more pedestrian and bicycle-friendly.

In addition to the WMTCC development, some of the parcels currently housing biotech and other light industrial activities, west, southwest, and south of the MARC station will likely redevelop in the coming years, changing the built environment in the station area.

Beyond MARC service, there are plans for Metropolitan Grove to house the Phase One terminal station for the Corridor Cities Transitway, connecting much of Gaithersburg to the Shady Grove Metrorail Station with a bus rapid transit service. In Phase Two, the Transitway will be extended north to Clarksburg. This new transit service will contribute to increased activity in the station area, making the need for safe, convenient, and appealing pedestrian and bicycle access infrastructure even more important.



Existing bicycle parking at Metropolitan Grove MARC station



Crossing with tactile warning in the Parklands development

## RECOMMENDATIONS

General station area recommendations consist of guidelines to help the City guide redevelopment in the station area. The City can use these recommendations during the development approval process to ensure that development occurs in a way that improves the local pedestrian and bicycle environment.

There are also recommendations for how the WMTC site plan can be improved from a transit access perspective.

### GENERAL

#### *Redevelopment Guidelines*

- + Pedestrian facilities should be ADA and PROWAG-compliant.<sup>6</sup>
- + All bus stops should be ADA-compliant. Whether they have shelters or not, there should be concrete pads for transit users to wait, and the concrete pads should be connected to the sidewalk network.
- + Any redevelopment should encourage the creation of a denser street grid in the station area.
  - Today, the Metropolitan Grove MARC station area consists of large superblocks that have poor internal circulation and limited connectivity to surrounding properties and streets.
  - Building new local roadways with pedestrian and bicycle facilities (e.g. connecting Metropolitan Court through to Watkins Mill Road with bike lanes and sidewalks on both sides) or building 10'-12' paved shared-use pathways will increase connectivity and pedestrian and bicyclist accessibility to Metropolitan Grove MARC station and surrounding businesses.
    - o Where possible, the City should insist on building new roadways because in addition to facilitating direct pedestrian and bicyclist trips, a denser street grid will relieve existing roadways and intersections by providing all road users routing options not dependent on using Clopper Road. The graphic on the following page illustrates potential new street options.
- + Urban design should encourage walking and biking.
  - Buildings should be easily accessible to pedestrians and bicyclists by having sidewalk-level main entrances. Pedestrians should not have to walk across a parking lot to enter a building. A building's parking lot should be located behind it, out of sight of those on the sidewalk.
  - Where possible, if the mixture of uses allows for it, the City should encourage shared-parking between buildings to reduce the number of parking spaces required.
  - The City should work with property owners to include different types of bicycle parking as part

Location-specific station area recommendations have a unique identifying code allowing the reader to locate the recommendation on the station area map and the cost estimate table at the end of this section. All recommendations improve access to transit for pedestrians and bicyclists in some way. Some improvements are geared toward making existing infrastructure more apparent to potential users. Others call for the construction of new facilities. These recommendations seek to remedy issues identified in the prior existing conditions section.

Location-specific recommendations are divided into short-term (<2 years), medium-term (2-5 years), and long-term (>5 years) based on project's complexity, cost, and level of inter-jurisdictional coordination required to accomplish it.

<sup>6</sup> ADA - Americans with Disabilities Act

PROWAG - Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way

of any redevelopment. There should be a mixture of long-term and short-term parking options to best facilitate first-mile/last-mile connections to transit. A further discussion of bicycle parking can be found in the general recommendations at the beginning of this document.

### WMTC Site Plan Recommendations

- + The existing development has a safe and pleasant pedestrian environment with landscape buffered sidewalks, tactile warning at curb ramps, and wide sidewalks.
- + The next phase of this development borrows successful elements from the first phase, but the City should insist on a number of adjustments or clarifications.
  - As discussed above, buildings should have their main entrances on sidewalks, if at all possible. Buildings L1, L2, and L3 should have their main entrances on either Town Center Boulevard or Watkins Mill Road. Parking should be hidden behind the buildings or included as part of the large parking structure in Building C5.
  - The curves leading into the southern east/west portion of Commercial Street, as currently designed, encourage speeding and are not in keeping with the pedestrian-friendly nature of the rest of the development. This street design should be reexamined to slow vehicular speeds.
  - The bicycle parking shown in front of the Building C5 parking garage and in front of the CCT/MARC station should be supplemented by bicycle parking inside the parking garage itself, as close to the CCT/MARC station as possible. Pedestrians should be able to access the CCT/MARC station from the parking garage without exiting onto Commerce Street and walking around.
  - A 10'-12' shared-use path should be constructed parallel to the future CCT ROW that connects the Caulfield Drive residential area to the current MARC and future CCT stations. This path can be continued further east and west at a later date.
  - There should be attractive, informative wayfinding signage throughout the development that directs visitors to the CCT/MARC station.



Top: Existing general street grid  
Bottom: Potential new street connections shown in pink. New trails shown in green.



Buildings set back from the street along Watkins Mill Road

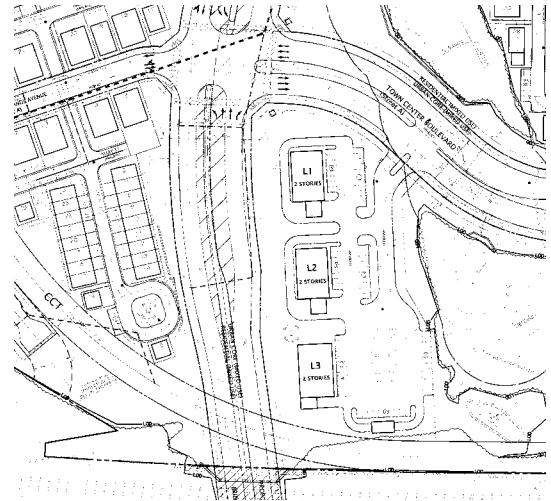
## LOCATION-SPECIFIC

### Short Term

Improvements focus on quickly retrofitting the existing built environment to improve pedestrian and bicycle connections.

### Bicycle Parking Improvements

- + **Replace existing inverted “U” bicycle racks and other short-term bicycle parking** in the immediate MARC station area with a mix of long- and short-term bicycle parking (**MG8**). The City should install five bike lids and five covered bike racks. See the bicycle parking discussion in the Introduction section of this report for more information about bicycle parking types.



Buildings L1, L2, and L3 currently set back from the street, accessed through parking lots

### Pedestrian Improvements

- + **Extend the existing path through the parking lot** just south of 50 Watkins Mill Road to connect to Metropolitan Court. This path effectively bisects the superblock made up of Watkins Mill Road, Clopper Road, Metropolitan Grove Road, and the CSX Tracks, shortening pedestrian and bicyclist travel time. The City should work with the property owners to install this path and appropriate wayfinding signage to direct users to the MARC station and to Watkins Mill Road respectively (**MG1**).
- + **Regrade the northeast corner** of Watkins Mill Road and Clopper Road and rebuild sidewalk and curb ramps. The current slope of the intersection approach of the northeast corner of Watkins Mill Road and Clopper Road is too steep. The City should work with MDSHA so that the new surface has an ADA-compliant slope and each marked crosswalk has its own curb ramp with tactile warning (**MG3**).



Covered short-term bicycle parking

- + **Encourage the Parklands property owner to construct a curb ramp** at the end of the path connecting to the MARC station (**MG5**).

### Wayfinding Improvements

- + **Improve pedestrian wayfinding** to make people aware of how they can access the MARC station and commercial properties in the station area (**MG7**). Wayfinding signage should be extended into the neighborhoods west, south, and east of the station and should let pedestrians know how far away the station is and what route to take to get there.

### Medium Term

### Bicycle Parking Improvements

**Install additional bicycle parking** in the immediate MARC station area (**MG14**). Depending on demand for existing bicycle parking, the City should install five bike lids or five bicycle lockers (10 parking spaces) and five additional covered inverted “U” racks.

## Pedestrian Improvements

- + **Widen and repave the sidepath** on the south side of Clopper Road between Watkins Mill Road and Firstfield Road. The path should be widened to 8-10 feet (**MG11**).
- + **Install a stair and sidewalk** at Clopper Road and Twelve Oaks Drive (**MG10**). At the southeast corner, the sidewalk follows Twelve Oaks Drive curving away from Clopper Road due to a change in topography, and returns to the side of the road further east of Twelve Oaks. A retaining wall was installed to prevent erosion, however pedestrians continue to follow a direct desire line by stepping over a curb. The current sidewalk route should be preserved to meet ADA standards; and a stair and short path segment should be installed to allow other pedestrians to proceed straight along Clopper Road. Provide appropriate signage to direct pedestrians.



*Steep slopes down to intersections are uncomfortable and unsafe for those in wheelchairs*

## Wayfinding Improvements

- + **Create a pedestrian route to the MARC station** through the Orchard Pond Apartments property using both public and private sidewalks. The planned route stretches from Quince Orchard Road and Firstfield Road through the Orchard Pond parking lot to Metropolitan Grove Road, and then along Metropolitan Court to the MARC station. The route should be defined by wayfinding signage (**MG9**). A small sidewalk is needed to connect the parking lot to the sidewalk on the east side of Metropolitan Grove Road (**MG2**). Curb ramps and crosswalks will also be needed for crossing Metropolitan Grove Road. In concert with **MG1**, this improvement would allow pedestrians to travel from Quince Orchard Road to Watkins Mill Road without walking on Clopper Road at all. Until this area is redeveloped and a denser street grid is created, this low cost retrofit option will improve pedestrian mobility and access.



*Twelve Oaks: Install a stairway along desire line to stop erosion and provide direct pedestrian travel*



*Twelve Oaks: Pave desire line atop berm*

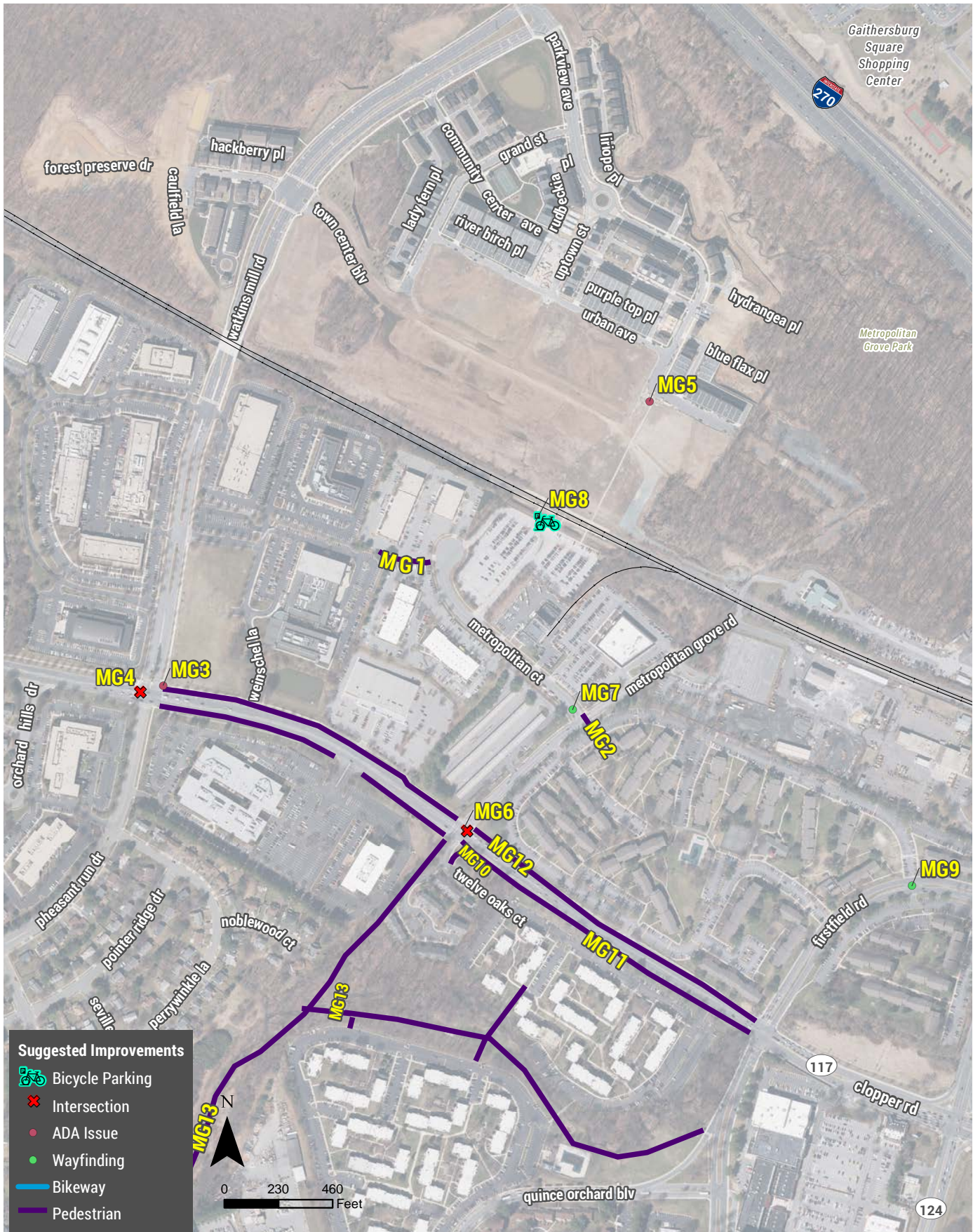
## Long Term

### Pedestrian Recommendations

- + **Widen and repave the sidewalk** on the north side of Clopper Road between Watkins Mill Road and Firstfield Road. The existing sidewalk should be widened to 8-10 feet (**MG12**).
- + **Develop a greenway trail with bridges** along the Long Draught Branch connecting Rabbit Road and Clopper Road at Twelve Oaks Drive. These paths will provide a short and direct walk or bike ride to the station area for residents that live in the residential developments south of Clopper Road (**MG13**).



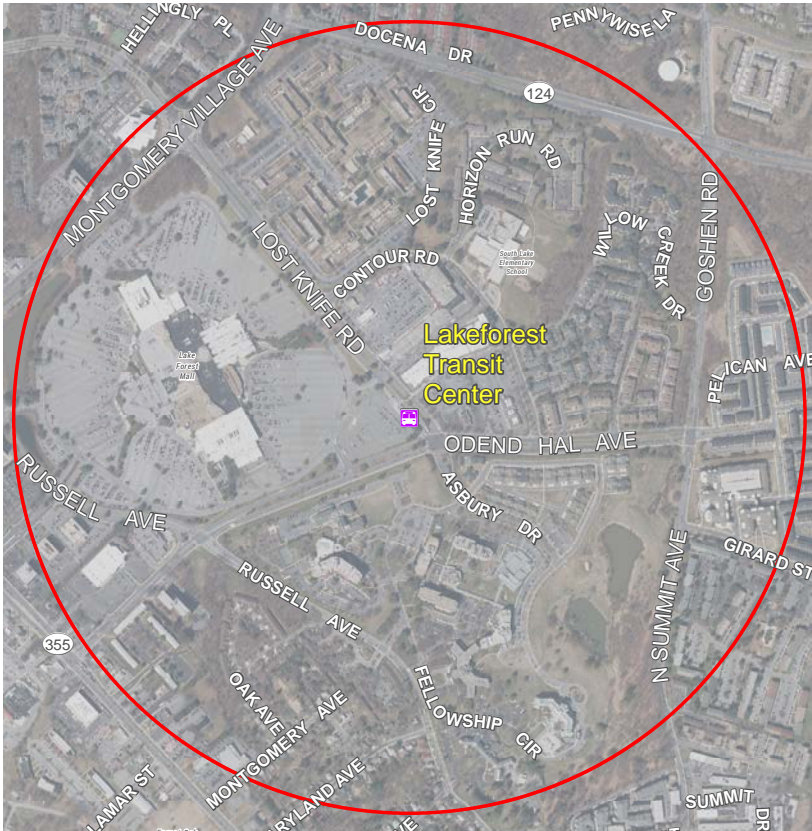
Figure 2.2: Metropolitan Grove MARC Station Recommendations



**Table 2: Metropolitan Grove MARC Station Recommendations**

Rec Code	Improvement Type	Location	Description	Timeframe	Responsibility	Cost
MG1	Path	Parking lot crossing from Watkins Mill Road to Metropolitan Court	Build path through parking lot with wayfinding	Short	Private	\$36,036
MG11	Path	Clopper Road from Watkins Mill Road to Firstfield Road	Repave and widen path on south side of street from five feet to eight feet.	Short	City/MDSHA	\$405,778
MG3	Sidewalk	Northeast corner of Watkins Mill Road and Clopper Road	Regrade corner and reconstruct curb ramps to be ADA-compliant	Short	City/MDSHA	\$22,430
MG4	Intersection	All marked crossings of Watkins Mill Road at Clopper Road	Restripe crosswalks with high-visibility markings	Short	City/MDSHA	\$5,625
MG6	Intersection	Clopper Road at Metropolitan Grove Road	Restripe crosswalks with high-visibility markings	Short	City/MDSHA	\$3,094
MG5	Intersection	MARC path at Exchange Avenue	Install ADA-compliant curb ramp to improve access to MARC station	Short	Private	\$860
MG8	Bicycle Parking	MARC Station Area	Provide secured/covered bicycle parking.	Short	City/MTA	\$66,000-\$300,000
MG7	Wayfinding	Within walking distance of MARC station	Install more visible pedestrian wayfinding from residential communities to station	Short	City	\$1,661
MG14	Bicycle Parking	Station Area	Install five bike lids or five bicycle lockers and five covered inverted “U” racks	Medium	City	\$15,000
MG10	Sidewalk	Clopper Road from Twelve Oaks Drive to existing sidewalk	Add stairs and small sidewalk to follow desire line.	Medium	City/MDSHA	\$14,288
MG9	Wayfinding	Firstfield Road at parking access	Add pedestrian wayfinding to direct pedestrians to MARC via private property	Medium	City/Private	\$1,661
MG2	Path	Path from parking access to Metropolitan Grove Road	Connect parking lot to existing sidewalk with new path	Medium	City/Private	\$1,392
MG12	Path	Clopper Road from Watkins Mill to Firstfield Road	Repave and widen path on north side of street from 5 to 8 feet.	Long	City/MDSHA	\$213,875
MG13	Path	Trails along the Long Draught Branch	Develop a greenway trail and bridges along the Long Draught Branch	Long	City	Not Costed

# LAKEFOREST TRANSIT CENTER



1/2 mile radius around the Lakeforest Transit Center



## INTRODUCTION

The Lakeforest Transit Center is located on the east edge of the Lakeforest Mall's parking lots. It is just northwest of the intersection of Lost Knife Road and Odendhal Avenue. Within a walkable distance of the Transit Center are dense townhouse and apartment residences, busy strip mall-style restaurant and retail developments, the South Lake Elementary School, and the Asbury Methodist Village retirement community.

There are about 3,500 total daily boardings at the transit center, according to the Lakeforest Transit Center Feasibility Study.

The study area around the Transit Center is characterized by pockets of multi-family housing and commercial development that are separated by wide roads. Major roads in the area include Odendhal Avenue, Lost Knife Road, Montgomery Village Avenue, North Frederick Avenue (MD 355), and Russell Avenue. Most of the segments of these roads are median-divided with at least two through travel lanes in each direction. Most of the medians are generous in width and planted with grass and trees. All of the roads have sidewalks



Sign informing motorists where they can park to use the transit center

on at least one side. The commercial development served by this road network includes the Mall itself, as well as other retail centers, banks, big box stores, car dealers and office buildings. Gaithersburg Public Library is also located just north of the Mall.

It is important to note that Lost Knife Road is the boundary between the City of Gaithersburg and unincorporated Montgomery County, which means that the Transit Center is within the City, but largely serves a population that lives outside of the City's limits. To further complicate jurisdictional issues, much of the unincorporated part of the County is Montgomery Village, a planned community, with services provided by a Village Foundation and the County. Its residential community includes an increasingly diverse middle class and working class population

### Parking

A portion of the mall parking lot is made available for use by bus riders who drive to the Transit Center.

**Bolded numbers in parentheses connect specific locations referenced in text to the adjacent map in Figure 3.1.**

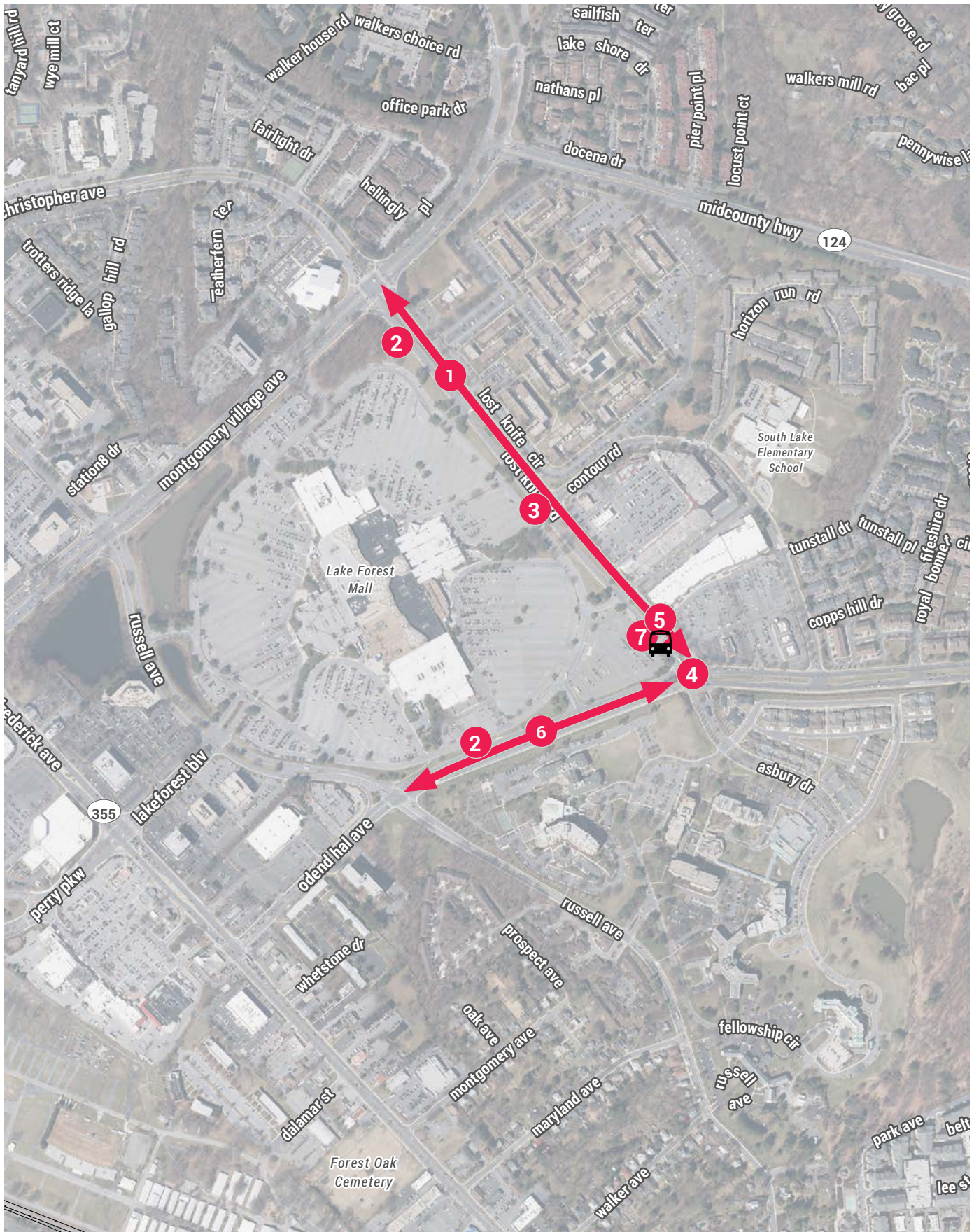
### Street Connectivity

Internal and external connectivity in the station area is limited. The Lakeforest Mall is a massive property without fine-grained connections to adjacent properties and land uses. Block faces surrounding the mall property average 2,100 feet, the equivalent of five typical downtown block faces. The limited street network leads to frustrating or disjointed pedestrian and bicycle trips: a) staying on sidewalks requires a large detour around the Mall, or b) a direct route will include dangerous shortcuts through the mall parking lots and traversing the mall's interior concourses. Outside of the Mall area, the next ring of development is organized in largely disconnected pods. The pods are smaller than the mall, but the lack of a street grid continues to make bicycling and walking between land uses difficult and almost always indirect.



Lakeforest Mall entrance across parking lot from transit center

Figure 3.1: Lakeforest Transit Center Existing Conditions



### Sidewalks, Paths & Crossings

During fieldwork on March 7th, 2016 conducted at the Transit Center, the TDG Team observed frequent pedestrian crossings of Lost Knife Road outside of marked crosswalks because the distance between such crosswalks averages 750 feet (1). This distance is too far to expect all (or even most) pedestrians to use marked crosswalks, especially when to do so would be a significant trip detour.

There are strong desire lines connecting the bus stops at the southwestern corner of Montgomery Village Avenue/Lost Knife Road and the eastbound side of Odendhal Avenue between Lost Knife Road and Russell Avenue respectively to the Mall property (2).

Additionally, the existing sidewalk connecting Lost Knife Road at Contour Road to the Mall property is not ADA-compliant due to its steep slope (3).

At the intersection of Lost Knife Road and Odendhal Avenue, the northern crosswalk parallel with Odendhal is 140 feet long, but lacks a pedestrian median refuge. The pedestrian crossing time may not be sufficient for users to cross in one light cycle (4).

Currently, marked crosswalks and a sidewalk across the Lost Knife Road median provide users Transit Center access and egress. Fences have been erected on the median to prevent pedestrians from crossing Lost Knife Road outside of this designated crossing. This crossing is useful for those accessing the station from the east or southeast, but it is a slight detour for those traveling to or from the northeast where there are many residential units. Additionally, when buses are queued, the crossing can be blocked or the buses can screen users from view of motorists, creating a dangerous situation (5).

### Bicycle Facilities

There are a few bicycle facilities in the station area, including shared lane markings on Odendhal Avenue (6). The Lakeforest Transit Center itself has two sub-standard “wave” style bicycle racks (7). During fieldwork, the TDG Team observed bicyclists sharing sidewalks with pedestrians. Landscaped medians and roadside landscape buffers on the majority of major roads appear to be wide enough for separated bicycle facilities.

### Future Development

The Lakeforest Transit Center was the subject of a 2015 feasibility study by Montgomery County DOT to increase the number of bus bays and add transit bus operator restroom facilities. The study proposes adding additional bus bays and associated infrastructure on Odendhal Avenue, using a



*Pedestrian crosses Lost Knife Road between marked crosswalks*



*Existing “wave” bicycle racks at Lakeforest Transit Center*

portion of the Mall parking lot that fronts Odendhal. These changes would improve bus circulation and pedestrian safety.

The timeline for these improvements relies partially on redevelopment of the Lakeforest Mall and adjacent properties. Any redevelopment of the Mall will transform the station area. The magnitude of this development and its impacts on the transportation system underscore the importance of making the area pedestrian and bicycle-friendly. It is critical that the redevelopment scheme that goes forward adheres to principles that support mixed-use development and a bicycle and pedestrian oriented environment.

## RECOMMENDATIONS

General station area recommendations consist of guidelines to help the City guide redevelopment in the station area. The City can use these recommendations during the development approval process to ensure that development occurs in a way that improves the local pedestrian and bicycle environment.

### GENERAL

#### *Redevelopment Guidelines*

- + As discussed in the Montgomery Village Master Plan (p. 77), right-turn slip lanes are dangerous for pedestrians and bicyclists. They encourage speeding, introduce conflict between pedestrians, bicyclists and motorists, and result in longer crossing times for pedestrians. The City should work with the County and MDSA to remove these slip lanes from all roads in the study area and prevent new slip lanes from being constructed. Removal will create more pedestrian space, slow motorists, and improve safety in the study area.
- + Like Metropolitan Grove, through redevelopment, more connecting streets should be built in the Lakeforest Transit Center area. The potential redevelopment of the Lakeforest Mall presents an incredible opportunity to provide residents and visitors additional routing options. For instance, continuing Lakeforest Boulevard across the Mall property, and beyond to Midcounty Highway would provide an alternative to Montgomery Village Avenue (Partially identified in the Montgomery Village Master Plan). Additionally, a new north-south road connecting Odendhal Avenue to Watkins Mill Road through the Mall property would help travelers avoid Midcounty Highway, Russell Avenue, and MD 355. In addition to these more significant connections, the City should work with the Mall developer to ensure that the Mall property has a sufficient network of streets for internal circulation and that it is well-connected to adjacent properties to help current and future residents run errands and complete other trips on local streets without venturing onto busy arterials or major highways.
- + The City should work with property owners to include different types of bicycle parking as part of any redevelopment. There should be a mixture of long-term and short-term parking options to best facilitate first-mile/last-mile connections to transit. A further explanation of different parking types and their service characteristics can be found in the Introduction.

Location-specific station area recommendations have a unique identifying code allowing the reader to locate the recommendation on the station area map and the cost estimate table at the end of this section. All recommendations improve access to transit for pedestrians and bicyclists in some way. Some improvements are geared toward making existing infrastructure more apparent to potential users. Others call for the construction of new facilities. These recommendations seek to remedy issues identified in the prior existing conditions section.

Location-specific recommendations are divided into short-term (<2 years), medium-term (2-5 years), and long-term (>5 years) based on project's complexity, cost, and level of inter-jurisdictional coordination required to accomplish it.

## General Recommendations

Access management improvements and lighting improvements are needed in a variety of locations around the Transit Center, many of which are outside of the City of Gaithersburg. Montgomery County should consider a study of pedestrian and bicycle access and safety issues for the areas that are unincorporated and also not within the Montgomery Village planning area/service district.

## LOCATION-SPECIFIC

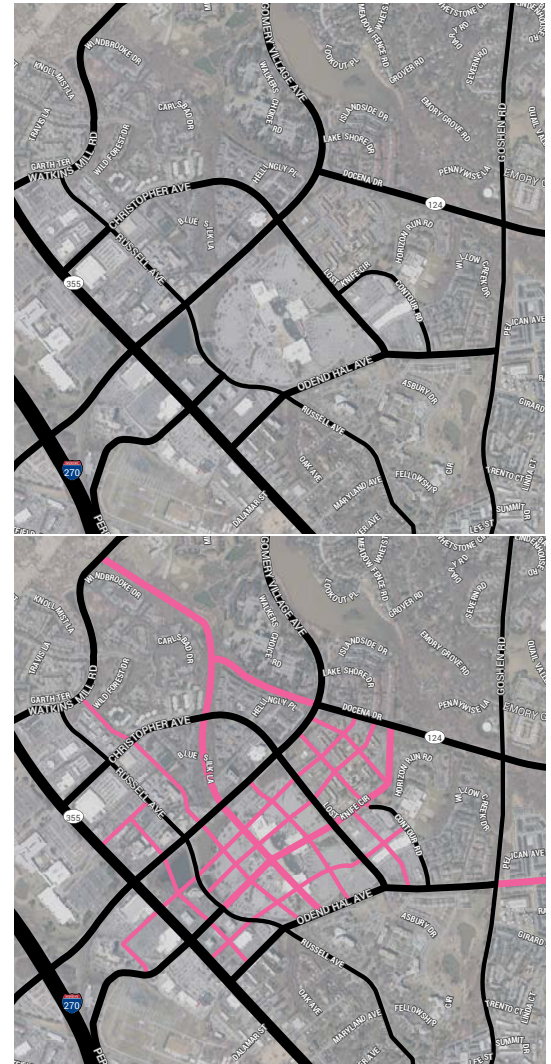
### Short Term

#### Pedestrian Improvements

- + **Regrade the path** connecting Contour Road to the mall area. It is not ADA-compliant (**LF5**). This path is on private property, and the City should work with the property owner to construct an ADA-compliant path.
- + **Establish a pedestrian link** between the south end of the mall complex and the bus stop along Odendhal Avenue across from the Asbury Village. This sheltered stop needs a sidewalk or striping and signage to allow pedestrians to safely cross the parking lot from the mall exit doors and perimeter sidewalks. A curb ramp from the mall access road is needed at the bus stop. A sidewalk connection to the west along Odendhal to Russell Avenue would also be warranted given the pedestrian desire line worn in the grass buffer next to the road (**LF24**).
- + **Study pedestrian access to the Mall** around its entire circumference to determine which low cost pedestrian safety improvement could be made prior to redevelopment, such as installing crosswalks across parking lot access drives or installing short sidewalks on lawn areas with worn dirt tracks. Specifically, there is a bus stop in the southbound direction of Lost Knife Road just south of Montgomery Village Avenue that has a strong desire line connecting it to the mall parking lot access drive. A sidewalk should be constructed on this desire line and crosswalk markings should be used to direct pedestrians across the mall parking lot (**LF23**).

#### Bicycle Facility Improvements

**Replace existing bicycle parking** at the Lakeforest Transit Center with a mix of long-term, secure bicycle parking and short-term covered inverted “U” racks (**LF21**). Based on the Association of Pedestrian and Bicycle Professionals’ Bicycle Parking Guidelines and estimated AM peak hour bus boardings, 60 long-term secure bicycle parking spaces and 18 covered short-term parking spaces may be needed. These quantities should be viewed as a long-term goal. In the short-term, the City/County should start by installing five bicycle lids and five covered inverted “U” racks.



Top: Existing general street grid  
Bottom: Potential new street connections shown in pink



Steep slope on sidewalk connecting the Mall to Contour Road crosswalk



## Intersection Improvements

- + **Construct a median refuge island** at the northern leg of the Odendhal Avenue/Lost Knife Road intersection (LF2). Currently, the 140' crossing distance is difficult to traverse in one pedestrian signal phase. The existing landscaped median immediately adjacent to the crosswalk should make constructing this median refuge easier than it would otherwise be. The City should work with the County to construct this as soon as possible.



Covered inverted U bicycle racks in New York City

- + **Install a high-visibility crosswalk** across Asbury Drive. Because Asbury Drive leads to a large retirement facility, it is important that pedestrian space is well-defined at this intersection. A crosswalk with high visibility striping can be installed in the near-future by the City with assistance or support from the private landowner if necessary (LF1).
- + **Upgrade the intersection** just north of the transit center on Lost Knife Road (LF22).
  - Install a rectangular rapid flashing beacon at this location. Many transit users are accessing the station from the north, and it is inconvenient for them to use the existing median crossing because it is both out of the way and frequently blocked by queuing busses.
  - Add marked crosswalks on both legs of the intersection to improve pedestrian safety and convenience.
  - Construct a median refuge to accommodate pedestrians unable to safely cross the entirety of Lost Knife Road at once.
  - Construct a sidewalk in the median connecting the mid-block crossing at the Transit Center to the new marked crosswalks developed as part of this recommendation.

## Medium Term

### Bicycle Parking Improvements

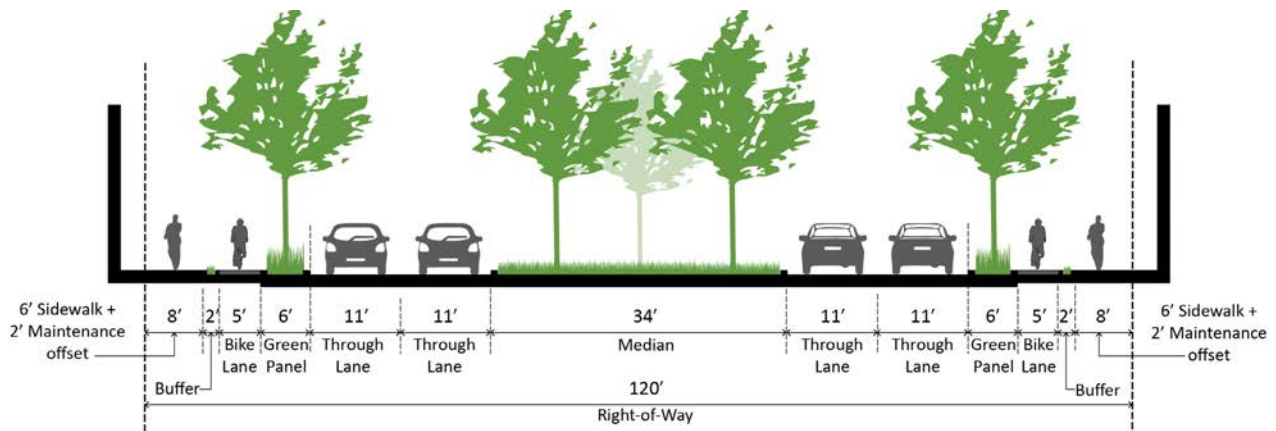
**Build five additional bike lids and five additional covered inverted “U” racks.** As bicycle parking demand grows, more bicycle parking should be provided. Because of the Transit Center’s intensity of use and the diversity of trips it serves, more short-term parking than the amount suggested by national guidelines may be necessary (LF25).

### Bicycle Facility Improvements

**Install a network of separated bikeways** to provide a low-stress bicycling environment for residents and visitors. The wide streets and landscaped medians in the study area indicate that there is ample space to install separated bike lanes along the roads listed above, many of which are within the City of Gaithersburg. Depending on right-of-way availability, paired one-way or a single two-way sidewalk-level separated bike lane should be installed on the following streets:



Existing northern leg crosswalk



Lost Knife Separated Bicycle Lane (LF9, LF10, LF18) Section from Montgomery Village Master Plan document

- + Montgomery Village Avenue from Russell Avenue to Lost Knife Road (**LF11, LF15**)
- + Odendhal Avenue from North Frederick Avenue to North Summit Avenue (**LF6, LF7, LF8**)
- + Lost Knife Road from Montgomery Village Avenue to Odendhal Avenue (**LF9, LF10, LF18**)
- + Russell Avenue from Montgomery Village Avenue to Odendhal Avenue (**LF16, LF17, LF19, LF20**)
- + North Frederick Avenue from Montgomery Village Avenue to Odendhal Avenue (**LF12, LF14**)
- + Lakeforest Boulevard from North Frederick Avenue to Russell Avenue (**LF13**)



Burlington, VT sidewalk-level separated bike lane example

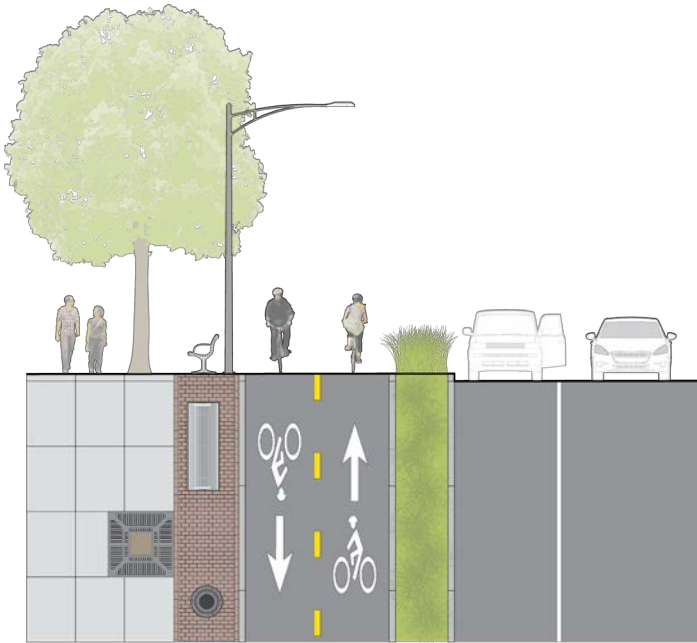
Separated bike lanes on Odendhal Avenue would connect to the shared-use path on North Summit Avenue and provide bicyclists a low-stress connection to the outskirts of Olde Towne.

Separated bike lanes on Lost Knife Road have already been proposed in the Montgomery Village Master Plan, extending from Odendhal Avenue across Montgomery Village Avenue along Christopher Avenue to North Frederick Avenue. This recommended network expands the utility of that recommendation. A grid of separated bicycle facilities outlined above would provide residents and visitors a low-stress, direct means of accessing local businesses, community amenities, and regional transit.



Cambridge, MA sidewalk-level separated bike lane example

- + As new streets are proposed in this area through redevelopment, separated bicycle facilities or standard bicycle lanes should be included as appropriate. A completed separated bike lane network in the study area would be an innovative example of retrofitting automobile-centric suburban roadways to promote active transportation.
- + Construct protected intersections everywhere separated bike lanes intersect. A protected intersection is a relatively new treatment that reduces conflicts between bicyclists and turning vehicles by extending the separation of the separated bike lane into the intersection, reducing the potential number of conflict points between bicyclists and turning motorists. Turning automobile traffic can sometimes be given a separate signal phase to further separate motorists and bicyclists.



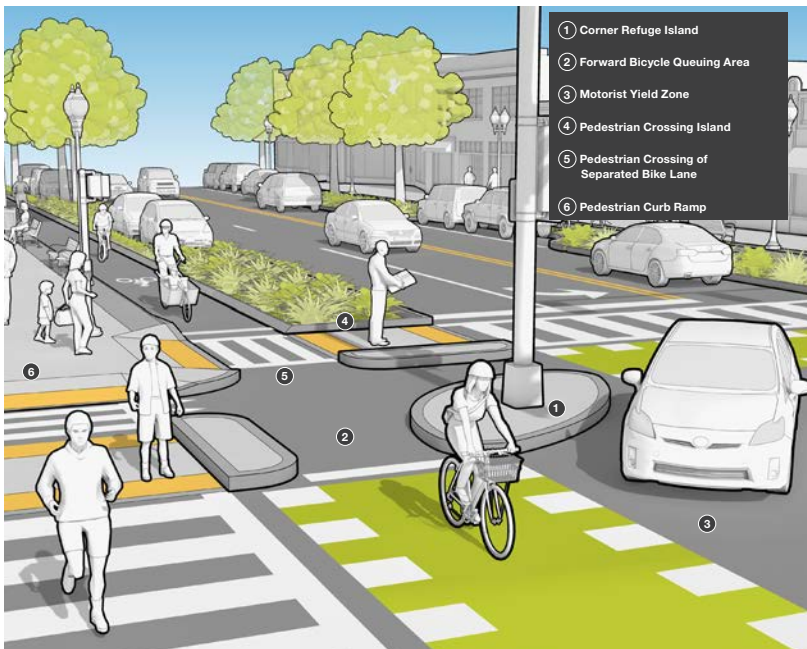
Example two-way sidewalk-level separated bike lane



Seattle, WA sidewalk-level separated bike lane example



Salt Lake City, UT Protected Intersection approach



Elements of a Protected Intersection



Indianapolis, IN sidewalk-level separated bike lane example

### Long Term

There are no long term recommendations beyond the general recommendations for redevelopment discussed previously.



**Table 3: Lakeforest Transit Center Recommendations**

Rec Code	Improvement Type	Location	Description	Timeframe	Responsibility	Cost
LF2	Intersection	Lost Knife Road at Odendhal Avenue	Install pedestrian refuge island on north crossing leg.	Short	County	\$7,500
LF1	Intersection	Asbury Drive at Odendhal Avenue	Install high visibility across Asbury Drive.	Short	Private/City	\$4,185
LF22	Intersection	Lost Knife Road at Mall Access Road	Install high visibility crosswalk, rectangular flashing beacon, and pedestrian refuge island.	Short	City/County	\$36,250
LF21	Bicycle Parking	Lakeforest Transit Center	Construct secured/long-term bicycle parking, in addition to short-term inverted U racks.	Short	MCDOT	\$15,000
LF5	Sidewalk	Path from Lost Knife Road to Mall Ring Road	Regrade sidewalk to be ADA-compliant.	Short	Private/County	\$5,378
LF23	Sidewalk	Desire line between Lost Knife Road and Mall Access Road immediately southeast of Montgomery Village Avenue	Construct sidewalk and curb ramp. Stripe crosswalk markings or raised sidewalk connecting to the mall.	Short	City/Private	\$67,200 - \$131,536
LF24	Sidewalk	Odendhal Avenue between Russell Avenue and Lost Knife Road	Construct curb ramp and crosswalk striping between the bus stop and mall.	Short	City/County/Private	\$21,650
LF25	Bicycle Parking	Station Area	Install five bike lids and five covered inverted "U" racks	Medium	City/County	\$15,000
LF11	Bicycle Facility	Montgomery Village Avenue from Russell Avenue to Lost Knife Road	Construct Two-way sidewalk-level separated bike lane	Medium	City/MDSHA	\$288,237
LF15	Bicycle Facility	Montgomery Village Avenue from N Frederick Avenue to Russell Avenue	Construct Two-way sidewalk-level separated bike lane	Medium	City/MDSHA/Private	\$144,764
LF6	Bicycle Facility	Odendhal Avenue from Lost Knife Road to N Summit Avenue	Construct Two-way sidewalk-level separated bike lane	Medium	City/Private	\$259,833
LF7	Bicycle Facility	Odendhal Avenue from Russell Avenue to Lost Knife Road	Construct Two-way sidewalk-level separated bike lane	Medium	City/Private	\$249,020
LF8	Bicycle Facility	Odendhal Avenue from N Frederick Avenue to Russell Avenue	Construct Two-way sidewalk-level separated bike lane	Medium	City/Private	\$169,779
LF9	Bicycle Facility	Lost Knife Road from Odendhal Avenue to Contour Road	Construct One-way sidewalk-level separated bike lane	Medium	County	\$154,853
LF10	Bicycle Facility	Lost Knife Road from Contour Road to Montgomery Village Avenue	Construct One-way sidewalk-level separated bike lane	Medium	County	\$186,802
LF18	Bicycle Facility	Lost Knife Road from Montgomery Village Avenue to Odendhal Avenue	Construct One-way sidewalk-level separated bike lane	Medium	County	\$338,800

**Table 3: Lakeforest Transit Center Recommendations**

Rec Code	Improvement Type	Location	Description	Timeframe	Responsibility	Cost
LF16	Bicycle Facility	Russell Avenue from Lakeforest Boulevard to Odendhal Avenue	Construct One-way sidewalk-level separated bike lanes	Medium	City/Private	\$145,336
LF17	Bicycle Facility	Russell Avenue from Montgomery Village Avenue to Lakeforest Boulevard	Construct One-way sidewalk-level separated bike lanes	Medium	City/Private	\$308,734
LF19	Bicycle Facility	Russell Avenue from Lakeforest Boulevard to Odendhal Avenue	Construct One-way sidewalk-level separated bike lanes	Medium	City/Private	\$122,496
LF20	Bicycle Facility	Russell Avenue from Montgomery Village Avenue to Lakeforest Boulevard	Construct One-way sidewalk-level separated bike lanes	Medium	City/Private	\$157,028
LF12	Bicycle Facility	N Frederick Avenue from Odendhal Avenue to Lakeforest Boulevard	Construct Two-way sidewalk-level separated bike lane	Medium	City/MDSHA/Private	\$122,170
LF14	Bicycle Facility	N Frederick Avenue from Montgomery Village Avenue to Lakeforest Boulevard	Construct Two-way sidewalk-level separated bike lane	Medium	City/MDSHA/Private	\$176,396
LF13	Bicycle Facility	Lakeforest Boulevard from N Frederick Avenue to Russell Avenue	Construct Two-way sidewalk-level separated bike lane	Medium	City/Private	\$93,927

## CONCLUSION

The recommendations for the three station areas studied for this report have multiple purposes. They identify relatively low-cost, minor improvements that can be implemented in the short to medium term to positively impact the pedestrian and bicycle environment. They also provide longer-term recommendations to extend the low-stress bicycling network in the station areas and to provide more comfortable pedestrian facilities. Finally, they provide a list of general principles that the City can use to ensure good pedestrian and bicycle access to transit around these stations and for other parts of the city.

Though land use and income levels have the strongest influence on levels of public transit use, the existence of high-quality pedestrian and bicycle facilities that provide direct connections to transit stations often makes the difference between someone taking transit and someone driving to their destination. As the City of Gaithersburg improves its active transportation environment, including better station wayfinding and marketing, transit use will increase and residents will be healthier and more connected to their community.



*Bicyclist crosses Clopper Road south at Watkins Mill Road*

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# COST APPENDIX

Order of magnitude cost estimates were developed for individual improvement recommendations. The following methodology was used:

- + Site assessment was based on aerial and street-level review of each location.
- + Cost estimates for linear improvements were developed by establishing a cost per linear foot or cost per square foot for the recommended facility type and applying it to the length or area of the improvement.
- + Cost estimates for individual spot improvements were developed by identifying anticipated quantities for significant construction items (e.g. asphalt, sidewalk, concrete curb, pavement markings, etc.).
- + Unit prices for construction items were established based on regional historical bid pricing and the estimator's experience and judgment. Some estimated costs, particularly dealing with roadway reconstruction, rely solely on estimator's experience and judgement. A significant source of cost information is the January 2016 MDSHA Price Index ([http://www.roads.maryland.gov/ohd2/MDSHA\\_PriceIndex\\_Jan2016.pdf](http://www.roads.maryland.gov/ohd2/MDSHA_PriceIndex_Jan2016.pdf))
- + The following cost items were calculated on a lump sum basis and applied primarily to the linear improvements. They were calculated as a percentage of the project's base cost, using the following percentages (a higher percentage was used for select projects that by their nature would require larger amounts of any of these activities):
  - Landscaping (5%),
  - Drainage and E&S (5%),
  - Maintenance of Traffic (5%), and
  - Utility Adjustments (10%).
  - Contingency (25% of the base plus the lump sum items)
- + Potential cost items that were not factored in to any of the estimates include the following:
  - permitting,
  - right-of-way,
  - mobilization,
  - insurance, and
  - inspection.

Although quantities and unit prices were developed for each estimate, a fluctuation in quantities and bid prices can be expected as the level of design progresses. Construction costs for a bid package can be determined only after final or near-final design.

The costs provided for this study are intended for budgeting purposes, and should be further informed by City engineers based upon the City's past experience with construction contracting for projects in the public right of way.

Spot Cost Estimates

RecCode	Improvement	Location	Notes	Station Area	Responsibility	Term	Estimated Cost
OT10	Wayfinding	Various locations around Old Town	Bicycle parking wayfinding signage on Summit Avenue	Old Town	City	Short	\$1,661
OT11	Bicycle Parking	Wells Avenue & New Plaza	Move 6 lockers from parking garage to Wells Avenue; purchase one set of 5 inverted U racks with a decorative cover (+\$5,000), install in new plaza	Old Town	City	Short	\$10,275
OT12	Intersection	S Summit Avenue just south of RR tracks	Restripe crosswalk.	Old Town	City	Medium	\$778
OT13	Intersection	Olde Towne Avenue at S Summit Avenue	Reduce NW curb radius. Install RRFB across S Summit Ave. Raise Olde Towne Avenue crosswalk.	Old Town	City	Medium	\$46,775
OT14	Intersection	E Diamond Avenue at Summit Avenue	Reconfigure intersection. Provide sidewalk space with NE and SW bulbouts.	Old Town	City	Medium	\$50,000
OT16	Sidewalk	Southeast corner South Summit Avenue at East Diamond Avenue	Move traffic mast arm from SW sidewalk to SE sidewalk	Old Town	City	Medium	\$12,500
OT17	Intersection	S Summit Avenue just south of RR tracks	Provide actuated pedestrian phase.	Old Town	City	Medium	\$8,015
OT20	Intersection	Fulks Corner Road at North Frederick Road	Full traffic signals with pedestrian countdowns. Two crosswalks.	Old Town	City/MDSHA	Short	\$380,175
OT21	Bicycle Parking	Wells Avenue and New Plaza	Add 5 Bike Lids & 10 covered rack spaces (5 racks).	Old Town	City	Medium	\$15,000
MG3	Sidewalk	NE corner of Watkins Mill Rd and Clopper Rd	The sidewalk slope is not ADA-compliant. Risks wheeled users rolling into the roadway. Regrade corner	Met Grove	City/MDSHA	Short	\$22,430
MG4	Intersection	All crossings of Watkins Mill Rd and Clopper Rd	Crosswalk markings should be high-visibility, especially due to SB cars coming over hill.	Met Grove	City/MDSHA	Short	\$5,625
MG5	Sidewalk	Path from Exchange Avenue to MARC platform	Curb ramp needed for ADA-accessibility	Met Grove	Private	Short	\$860
MG6	Intersection	Clopper Road at Metropolitan Grove Road	Crosswalk markings should be high-visibility	Met Grove	City/MDSHA	Short	\$3,094
MG7	Wayfinding	Metropolitan Court at Metropolitan Grove Rd	More visible MARC pedestrian wayfinding from residential communities to station	Met Grove	City	Short	\$1,661
MG8	Bicycle Parking	Station area	Install 5 bike lids and 5 inverted U racks (10 spaces) with a decorative cover	Met Grove	City/MTA	Short	\$15,000
MG9	Wayfinding	First Field Rd at Parking access road	Add signage to direct pedestrians via parking access to MARC	Met Grove	City/Private	Medium	\$1,661
MG14	Bicycle Parking	Station area	Add 5 Bike Lids; or 5 lockers and & 10 covered rack spaces (5 racks).	Met Grove	City/MTA	Medium	\$15,000
LF1	Intersection	Asbury Drive at Odendhal Avenue	Needs crosswalk E/W across	Lakeforest	Private/City	Short	\$4,185
LF2	Intersection	Lost Knife Road at Odendhal Ave	140' crossing. Needs median refuge.	Lakeforest	County	Short	\$7,500
LF3	Access Management	Lost Knife Road at Lost Knife Circle	Close driveway	Lakeforest	County/Private	Short	\$39,327
LF21	Bicycle Parking	Lakeforest Transit Center	Install 5 bike lids and 5 inverted U racks (10 spaces) with a decorative cover	Lakeforest	MCDOT	Short	\$15,000
LF22	Intersection	Lost Knife Road at Mall Access Road	Add continental crosswalk, rectangular flashing beacon, and pedestrian refuge island, 3 curb ramps and 170 feet of Sidewalk	Lakeforest	City/County	Short	\$36,250
LF25	Bicycle Parking	Lakeforest Transit Center	Add 5 Bike Lids; or 5 lockers and & 10 covered rack spaces (5 racks).	Lakeforest	MCDOT	Medium	\$15,000

## Linear Cost Estimates

RecCode	Improvement	Corridor	From	To	Notes	Station Area	Responsibility	Term	Estimated Cost
OT2	Sidewalk	Path	Parking Garage	S Summit Avenue	Pave this path. Ensure motorized vehicles can't use it.	Old Town	Private/City	Short	\$20,598
OT3	Sidewalk	Desire line	Olde Towne Avenue	Fulks Corner Avenue	construct sidewalk along desire line. Create landscaped area with benches toward the middle	Old Town	City	Short	\$28,228
OT4	Sidewalk	S Summit Avenue	Brick sidewalk	RR tracks	Widen sidewalk to 8 feet	Old Town	City/Private	Medium	\$7,690
OT5	Sidewalk	E Diamond Avenue	Frederick Avenue	N Summit Avenue	Construct wider sidewalks. Build bulbouts to define parking area and provide flat sidewalks with driveways ramping down to street after pedestrian space	Old Town	City/Private	Medium	\$320,000-\$10M
OT6	Sidewalk	E Diamond Avenue Southside	Melvin Street	Girard Street	Fill in sidewalk gaps on southside of street	Old Town	City	Medium	\$15,573
OT7	Sidewalk	Desire line	E Diamond Avenue	Teachers Way	Construct path on desire line	Old Town	City/Private	Medium	\$24,301
OT7	Sidewalk	Desire line	E Diamond Avenue	Teachers Way	Construct path on desire line	Old Town	City/Private	Medium	\$12,211
OT9	Sidewalk	South of MARC tracks	Wells Avenue	Deer Park Drive	Shared-Use trail	Old Town	City/Private/MT A/CSX	Long	\$478,881
OT15	Traffic Calming	E Diamond Avenue Northside	Melvin Street	Girard Street	Continue bulbout stormwater facilities from Archstone apartments in the long term.	Old Town	City	Long	\$195,000
OT18	Sidewalk	Path	Gaithersburg Elementary	Victory Farm Road	Repave and widen path	Old Town	City/MCPS	Short	\$153,694
OT19	Sidewalk	CSX Tracks	South Summit Avenue	Chestnut Street	Shared-Use trail	Old Town	City/Private/MT A/CSX	Medium	\$319,830
MG1	Sidewalk	Parking lot crossing	Watkins Mill Road	Metropolitan Court	Short term: Path through parking lot with wayfinding.	Met Grove	Private	Short	\$36,036
MG2	Sidewalk	Path	Parking access	Metropolitan Grove Road	Path to connect parking lot to existing sidewalk on Metropolitan Grove Road	Met Grove	Private/City	Medium	\$1,392
MG10	Sidewalk	Clopper Road	Twelve Oaks Drive	Existing sidewalk	Address clear desire line and provide straight path from intersection to existing sidewalk by straightening sidewalk	Met Grove	City/MDSHA	Medium	\$14,288
MG11	Sidewalk	Clopper Road	Watkins Mill Road	Driveway	Repave and widen path to 8 feet from 5.	Met Grove	City/MDSHA	Short	\$118,097
MG11	Sidewalk	Clopper Road	Driveway	Metropolitan Grove Road	Repave and widen path to 8 feet from 5.	Met Grove	City/MDSHA	Short	\$66,306
MG11	Sidewalk	Clopper Road	Metropolitan Grove Road	Firstfield Road	Repave and widen path to 8 feet from 5.	Met Grove	City/MDSHA	Short	\$221,375
MG12	Sidewalk	Clopper Road	Watkins Mill Road	Firstfield Road	Repave and widen path on north side of street from 5 to 8 feet	Met Grove	City/MDSHA	Long	\$213,875
MG13	Sidewalk	Trails	Clopper Road	Rabbitt Road	Build greenway trail and bridges along the Long Draught Branch	Met Grove	City	Long	Uncosted
LF4	Lighting	Contour Road	Odendhal Avenue	Lost Knife Road	Add pedestrian-scale lighting	Lakeforest	County	Short	\$286,700
LF5	Sidewalk	Path	Lost Knife Road	Mall Ring Road	Regrade path to be ADA-compliant	Lakeforest	Private/County	Short	\$5,378
LF6	Bikeway	Odendhal Avenue	Lost Knife Road	N Summit Avenue	Two-way sidewalk-level separated bike lane	Lakeforest	City/Private	Medium	\$259,833

Linear Cost Estimates continued

RecCode	Improvement	Corridor	From	To	Notes	Station Area	Responsibility	Term	Estimated Cost
LF7	Bikeway	Odendhal Avenue	Russell Avenue	Lost Knife Road	Two-way sidewalk-level separated bike lane	Lakeforest	City/Private	Medium	\$249,020
LF8	Bikeway	Odendhal Avenue	N Frederick Avenue	Russell Avenue	Two-way sidewalk-level separated bike lane	Lakeforest	City/Private	Medium	\$169,779
LF9	Bikeway	Lost Knife Road	Odendhal Avenue	Contour Road	One-way sidewalk-level separated bike lane	Lakeforest	County	Medium	\$154,853
LF10	Bikeway	Lost Knife Road	Contour Road	Montgomery Village Avenue	One-way sidewalk-level separated bike lane	Lakeforest	County	Medium	\$186,802
LF11	Bikeway	Montgomery Village Avenue	Russell Avenue	Lost Knife Road	Two-way sidewalk-level separated bike lane	Lakeforest	City/MDSHA	Medium	\$288,237
LF12	Bikeway	N Frederick Avenue	Odendhal Avenue	Lakeforest Boulevard	Two-way sidewalk-level separated bike lane	Lakeforest	City/MDSHA/Private	Medium	\$122,170
LF13	Bikeway	Lakeforest Boulevard	N Frederick Avenue	Russell Avenue	Two-way sidewalk-level separated bike lane	Lakeforest	City/Private	Medium	\$93,927
LF14	Bikeway	N Frederick Avenue	Montgomery Village Avenue	Lakeforest Boulevard	Two-way sidewalk-level separated bike lane	Lakeforest	City/MDSHA/Private	Medium	\$176,396
LF15	Bikeway	Montgomery Village Avenue	N Frederick Avenue	Russell Avenue	Two-way sidewalk-level separated bike lane	Lakeforest	City/MDSHA/Private	Medium	\$144,764
LF16	Bikeway	Russell Avenue	Lakeforest Boulevard	Odendhal Avenue	One-way sidewalk-level separated bike lanes	Lakeforest	City/Private	Medium	\$145,336
LF17	Bikeway	Russell Avenue	Montgomery Village Avenue	Lakeforest Boulevard	One-way sidewalk-level separated bike lanes	Lakeforest	City/Private	Medium	\$308,734
LF18	Bikeway	Lost Knife Road	Montgomery	Odendhal	One-way sidewalk-level	Lakeforest	County	Medium	\$338,800
LF19	Bikeway	Russell Avenue	Lakeforest Boulevard	Odendhal Avenue	One-way sidewalk-level separated bike lanes	Lakeforest	City/Private	Medium	\$122,496
LF20	Bikeway	Russell Avenue	Montgomery Village Avenue	Lakeforest Boulevard	One-way sidewalk-level separated bike lanes	Lakeforest	City/Private	Medium	\$157,028
LF23	Sidewalk	LF Mall	Odendhal Avenue	The Mall Entrance	Build a path across parking lot between the bus stop along Odendhal to the Mall, include curb ramp and crosswalk at mall access road	Lakeforest	Private	Short	\$67,200-\$131,536
LF24	Path	LF Mall	Montgomery Village Avenue	The Mall Parking Lot	Build a path across landscaped area between the sidewalk along the street to the Mall parking lot, include curb ramp and crosswalk at mall access road	Lakeforest	Private	Short	\$21,650

Unit Costs for Point Projects

Item	Unit	Unit Cost	Assumptions	Source
Aggregate Base Course for Pavement	SY	\$8		MDSHA-520111
12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	\$8		MDSHA-585412
24 inch white lead free reflective pavement markings	LF	\$9	12' width, 2' markings with 2' between markings	MDSHA-585424
Concrete Sidewalk, 5-inch	SF	\$10		MDSHA-6551105
Provide Pedestrian Refuge Island	SF	\$10		Cost was Average from 2013 PBIC Countermeasure Costs Report
Wood Sign Supports 4 Inch X 4 Inch	LF	\$12	6 Supports, 12 feet tall (buried 36 inches)	MDSHA-801104
Sheet Aluminum Signs	SF	\$25	6 sign panels, 18 inches by 24 inches	MDSHA-801605
Earthwork, Excavation, Grading	CY	\$36	1 foot deep, assume 1500 SF of regrading	Cost from recent estimate for Alexandria, VA
Detectable Warnings	SF	\$41	10' width, 2' markings with 2' between markings	MDSHA-655120
Bollards	EA	\$730		Cost was Average from 2013 PBIC Countermeasure Costs Report
Pedestrian Signal Heads	EA	\$760	Does not include Signal Design/Retiming.	MDSHA-860285
Relocate Existing Lockers	EA	\$1,000		Estimate based on time likely required
Pedestrian Push Buttons	EA	\$1,067	Does not include Signal Design/Retiming.	MDSHA-865210
Pedestrian Signal Pedestal	EA	\$1,379	Does not include Signal Design/Retiming.	MDSHA-818004
Personal Enclosed Bike Rack (Bike Lid)	EA	\$1,700 - \$2,300	1 bike capacity	2016 Toole Design Group Research
Standard Bike Locker	EA	\$2,200 - \$3,500	2 bike capacity	2016 Toole Design Group Research
Covered Inverted U Racks	EA	\$4,000 - \$6,000	10 bike capacity	2016 Toole Design Group Research
Raised Crosswalk	EA	\$8,170		Cost was Average from 2013 PBIC Countermeasure Costs Report

Unit Costs for Point Projects continued

Item	Unit	Unit Cost	Assumptions	Source
Curb Extensions	EA	\$13,000		Cost was Average from 2013 PBIC Countermeasure Costs Report
Rectangular Rapid Flashing Beacon (RRFB)	EA	\$22,250		Cost was Average from 2013 PBIC Countermeasure Costs Report
Shelter Structure and Concrete Pad	EA	\$52,000		Recent project quote
Full Traffic Signal with Pedestrian Countdowns	EA	\$300,000		Based on DDOT experience
Curb Radius Reduction	EA	Variable		
Move Traffic Mast Arm	EA	Variable		

Unit Costs for Linear Projects

Item	Unit	Unit Cost	Assumptions	Source
5 inch white lead free reflective pavement markings	LF	\$2	22' on center, 2 LF per T	MDSHA-585405
Colored pavement	LF	\$6	Assume 6' width colored pavement high friction	TDG Green Lane Calculator
Aggregate Base Course for Pavement	SY	\$8		MDSHA-520111
24 inch white lead free reflective pavement markings	LF	\$9	Two crosswalks, one near bus stop, one near mall. Each 10' width, 2' markings with 2' between markings	MDSHA-585424
Concrete Sidewalk, 5-inch	SF	\$10		MDSHA-6551105
Wood Sign Supports 4 Inch X 4 Inch	LF	\$12	6 Supports, 12 feet tall (buried 36 inches)	MDSHA-801104
Sheet Aluminum Signs	SF	\$25	6 sign panels, 18 inches by 24 inches	MDSHA-801605
Curb	LF	\$32		MDSHA-634204
Earthwork, Excavation, Grading	CY	\$36	assume 5' width, 1' depth	Cost from recent estimate for Alexandria, VA
Detectable Warnings	SF	\$41	for two curb ramps	MDSHA-655120
Demolition, Earthwork, Excavation, Grading	CY	\$50	assume 10' width, 1' depth	Cost adjusted based from recent estimate for Alexandria, VA
Asphalt Base Course	TON	\$109	Assume 10' width and 2.5" depth, 13.3 CF in a TON	MDSHA-504560
Asphalt Surface Course	TON	\$137	Assume 10' width and 1.5" depth, 13.3 CF in a TON	MDSHA-504500
Bollards	EA	\$730		Cost was Average from 2013 PBIC Countermeasure Costs Report
Concrete Steps	CY	\$1,500	assume 7' width, 2' deep, 6.6' high	MDSHA-697009
Benches	EA	\$1,550		Cost was Average from 2013 PBIC Countermeasure Costs Report
Curb Extensions	EA	\$13,000		Cost was Average from 2013 PBIC Countermeasure Costs Report
Roadway Reconstruction/ Street Narrowing	SF	Variable		