County Council of Howard County, Maryland

2020 Legislative Session Legislative Day No. **1**

Resolution No. 14 -2020

Introduced by: Chairperson at the request of the County Executive

A RESOLUTION adopting WalkHoward, the Howard County Pedestrian Master Plan and authorizing the Office of Transportation to publish WalkHoward.

Introduced and read first time _____, 2020.

By order _____
Diane Schwartz Jones, Administrator

Read for a second time at a public hearing on _____, 2020.

By order _____
Diane Schwartz Jones, Administrator

This Resolution was read the third time and was Adopted__, Adopted with amendments__, Failed__, Withdrawn__, by the County Council on _____, 2020.

Certified By _____
Diane Schwartz Jones, Administrator

NOTE: [[text in brackets]] indicates deletions from existing law; TEXT IN SMALL CAPITALS indicates additions to existing law; ~~Strike-out~~ indicates material deleted by amendment; Underlining indicates material added by amendment

WHEREAS, in 2007, the County developed its first Pedestrian Master Plan (the "2007 Plan"), aimed at addressing the gaps and inconsistencies in the County's pedestrian network; and

WHEREAS, the 2007 Plan attempted to prioritize pedestrian improvements near transit facilities, commercial areas, and sites serving senior citizens, but it generally recommended long segments of sidewalks along collector and arterial roads and many of these segments have proven difficult to implement, with right-of-way, topographical, and funding challenges; and

WHEREAS, adopted in 2012, the Howard County's General Plan, PlanHoward, addresses the need for a connected, comfortable and safe pedestrian network that accommodates all users; and

WHEREAS, over the past four years, the County has assessed current conditions, solicited public input, and worked on identifying a vision, goals, and guiding principles to determine the need for physical changes to the pedestrian network; and

WHEREAS, the County held Pedestrian Master Plan open houses in Laurel, Columbia, and Elkridge, and collected over 2,500 comments and 36,000 "likes" and "dislikes" from the public via an online interactive map; and

WHEREAS, addressing the shortcomings of the 2007 Plan and based on the current conditions assessment, public input, and stakeholder workgroup, the County has developed and wishes to adopt WalkHoward, an updated Pedestrian Master Plan, which aims to identify and prioritize more achievable projects to facilitate the implementation of pedestrian improvements; while paying special attention to the needs of seniors, children, those with disabilities, and those who do not own a car; and

WHEREAS, WalkHoward differs from the 2007 Plan in notable ways, including:

1. An increased focus on the integration of pedestrian facilities with transit service, and a new focus on the health and wellness benefits of walking;

2. An emphasis on achievable infrastructure improvements in manageable sections, beyond recommending sidewalks along long stretches of arterial and collector roads; and
3. The inclusion of high priority projects that are an avenue for implementation missing from the 2007 plan; and

WHEREAS, WalkHoward complements and supports the Howard County Complete Streets Policy and is coordinated with BikeHoward, the Howard County Bicycle Master Plan; and

WHEREAS, WalkHoward will provide a framework to improve conditions for people walking in Howard County and to promote walking as a safe and convenient option; and

WHEREAS, WalkHoward has been reviewed and endorsed by the Multimodal Transportation Board; and

WHEREAS, WalkHoward has been reviewed by the Planning Board and it unanimously recommended approval of the Plan, stating it was well thought out and should be considered by the County Council; and

WHEREAS, the County Executive wishes to adopt WalkHoward, the Howard County Pedestrian Master Plan, as attached.

NOW, THEREFORE, BE IT RESOLVED by the County Council of Howard County, Maryland, this _____ day of _____, 2020, that it hereby adopts WalkHoward, the Howard County Pedestrian Master Plan, as attached.

AND BE IT FURTHER RESOLVED, that the Administrator of the Office of Transportation may publish WalkHoward by adding or amending covers, title pages, table of contents, and graphics to improve readability.

WalkHoward

moving forward







Howard County Pedestrian Master Plan | County Council Version December 2019

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

Glossary iv
Tables and Figures v

Introduction 1
Walking in Howard County. 2
Planning for a Walkable Howard County. 2
Plan Development 4
Plan Organization 8

Plan Vision, Goals and Guiding Principles 9
Why Walking? 10
Vision Statement. 14
Goals. 14
Guiding Principles. 14

Existing Conditions 15
Field Assessment. 17

Network and Facility Recommendations 33
Sidewalks 35
Intersections 36
Bus stops 37
Missing Pedestrian Connections 38

Program Recommendations 39
Recommended Program Descriptions 41

Policy Review and Recommendations 45
The Review 46
Themes and potential updates 47

Implementation Plan 49
Guiding Principles and Strategies 51
Objective: Provide Supportive Programs 53
Objective: Update Policies and Practices 54
Objective: Identify Recommended Projects 55
Structured Projects 62
Priority Connections 105

Appendices 123
Appendix A: Field assessment forms. 124
Appendix B: Curb Ramp Placement Best Practices. 128
Appendix C: Development of Project Prioritization Scores. 136
Appendix D: Project Prioritization Details 142
Appendix E: Planning level cost estimate unit costs. 151
Appendix F: Grant Funding Sources. 153

Glossary

Term	Definition
ADA	Americans with Disabilities Act; the adopted ADA Accessibility Guidelines (ADAAG) address public facilities such as public buildings, parks, and libraries, and the proposed Public Right of-Way Accessibility Guidelines (PROWAG) address sidewalks, curb ramps and intersections.
Arterial	A roadway intended primarily to serve medium to long-distance trips, typically connecting to collector roadways and providing for some degree of access control.
Collector	A roadway intended primarily to serve short to medium-distance trips, typically providing access within a residential neighborhood or commercial area and connecting to local and arterial roadways.
Complete Streets	Streets designed and operated to enable safe use and mobility for all users, of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders.
Complete Streets Implementation Team	A working group, comprising County staff and public stakeholders, that developed the Complete Streets Policy and will develop complete streets updates to the Howard County Design Manual.
Goal	Statements that provide benchmarks for the County to determine whether the vision has been achieved.
Guiding Principle	The specific methods and ideas the County will use to reach its goals.
Lead Pedestrian Interval	A period of a few seconds during which the walk signal is illuminated before the corresponding traffic signal turns green. This gives pedestrians the chance to start crossing the street before turning vehicles have a green light.
Missing Connection	A location, identified by members of the public through the input process, where a pathway connection would increase pedestrian mobility.

Term	Definition
Pedestrian Advisory Team	A group of County staff and public stakeholders that met during plan development to develop the vision, goals, and guiding principles, prioritization methods, and plan contents.
Priority Connection	A missing connection selected for inclusion in the plan due to its apparent feasibility or the magnitude of the connection it would provide.
Structured Project	A geographic grouping of *WalkHoward* recommendations, with a total planning-estimate cost of under $500,000, selected from the highest 15 percent of priority scored-recommendations.
Transit and Pedestrian Advisory Group	A statutory Advisory Group, comprising County staff and public stakeholders, that advises the County Executive and County Administration on matters of public transit and pedestrian transportation.
Vision	A snapshot of the future condition Howard County hopes to achieve by implementing *WalkHoward*
Walk Score	An online program that ranks the walkability of a community from 0 to 100 based on the completeness and directness of the pedestrian network, scoring factors such as proximity to schools, shopping, and entertainment.

Tables and Figures

Tables

Table 1 - Summary of Survey and Crowdsourced Map Comments 7
Table 2 - Infrastructure Affecting Pedestrian Safety and Comfort 16
Table 3 - ADA Non-Compliance Rates in Assessed Sidewalk Segments 21
Table 4 - Summary of Sidewalk Recommendations 35
Table 5 - Summary of Intersection Recommendations 36
Table 6 - Summary of Bus Stop Recommendations 37
Table 7 - Reasons to Complete Missing Connections 38
Table 8 - Program Recommendations 40
Table 9 - Pedestrian Crossings of Limited-Access Highways 48
Table 10 - Structured Projects and Priority Connections 56
Table 11 - Funding Scenarios 60
Table 12 - Pedestrian Demand Score Measures 142
Table 13 - Pedestrian Needs Score Measures 145

Figures

Figure 1 - Howard County Community Walk Scores 2
Figure 2 - 2017 Status of 2007 Pedestrian Master Plan Projects 5
Figure 3 - Public Input from Wikimap 6
Figure 4 - Willingness to Walk 11
Figure 5 - *WalkHoward* Field Assessment Locations 17
Figure 6 - Field Assessment Form for Bus Stops 18
Figure 7 - Number of Bus Stop Recommendations 19
Figure 8 - Number of Intersection Recommendations 19
Figure 9 - Number of Sidewalk Recommendations 20
Figure 10 - Public Input (Wikimap) 20
Figure 11 - Sidewalks Inspected 21
Figure 12 - Sidewalks Not Meeting One or More ADA Requirements 22
Figure 13 - Sidewalks (in Field Work Area) with Less than 3' Buffer 23
Figure 14 - Gaps in the Sidewalk Network 24
Figure 15 - Howard County Pedestrian Crash Density, 2013-2015 25
Figure 16 - Intersections Assessed by County Staff 26
Figure 17 - Intersections Without Curb Ramps or with Non-Compliant Curb Ramps 27
Figure 18 - Intersections with Single Diagonal Curb Ramps 29
Figure 19 - Bus Stops Needing Pedestrian Improvements 30
Figure 20 - Missing Pedestrian Connections 31
Figure 21 - Map of Recommended Sidewalk Projects 35
Figure 22 - Map of Recommended Intersection Projects 36
Figure 23 - Map of Recommended Bus Stop Projects 37
Figure 24 - Map of Missing Connections Identified through Public Input 38
Figure 25 - Structured Project Locations 61
Figure 26 - Howard County Public Schools 138
Figure 27 - Pedestrian Focus Areas 139
Figure 28 - Socio-Economic Needs in Howard County 140
Figure 29 - Project Prioritization Map 141
Figure 30 - Assessed Infrastructure near Howard County Public Schools 143
Figure 31 - Pedestrian Demand Analysis Results 144
Figure 32 - Pedestrian Crash Densities 146
Figure 33 - Pedestrian Needs Analysis Results 147
Figure 34 - Pedestrian Focus Areas 148

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 1:

Introduction



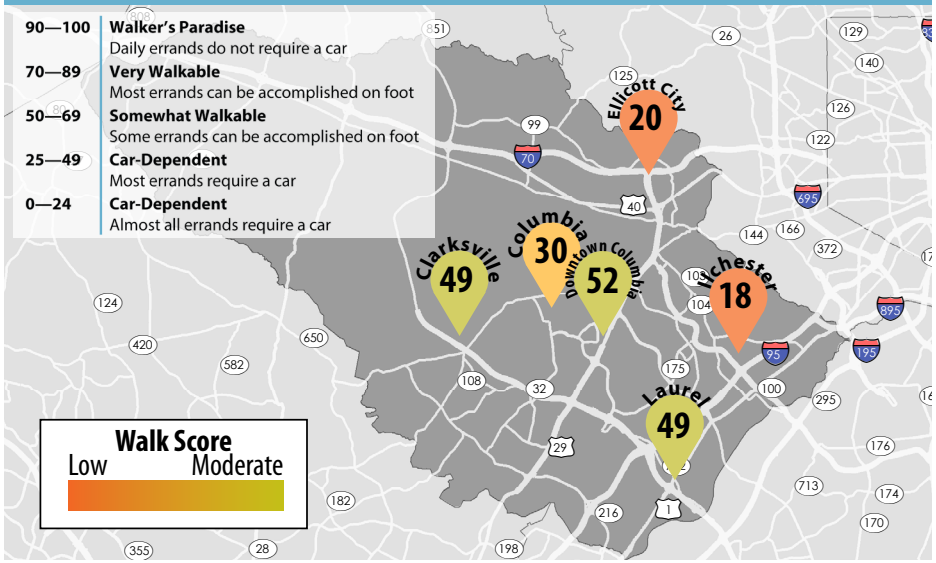
Walking in Howard County

Howard County is a great place to live, work, and play—and, generally, a good place to walk. Many of its neighborhoods are served by networks of trails, pathways and sidewalks that make walking to schools, commercial areas, and jobs possible. But is walking a fully safe and viable mode of transportation in Howard County? Or is it mostly a recreational activity in which to engage after work and on weekends and holidays?

The Walk Scores for six Howard County communities are shown below.[1] These scores suggest that with the exception of Downtown Columbia, which is considered "somewhat walkable," most of eastern Howard County is car-dependent. See **Figure 1**.

While the viability of walking as a mode of transportation depends on pedestrian access to destinations, safety is a key related consideration. Locations with unsafe walking conditions are very common in the County. The number of pedestrian fatalities in Howard County has fluctuated in recent years,[2] but reached a new high in 2016: eight pedestrians were killed in that year. Of those fatalities, six occurred along the US 1 (Washington Boulevard) corridor.[3]

Figure 1 - Howard County Community Walk Scores



With regards to walking to work, the County has walking commute rates between 1.0% and 1.5%, depending on the year. This lags behind the state average of 2.4 percent and national average of 2.8 percent,[4] and Howard County's rate is trending lower.[5] Such low rates are correlated with poor health, lesser sustainability, and missed economic opportunities.[6 7 8 9 10 11 12]

Planning for a Walkable Howard County

Shifting from accommodating walking as primarily a form of recreation to providing for it as a form of transportation requires planning. The County began a decade ago with its first Pedestrian Master Plan (2007) aimed at closing the "… many gaps and inconsistencies in the County's pedestrian network."[13]

Conceived with the recognition that work is still needed in this area, and guided by evolving pedestrian transportation priorities, this *WalkHoward* plan updates the 2007 Pedestrian Master Plan.

The primary initial focus of the 2007 plan was "to create a system of pedestrian facilities along and between minor collector and higher classified roads linking important destinations (retail centers, public buildings, parks, employment sites,

1 Walk Score is an online program that ranks the walkability of a community from 0 to 100 based on the completeness and directness of the pedestrian network, scoring factors such as proximity to schools, shopping, and entertainment. More information is at https://www.walkscore.com/.

2 National Highway Traffic Safety Administration Fatality Analysis Reporting System (FARS) 2001 to 2015 data for Howard County

3 Maryland Statewide Vehicle Crashes dataset

4 Alliance for Biking and Walking. 2016 Benchmarking Report

5 American Community Survey 1-, 3-, and 5-year estimates for 2007 to 2015 in table B08101: Means of Transportation to Work by Age

6 Doyle, Scott, et al. "Active community environments and health: the relationship of walkable and safe communities to individual health." Journal of the American Planning Association 72.1 (2006): 19-31.

7 Gotschi, Thomas, and Kevin Mills. "Active transportation for America: The case for increased federal investment in bicycling and walking." (2008),

8 Leinberger, Christopher, and Mariela Alfonzo. "Walk this way: The economic promise of walkable places in metropolitan Washington, DC." The Brookings Institution (2012).

9 MacCleery, Rachel, Casey Peterson, and Julie D. Stern. "Shifting suburbs: reinventing infrastructure for compact development." Urban Land Institute (2012).

10 Millsap, Adam. "Location choice in early adulthood: Millennials versus Baby Boomers." Papers in Regional Science (2016).

11 Gilderbloom, John I., William W. Riggs, and Wesley L. Meares. "Does walkability matter? An examination of walkability's impact on housing values, foreclosures and crime." Cities 42 (2015): 13-24.

12 Pivo, Gary, and Jeffrey D. Fisher. "The walkability premium in commercial real estate investments." Real Estate Economics 39.2 (2011): 185-219.

13 2007 Howard County Pedestrian Master Plan, page 5.

etc.) with major pedestrian points of origin."[14] While the 2007 plan attempted to prioritize pedestrian improvements near transit facilities, commercial areas, and sites serving senior citizens, it generally recommended long segments of sidewalk along collector and arterial roads. These segments have proven difficult to implement, with right-of-way, topographical, and funding challenges. Thus, *WalkHoward* aims to identify more achievable projects to facilitate implementation. Recognizing that special attention must be paid to meeting the needs of seniors, children, those with disabilities, and those who do not own a car, *WalkHoward* prioritizes projects in locations most likely to increase those users' mobility and access by including a 20% "equity bonus" in its prioritization methodology (see Appendices C & D).



WalkHoward provides a framework for improving conditions for people walking in Howard County and promoting this mode as a safe and convenient travel option. While this document provides detailed recommendations for programs and projects, it does not commit County funds.

WalkHoward is also consistent with the County's Complete Streets implementation program.[15] In October 2019, the Howard County Council adopted a Complete Streets Policy developed by a Complete Streets Implementation Team consisting of government officials and representatives from the Multimodal Transportation Board, Columbia Association (CA), and the Howard County Public School System. The policy is based on best practices from around the country and incorporates input from stakeholders and the public to tailor guidance to Howard County. In addition, the Howard County Design Manual will be updated to reflect the policy and provide Complete Streets design guidance.[16]

14 Ibid, page 7

15 A definition of Complete Streets from the Complete Streets Coalition, the Howard County Complete Streets Policy, and information about ongoing complete streets implementation are available at www.howardcountymd.gov/completestreets

16 From January 5, 2016 press release, http://howardcountymd.gov/News010516b.htm

PURPOSE OF PLAN UPDATE

WalkHoward sets forth a plan for implementing a connected, comfortable, and safe pedestrian network that accommodates all users. To do this, it identifies pedestrian network improvements needed beyond those completed under the 2007 Plan. It also provides recommendations for changes in policies, guidelines, and practices that affect the pedestrian network, and for programs that will encourage the network's use.

WalkHoward is part of a family of plans that guide the County's community and economic development and articulate goals for its transportation system:

PlanHoward 2030: Enacted in 2012, this is Howard County's general (comprehensive) plan, organized around three concepts: environmental, economic, and community sustainability. *WalkHoward* builds upon the recommendations of *PlanHoward2030* and provides for measurable outcomes related to pedestrian infrastructure in the County.

Walking contributes toward achieving PlanHoward's sustainability goals in the following ways:

- Environmental sustainability: reducing air and water pollution by replacing car trips with walking trips
- Economic sustainability: allowing pedestrians the opportunity to walk to local businesses for day-to-day activities
- Community sustainability: contributing to public health and promoting personal interactions with neighbors

PlanHoward2030 calls for the establishment of an interdepartmental team to implement both a countywide bicycle master plan and a countywide pedestrian master plan. With *BikeHoward*'s adoption in 2016, *WalkHoward* is the final step in achieving the general plan's objective.

BikeHoward: Adopted in 2016, this is Howard County's Bicycle Master Plan, focusing on developing comfortable facilities for bicyclists of all ages and abilities through a countywide bicycling network and implementing efforts to increase all bicycle trip types, and establishing guidelines for bicycle facility design and policies that support bicycling.

Connecting Howard County: This is a 2014 report to the County Council and County Executive from the Public Transportation Board, which evaluated the performance of the County's public transportation system and provided recommendations for its improvement. The report was based on four findings that are compatible with a strong pedestrian network:

- We are becoming more urban and more dense.
- We need to identify funding and expand public transportation options now.
- We need to firmly link land use and transportation decisions.
- We need to establish a sensible set of policies and standards to guide the expansion of our public transportation network and all of its components.

The report concluded that "Multi-modal means must be built to access commuter and local transit services, including…improved pedestrian access and shelters," in addition to service changes to increase transit use.[17]

Connecting Columbia Active Transportation Action Agenda: This 2012 plan is a "blueprint and strategy" for the implementation of pedestrian and bicycle infrastructure in Columbia. It emphasizes new pathway connections to community destinations, commercial centers and neighborhoods. Additionally, the plan stresses the need to improve visibility at intersections and reduce crashes where pathways meet roadways. [18]

PLAN DEVELOPMENT

The following questions guided County and consulting staff during the four-year *WalkHoward* development process:

- What are our goals for improving the pedestrian network?
- What remains undone that was identified in the 2007 Pedestrian Master Plan (See **Figure 2**)?
- What needs do residents have that we should include in this plan?
- How do we decide which improvements to make in the short term?
- How can programmatic efforts encourage more walking and improved safety?
- What is the best approach to policy and process changes that will improve and expand the pedestrian network?

Answers to these questions came from a multi-step process of assessing current conditions, gaining public input, identifying a vision, goals, and guiding principles, determining needs for physical changes to the pedestrian network, proposing programs to support walking, and recommending a framework for making changes to policy, procedure, and practice when needed.

This plan differs from the 2007 plan in notable ways, including an increased focus on the integration of pedestrian facilities with transit service, and a new focus on the health and wellness benefits of walking. This plan emphasizes achievable infrastructure improvements in manageable sections, rather than just recommending sidewalk along long stretches of arterial and collector roads. Finally, this plan includes structured projects that are an avenue for implementation missing from the 2007 plan.

Assess current conditions

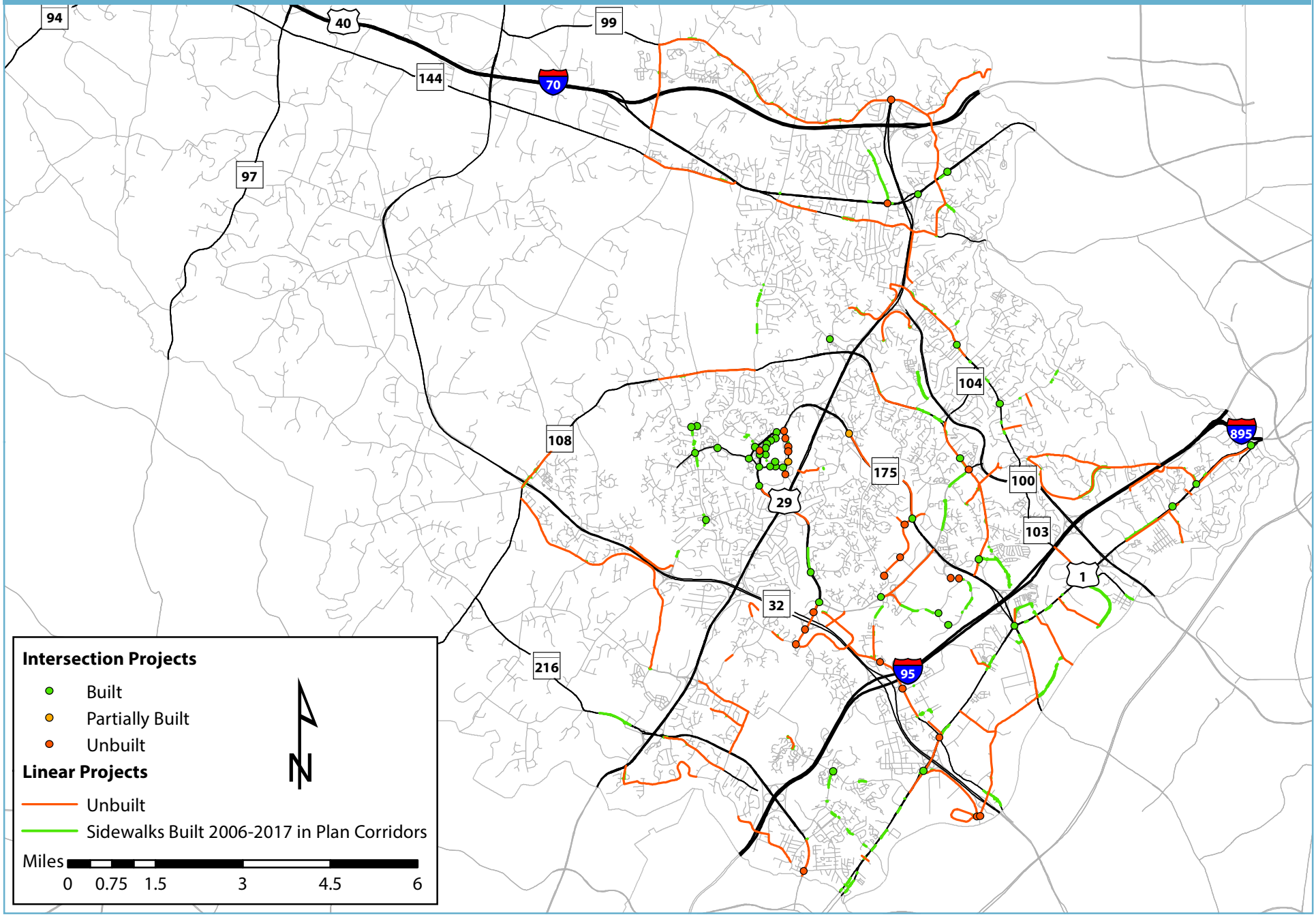
The County used a combination of field work and data analysis to assess the current pedestrian network. The field work was done in two phases. Phase One concentrated on bus stops and roads along which bus routes operate, while Phase Two focused on streets where pedestrian projects identified in the 2007 plan remain unbuilt as well as streets that were not part of Phase One. The second phase also added a review of the pedestrian network in six hamlets: Glenwood, Lisbon, West Friendship, Highland, Glenelg, and Dayton. Both phases assessed the condition of sidewalks, intersections, and bus stops throughout the most populated areas of the County, gathering information on 343 miles of existing roadways, 915 intersections, and 494 bus stops.

The County received information on sidewalk, intersection, bus stop, and other connection needs from the public via a series of open houses, online surveys and crowdsourcing tools, as well as written suggestions and

17 Page 7 and 8 of the report.

18 Connecting Columbia—Active Transportation Agenda for Columbia. Available at http://www.columbiaassociation.org/about-us/about-columbia-association/planning-and-development/active-transportation-action-agenda

Figure 2 - 2017 Status of 2007 Pedestrian Master Plan Projects

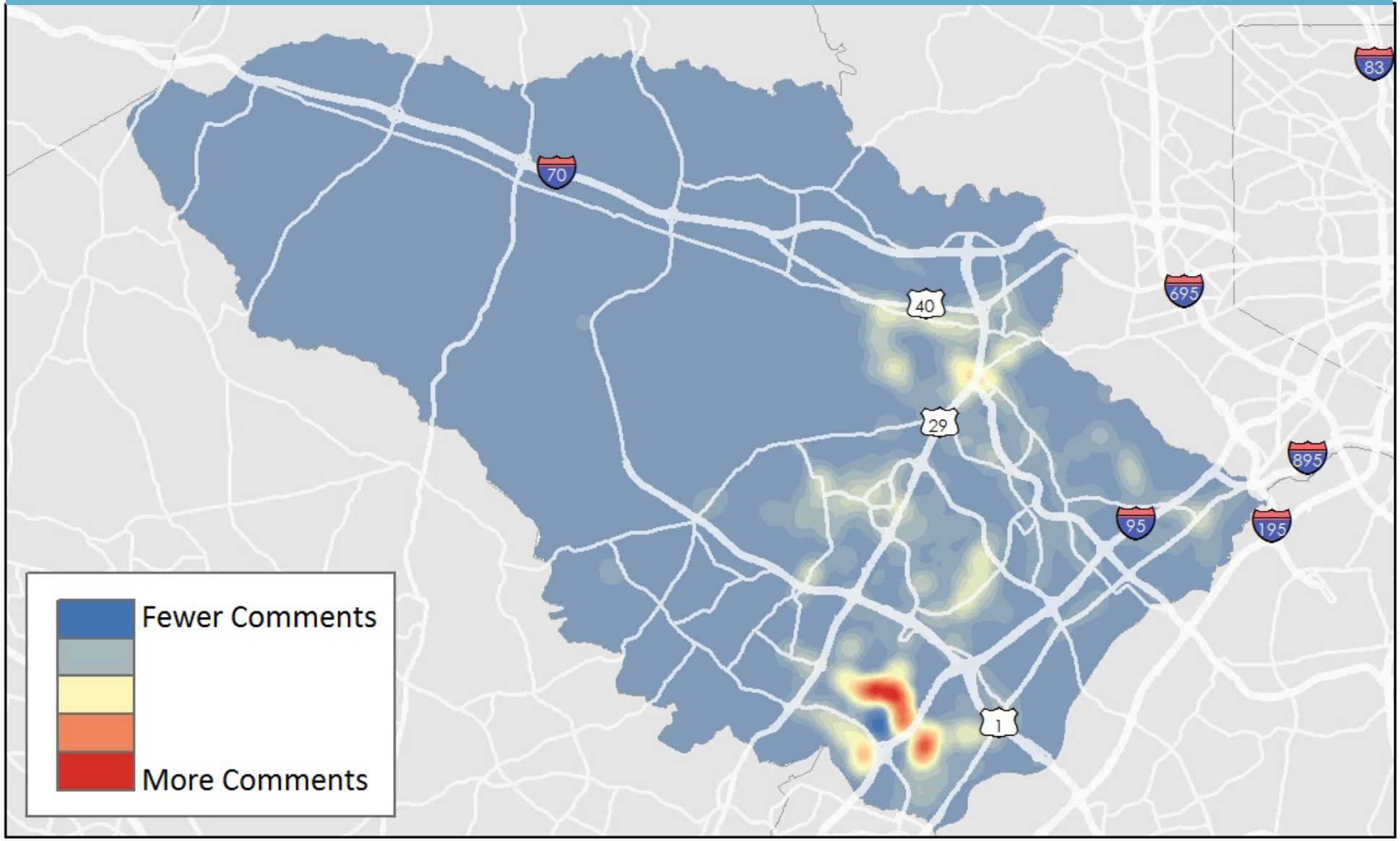


comments. Guidance from a Pedestrian Advisory Team helped shape the project prioritization, an approach to policy changes, and programmatic recommendations.

General public input

County and consulting staff made information about the project available through a *WalkHoward* website. A series of open houses, online and printed surveys, and various events of different formats allowed the public—including

Figure 3 - Public Input from Wikimap





both residents and those who worked in Howard County but resided elsewhere—to identify challenges and opportunities related to the accessibility and comfort of walking. Public open houses were held throughout winter and spring 2015 across various locations, times of the day, and on different days of the week to enhance access from different communities. In addition, staff distributed printed survey forms to many community venues, such as libraries, schools, and coffee houses. The survey was also available online as a Google document and as an online crowdsourcing interactive map, which expanded the opportunity to provide input and allowed for location-specific comments. All comments received via other means were entered onto the online map for ease of viewing and analysis.

Table 1 - Summary of Survey and Crowdsourced Map Comments

Comment	Total Number	Number of "Likes"	Number of "Dislikes"
Needs Sidewalk	1,312	23,073	57
Difficult Roadway Crossing	573	6,301	886
Other	287	2,339	454
Missing Connections	273	1,861	1,473
Pathway Obstruction	27	84	87
TOTAL	**2,472**	**33,658**	**2,957**

The survey asked participants to identify locations with missing or deficient sidewalks, challenging roadway crossings, and bus stops with access and comfort concerns. In all, nearly 2,500 location-specific comments were received and mapped. Participants also reacted to each other's comments, noting their reaction with a "like" or "dislike". The complete breakdown of comments, "likes", and "dislikes" is presented in **Table 1.**

All comments were mapped using a heat map approach, i.e., locations with the highest density of comments appear brightest on the map (see **Figure 3**). The brightest locations—where the greatest number of comments and "likes" were made—suggest a strong community-identified need or a comment that had significant support. The public input was used as part of the project prioritization process, which occurred later in the plan development; see Appendix C for more information.

Advisory Team guidance

General public input concluded in early spring 2015. The second phase of public engagement occurred with a group of stakeholders assembled as the

The Advisory Team included representatives from the following organizations:

Columbia Association: Scott Templin and Jane Dembner
Homebuilders/Development Community: Michael Harrison
Howard Community College: Bob Marietta
Howard County Administration: Carl DeLorenzo
Howard County Chamber of Commerce: Leonardo McClarty
Howard County Department of Community Resources and Services: Michelle Henry
Howard County Department of Planning and Zoning: Bill Mackey
Howard County Department of Public Works: Holger Serrano
Howard County Department of Recreation and Parks: Clara Gouin and Raul Delerme
Howard County Health Department: Kati Moore, Lisa DeHernandez, and Johnia Curtis
Howard County Office on Aging: Jennifer Lee
Howard County Office of Transportation: John Powell and Kathleen Donodeo
Howard County Police Department: Michael Yetter
Howard County Public School System: Doug Kampe, Joel Galihue, Bill Stolis, and David Ramsay
Howard County Public Transportation Board: Larry Schoen*
Maryland State Highway Administration: Tara Penders
Regional Transportation Agency: Maynard Nash

*The Public Transportation Board was subsequently renamed to the Multimodal Transportation Board by CB20-2017

Pedestrian Advisory Team. The team met three times and provided guidance in three areas:

- What the plan should help accomplish in the long term, i.e., Vision, Goals, and Guiding Principles
- How to determine priorities for recommended projects
- The contents of the final plan

More information on the Advisory Team's guidance is included throughout the plan.

Identify vision, goals, and guiding principles

The vision and goals for *WalkHoward* were formalized after the field assessment and general public input phases were complete. This approach allowed the vision and goals to reflect existing conditions and the community's desires for its pedestrian network. Chapter 2 provides a more detailed discussion of these items.

Determine infrastructure project priorities

The field assessment and public input processes generated a set of recommendations for infrastructure changes that would benefit the pedestrian network. The process of prioritizing the recommendations was based on the analysis of pedestrian focus areas completed for the field assessment, augmented by the Pedestrian Advisory Team's guidance to strengthen the effect of the socio-economic factors included in Plan Howard 2030, and validated in part from comments received through the public input process.

Devise programs to support walking

Howard County's recent Bicycle Master Plan included a number of programmatic recommendations that support bicycling for transportation. These recommendations provided the basis for programs in *WalkHoward* to increase walking for transportation in the County, including travel to work, school, shopping, and entertainment, with health and fitness as side benefits.

Develop a framework for determining policy,procedure, and practice changes

The *WalkHoward* development process included a review of policies, procedures and practices to determine where updates could further pedestrian network development. The work focused on a review of existing documents and focus group discussion, which resulted in a set of themes and potential updates. Staff from several County offices and related organizations participated in the stakeholder discussions and the Pedestrian Advisory Team reviewed the list of potential updates as part of their work in the summer of 2015.

PLAN ORGANIZATION

This plan is composed of eight chapters, supplemented by technical appendices.

Chapter One serves as the plan's introduction, reflecting on the County's progress to date and laying the groundwork for further improving the pedestrian network.

Chapter Two discusses why planning for walking is important, and establishes the plan's vision, goals, and guiding principles.

Chapter Three summarizes the results of the field assessment that determined the existing condition of sidewalks, intersections, curb ramps, and bus stops.

Chapter Four presents network and facility recommendations. Drawing from the results of the field assessment, this chapter also discusses recommended improvements (referred to as "mitigations") by location and project category (sidewalks, intersections, bus stops, and missing connections).

Chapters Five and **Six** provide programmatic recommendations to encourage more walking and a framework for identifying policy updates based on the set of priorities and goals set forth in Chapter Two.

Chapter Seven presents an implementation plan for programmatic and infrastructure recommendations, including structured pedestrian projects that geographically group sidewalk, bus stop, and intersection improvements. The chapter also identifies missing pedestrian connections that merit further investigation.

Chapter 2:

Plan Vision, Goals and Guiding Principles



Why Walking?

Everyone is a pedestrian at some point in every journey. For some, walking means a short trip every so often, but for those who are not able to drive, walking is an essential means of transportation. This includes young people, some seniors, people with temporary or permanent disabilities, those who choose to walk, and those who cannot afford to drive. Some may be able to rely on others to drive them, but others may need to travel on their own by walking, bicycling, or taking transit. By focusing on improving the pedestrian network and increasing access to bus stops, Howard County can help people travel independently and reach destinations such as schools, shopping, services, and social interaction in a safe and comfortable manner. In addition, improving walkability can result in significant health, economic, and safety benefits for individuals and for the community as a whole.

"Between 2015 and 2040 the County's population aged 50 years and older is projected to grow from 104,785 to 145,855, an increase of 39.2%"

American Community Survey 2015 population estimates and Maryland Department of Planning 2014 population projections

WALKING IS GOOD FOR HEALTH

Studies have shown that regular physical activity can help reduce individuals' risk for chronic diseases including diabetes, heart disease, high blood pressure, and obesity,[19] and Howard County residents are among the most physically active people in Maryland.[20] However, a growing majority (60 percent in 2016, up from 56 percent in 2012 and 2014) of adults in Howard County are overweight or obese. Obesity is a primary risk factor for diabetes, heart disease, stroke, and cancer, which together account for over half the deaths in Howard County each year. [21]



19 Center for Disease Control "Perceptions of neighborhood characteristics and leisure-time physical inactivity—Austin/Travis County, Texas, 2004". Morbidity and Mortality Weekly Report 2005; 54(37):926-8

20 2016 Howard County Health Assessment Survey. Report of Findings.

21 Ibid

Furthermore, while each hour spent in a car per day is associated with a 6 percent increase in the likelihood of obesity,[22] almost 94 percent of Howard County resident commuters drive to work, and more than 45 percent commute more than an hour round trip each day.[23] In a 2015 call to action, the U.S. Surgeon General called for a regular—preferably daily—regimen of at least 30 to 45 minutes of brisk walking, bicycling, or even working around the house or yard, to help reduce the risk of coronary heart disease, hypertension, colon cancer, and diabetes.[24] [25] Therefore, making changes to the built environment of Howard County to facilitate walking as a form of transportation will contribute to a decreased risk for these diseases.

Figure 4 - Willingness to Walk



Copyright 2012. Robert Wood Johnson Foundation. Used with permission from the Robert Wood Johnson Foundation.

22 Frank, Lawrence D., Martin A. Andresen, and Thomas L. Schmid. "Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars." Am J Prev Med 27.2 (2004): 87-96.

23 American Community Survey 2015 5-year Estimates, Table B08134: MEANS OF TRANSPORTATION TO WORK BY TRAVEL TIME TO WORK - Universe: Workers 16 years and over who did not work at home

24 http://www.surgeongeneral.gov/library/calls/walking-and-walkable-communities/

25 U.S. Department of Health and Human Services. Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General; 2015

WALKING IS GOOD FOR SUSTAINABILITY

Increased investment in the safety and comfort of people walking will help the County achieve its sustainability goals. Replacing car trips with walking trips avoids the air pollution and carbon emissions produced by the vehicle, and research has found that people will walk a mile or more to church, school, or work if a network of sidewalks, crosswalks, and pedestrian paths exists to allow them to safely and comfortably reach their destination. See **Figure 4**.[26] There is thus a potential to convert the nearly 30 percent of car trips that are one mile or less to walking trips. This in turn would help reduce greenhouse gas emissions, as called for by *PlanHoward2030*.

WALKING IS GOOD FOR THE COMMUNITY

Sidewalks make good spaces for interpersonal interaction where people can "rub shoulders" with each other. Connected sidewalks allow community members a healthy option to meet neighbors and socialize in a wider network.

WALKING IS GOOD FOR THE ECONOMY

People who live in walkable communities tend to be more familiar with their surroundings, more engaged in their community, and more likely to walk for day-to-day activities including local errands. This tendency for people to shop locally in walkable areas can help attract and retain workplaces and employees, and support real estate values, civic pride, and community involvement.

Economic benefits for businesses

Improving the pedestrian network can help support local businesses. Pedestrian patrons of non-supermarket businesses have been found to visit those businesses more often and spend more each time they visit.[27] Locally, a survey of neighborhoods in the Washington Metropolitan Area found that more walkable areas had significantly higher levels of retail sales.[28]

26 Robert Wood Johnson Foundation. "Better Transportation Options = Healthier Lives." Culture of Health. October 2012. http://www.rwjf.org/en/library/infographics/infographic--better-transportation-options---healthier-lives.html.

27 2009 Clifton, Kelly J., et al. "Examining consumer behavior and travel choices." (2013).

28 Leinberger, Christopher, and Mariela Alfonzo. "Walk this way: The economic promise of walkable places in metropolitan Washington, DC." The Brookings Institution (2012).

Economic benefits for employers

Walkability can also help employers' bottom lines by improving productivity and reducing absenteeism. Workplace fitness programs, which might include programs to promote walking to work, have been shown to reduce employer health care costs by 20 to 55 percent.[29] Furthermore, today's young professionals have an increasing desire for walkable places.[30] Therefore, providing an adequate pedestrian network may increase the likelihood that professionals will choose to locate in Howard County. [31]

Economic benefits for real estate

Walking can also help increase real estate values. Research has shown that walkability is associated with increased residential property values as well as increased resilience to downturns in the real estate market.[32] In addition, a ten percent increase in WalkScore for commercial and multifamily properties can increase property values by up to nine percent over an equivalent property in a non-walkable neighborhood.[33]

Economic benefits for individuals

At the individual level, walking can also lead to economic benefits. These come in the form of reduced household expenditures on transportation and health care, which combined make up over 22 percent of annual average household expenditure in the United States.[34] In 2015, a typical medium sedan cost an average driver 57 cents per mile to operate. Based on these data, replacing a 1.2-mile vehicle round-trip with a 1.2-mile walking round trip every day would save over $500 per year.[35]

29 American Heart Association, 2011.

30 MacCleery, Rachel, Casey Peterson, and Julie D. Stern. "Shifting suburbs: reinventing infrastructure for compact development." Urban Land Institute (2012).

31 Millsap, Adam. "Location choice in early adulthood: Millennials versus Baby Boomers." Papers in Regional Science (2016).

32 Gilderbloom, John I., William W. Riggs, and Wesley L. Meares. "Does walkability matter? An examination of walkability's impact on housing values, foreclosures and crime." Cities 42 (2015): 13-24.

33 Pivo, Gary, and Jeffrey D. Fisher. "The walkability premium in commercial real estate investments." Real Estate Economics 39.2 (2011): 185-219.

34 U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2010.

35 American Automobile Association "2016 Driving Costs per Mile" http://newsroom.aaa.com/auto/your-driving-costs. 2016.

WALKABLE PLACES ARE SAFER FOR EVERYONE

Streets and sidewalks are important parts of cities, towns, and communities: they allow children to get to school and adults to get to work, and they bring together neighbors and draw visitors to neighborhood stores. Walkable neighborhoods tend to have much lower rates of traffic fatalities—for both pedestrians and motorists—than car-centric areas.[36] These neighborhoods' pedestrian facilities help reduce the number of car trips and support walking, jogging, and bicycling to school, shopping, and social activities.

One study found that designing for pedestrian travel by installing raised medians and redesigning intersections and sidewalks reduced pedestrian risk of injury and fatality by 28 percent.[37] Pedestrians walking in sidewalks rather than in roadways face an 88 percent lower risk of being struck.[38] But pedestrian-friendly roads—equipped with narrower lanes, vegetated buffers, and traffic calming—are safer not just for pedestrians: making roads safer for people walking by redesigning them for lower motor vehicle speeds and speed limits also helps make roads safer for motorists. The lower speeds resulting from these road treatments result in a reduction in overall crashes and lower numbers of motorist injuries and fatalities.[39]



36 America Walks. Learning Center. Safety benefits of walking. http://americawalks.org/learning-center/benefits-of-walking-2/safety/#sthash.0d8cPpPC.dpuf

37 Coalition for Smart Growth. Complete Streets Coalition. Introduction to Complete Streets Presentation. http://www.smartgrowthamerica.org/complete-streets/ complete-streets-fundamentals.

38 Federal Highway Administration. "Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes." http://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/. 2008

39 Ewing, Reid, and Eric Dumbaugh. "The built environment and traffic safety a review of empirical evidence." Journal of Planning Literature 23.4 (2009): 347-367.

This approach has been codified in Howard County law via the adopted Complete Streets Policy.

Investing in walking infrastructure can also reduce the increased risk of injury many seniors face due to their slower walking speeds, as well as address the mobility needs of people with disabilities. Pedestrian countdown signals tell people how much time remains to safely cross a street, allowing them to plan their crossing at their own pace.[40] Pedestrian islands of refuge—medians with a pedestrian path cut through them—reduce the time pedestrians are exposed to traffic and can provide a safe place to wait for a signal to change, particularly on multi-lane roads.[41]



This pedestrian refuge island allows pedestrians to more safely cross Frederick Road to access the Miller Branch Library in Ellicott City



Thus, the safety, economic, sustainability, and health benefits of pedestrian infrastructure can significantly enhance a community's well-being and quality of life. At the same time, adequate pedestrian infrastructure expands transportation options for those who do not, or cannot, drive.

The Plan's vision, goals, and guiding principles grew out of the field assessment and public engagement processes. Both of these plan development stages provided insight into the type of actions and programming needed for the County's pedestrian network. Parallel community advocacy activities aimed at increasing walkability and bikeability for residents and the Pedestrian Advisory Team review also influenced the vision, goals and guiding principles.

All of the planned facilities and programmatic recommendations in *WalkHoward* are based upon a common vision and seek to further the county's goals as outlined below. The **Vision Statement** is a snapshot of the future condition Howard County hopes to achieve by implementing the plan. The **Goals** provide benchmarks for the County to determine whether the vision has been achieved, and the **Guiding Principles** are the specific methods and ideas the County will use to reach its goals.

40 Ernst, Michelle. Dangerous by Design: Solving the Epidemic of Preventable Pedestrian Deaths. Transportation for America. 2011.20. http://t4america.org/docs/dbd2011/Dangerous-by-Design-2011.pdf

41 National Association of City Transportation Officials "Urban Street Design Guide." 2013: 116

Vision Statement

Howard County has a connected pedestrian network that safely and conveniently accommodates people of all ages and abilities.

Goals

- Fill gaps in the sidewalk, pathway, and crosswalk network.
- Provide safe and convenient pedestrian connections to all transit locations.
- Meet or exceed ADA standards for pedestrian facilities.
- Support efforts to increase walking to schools.
- Improve the maintenance of the facilities that constitute the pedestrian network.



- Maintain a low rate of pedestrian-related crashes, injuries and fatalities.
- Coordinate with state agencies regarding the pedestrian network on state-owned and state-managed roadways.
- Require developers to provide high quality pedestrian facilities or resources for a more effective and timely alternative through the development process.

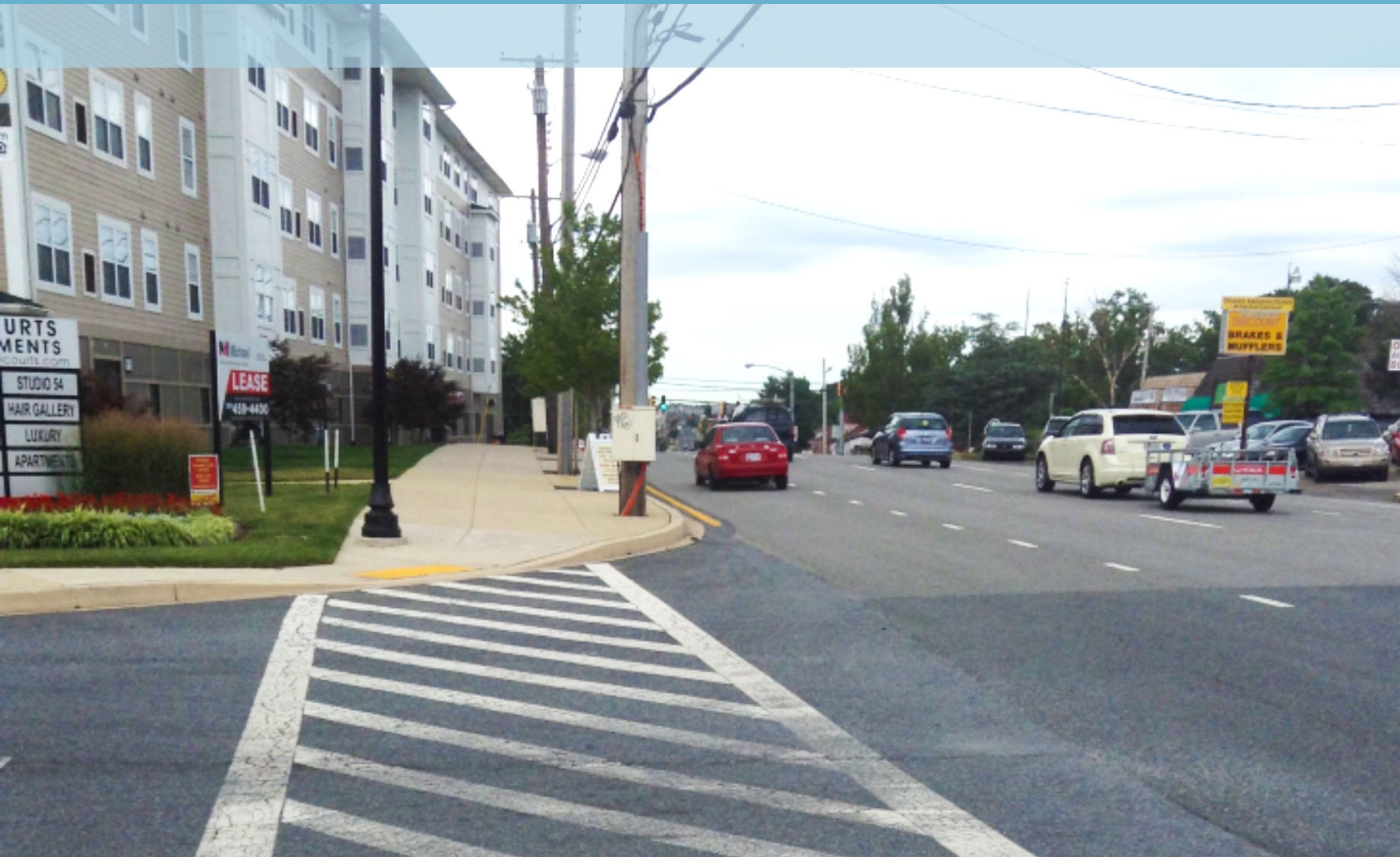
Guiding Principles

- Build a pedestrian network that is meant to be used; maintain it so that it is used.
- Ensure the pedestrian network is coherent, continuous, and connected.
- Design all pedestrian network elements to satisfy pedestrians' desire for safe, direct routes.
- Allocate space where needed so that pedestrian facilities meet design standards for best practices and are ADA compliant.



Chapter 3:

Existing Conditions



Overview

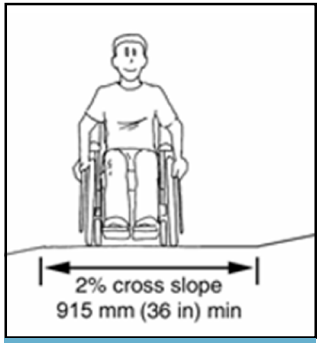
This chapter describes the present physical condition of Howard County's pedestrian network, as determined through the field assessment. Facilities assessed include sidewalks, intersections, curb ramps, and bus stops throughout the most populated areas of the County. During the two-phased assessment, County staff gathered information on 343 miles of roadways, 915 intersections, and 494 bus stops.

The field assessment surveyed existing conditions to identify facilities that do not meet Americans with Disabilities Act (ADA) standards, have gaps in connectivity, are inadequate to meet pedestrian travel needs, or have safety concerns. The chapter is organized into four pedestrian facility types: sidewalks, intersections, curb ramps and bus stops.

ADA compliance was assessed in each of the four types because of their importance for many pedestrians. The ADA codified access as a civil right, and since its passage in 1990, two sets of guidelines have been developed to ensure access in public space. The ADA Accessibility Guidelines (ADAAG) address public facilities such as public buildings, parks, and libraries, and the Public Right-of-Way Accessibility Guidelines (PROWAG) address sidewalks, curb ramps and intersections.

PEDESTRIAN NETWORK ELEMENTS

The safety and comfort of pedestrian travel is significantly influenced by the design of the built environment, as shown in **Table 2**. Understanding existing conditions for walking was therefore the first step for developing *WalkHoward*'s recommendations. Factors such as the layout and connectivity of the street network, presence or absence of pedestrian facilities, and organization of land uses all play a role in walkability. Accessible sidewalks are those which comply with ADA requirements for sidewalk width, cross slope and functionality, as shown in the adjacent graphic and text box.



Sidewalk width and cross slope are part of ADA compliance needs.

Table 2 - Infrastructure Affecting Pedestrian Safety and Comfort

Sidewalks	Curb Ramps
• Is there a sidewalk present? • Is the sidewalk continuous? • Is the sidewalk wide enough? • Is the sidewalk well-maintained? • What is the sidewalk made of? • Are there any obstructions? • How close is the sidewalk to the roadway? • Does the sidewalk get puddles and ice patches during wet weather?	• How wide is the curb ramp? • Where are utilities placed in relation to the crosswalk and curb ramp? • Does the drainage system keep the base of the ramp clear of water, ice, and debris? • Are the crosswalk and curb ramps aligned? • Is there enough space for a compliant curb ramp? • Does the topography affect the curb ramp placement and type?
Crossings	**Bus Stops**
• Is there a marked crosswalk? • What is the crossing distance? • How long does it take to cross? • How long is the wait time for a signal or a gap in traffic? • Are there traffic calming features to slow motor vehicle speeds near the crossing location? • Are there pedestrian crossing signals?	• Is the stop convenient to origins and destinations? • Is the stop clearly marked? • Are there any obstacles near the stop? • Is there a level paved surface for waiting to get on the bus or when getting off the bus? • Is there a safe route to get to the stop? • Is there a shelter? • Is there enough lighting?

Field Assessment

The field assessment occurred during the summer and fall of 2014 and the spring of 2015. The first phase concentrated on bus stops and the roads along which bus routes operated. The second phase focused on streets selected according to two criteria: streets and project locations brought forward from the 2007 Pedestrian Plan that were not assessed during Phase I, and streets in six rural hamlets: Glenwood, Lisbon, West Friendship, Highland, Glenelg, and Dayton. **Figure 5** shows field assessment locations.

Prior to beginning the field assessment, County staff received a day of training about ADA accessibility, pedestrian connectivity, and access. This training included information about minimum sidewalk widths, maximum sidewalk grades, bus stop accessibility requirements, and engineering best practices. County staff also received in-the-field training on what to look for when assessing sidewalks, crosswalks, bus stops and intersections.



Figure 5 - *WalkHoward* Field Assessment Locations

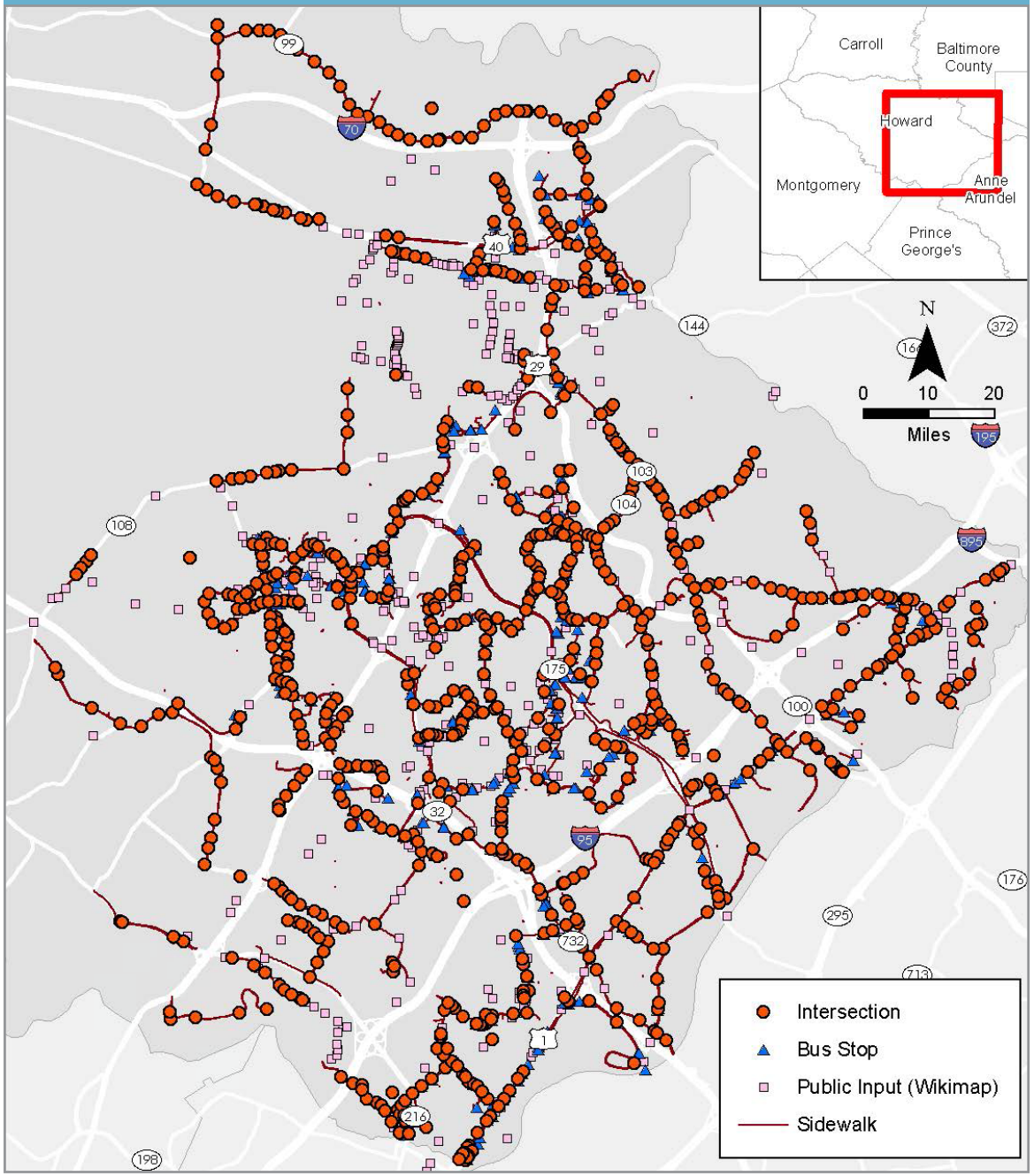


Figure 6 - Field Assessment Form for Bus Stops

Bus Stop ID

Location ○ Midblock ○ Intersection

Routes

Tax Map

Grid

Street Name

Date

Staff ☐ BPickar ☐ JMiller ☐ MHenry ☐ CNzekwe ☐ BMuldoon ☐ HFisher ☐ ELewis ☐ Other

Bus Stop Sign

Bus Stop Sign? ○ Yes ○ No

Sign Present and Visible from Sidewalk Access ○ Yes ○ No

Is it Correct? ○ Yes ○ No

Bus Stop Lighting

Bus Stop Lighting? ○ Yes ○ No

Street? ○ Yes ○ No

Pedestrian Scale? ○ Yes ○ No

Bus Stop Landing Pad

Bus Stop Landing Pad? ○ Yes ○ No

Landing Pad Greater than or Equal to 8' x5' ? ○ Yes ○ No

Pad Connected to Sidewalk? ○ Yes ○ No

Slope Perpendicular to Road Less than or Equal to 2%? ○ Yes ○ No

Bus Shelter

Existing Bus Shelter? ○ Yes ○ No

Shelter Pad? ○ Yes ○ No

Bus Schedule? ○ Yes ○ No

Route Map? ○ Yes ○ No

48" Minimum Peripheral Access? ○ Yes ○ No

36" Wide Door or NO front Panel? ○ Yes ○ No

36" Wheelchair Bay Clear Space? ○ Yes ○ No

60" Internal Wheelchair Turnaround? ○ Yes ○ No

Bench Height between 17" - 19"? ○ Yes ○ No

Bench Width Between 20" - 24"? ○ Yes ○ No

Trash/Recycle Receptacle? (Max Height 48") ○ Yes ○ No

Shelter Name? ○ Yes ○ No

Shelter Condition ○ Good ○ Fair ○ Poor (Minor Damage, Vegetation)

Edge of Pavement

Curb and Gutter? ○ Yes ○ No

Open Section? ○ Yes ○ No

Comments

Bus Stop Sign Mitigation

Install or Replace Sign ○ Yes ○ No

Bus Stop Lighting Mitigation

Install Street/Pedestrian Scale Light ○ Yes ○ No

Install Shelter Light ○ Yes ○ No

Repair Shelter Light ○ Yes ○ No

Repair Street/Pedestrian Light ○ Yes ○ No

Install Electric Service or Solar Battery ○ Yes ○ No

Bus Stop Landing Pad Mitigation

Install 8' x 5' Landing Pad ○ Yes ○ No

Demolish/Replace Landing Pad ○ Yes ○ No

Install Shelter Pad ○ Yes ○ No

Repair Shelter Pad ○ Yes ○ No

Modify Pad ○ Yes ○ No

Bus Stop Shelter Mitigation

Demolish and Rebuild Shelter ○ Yes ○ No

Install Shelter ○ Yes ○ No

Remove Front Panel ○ Yes ○ No

Label on Shelter ○ Yes ○ No

Install Wheelchair Bay ○ Yes ○ No

Replace/Modify Bench ○ Yes ○ No

Install Map/Schedule Holder ○ Yes ○ No

Install Map/Schedule ○ Yes ○ No

Modify Access to Shelter Door ○ Yes ○ No

Install Trash Receptacle ○ Yes ○ No

Reposition Trash Receptacle ○ Yes ○ No

Install Recycle Receptacle ○ Yes ○ No

Reposition Recycle Receptacle ○ Yes ○ No

Curb Mitigation

Reconstruct Curb Ramp (Demolish/Rebuild) ○ Yes ○ No

Install Curb Ramp ○ Yes ○ No

Other Mitigation

Other Mitigation

Photo1 Photo2 Photo3

The project team developed online field assessment forms which allowed them to collect information about characteristics of sidewalks, crosswalks, bus stops and intersections using an iPad, as shown in **Figure 6**.

The data collected included the presence and width of sidewalks, existence of bus stops and shelters, as well as the types of existing crosswalks at major intersections. The field assessment forms also allowed staff to recommend ways to mitigate an existing condition. A full list of characteristics and potential mitigations can be found in Appendix A.



GREATEST NEEDS

The next four maps, **Figures 7, 8, 9,** and **10**, indicate locations with high numbers of recommended improvements in each category.

Figure 7 - Number of Bus Stop Recommendations

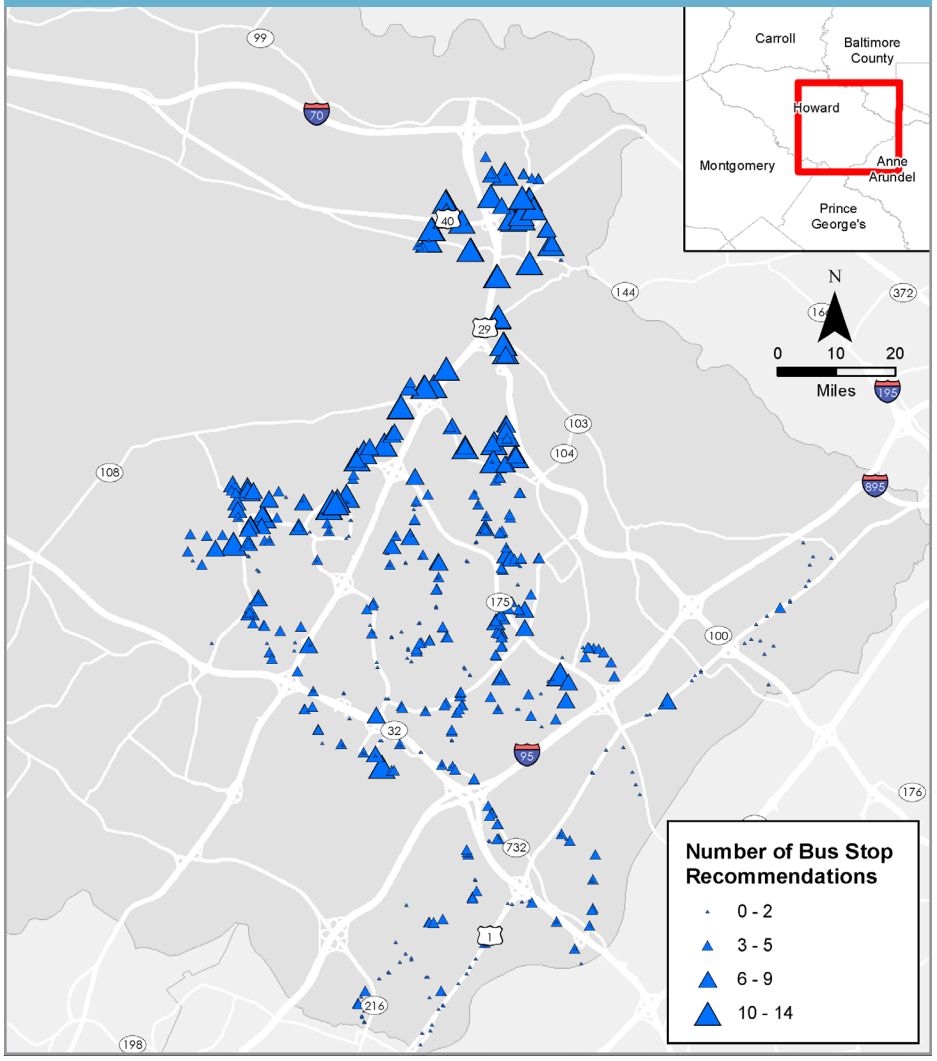


Figure 8 - Number of Intersection Recommendations

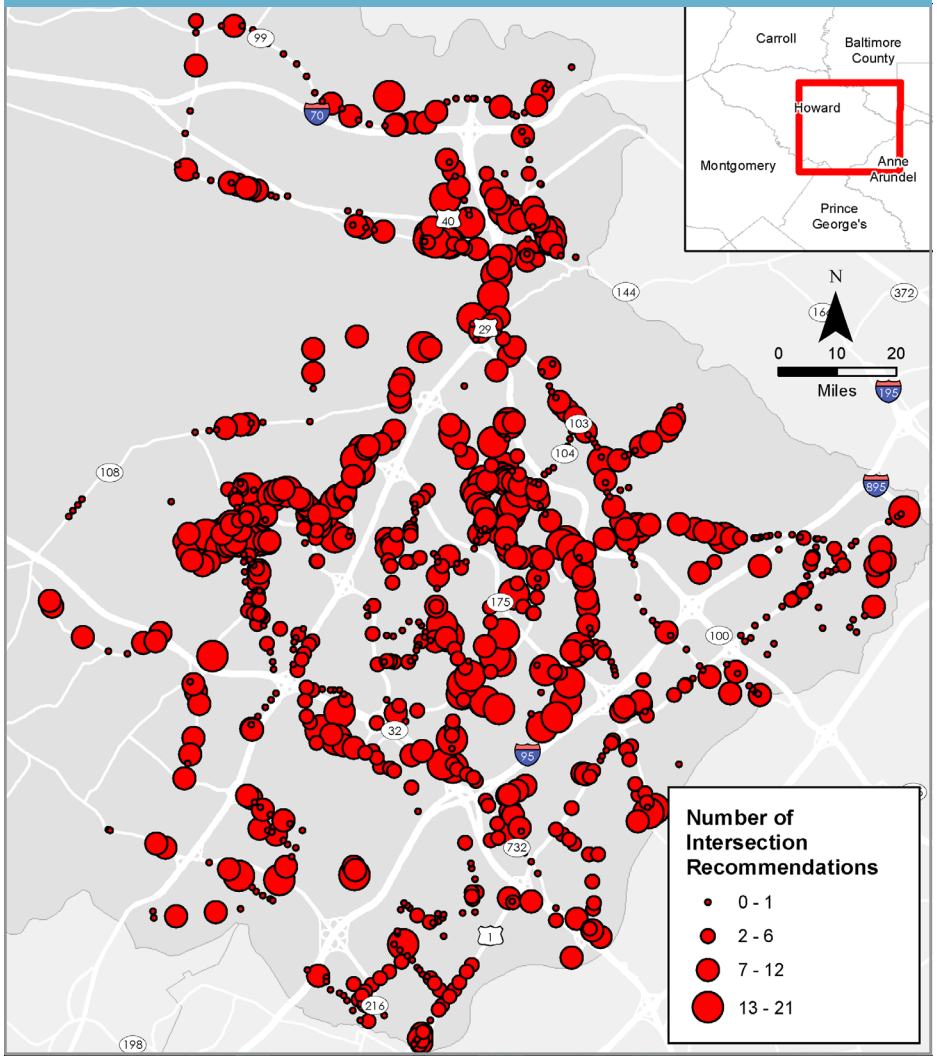


Figure 9 - Number of Sidewalk Recommendations

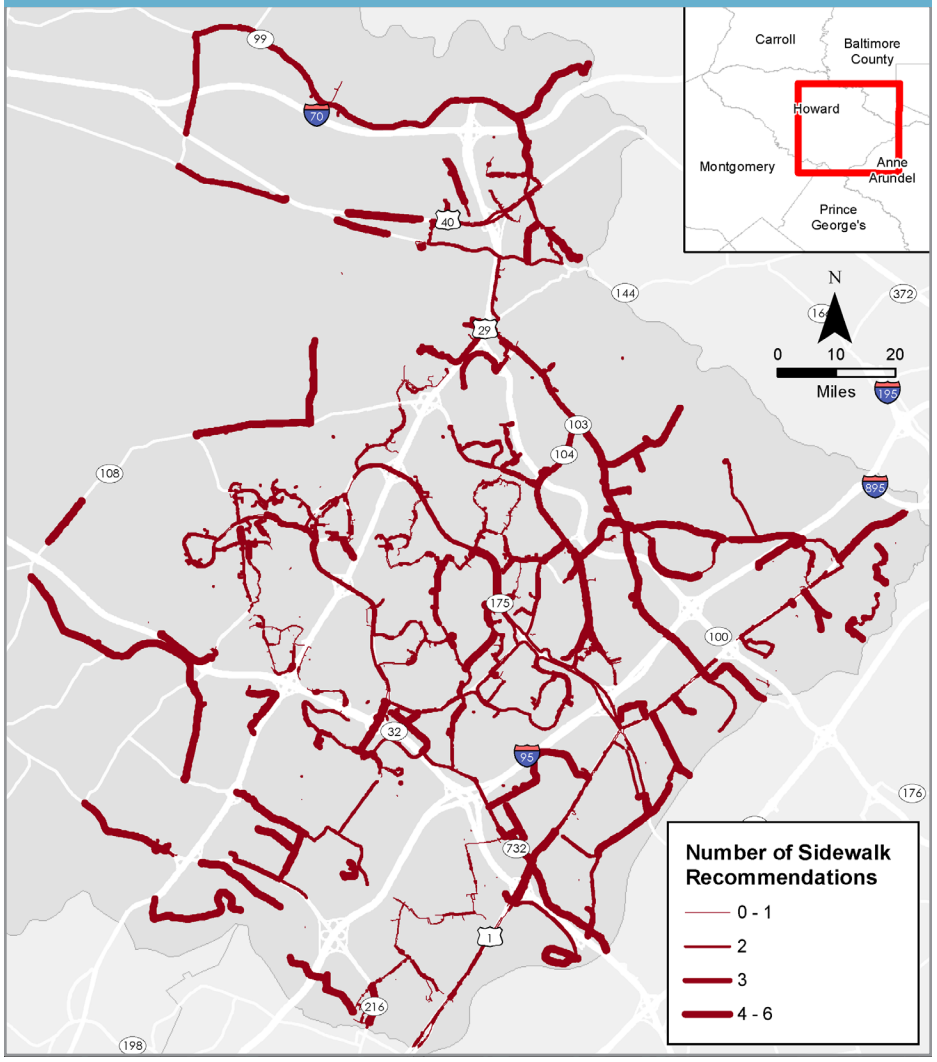
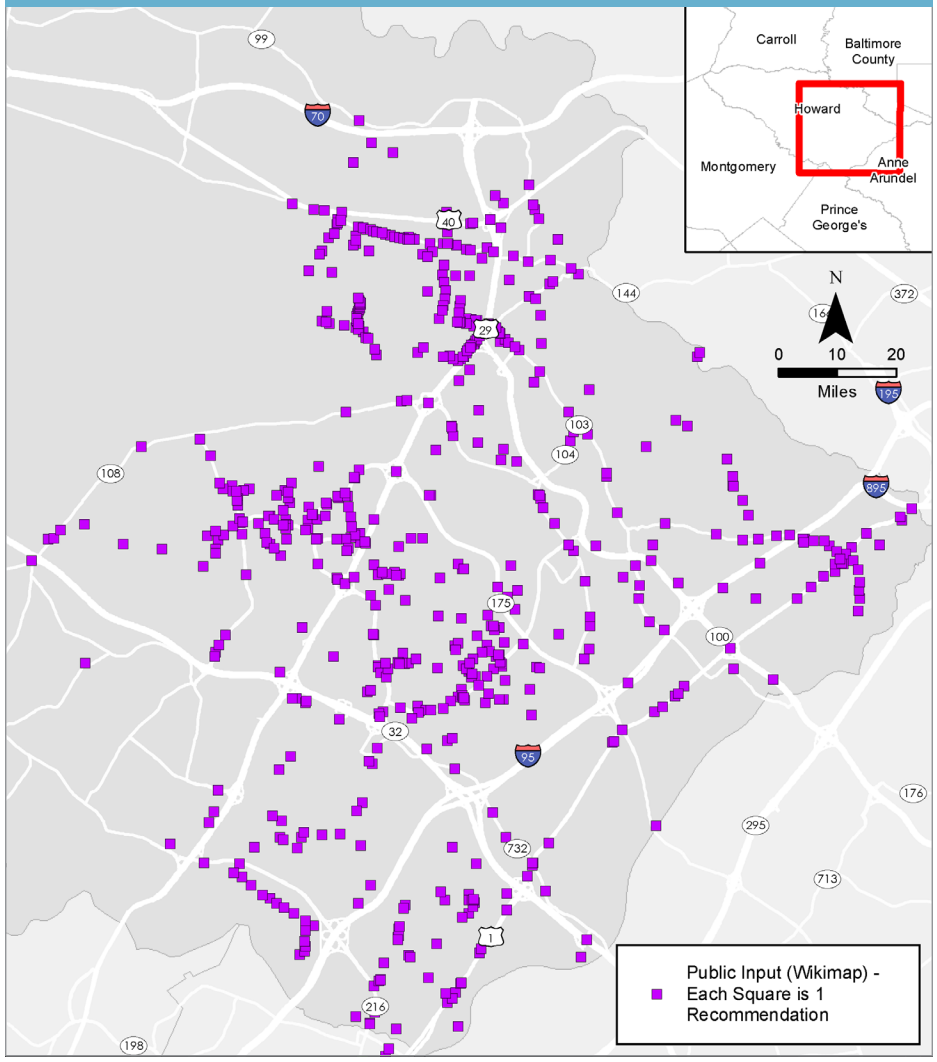


Figure 10 - Public Input (Wikimap)



The following sections highlight field assessment findings for sidewalks, intersections (curb ramps and crossings) and bus stops. A map showing missing connections identified through public input is also included.

SIDEWALKS

County staff inspected over 343 miles of roadways, focusing on streets with bus stops and streets included in the 2007 Pedestrian Plan for which planned projects have not been completed. See **Figure 11**. The field assessment recorded ADA compliance, condition, gaps, and position relative to the roadway (as a proxy for pedestrian comfort).

Is the sidewalk ADA compliant?

ADA-compliant sidewalks meet the standards of the Public Right-of-Way Accessibility Guidelines for conditions such as width, cross slope, surface condition, and obstructions. The percentage of assessed sidewalk segments that did not meet the standards in these four areas is summarized in **Table 3.**

Table 3 - ADA Non-Compliance Rates in Assessed Sidewalk Segments	
Width - less than 4' minimum	22%
Cross slope greater than 2%	60%
Surface conditions in need of repair	6%
Obstructions requiring corrective action	8%

Figure 11 - Sidewalks Inspected

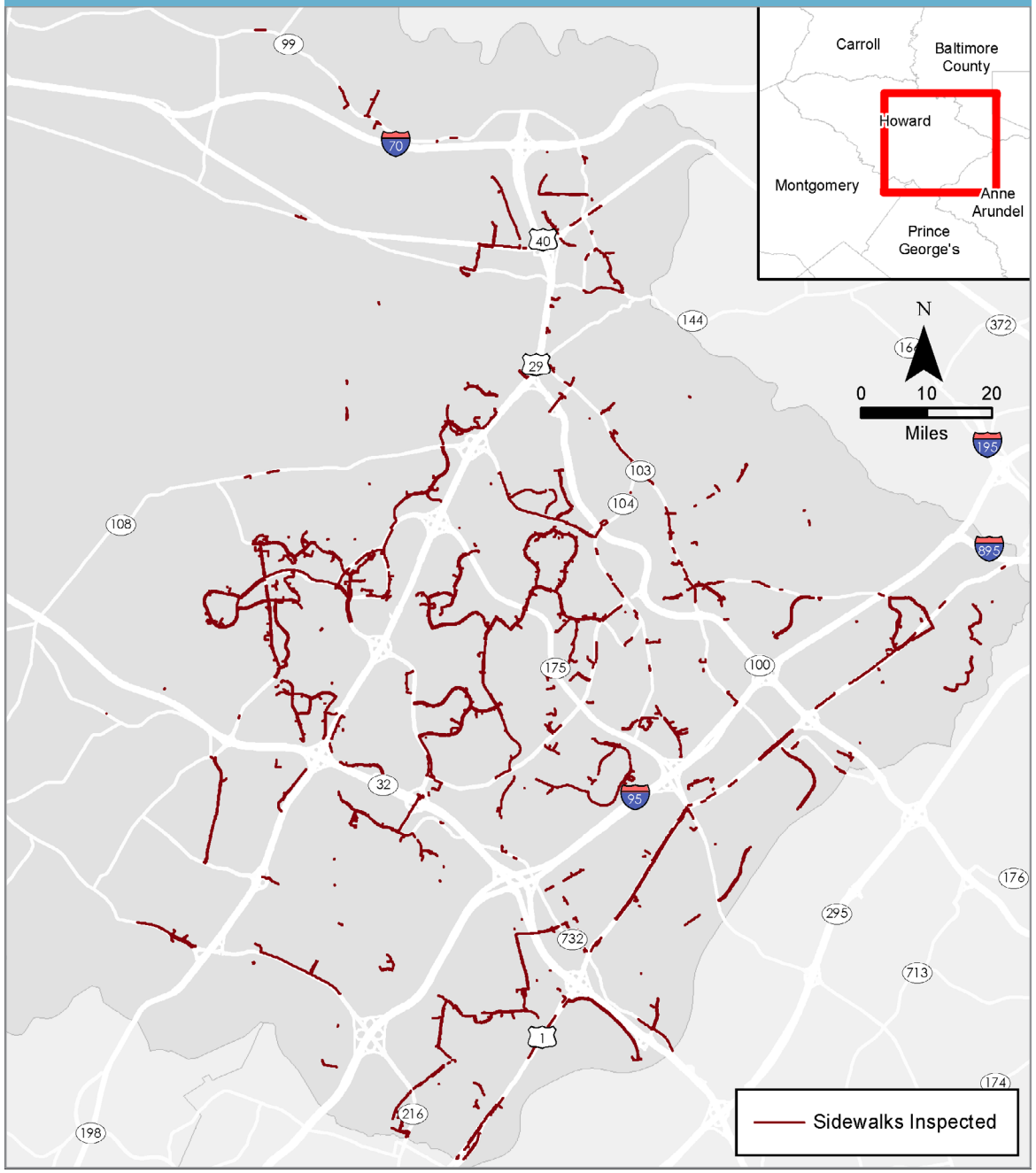


Figure 12 shows the location of sidewalks that do not meet one or more these four ADA conditions.

Approximately 78 percent of segments assessed were four feet or wider, which meets the ADA standards for width. However, modern best practices are for a minimum sidewalk width of five feet, which allows for at least two people to travel side-by-side and for passing pedestrians traveling in the opposite direction. [42] Over 60 percent of segments inspected have a cross slope of more than 2 percent, making it difficult for persons with physical disabilities or in wheelchairs to travel.

Of the sidewalks inspected, only about six percent of segments were flagged for having damaged surfaces or surfaces in need of some kind of repair. About 20 percent of sidewalk segments assessed had some type of obstruction. Obstructions such as signs, newspaper boxes, or debris that did not affect pedestrian travel were designated minor obstructions. About 8 percent of segments assessed were flagged as having major obstructions, such as trees, that significantly inhibit pedestrian travel. Rectifying these obstructions would require the County to relocate the obstruction or find an alternative throughway for pedestrians

42 National Association of City Transportation Officials (NACTO): "Urban Street Design Guidelines." 2013. p 40. The Howard County Design Manual, Volume III Sec 2.4G, requires that "where there will be a large number of pedestrians, such as near schools and in some commercial areas, the sidewalks shall be made sufficiently wide to accommodate the anticipated pedestrian demand."

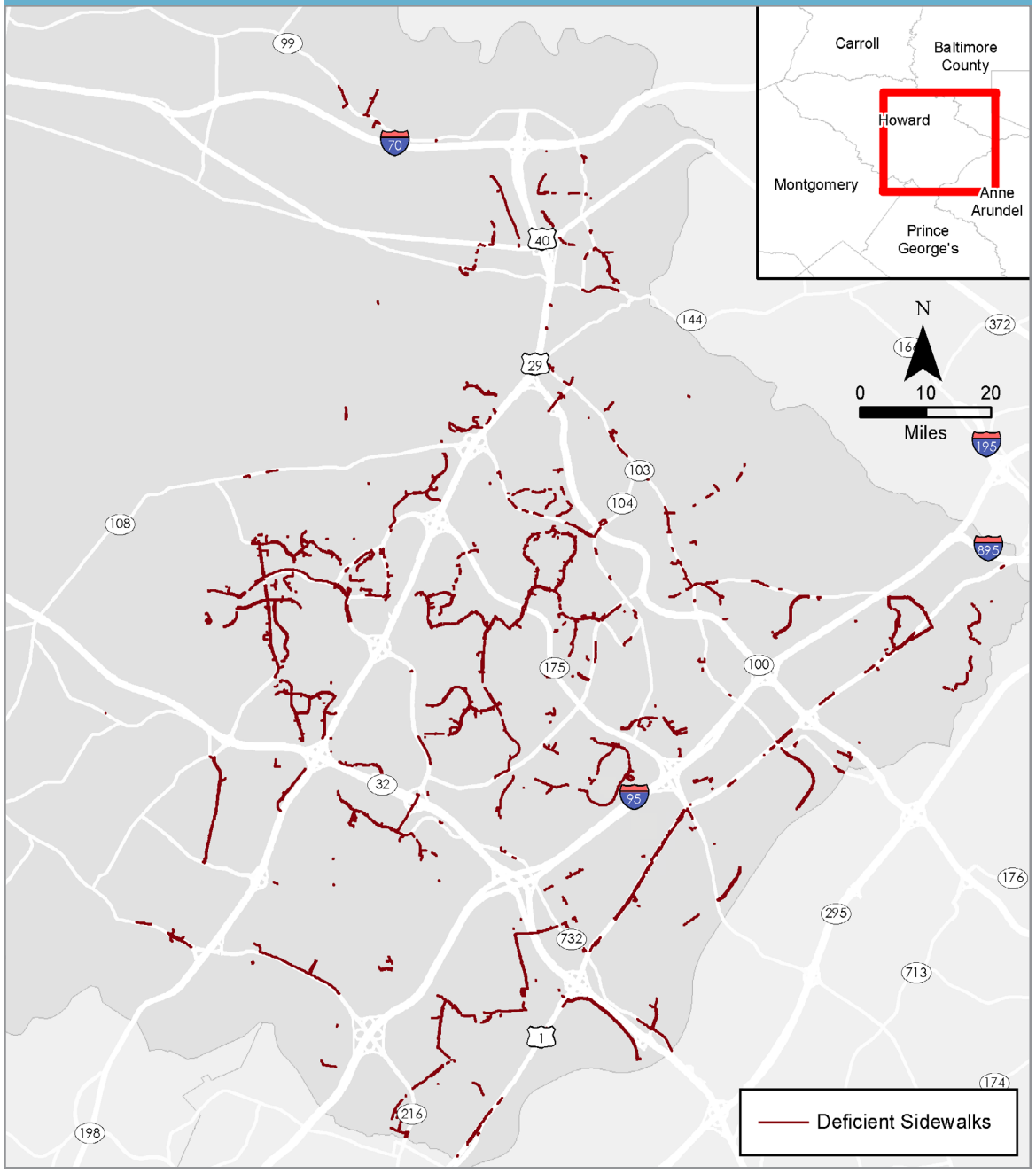


Major Obstruction



Minor Obstruction

Figure 12 - Sidewalks Not Meeting One or More ADA Requirements



Is the sidewalk comfortable to walk along?

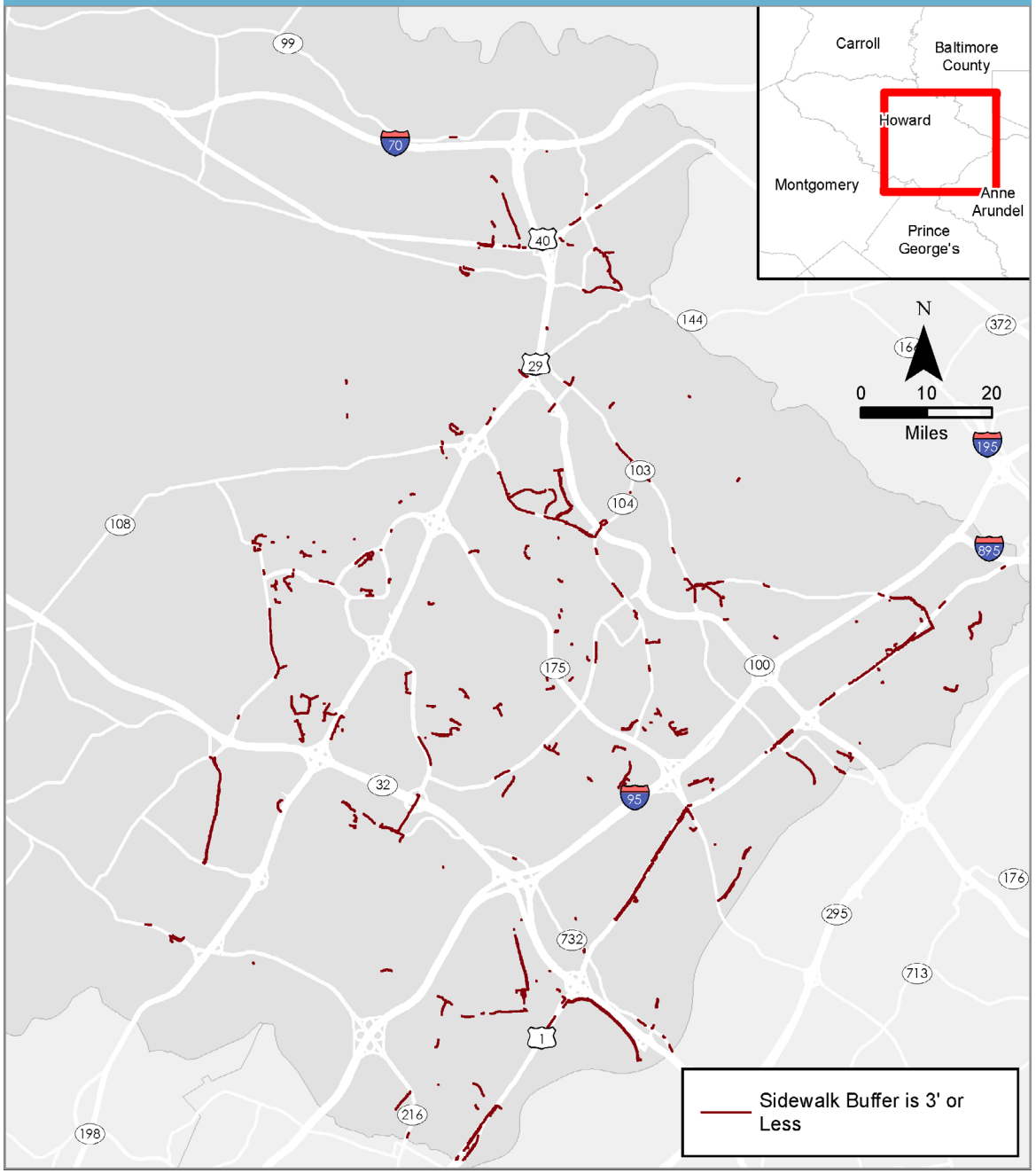
County staff also collected data on features that could make using sidewalks difficult or uncomfortable, such as driveway crossings or a lack of buffers between the sidewalk and roadway. The data collectors noted that about 54 percent of existing sidewalks include a buffer (a separation between the roadway and the sidewalk) of more than three feet. **Figure 13** shows the location of sidewalk segment with a buffer of 3 feet or less.

While driveways are necessary to provide connections between the road and destinations, they are also conflict points that affect pedestrian comfort. For example, seniors or others with mobility impairments may experience difficulty walking across a driveway with a cross slope greater than ADA guidelines permit. About 8 percent of sidewalks segments inspected had driveways across the pedestrian pathway.

Driveway aprons, such as this example along Old Washington Road in Elkridge, can make walking along sidewalks uncomfortable.



Figure 13 - Sidewalks (in Field Work Area) with Less than 3' Buffer



Are there gaps in the sidewalk along a block or between bus stops?

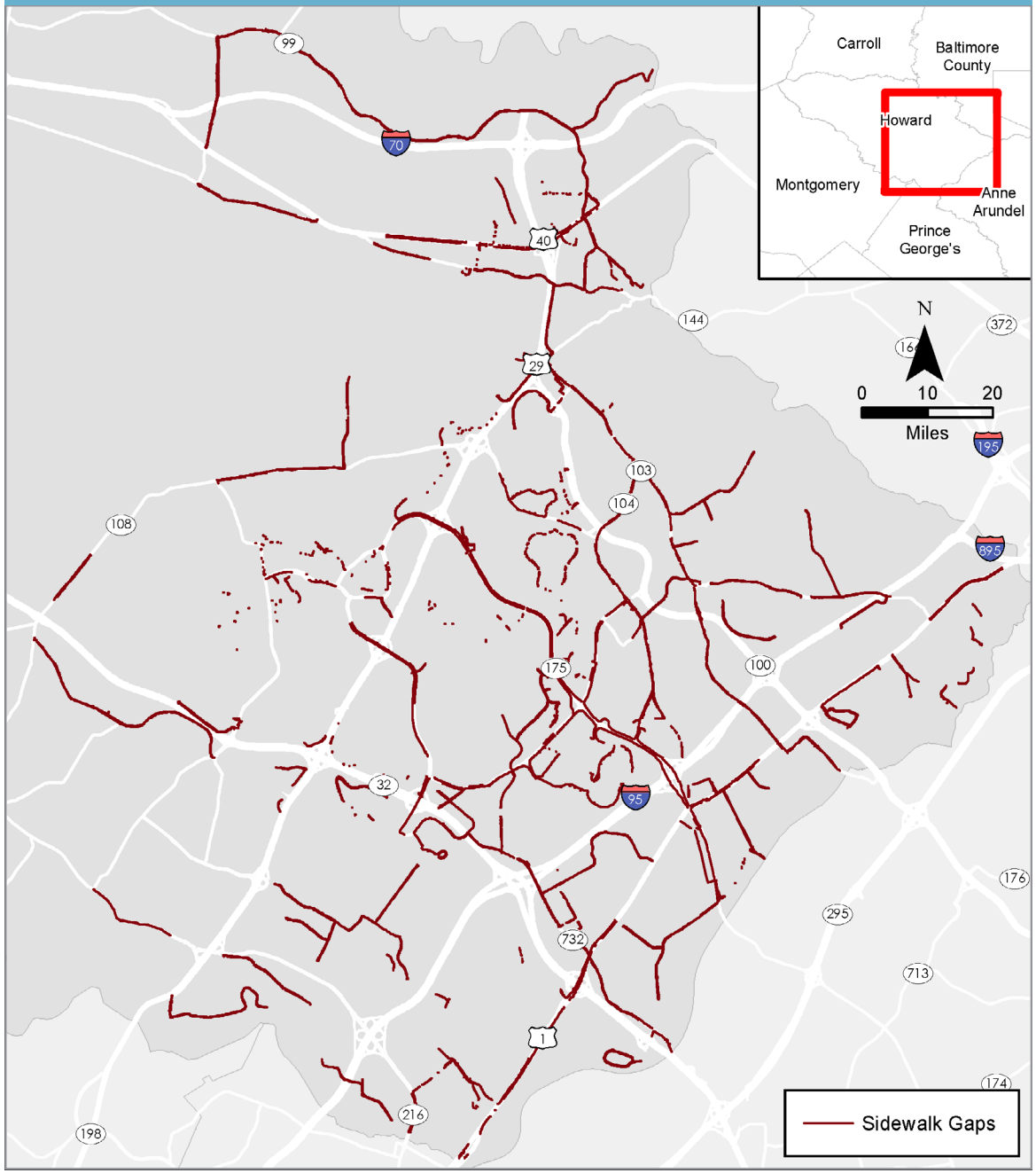
Sidewalk gaps are missing segments of the sidewalk network that may be as long as a block. These gaps interrupt a pedestrian's path of travel, forcing them to either cross the street to travel on a different sidewalk, travel along a dirt path, or walk across grass and vegetation. Where there is no sidewalk, people often opt to walk in the street instead of in the grass, increasing their risk of being struck by a vehicle. Sidewalk gaps often occur in areas where grading would be needed to build a sidewalk, making the experience of walking there even more uncomfortable.

Locations where the field assessment noted sidewalk gaps are shown in **Figure 14**.

Is there a sidewalk on one side of the street? Is there a sidewalk on both sides of the street?

As evidenced by the gaps shown in Figure 14, outside of a community's central business district and neighborhoods with a dense street network, sidewalks may only be present on one side of the street, regardless of the presence of pedestrian generators such as bus stops. The Urban Street Design Guidelines developed by the National Association of City Transportation Officials (NACTO) recommend sidewalks on both sides of the street in urban areas.[43] Where sidewalks are feasible on only one side of the street, they should be combined with frequent pedestrian crossings so that pedestrians traveling along the sidewalk can reach their destination without crossing in undesignated locations.

Figure 14 - Gaps in the Sidewalk Network



43 National Association of City Transportation Officials (NACTO): "Urban Street Design Guidelines." 2013. p 40.

Pedestrian Safety

Collisions between pedestrians and motor vehicles are a problem affecting many communities, including Howard County. From 2013 to 2015, Howard County had an average of 59 crashes involving pedestrians and 2 pedestrian deaths per year,[44] but 2016 was more deadly: motor vehicle crashes killed 8 pedestrians in Howard County that year.[45]

The streets in the eastern portion of the County create a pattern of neighborhood streets and collector roads, which accumulate traffic from neighborhood streets. These collectors tend to be wider and more dangerous for pedestrians. Arterial roads such as Route 1 and Route 40 were primarily designed to convey vehicle traffic, as shown in the above right. They are thus wider and have higher motor vehicle travel speeds, and were not designed with pedestrians in mind. **Figure 15** shows the density of pedestrian crashes from 2013 to 2015. The map shows that a great number of crashes occur on wide County and State roads like US 1, US 40, and Snowden River Parkway.

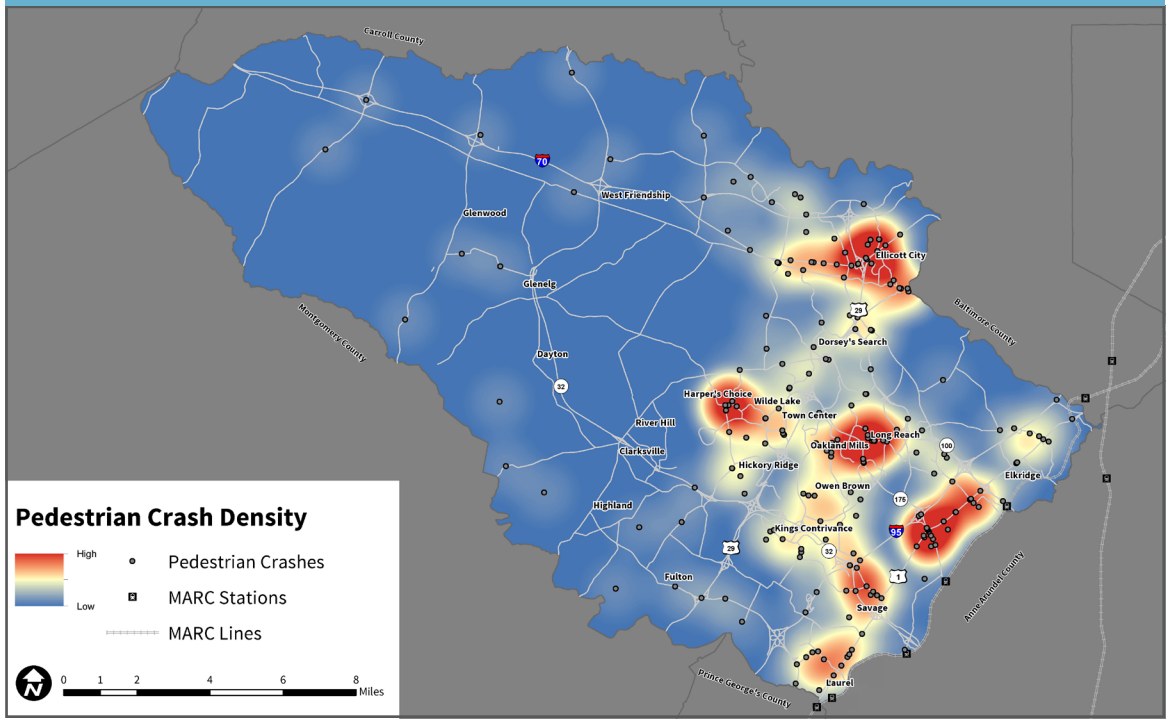
44 Maryland Department of Transportation. Maryland Twenty-Year Bicycle and Pedestrian Master Plan. January 2014. Obtained from http://www.remlinedigital.com/M5144%20MDOT%20Bicycle%20and%20Pedestrian%20Master%20Plan/links/bike_ped_plan/BikePed%20Booklet%202014-01-14.pdf on September 2015.

45 Maryland State Police. Maryland Statewide Vehicle Crashes. https://data.maryland.gov/browse?category=Public Safety&limitTo=blob.

Route 1 in North Laurel (example of wide major arterial)



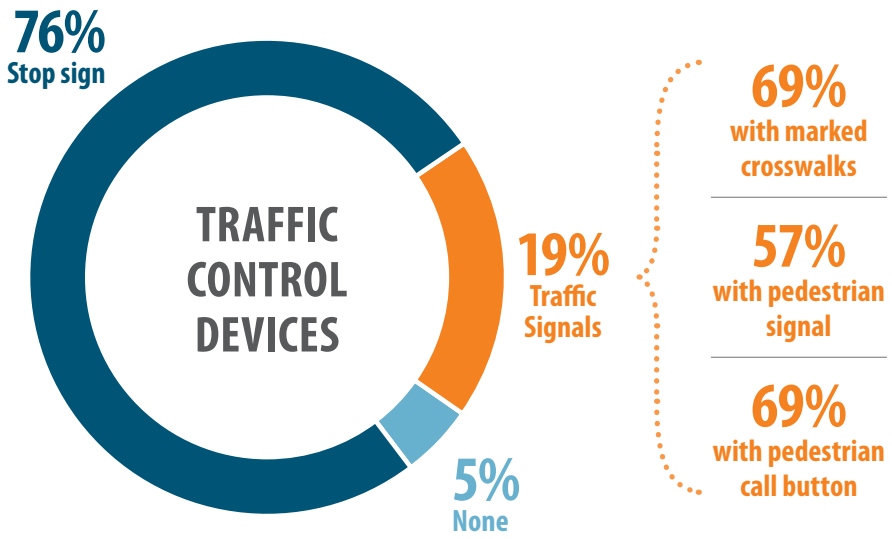
Figure 15 - Howard County Pedestrian Crash Density, 2013-2015



INTERSECTIONS

County staff assessed 915 intersections during the field assessment phase of plan development. The assessment captured the presence, type, and condition of the elements of each intersection. These included traffic control devices, pedestrian signals, curb ramps, crosswalks, lighting, and signage.

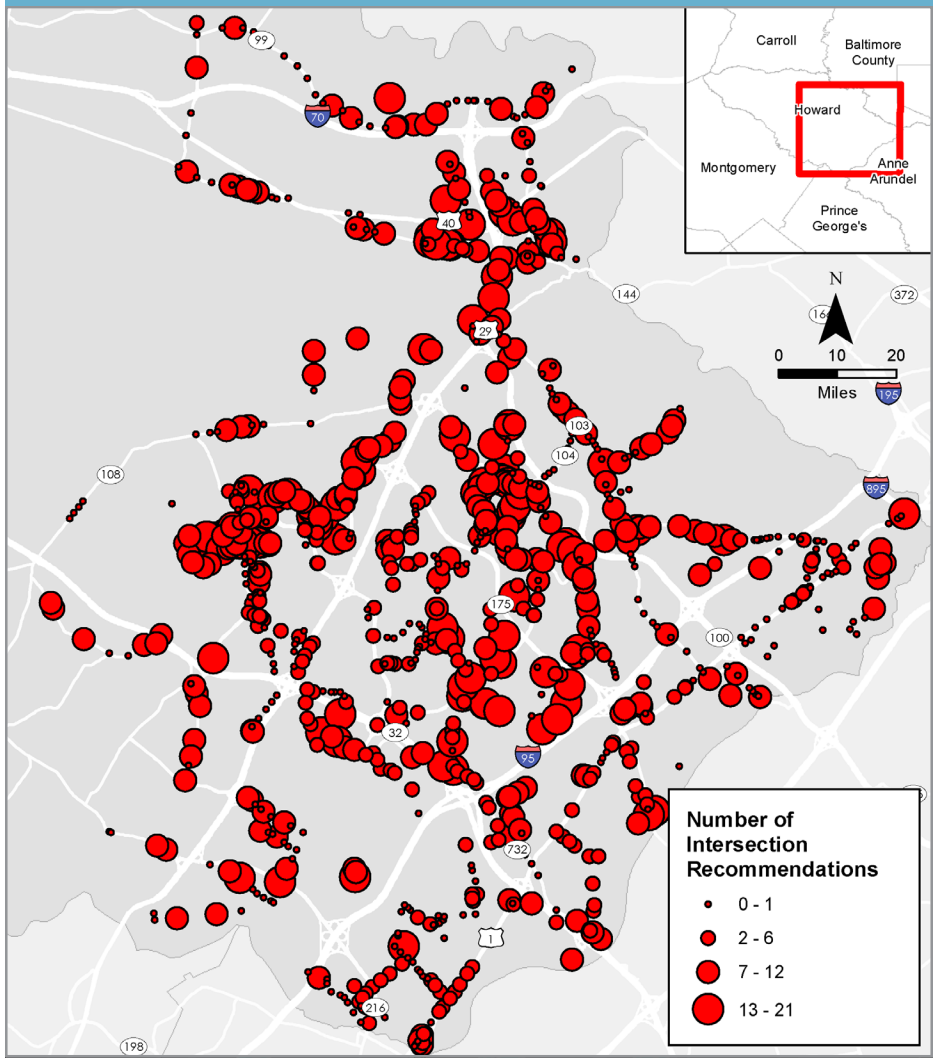
Of the intersections assessed, 95 percent had some type of traffic control device—most commonly a stop sign. Of the intersections with traffic signals, close to 70 percent had marked crosswalks and 57 percent had pedestrian signals, nearly all of which were activated with a pedestrian call button. While pedestrian signals are commonly accepted and expected at signalized intersections, some guidelines support fixed-time signals or passive pedestrian detection instead of pedestrian call buttons.[46]



County staff also captured the presence and condition of pedestrian refuge islands on larger arterial roadways, as well as the existence and type of available lighting. Twelve percent of intersections assessed include pedestrian refuges. County staff found that a large majority of intersections (87.7 percent) included some type of lighting, but, of those, only around one quarter (22.9 percent) provided pedestrian-scale lighting. The remainder (77.1 percent of intersections with any lighting) had conventional street lighting.

Figure 16 shows the location of intersections assessed by County staff, as well as the number of crossing improvements recommended at each location

Figure 16 - Intersections Assessed by County Staff



46 The National Association of City Transportation Officials Urban Streets Design Guide says: "fixed-time signals or passive detection are preferable to push-button detection." (p. 115).

CURB RAMPS

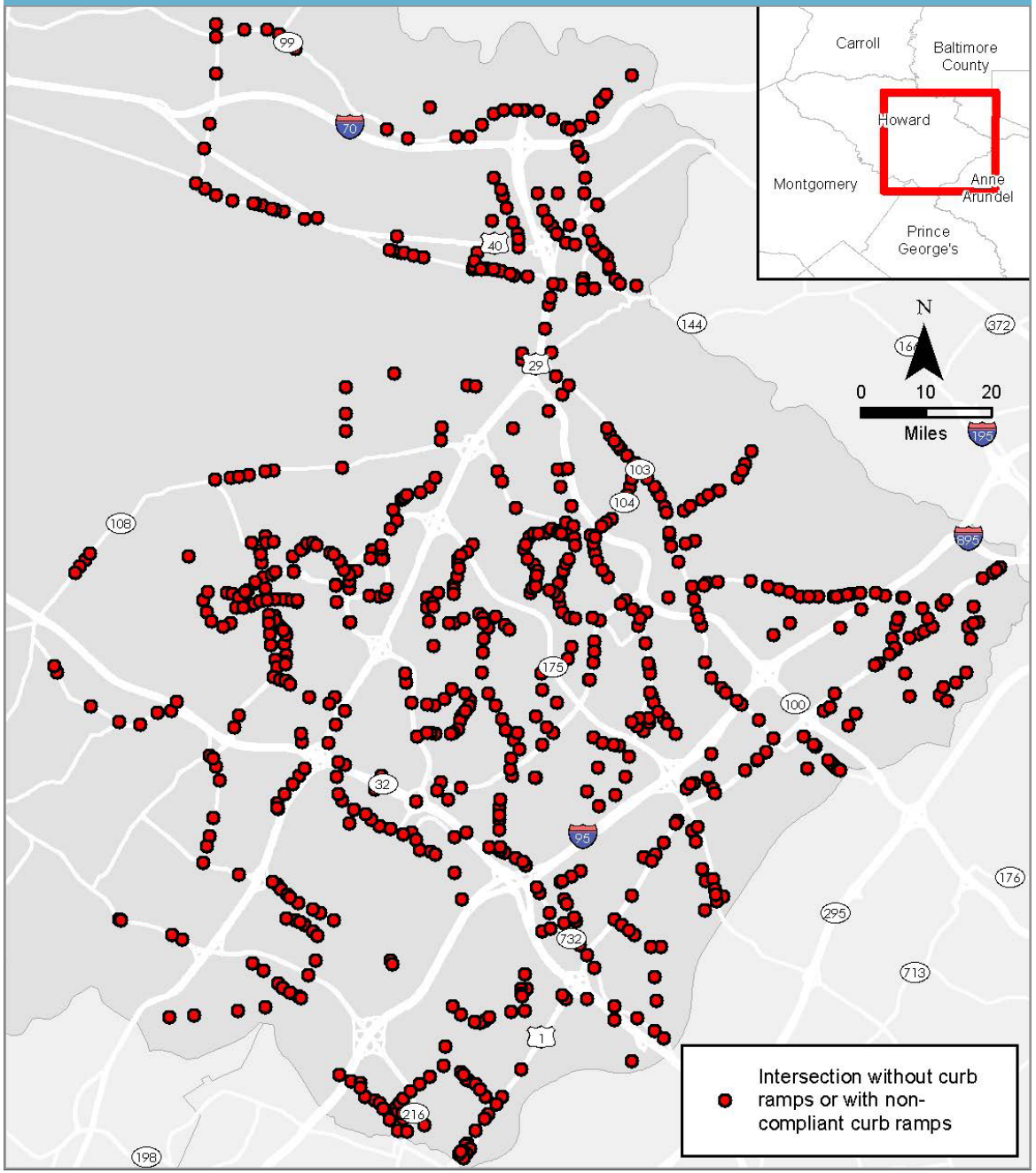
Curb ramps are a critical part of the pedestrian network: they make sidewalks, street crossings, and the other pedestrian routes usable for people with disabilities, people pushing strollers, children with bicycles, and others. The U.S. Access Board's Public Right-of-Way Accessibility Guidelines (PROWAG) include a comprehensive review of standards for curb ramps. Intersection design that includes a set of pedestrian crossing facilities and curb ramps positioned for each pedestrian path of travel across the intersection helps increase safety, and including a curb ramp for each direction of pedestrian travel meets ADA standards.

The field work assessed the 915 intersections along plan corridors, of which only about 20 percent do not include curb ramps. About 25 percent of intersections with curb ramps were determined not to be ADA-compliant. Typical non-compliant ramps were missing truncated domes at the end of each ramp, were less than 4 feet wide, or had running slopes greater than 8.3 percent. **Figure 17** shows those intersections that were identified as not having curb ramps or having non-compliant curb ramps.



This pedestrian crossing at Broken Land Parkway and Snowden River Parkway has ADA-compliant perpendicular curb ramps.

Figure 17 - Intersections Without Curb Ramps or with Non-Compliant Curb Ramps



A single curb ramp placed diagonally at a corner to serve multiple directions, as shown at right, does not adequately serve pedestrians. Diagonal curb ramps orient pedestrians into the middle of the intersection instead of to the crosswalk. People with vision impairments may not easily detect the correct crossing location. Those using a mobility device such as a wheel chair or walker may need to travel in motor vehicle travel lanes as they make their way to the crosswalk. County staff captured these conditions in their assessment; approximately 61 percent of intersections assessed had corners that were configured with a single diagonal curb ramp. To avoid the access and safety concerns of a single diagonal curb ramp, it has become a best practice to install a curb ramp for each path of travel.[47] The following photos show an existing non-compliant curb ramp and two options for providing compliant ramps that offer a ramp in each direction of travel.

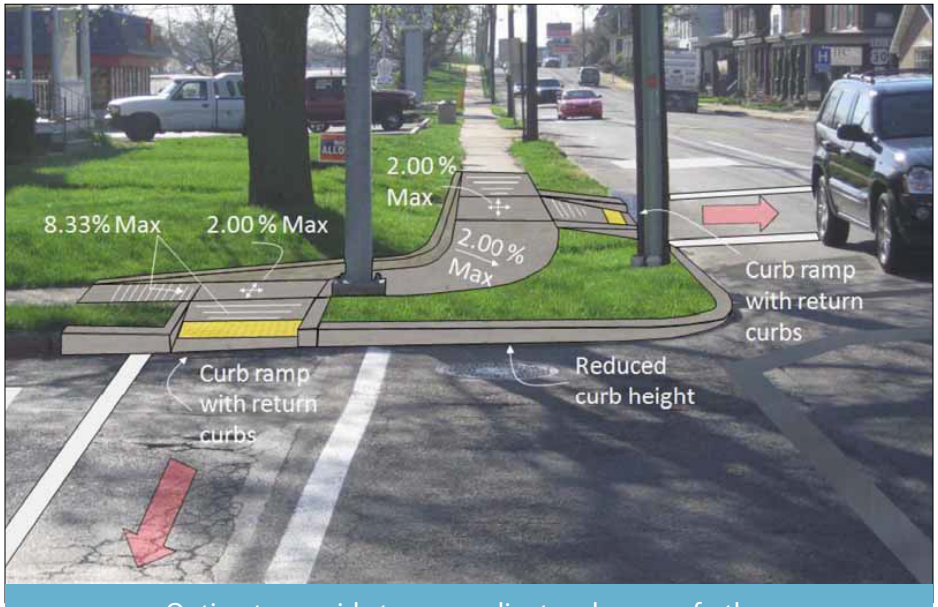
47 United States Access Board, "Public Rights-of-Way Accessibility Guidelines." 2011. Section R304. https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines/chapter-r3-technical-requirements



Existing single diagonal curb map that does not meet ADA.



Re-configured curb ramp to provide two compliant ramps at the existing location.



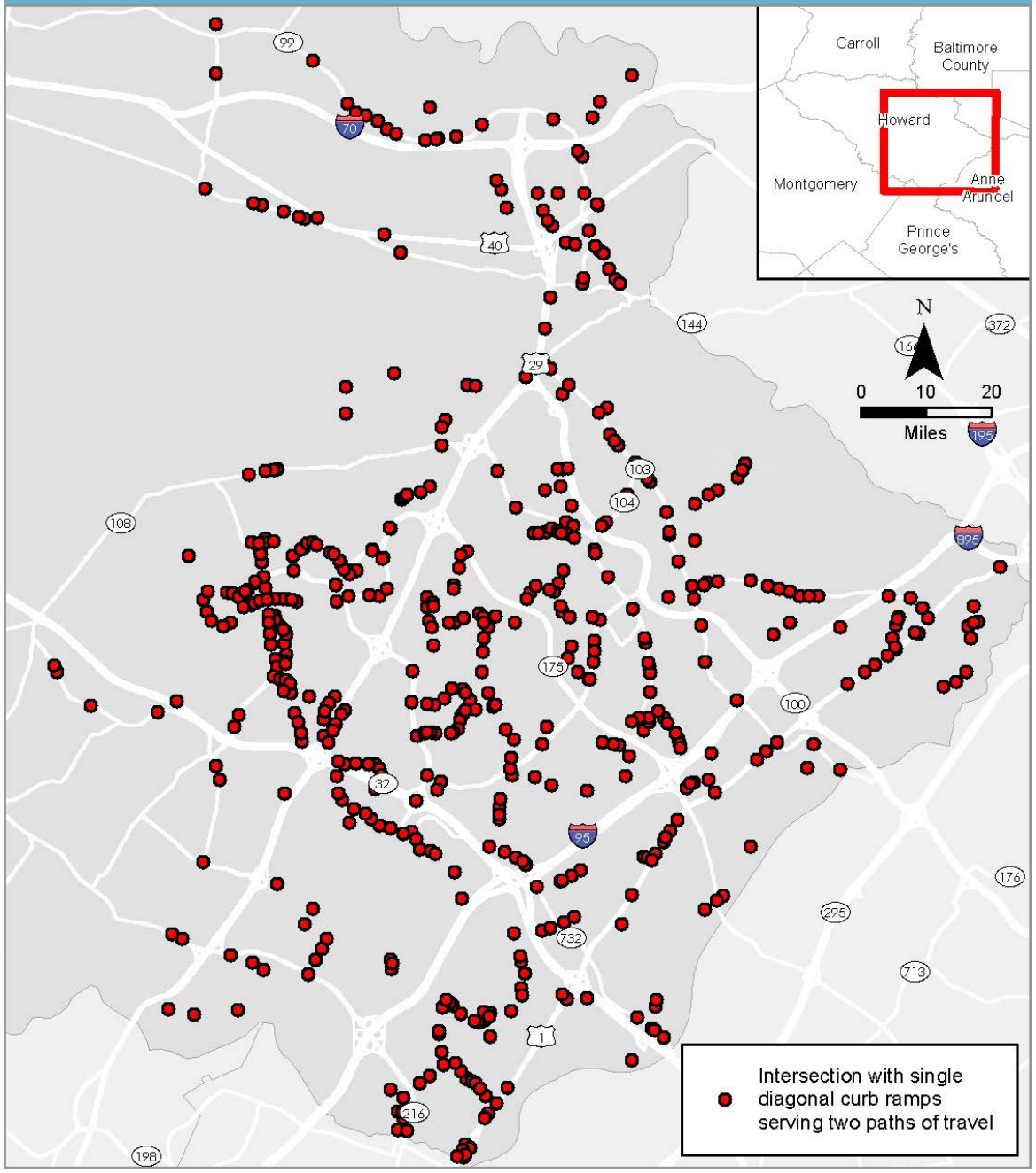
Option to provide two compliant curb ramps farther away from the corner and with crosswalks relocated.

Best practices for curb ramp placement are included in **Appendix B**. **Figure 18** shows assessed locations that had a single diagonal curb ramp of the type discussed on the previous page.

Diagonal curb ramps, such as this example along US 1 in Laurel, can direct pedestrians into traffic and are therefore discouraged.



Figure 18 - Intersections with Single Diagonal Curb Ramps



BUS STOPS

Connecting Howard, a report to the County Council and County Executive on the performance of the Howard County public transportation system prepared by the Howard County Public Transportation Board (November 2014), proposed a set of actions to strengthen the County's transit system beginning with the following three actions related to bus stops:

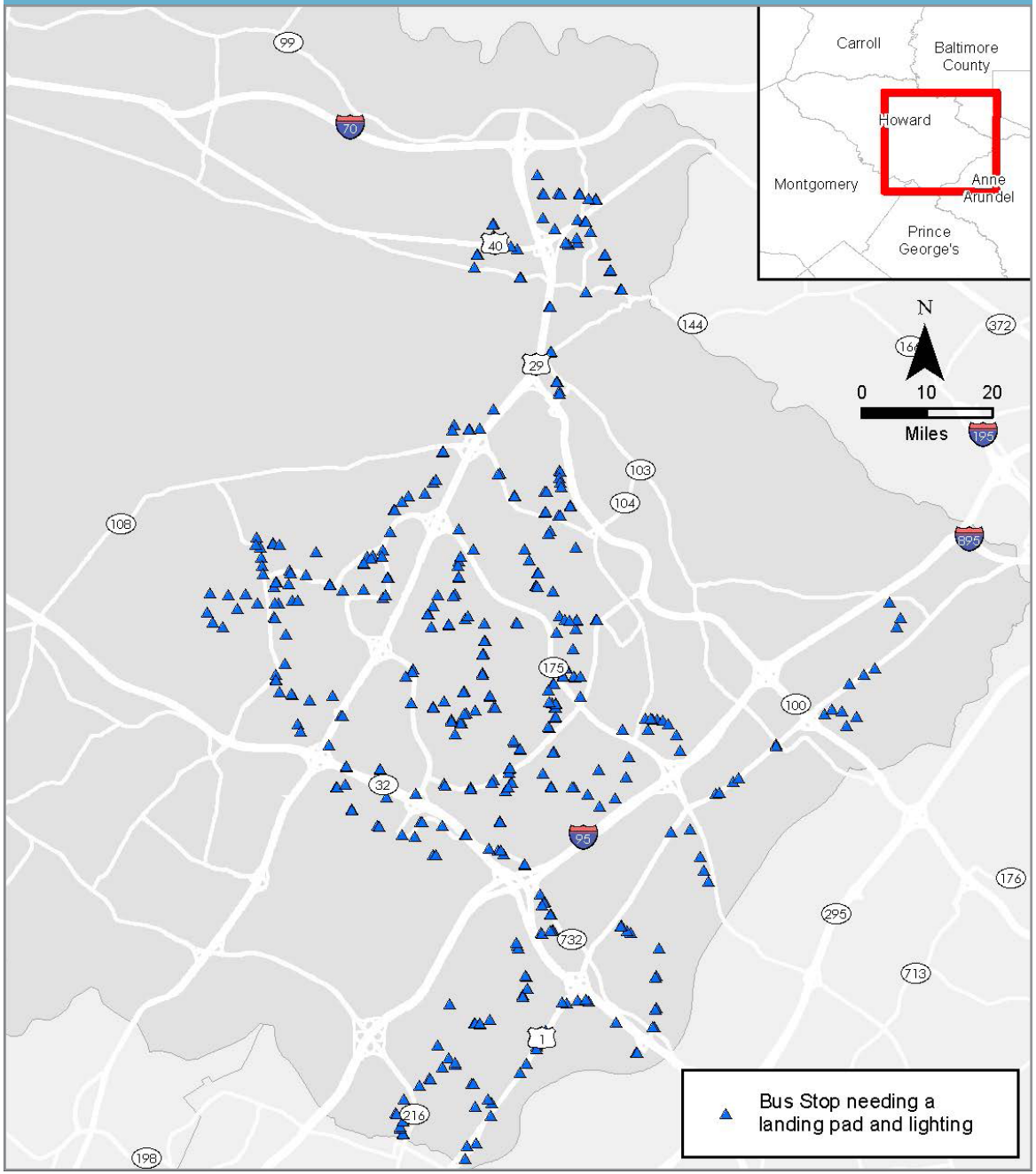
- Accelerate the construction of bus shelters, benches, and safe waiting areas in the right locations
- Require sidewalk connections to every bus stop where possible
- Equip shelters and major bus stops with signage indicating where buses go, timetables, how to ride information and maps

Due to the importance of safe and accessible transit service, the first phase of the field assessment concentrated on bus stops and roads with bus routes. In all, County staff assessed 494 bus stops and access to them via sidewalks and roadway crossings. The highest needs at bus stops were for landing pads (78 percent) and for pedestrian lighting (51 percent), as shown in **Figure 19**. Other often-recommended improvements were for a new bus stop sign (33 percent), a map and schedule (27 percent), and a curb ramp to the stop (22 percent). Less than 3 percent of stops were fully compliant.

Adding a bus stop landing pad greatly improves transit accessibility
(Image courtesy Capital Metropolitan Transportation Authority)



Figure 19 - Bus Stops Needing Pedestrian Improvements



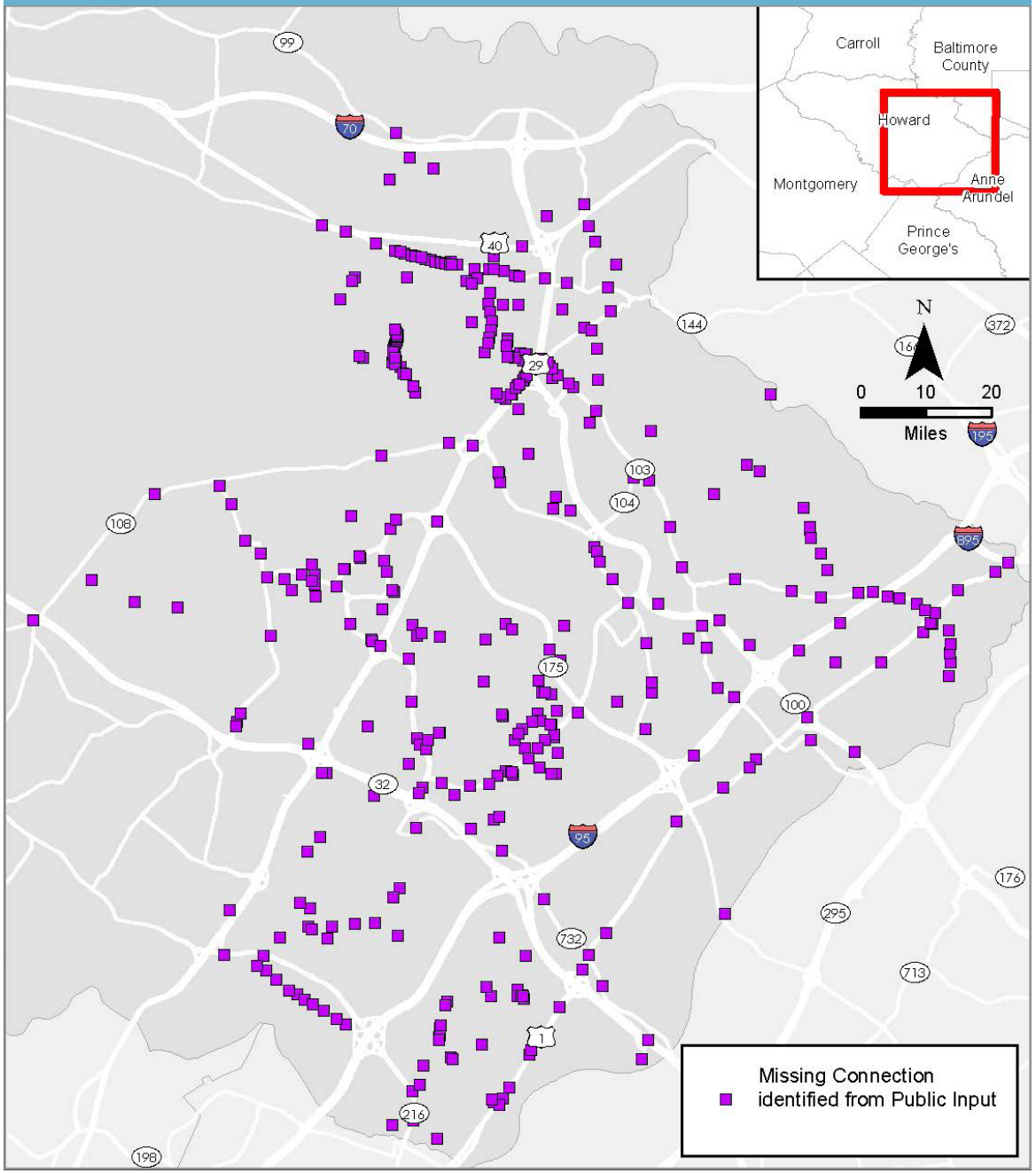
MISSING PEDESTRIAN CONNECTIONS

County staff only assessed pedestrian facilities within the public right-of-way. Since pathways (often called trails) provide important pedestrian connections in Howard County, the public input process was used to identify locations where a pathway connection would increase pedestrian mobility. A total of 392 pedestrian desire lines (missing connections) were identified through this process, as shown in **Figure 20**, from which staff selected the 17 Priority Connections (illustrated starting on page 105).



Members of the public identified missing connections via a series of open houses and an online wikimap.

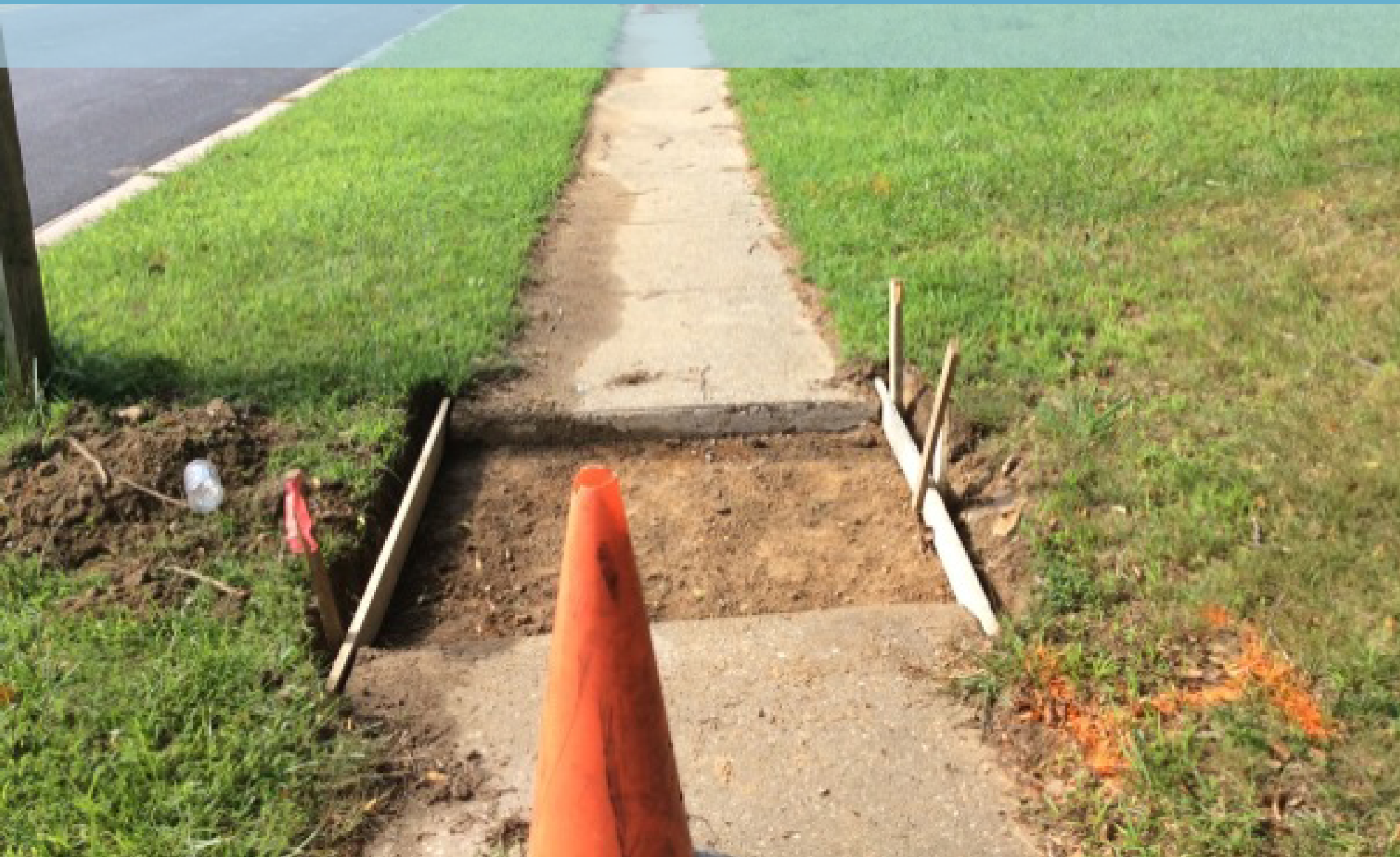
Figure 20 - Missing Pedestrian Connections



THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 4:

Network and Facility Recommendations



Overview

This chapter is a companion to Chapter 3, Existing Conditions. It provides a summary of recommendations for each of the improvement categories: sidewalks, intersections, bus stops, and pedestrian desire lines (missing connections). Where the field assessment process identified multiple individual recommendations for a specific location, they were grouped into a project, for example, a handful of individual recommendations for improving a bus stop. Consolidating individual recommendations into projects creates a comprehensive picture of improvements needed without regard to priority ranking or cost.

The majority of sidewalk, crossing, and bus stop projects were identified during the field assessment, but some projects were included based on public input gathered in the spring of 2015. All of the missing connections were identified through public input.

Infrastructure project recommendations are strongly connected to the first four plan goals, i.e., the ones that are more specific to physical improvement:

- Fill gaps in the sidewalk and crosswalk networks
- Establish safe and convenient pedestrian connections to all transit locations
- Meet and exceed ADA standards for pedestrian facilities
- Support efforts to increase walking to schools

These recommendations are to be considered, along with the recommendations of the General Plan, *BikeHoward*, and any corridor- or location-specific plans or design guidance (e.g. the Route 1 Manual, Clarksville Pike Streetscape Plan and Design Guidelines, or the Downtown Columbia Plan), when developer or County capital projects are proposed. Any conflicting recommendations among the applicable planning documents shall be resolved by staff and other stakeholders during the project development process.

Figures 21, 22, 23, and 24 show the locations of recommended projects in each improvement category.



SIDEWALKS

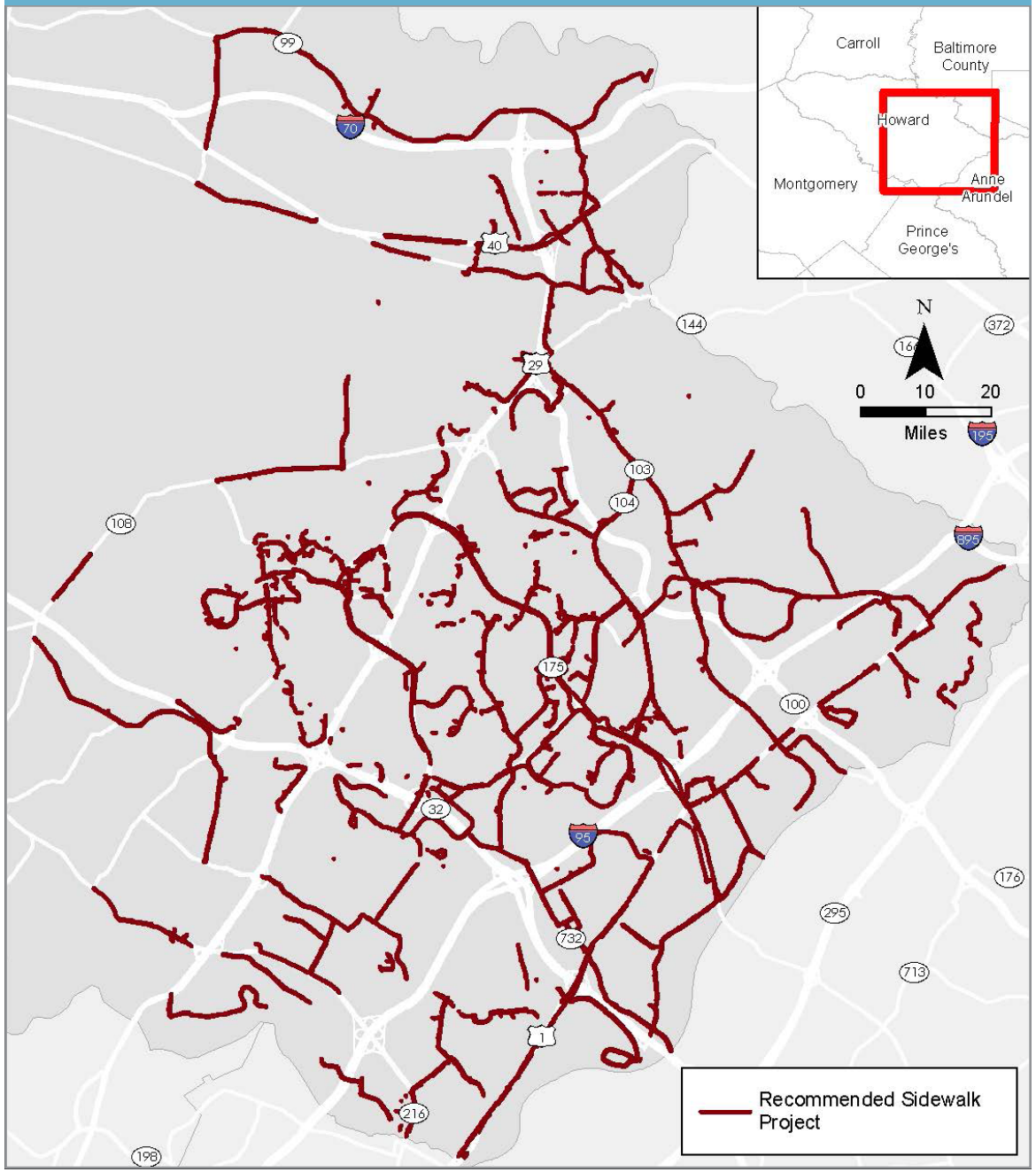
Table 4 - Summary of Sidewalk Recommendations

	Number of locations	Linear feet	Linear miles
New sidewalks	1,044	1,119,209	212.0
Sidewalk repairs	492	167,737	31.8
Totals	1,536	1,286,946	243.8

This sidewalk, along Tamar Drive, is an example of a sidewalk in poor condition.



Figure 21 - Map of Recommended Sidewalk Projects



INTERSECTIONS

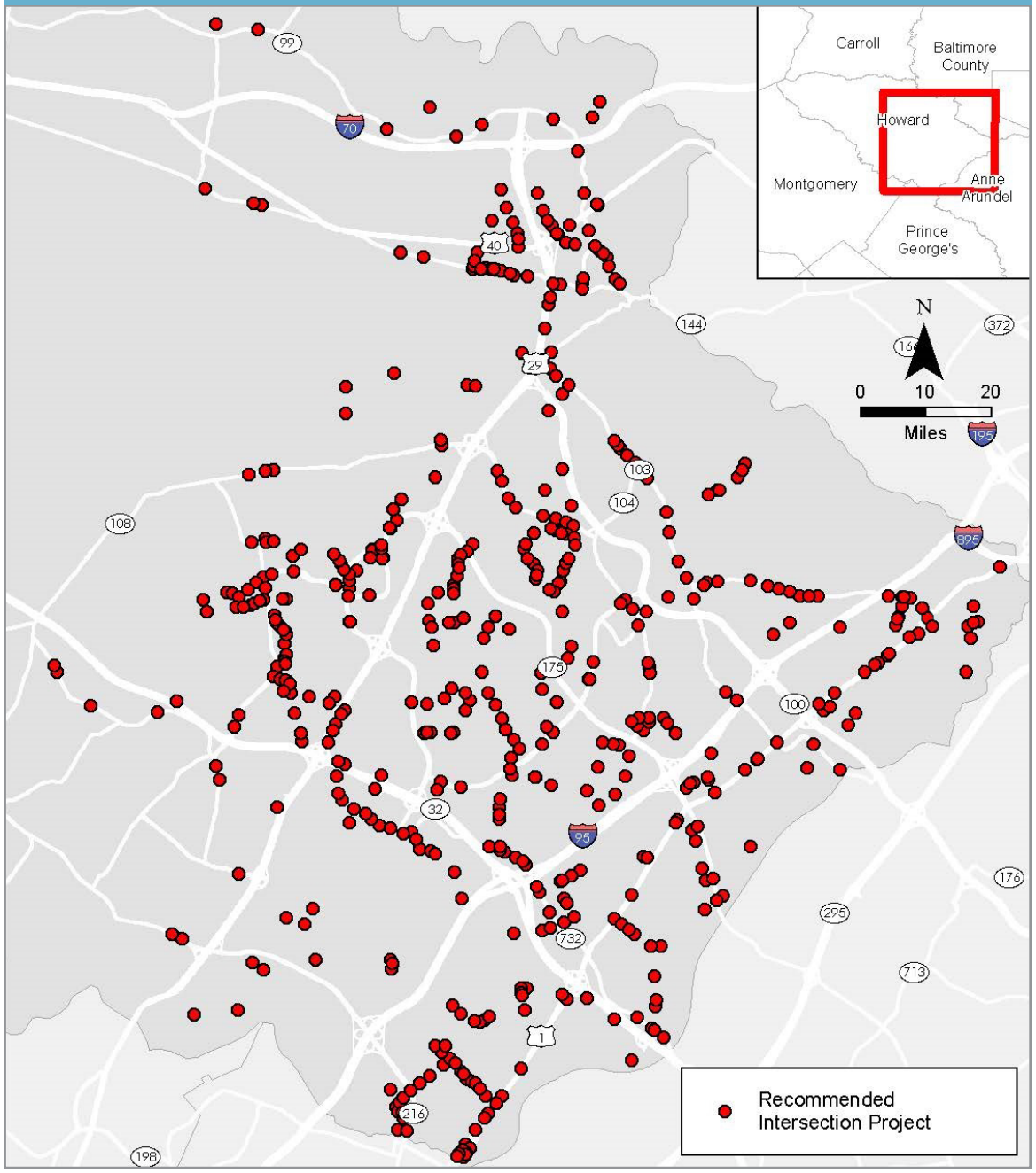
Table 5 - Summary of Intersection Recommendations

	Number of locations
Install or repair curb ramp	501
Repair or replace crosswalk	67
Shorten crossing distance (with pedestrian refuge or curb extension)	53
Total	621

This intersection at Clarksville Pike and Columbia Road has a pedestrian refuge for only one direction of travel.



Figure 22 - Map of Recommended Intersection Projects



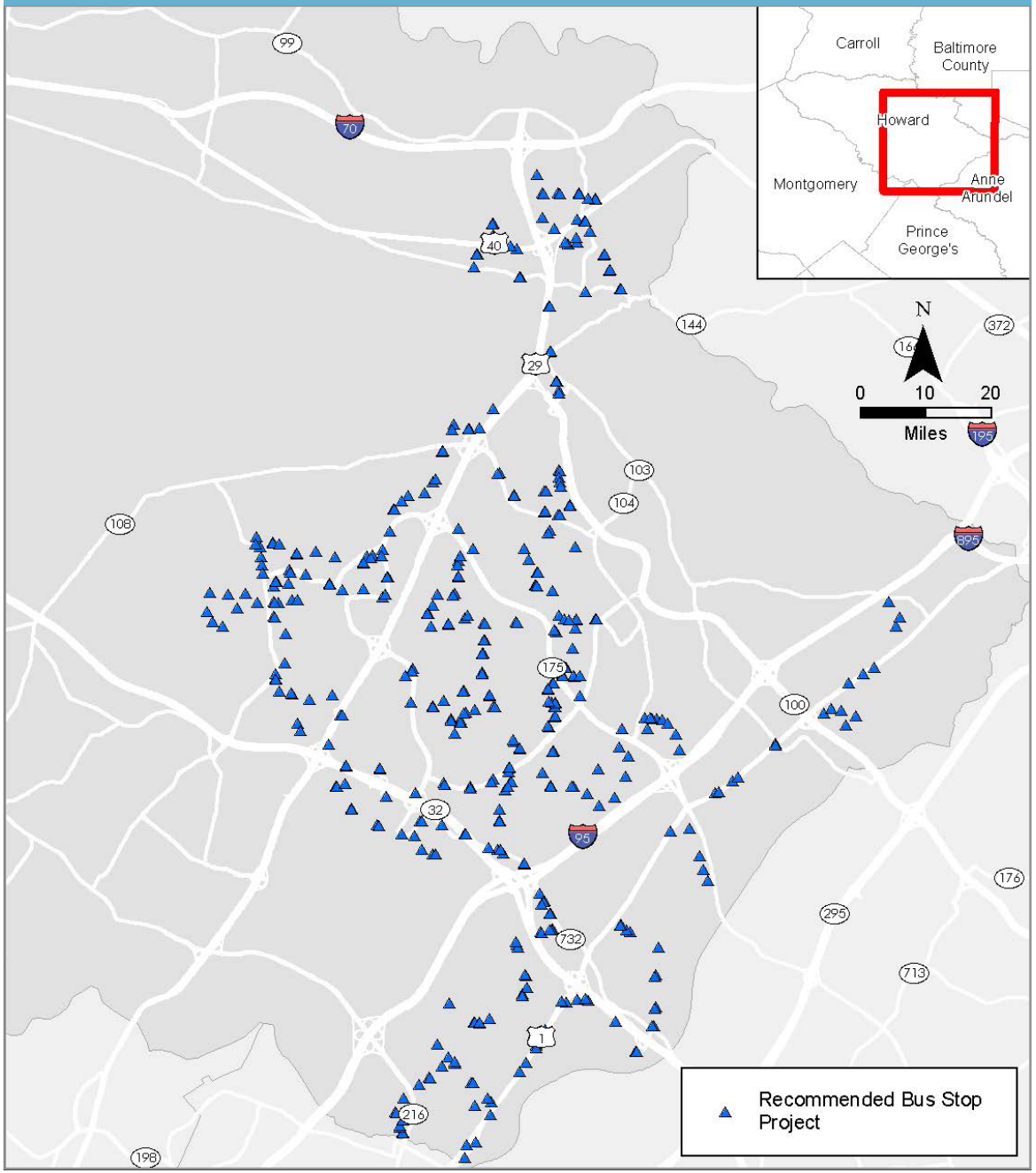
BUS STOPS

Table 6 - Summary of Bus Stop Recommendations	
Note: some stops had more than one type of need	**Number of stops**
Updates needed, including maintenance	55
ADA element needed, such as landing pad	421
Safety element needed, such as lighting	90
Trash and/or recycling bin needed	119
Total of stops with needed improvements	494

This bus stop along US 1 (Washington Boulevard) is missing a landing pad and pedestrian access.



Figure 23 - Map of Recommended Bus Stop Projects



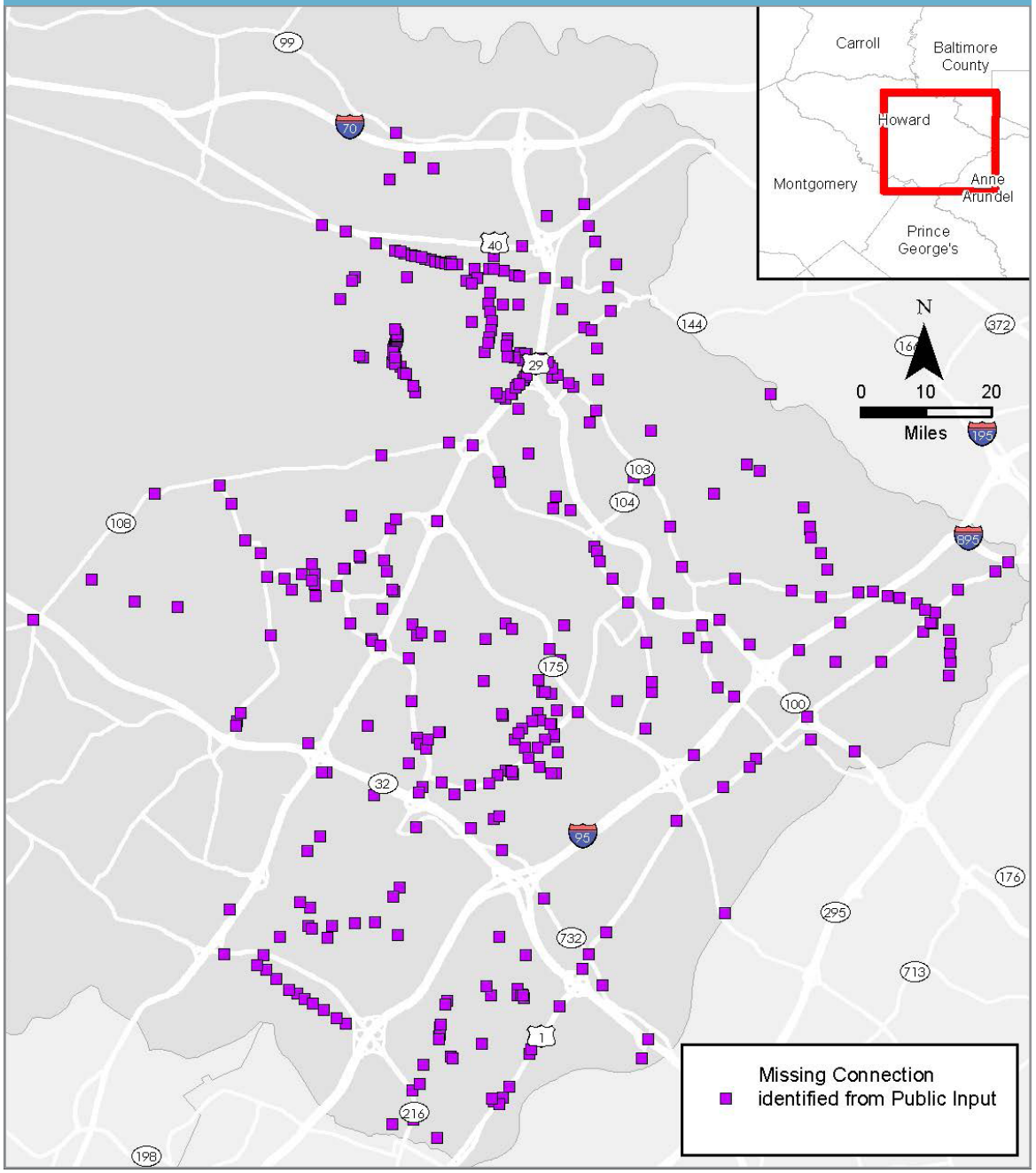
MISSING PEDESTRIAN CONNECTIONS

Table 7 - Reasons to Complete Missing Connections	
Safety	This connection will mean that pedestrians and bicyclists can avoid using a very busy road.
Network Connectivity	This connection would help travel between neighborhoods and provide access to other County pathways on foot or bike.
Access to Retail	This connection would provide a way to walk or bicycle to nearby retail.
Safe Routes to School	This connection would make it easier and safer to get to the bus stop or to school.

This pedestrian connection provides access to Laurel Woods Elementary School in Laurel.



Figure 24 - Map of Missing Connections Identified through Public Input



Chapter 5:

Program Recommendations



Overview

Physical improvements are only one avenue of change in pedestrian transportation; strong programs designed to get more people using the county's pedestrian network can also effect change. Successful programs typically focus on culture shifts related to how often people walk or how often people practice safe behavior when walking, biking, or driving. They are designed to support both those who walk on a regular basis—either by choice or due to life circumstances—and those who can be encouraged to become more regular walkers.

Howard County has a solid foundation of programs that encourage walking, and *WalkHoward*'s recommendations in this chapter build on them. Many of this plan's goals (see Chapter 2) will be advanced through the programs described in this chapter. **Table 8** summarizes the goals and recommended programs, showing which programs support completion of which goals. A description of each program follows the table.

Table 8 - Program Recommendations

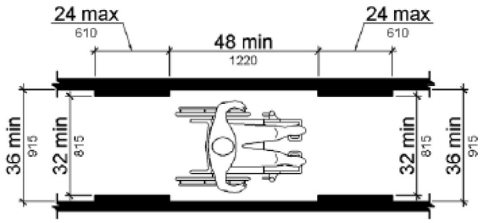
Program Recommendations	*WalkHoward* Goals							
	To provide safe and convenient pedestrian connections to all transit locations	To meet or exceed ADA standards for pedestrian facilities	To support efforts to increase walking to schools	To improve the maintenance of the facilities that constitute the pedestrian network	To maintain a low rate of pedestrian-related crashes, injuries and fatalities	To coordinate with state agencies regarding the pedestrian network on state-owned and state-managed roadways	To coordinate with developers to ensure quality pedestrian facilities are provided through the site review process	General encouragement programs
Develop a "Beyond the Minimum" program for ADA accommodation		●						
Support and expand Healthy Howard program			●					●
Expand non-motorized police patrol units					●			
Analyze and publicize pedestrian crash data					●	●		
Expand the county-wide pedestrian counting program				●	●	●		
Adopt pedestrian friendly laws and policies	●		●	●	●	●		
Establish a countywide Safe Routes to School Program (SRTS)			●		●			
Establish a Share-the-Path Safety and Respect program	●		●	●	●			
Establish a series of Howard County "Walkabouts"								●
Receive a Walk-Friendly Community Designation from the national Walk Friendly Communities recognition program	●	●	●	●	●		●	●

Recommended Program Descriptions

Develop a "Beyond the Minimum" program for ADA accommodation

This type of program designed for the pedestrian network is based on a similar program in the health care facility industry.[48] The program would guide Howard County government, its school system, local businesses, restaurants, etc., in exceeding minimum standards for ADA-accessible public spaces.

Lead Agency: Department of Community Resources and Services (DCRS) Office of ADA Coordination.



1. Educating policy makers, staff, and contractors on the purpose of ADA standards.
2. Developing a set of low cost retrofits to address highly problematic situations that are very costly to make compliant, such as portable landscaping to partition sidewalk cafes.
3. Using the set of principles known as "universal design" to accommodate as many pedestrians as possible, regardless of disability.
4. Safeguarding the "ADA Path of Travel" by removing barriers to bus stops and other pedestrian destinations within the pedestrian network to maintain the minimum ADA-accessible pathway.
5. Using ADA guidance and standards for all project phases: design, construction, and maintenance.
6. Spelling out compliance requirements for contractors to keep common construction practices from resulting in inaccessibility issues, such as non-compliant sidewalk closure and detour signs.
7. Designing for actual use, not just minimum compliance. For example, sidewalks and intersections adjacent to healthcare facilities or housing for seniors may need more accessibility.
8. Incorporating accessibility review early in the design review process for transportation and development projects, so accommodations can be made without negatively impacting other needs.
9. Creating, in coordination with the County's existing Commission on Disability Issues and Access Committee, an advisory board composed of staff and community members with disabilities to provide ongoing review and suggestions for the pedestrian network.
10. Establish a short accessible design check list to help avoid mistakes from Preliminary and Final design of projects.

48 http://www.healthcarefacilitiestoday.com/posts/Ten-steps-for-designing-beyond-minimum-ADA-compliance-standards-in-hospitals—565

Expand non-motorized police patrol units

As Downtown Columbia and other compact areas like Ellicott City and Laurel continue to transform into more walkable and bicycle-friendly communities, the County should consider expanding its non-motorized police patrol units. Officers may walk or use bicycles to monitor these areas and respond to calls. Non-motorized patrol units model proper pedestrian and bicyclist behaviors, and enforce laws designed to improve road safety for all users. These units can also help patrol trails and be trained to support special events.

Lead Agency: Howard County Police Department



Analyze pedestrian crash data

Through this program, the Howard County Police Department would work with the Department of Public Works, the Department of Planning and Zoning, and the Office of Transportation to create an annual pedestrian crash report. Hospital emergency rooms would also be asked to share their data regarding visits related to pedestrian crashes. The report may assist in the development of pedestrian safety programs involving infrastructure design and accommodations as well as education programs.

Lead Agency: Office of Transportation

Encourage organizations to promote health and wellness

This recommendation seeks to increase the number of Howard County organizations that implement health and wellness programs and events. Organizations that could be encouraged to promote health and wellness include the Howard County Department of Public Health, Howard County General Hospital, practitioner associations, the Horizon Foundation, private gyms, Columbia Association, and County recreation centers and programs. These organizations could implement various programs promoting walking for heath, including prescriptions for outdoor activity and sponsorship of a special event in each season of the year, possibly targeted to specific at-risk populations.

Lead Agency: To Be Determined

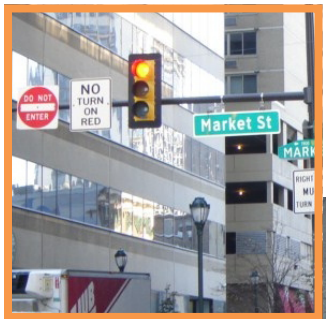
Expand the county-wide pedestrian counting program

Howard County should expand its existing pedestrian counting program to establish a baseline and measure annual changes in walking rates as infrastructure improvements are made. Counts should be taken at several locations, including both road and pathway settings. Howard County has already ordered automated counters to conduct ongoing pedestrian counts. These counters can be supplemented by perioding manual counts in multiple locations. These manual counts require a significant amount of staff resources, but can also be conducted by trained volunteers such as high school students, neighborhood association members and local advocates. Manual counts can be performed on an annual or more frequent basis.

Lead Agencies: Office of Transportation and Columbia Association

Promote pedestrian friendly laws and policies

Howard County should consider the following pedestrian-friendly practices to improve pedestrian safety and the quality of the pedestrian experience at signalized intersections:



Right turn on red restrictions

Research has found that more than 50 percent of drivers making right turns on red fail to come to a complete stop before turning.[1] In addition, many drivers turning right on red look left for traffic and fail to check for pedestrians using the crosswalk on their right. Eliminating right turns on red at intersections with high pedestrian volumes can reduce the number of vehicular-pedestrian crashes.

1 Zegeer, Charles V., and Michael J. Cynecki. "Determination of motorist violations and pedestrian-related countermeasures related to right-turn-on-red." Transportation Research Record 1010 (1985).



Pedestrian signals with countdown timers

Pedestrian signals with countdown timers indicate the number of seconds remaining in the walk cycle, which helps pedestrians complete the crossing safely without having to run.



Leading pedestrian intervals

A leading pedestrian interval is a period of a few seconds during which the walk signal is illuminated before the corresponding traffic signal turns green. Leading pedestrian intervals should be used where there are heavy volumes of pedestrians and turning vehicles, and near schools and senior centers where it is important to accommodate slower-moving pedestrians by giving them the chance to start crossing the street before turning vehicles have a green light.





Automatic pedestrian recall

In areas with heavy pedestrian volumes, pedestrians should not be required to push a button to request a walk signal. Pedestrian signals that occur automatically with the corresponding traffic signal are predictable and guarantee regular walk phases for pedestrians.



Establish a countywide Safe Routes to School program

Howard County should aim to have 50 percent of elementary and middle schools participating in Safe Routes to School (SRTS) activities by 2023. To reach this goal and guide school activities, the Howard County Public School System would lead a joint effort with the Howard County Police Department and the Department of Public Works. The program would target schools with the greatest potential for biking and walking to school, i.e. the schools with the highest percentage of students living within one mile of the school. The program would promote and coordinate the following activities:

- Participation in annual Walk and Bike to School Days
- Implementation of curriculum designed to educate students about safe walking and biking practices, including the importance of wearing reflective gear to be visible when it is dark
- Creation of incentive programs and organized "walking school buses," in which adults supervise groups of students walking together to school[49]

Lead Agency: Howard County Public School System

Establish a Share-the-Path Safety and Respect program

This initiative would be led by a partnership including Columbia Association, the County Department of Recreation and Parks, and representatives from a variety of path user groups, village councils, and HOAs. The goals of the program would include:

- Reducing user conflicts on Columbia Association and County paths, many of which are narrower than 8 feet
- Fostering courtesy and mutual respect among path users and supporters
- Advocating for path widening, safer road crossings, wayfinding signs and a host of other needed upgrades to make the path system safe and functional for pedestrian travel, whether it be for transportation or recreation

Program activities would include promoting safe practices and mutual respect among pedestrians and bicyclists using the pathway system. For example, the program would educate pedestrians and bicyclists about the use of headphones and lights, keeping to the right, passing on the left, providing an audible warning when passing, and keeping dogs on a "short leash." The Share the Path Safety and Respect program could serve as a model for, or be rolled out in conjunction with, a Share the Road Safety and Respect program that addresses all users of the county's road network.

Lead Agency: Department of Recreation and Parks and Columbia Association

Establish a series of Howard County "Walk-abouts"

Following the example of the Columbia Association's Bikeabout, a "walk-about" program would designate certain days as celebrations of walking to help Howard County residents learn more about where they live. Local businesses could help sponsor the events and provide discounts to customers who arrive on foot. The "walk-abouts" would help increase awareness of walking's benefits as well as available walking routes in Howard County.

Lead Agency: Department of Recreation and Parks and Columbia Association

Pursue Designation as a Walk Friendly Community

Walk Friendly Communities (WFC) is a national program developed to encourage towns and cities across the U.S. to commit or recommit to making safe walking environments a high priority. A complementary program to the Bike Friendly Community program, the WFC program provides Bronze, Silver, Gold and Platinum designations and recognizes communities that are working to improve a wide range of conditions related to walking, including safety, mobility, access, and comfort. Howard County could become the first recognized Walk Friendly Community in Maryland.[50]

Lead Agency: Office of Transportation

49 For more information, visit http://www.walkingschoolbus.org/

50 http://www.walkfriendly.org/index.cfm; Howard County received an honorable mention for its work in becoming a Bike Friendly Community in 2013

Chapter 6:

Policy Review and Recommendations



Overview

The County's transportation network reflects the County's policies, design standards, guidelines, practices, and processes—both those specific to transportation and those related to planning and development more generally—and targeted policy adjustments often lead to important changes in the transportation network, especially with respect to pedestrian travel. This chapter describes the review of existing policies and practices that took place as part of developing *WalkHoward* and identifies policy considerations to support the plan's network recommendations.

Historically, the County pursued on a roadway network for motor vehicles with separate accommodations for bicyclists and pedestrians. However, in recent years the County has modified its policies to pursue a more integrated, multi-modal approach. For example, the County Council's October 7, 2019 adoption of a Complete Streets Policy was an important step in increasing walkability in the County. The adopting resolution requires corresponding updates to the Howard County Design Manual within two years. In addition, the new policy can inform changes in other parts of the code, such as the subdivision regulations and zoning.

To ensure that Howard County is a place for individuals of all backgrounds to live and travel freely, safely, and comfortably, public and private roadways in Howard County shall be safe and convenient for residents of all ages and abilities who travel by foot, bicycle, public transportation or automobile, ensuring sustainable communities Countywide.

—Howard County's Complete Streets policy intention statement, January 5, 2016



"I will make Complete Streets a priority to promote our vision of a true multi-modal transportation system"

—County Executive Calvin Ball, February 27, 2019

THE REVIEW

The project team conducted a review of current County policies, practices, and guidelines during spring and summer 2014. Documents reviewed included the Howard County Subdivision and Land Development Regulations (October 7, 2007), the Howard County Design Manual, Volume III: Roads and Bridges (October 2006), various neighborhood master plans, the US 1 and US 40 Design Manuals, and *PlanHoward* 2030.

In addition, staff from several County offices and related organizations participated in discussions, including:

HOWARD COUNTY GOVERNMENT

Office of Transportation

Department of Planning and Zoning

Division of Land Development

Division of Comprehensive and Community Planning

Development Engineering Division

Department of Public Works

Office of the Director of Public Works

Bureau of Engineering

Bureau of Environmental Services

Real Estate Services Division

Department of Recreation and Parks

Bureau of Capital Projects

Park Planning and Construction

Department of Community Resources and Services

Office of ADA Coordination

DOWNTOWN COLUMBIA PARTNERSHIP

MARYLAND STATE HIGHWAY ADMINISTRATION

District Engineering

Regional Planning

Access Permits

THEMES AND POTENTIAL UPDATES

The review process identified a number of areas for consideration. The project team also reviewed similar policies in peer communities, identified resources, and developed more specific recommendations. The Pedestrian Advisory Team reviewed the recommendations as part of its work in summer 2015.

Based on the Advisory Team's review and the extent of analysis and consensus-building needed to develop code changes, the best approach would be to convene a team to work over a 12 to 18-month period to identify a set of updates that will support pedestrian network development and develop an implementation timeframe for those updates. Some of this work is already underway via the Complete Streets Implementation team, but the following recommendations go beyond Complete Streets to a broader review of County policies and procedures.

Recommendations to Consider

- County design documents should encourage walking by prioritizing human-scale pedestrian environments with elements such as trees, street furniture, and pedestrian-scale lighting.
- The County should centralize all ADA transition (upgrading of County facilities to meet ADA standards) responsibility under one department within the County government, and empower that department to provide actionable input on Countywide plans, subdivision applications, construction drawings, and any other document that could impact accessibility. A comprehensive ADA transition plan does not exist.
- The County should provide or coordinate training opportunities for staff, stakeholders and/or developers on:
  - Pedestrian or complete streets design practices
  - Howard County design standards
  - ADA guidelines
- Better aligning the fees collected from developer-requested waivers with the actual cost of sidewalk implementation may reduce the frequency in which fees are collected in place of actual sidewalk construction. When fees are collected, they should be allocated, in a timely manner, to a nearby project that provides a more useful pedestrian connection than a frontage sidewalk at the development.
- The County should adjust language in the subdivision regulations and design guidelines to better encourage access to transit and other important community destinations (e.g. require sidewalk and intersections improvements near bus stops).
- A clear sidewalk policy would include a process for sidewalk installation and maintenance requests—who has responsibility, including that for bearing the cost—and for clarifying, simplifying, consolidating, and streamlining requirements included in various documents.
- Developers and other stakeholders may find it difficult to determine which plans, policies and design guidelines are applicable to any individual location. Consolidating bicycle and pedestrian plans, neighborhood design guidelines, and other relevant planning documents into a centralized database (e.g. an interactive online map) would allow developers, SHA, and



Roundabouts, like this example at the intersection of Stephens Road and Whiskey Bottom Road in Laurel, can provide safer accommodations for pedestrians.

others to quickly identify the relevant plans and policies that apply to a given area.

- The subdivision regulations and Design Manual should be clarified to establish where sidewalks wider than the 5' minimum are appropriate, as well as whether sidewalks are appropriate on one or both sides of streets.
- Challenges exist in cases where the County has planned new or widened sidewalks but adjacent homeowners oppose them. Objections may be based on the County requirement for landowners to maintain sidewalks, or they may have other causes. The County should develop a process for outreach to owners of property adjacent to proposed sidewalks to explain the need for pedestrian access and correct any misconceptions property owners may have.
- Challenges exist around the subdivision review timelines at SHA and Howard County. SHA is often unable to follow the County's requested timeline and, if the County attempted to provide expedited review for a project, SHA would not necessarily be able to commit to an expedited timeline. The County should coordinate with SHA to better match review timelines.



This buffered sidewalk along Gorman Rd across I-95 is an example of acceptable pedestrian accommodation across a limited-access highway.

- While they are important conduits for vehicular travel in Howard County, limited-access highways such as US 29, MD-100, and I-95 constitute major barriers to pedestrian travel in Howard County. Even where sidewalk crossings are available, they require traversing rights-of-way that are hundreds of feet wide, and are often narrow, with no buffer between pedestrians and motor vehicle traffic. **Table 9**, below, shows limited-access highways in Howard County and the number of crossings of each that provide accommodation for pedestrians. When other crossings are replaced and interchanges are redesigned, Howard County should partner with the State Highway Administration to ensure that they are designed to allow safe and comfortable passage for pedestrians across these highways.

Table 9 - Pedestrian Crossings of Limited-Access Highways

Highway	Distance in Howard County	Number of Crossings with Pedestrian Accommodation
US 29	13.5 miles	3 crossings
I-95	11.5 miles	4 crossings
MD-32	10.3 miles	5 crossings
MD-100	7.1 miles	2 crossings
I-70	19.4 miles	4 crossings

- When a pedestrian project is proposed, *BikeHoward* should also be consulted to identify its bicycle facility proposals for that location. If a combined facility (i.e. shared-use pathway) would better serve pedestrian and bicycle travel within the project area than separate bicycle and pedestrian accommodations, the County should pursue that approach.

Chapter 7:

Implementation Plan



Overview

Implementing this Pedestrian Master Plan will move Howard County closer to the vision and goals stated in Chapter 2. How is this to be accomplished? What overriding guidance and actions will keep things moving? This chapter lays out a plan for implementing programmatic and infrastructure changes that will result in more people walking in the County. Recommendations are organized into four inter-related objectives:



Provide Supportive Programs

Chapter 5 describes a set of programs to encourage more residents to walk, to support safety goals, and to track walking rates. Many of these programs could be achievable in the short term with a small investment of funds and resources, while others could be implemented in the short term, but would require a commitment of resources from community partners to be sustainable.



Maintain the Network

Maintaining the pedestrian network is important work that will ensure pedestrian facilities do not fall into disrepair. This plan focuses on specific improvements rather than ongoing maintenance. However, the plan does also encourage the County to continue its ongoing commitment of resources dedicated to pedestrian network maintenance, as well as ensure that pedestrian passage is maintained during construction projects and that facilities are not temporarily obstructed by other maintenance, such as plowed snow or temporary traffic control signs.



Update Policies and Practices

Chapter 6 recommends that policy updates be considered more fully by a team comprising County staff and other stakeholders. This group should supplement the Complete Streets Implementation Team with a more comprehensive look at pedestrian access and safety, and its work should take place during the 12 to 18 months following plan approval, with any policy updates occurring after that.



Identify Recommended Projects

This objective identifies ways to group the highest-priority pedestrian infrastructure needs into discrete structured projects. Funding opportunities go beyond the County's Capital Budget to include other regional, state, and federal sources. See **Appendix F** for a table of non-County funding sources.

Key to achieving this objective is integrating the plan and its recommendations into other County plans and activities. For example, some plan recommendations can be built through the land development process. New development and redevelopment projects should address the recommendations of this Plan as they would any part of the Comprehensive Plan. Developer contributions toward construction of adjacent pathways and facilities identified in the Pedestrian Network Recommendations should be required as conditions of approval during the development review process, and include:

- Pedestrian connections from the development to existing and planned transportation facilities such as pathways and transit stops
- Pedestrian connectivity between the development and the surrounding community
- Pedestrian-scale lighting along sidewalks and trails

GUIDING PRINCIPLES AND STRATEGIES

Chapter 2 introduced four Guiding Principles, which are the mechanics of the plan implementation. While the Vision provides a snapshot of the future, and the Goals lay out benchmarks for knowing if the vision is reached, the Guiding Principles are a set of strategies to achieve the goals. Implementation objectives for each strategy are shown with the icons introduced on the previous page.

Principle: build a pedestrian network to be used; maintain it so it is used.

Strategies:

1. Employ Universal Design principles in the design of pedestrian facilities.

2. Consider the access and safety needs of residents, workers, and visitors when designing pedestrian facilities.

3. Design facilities for pedestrians of all ages and abilities.

4. Separate the pedestrian network from other modes of transportation when needed for safety, directness, quality of life, or other reasons.

5. Revise maintenance standards and responsibilities when necessary to ensure facilities remain usable.


Principle: ensure the pedestrian network is coherent, continuous, and connected.

Strategies:

1. Design the network so that it is coherent—it is easy to see and understand.

2. Design the network so that it is continuous—it continues as long as it is needed instead of ending when right-of-way changes, funding runs out, or other needs are deemed more important.

3. Design the network so that it is connected—it connects to places where pedestrians would like to go and to other network elements, e.g., sidewalks lead to bus stops and intersections, and curb ramps lead to crosswalks.

4. Establish effective partnerships with other agencies and organizations that share responsibility for the pedestrian network, policies, and programs.


Principle: design all pedestrian network elements to satisfy pedestrians' desire for safe, direct routes.

Strategies:

1. Adopt a design standard for curb ramps that ensures an accessible, direct link between crosswalks and sidewalks.

2. Develop and use pedestrian signals with features such as lead pedestrian intervals and pedestrian-only phases.

3. Develop a crosswalk policy that contains crosswalk design guidelines and placement practices.

4. Install new lighting or retrofit existing lighting to illuminate key pedestrian connections during nighttime hours.

5. Take advantage of opportunities that arise during the development and

permitting process and through ongoing collaboration and coordination with property owners, to provide safe and comfortable pedestrian facilities in public rights-of-way, within other public land, and in partnership with private property owners.

6. Support policies that promote the construction of sidewalks, sidepaths, or trails on at least one side of all designated roads.
7. Provide safe, comfortable, and accessible pedestrian facilities like sidewalks or trails on both sides of roads where transit stops exist.
8. Prioritize gap closure in sidewalk and crosswalk networks within ¼ mile of all schools.

Principle: create space when needed so that pedestrian facilities meet design standards and best practices and are ADA-compliant.

Strategies:

1. Re-purpose right-of-way where there is unused or underused space.
2. Acquire small amounts of land if necessary to allow for safety and ADA compliance, such as in cases where sidewalk widening is needed to comply with ADA requirements for passing space.
3. Build knee walls or retaining walls at bus stops to create space that increases safety and satisfies ADA guidelines, as shown in the photo at right.

Responsible Agencies and Funding

Several agencies are responsible for implementing pedestrian network projects in Howard County. These include the Howard County Department of Parks and Recreation (for pathway connections), Howard County Public Schools (for direct access to schools), the Howard County Office of Transportation (for bus stops), the Maryland State Highway Administration (for projects along state-maintained roadways), and the Howard County Department of Public Works (for sidewalks and intersections in the public right-of-way). Different offices or bureaus within the Department of Public Works implement projects based on what they are and what they require: the Bureau of Highways handles sidewalk maintenance, the Traffic Engineering Division handles intersections (curb ramps, crosswalks, and traffic controls), and the Transportation & Special Projects Division handles new sidewalks and projects requiring right-of-way acquisition. Developer-built projects are reviewed by one or more agencies and may be maintained publicly or privately.

Project implementation requires a funding source. This document does not commit funding for any projects. Typical sources for pedestrian transportation projects include federal or state grant programs, the Howard County Operating



This landing pad and knee wall at an RTA bus stop on Ridge Road in Ellicott City provide an ADA-compliant place for transit users to wait for the bus.

and Capital Budgets, and developer contributions. Low-cost projects may be incorporated into larger Capital Budget projects (both State and County), especially when a long portion of a street is under construction.

Some key funding sources for federal, state, and other organizations are shown in the textbox at right. Other potential sources include foundations or crowdsourcing. A complete list of potential grant funding sources and opportunities is included as Appendix F. Some funding sources are targeted to infrastructure, safety, education, or encouragement efforts. Some sources are not directly pedestrian-related but can be applicable to a pedestrian project via another public priority such as historic preservation or public health. Some sources may support grants of hundreds of thousands or even millions of dollars, while others may be targeted to smaller amounts and require citizen volunteers or community involvement.

OBJECTIVE: PROVIDE SUPPORTIVE PROGRAMS

The programs described in Chapter 5 include education, encouragement, enforcement, evaluation and planning. Implementing these programs as soon as possible will support pedestrian transportation in Howard County.



Federal

FHWA's Table of Federal Funding

The Federal Highway Administration has created a data table that explains which federal funding programs can be used for bicycle and pedestrian projects. The table provides an overview; specific program requirements must be met and eligibility must be determined on a case-by-case basis.
www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm

Federal Community Services Block Grant Program (CSBG)

Administered by the Department of Health and Human Services, CSBG funding is allocated to states, which make it available to local communities. Funded projects have included commercial-district streetscape improvements, sidewalk improvements, safe routes to school, and neighborhood-based bicycling and walking facilities that improve local transportation options or help revitalize neighborhoods.
www.acf.hhs.gov/programs/ocs/programs/csbg/about

State

ADA Retrofit (SHA Fund 33)

The ADA Retrofit (SHA Fund 33) program allocates funding toward upgrading existing sidewalks, curb ramps, intersections, and driveway entrances along state roadways to achieve compliance with the Americans with Disabilities Act (ADA).
http://roads.maryland.gov/Index.aspx?PageId=576

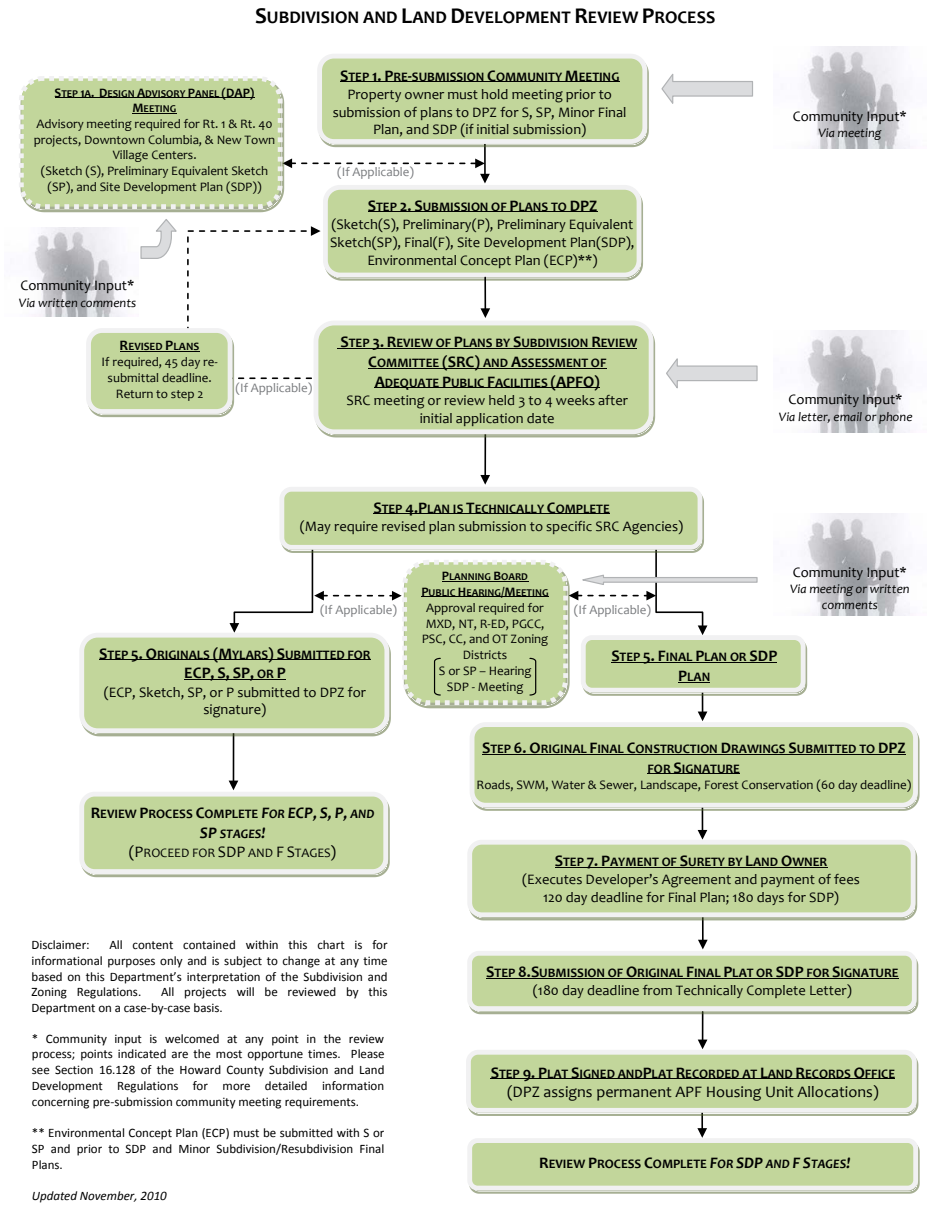
New Sidewalk Construction for Pedestrian Access (SHA Fund 79)

This fund is focused on constructing missing sidewalk segments along State roadways to fill gaps within the pedestrian network. The missing segment must be located in an urban area (as defined by the U.S. Census Bureau).

Safe Routes to Schools

This program provides funding for education, enforcement, evaluations, and infrastructure improvements near elementary and middle schools that promote students walking and bicycling to school. This was a federally funded program between 2005 and 2012. It has since been combined with other programs, but funds provided to states during that time do not expire and may still be available. Under the FAST Act, funding to states can be provided via the Surface Transportation Block Grant Program Set-Aside.
www.roads.maryland.gov/Index.aspx?PageId=735
http://saferoutesinfo.org/about-us/newsroom/new-transportation-legislation-maintains-srts-funding-through-2020

Howard County Subdivision and Land Development Review Process



Disclaimer: All content contained within this chart is for informational purposes only and is subject to change at any time based on this Department's interpretation of the Subdivision and Zoning Regulations. All projects will be reviewed by this Department on a case-by-case basis.

* Community input is welcomed at any point in the review process; points indicated are the most opportune times. Please see Section 16.128 of the Howard County Subdivision and Land Development Regulations for more detailed information concerning pre-submission community meeting requirements.

** Environmental Concept Plan (ECP) must be submitted with S or SP and prior to SDP and Minor Subdivision/Resubdivision Final Plans.

Updated November, 2010

OBJECTIVE: UPDATE POLICIES AND PRACTICES

Chapter 6 recommends convening a group of County staff and other stakeholders to conduct a review of existing policies and practices that can be updated to support and enhance the pedestrian network. A review of the subdivision regulations and design guidelines and a series of stakeholder focus groups conducted as part of developing this plan concluded that more time, consideration, and conversation is needed.

As it includes many of the stakeholders in pedestrian transportation, the Transit and Pedestrian Advisory Group can serve as a starting place for the review group. County agencies and other organizations recommended as part of the review are shown in the textbox on the next page. A recommended sequence for review follows.

1. Develop an understanding of the County and non-County agencies involved in planning, developing, and maintaining the pedestrian network, including their roles and responsibilities. The agency descriptions in the text box on the following page can be used as a starting point.

2. Develop an understanding (perhaps through a diagram) of how the workflow through these agencies results in new infrastructure and the maintenance needs of existing infrastructure. This step would also include documenting existing practices. The flowchart at left shows the current subdivision and land development process in Howard County.

3. Agree on key documents to review, including:
   - The Adequate Public Facilities Ordinance
   - The zoning ordinance
   - The subdivision and land development regulations
   - The Howard County Design Manual

4. Develop an understanding of why prevailing practices do not always yield results that meet stated goals of policies and design guidelines.

5. Agree on a manageable set of items to review, starting with those of the highest importance.

Office of Transportation

- The Office of Transportation's primary focus is to increase the efficiency and effectiveness of public transportation services, walking and bicycling in and around Howard County and ensure that connectivity is front and center in land use planning and site development
- The Office also oversees the provision of public transportation services in the County. In addition, the Office also develops and oversees the implementation of the plans that guide transportation in the county; these plans include the countywide bike and pedestrian master plans, the County's comprehensive plan (PlanHoward 2030), and regional transportation plans. The Office also develops and manages grant programs that fund the planning and construction of bicycle and pedestrian facilities.

Department of Planning and Zoning

- The Department's mission is to create collaborative, innovative plans and implement strategies that effectively address growth and redevelopment challenges. DPZ seeks to enhance Howard County's high quality of life, prosperity, and stewardship of our natural and cultural resources.
- The Department oversees the land development and zoning processes as well as community planning, conservation, and preservation.

Department of Public Works

- The Bureau of Engineering develops and implements major capital projects, including the development of new roads, the widening of existing roads, and the construction and reconstruction of sidewalks and intersections.
- The Bureau of Highways oversees the maintenance and repair of the county's sidewalks, roads, and intersections, including the repaving and restriping of roads, the cleaning of streets, and the development of traffic-calming measures.
- The Bureau of Facilities is responsible for the maintenance and upgrading of County buildings, including parking lots and grounds.
- The Real Estate Services Division plays an important role by developing and managing developer agreements and sidewalk maintenance agreements, as well as securing land for capital projects.

Department of Recreation and Parks

- The Bureau of Capital Projects, Park Planning and Construction conducts long range planning efforts that guide park and recreational facility development, and constructs new parks, park buildings, and trails.
- The Bureau of Recreation Services manages and develops the recreational programs for the public, such as walking and hiking events, as well as educational programs in park facilities.

Howard County Public School System

- The Department of School Facilities conducts the planning, development, and construction of school buildings and grounds, including the building and maintenance of sidewalks and pathways into and through school grounds. This includes paths that connect to County and Columbia Association paths.

Howard Community College

- The Department of Facilities conducts the planning, development, and construction of campus buildings and grounds, including the building and maintenance of sidewalks and pathways into and through the College's campus. This includes paths that connect to County and Columbia Association paths.

Columbia Association

- The Association plans, develops, constructs, and maintains its pathway network within its boundaries, manages a broad range of programs and events that use the pathway system, works closely with the County to coordinate planning and maintenance efforts, and constructs and maintains sidewalks adjacent to its own facilities.

OBJECTIVE: IDENTIFY RECOMMENDED PROJECTS

The County's experience with implementing pedestrian infrastructure projects suggests that a wide range of factors should be used to determine which improvements should be made each year. County staff therefore analyzed the feasibility, complexity, cost, and prioritization scores (see Appendices C and D) of potential improvements to develop 43 structured projects comprising individual improvement needs identified during the field assessment process. These projects were identified by selecting sidewalks that were missing or had major obstructions that earned the highest 15 percent priority scores, as well as the highest 15 percent of bus stops that were missing landing pads. These sidewalk and bus stop improvements were segmented geographically to create localized projects, and then screened by County staff for their feasibility. Some possible projects, despite having high priority scores, would have a level of effort and cost too high to justify the expected level of pedestrian usage. Therefore, these projects were not included in this list of structured projects.

The 43 projects, listed in geographic order south to north, comprise approximately $9.44 million of sidewalk construction, $1.18 million of intersection improvements, and $862,000 of bus stop improvements. for a total

of $11.49 million in improvements. **Table 10** lists the projects and provides estimated costs developed with the unit costs contained in Appendix E. The descriptions and estimated costs in Table 10 are preliminary and do not commit County funds. Intersection improvement costs have been assigned to all of the structured projects adjacent to the intersections to be improved, as those improvements can be made along with any of the adjacent sidewalk improvements.

These estimates are subject to revision based on future development, roadway projects, or other circumstances. However, they constitute a starting point that can guide investment in pedestrian infrastructure. In addition, funding is only one part of project delivery; availability of staff and ability to acquire right-of-way are important aspects of ensuring that the County has the capacity to deliver sidewalk projects.

In addition to creating structured projects, staff assessed the missing connections identified by the public to identify gaps that are feasible to fill, would make an especially important connection, or both. Some of them could be addressed along with adjacent structured projects, while others would be better addressed as standalone projects. These 17 connections are designated as "Priority Connections," and are illustrated starting on page 105, also in south-to-north geographic order. Because these connections are conceptual, and because details such as facility type are not yet known, it is impossible to apply the planning estimate unit costs for the Priority Connections, so these connections do not contain cost estimates. Some of the priority connections have the potential to have scope and cost even larger than the identified structured projects.

In some cases, it may be preferable to pursue *WalkHoward* and *BikeHoward* recommendations at the same time through a roadway-reconstruction project that adds bicycle accommodations to the roadway and sidewalks alongside it simultaneously. In accordance with the Complete Streets Policy, which requires the County to consider every transportation mode during the development of every transportation project, bicycle accommodations along the adjacent roadway shall be considered at the inception of each pedestrian project, and the County shall determine whether bicycle accommodations can be provided concurrently with the proposed pedestrian improvements.

Table 10 - Structured Projects and Priority Connections

Number	Estimate*	Project Description	Page
Structured Project 1	$117,510	*Install sidewalks along Gorman Road and Stephens Road, and make associated intersection improvements. This project will be addressed by capital project J4202.*	*62*
Structured Project 2	$290,197	*Install sidewalks on the west side of Savage Guilford Road from Baltimore Street to Jefferson Street and make associated bus stop and intersection improvements.*	*63*
Structured Project 3	$283,239	*Install sidewalks on both sides of Graeloch Road from Leishear Road to Aladdin Drive and make associated intersection improvements.*	*64*
Structured Project 4	$257,108	*Install sidewalks on both sides of Graeloch Road from Aladdin Drive to its west end past Helmart Drive and make associated intersection improvements.*	*65*
Structured Project 5	$350,245	*Install sidewalks along Oakland Mills Road from Procopio Circle to Guilford Roadand make associated intersection and bus stop improvements. This project will be addressed by capital project J4207.*	*66*
Structured Project 6	$295,145	*Install sidewalks on the west side of Broken Land Parkway from Guilford Road to the Broken Land park & ride lots.*	*67*
Structured Project 7	$358,303	*Install sidewalks on the east side of Waterloo Road and Old Waterloo Road from Mayfield Avenue to Waterloo Park and make associated intersection and bus stop improvements.*	*68*
Structured Project 8	$264,077	*Install sidewalks along the north side of Guilford Road between Berry Wood Court and Great Star Drive and make associated intersection improvements.*	*69*
Structured Project 9	$10,400	*Make improvements to 8 bus stops in the Cradlerock area.*	*70*

Number	Estimate*	Project Description	Page
Structured Project 10	$248,893	*Install sidewalks on the north side of Guilford Road from Great Star Drive to Erin Drive.*	*71*
Structured Project 11	$532,998	*Install sidewalks on the east side of Dobbin Road from Columbia Crossing Circle to McGaw Road and make associated intersection improvements.*	*72*
Structured Project 12	$504,203	*Install sidewalks on the west side of Dobbin Road from Old Dobbin Road to McGaw Court and make associated intersection improvements.*	*73*
Structured Project 13	$88,510	*Install sidewalks on the north side of Guilford Road from Thompson Drive to Clarksville Pike and make associated intersection improvements.*	*74*
Structured Project 14	$402,467	*Install sidewalks on Old Montgomery Road west of Waterloo Road and make associated intersection improvements.*	*75*
Structured Project 15	$389,042	*Install sidewalks on Waterloo Road from Waterloo Elementary School to Old Stockbridge Drive and make associated intersection improvements.*	*76*
Structured Project 16	$85,343	*Make a variety of sidewalk, intersection, and bus stop improvements in the vicinity of Jeffers Hill Elementary School.*	*77*
Structured Project 17	$163,023	*Install sidewalks along Augustine Avenue and Bakers Place and make associated intersection improvements.*	*78*
Structured Project 18	$222,077	*Install sidewalks on the west side of Snowden River Parkway from an existing pathway north of Tamar Drive to Waterloo Road and make associated intersection and bus stop improvements.*	*79*
Structured Project 19	$227,955	*Install sidewalks on Old Montgomery Road east of Waterloo Road and make associated intersection improvements.*	*80*

Number	Estimate*	Project Description	Page
Structured Project 20	$285,390	*Install sidewalks at the intersection of Waterloo Road and Snowden River Parkway and make associated intersection improvements.*	*81*
Structured Project 21	$57,075	*Make improvements to 11 bus stops in Oakland Mills.*	*82*
Structured Project 22	$383,505	*Install sidewalks along Montgomery Road between Elkridge Crossing Way and Lawyers Hill Road and make associated intersection improvements.*	*83*
Structured Project 23	$412,518	*Install sidewalks on the east side of Washington Boulevard from Montgomery Road to Old Washington Road and make associated intersection improvements.*	*84*
Structured Project 24	$184,376	*Install sidewalks along Old Montgomery Road from Montgomery Road to University Boulevard and make associated intersection improvements.*	*85*
Structured Project 25	$154,605	*Install sidewalks on the west side of Little Patuxent Parkway from the end of existing sidewalk opposite Wincopin Circle to the Mall entrance.*	*86*
Structured Project 26	$223,403	*Install sidewalks on the south side of Montgomery Road from Brandons Way to Marbuck Way and make associated intersection improvements.*	*87*
Structured Project 27	$152,630	*Install sidewalks on the west side of Waterloo Road from Brothers Partnership Court to Davis Road.*	*88*
Structured Project 28	$463,124	*Install sidewalks on both sides of Clarksville Pike from Linden Linthicum Road to Broad Meadow Lane. This project is partially referenced in BikeHoward as Structured Project 64., and can be addressed by capital project T7108.*	*89*

Number	Estimate*	Project Description	Page
Structured Project 29	$207,925	*Make improvments to 7 bus stops in Downtown Columbia.*	*90*
Structured Project 30	$225,579	*Make a variety of sidewalk, bus stop, and intersection improvements along Cedar Lane and Harpers Farm Road. This project is also scheduled to be addressed through BikeHoward in the form of a shared-use pathway.*	*91*
Structured Project 31	$257,610	*Make a variety of sidewalk, bus stop, and intersection improvements in the vicinity of Howard High School.*	*92*
Structured Project 32	$331,505	*Install sidewalks on the west side of Little Patuxent Parkway from Vantage Point Road to Columbia Road and on Columbia Road to Flowerturt Court, and make associated intersection and bus stop improvements.*	*93*
Structured Project 33	$466,249	*Install sidewalks on Clarksville Pike from Eliots Oak Road to Harpers Farm Road and make associated intersection improvements.*	*94*
Structured Project 34	$440,729	*Install sidewalks on both sides of Montgomery Road from Wheatfield Way to Long Gate Parkway.*	*95*
Structured Project 35	$295,086	*Install sidewalks along the entrance drive to the Long Gate Shopping Center and make associated intersection and bus stop improvements.*	*96*
Structured Project 36	$424,565	*Install sidewalks on both sides of Montgomery Road between Long Gate Parkway and Old Columbia Pike and make associated intersection improvements.*	*97*
Structured Project 37	$391,144	*Install sidewalks along Columbia Road and Northfield Road from Labrador Lane to Northfield Elementary School and along Saint Johns Lane from Whitehall Road to Columbia Road, and make associated intersection improvements.*	*98*
Structured Project 38	$266,572	*Install sidewalks on the south side of Court House Drive east of Ellicott Mills Drive and make associated intersection improvements.*	*99*
Structured Project 39	$157,591	*Install sidewalks on the east side of North Chatham Road from Resurrection-St. Paul School to Paulskirk Drive and make associated intersection and bus stop improvements along North Chatham Road.*	*100*
Structured Project 40	$290,441	*Install sidewalks on the east side of Saint Johns Lane from Bicentennial Court to Victoria Drive and make associated intersection improvements.*	*101*
Structured Project 41	$329,857	*Install sidewalks on the north side of Old Frederick Road from Old Mill Road to Mt. Hebron High School.*	*102*
Structured Project 42	$312,425	*Install sidewalks along Rogers Avenue from Faber Way to Old Frederick Road and make associated intersection improvements.*	*103*
Structured Project 43	$49,061	*Install sidewalks on the south side of Old Frederick Road west of Raleigh Tavern Lane.*	*104*
Priority Connection 1	*N/A*	*Between the end of Eden Brook Dr and the existing Kings Contrivance loop pathway.*	*105*
Priority Connection 2	*N/A*	*Between the Broken Land west park-and-ride lot and an existing pathway at Broken Land Pkwy and Snowden River Pkwy; would offer a further connection the Patuxent Branch Trail.*	*106*
Priority Connection 3	*N/A*	*Between 9200 Berger Rd and the intersection of Snowden River Pkwy and Oakland Mills Rd.*	*107*

Number	Estimate*	Project Description	Page
Priority Connection 4	*N/A*	*Across I-95 between the end of Old Waterloo Rd and New Colony Village and the Oaks at Waters Edge. The costs of this connection would be very high, but it would link residential neighborhoods to the east of I-95 and a variety*	*108*
Priority Connection 5	*N/A*	*Across Snowden River Pkwy, between Oak Hall Ln and the Snowden Square Shopping Center.*	*109*
Priority Connection 6	*N/A*	*Between the Dorsey MARC station and Howard Square; expected to be provided by the developer of that community.*	*110*
Priority Connection 7	*N/A*	*Across Snowden River Pkwy, between 6750 Alexander Bell Dr and an existing sidewalk on the west side of Snowden River Pkwy; would provide pedestrian access into the Columbia Gateway area.*	*111*
Priority Connection 8	*N/A*	*Between Ducketts Ln and the Troy Hill corporate park; would create a connection from the residential neighborhoods along Ducketts Ln to Troy Hill Park.*	*112*
Priority Connection 9	*N/A*	*Between Bellows Springs ES and Old Farm Rd. It would create a link between the school and Woodland Village*	*113*
Priority Connection 10	*N/A*	*Across US-29 and Broken Land Pkwy to create a link between Stevens Forest Rd and Downtown Columbia. This project is referenced in the capital budget as Phase I of project T7107.*	*114*
Priority Connection 11	*N/A*	*A pathway gap adjacent to Old Montgomery Road near Jeffers Hill ES; would complete a connection between Blandair Park, Lake Elkhorn; Long Reach.*	*115*
Priority Connection 12	*N/A*	*Between Campus Dr and parking lots on the campus of Howard County General Hospital; would create a link between the hospital and Howard Community College.*	*116*
Priority Connection 13	*N/A*	*Between Howard HS and Centre Park Dr; would create a link from the school to the shops and restaurants along Centre Park Dr and Columbia 100 Pkwy.*	*117*
Priority Connection 14	*N/A*	*Between Dower Dr and Meadowbrook Park on existing Howard County property; would create a connection between the residential neighborhoods surrounded by MD-100, MD-108; US-29 and Meadowbrook Park.*	*118*
Priority Connection 15	*N/A*	*Between the end of Chatham Rd and the eisting pathway between Bright Bay Way and Dunloggin MS; would create a link between the destinations on US-40 and Dorsey's Search.*	*119*
Priority Connection 16	*N/A*	*Between Whitehall Rd and Saint Johns Ln along existing Howard County Property.*	*120*
Priority Connection 17	*N/A*	*Between Plum Meadow Dr and the campus containing the Miller Branch of the Howard County Library System and the Ellicott City 50+ Center; would create a connection between those facilities and the residential neighborhoods*	*121*

AREA OF SPECIAL FOCUS: US 1 (WASHINGTON BOULEVARD)

Between October 2015 and October 2016, motor vehicle crashes killed seven pedestrians in the US 1 (Washington Boulevard) corridor. These crashes occurred at a variety of locations throughout the corridor, both on US 1 itself and on adjacent streets, and at a variety of times of day and days of the week. The severity and urgency of this trend demands immediate action, but the diversity of crash circumstances suggests that there is no single step that will by itself increase safety in the US 1 corridor.

Howard County therefore undertook a safety evaluation process for US 1. The safety evaluation report[51] contains detailed recommendations for pedestrian and bicycle improvements along US 1 in Howard County that can

51 US 1 Safety Evaluation on Bicyclists and Pedestrian Safety, February 2019, www.howardcountymd.gov/US1Safety

be implemented in the short term to improve safety for people walking and bicycling in the corridor. Howard County is pursuing partnerships with the State Highway Administration, developers, and other stakeholders to implement these improvements and increase safety in the corridor.

COORDINATION WITH OTHER PLANS

This plan lays out the framework for future pedestrian network improvements and establishes structured projects and priority connections to advance those improvements in attainable, impactful projects. However, this plan does not require that its proposed improvements be implemented as standalone projects, and it recognizes that improvements proposed by *WalkHoward*—even those contained within Structured Projects—may also be completed through bus stop improvement, *BikeHoward*, developer, or County capital roadway projects.

In addition, the County will make annual funding decisions for pedestrian projects based on the Complete Streets Policy's prioritization process, including use of the Vulnerable Population Index.[52] The prioritization process will be developed during 2020 and will require quantitatively prioritizing projects using the Complete Streets Policy's performance measures.[53]

FUNDING NEEDS

Table 11 contains planning-level estimates of approximate annual funding need and cumulative cost to complete the 43 structured projects in 5, 10, and 15 years, assuming a 3 percent per year increase in project costs. As developer and grant funding is identified, the County can use this plan to advance the most important and/or the most opportunistic projects on an annual basis. In addition, the table provides for a 10% annual allocation of funding to assess the feasibility of the priority connections.

Table 11 - Funding Scenarios

		Cumulative Total	Annual Funding Need
5-Year Scenario	Structured Projects	$11,600,000	$2,320,000
	10% to Study Priority Connections	$1,300,000	$260,000
	Total	**$12,900,000**	**$2,580,000**
10-Year Scenario	Structured Projects	$12,500,000	$1,250,000
	10% to Study Priority Connections	$1,400,000	$140,000
	Total	**$13,900,000**	**$1,390,000**
15-Year Scenario	Structured Projects	$13,600,000	$905,000
	10% to Study Priority Connections	$1,500,000	$100,000
	Total	**$15,100,000**	**$1,005,000**

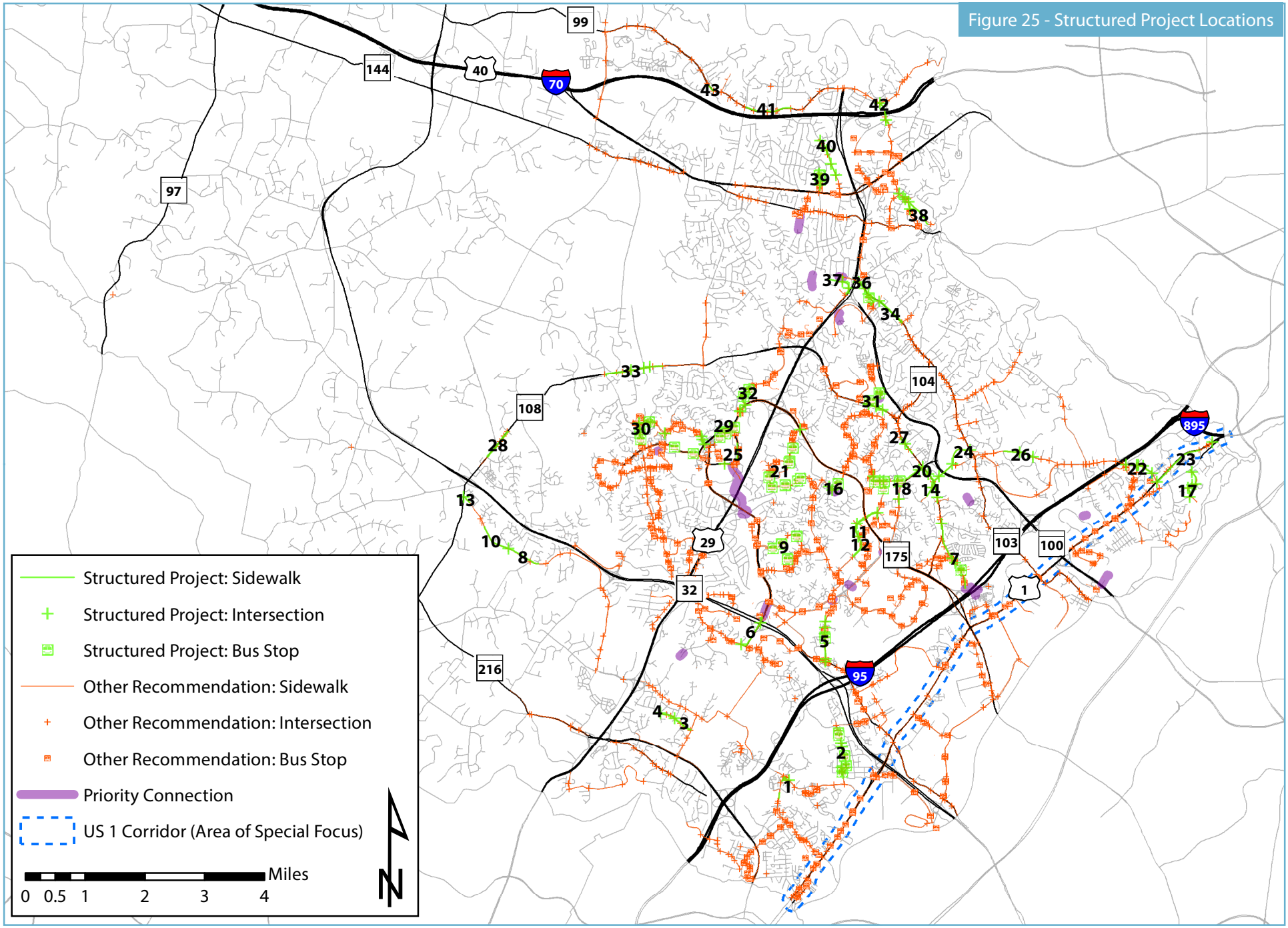
While the exact annual county funding level cannot be determined as part of the adoption of this master plan, the table above is meant to inform the Administration, Council and the general public of the level of commitment needed to implement the highest priority (top 15%) components of this plan in a timely manner.



52 The Vulnerable Poopulation Index used for the Complete Streets Policy is based on the Baltimore Metropolitan Council's *Vulnerable Population Index (VPI): Considering the Transportation Needs of Vulnerable Populations,* July 2018, https://www.baltometro.org/sites/default/files/bmc_documents/data%26maps/transportation/vpi/VPI-white-paper-2018_web.pdf

53 Howard County Council Resolution 120-2019, adopted October 7, 2019, apps.howardcountymd.gov/olis/LegislationDetail.aspx?LegislationID=12342. This resolution will help guide the establishment of funding priorities for transportation projects that have not already been included in the capital program.

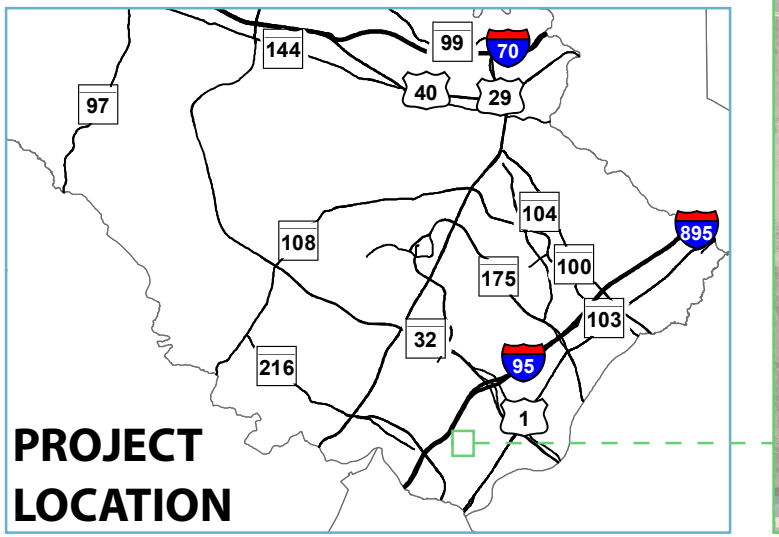
Figure 25 - Structured Project Locations



STRUCTURED PROJECT 1

Install sidewalks along Gorman Road and Stephens Road, and make associated intersection improvements. This project will be addressed by capital project J4202.

Bus Stop Improvements: $0
Intersection Improvements: $3,000
Sidewalk Improvements: $114,510
Total Cost: $117,510

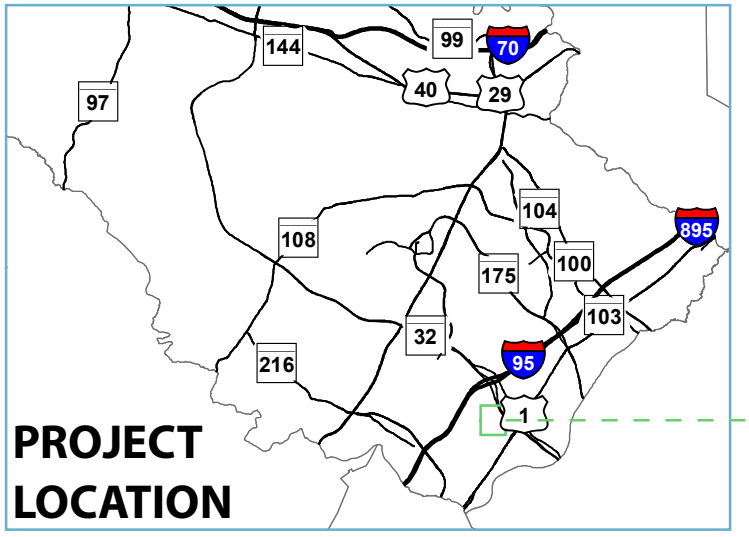




STRUCTURED PROJECT 2

Install sidewalks on the west side of Savage Guilford Road from Baltimore Street to Jefferson Street and make associated bus stop and intersection improvements.

Bus Stop Improvements: $80,200
Intersection Improvements: $52,000
Sidewalk Improvements: $157,997
Total Cost: $290,197

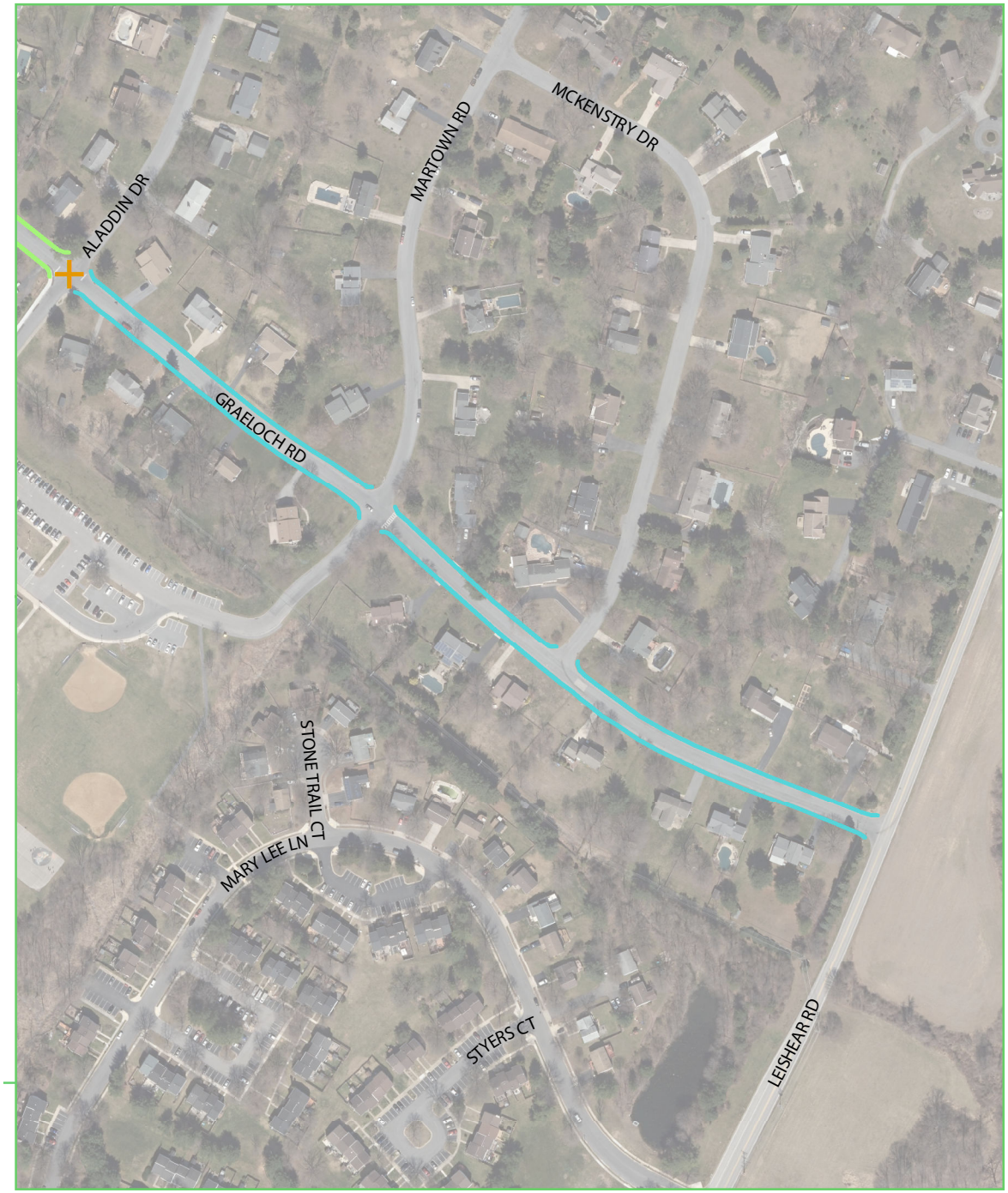




STRUCTURED PROJECT 3

Install sidewalks on both sides of Graeloch Road from Leishear Road to Aladdin Drive and make associated intersection improvements.

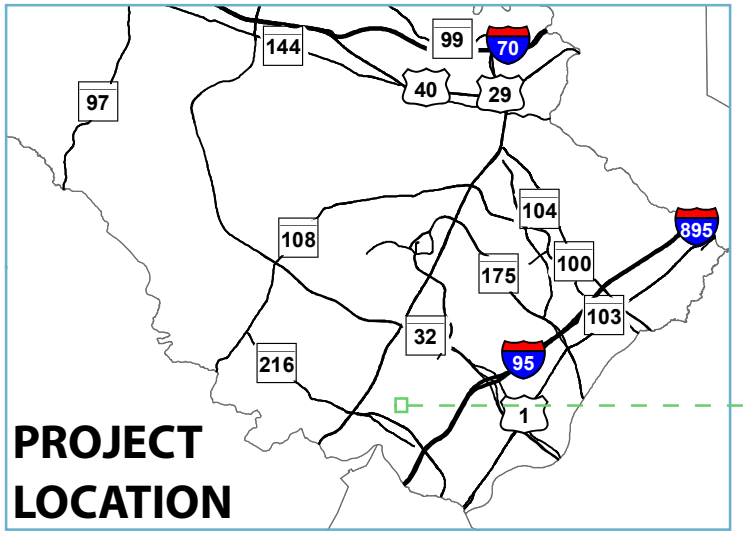
Bus Stop Improvements: $0
Intersection Improvements: $3,000
Sidewalk Improvements: $280,239
Total Cost: $283,239



Structured Project 3
Structured Project 4
Intersection Improvement

N

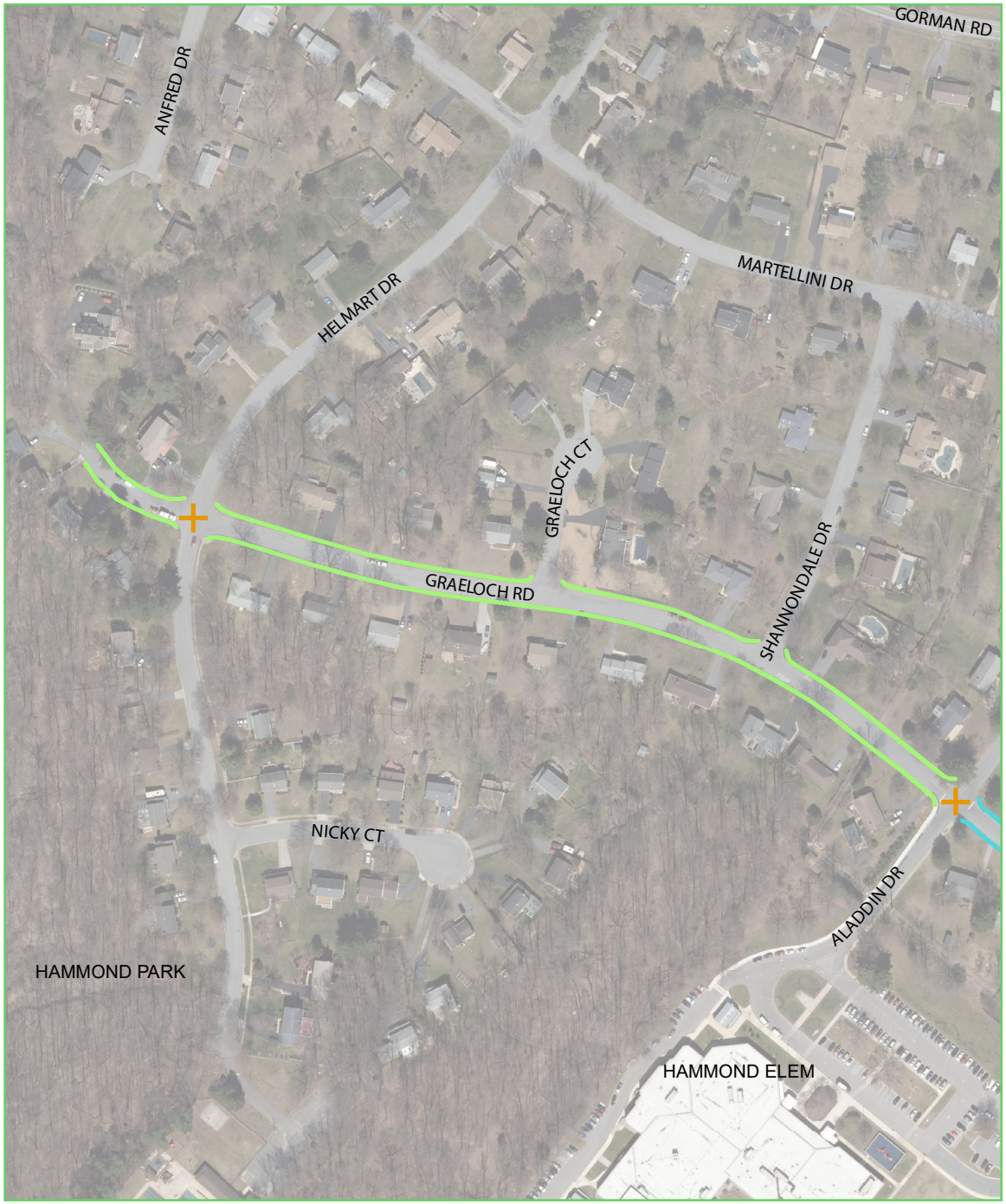
0 0.045 0.09 0.135 0.18 MILES



STRUCTURED PROJECT 4

Install sidewalks on both sides of Graeloch Road from Aladdin Drive to its west end past Helmart Drive and make associated intersection improvements.

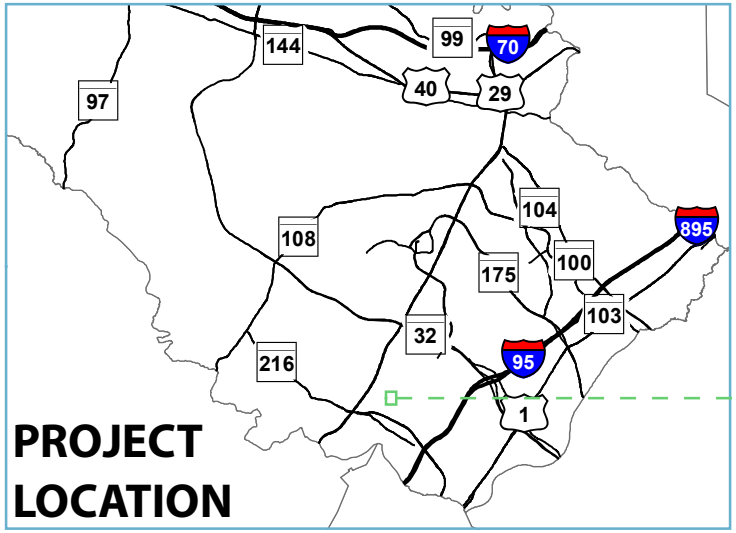
Bus Stop Improvements: $0
Intersection Improvements: $6,000
Sidewalk Improvements: $251,108
Total Cost: $257,108



Structured Project 3
Structured Project 4
Intersection Improvement

N

MILES
0 0.04 0.08 0.12 0.16



STRUCTURED PROJECT 5

Install sidewalks along Oakland Mills Road from Procopio Circle to Guilford Road and make associated intersection and bus stop improvements. This project will be addressed by capital project J4207.

Bus Stop Improvements: $8,600
Intersection Improvements: $91,750
Sidewalk Improvements: $249,895
Total Cost: $350,245



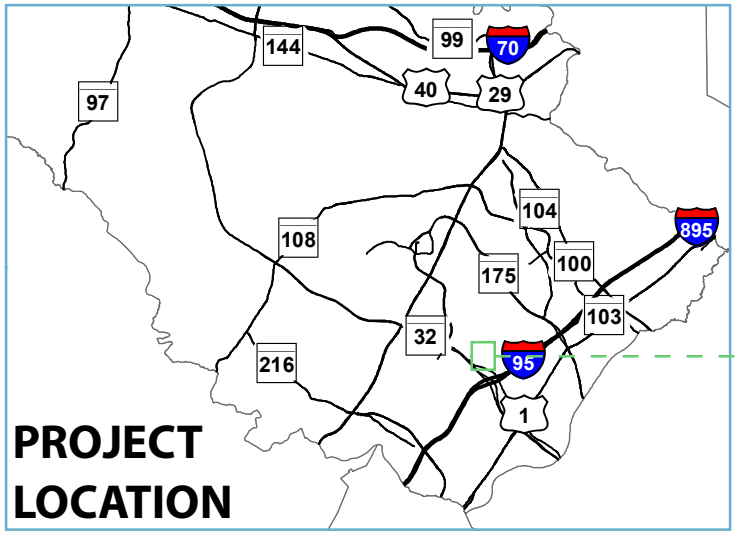
Structured Project 5

Intersection Improvement

Bus Stop Improvement

N

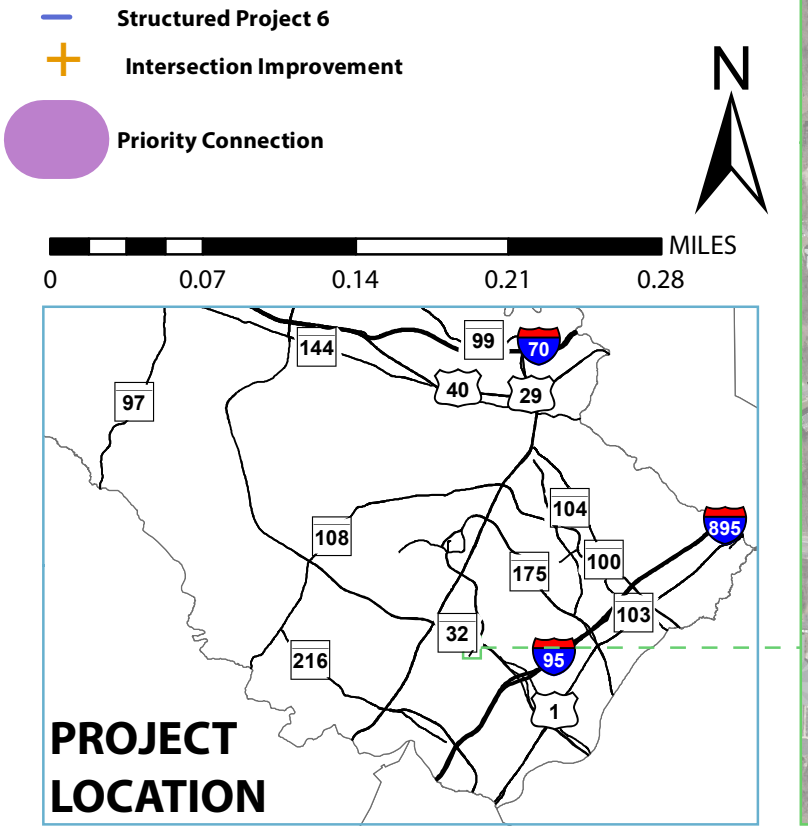
0 0.09 0.18 0.27 0.36 MILES

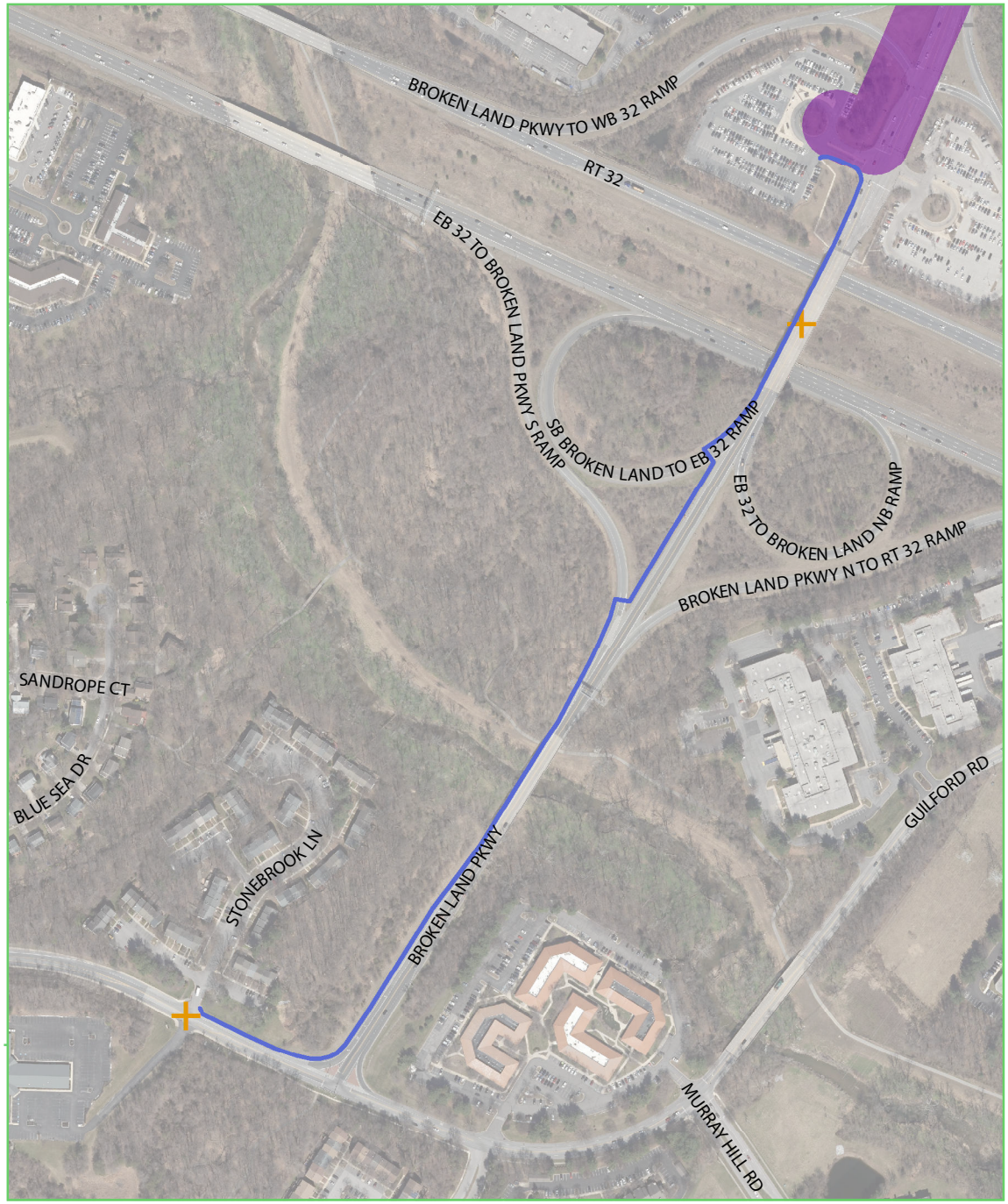


STRUCTURED PROJECT 6

Install sidewalks on the west side of Broken Land Parkway from Guilford Road to the Broken Land park & ride lots.

Bus Stop Improvements: $0
Intersection Improvements: $16,500
Sidewalk Improvements: $278,645
Total Cost: $295,145

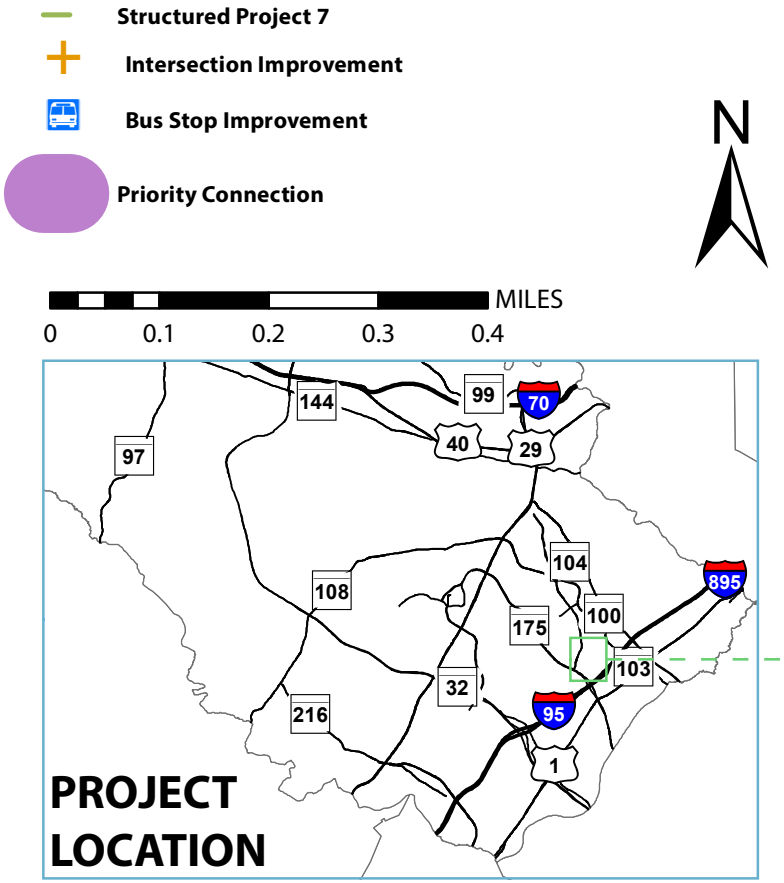




STRUCTURED PROJECT 7

Install sidewalks on the east side of Waterloo Road and Old Waterloo Road from Mayfield Avenue to Waterloo Park and make associated intersection and bus stop improvements.

Bus Stop Improvements: $11,300
Intersection Improvements: $12,250
Sidewalk Improvements: $334,753
Total Cost: $358,303





STRUCTURED PROJECT 8

Install sidewalks along the north side of Guilford Road between Berry Wood Court and Great Star Drive and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $3,000
Sidewalk Improvements: $261,077
Total Cost: $264,077



Structured Project 8

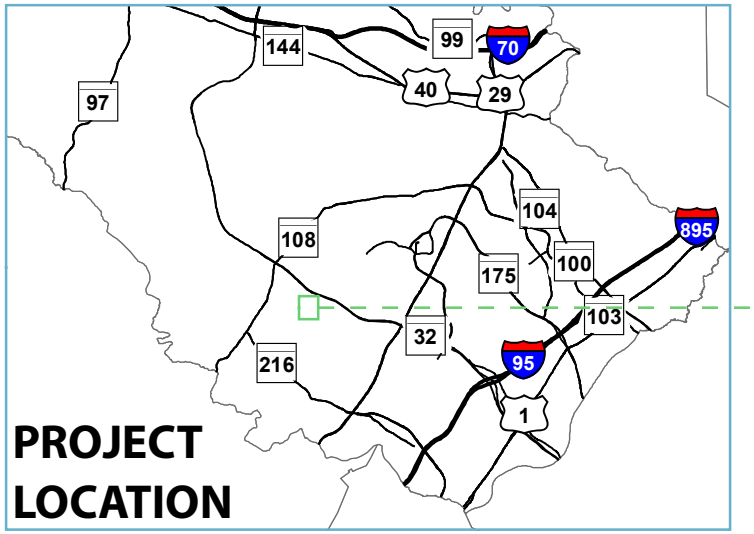
Structured Project 10

Intersection Improvement

N

MILES

0 0.075 0.15 0.225 0.3



STRUCTURED PROJECT 9

Make improvements to 8 bus stops in the Cradlerock area.

Bus Stop Improvements: $10,400
Intersection Improvements: $0
Sidewalk Improvements: $0
Total Cost: $10,400

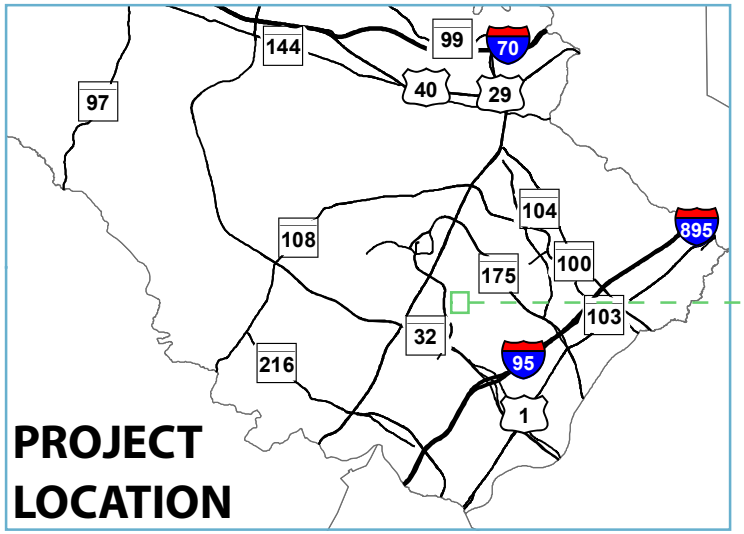


Bus Stop Improvement

N

MILES

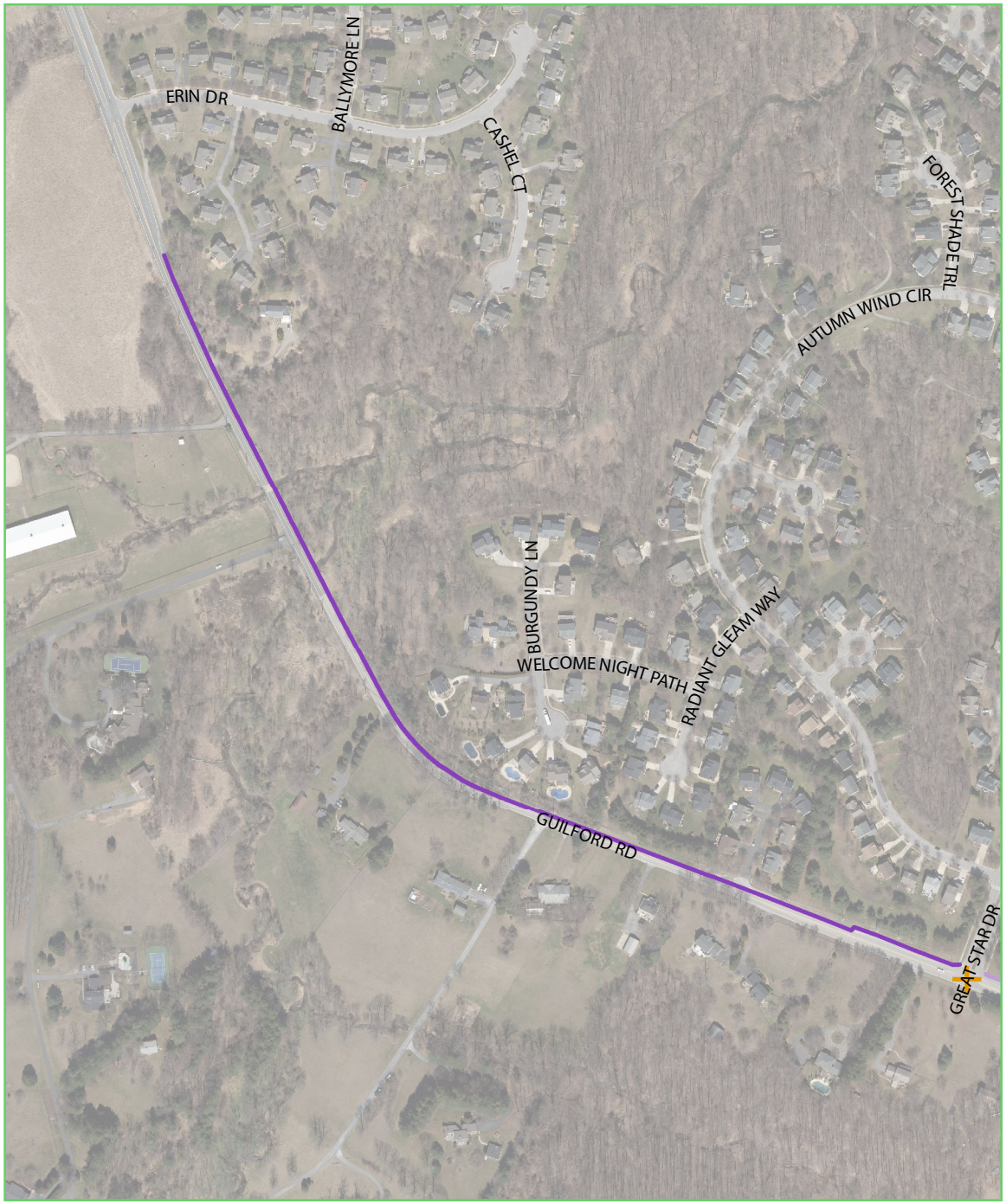
0 0.065 0.13 0.195 0.26



STRUCTURED PROJECT 10

Install sidewalks on the north side of Guilford Road from Great Star Drive to Erin Drive.

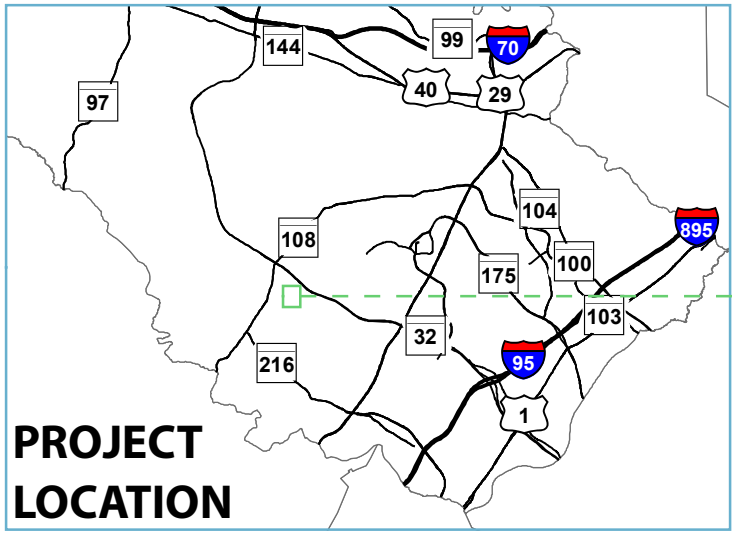
Bus Stop Improvements: $0
Intersection Improvements: $3,000
Sidewalk Improvements: $245,893
Total Cost: $248,893



Structured Project 8
Structured Project 10
Intersection Improvement

N

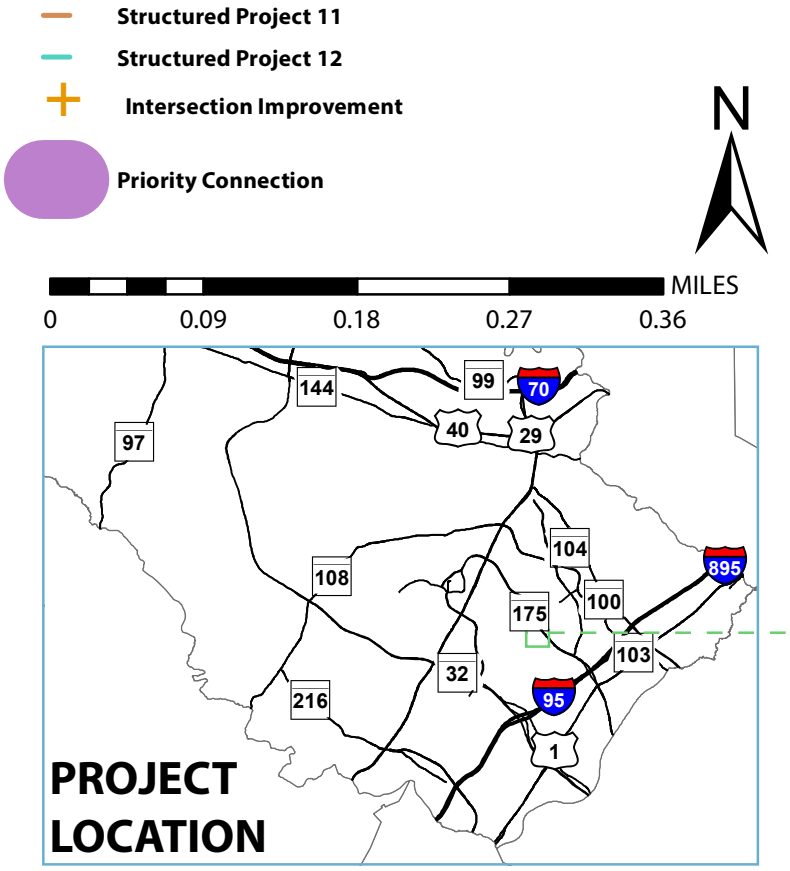
MILES
0 0.065 0.13 0.195 0.26

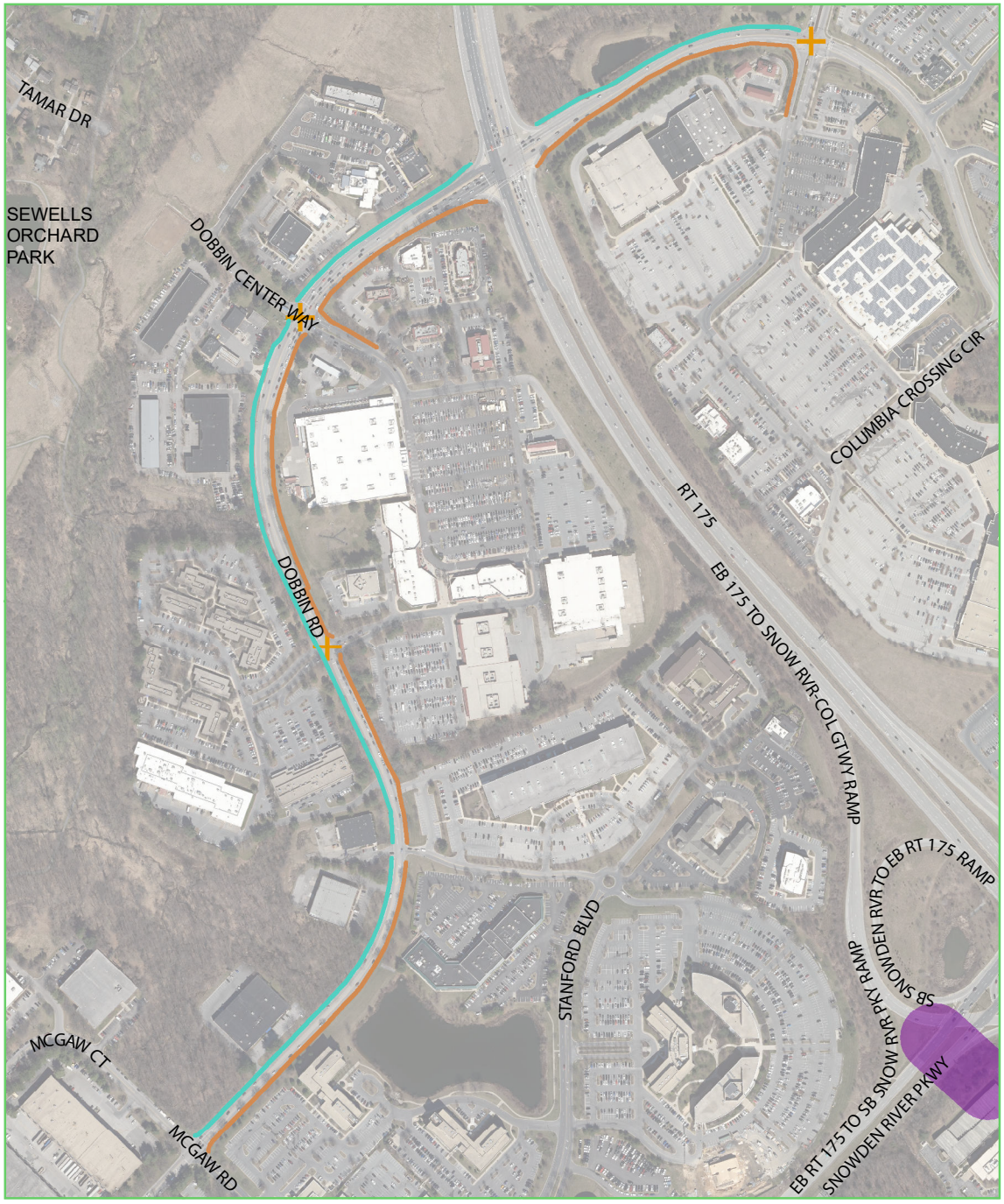


STRUCTURED PROJECT 11

Install sidewalks on the east side of Dobbin Road from Columbia Crossing Circle to McGaw Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $95,500
Sidewalk Improvements: $437,498
Total Cost: $532,998

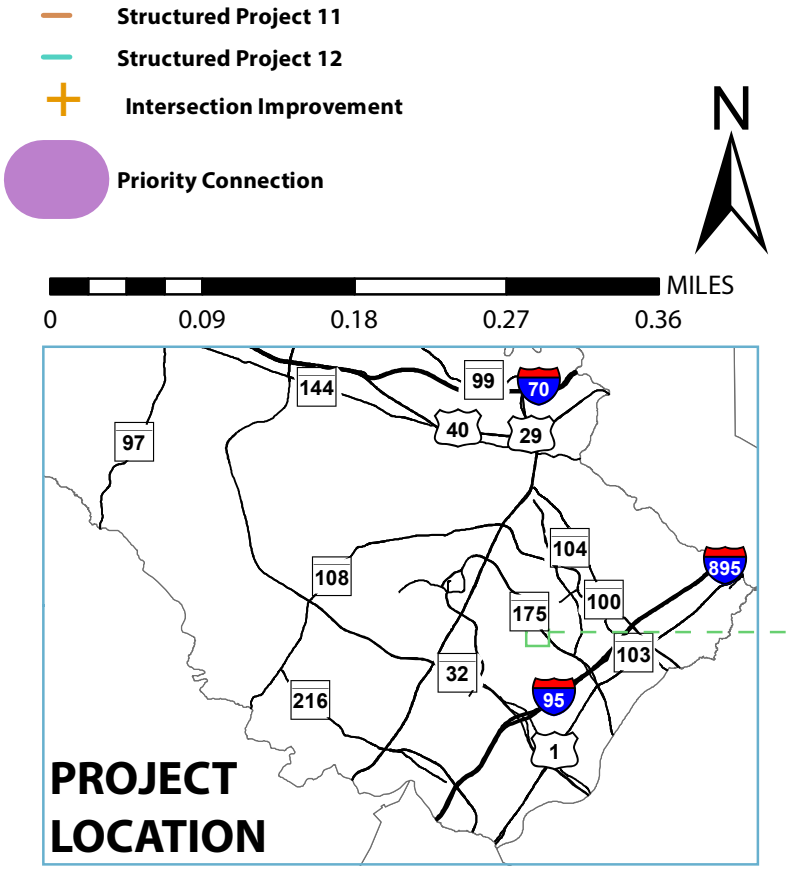


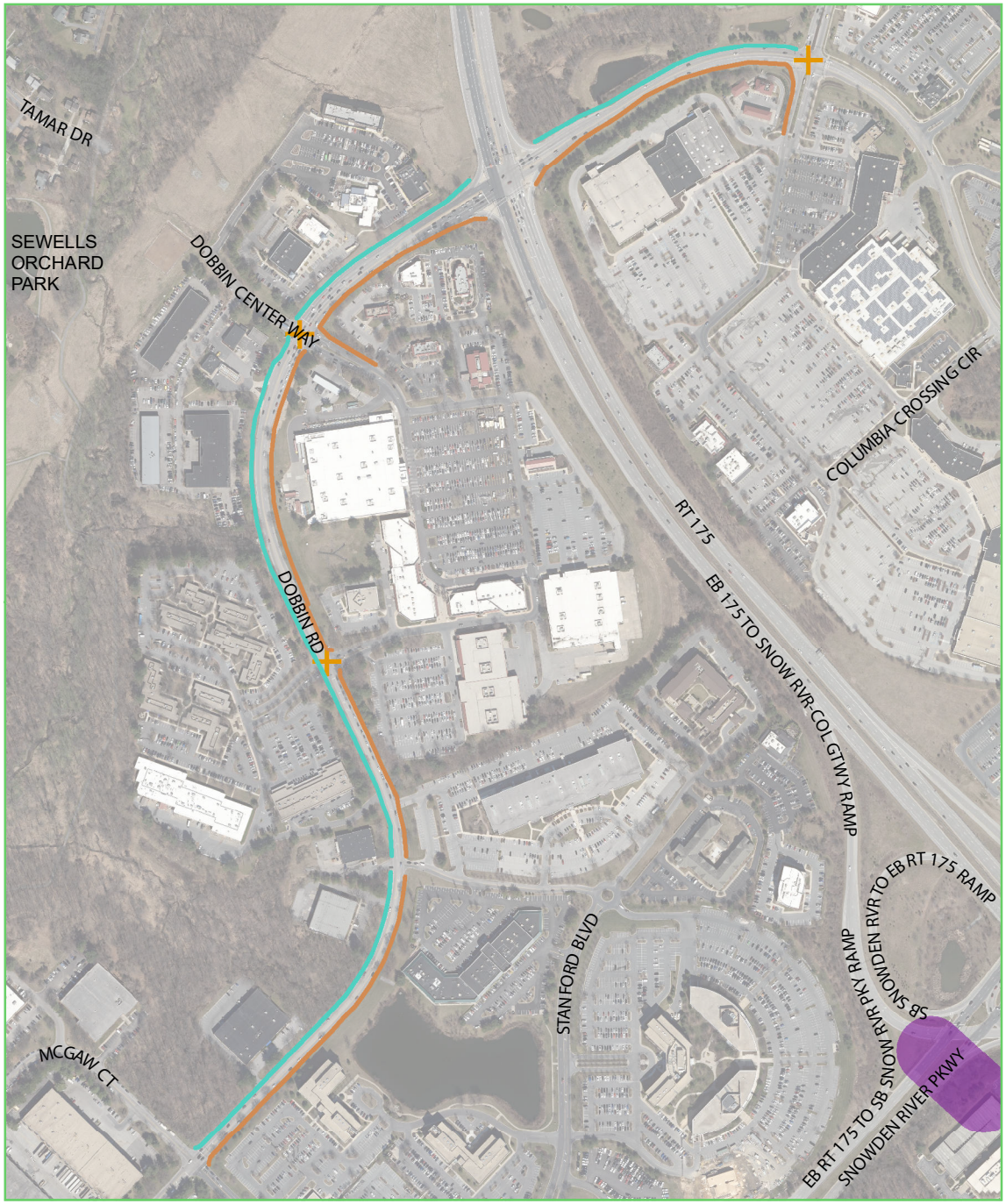


STRUCTURED PROJECT 12

Install sidewalks on the west side of Dobbin Road from Old Dobbin Road to McGaw Court and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $95,500
Sidewalk Improvements: $408,703
Total Cost: $504,203





STRUCTURED PROJECT 13

Install sidewalks on the north side of Guilford Road from Thompson Drive to Clarksville Pike and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $27,000
Sidewalk Improvements: $61,510
Total Cost: $88,510



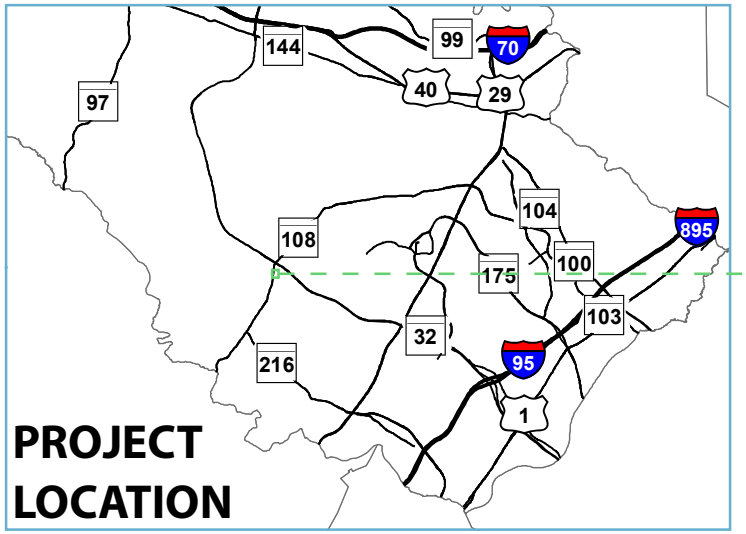
Structured Project 13

Intersection Improvement

N

MILES

0 0.025 0.05 0.075 0.1



STRUCTURED PROJECT 14

Install sidewalks on Old Montgomery Road west of Waterloo Road and make associated intersection improvements.

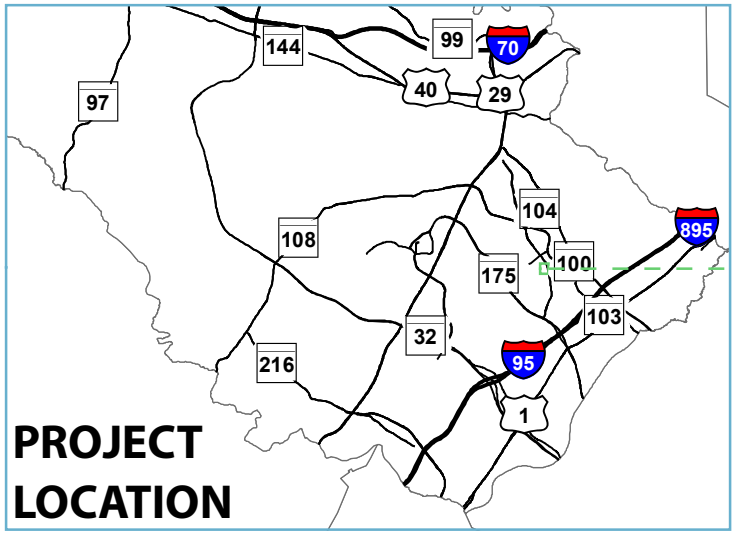
Bus Stop Improvements: $0
Intersection Improvements: $250
Sidewalk Improvements: $402,217
Total Cost: $402,467



- Structured Project 14
- Structured Project 15
- Structured Project 19
- Intersection Improvement

N

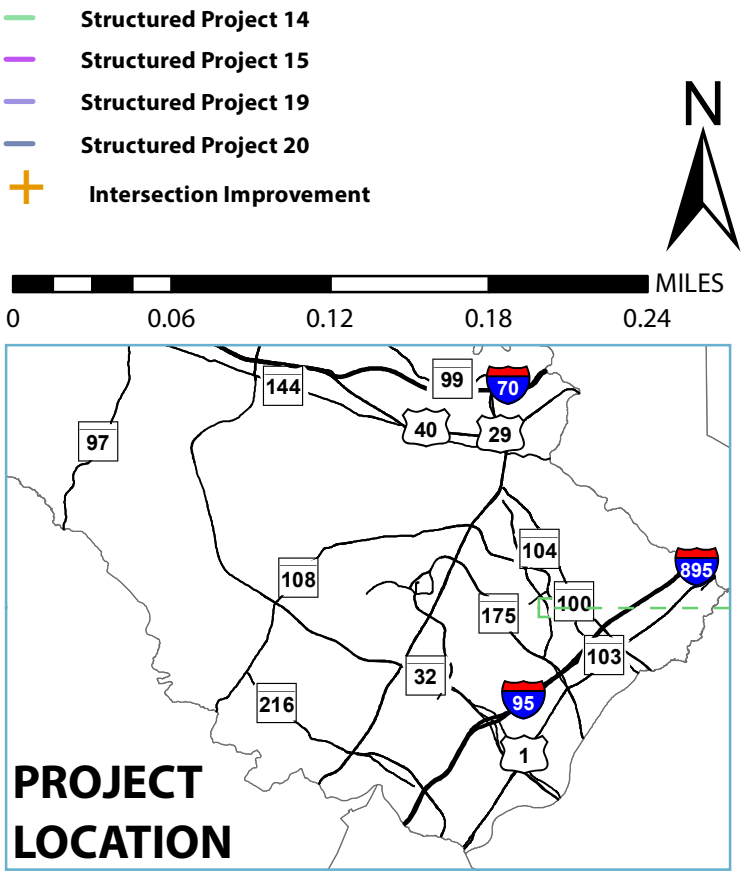
0 0.03 0.06 0.09 0.12 MILES

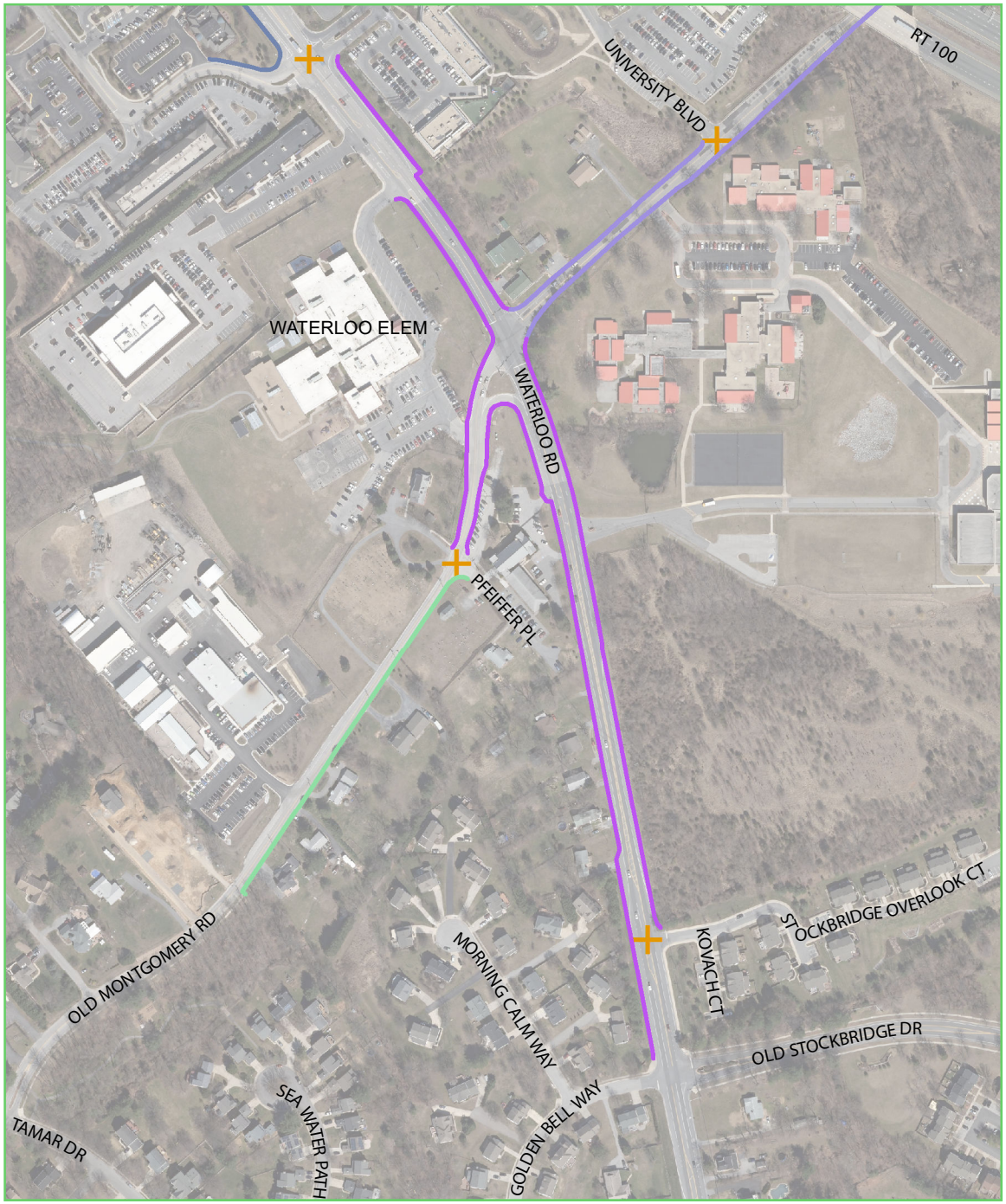


STRUCTURED PROJECT 15

Install sidewalks on Waterloo Road from Waterloo Elementary School to Old Stockbridge Drive and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $44,400
Sidewalk Improvements: $344,642
Total Cost: $389,042

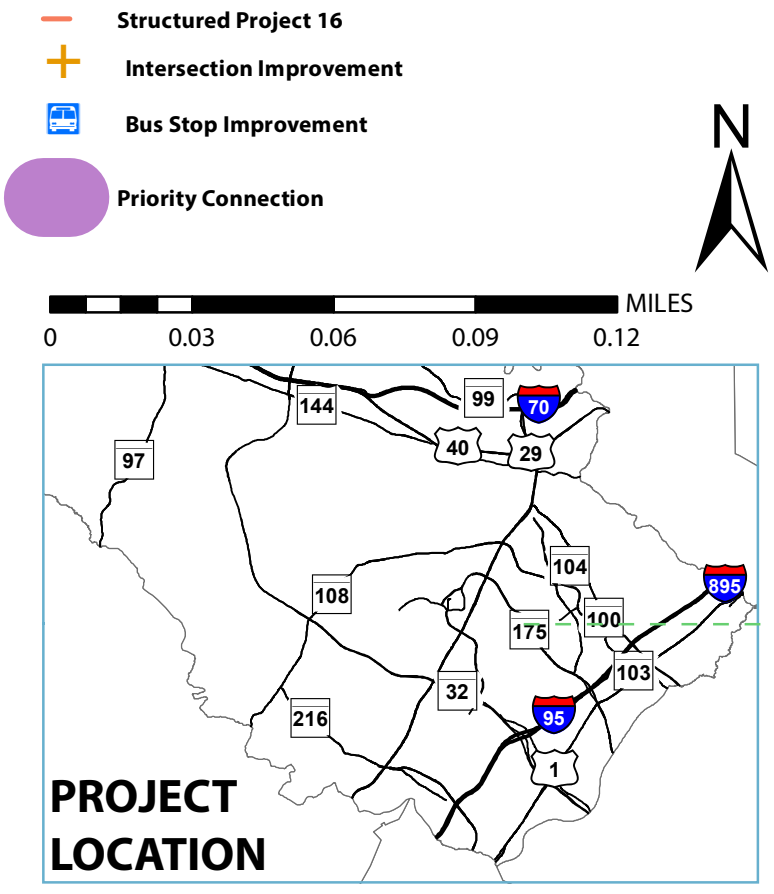


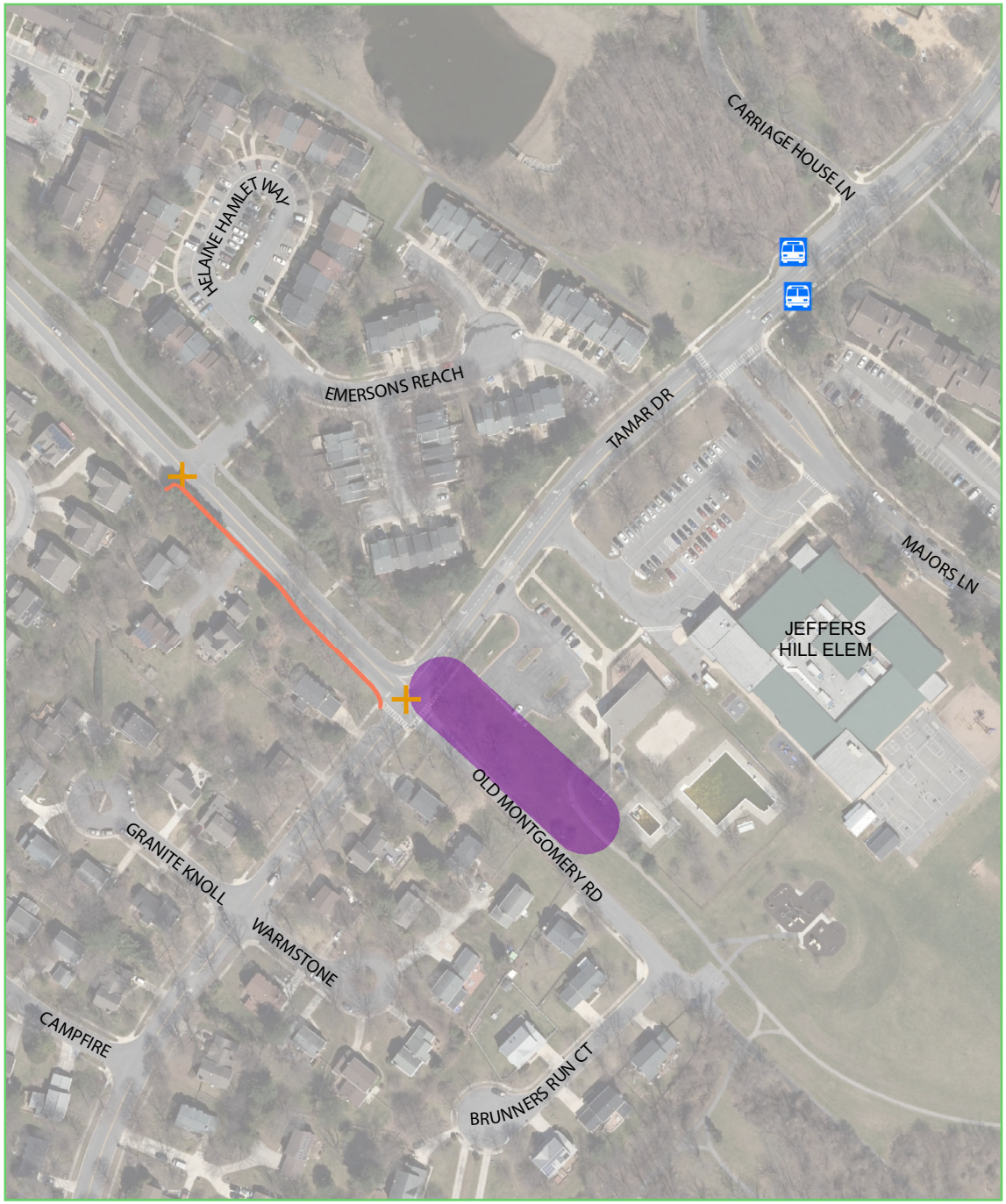


STRUCTURED PROJECT 16

Make a variety of sidewalk, intersection, and bus stop improvements in the vicinity of Jeffers Hill Elementary School.

Bus Stop Improvements: $8,600
Intersection Improvements: $44,500
Sidewalk Improvements: $32,243
Total Cost: $85,343

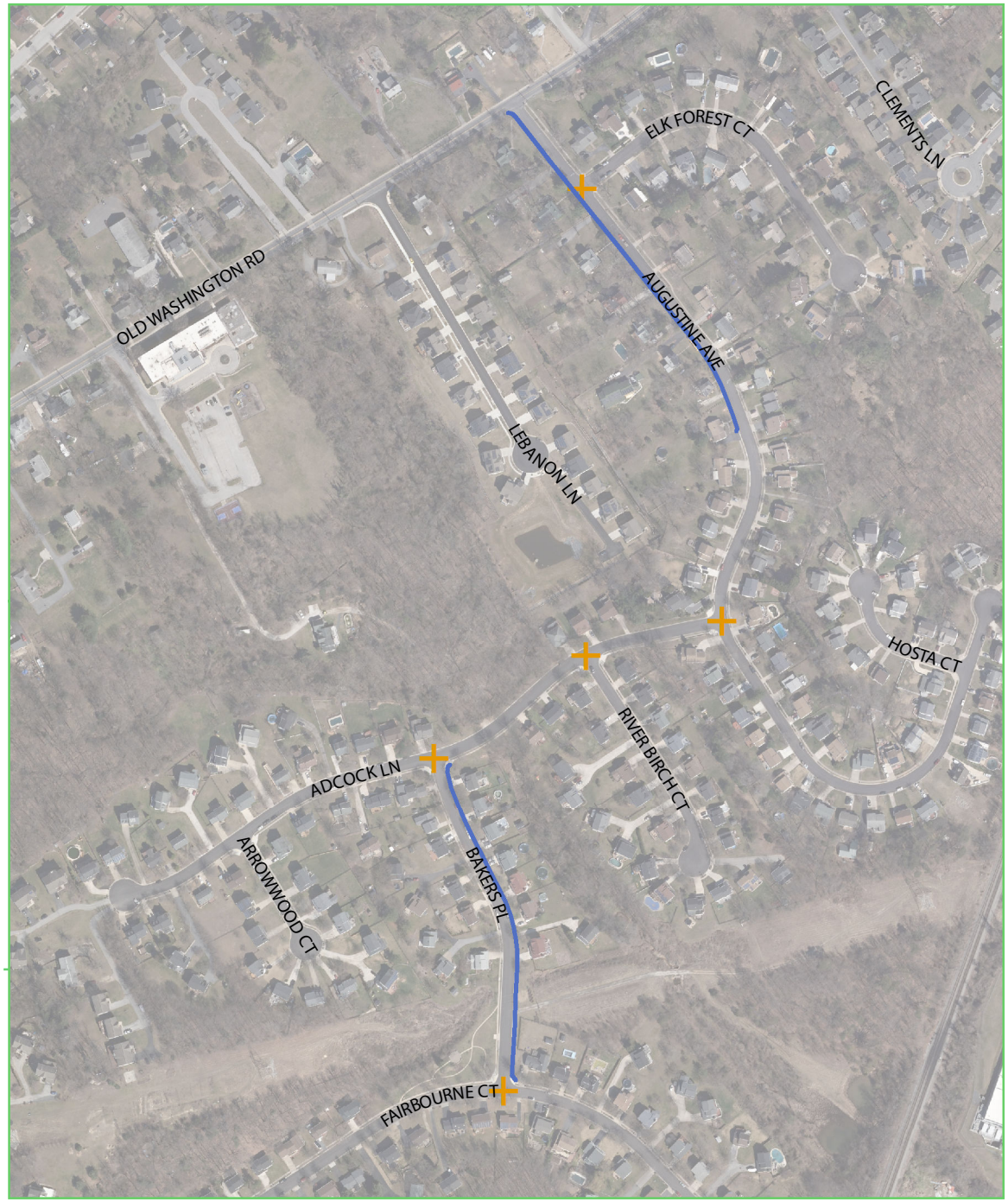




STRUCTURED PROJECT 17

Install sidewalks along Augustine Avenue and Bakers Place and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $15,000
Sidewalk Improvements: $148,023
Total Cost: $163,023



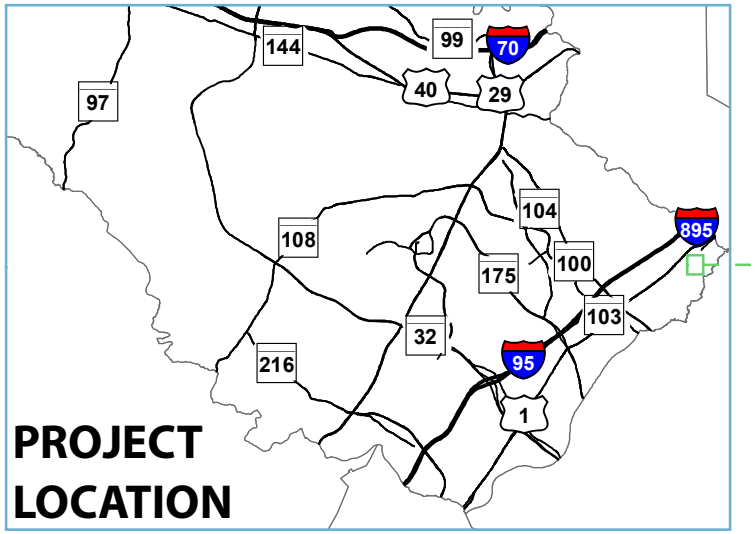
Structured Project 17

Intersection Improvement

N

MILES

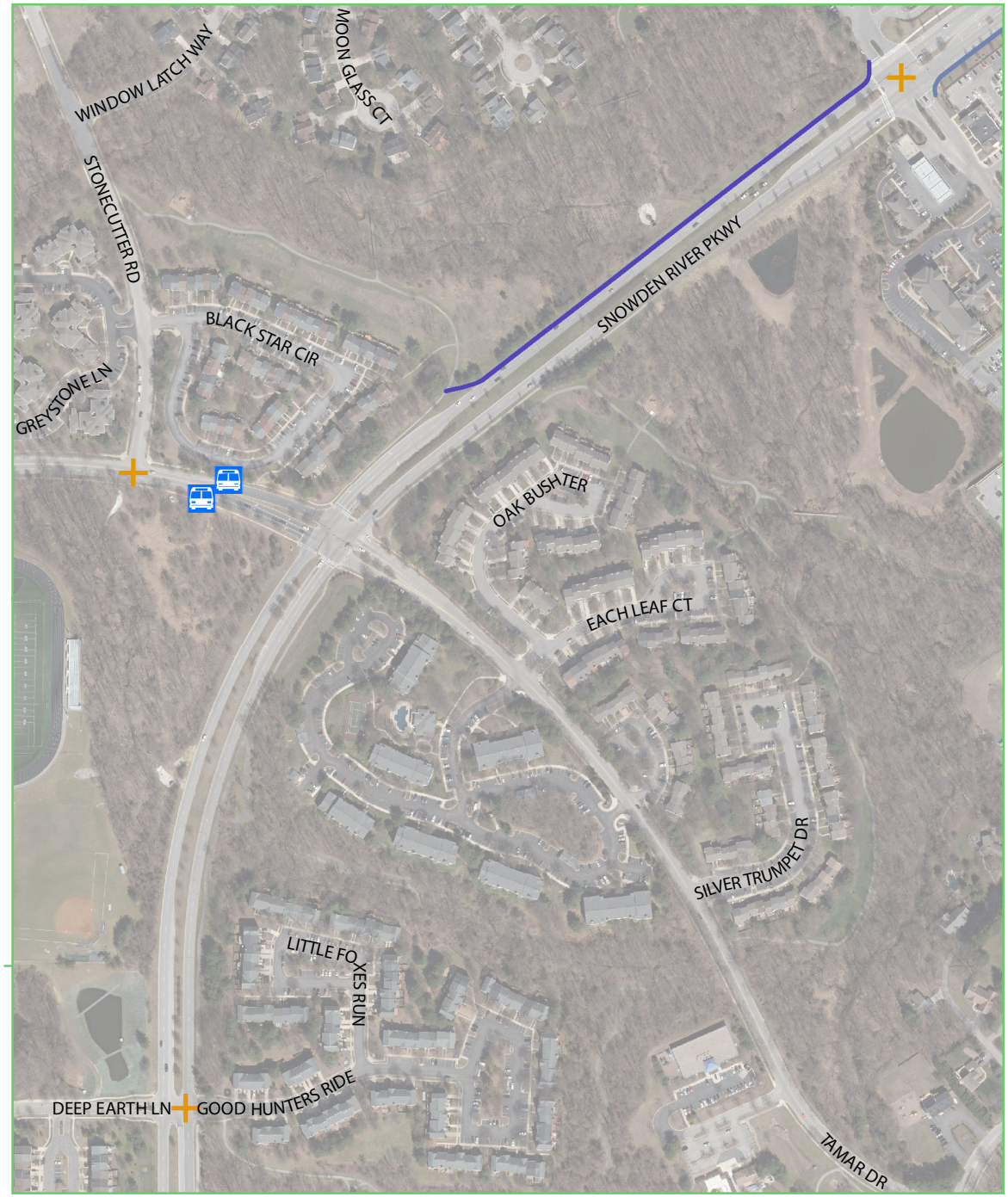
0 0.06 0.12 0.18 0.24



STRUCTURED PROJECT 18

Install sidewalks on the west side of Snowden River Parkway from an existing pathway north of Tamar Drive to Waterloo Road and make associated intersection and bus stop improvements.

Bus Stop Improvements: $17,150
Intersection Improvements: $93,100
Sidewalk Improvements: $111,827
Total Cost: $222,077



Structured Project 18

Structured Project 20

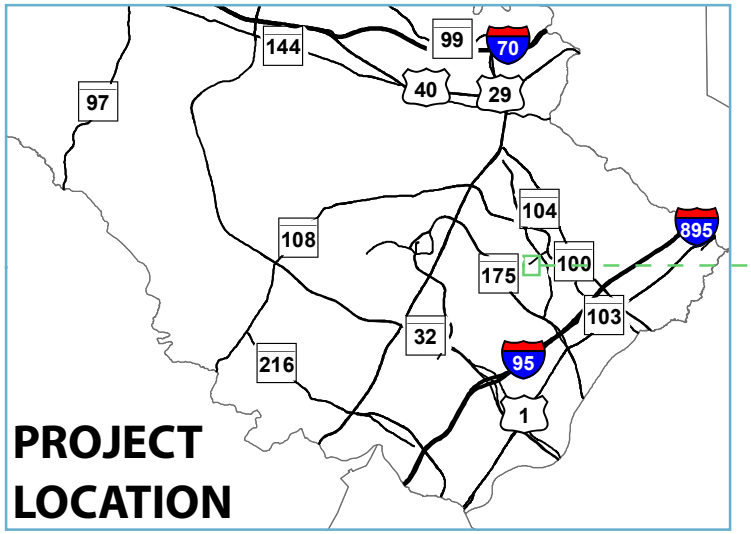
Intersection Improvement

Bus Stop Improvement

N

MILES

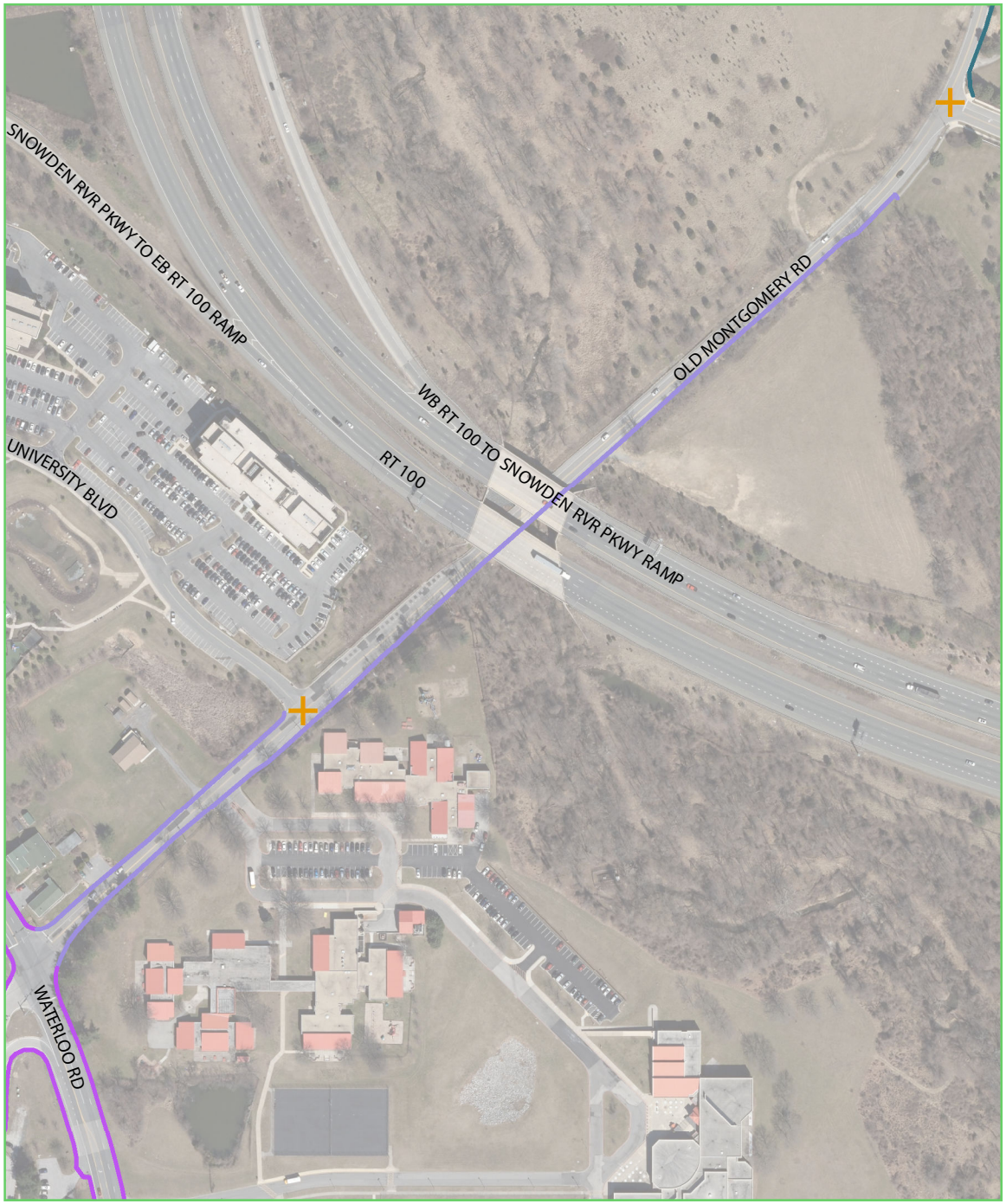
0 0.065 0.13 0.195 0.26



STRUCTURED PROJECT 19

Install sidewalks on Old Montgomery Road east of Waterloo Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $10,000
Sidewalk Improvements: $217,955
Total Cost: $227,955

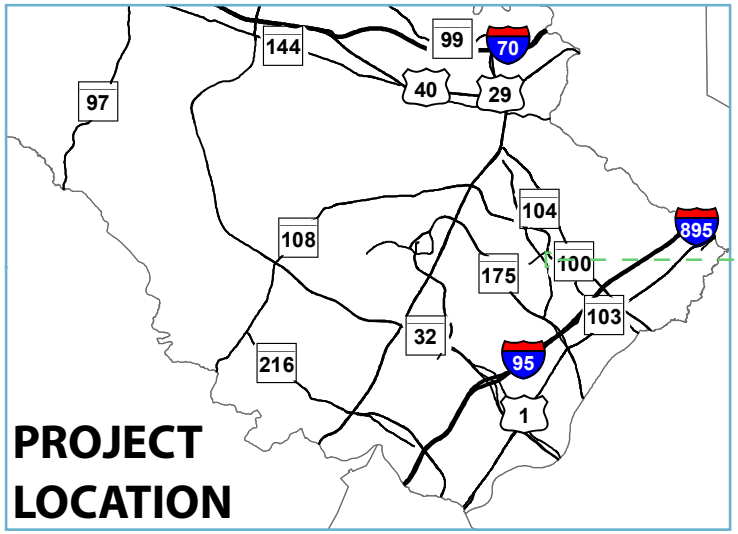


- Structured Project 15
- Structured Project 19
- Structured Project 24
- Intersection Improvement

N

MILES

0 0.045 0.09 0.135 0.18



STRUCTURED PROJECT 20

Install sidewalks at the intersection of Waterloo Road and Snowden River Parkway and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $185,200
Sidewalk Improvements: $100,190
Total Cost: $285,390



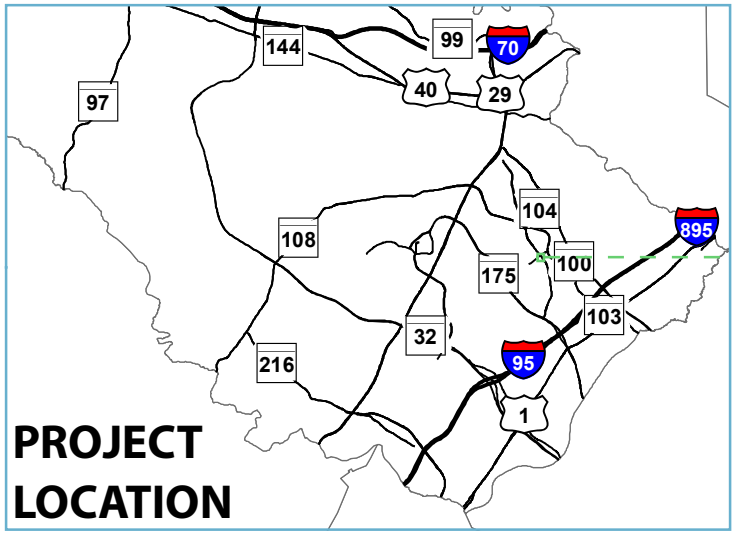
Structured Project 20

Intersection Improvement

N

MILES

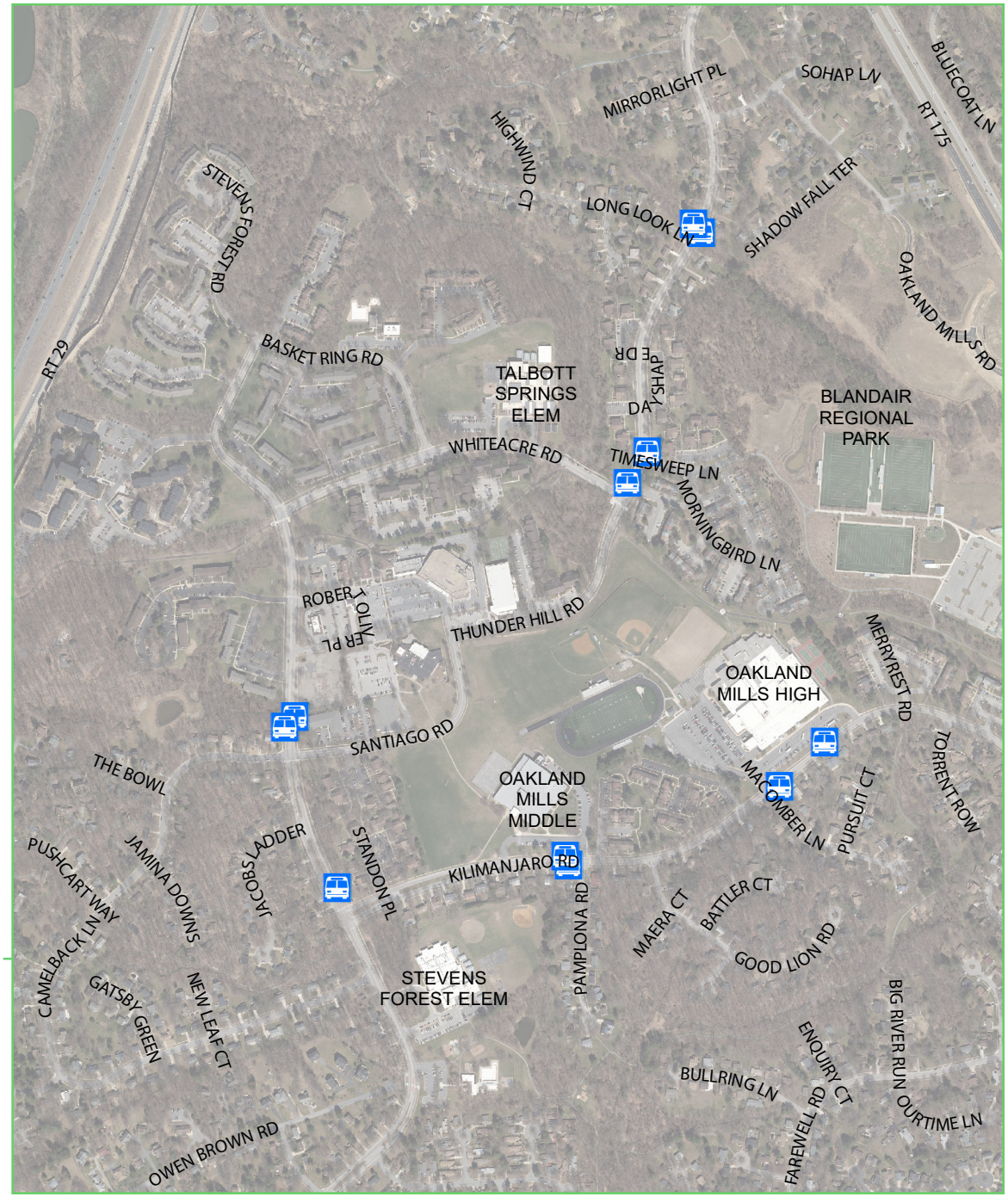
0 0.025 0.05 0.075 0.1



STRUCTURED PROJECT 21

Make improvements to 11 bus stops in Oakland Mills.

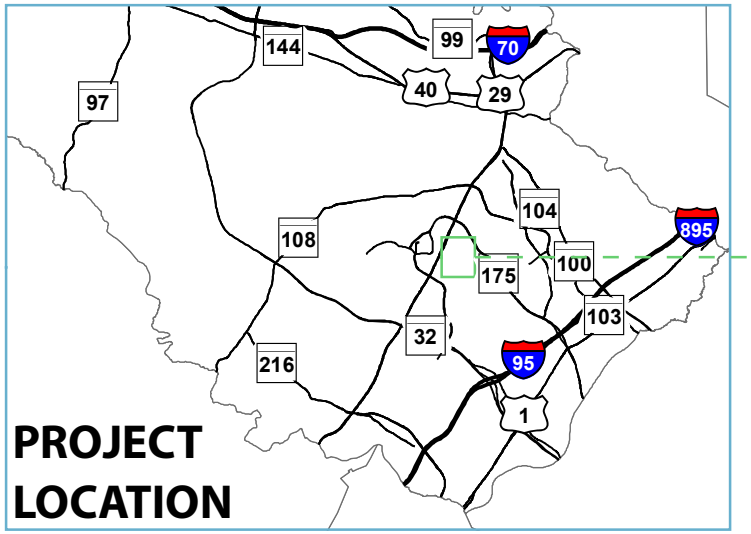
Bus Stop Improvements: $57,075
Intersection Improvements: $0
Sidewalk Improvements: $0
Total Cost: $57,075



N

Bus Stop Improvement

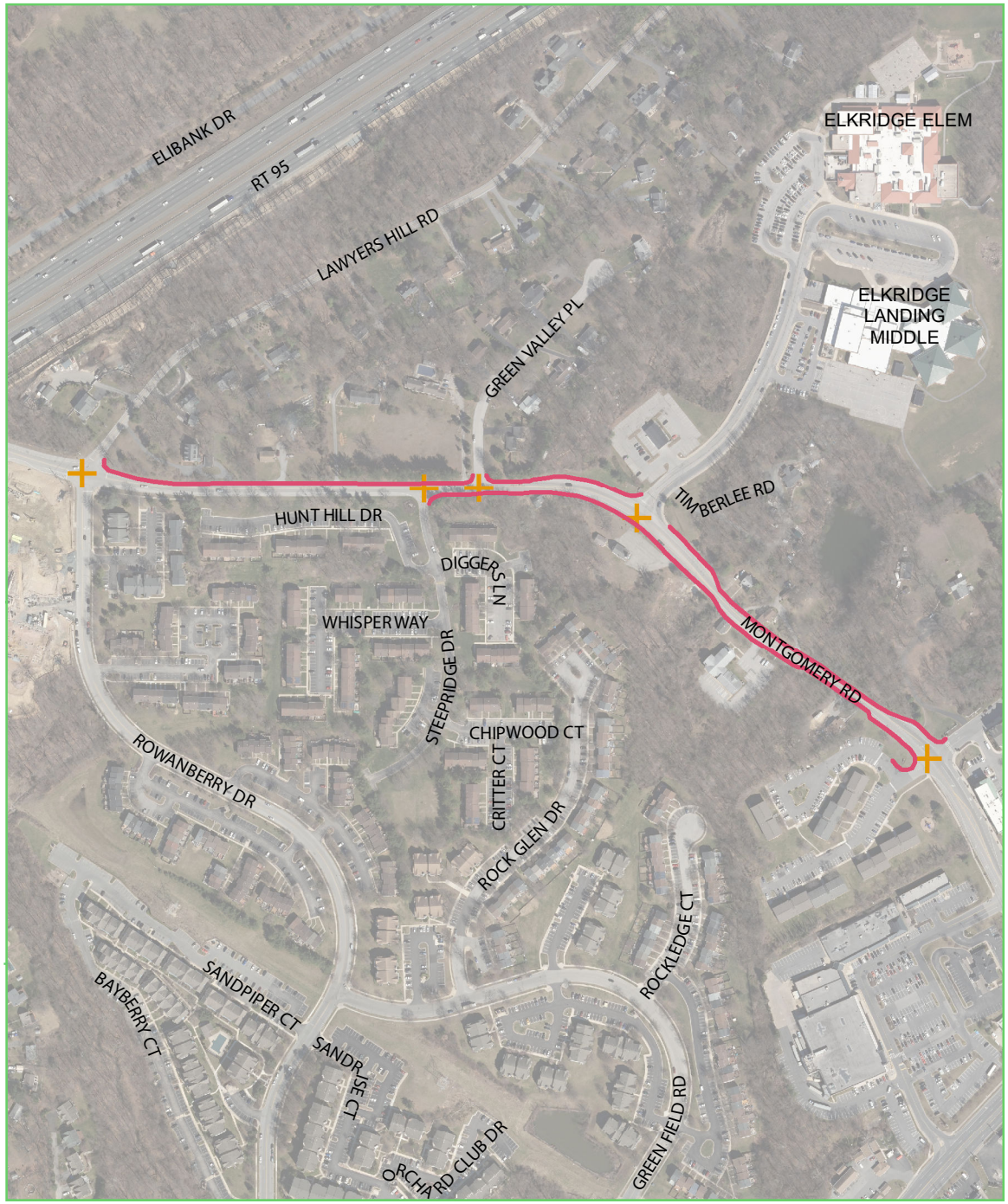
MILES
0 0.1 0.2 0.3 0.4



STRUCTURED PROJECT 22

Install sidewalks along Montgomery Road between Elkridge Crossing Way and Lawyers Hill Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $51,500
Sidewalk Improvements: $332,005
Total Cost: $383,505



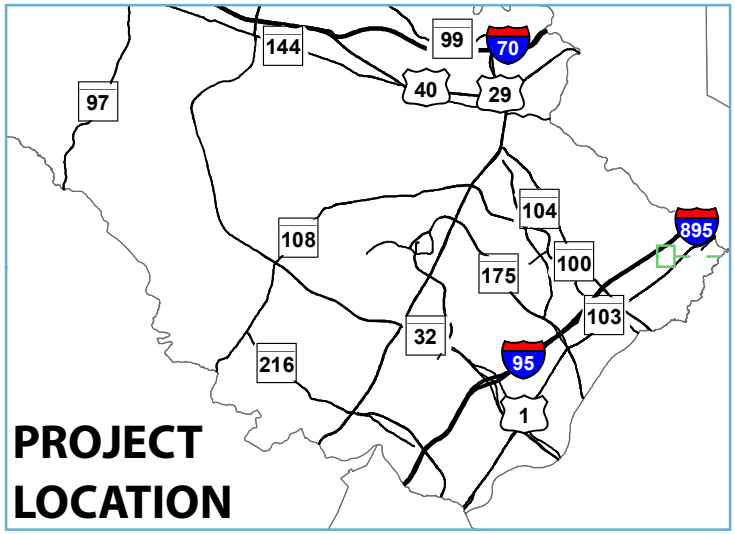
Structured Project 22

Intersection Improvement

N

MILES

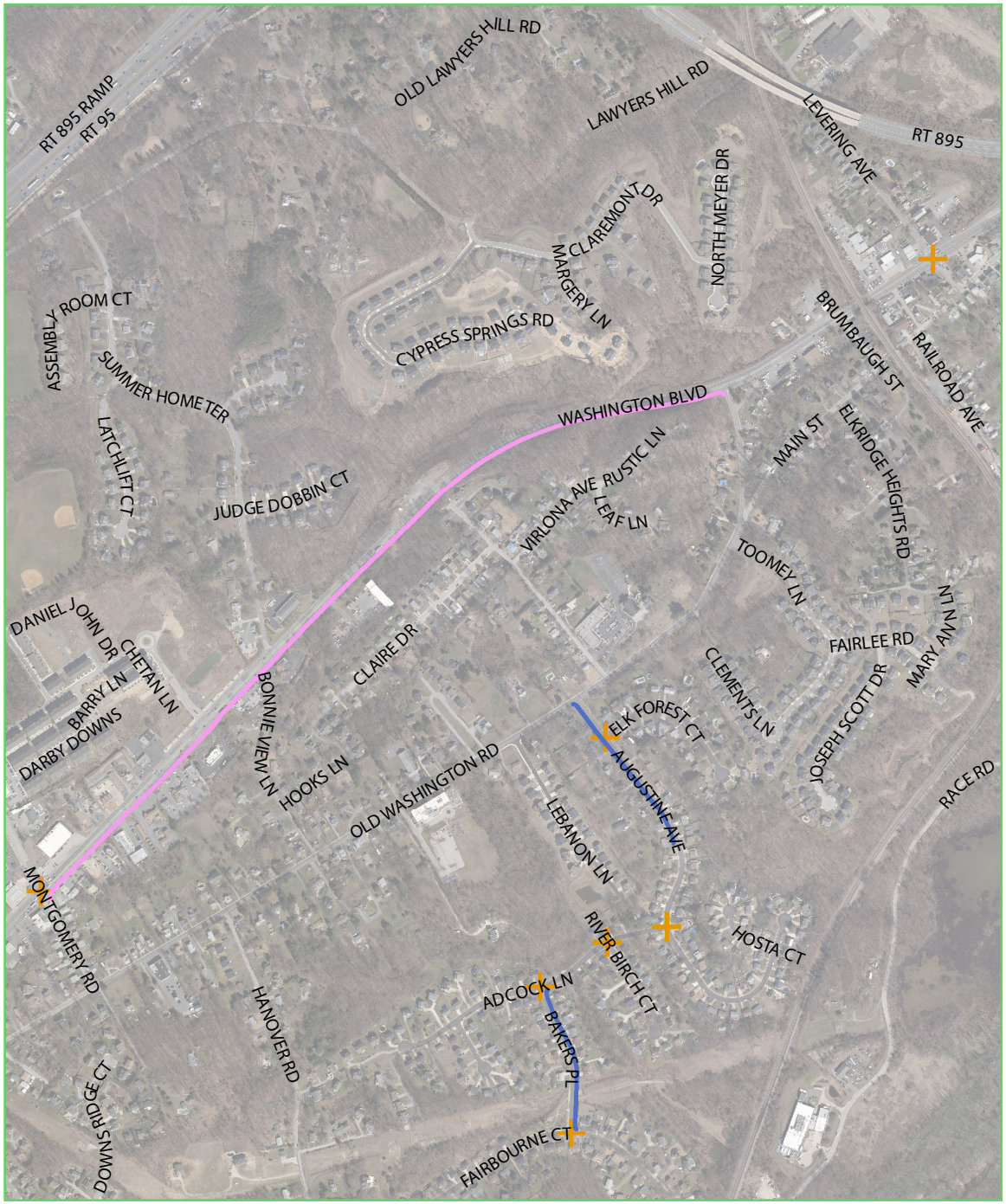
0 0.07 0.14 0.21 0.28



STRUCTURED PROJECT 23

Install sidewalks on the east side of Washington Boulevard from Montgomery Road to Old Washington Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $23,300
Sidewalk Improvements: $389,218
Total Cost: $412,518



Structured Project 17

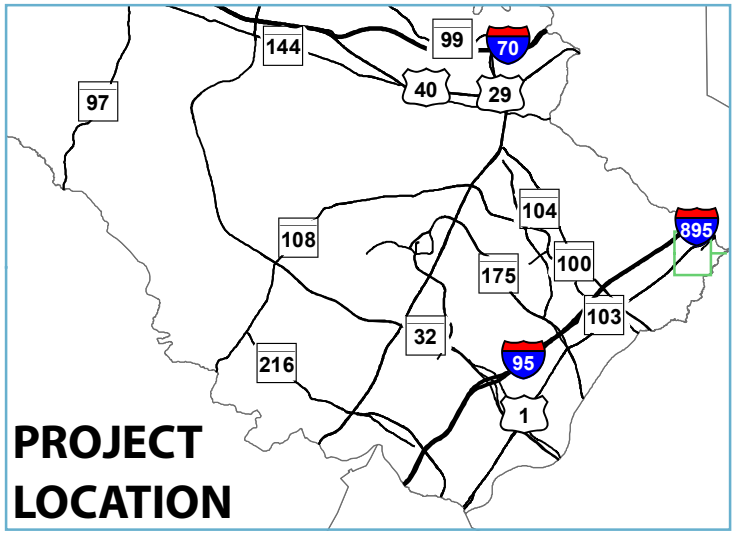
Structured Project 23

Intersection Improvement

N

MILES

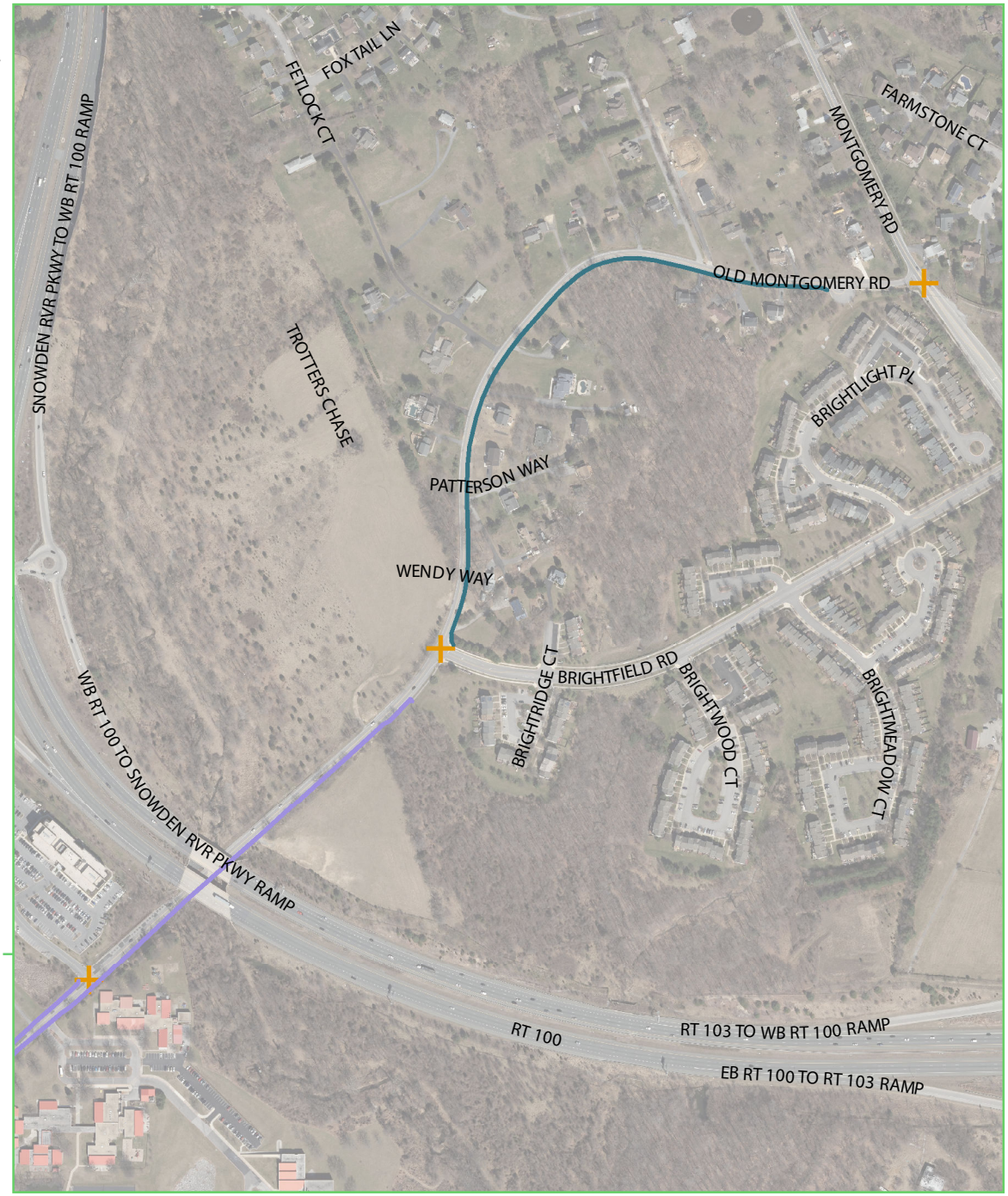
0 0.1 0.2 0.3 0.4



STRUCTURED PROJECT 24

Install sidewalks along Old Montgomery Road from Montgomery Road to Brightfield Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $17,100
Sidewalk Improvements: $167,276
Total Cost: $184,376



Structured Project 19

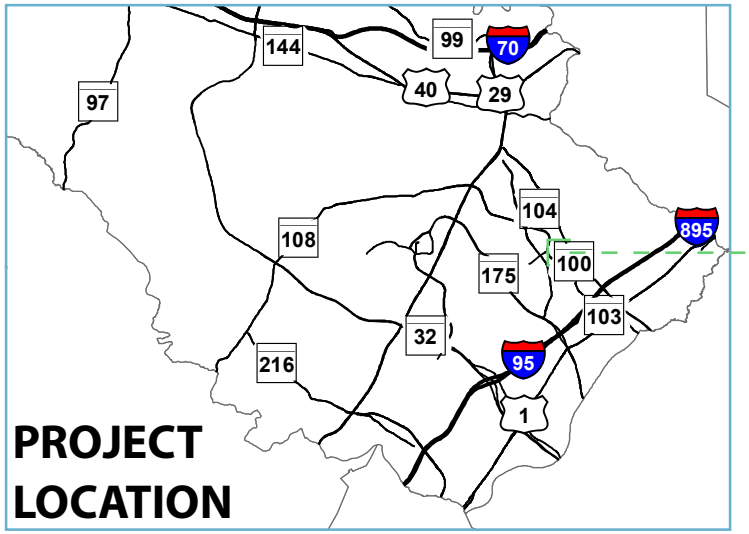
Structured Project 24

Intersection Improvement

N

MILES

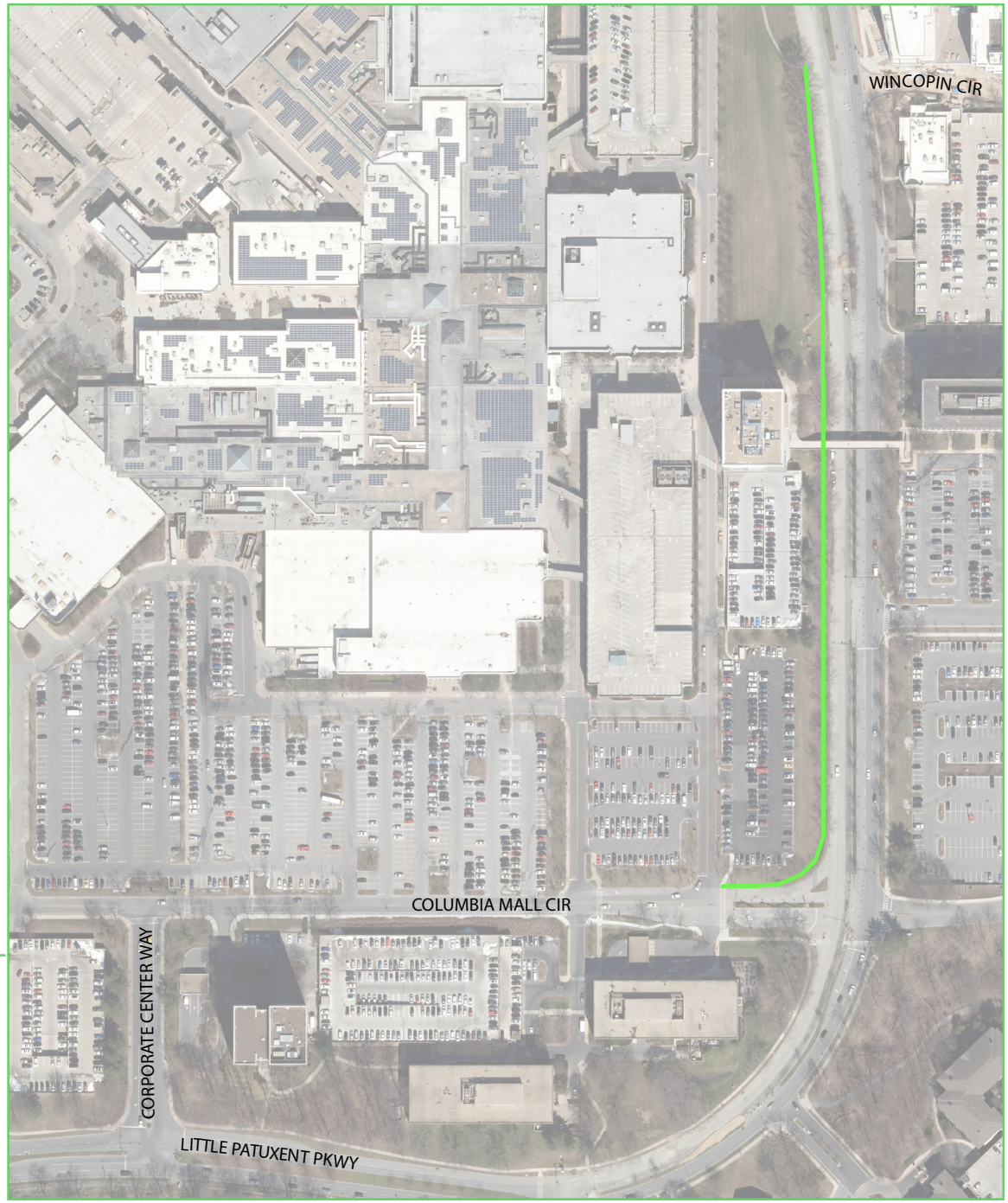
0 0.085 0.17 0.255 0.34



STRUCTURED PROJECT 25

Install sidewalks on the west side of Little Patuxent Parkway from the end of existing sidewalk opposite Wincopin Circle to the Mall entrance.

Bus Stop Improvements: $0
Intersection Improvements: $33,950
Sidewalk Improvements: $120,655
Total Cost: $154,605

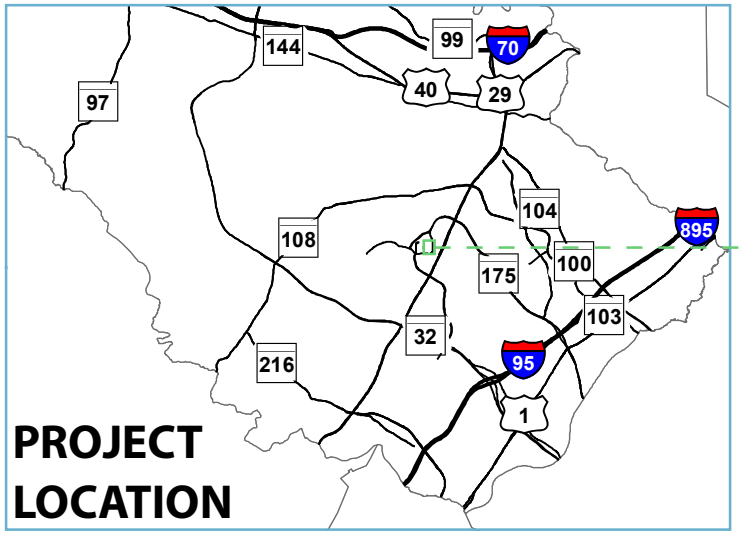


N

Structured Project 25

MILES

0 0.04 0.08 0.12 0.16



STRUCTURED PROJECT 26

Install sidewalks on the south side of Montgomery Road from Brandons Way to Marbuck Way and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $6,000
Sidewalk Improvements: $217,403
Total Cost: $223,403



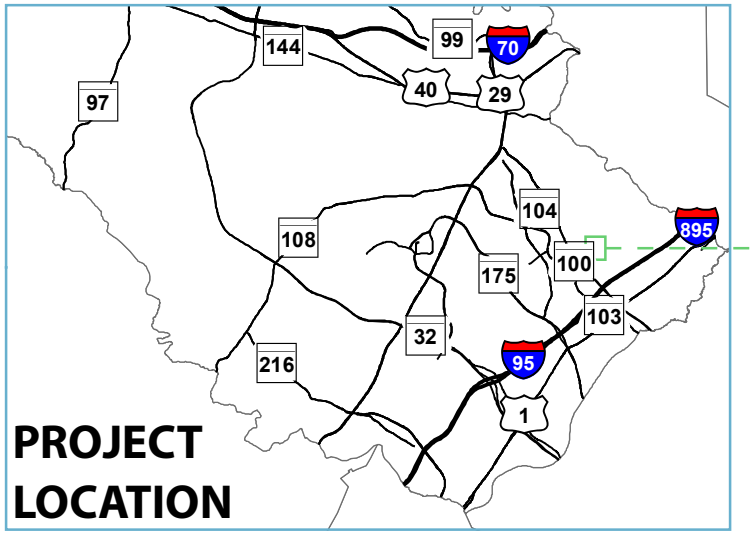
Structured Project 26

Intersection Improvement

N

MILES

0 0.075 0.15 0.225 0.3



STRUCTURED PROJECT 27

Install sidewalks on the west side of Waterloo Road from Brothers Partnership Court to Davis Road.

Bus Stop Improvements: $0
Intersection Improvements: $7,800
Sidewalk Improvements: $144,830
Total Cost: $152,630



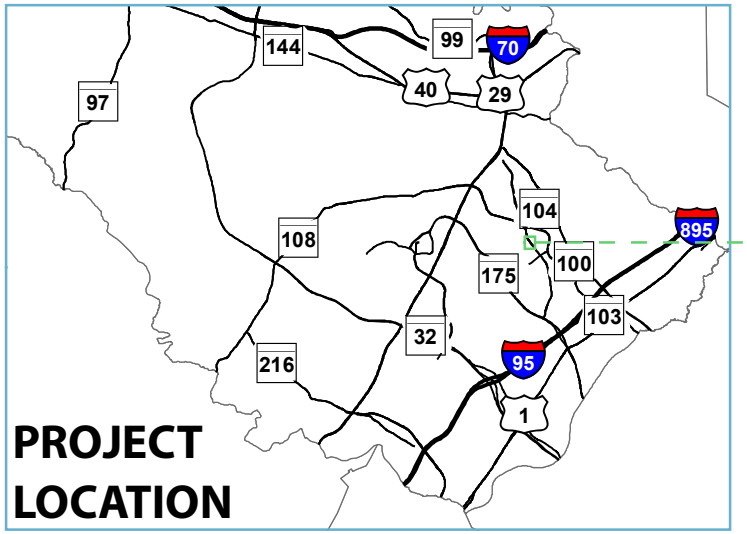
Structured Project 27

Intersection Improvement

N

MILES

0 0.04 0.08 0.12 0.16



STRUCTURED PROJECT 28

Install sidewalks on both sides of Clarksville Pike from Linden Linthicum Road to Broad Meadow Lane. This project is partially referenced in BikeHoward as Structured Project 64, and can be addressed by capital project T7108.

Bus Stop Improvements: $0
Intersection Improvements: $0
Sidewalk Improvements: $463,124
Total Cost: $463,124

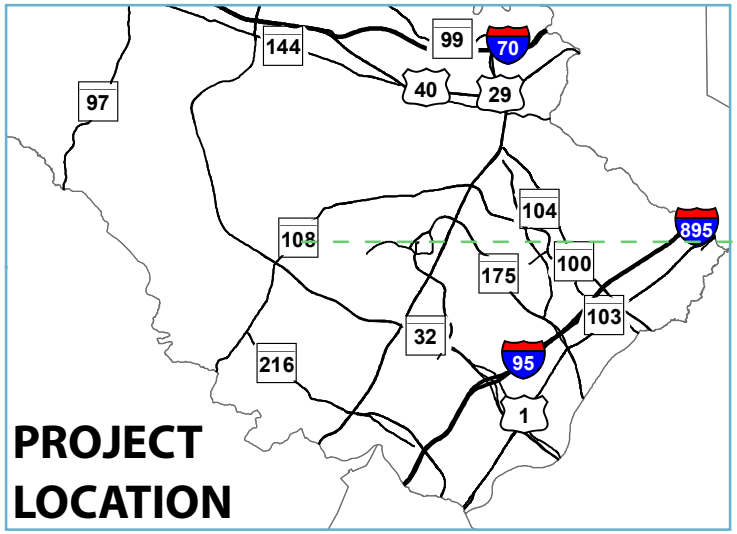


Structured Project 28

N

MILES

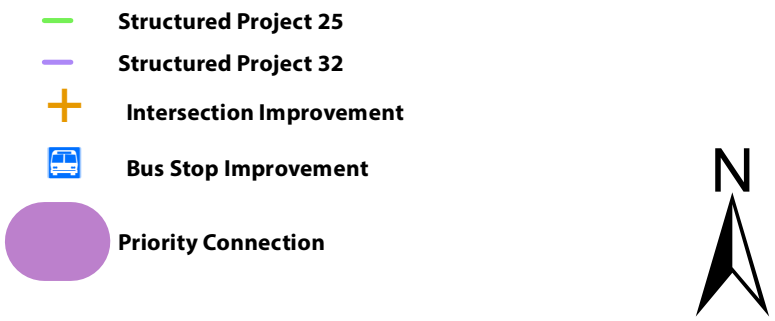
0 0.06 0.12 0.18 0.24

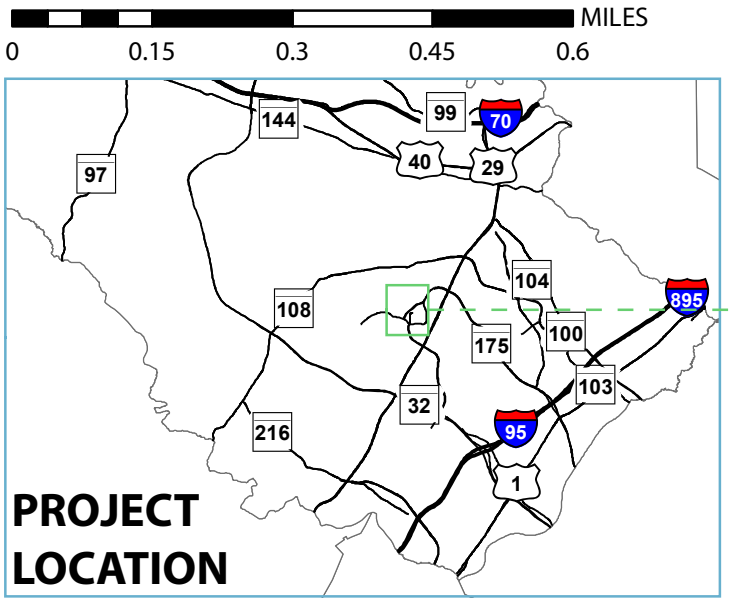


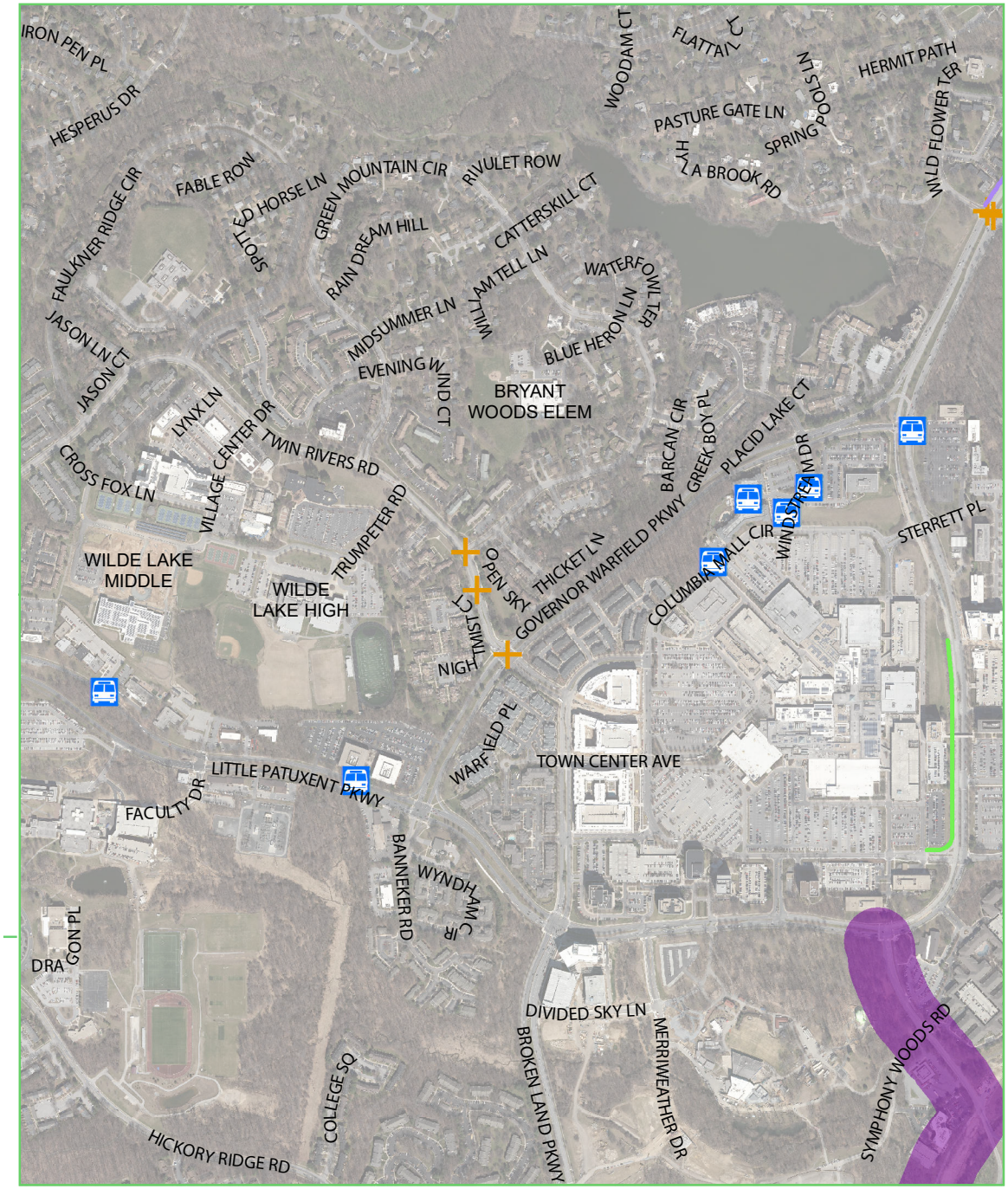
STRUCTURED PROJECT 29

Make improvments to 7 bus stops in Downtown Columbia.

Bus Stop Improvements: $207,925
Intersection Improvements: $0
Sidewalk Improvements: $0
Total Cost: $207,925



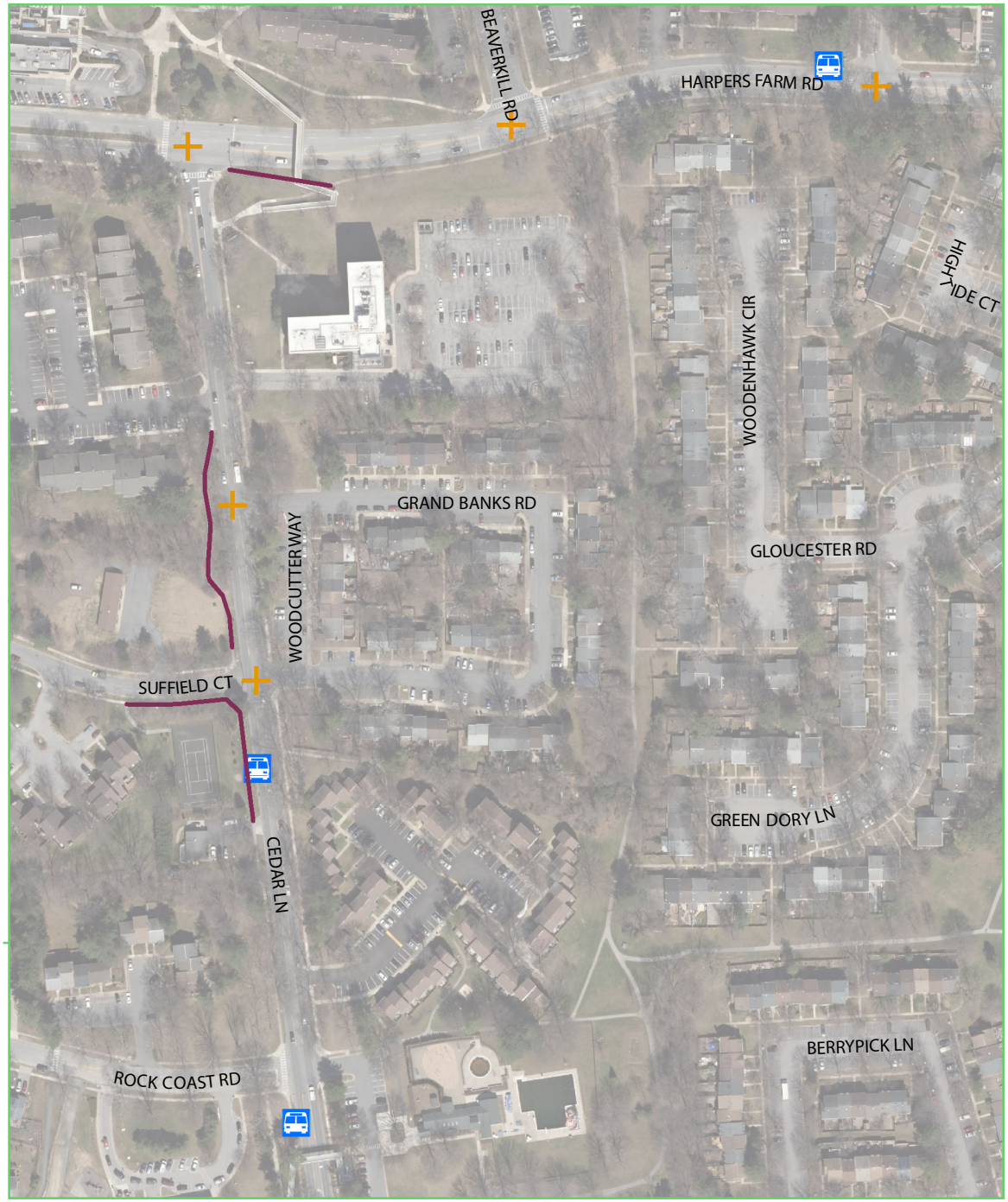




STRUCTURED PROJECT 30

Make a variety of sidewalk, bus stop, and intersection improvements along Cedar Lane and Harpers Farm Road. This project is also scheduled to be addressed through BikeHoward in the form of a shared-use pathway.

Bus Stop Improvements: $66,325
Intersection Improvements: $94,750
Sidewalk Improvements: $64,504
Total Cost: $225,579



Structured Project 30

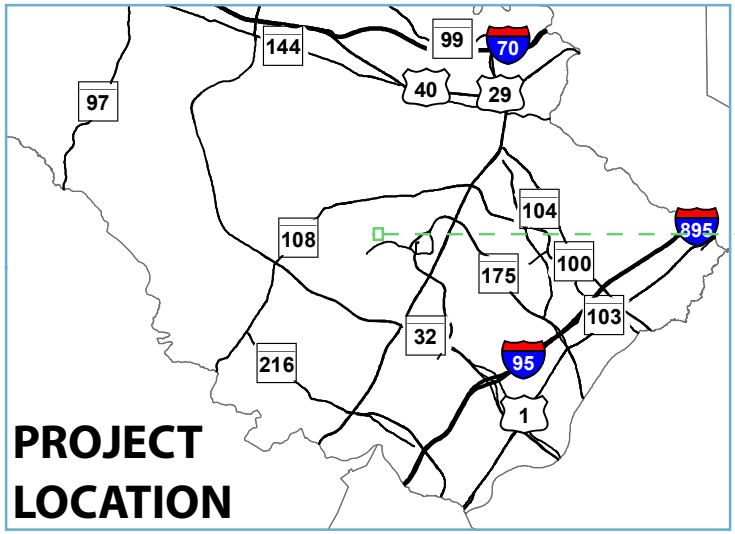
Intersection Improvement

Bus Stop Improvement

N

MILES

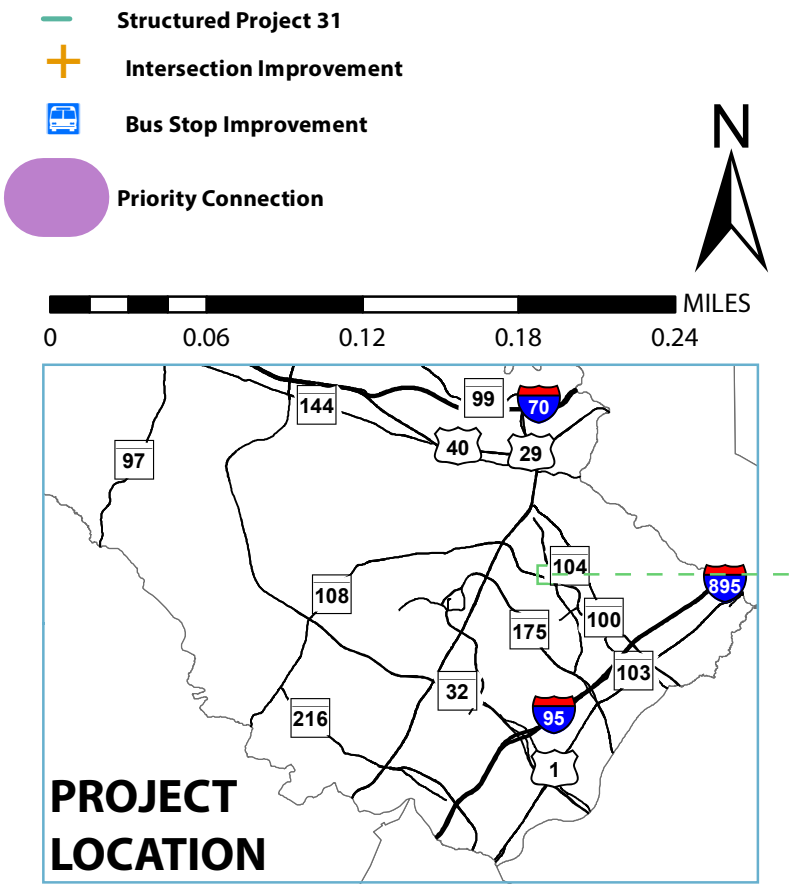
0 0.035 0.07 0.105 0.14

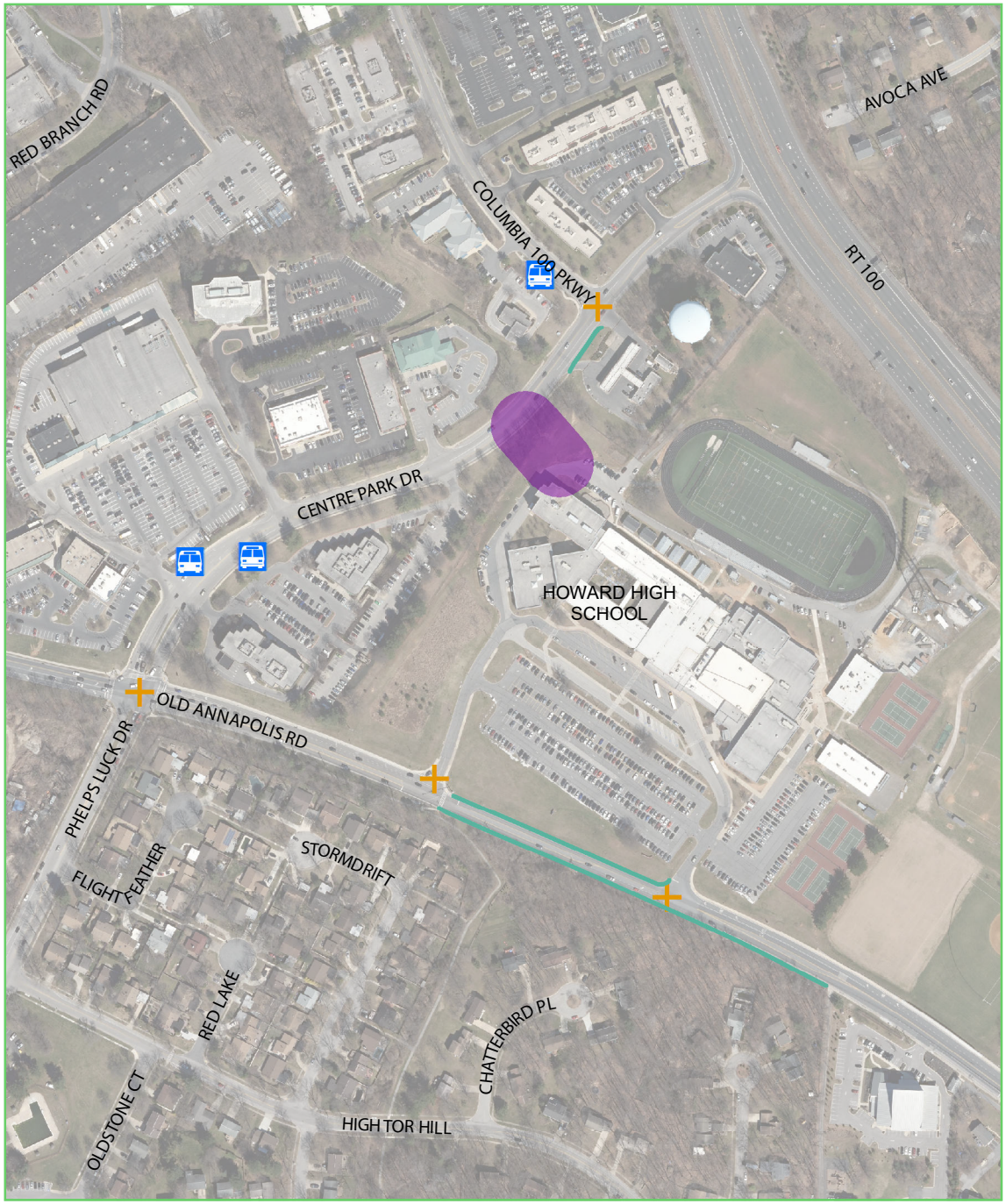


STRUCTURED PROJECT 31

Make a variety of sidewalk, bus stop, and intersection improvements in the vicinity of Howard High School.

Bus Stop Improvements: $83,975
Intersection Improvements: $77,900
Sidewalk Improvements: $95,735
Total Cost: $257,610

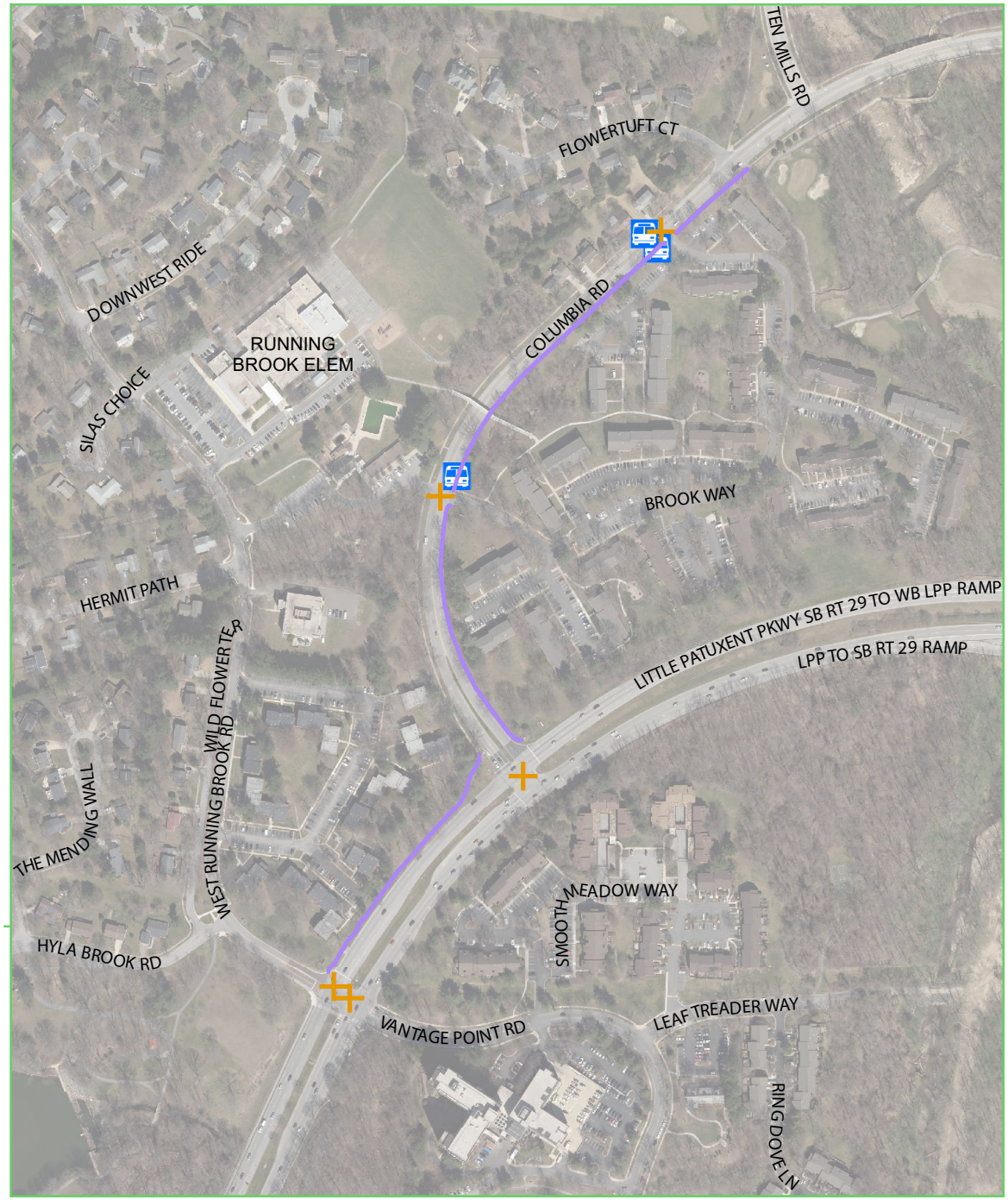




STRUCTURED PROJECT 32

Install sidewalks on the west side of Little Patuxent Parkway from Vantage Point Road to Columbia Road and on Columbia Road to Flowerturt Court, and make associated intersection and bus stop improvements.

Bus Stop Improvements: $131,400
Intersection Improvements: $60,250
Sidewalk Improvements: $139,855
Total Cost: $331,505



Structured Project 32

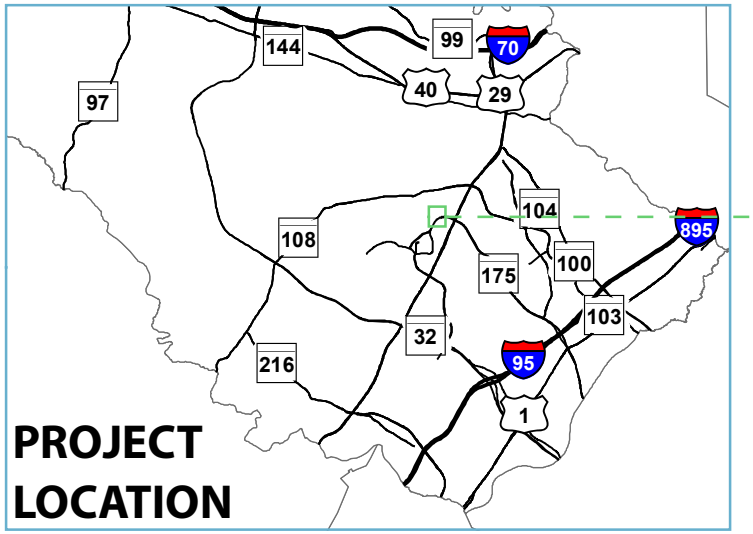
Intersection Improvement

Bus Stop Improvement

N

MILES

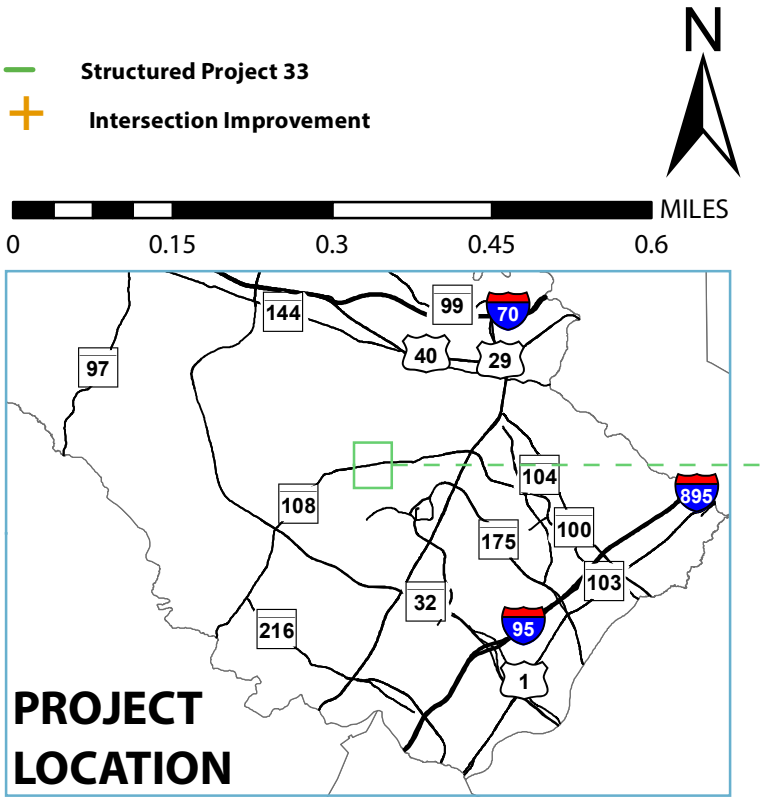
0 0.065 0.13 0.195 0.26



STRUCTURED PROJECT 33

Install sidewalks on Clarksville Pike from Eliots Oak Road to Harpers Farm Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $9,000
Sidewalk Improvements: $457,249
Total Cost: $466,249

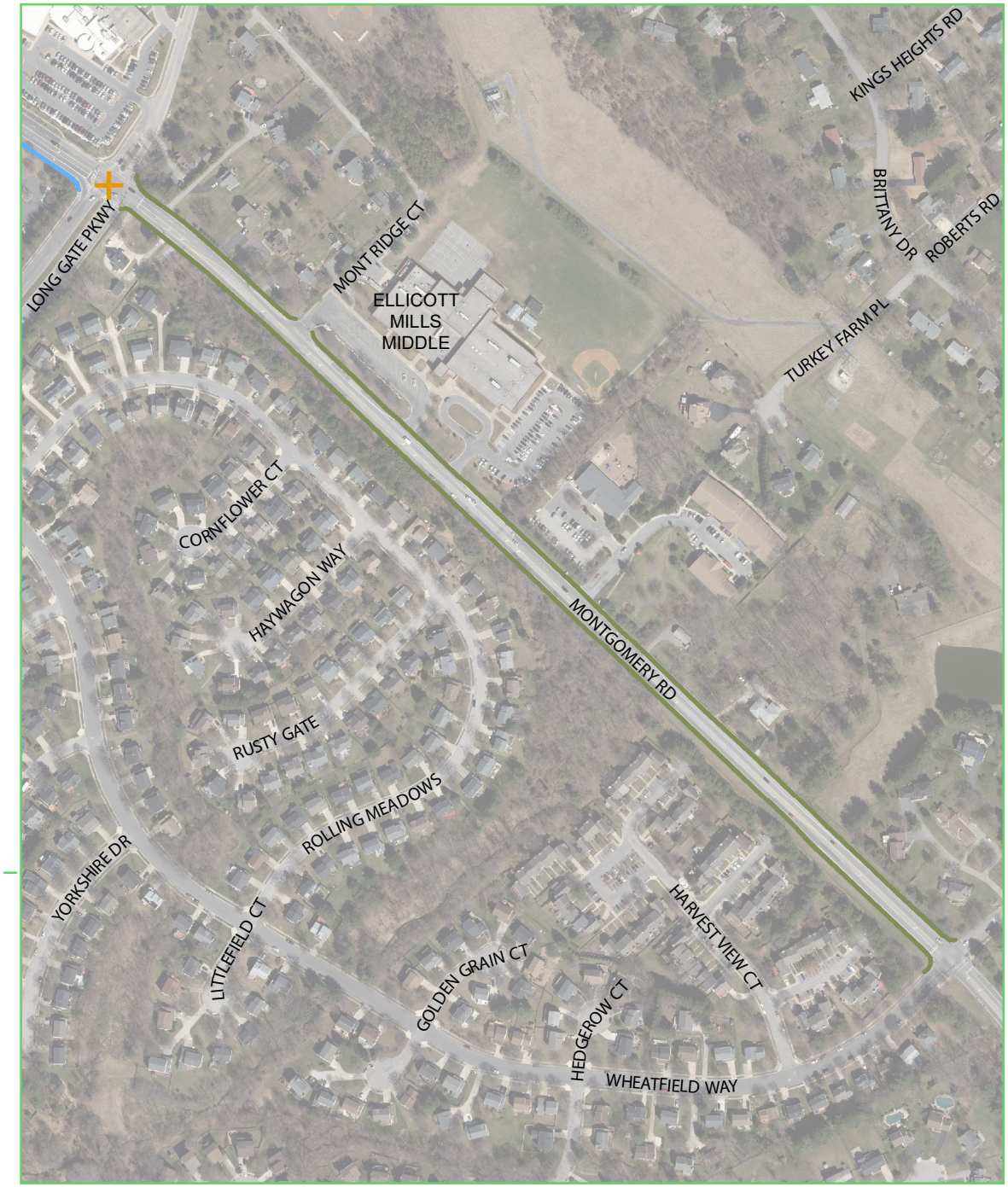




STRUCTURED PROJECT 34

Install sidewalks on both sides of Montgomery Road from Wheatfield Way to Long Gate Parkway.

Bus Stop Improvements: $0
Intersection Improvements: $250
Sidewalk Improvements: $440,479
Total Cost: $440,729



Structured Project 34

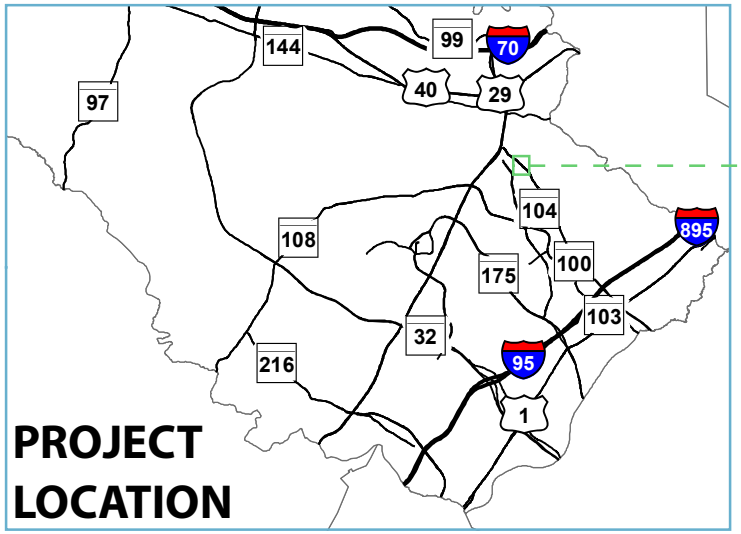
Structured Project 35

Intersection Improvement

N

MILES

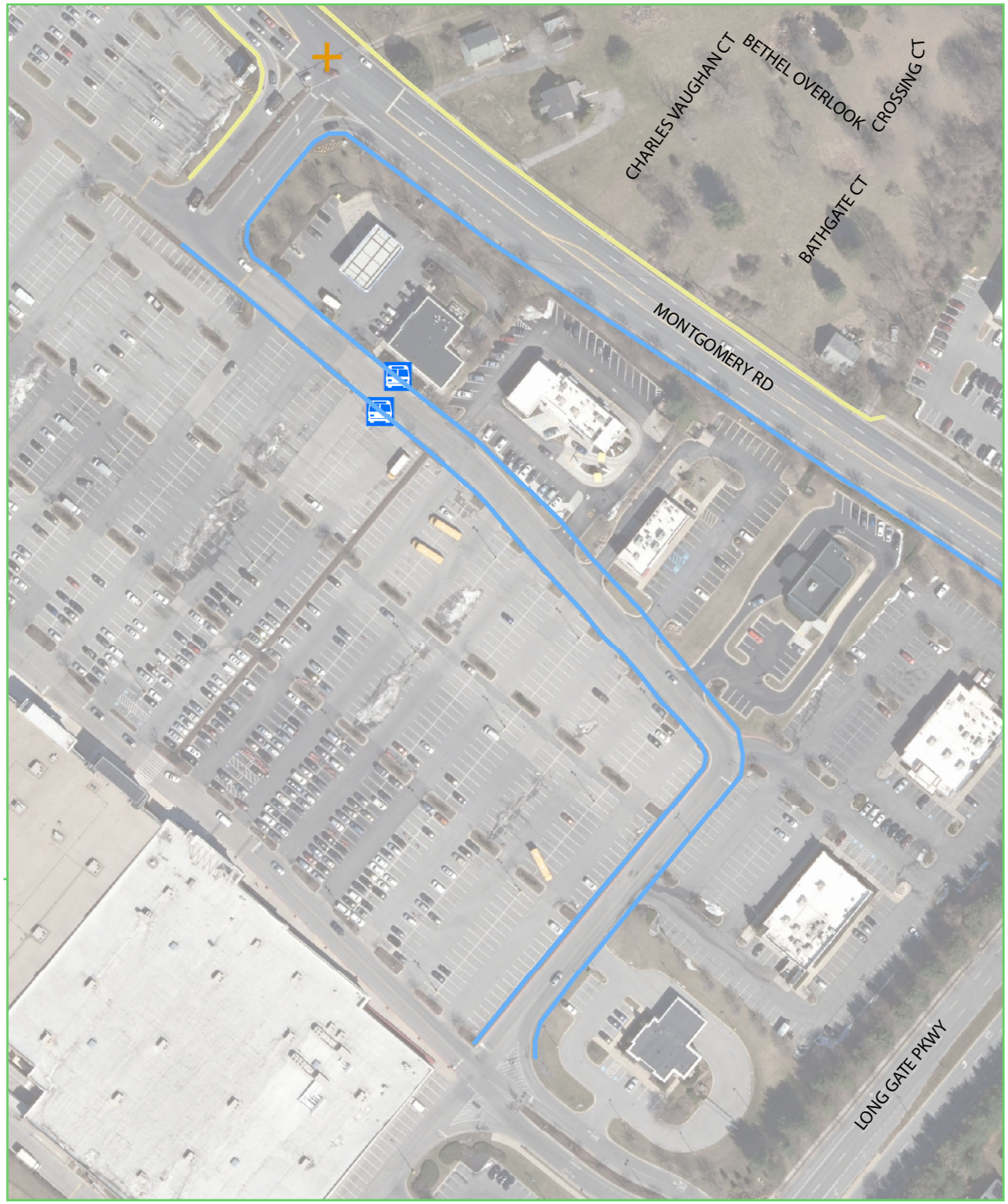
0 0.06 0.12 0.18 0.24



STRUCTURED PROJECT 35

Install sidewalks along the entrance drive to the Long Gate Shopping Center and make associated intersection and bus stop improvements.

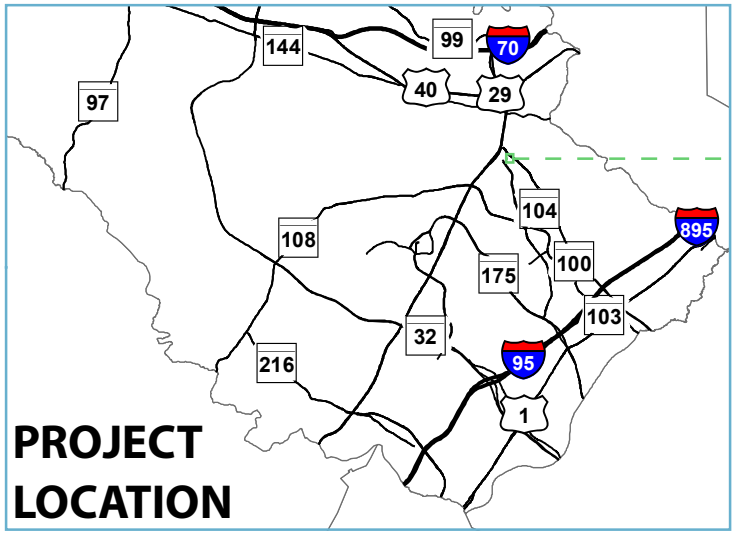
Bus Stop Improvements: $89,750
Intersection Improvements: $10,250
Sidewalk Improvements: $195,086
Total Cost: $295,086



- Structured Project 35
- Structured Project 36
- Intersection Improvement
- Bus Stop Improvement

N

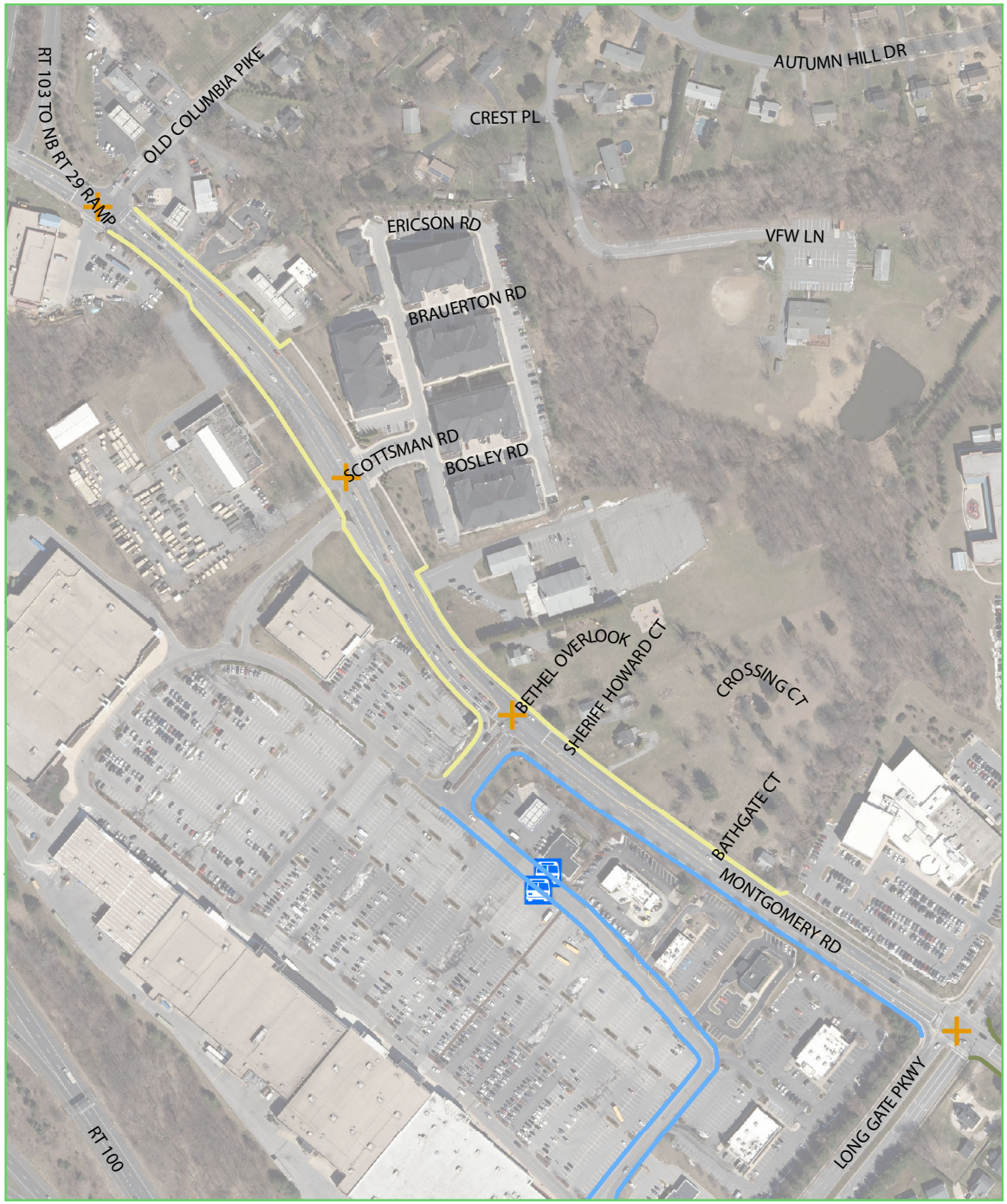
MILES
0 0.025 0.05 0.075 0.1



STRUCTURED PROJECT 36

Install sidewalks on both sides of Montgomery Road between Long Gate Parkway and Old Columbia Pike and make associated intersection improvements.

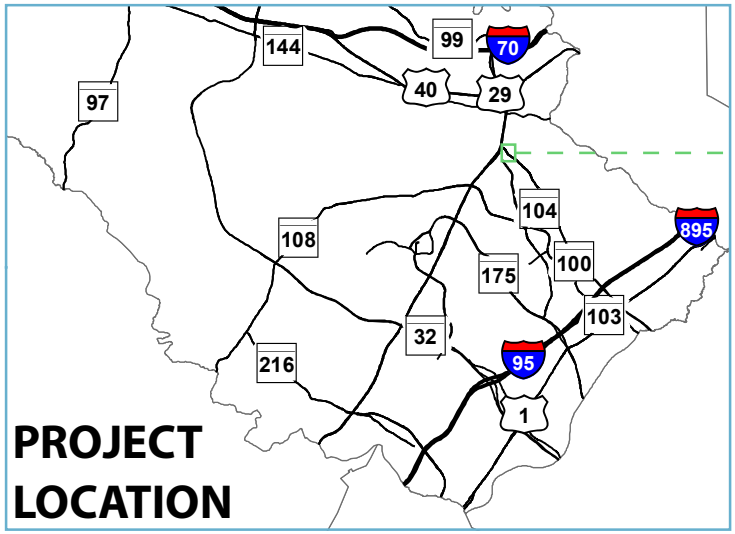
Bus Stop Improvements: $0
Intersection Improvements: $40,500
Sidewalk Improvements: $384,065
Total Cost: $424,565



- Structured Project 34
- Structured Project 35
- Structured Project 36
- Intersection Improvement
- Bus Stop Improvement

N

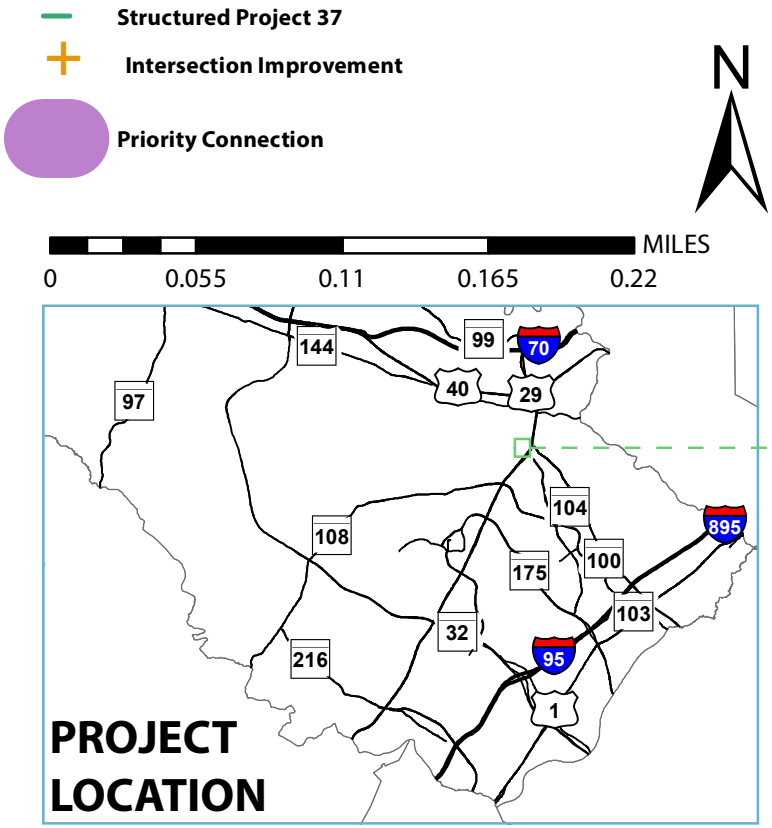
0 0.055 0.11 0.165 0.22 MILES

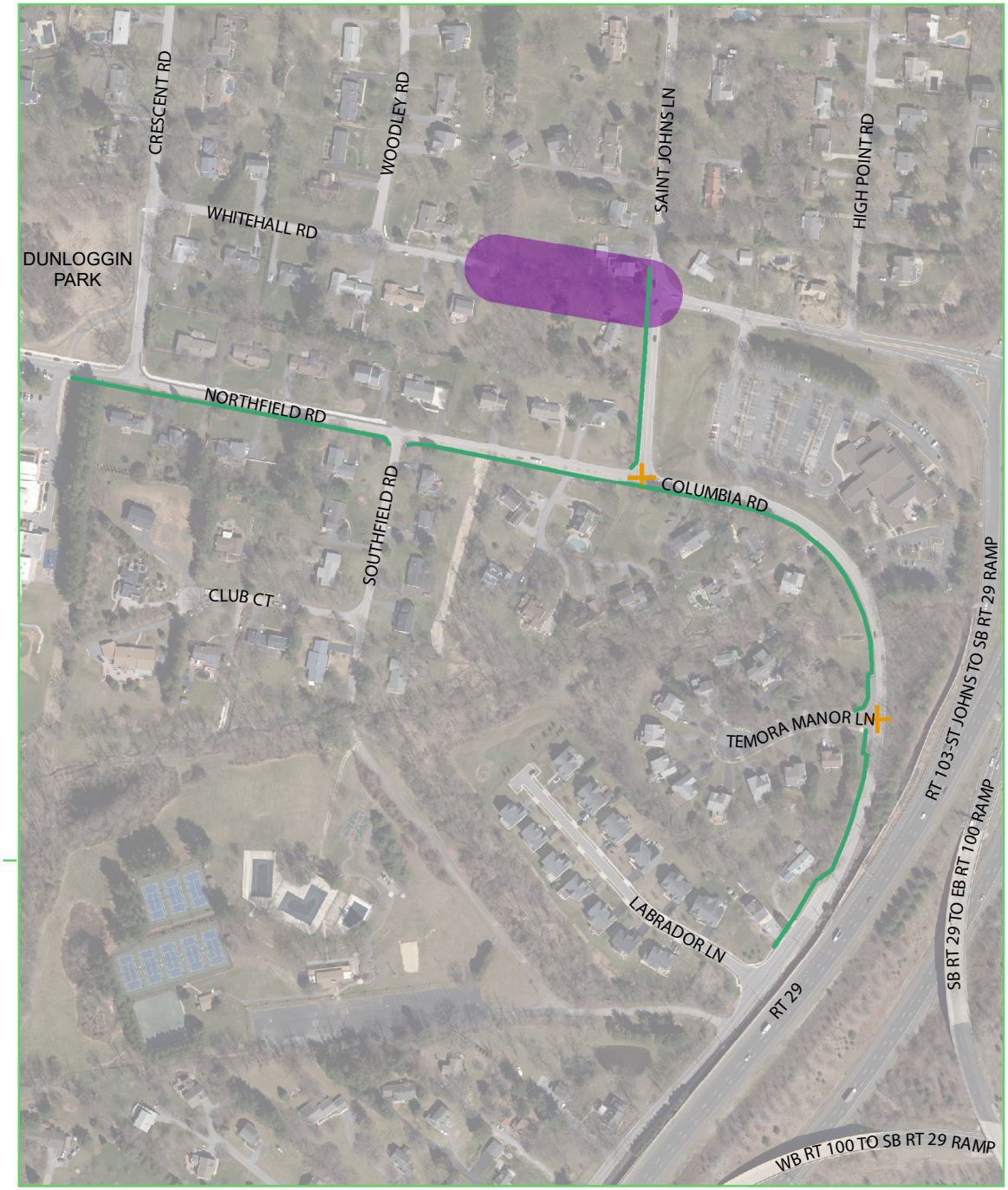


STRUCTURED PROJECT 37

Install sidewalks along Columbia Road and Northfield Road from Labrador Lane to Northfield Elementary School and along Saint Johns Lane from Whitehall Road to Columbia Road, and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $11,100
Sidewalk Improvements: $380,044
Total Cost: $391,144

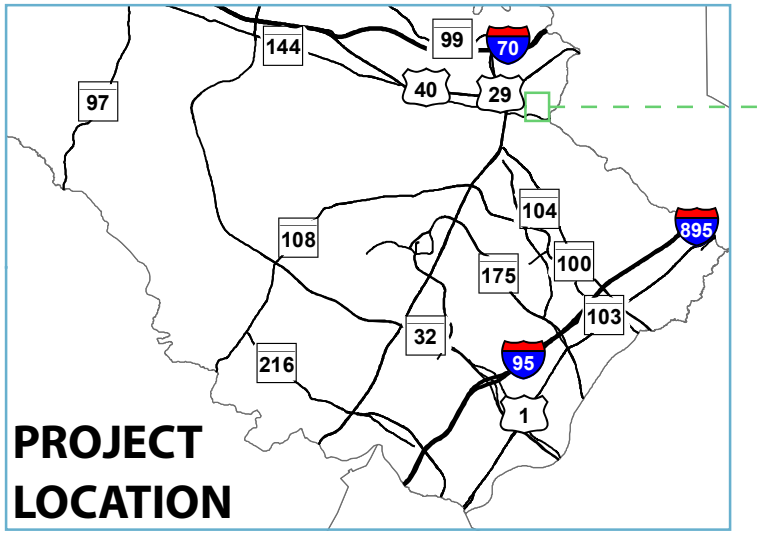




STRUCTURED PROJECT 38

Install sidewalks on the south side of Court House Drive east of Ellicott Mills Drive and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $50,500
Sidewalk Improvements: $216,072
Total Cost: $266,572





STRUCTURED PROJECT 39

Install sidewalks on the east side of North Chatham Road from Resurrection-St. Paul School to Paulskirk Drive and make associated intersection and bus stop improvements along North Chatham Road.

Bus Stop Improvements: $89,250
Intersection Improvements: $35,450
Sidewalk Improvements: $32,891
Total Cost: $157,591



Structured Project 39

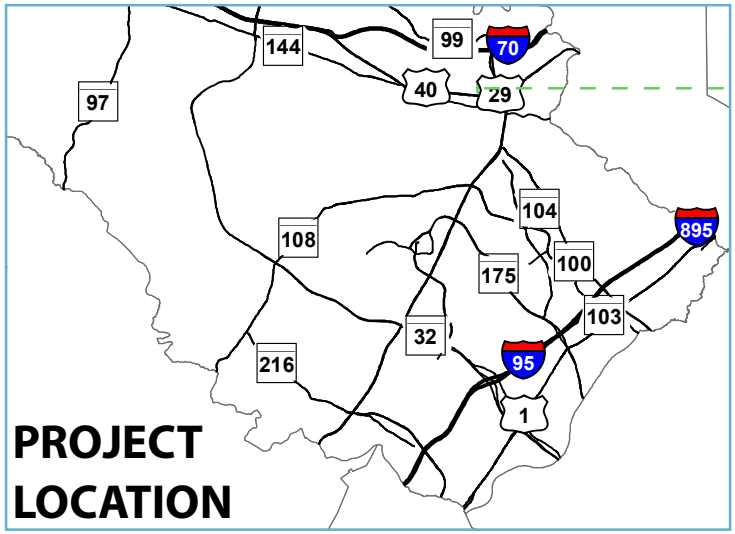
Intersection Improvement

Bus Stop Improvement

N

MILES

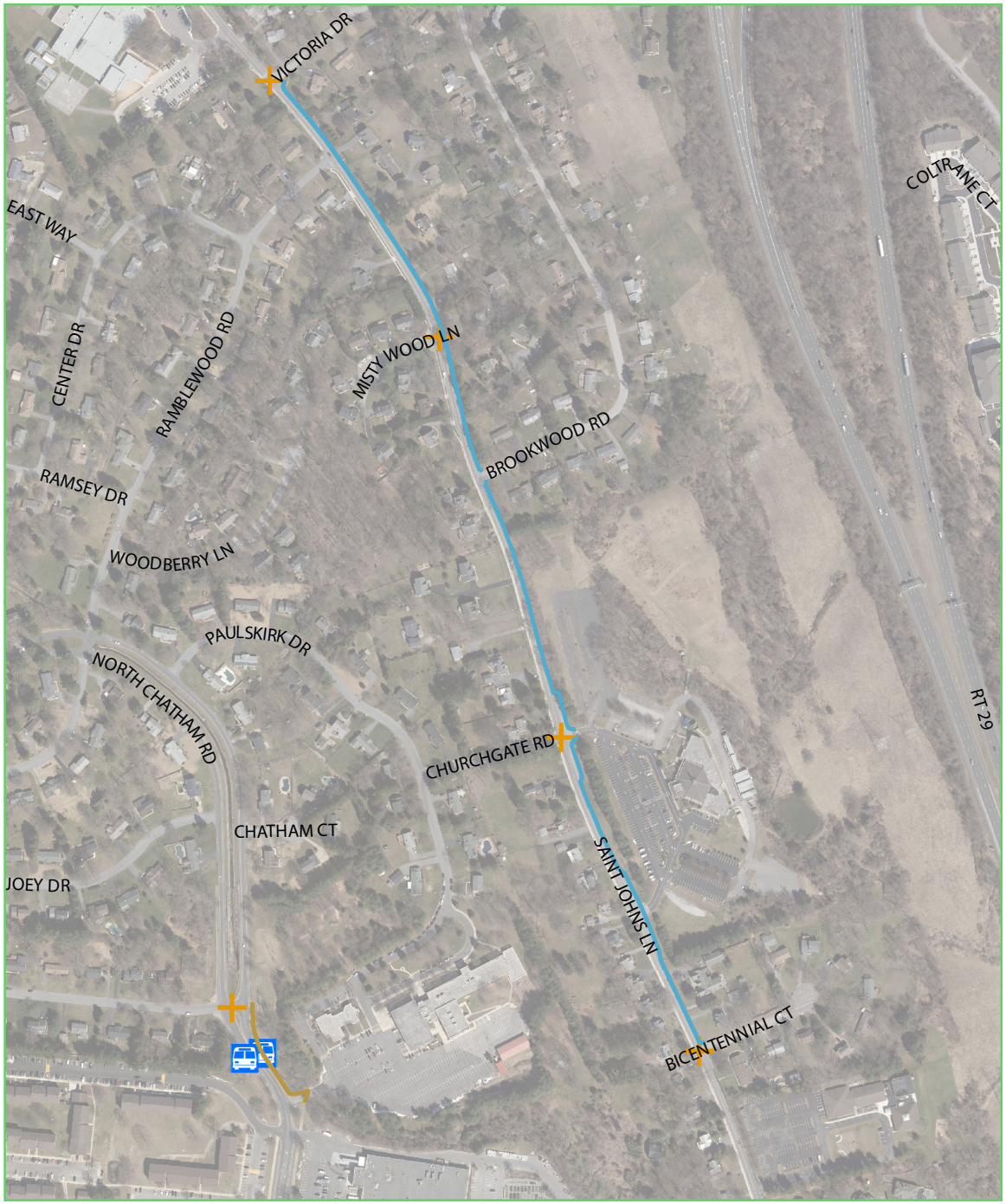
0 0.025 0.05 0.075 0.1



STRUCTURED PROJECT 40

Install sidewalks on the east side of Saint Johns Lane from Bicentennial Court to Victoria Drive and make associated intersection improvements.

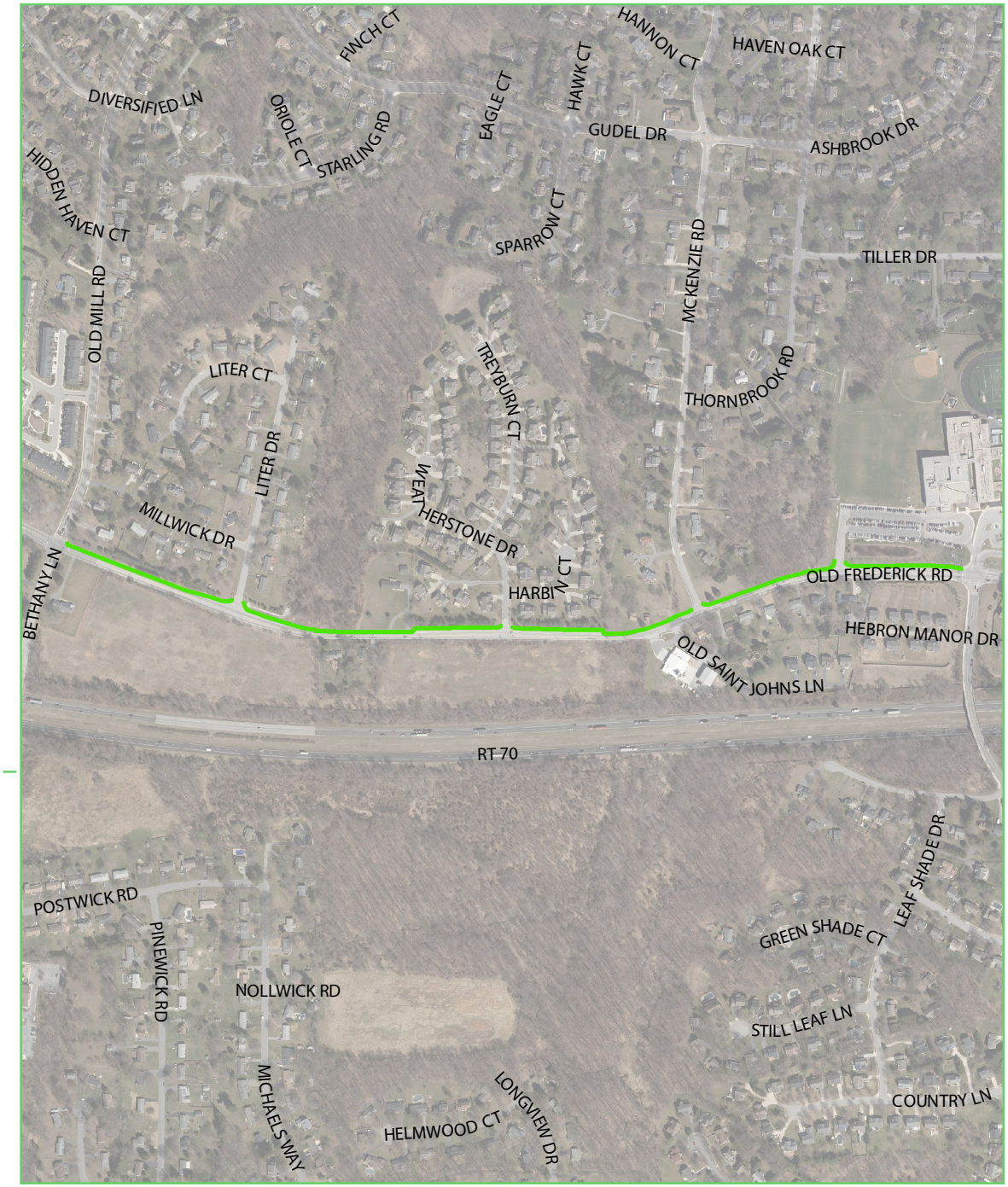
Bus Stop Improvements: $0
Intersection Improvements: $10,000
Sidewalk Improvements: $280,441
Total Cost: $290,441



STRUCTURED PROJECT 41

Install sidewalks on the north side of Old Frederick Road from Old Mill Road to Mt. Hebron High School.

Bus Stop Improvements: $0
Intersection Improvements: $0
Sidewalk Improvements: $329,857
Total Cost: $329,857

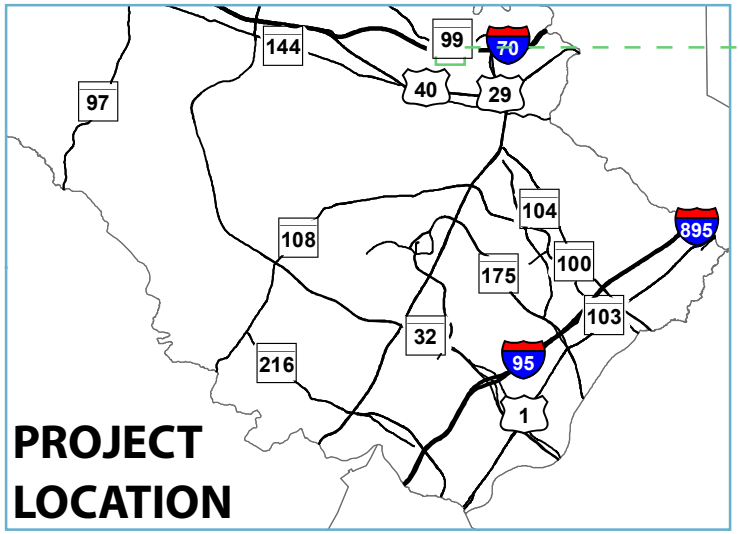


N

Structured Project 41

MILES

0 0.1 0.2 0.3 0.4



STRUCTURED PROJECT 42

Install sidewalks along Rogers Avenue from Faber Way to Old Frederick Road and make associated intersection improvements.

Bus Stop Improvements: $0
Intersection Improvements: $5,200
Sidewalk Improvements: $307,225
Total Cost: $312,425



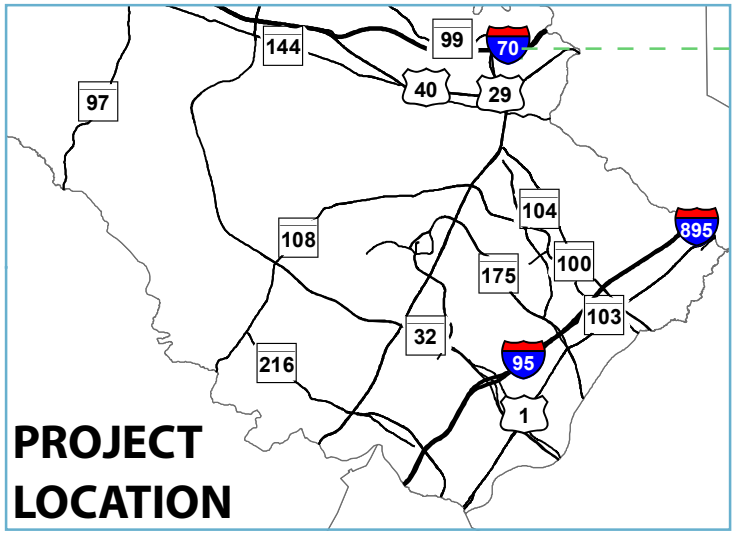
Structured Project 42

Intersection Improvement

N

MILES

0 0.065 0.13 0.195 0.26



STRUCTURED PROJECT 43

Install sidewalks on the south side of Old Frederick Road west of Raleigh Tavern Lane.

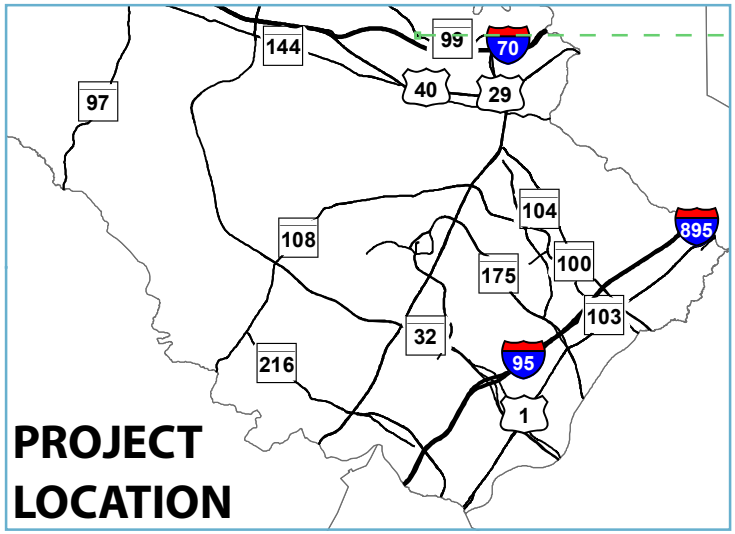
Bus Stop Improvements: $0
Intersection Improvements: $0
Sidewalk Improvements: $49,061
Total Cost: $49,061



N

Structured Project 43

MILES
0 0.015 0.03 0.045 0.06

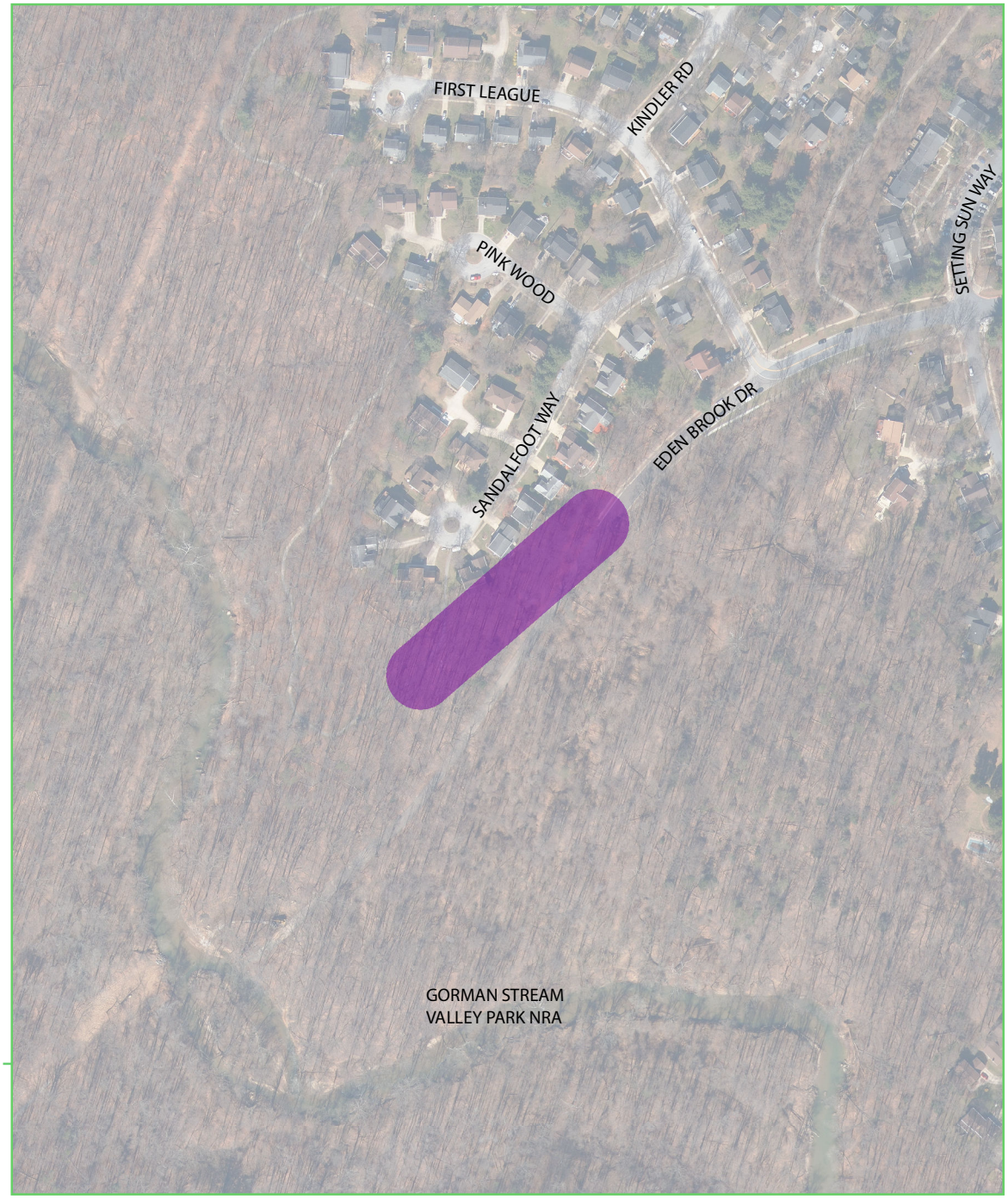


PRIORITY CONNECTION 1

The identified connection is between the end of Eden Brook Dr and the existing Kings Contrivance loop pathway.

Needs Addressed by this Connection:
Network Connectivity

Level of Effort: Medium

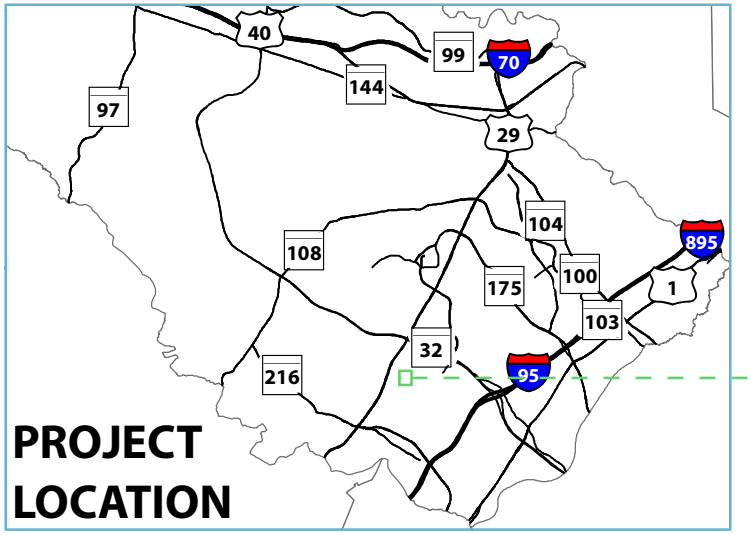


Priority Connection

N

FEET

0 250 500 750 1,000

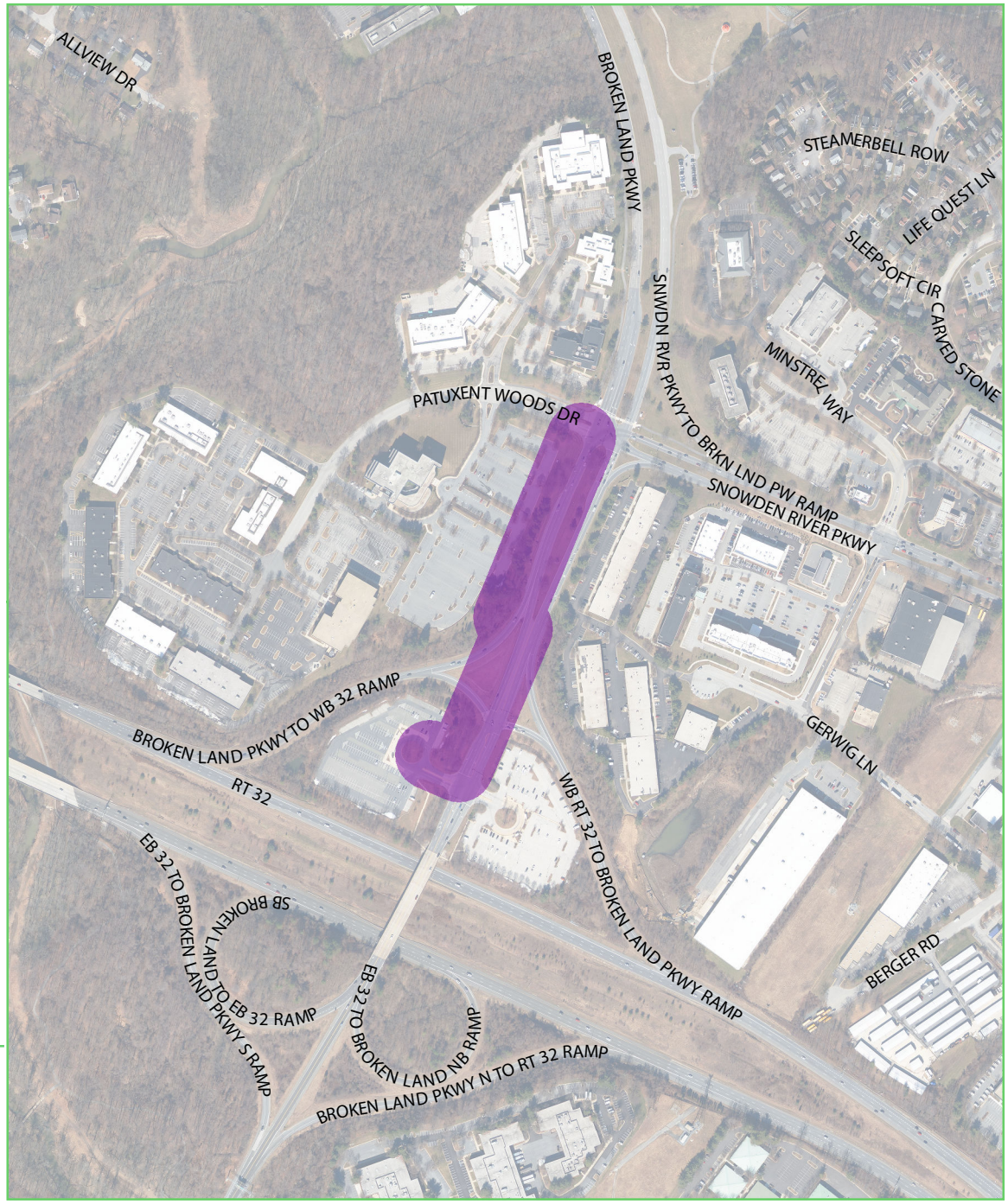


PRIORITY CONNECTION 2

The identified connection is between the Broken Land west park-and-ride lot and an existing pathway at Broken Land Pkwy and Snowden River Pkwy, which would offer a further connection to the Patuxent Branch Trail.

Needs Addressed by this Connection:
Safety and Network Connectivity

Level of Effort: Medium

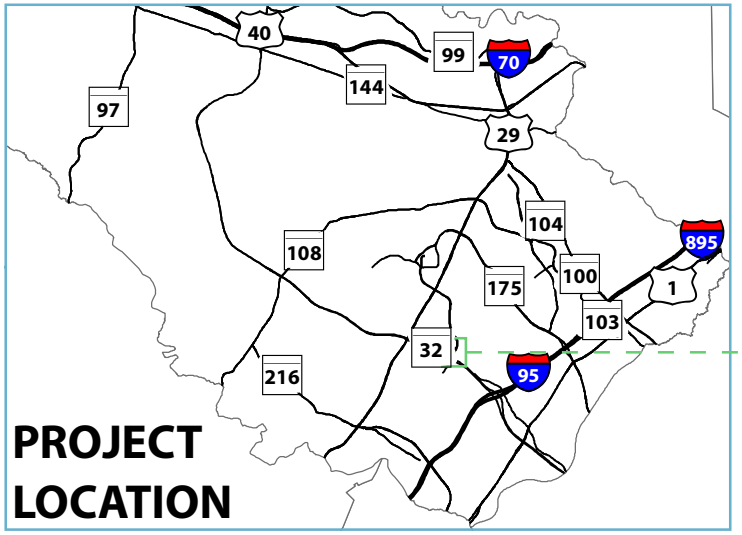


Priority Connection

N

FEET

0 510 1,020 1,530 2,040



PRIORITY CONNECTION 3

The identified connection is between 9200 Berger Rd and the intersection of Snowden River Pkwy and Oakland Mills Rd.

Needs Addressed by this Connection:

Safety

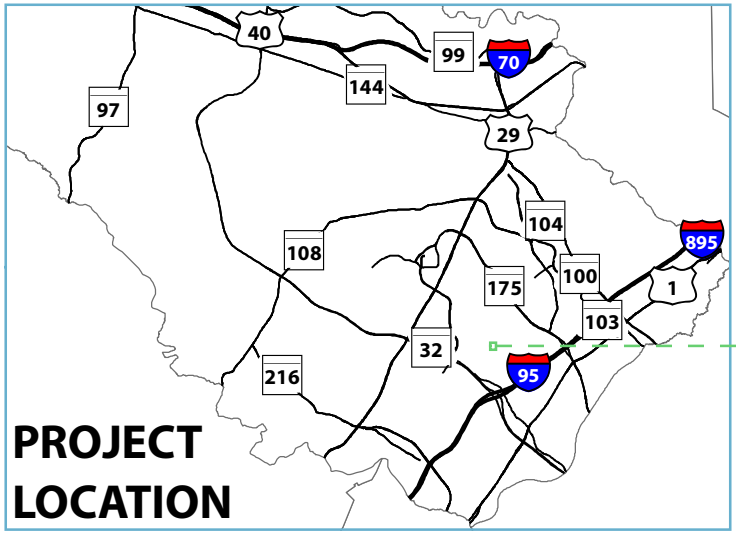
Level of Effort: Medium

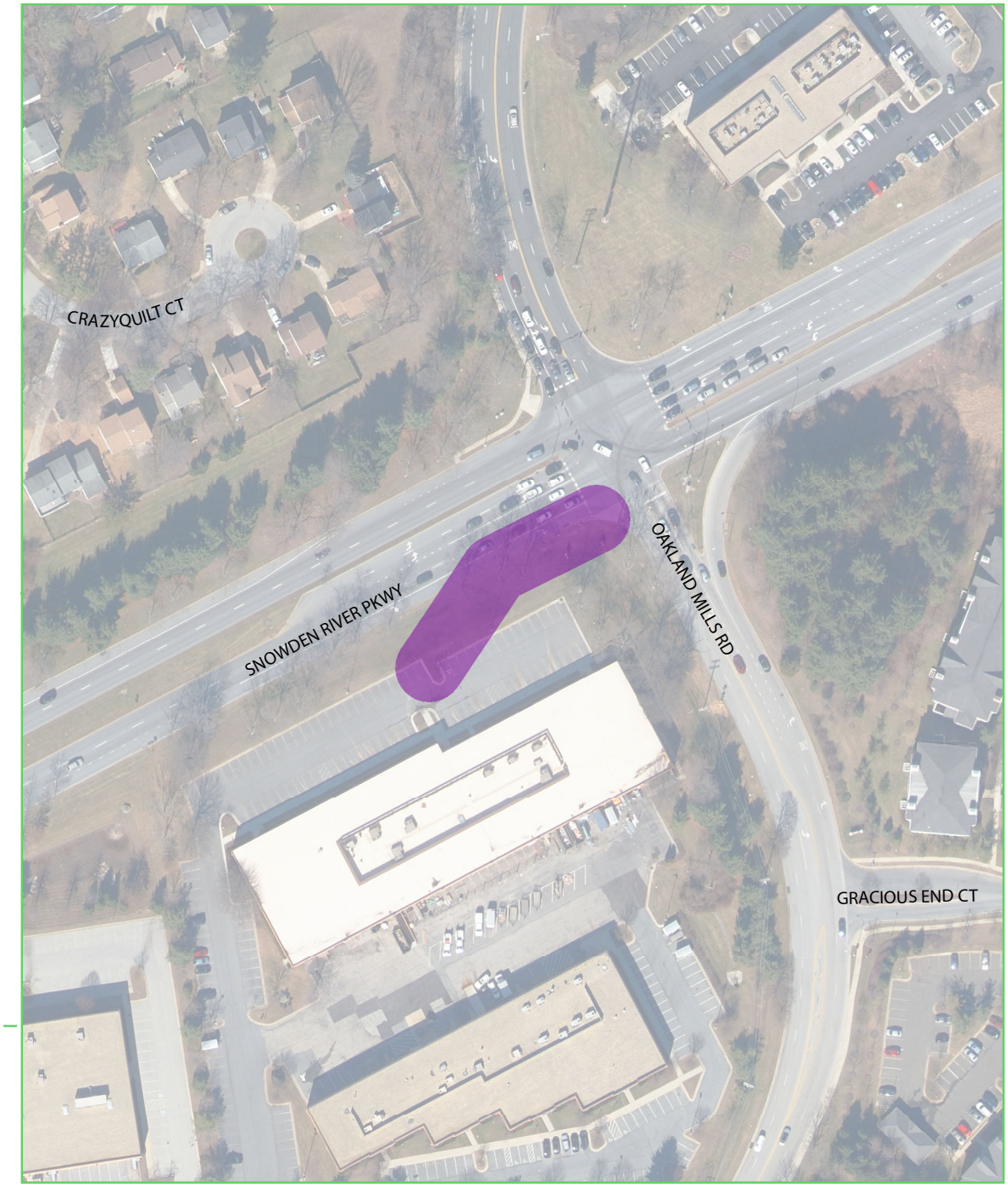
Priority Connection

N

FEET

0 125 250 375 500





PRIORITY CONNECTION 4

The identified connection is across I-95 between the end of Old Waterloo Rd and New Colony Village and the Oaks at Waters Edge. The costs of this connection would be very high, but it would link residential neighborhoods to the east of I-95 and a variety of destinations to its west.

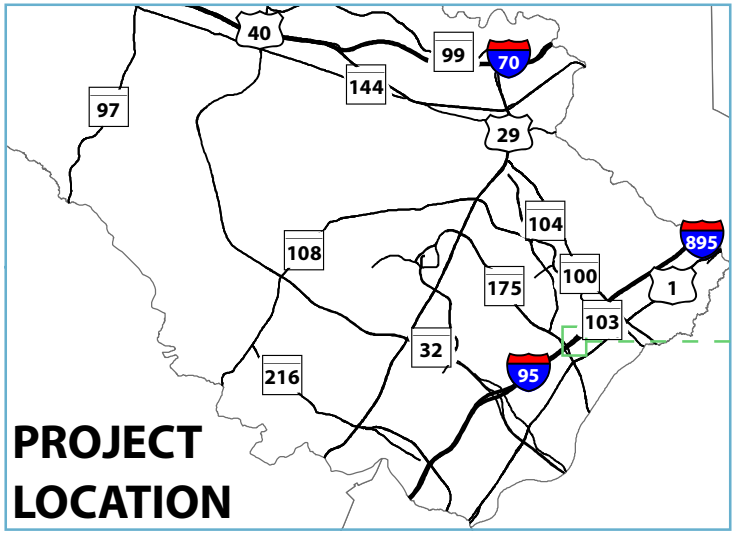
Needs Addressed by this Connection:
Network Connectivity

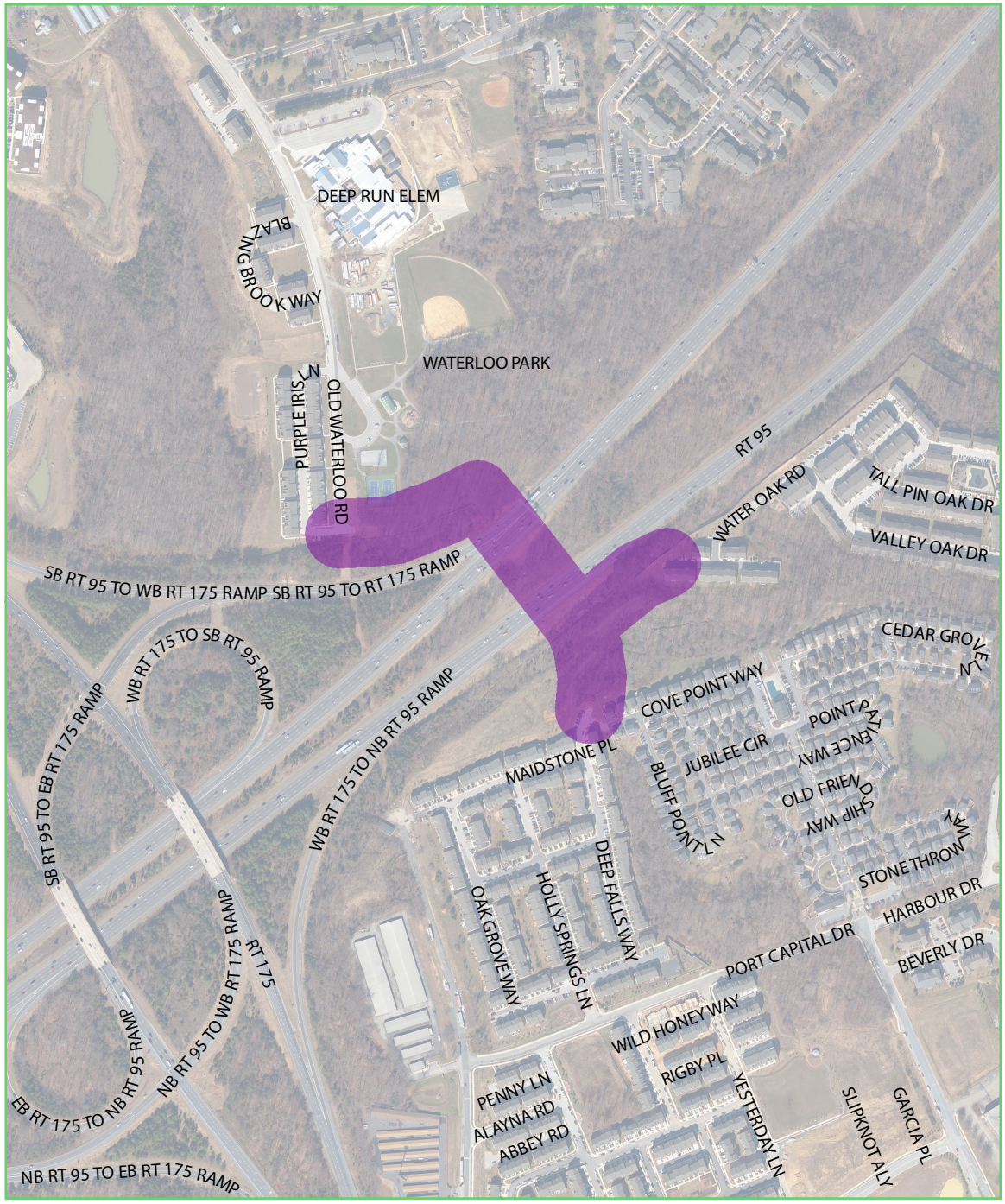
Level of Effort: High

Priority Connection

N

FEET
0 510 1,020 1,530 2,040



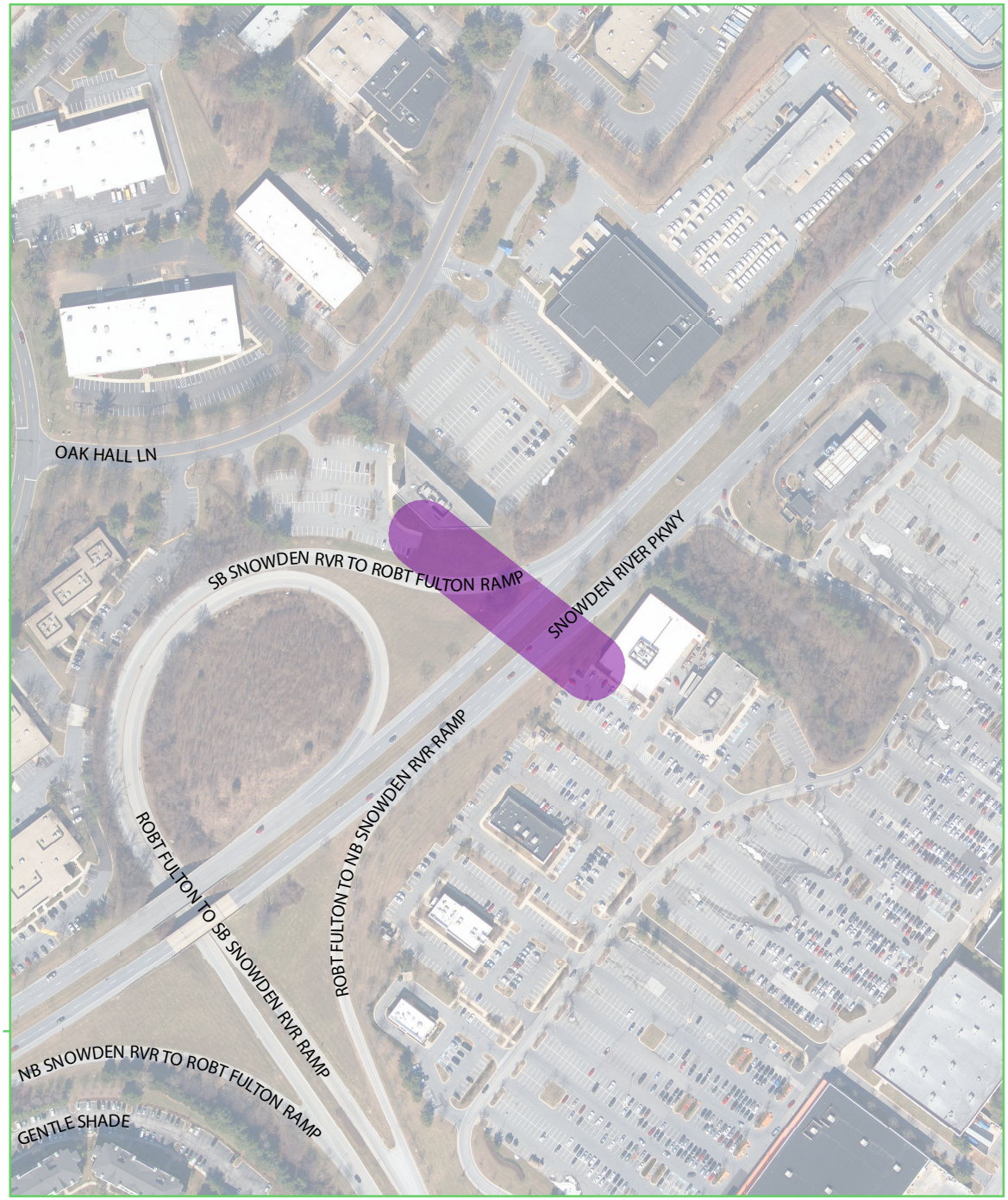


PRIORITY CONNECTION 5

The identified connection is across Snowden River Pkwy, between Oak Hall Ln and the Snowden Square Shopping Center.

Needs Addressed by this Connection:
Safety and Access to Retail

Level of Effort: High

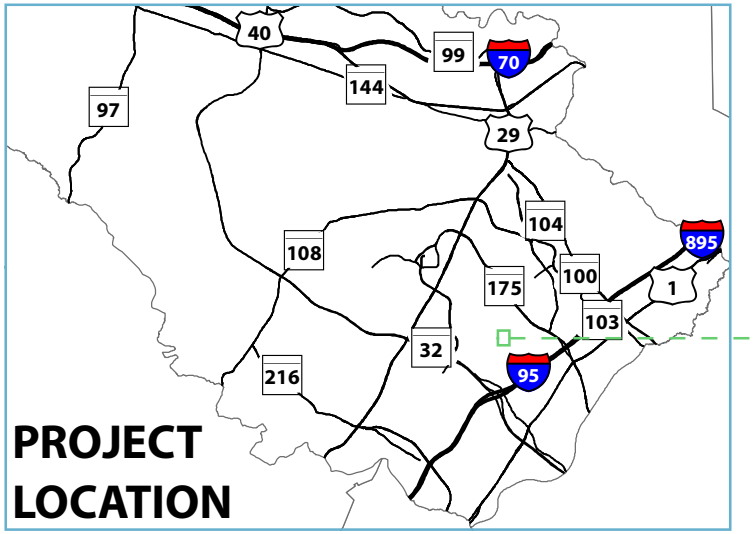


Priority Connection

N

FEET

0 250 500 750 1,000

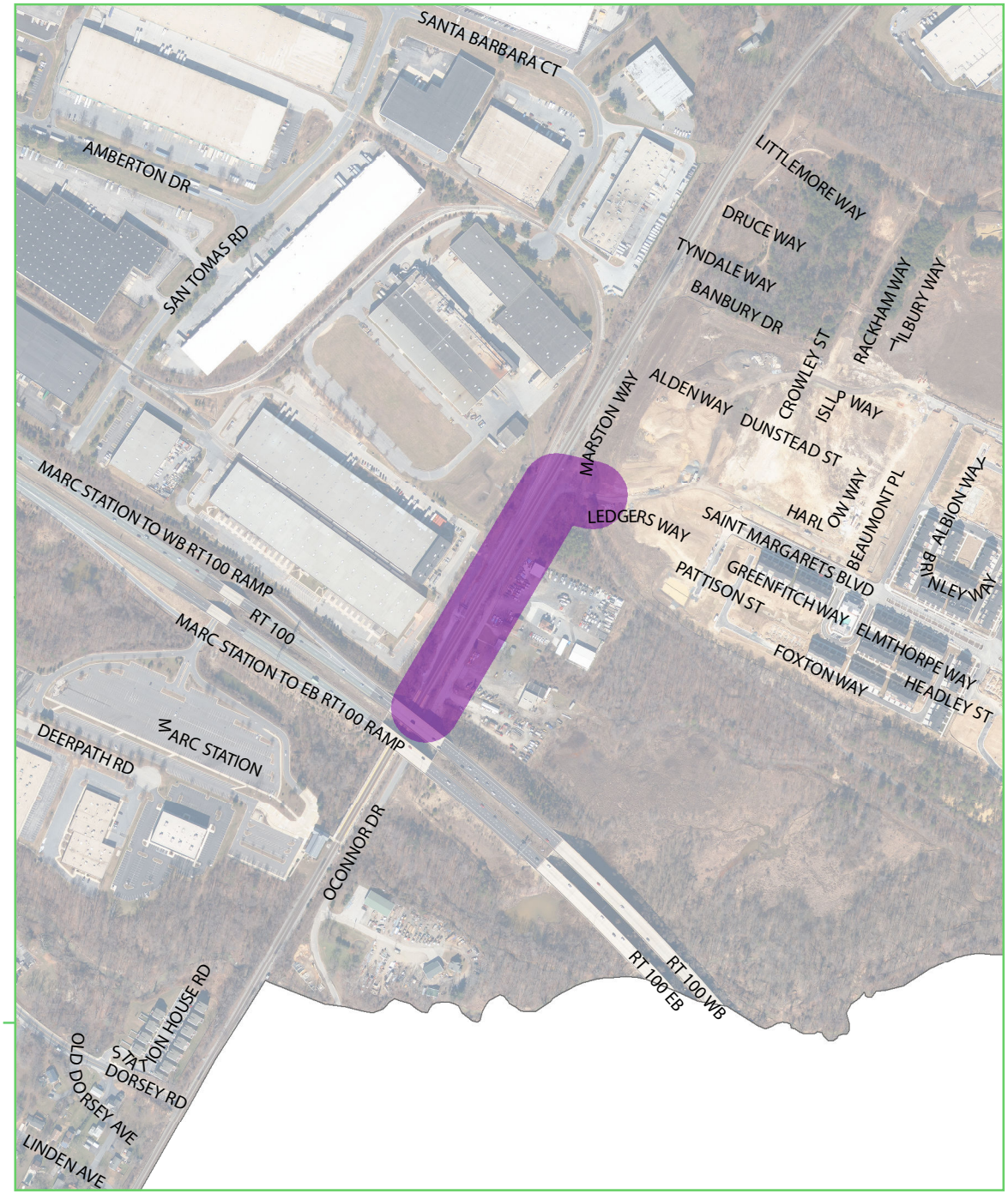


PRIORITY CONNECTION 6

The identified connection is between the Dorsey MARC station and Howard Square, and is expected to be provided by the developer of that community.

Needs Addressed by this Connection:
Safety and Network Connectivity

Level of Effort: Medium

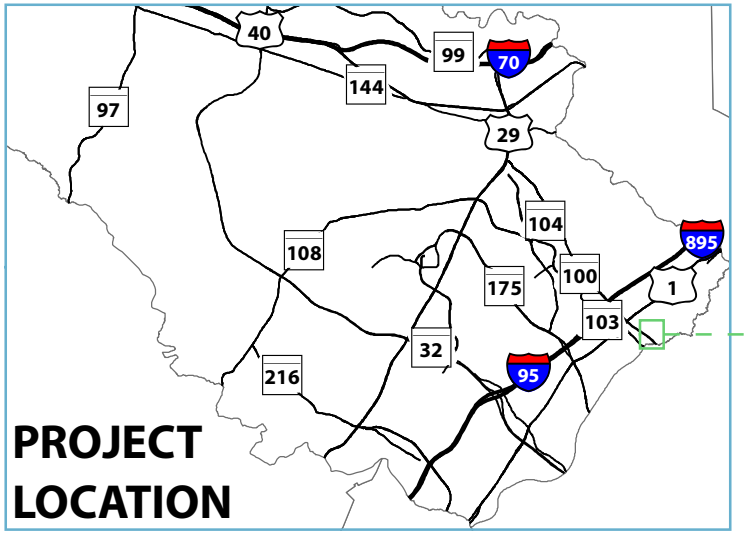


Priority Connection

N

FEET

0 510 1,020 1,530 2,040

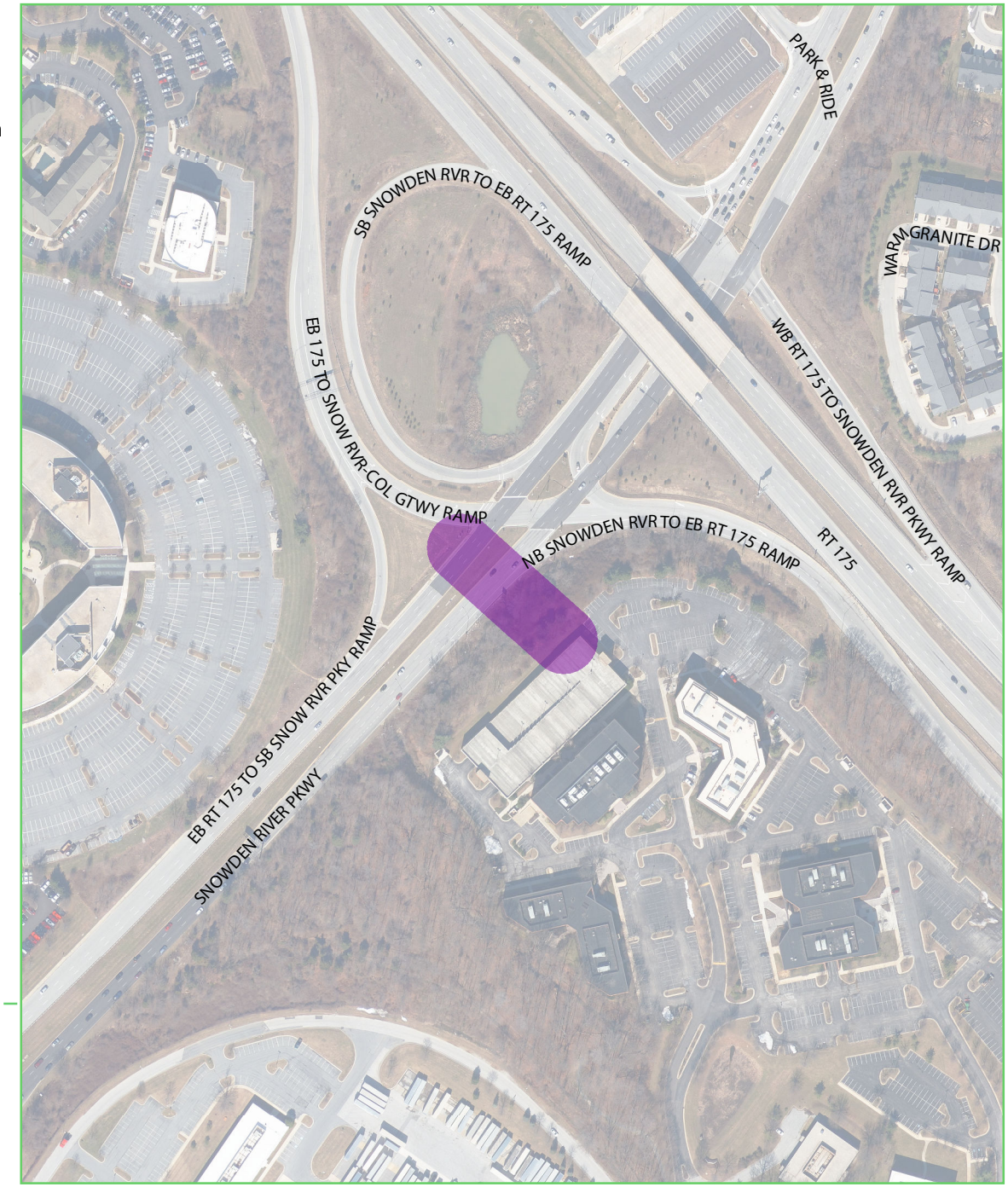


PRIORITY CONNECTION 7

The identified connection is across Snowden River Pkwy, between 6750 Alexander Bell Dr and an existing sidewalk on the west side of Snowden River Pkwy, and would provide pedestrian access into the Columbia Gateway area.

Needs Addressed by this Connection:
Safety and Network Connectivity

Level of Effort: High

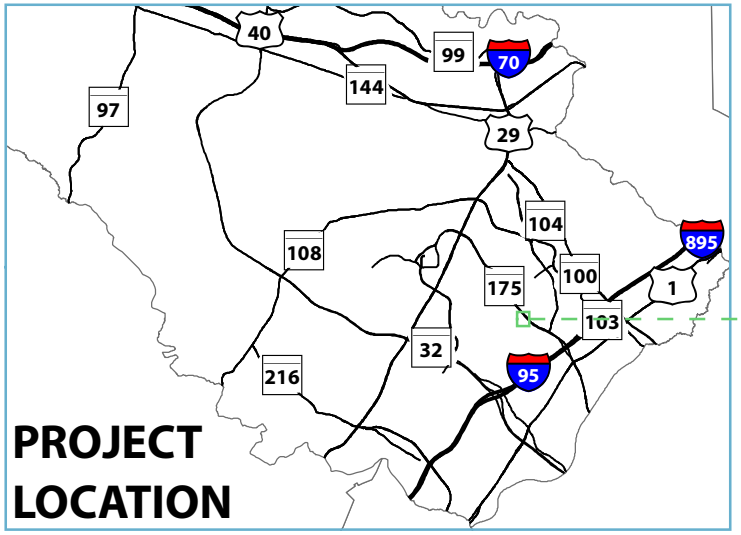


Priority Connection

N

FEET

0 250 500 750 1,000



PRIORITY CONNECTION 8

The identified connection is between Ducketts Ln and the Troy Hill corporate park. It would create a connection from the residential neighborhoods along Ducketts Ln to Troy Hill Park.

Needs Addressed by this Connection:

Safety and Network Connectivity

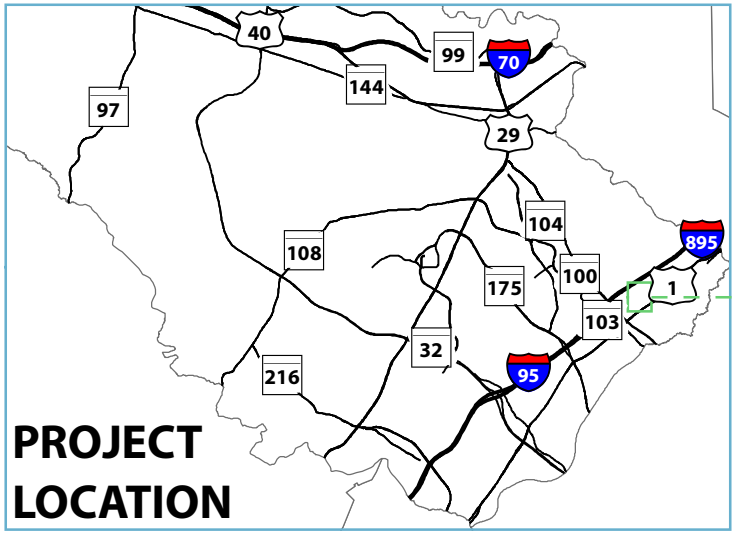
Level of Effort: Medium

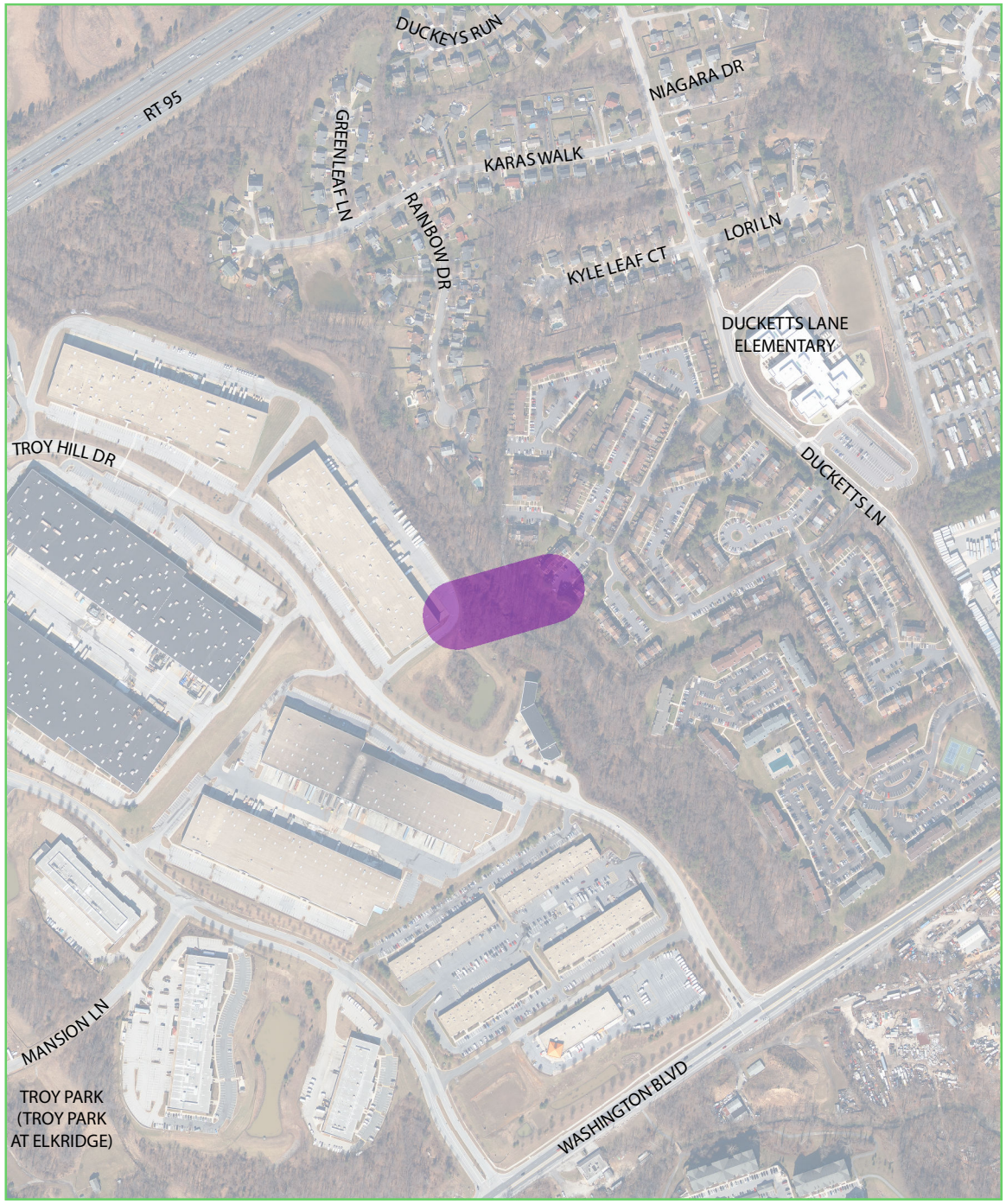
Priority Connection

N

FEET

0 510 1,020 1,530 2,040



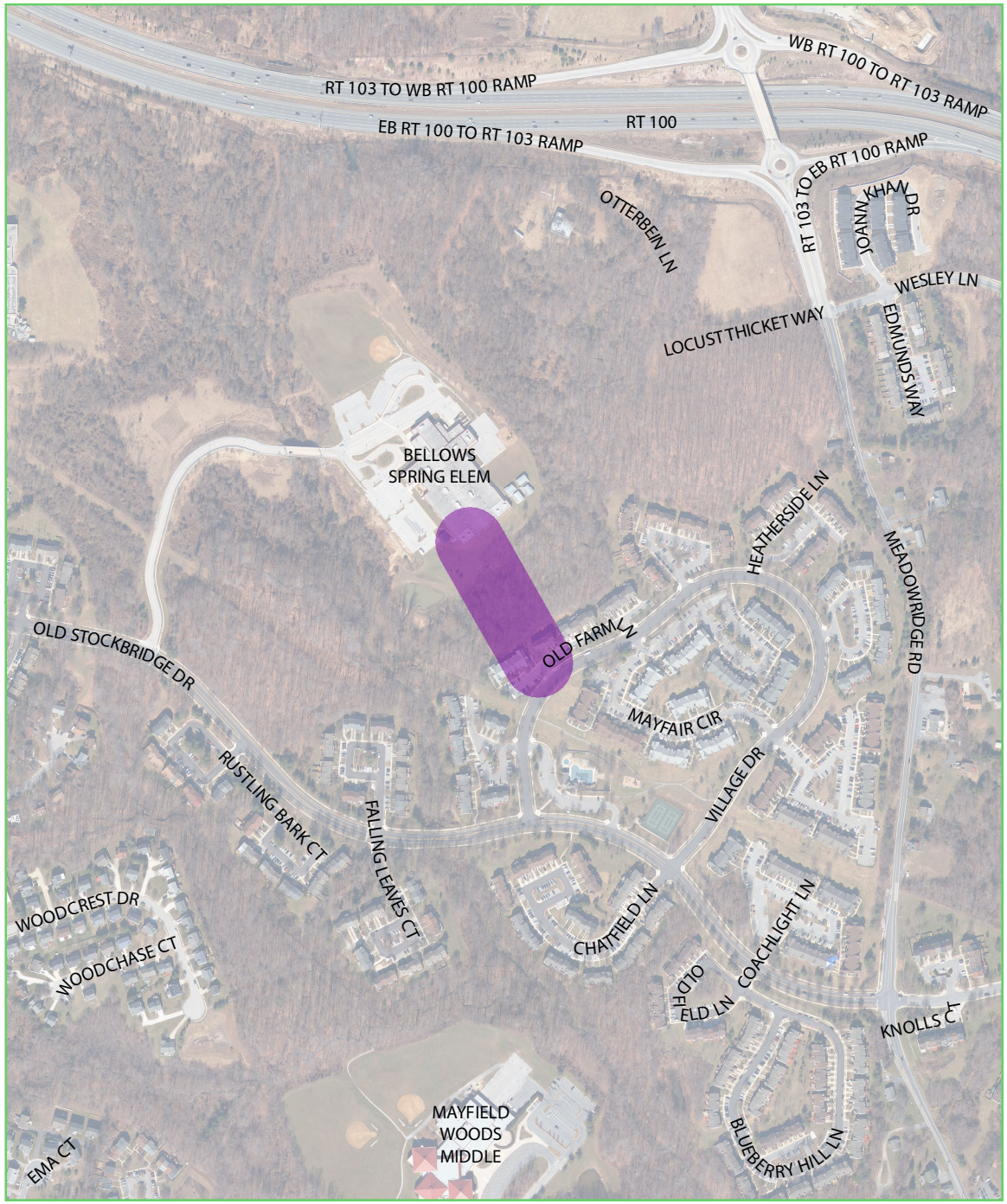


PRIORITY CONNECTION 9

The identified connection is between Bellows Springs ES and Old Farm Rd. It would create a link between the school and Woodland Village.

Needs Addressed by this Connection:
Safety and Safe Routes to School

Level of Effort: Medium

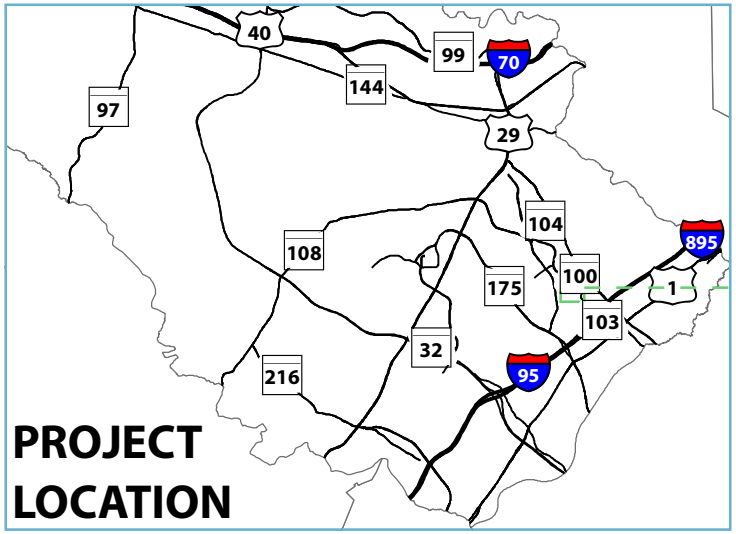


Priority Connection

N

FEET

0 510 1,020 1,530 2,040



PRIORITY CONNECTION 10

The identified connection is across US-29 and Broken Land Pkwy to create a link between Stevens Forest Rd and Downtown Columbia. This project is referenced in BikeHoward as Structured Project 63 and in the capital budget as Phase I of project T7107.

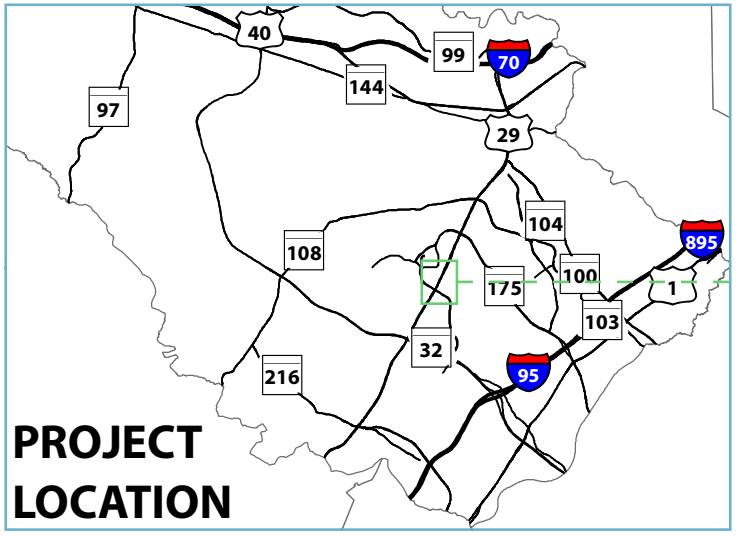
Needs Addressed by this Connection:
Safety, Access to Retail, and Network Connectivity

Level of Effort: High

Priority Connection

N

0 770 1,540 2,310 3,080 FEET



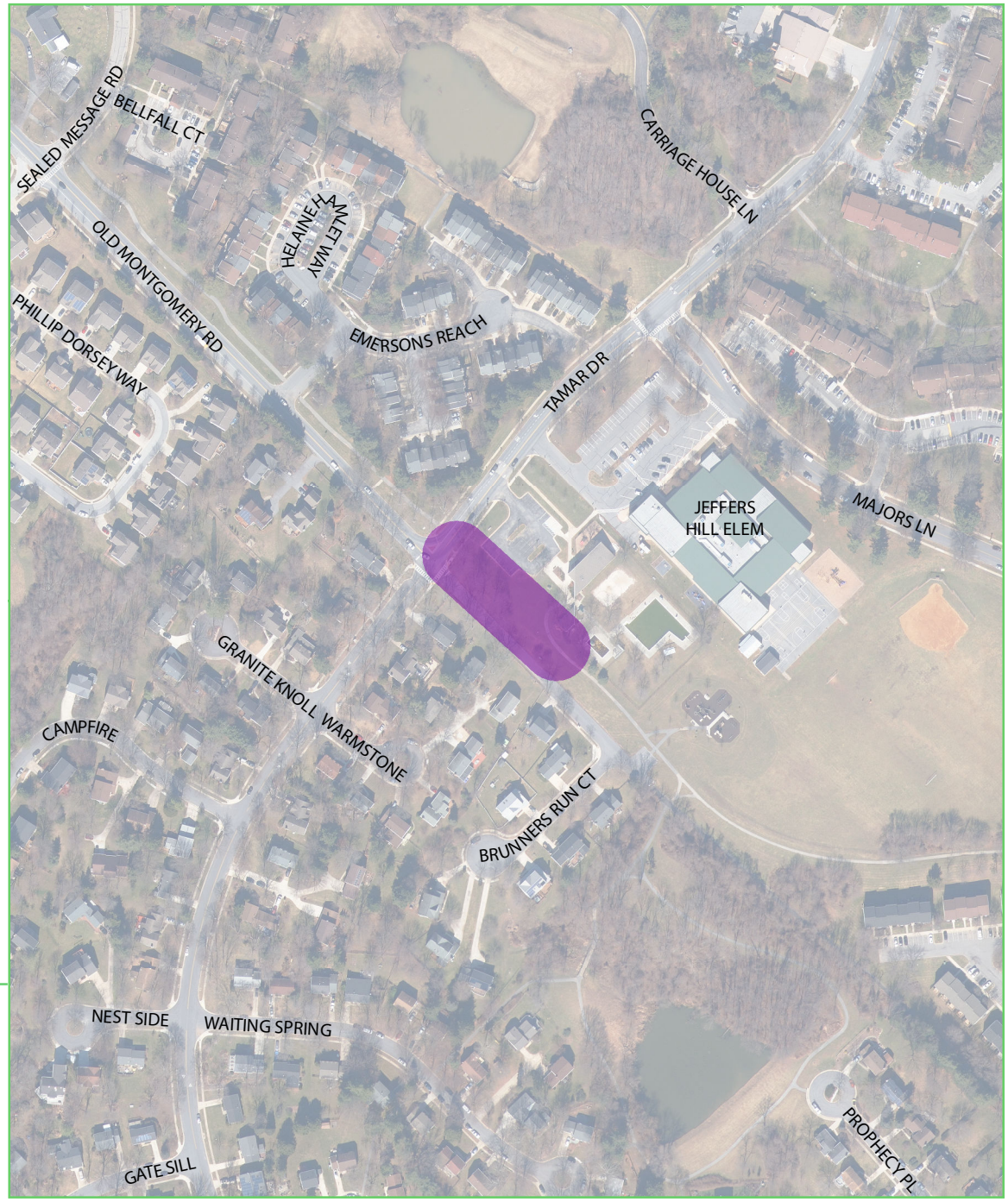


PRIORITY CONNECTION 11

The identified connection is a pathway gap adjacent to Old Montgomery Road near Jeffers Hill ES. Filling this gap would complete a connection between Blandair Park, Lake Elkhorn, and Long Reach.

Needs Addressed by this Connection:
Safety, Safe Routes to School, and Network Connectivity

Level of Effort: Low

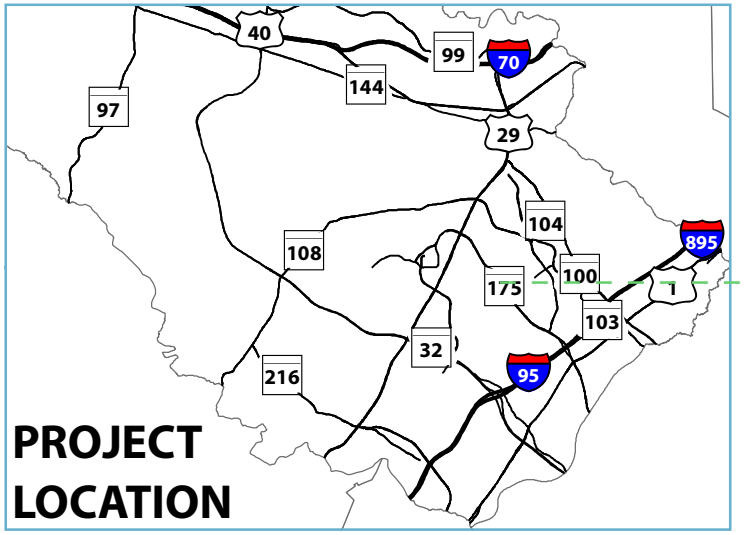


Priority Connection

N

FEET

0 250 500 750 1,000



PRIORITY CONNECTION 12

The identified connection is between Campus Dr and parking lots on the campus of Howard County General Hospital, and would create a link between the hospital and Howard Community College.

Needs Addressed by this Connection:
Network Connectivity

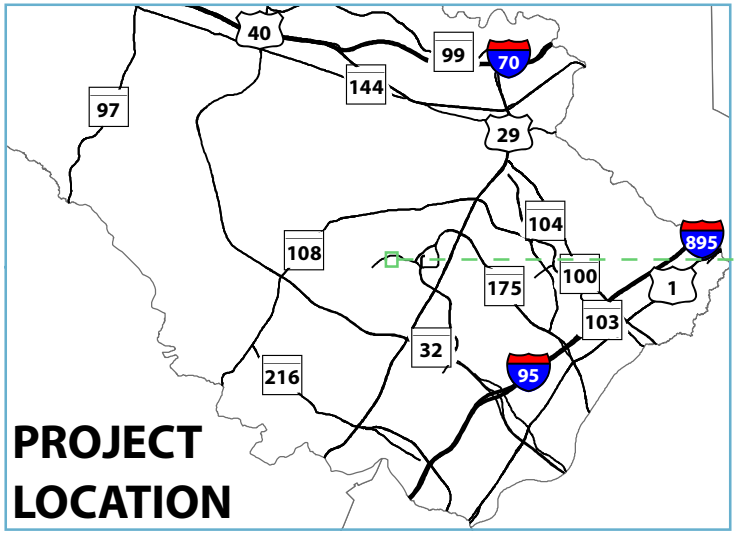
Level of Effort: Low

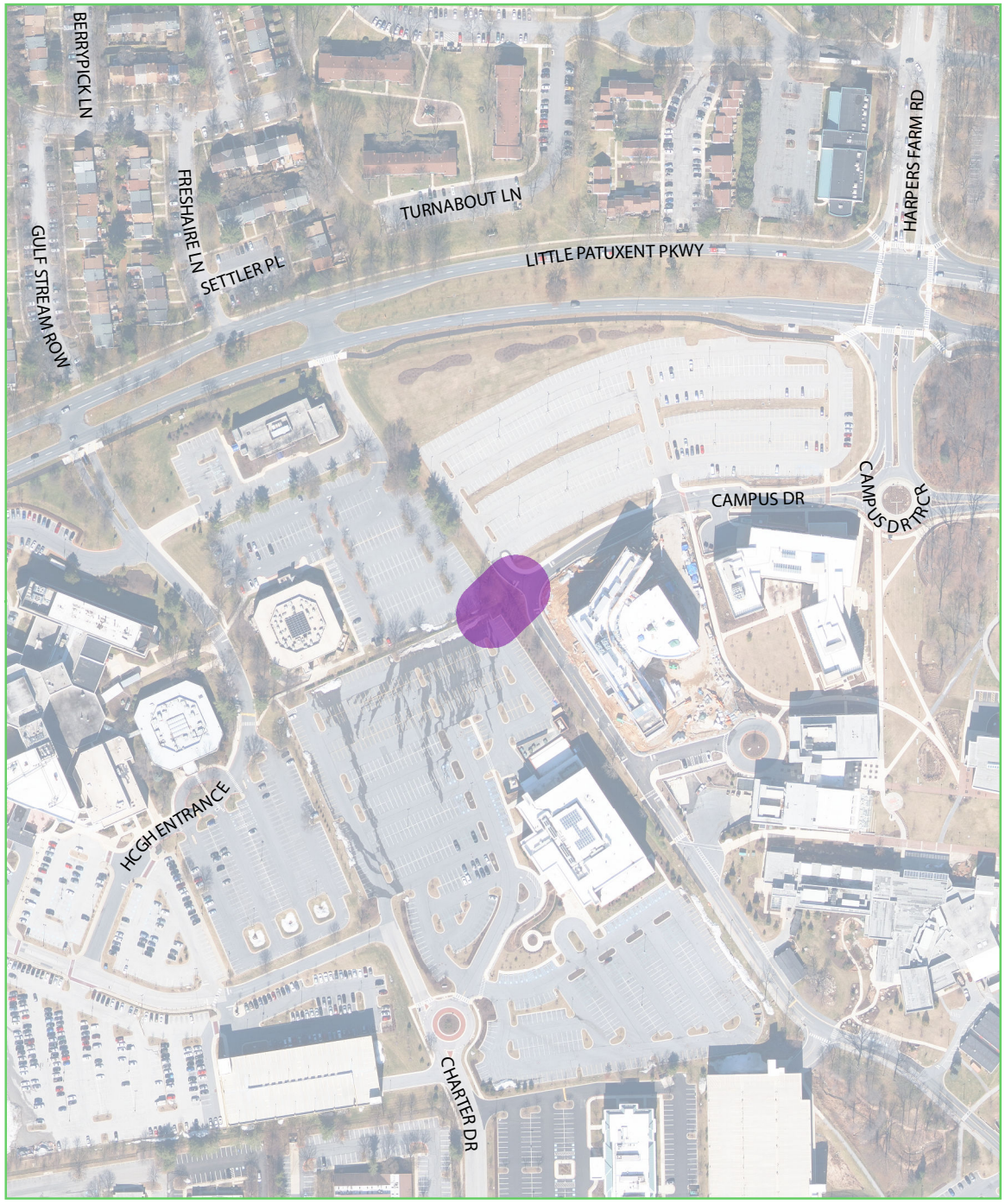
Priority Connection

N

FEET

0 250 500 750 1,000



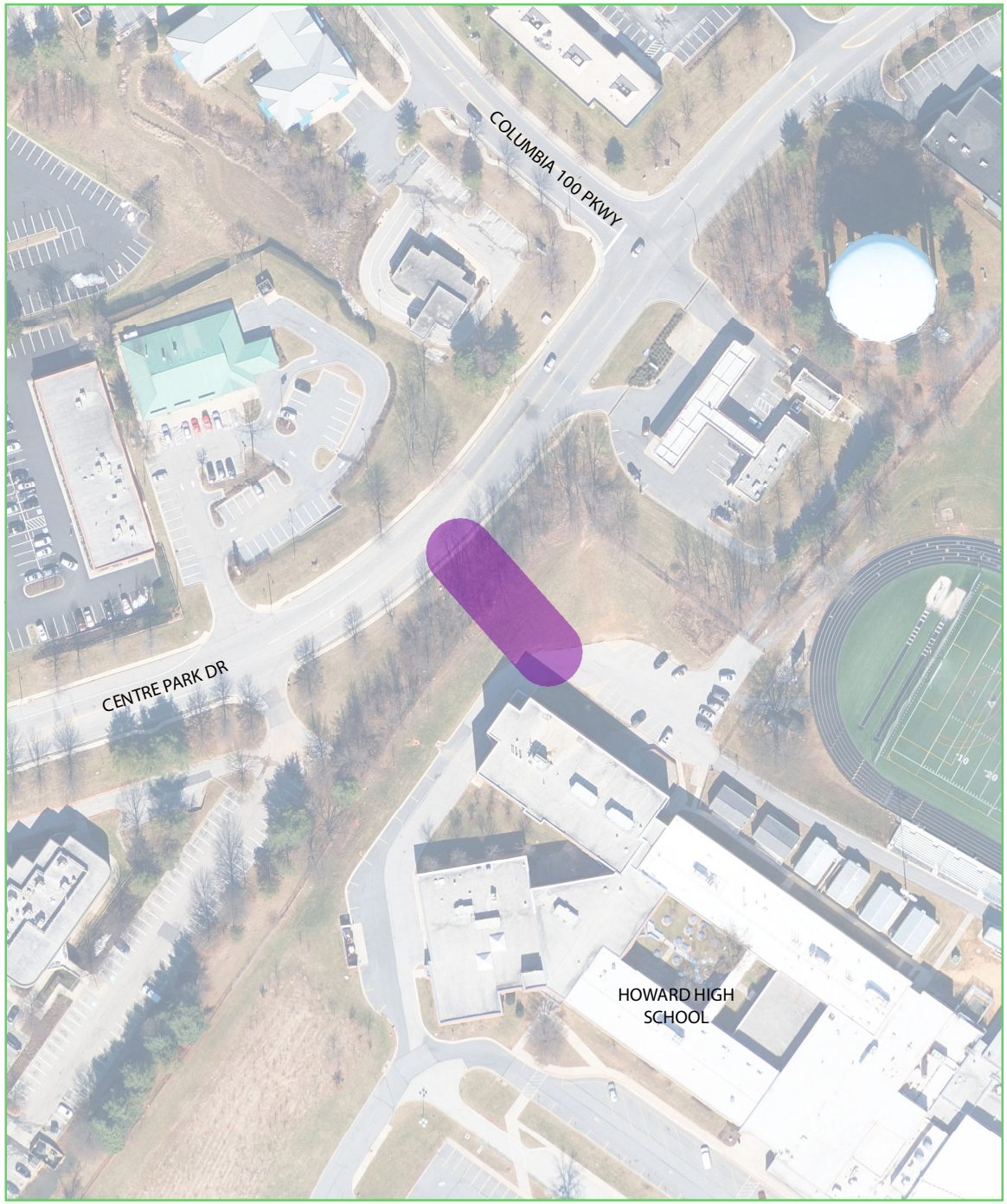


PRIORITY CONNECTION 13

The identified connection is between Howard HS and Centre Park Dr, and would create a link from the school to the shops and restaurants along Centre Park Dr and Columbia 100 Pkwy.

Needs Addressed by this Connection:
Safety, Access to Retail, and Safe Routes to School

Level of Effort: Low

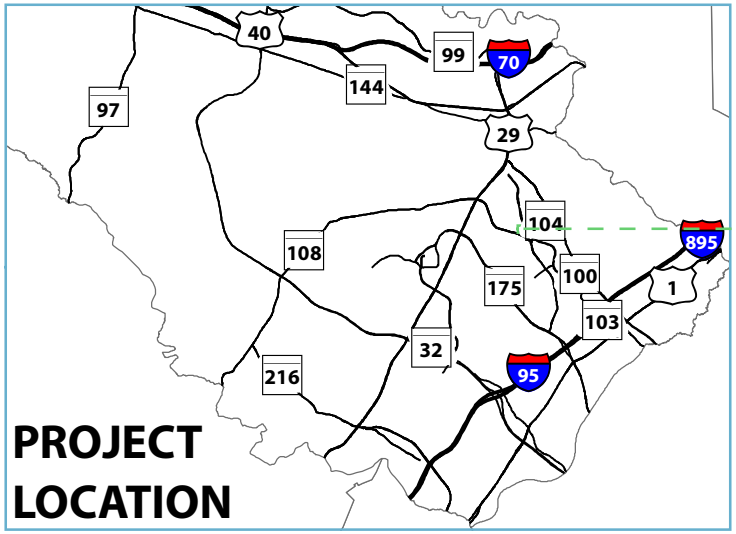


Priority Connection

N

FEET

0 125 250 375 500

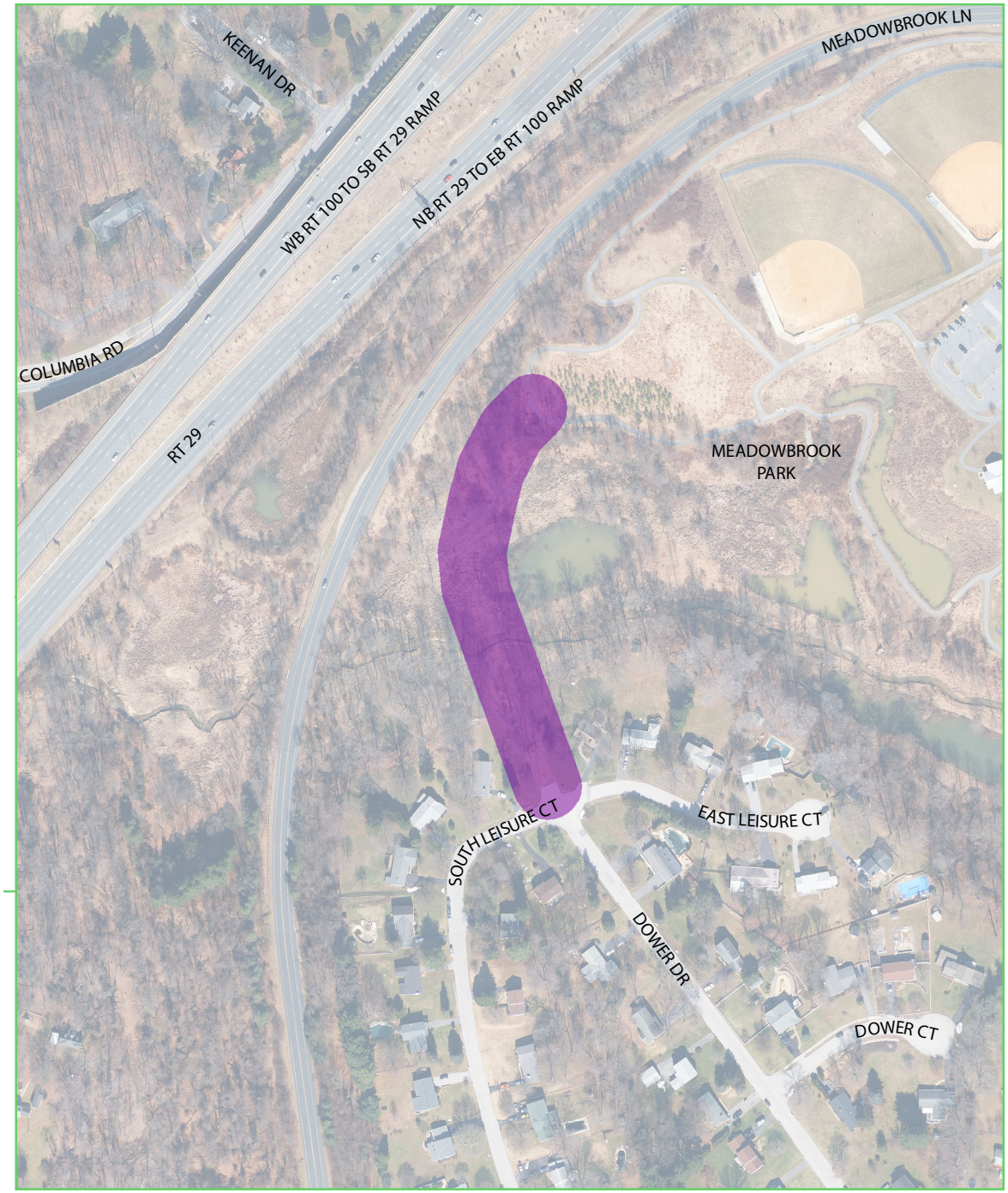


PRIORITY CONNECTION 14

The identified connection is between Dower Dr and Meadowbrook Park on existing Howard County property, and would create a connection between the Columbia Hills-Meadowbrook Farms neighborhood and Meadowbrook Park.

Needs Addressed by this Connection:
Safety and Network Connectivity

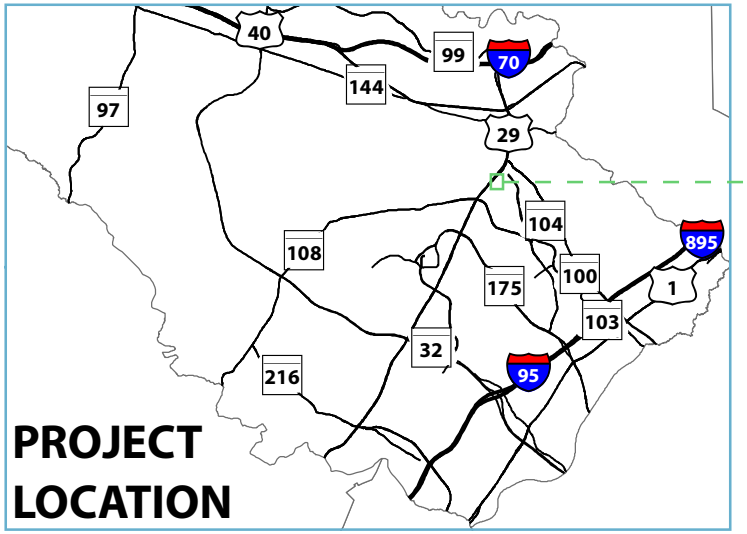
Level of Effort: Medium



Priority Connection

N

0 250 500 750 1,000 FEET

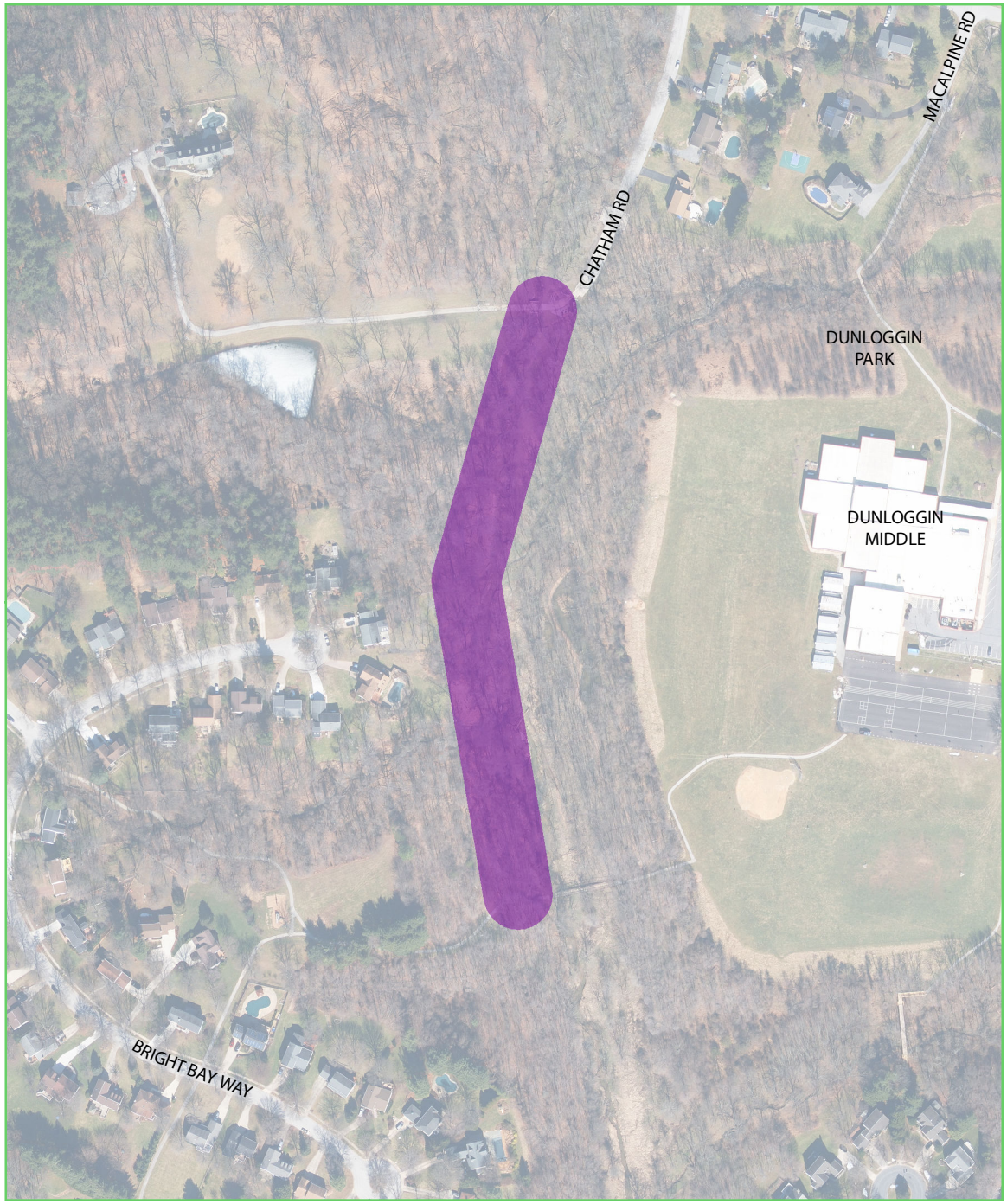


PRIORITY CONNECTION 15

The identified connection is between the end of Chatham Rd and the eisting pathway between Bright Bay Way and Dunloggin MS, and would create a link between the destinations on US-40 and Dorsey's Search.

Needs Addressed by this Connection:
Network Connectivity

Level of Effort: Medium

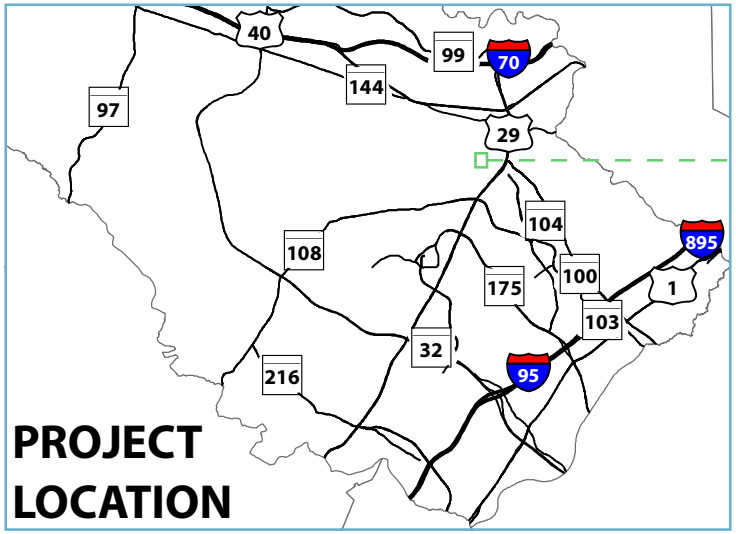


Priority Connection

N

FEET

0 250 500 750 1,000

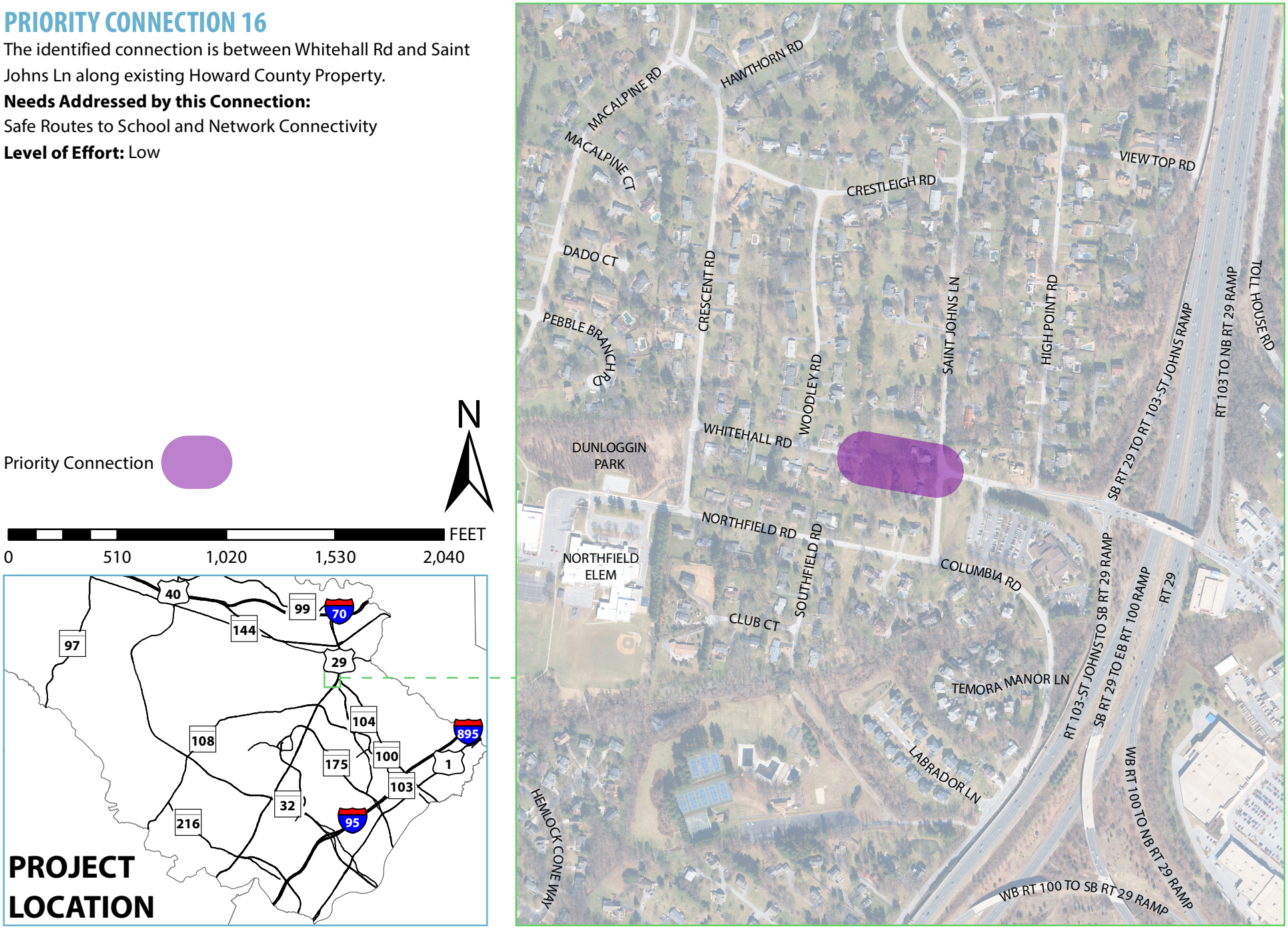


PRIORITY CONNECTION 16

The identified connection is between Whitehall Rd and Saint Johns Ln along existing Howard County Property.

Needs Addressed by this Connection:
Safe Routes to School and Network Connectivity

Level of Effort: Low

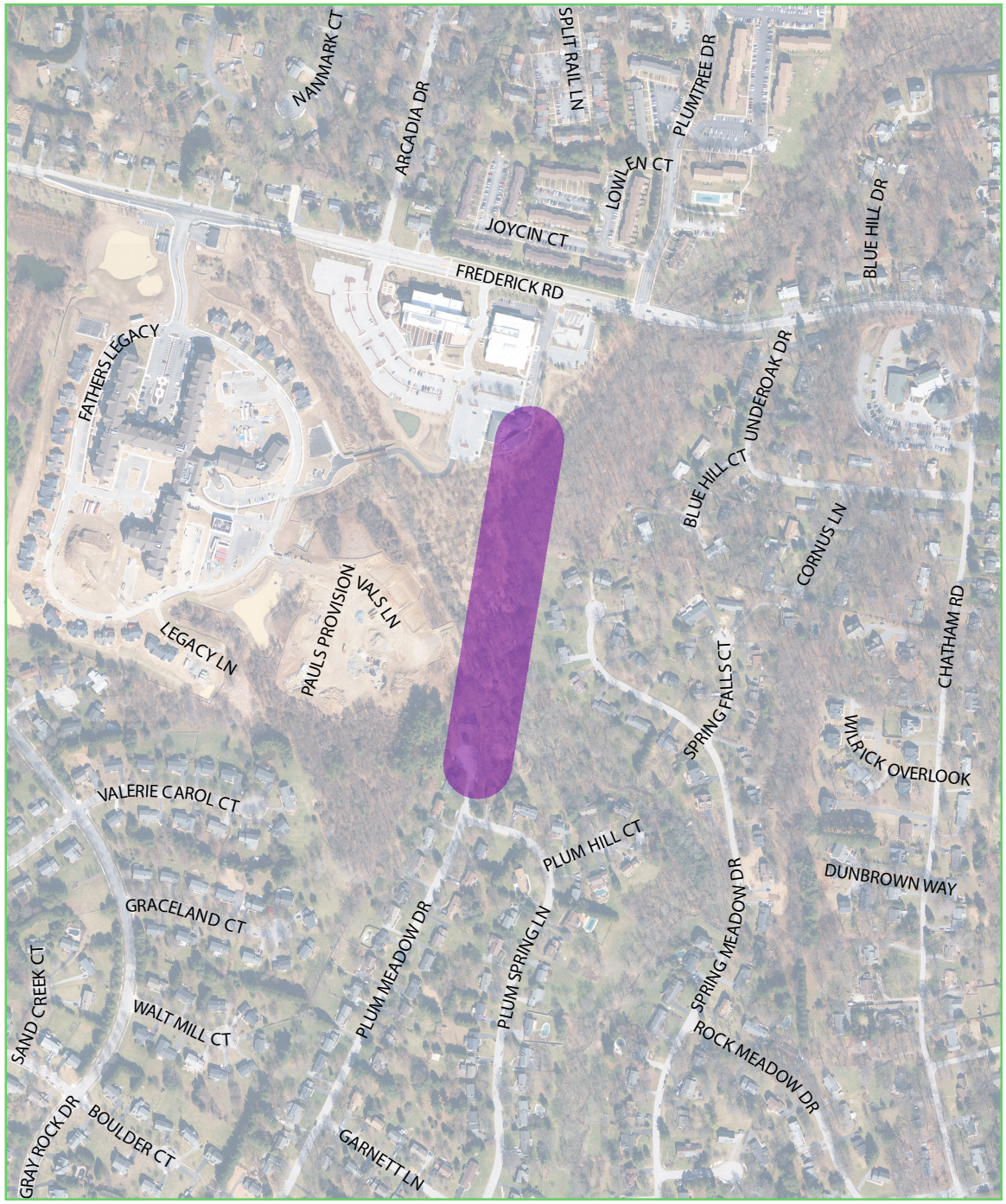


PRIORITY CONNECTION 17

The identified connection is between Plum Meadow Dr and the campus containing the Miller Branch of the Howard County Library System and the Ellicott City 50+ Center, and would create a connection between those facilities and the residential neighborhoods to the south.

Needs Addressed by this Connection:
Network Connectivity

Level of Effort: High

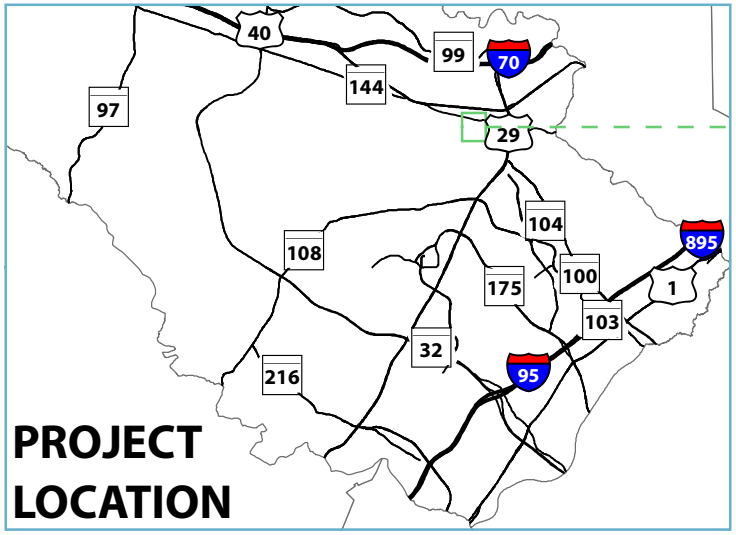


Priority Connection

N

FEET

0 510 1,020 1,530 2,040



THIS PAGE INTENTIONALLY LEFT BLANK

Appendices



Appendix A: Field assessment forms

This appendix consists of the field assessment forms used to determine the condition of bus stops, sidewalks, and intersections. A separate form was used for each of these infrastructure categories. All forms included a place to identify potential mitigation options from a single list. This list is shown on page 127 of this appendix.

BUS STOPS

Bus Stop ID:	**Location:** Midblock or Intersection (Circle One)	**Route(s):**	**Tax Map:**
Street Name:		**Date:**	**Grid:**

Nearest Intersection(s):	**Staff:**

		Yes	No	Code	Potential Mitigation Options
Bus stop sign:					1
	Sign present and visible from sidewalk access?				
	Is it correct?				
Bus stop lighting:					
	Street?				2, 5, 6
	Pedestrian scale?				
Bus stop landing pad:					7, 8, 9, 10, 11
	Landing pad greater than or equal to 8′ x 5′?				
	Pad connected to sidewalk?				
	Slope perpendicular to road less than or equal to 2%?				
Bus Shelter:					
	Existing Bus shelter?				13
	Shelter pad?				
	Bus schedule?				18, 19
	Route Map?				18, 19
	48″ Minimum peripheral access?				10, 11
	36″ Wide door or NO front panel?				14, 20
	36″ Wheelchair bay clear space?				16

		Yes	No	Code	Potential Mitigation Options
	60″ Internal wheelchair turnaround?				14, 17, 20
	Bench height between 17″ - 19″?				17
	Bench width between 20″ - 24″?				17
	Trash/Recycle receptacle? (Max height 48″)				21, 22, 23, 24
	Shelter Name?				15
	Condition:				
	Good				
	Fair (minor damage, vegetation)				
	Poor (non-ADA compliance)				
Edge of Pavement:					
	Curb and Gutter?				33, 34, 35
	Open Section?				
Other Concerns:					

PEDESTRIAN ACCESS/SIDEWALKS

Bus Stop ID(s):	**Location:** Midblock or Intersection (Circle One)	**Date:**	**Tax Map:**
To / From (Circle One)	**Nearest Intersection ID(s):**	**Staff:**	**Grid:**

Street Name: (*Direction of Travel*)	**Driveway ID:**	**Segment ID:**

Pedestrian Accessible Route:	**Yes**	**No**	**Code**	**Potential Mitigation Options**
Sidewalk?				25,26, 27
Pathway?				28, 29,30
Concrete?				
Asphalt?				
Other?				
Greater than or equal to 48" wide?				
Cross-slope less than or equal to 2%?				
Buffer from curb/shoulder?				
Less than 36"?				
Greater than or equal to 36"?				
Curb ramps where needed? (not intersections —driveways or private road)				

Pedestrian Accessible Route:	**Yes**	**No**	**Code**	**Potential Mitigation Options**
Non-compliant curb ramp(s)?				
Driveway across pedestrian pathway? (Cross-slope less than or equal to 2%)				
Obstructions:				26,31, 32
Minor obstruction? (Can be removed or repaired at low cost)				
Damaged sidewalk segment(s)?				
Major obstruction? (Light pole or tree to be removed; higher level cost to mitigate)				
Other Concerns:				

INTERSECTIONS

Intersection ID:	Nearest Bus Stop ID(s):	Date:			Tax Map:
Bus Stop Location: Midblock or Intersection (Circle One)		**Staff:**			**Grid:**

Intersection Name:					

Curb Ramps	Yes	No	Code	Potential Mitigation Options
Curb Ramp(s)?				33, 34, 35, 40
Diagonal to both ROW directions?				
Perpendicular to ROW direction?				
Parallel Curb Ramps with landing perpendicular to ROW direction?				
Intersection missing some curb ramps (for perpendicular and parallel to ROW crossing only)?				
Non-compliant curb ramp(s)?				
Signalized intersections				36, 37, 38, 39, 40
Pedestrian indications?				
Audio?				
Vibro-tactile?				
Pedestrian indications button?				
Is pedestrian indications button compliant?				
Non-Signalized intersections				
Stop sign control?				41
Crosswalk				
Marked Crosswalk?				
Width greater than or equal to 72”?				

Curb Ramps	Yes	No	Code	Potential Mitigation Options
Unmarked Crosswalk?				42
Lighting				
Lighting needed?				2, 5, 6
Lighting Broken? (work order needed)				31
Pedestrian refuge				43, 44, 45
Pedestrian refuge where needed?				
Median?				

MITIGATION OPTIONS

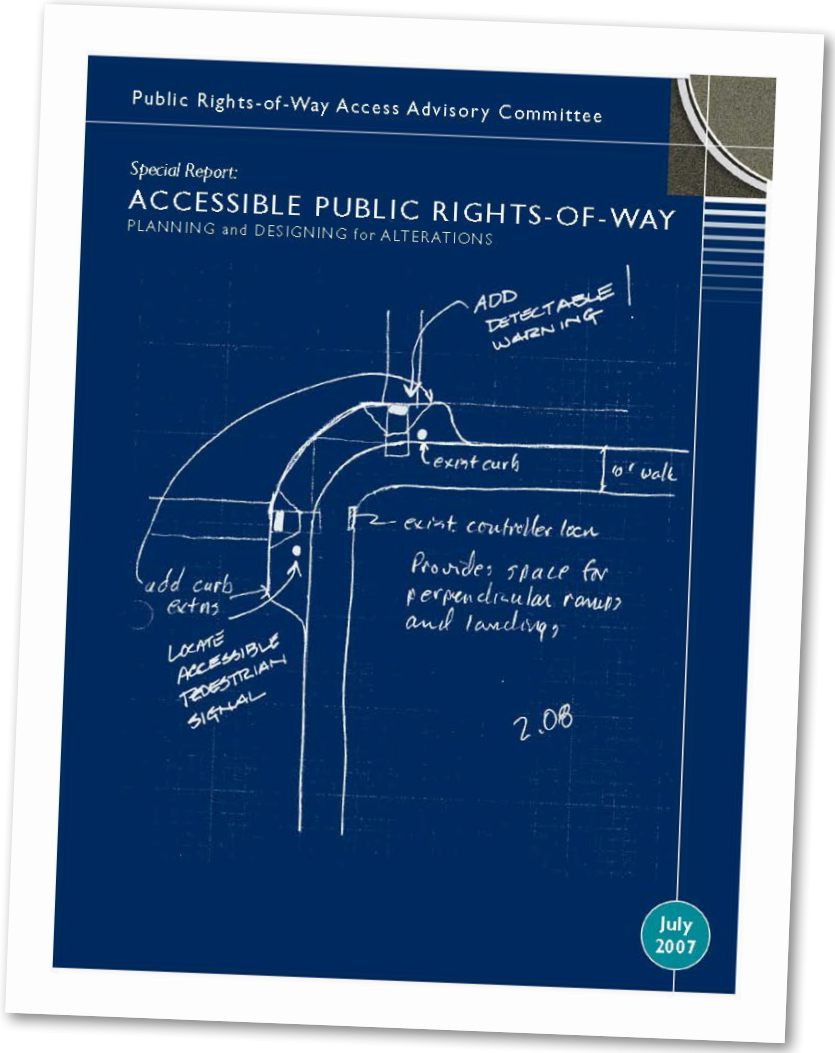
Description	Code	Actions
Bus stop sign	1	Install or replace sign
Bus Stop lighting	2	Install street/pedestrian scale light
	3	Install shelter light
	4	Repair shelter light
	5	Repair street/pedestrian light
	6	Install electric service or solar battery
Bus Stop Pad	7	Install 8′ x 5′ landing pad
	8	Demolish/replace landing pad
	9	Install shelter pad
	10	Repair shelter pad
	11	Modify pad
Bus Stop Shelter	12	Demolish and rebuild shelter
	13	Install shelter
	14	Remove front panel
	15	Label on shelter
	16	Install wheelchair bay
	17	Replace/modify bench (Other than 12)
	18	Install map/schedule holder
	19	Install map/schedule
	20	Modify access to shelter door
	21	Install trash receptacle
	22	Reposition trash receptacle
	23	Install recycle receptacle
	24	Reposition recycle receptacle

Description	Code	Actions
Pedestrian Access	25	Install sidewalk
	26	Repair sidewalk
	27	Demolish/replace sidewalk
	28	Install pathway
	29	Repair pathway
	30	Replace Pathway
Obstructions	31	Contact SHA, DPW, BGE, etc.
	32	Relocate obstruction
Curb	34	Reconstruct curb ramp (demolish/rebuild)
	35	Install curb ramp
Signalized Intersections	36	Install pedestrian signal
	37	Modify pedestrian signal
	38	Install audio cues
	39	Modify audio cues
Signalized Intersections	41	Install/replace stop sign
Crosswalk	42	Repair/replace crosswalk
Pedestrian refuge	43	Install refuge
	44	Install median with refuge
	45	Install pedestrian island with refuge
Other	46	Other

Appendix B: Curb Ramp Placement Best Practices

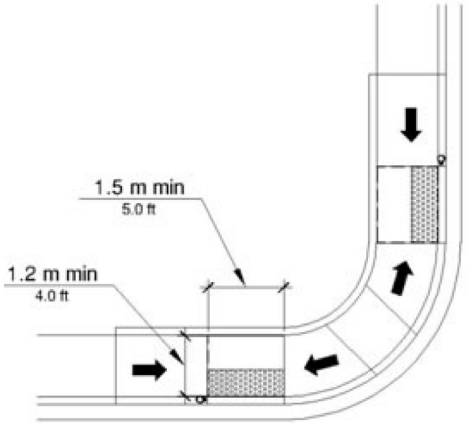
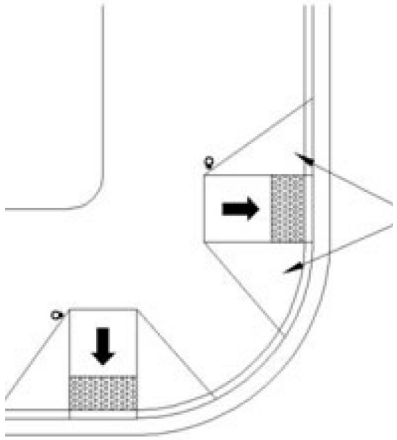
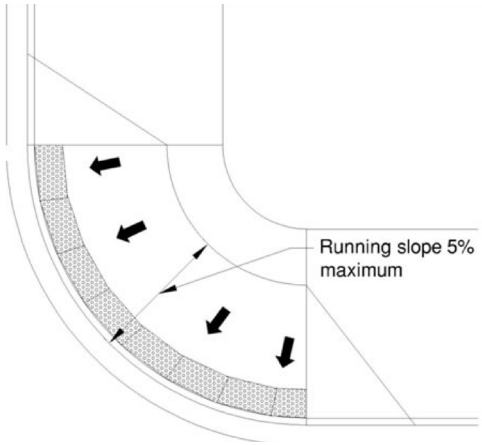
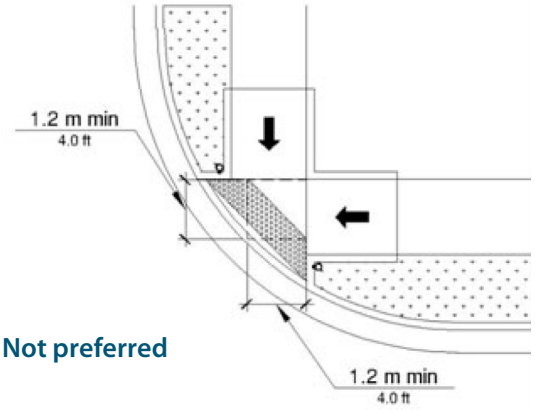
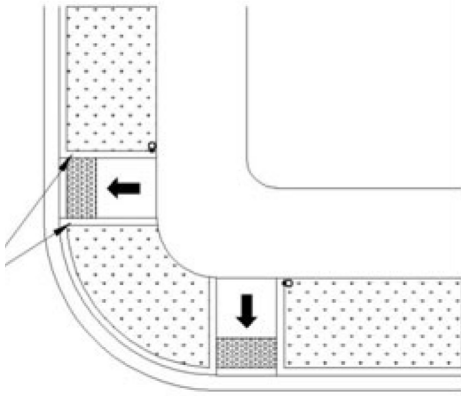
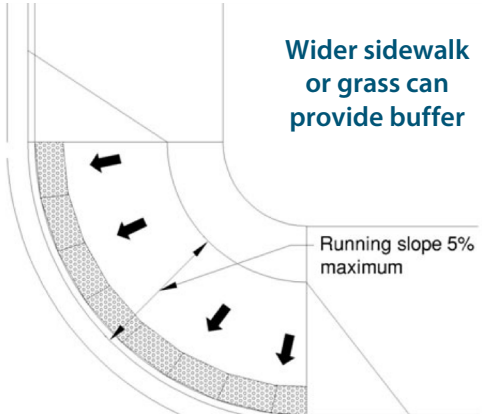
The review of curb ramps was prepared for a July 24, 2014 Home Builders' Forum and presented by a member of the County Department of Public Works staff. This document contains a limited number of examples of curb ramp placement elements. It draws heavily from material developed by the Federal Highway Administration, the U.S. Access Board, and John McNally at CED Engineering, Stony Point, NY.

Example 5 is of the preferred driveway treatment. The preferred treatment maintains the sidewalk across a driveway instead of interrupting the sidewalk with a driveway designed like a roadway, requiring pedestrians to step down and up onto the driveway.



GENERIC EXAMPLES OF CURB RAMP TYPES

Three basic types of curb ramps—parallel, perpendicular, and blended transition—are used to meet PROWAG requirements. Site-specific conditions will determine if a single type or combination of ramp types is suitable for each location. See the next table, "Elements affecting curb ramp placement and type" for more information.

	Parallel	Perpendicular	Blended transition
Without Buffer at Back of Curb			
With Buffer at Back of Curb	 Not preferred		 Wider sidewalk or grass can provide buffer

ELEMENTS AFFECTING CURB RAMP PLACEMENT AND TYPE

The table below shows ten common factors affecting curb ramp placement and type, along with typical conditions and impacts on curb ramp placement.

	Element	Typical conditions	Impact on curb ramp
1	Sidewalk placement	Next to curb (no buffer)	Travel path will include ramps.
		Buffer between sidewalk and curb	May result in ramps placed outside of pedestrian travel path along sidewalk
2	Radius curb return	Tight (e.g., 10′)	Allows curb ramp and crosswalk to be placed closer to the corner, depending on buffer
		Wide (e.g., 30′)	Curb ramps and crosswalks moved farther away from corner
3	Topography	Relatively flat	Ideal conditions for compliant ramp configuration
		Steep roadway grades	Requires ramps to be longer in order to tie back into roadway slopes
		Presence of elevation or depression	Topography affects curb ramp type or requires grading and supporting structure
4	Available right of way	Sufficient	None
		Insufficient	Acquiring needed ROW is at the County's discretion
5	Sidewalk width	Less than 5′	Widen sidewalk to meet 5′ minimum
		Between 5′ and 10′	May need to use parallel ramps where sidewalks are narrower
		Sidewalk greater than 10′	Will allow for landing area on sidewalk above ramp
6	Utility placement	Obstructs pedestrian path of travel	Adjust ramp location to avoid utility if possible, or move utility (determine who pays)
		No obstruction	Utility relocation may still be required for other reasons such as access to pedestrian push buttons
		No obstruction, but affects placement	Determine which 'side' of utility is best pedestrian pathway
7	Drainage	Inlets are not in the pedestrian path of travel	None
		Inlets are in the pedestrian path of travel	May affect curb ramp placement or size beyond minimum required
		Water does not drain properly and puddles at base of the curb ramp	Resolve drainage issue or place curb ramp in a different location
8	Site distances	Clear sight distances for all modes on all approaches	Place curb ramp in best location for motorists/vehicles and pedestrians to be visible to one another
		Sight distance limited due to utility poles, trees/vegetation, building, signs, etc.	Restrict parking from corner per County or SHA requirements Address sight distance issue or shift in curb ramp location
9	Infrastructure for other modes and other obstacles	Bike lanes, bus stops, street furniture, signs limit flexibility	Widen sidewalk or place infrastructure items and or/obstacles in locations that ensure 4′ minimum clear width of travel path
10	Crosswalk placement	One crosswalk for each pedestrian path of travel	Optimal configuration
		Crosswalk in alignment with curb ramp	Optimal configuration
		Diagonal section of crosswalk connects two crosswalks	Required to provide landing area where blended diagonal configuration is used. Not desirable.
		Crosswalk and curb ramp are not aligned	Adjust placement of crosswalk to align with ramps.
		No crosswalk	Provide crosswalks and ramps at intersections where pedestrian crossing occurs.

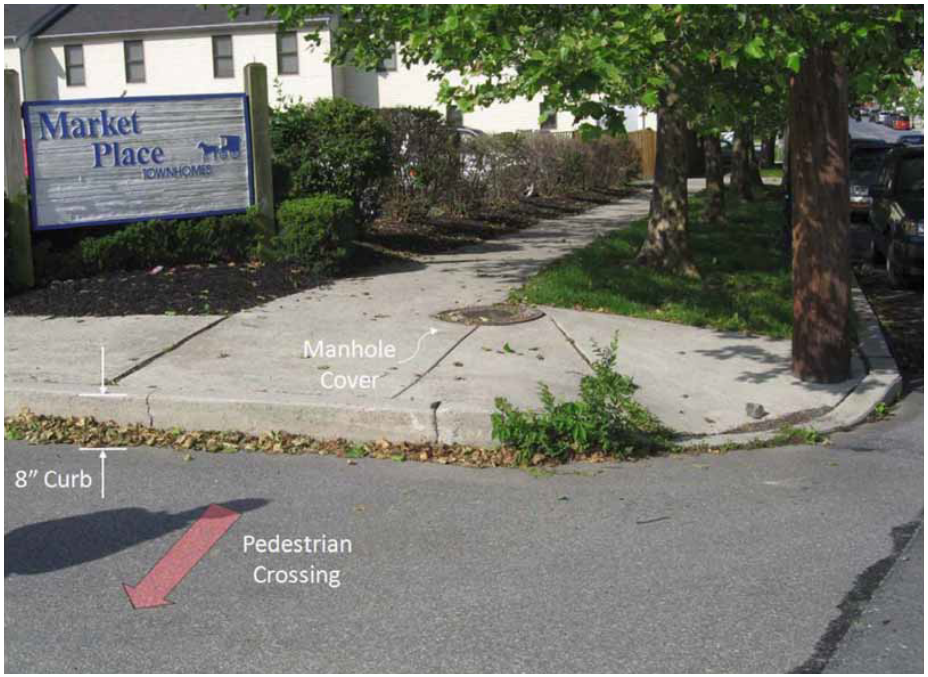
EXAMPLES OF CURB RAMP CHANGES TO MEET PROWAG REQUIREMENT AND A PREFERRED DRIVEWAY APRON DESIGN

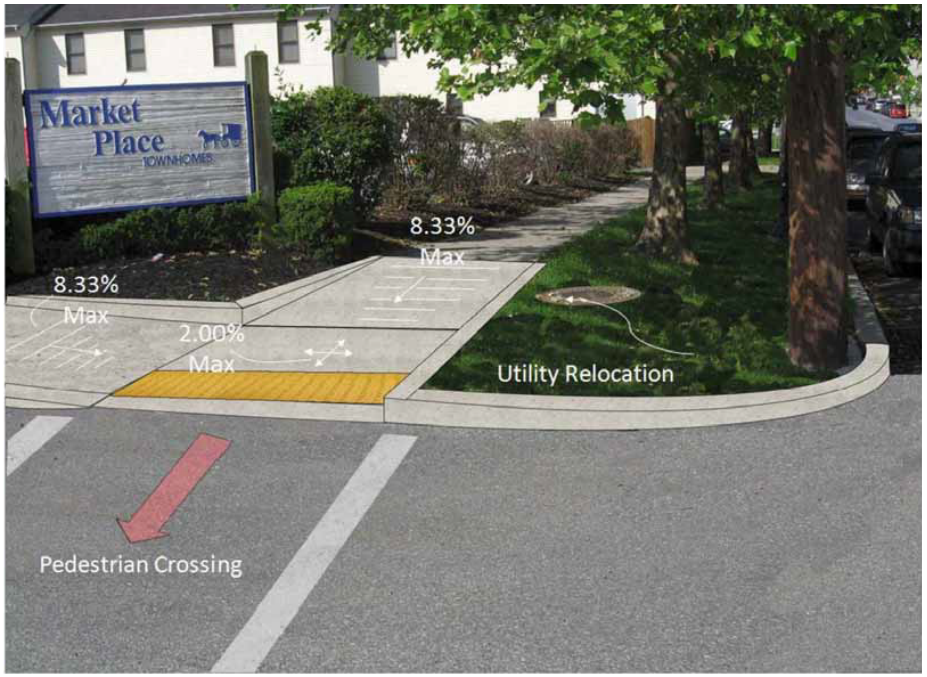
Example 1:

BEFORE: Diagonal curb ramp with limited landing area; only one pedestrian path of travel

AFTER: Replace with parallel ramp serving pedestrian path of travel

	Element	Condition	Solution
1	Sidewalk placement	Next to curb on one approach; buffer on one approach; only one ramp needed	Use parallel ramp configuration
2	Radius curb return	Tight	Curb ramp remains close to corner
4	Available ROW	Sufficient	No additional ROW needed
5	Sidewalk width	Less than 5′	Widen approaching sidewalk ramp to 5′ minimum
6	Utility placement	Obstructs pedestrian path of travel	Move utility to reclaimed grass buffer
8	Site distances	Trees may obstruct line of site for pedestrians and motorists traveling in the direction of the pedestrian path of travel	Restrict parking from corner per County or SHA requirements
10	Crosswalk	No crosswalk	Stripe crosswalk in alignment with new curb ramp





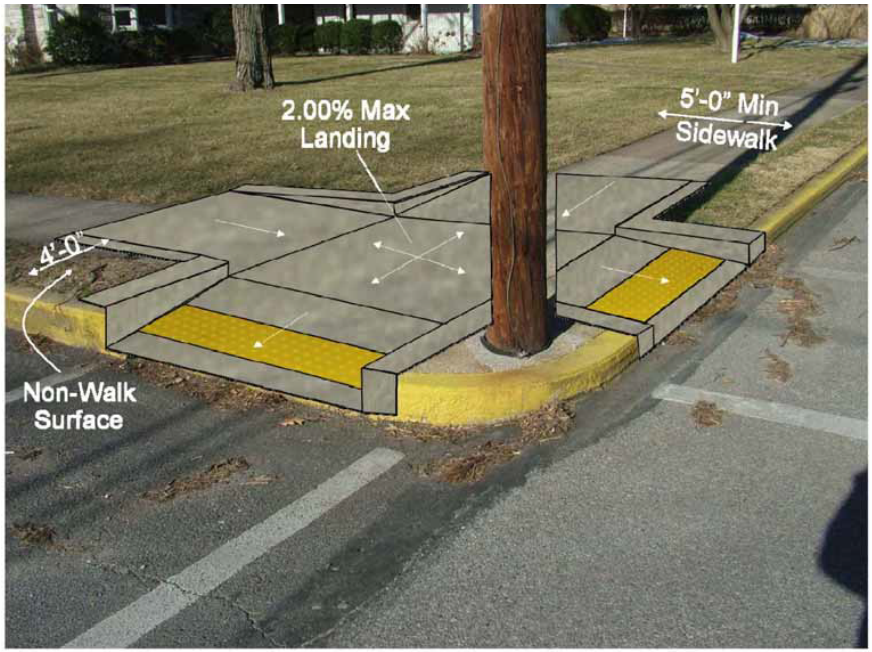
Example 2:

BEFORE: No curb ramps for striped crosswalks

AFTER: Install parallel curb ramps

	Element	Condition	Solution
1	Sidewalk placement	Buffer between sidewalk and curb	Use perpendicular ramp configuration. Sidewalk relocation may be required if buffer is narrow.
2	Radius curb return	Tight	Curb ramp remains close to corner
4	Available ROW	Sufficient	No additional ROW needed
5	Sidewalk width	Less than 5′	Widen approaching sidewalk ramp to 5′ minimum
6	Utility placement	No obstruction	
8	Site distances	Utility pole may obstruct line of site for pedestrians and motorists traveling in the direction of the pedestrian path of travel	Relocate utility pole, if possible
10	Crosswalk	NA	Re-stripe crosswalk, if needed to align with new curb ramp.



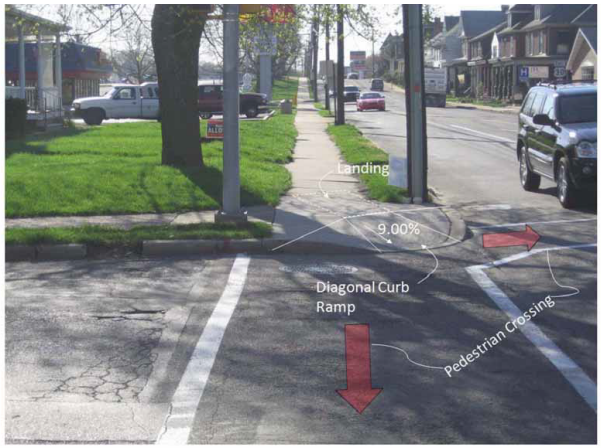


Example 3:

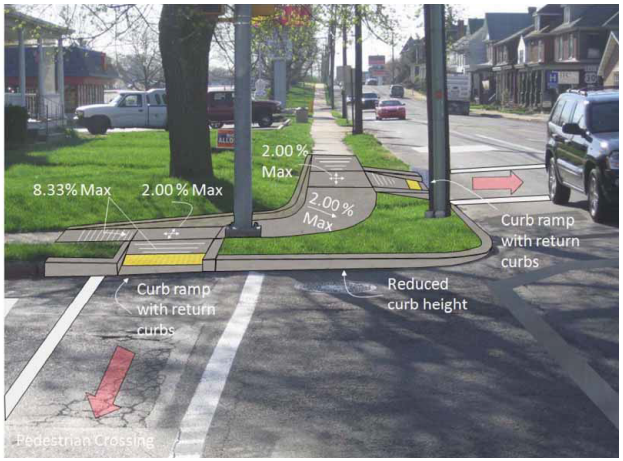
BEFORE: **Diagonal curb ramp with limited landing area and diagonal crosswalk striping to connect two crosswalks**

AFTER: **Replace with curb maps for each pedestrian path of travel**

	Element	Condition	Solution 1	Solution 2
1	Sidewalk placement	Buffer between sidewalk and curb	Provide blended transition (not generally desirable, but may be the appropriate solution if sight distance is an issue with perpendicular configuration)	Provide perpendicular ramp configuration (may not be desirable if ramps are farther from intersection and sight distance obstructions are present
2	Radius curb return	Tight	Curb ramp remains close to corner	Curb ramps move away from corner
4	Available ROW	Sufficient	No additional ROW needed	No additional ROW needed
5	Sidewalk width	Less than 5'	Widen approaching sidewalk ramp to 5' minimum	Widen approaching sidewalk and sidewalk corner
6	Utility placement	No obstruction, but offers two options for curb ramp placement	Curb ramps placed 'inside' utility poles	Curb ramps placed 'outside' utility poles
7	Drainage	Inlets away from corner	No affect or curb ramps	Ensure drainage works, due to curb ramp placement next to inlet.
8	Site distances	Utility poles may obstruct line of site for pedestrians and motorists traveling in the direction of the pedestrian path of travel	Relocate utility poles, if possible	Stop bar pushed back may create sight distance issues
10	Crosswalk	Diagonal section of crosswalk connects two crosswalks	Re-stripe one crosswalk for each pedestrian path of travel	Re-stripe one crosswalk for each pedestrian path of travel





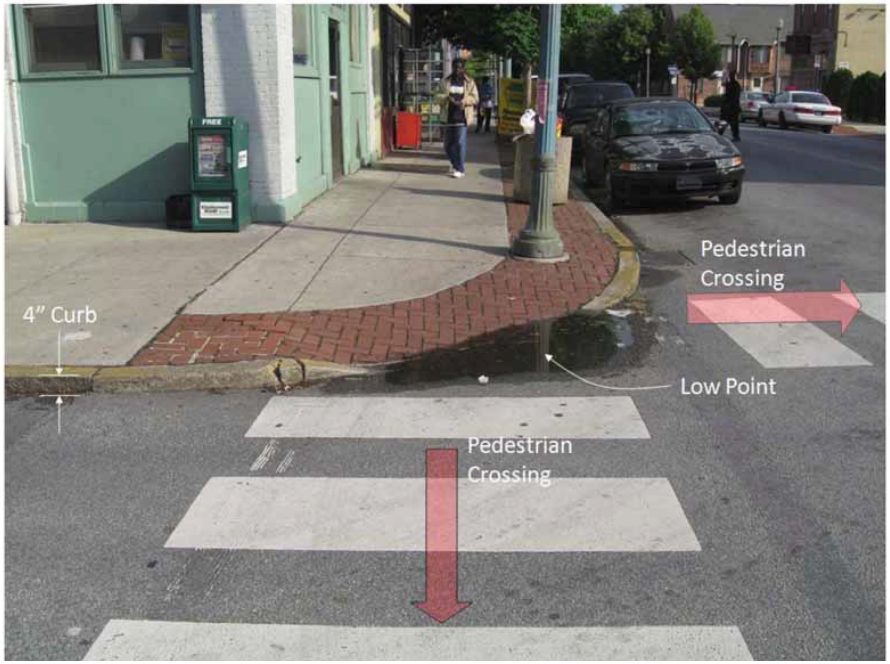


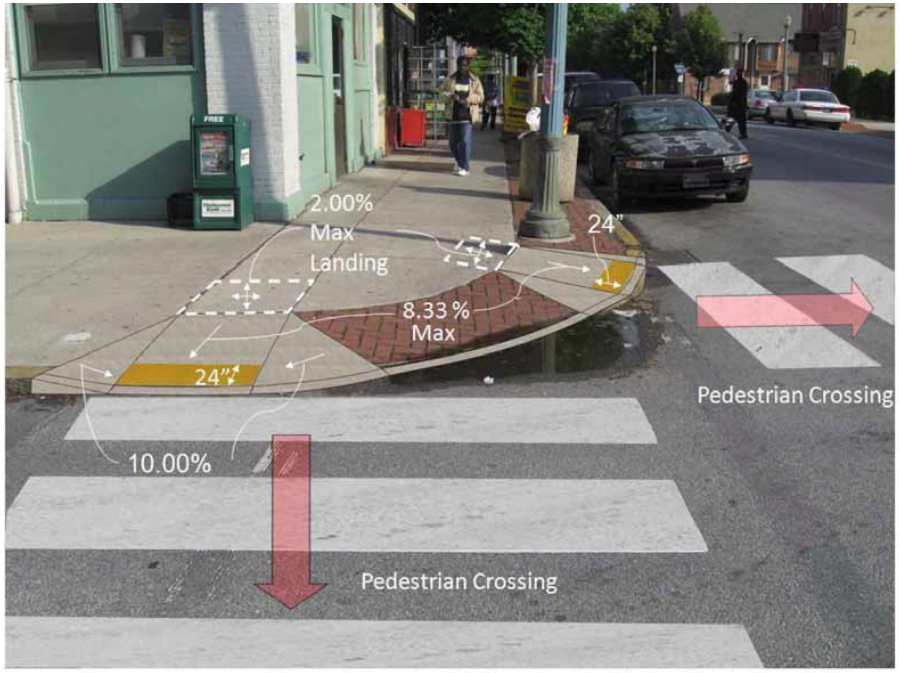
Example 4:

BEFORE: Diagonal curb ramp with drainage issue

AFTER: Install two perpendicular curb ramps, but drainage issue remains unresolved.

	Element	Condition	Solution
1	Sidewalk placement	Buffer between sidewalk and curb	
2	Radius curb return	Wide	Curb ramps placed on edges of corner radii
4	Available ROW	Sufficient	No additional ROW needed
5	Sidewalk width	Between 5' and 10' (but cross slope seems greater than 2%)	Blended transition at corner apex with perpendicular curb ramps and landing area
6	Utility placement	No obstruction	
8	Sight distances	The single utility pole and building setbacks don't appear to affect sight lines	
10	Crosswalk	Crosswalks within the capture area of the curb ramp	Re-stripe crosswalks and widen to meet outer curb ramp edge

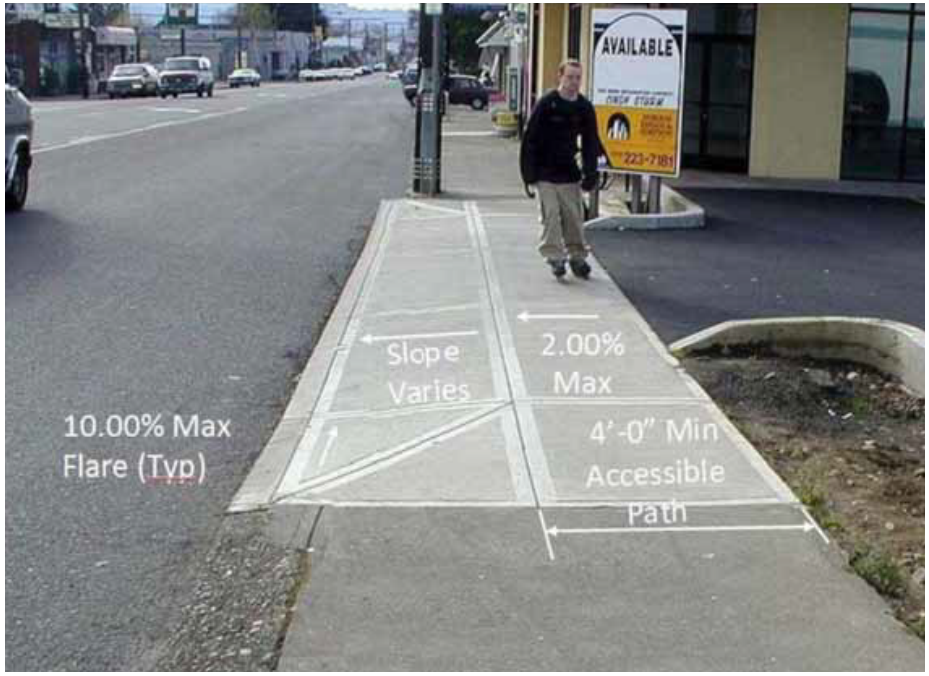




Example 5:

Preferred driveway apron with sidewalk remaining at same level across the driveway and corner radii is tight

Safety outcomes:
Pedestrians are more visible to motorists
Avoid need for curb ramps
Motorists slow to turn into and out of driveway

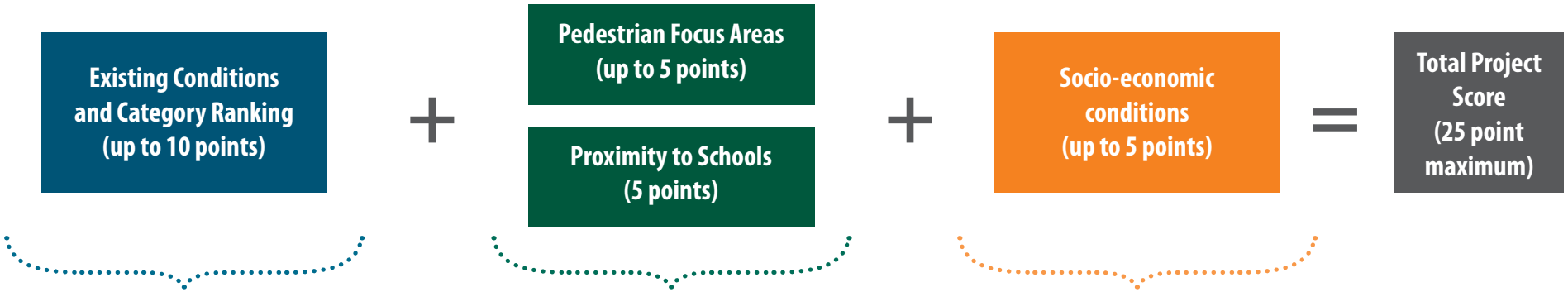


Appendix C: Development of Project Prioritization Scores

A complete and well-maintained pedestrian network has safety, economic, and community well-being benefits, but establishing and maintaining such a network takes resources. Balancing pedestrian network needs with available resources requires determining priorities for projects. The prioritization process starts with determining which projects are the most needed, independent of cost and feasibility. This allows projects to be compared on their merits.

PROJECT PRIORITIZATION METHODOLOGY

The diagram below gives an overview of the various factors used to calculate priority scores for pedestrian network improvements. The next sections describe the prioritization process, and a more detailed explanation is presented in **Appendix D**.



WHAT'S NEEDED AND WHAT'S IMPORTANT?

In addition to surveying existing conditions, the field assessment identified needs within the pedestrian network by determining what changes were needed at each location to meet pedestrian infrastructure needs.

The compilation of field assessments and public input was divided into four manageable categories—sidewalks, intersections, bus stops, and missing connections—which the Pedestrian Advisory Team ranked in order of importance.

The maximum number of points that could be assigned for the first two elements of the scoring was 10 points.

WHERE DO PEDESTRIANS WALK?

This question was answered through a mapping exercise that identified 'pedestrian focus areas' by factoring in pedestrian destinations (such as schools, employment centers, bus stops, retail and entertainment, health care facilities, and other civic destinations) and walking conditions.

The maximum number of points that could be assigned for this element of the scoring was 5 points.

WHAT ELSE IS IMPORTANT?

PlanHoward 2030 included an analysis that used five socio-economic factors to identify historically-underserved populations and communities. To ensure that high-need communities receive necessary pedestrian network improvements, these five factors were therefore included in the project scoring: low median household income, high rates of rental households, low rates of college education, high rates of single parents with children under 18, and high rates of unemployment.

The maximum number of points that could be assigned for this element of the scoring was 5 points.

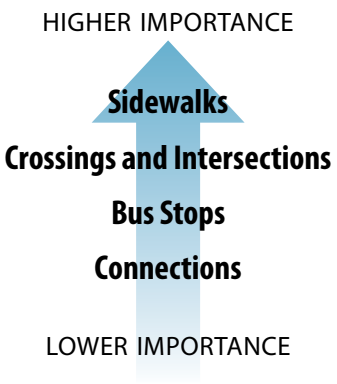
WHAT IS NEEDED?

The field assessment identified the presence and condition of pedestrian infrastructure, and identified mitigations to improve pedestrian conditions. Each surveyed sidewalk, intersection, and bus shelter received a number of suggested mitigation actions. To simplify the scoring, only the top three most common mitigations from the field assessment were used for sidewalks, intersections, and bus stops. Missing connections were not identified or assessed in the field. Instead, the locations of needed off-road connections were identified through the public input phase of the plan development.

Project Category	Mitigation Action
Sidewalks	• Install, Replace, Repair, Curb Ramps OR Install, Replace, Tactile Pads (not double counted if both are selected) • Install Sidewalk • Repair Sidewalk
Intersections	• Install Tactile Pads OR Reconstruct Curb Ramp (not double counted if both are selected) • Install Curb Ramp • Install Crosswalk at All Approaches OR Install Replace Stop Sign (not double counted if both are selected)
Bus Stops	• Install 8x5 Landing OR Demolish and Replace Landing Pad OR Modify Pad • Install Shelter OR Install Wheelchair Bay OR Remove Front Panel OR Modify Access to Door • Install Street/Pedestrian Light OR Install Electric Service OR Install Shelter Light

WHAT IS IMPORTANT?

As a second step in the 'what is needed' scoring, the Pedestrian Advisory Team ranked the order of importance of the four project categories, as shown on the right. The scores assigned for needed mitigations and for category importance were then combined, with a maximum of 10 points awarded for this step.



WHERE DO PEDESTRIANS WALK?

The second phase of the prioritization process was to calculate pedestrian demand, or the likelihood that people want to walk in a certain location. This process had 3 steps. First, the team used a mapping exercise to determine the density of actual and potential destinations. Second, the team mapped roadway conditions that are known to influence the walkability of a place, such as roadway width and the number of crashes. Third—since increasing walking and biking to school is a goal—the scoring system gave an additional 5 points to improvement recommendations within ¼ mile of a public school. See **Appendix D**, *Project Prioritization Details*, for a complete description of this methodology.

Figure 26 shows the location of Howard County public schools.

A range of scores for each element of the demand and needs analysis was established and then combined, resulting in Pedestrian Focus Areas that represent demand and need. **Figure 27** shows the results of this analysis; areas in red were those identified as high in demand and need, including the following communities/areas[54] and corridors:

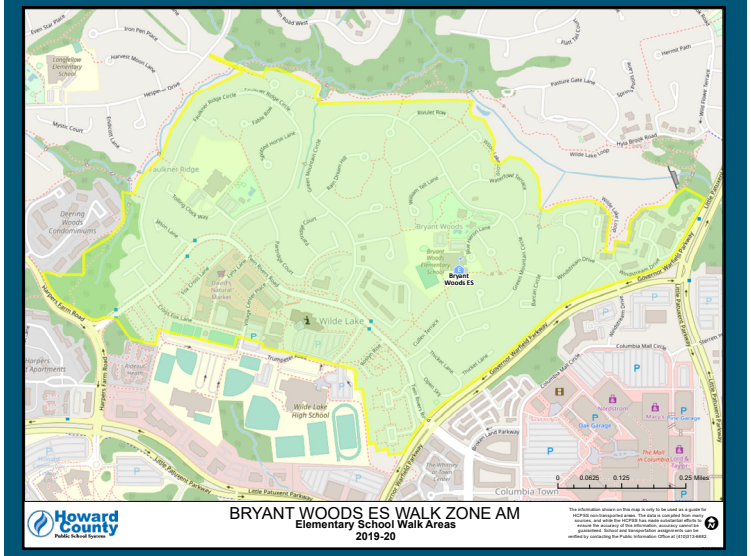
Communities:

- Ellicott City
- Villages of Wilde Lake, Oakland Mills, Long Reach, and Owen Brown
- Columbia Town Center
- Areas in Columbia between Old Annapolis Rd and MD 100
- Savage
- Laurel
- Northern Elkridge

Corridors:

- US-1 in Laurel, Savage, and Elkridge
- MD-175 between I-95 and Columbia Town Center
- Snowden River Parkway
- Broken Land Parkway
- MD-108 between US-29 and Snowden River Parkway
- US-40 between Greenway Drive and Chestnut Hill Drive

54 The prioritization process identified these four villages of Columbia as high in demand and need, but all of Columbia's should be high-priority areas as well due to their role as local communities.



The Howard County Public School System (HCPSS) provides bus transportation for students that live more than one mile from their elementary and middle schools or more than a mile and a half from their high school, and for students who live within those distances but for whom walking to school would be unsafe due to hazardous pedestrian conditions.

For students who do not qualify for bus transportation, HCPSS provides "Walk Zone Maps" for each school, such as the above map showing the walk zone for Bryant Woods Elementary School, showing the streets and addresses that are within the walk zone.

Figure 26 - Howard County Public Schools

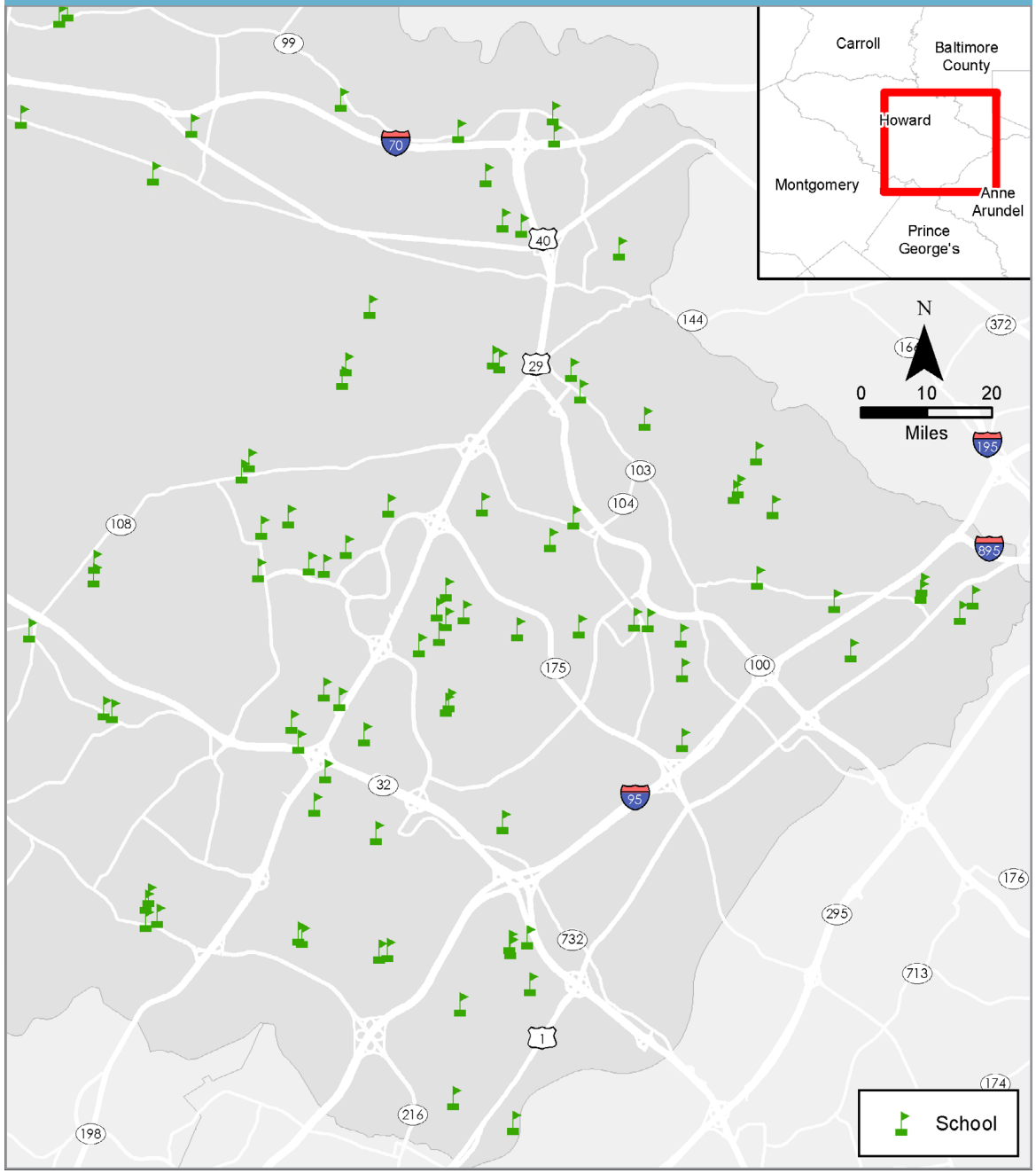
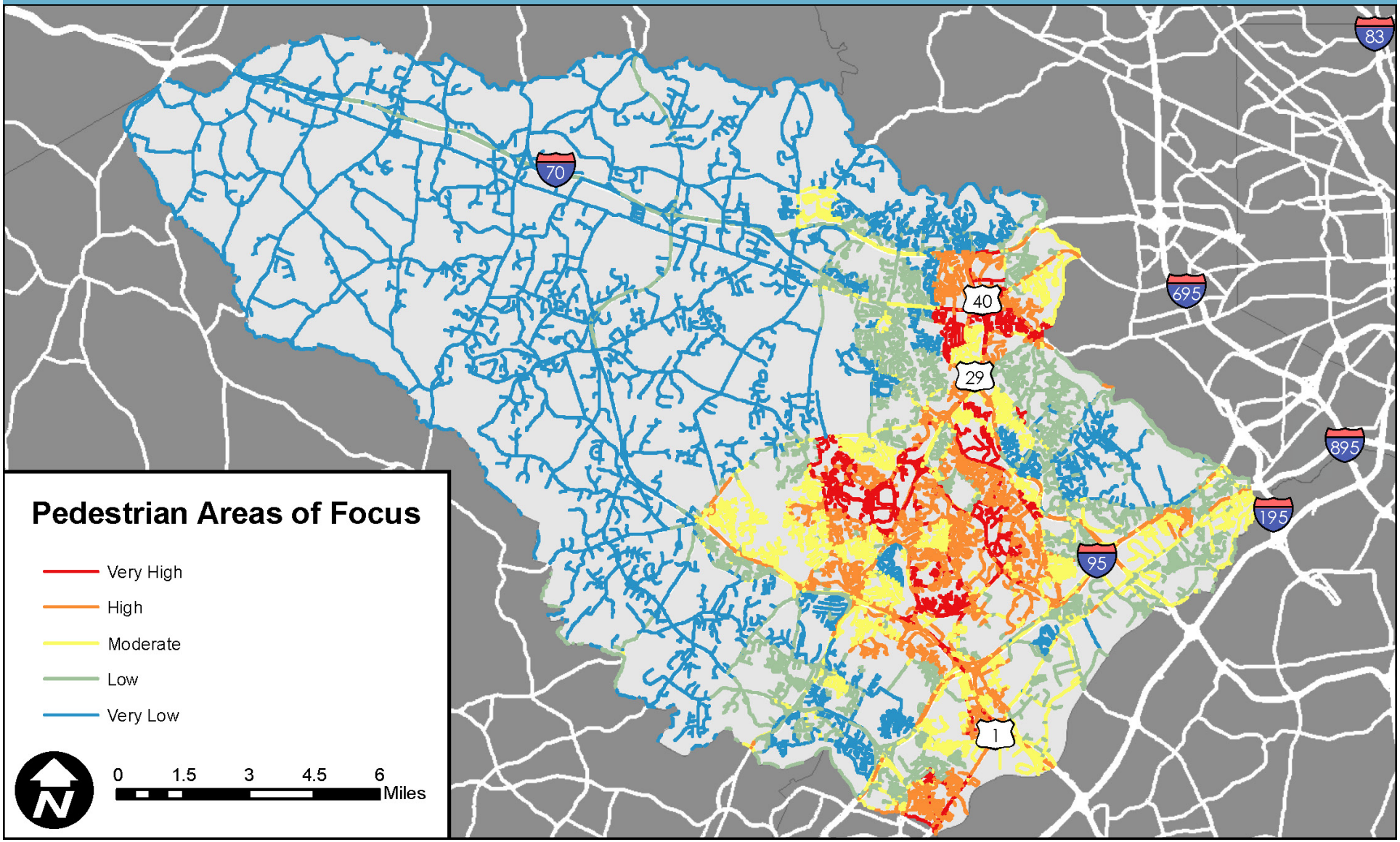


Figure 27 - Pedestrian Focus Areas

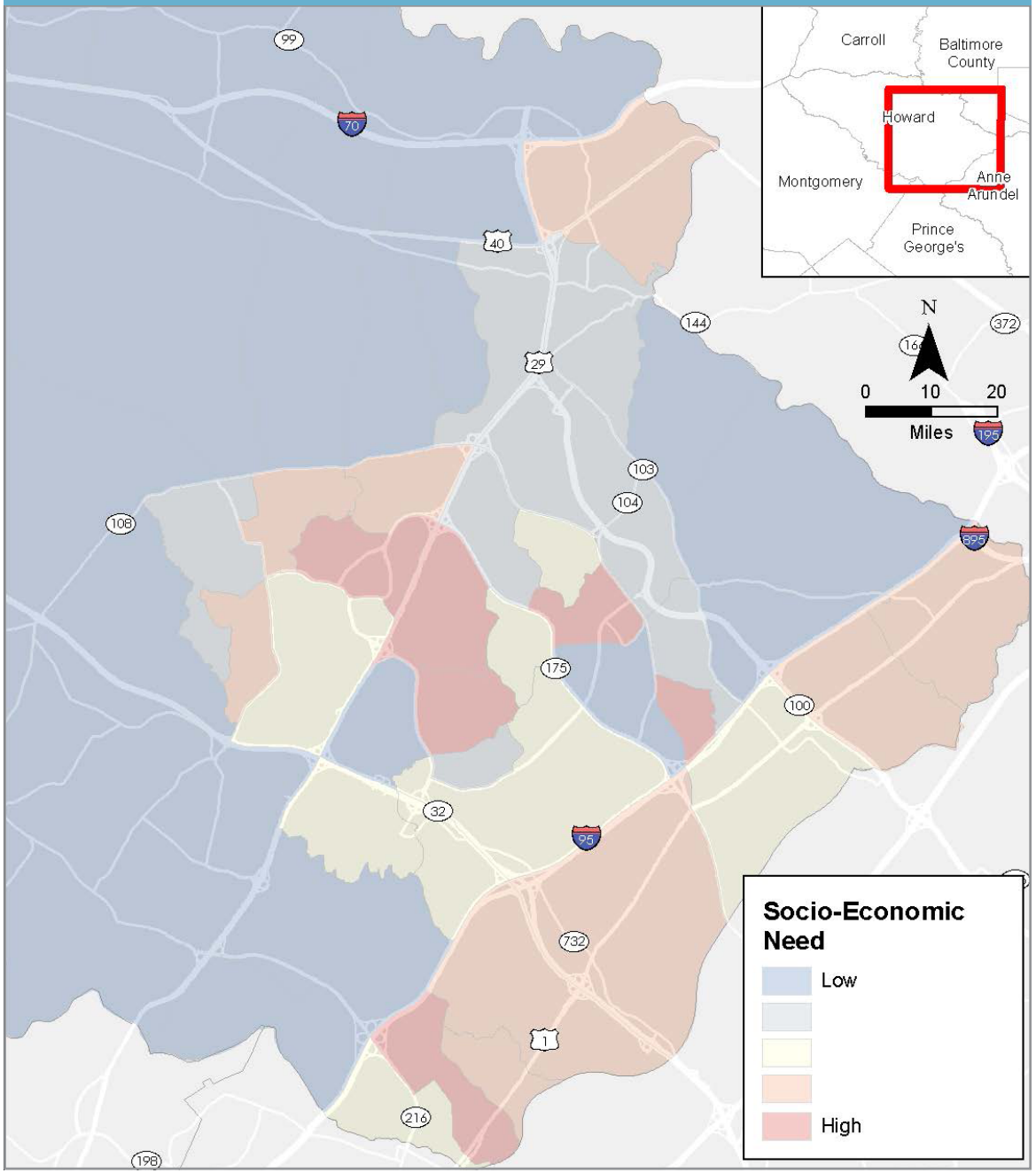


WHAT ELSE IS IMPORTANT?

The Pedestrian Advisory Team recommended the prioritization methodology include a socio-economic component. Therefore, to bolster the methodology and target the implementation of projects in communities that have historically had a higher level of need for pedestrian infrastructure, the following census data attributes in the area around each project were considered: Median Household Income, Percent Renters, Educational Attainment, Single Parent Families with Children Under 18, and Unemployment Rate. Each project received up to five (5) points for these attributes. **Figure 28** shows the scores for each census tract in the study area.



Figure 28 - Socio-Economic Needs in Howard County

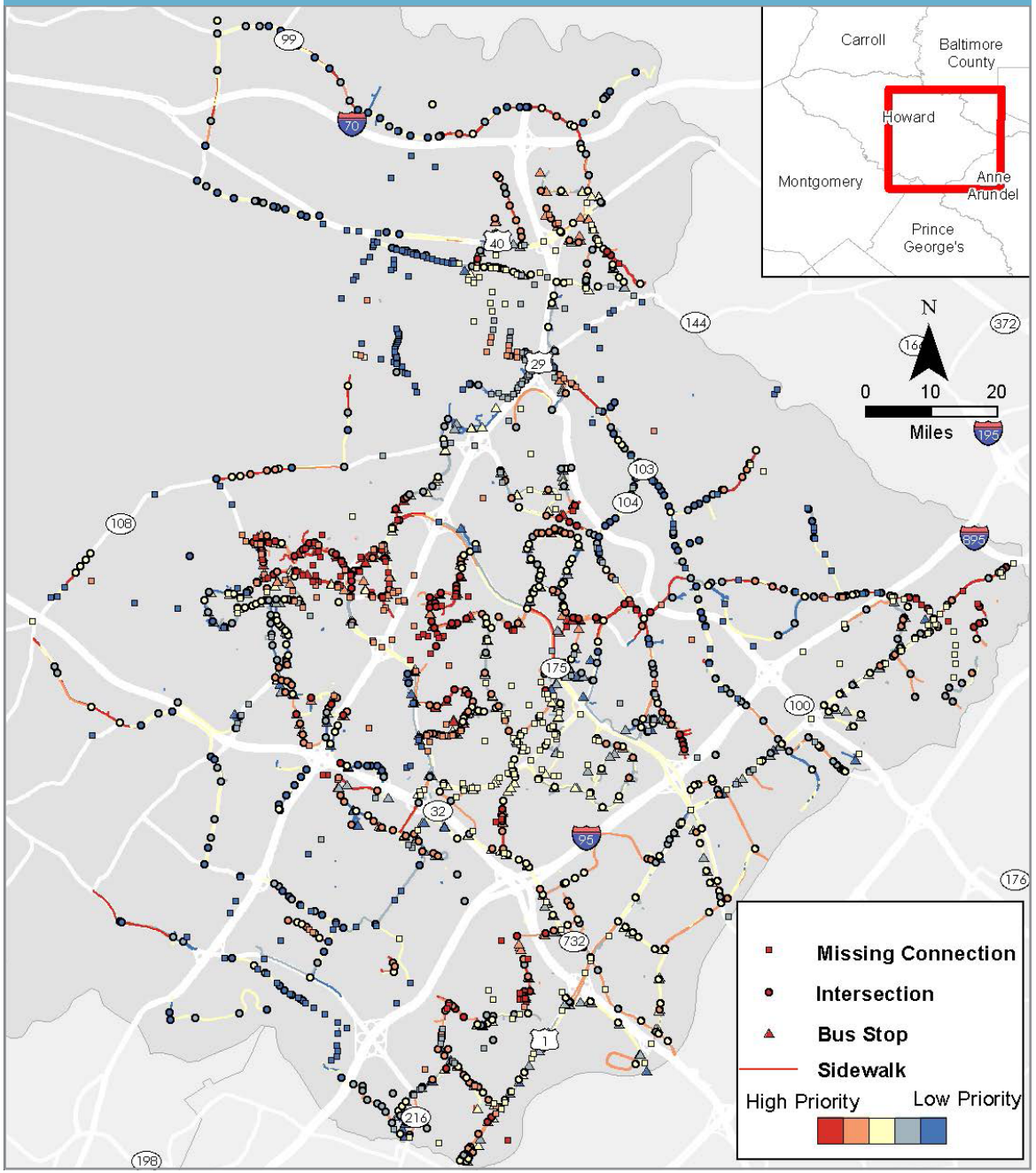


PROJECT PRIORITIZATION OUTCOME

To complete the project prioritization portion of *WalkHoward*, scores obtained from each of the inputs were combined into one final prioritization score and ranked in comparison to other projects. These results are shown in **Figure 29**.



Figure 29 - Project Prioritization Map



Appendix D: Project Prioritization Details

PEDESTRIAN DEMAND

The pedestrian demand analysis combines demographic factors and likely pedestrian generators to calculate a demand score. The four demographic factors used—population density, employment density, transit commuter density, and walk commuter density—were combined with a density score for pedestrian generators.

Transit Commuter Density was calculated by census tract from the following six demographics. Each census tract is ranked in descending order in each demographic category and then assigned a score from 0 to 100 in each category based on that ranking. With 6 categories, the maximum score is 600.

- Population in labor force density
- Population over 65 density
- Families in poverty density
- Zero-car households density
- Transit commuters density
- Household density

Pedestrian Generator Density was calculated from locations where pedestrians could be expected, such as housing, employment centers, health care facilities, schools, and commercial establishments. Each pedestrian generator received a score from zero to four based on its estimated level of walking trip generation. For example, schools, major hospitals, and parks received a score of four, as they would likely see the highest amounts of people who would walk to reach them. The complete list of the generator types, sources, and corresponding scores is included here.

Table 12 shows the data sources and highest possible score for each demand score input. Data sources included the Baltimore Metropolitan Council's (BMC) regional projections by Transportation Analysis Zone (TAZ), US Census American Community Survey (ACS) and the Howard County Office of Transportation. The total possible score for each element of the demand score was either 100 or 500, with a maximum possible score of 900. Roadway segments were assigned scores from the census block groups that they fell within.

Table 12 - Pedestrian Demand Score Measures

Measure	Source	Highest Possible Score
Population Density	Baltimore Metropolitan Council	100
Employment Density	Baltimore Metropolitan Council	100
Transit Commuter Density	2008-2012 American Community Survey	100
Walk Commuter Density	2008-2012 American Community Survey	100
Pedestrian Generator Density	County GIS	500
	Total Possible Score	**900**

As a second step in the "where do pedestrians walk or where could they walk" scoring, an additional five points were given to projects within ¼ mile of elementary, middle, and high schools. See **Figure 30** for the resulting map of projects falling within one-quarter mile of schools. It is important to note that no trails or pathways were considered in this prioritization process as the field assessment only reviewed the conditions of sidewalks, intersections and crossings, and bus stops.

Results of the pedestrian demand analysis are illustrated in **Figure 31.** Areas with the highest demand include Ellicott City, Central Columbia along Little Patuxent Parkway, areas adjacent to the US-40/US-29 interchange, the Village of Owen Brown, and portions of Savage and Laurel. All of these areas currently have and are expected to have high population densities and significant retail development.

Figure 30 - Assessed Infrastructure near Howard County Public Schools

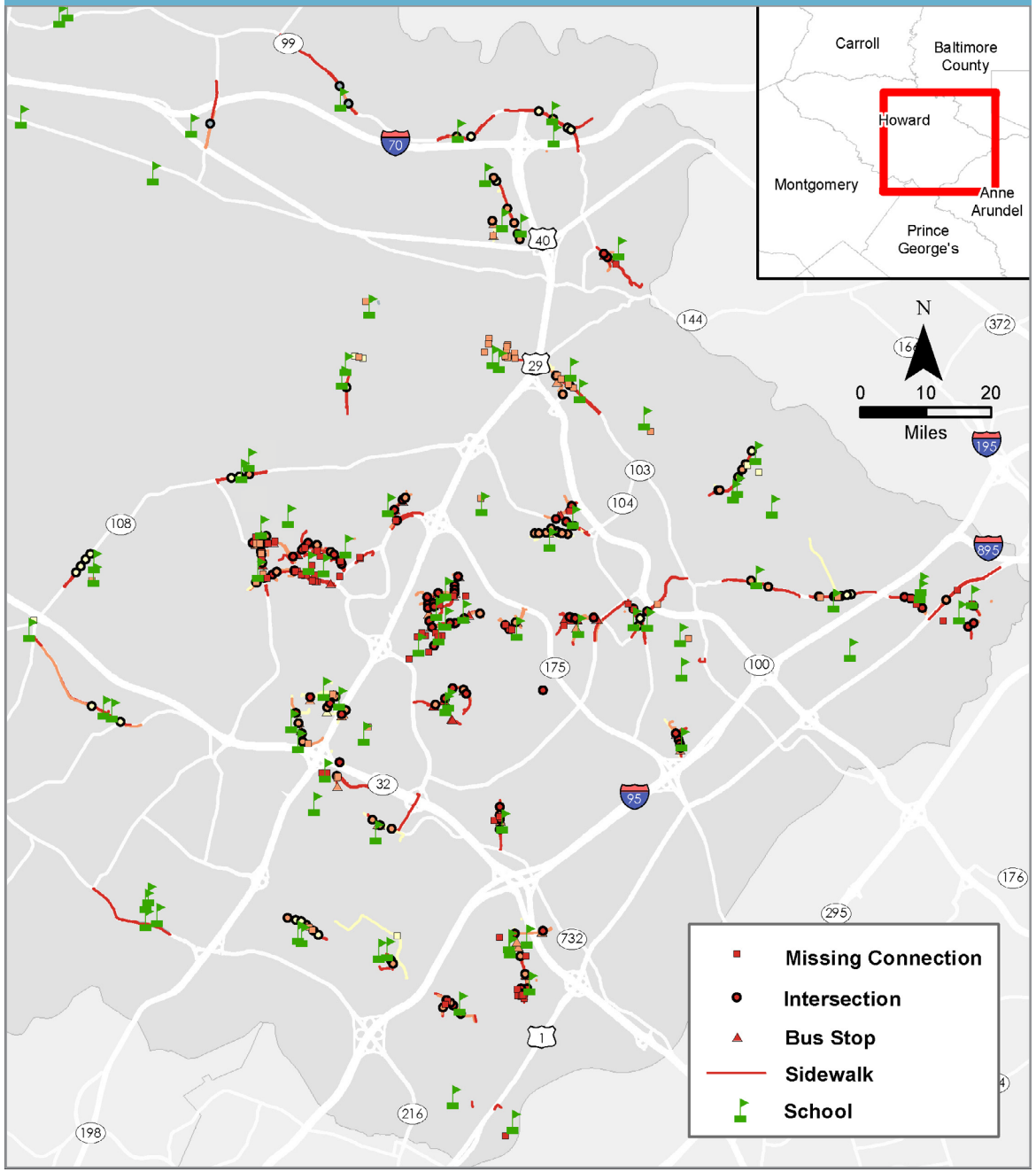
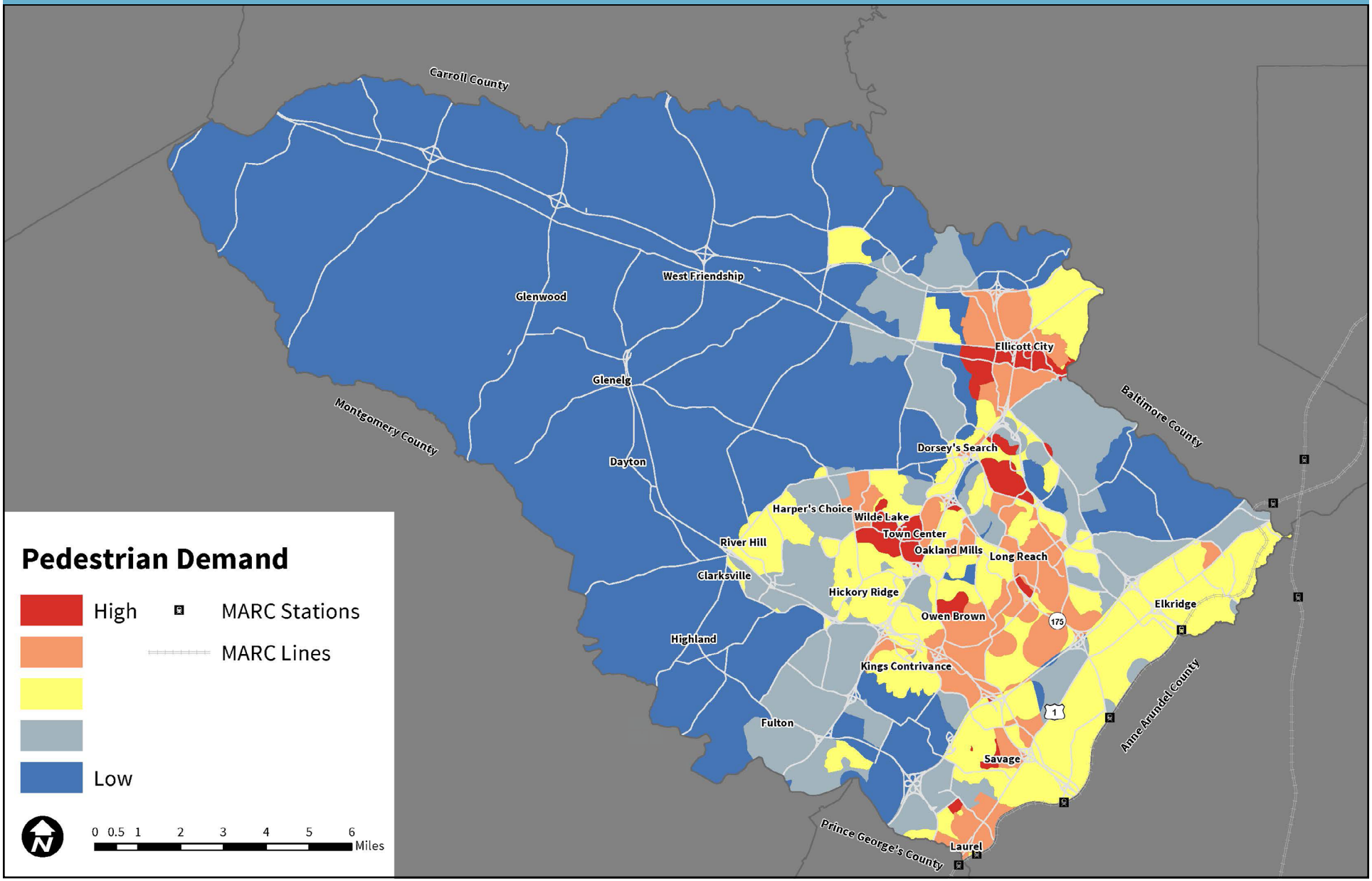


Figure 31 - Pedestrian Demand Analysis Results



PEDESTRIAN NEED

This analysis also used several demographic factors in combination with roadway and existing trail characteristics to determine pedestrian need throughout the County. Demographic factors included the density of seniors (age 65 and over), youths (5 to 18 year olds), zero and one-car households, persons with disabilities, and people living below the federal poverty level. These data were obtained from the U.S. Census American Community 3-year Estimates (2008-2012) at the census block group level. Similarly to the demand demographic measures, the scores in each category were generated using a ranking methodology of census block groups: the highest possible score in each category ranged from 50 to 150 depending on the category. Roadway segments were assigned scores from the census block groups that they fell within.

Other factors used for this needs analysis included roadway characteristics such as speed limit, average daily traffic volumes (ADT), adjacency to traffic signals and adjacency to bus stops. This was all calculated at the street segment level (i.e., every street segment received a ranking). The scoring for these measures varied accordingly, therefore they were ranked separately. Specifically, the analysis utilized the following methodology for each factor:

- **Speed limits:** segments with higher speed limits (which have been associated with more uncomfortable conditions for pedestrians) received a higher score;
- **ADT:** Segments with higher ADT, or number of cars per day, received a higher score.
- **Adjacency to traffic signals:** segments further away from traffic signals received higher scores; and,
- **Proximity to bus stops:** segments with adjacent bus stops received a higher score.

Roadways with higher speed limits, higher ADTs, and no traffic signals would likely be more dangerous for pedestrians, and therefore, better pedestrian facilities would be desired. Roadways adjacent to bus stops are likely to have higher pedestrian activity, and therefore would also require better pedestrian facilities.

The final two factors for this part of the analysis included the presence of trails, and pedestrian crash density. Areas within ¼-mile of a trail were given a higher score, as trails would likely help generate higher pedestrian traffic on adjacent roadways. Areas with a higher density of pedestrian crashes were given a higher score as they tend to be areas which need larger pedestrian infrastructure investments to correct some of their deficiencies. Pedestrian crash densities are shown in **Figure 32**. **Table 13** summarizes the pedestrian needs scoring measures, sources, and highest possible scores, with a maximum possible score of

Table 13 - Pedestrian Needs Score Measures

Measure	Source	Highest Possible Score
Senior Density (65 years and over)	2008-2012 American Community Survey	50
Youth Density (5-18 year olds)	2008-2012 American Community Survey	50
Zero Car Household Density	2008-2012 American Community Survey	150
One Car Household Density	2008-2012 American Community Survey	50
Disabled Density	2008-2012 American Community Survey	50
Poverty Density	2008-2012 American Community Survey	150
Trails	County GIS	100
Pedestrian Crash Density	County GIS	300
Speed Limit	County GIS	100
Not adjacent to traffic signal	County GIS	100
ADT	County GIS	100
Adjacent to bus stop	County GIS	100
	Total Possible Score	**1,300**

Results of the pedestrian needs analysis are illustrated in **Figure 33.** Several clusters of roadways displaying high pedestrian needs are evident in this analysis. These include roadways around the Columbia Town Center, and the Villages of Wilde Lake, Oakland Mills, Owen Brown and Long Reach. Other clusters included portions of Route 1 between Savage and Laurel, as well as portions of Route 40 in Ellicott City. Additionally, a few entire neighborhoods have moderately high need, including the Waterloo neighborhood of Elkridge, and areas in Ellicott City.

Figure 32 - Pedestrian Crash Densities

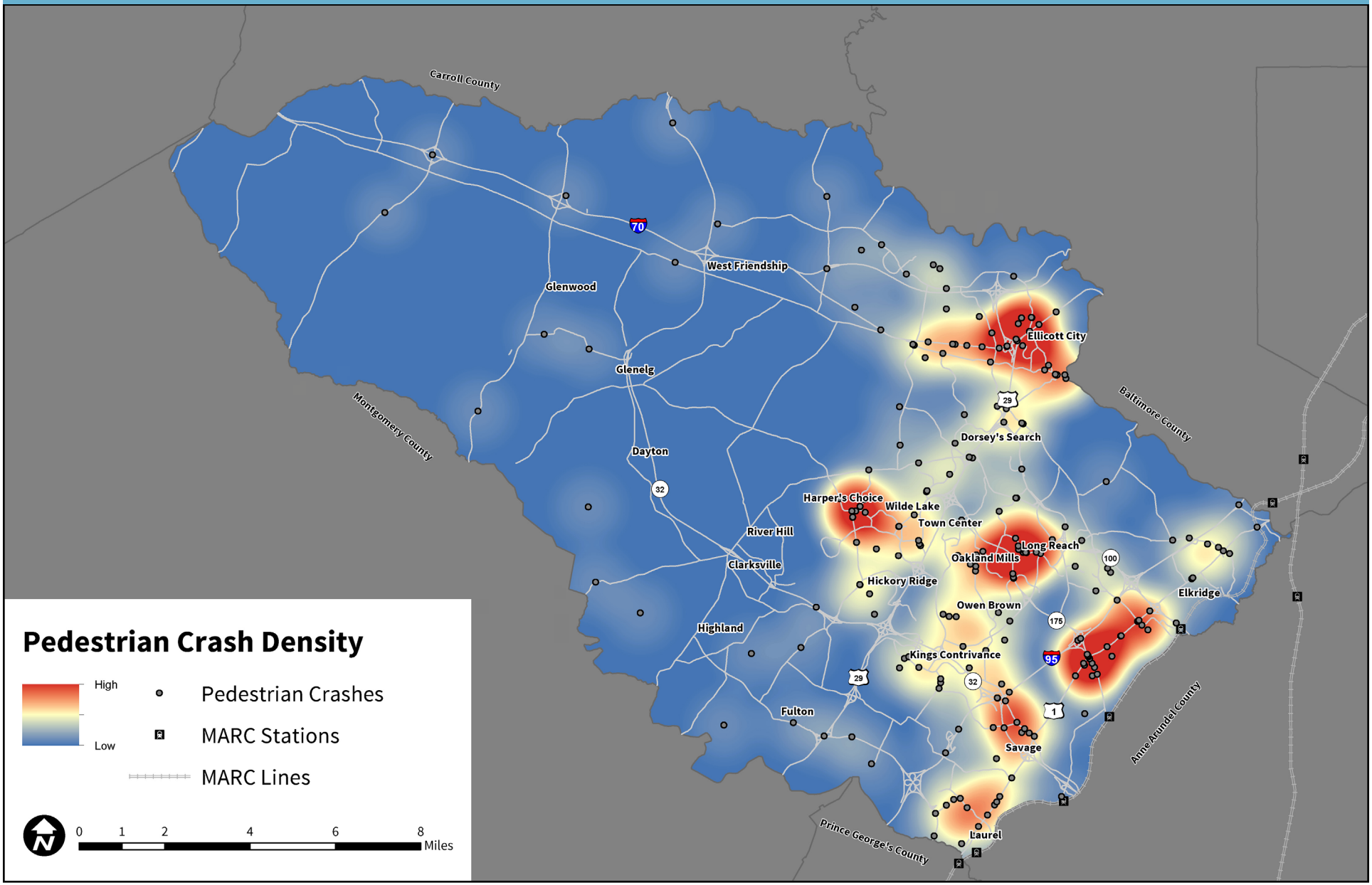


Figure 33 - Pedestrian Needs Analysis Results

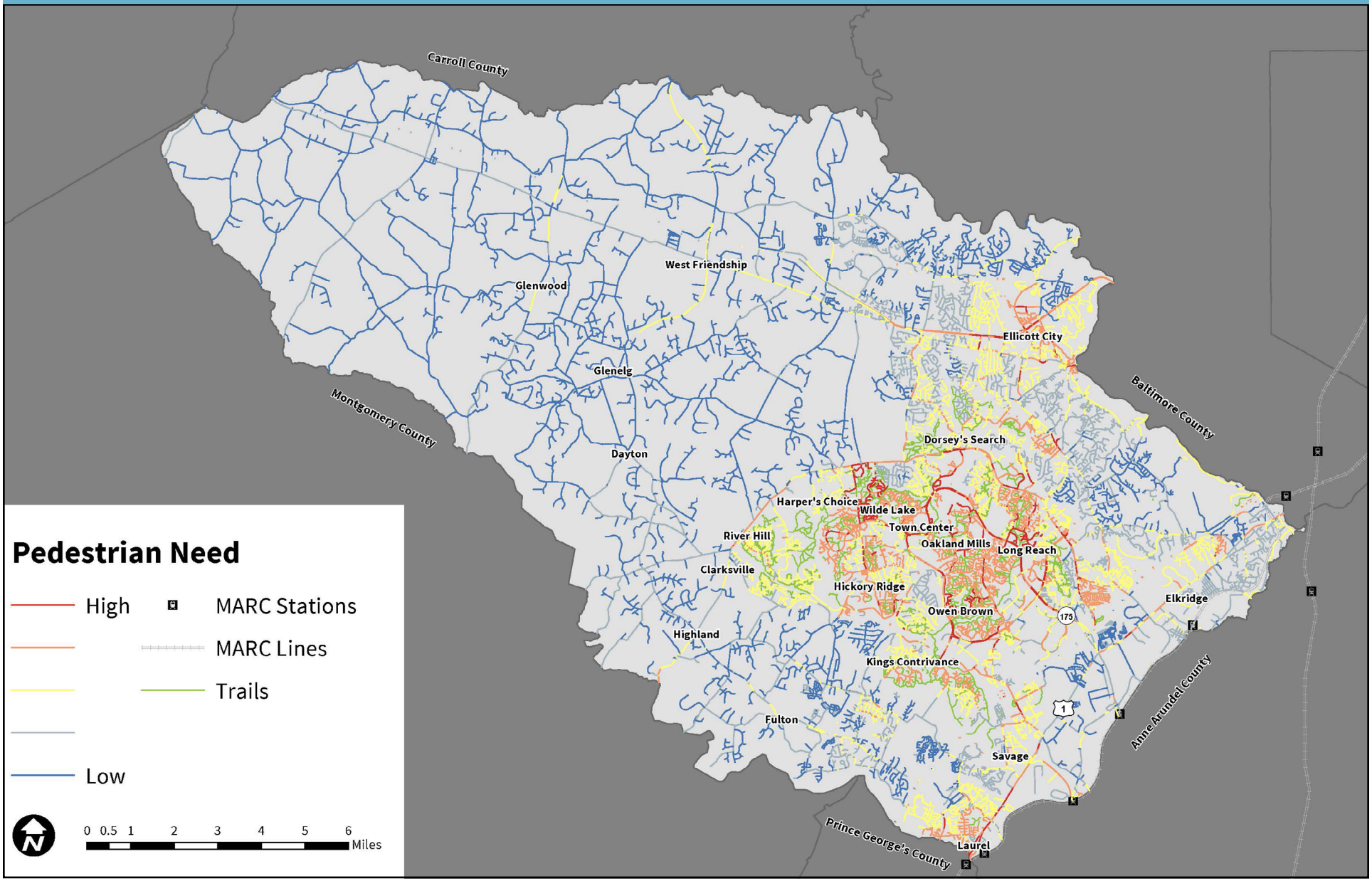
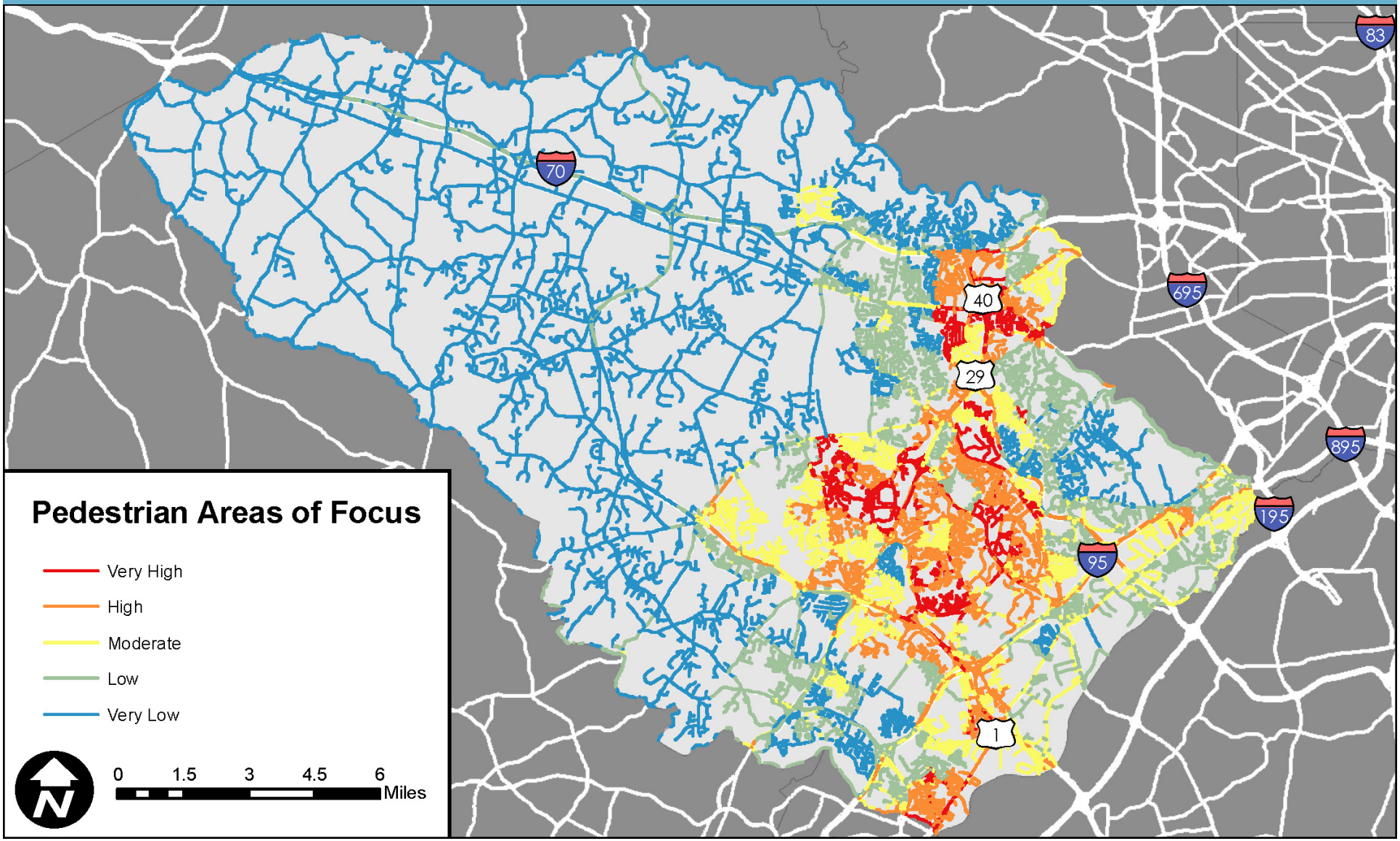


Figure 34 - Pedestrian Focus Areas



Scores from the demand and needs analyses were combined into an overall pedestrian focus score, which is an input into the full project prioritization score. The combined focus areas are illustrated in **Figure 34**. The majority of the high focus pedestrian areas are located in the eastern half of the County where population, employment and destination densities are highest.

TRANSIT PROPENSITY SCORING

A major component of the Howard County Pedestrian Master Plan is an inventory of the pedestrian infrastructure available to access bus stops. This information will be used to develop a list of needs at bus stops throughout the County related to pedestrian access. Bus stops will then be prioritized for improvement based on both existing use and demand. A number of different metrics will be used in order to quantify use and demand. The following outlines these metrics.

Use Score =
(weekday boardings/X*) + (# bus routes)+(# bus trips)

Demand Score =
Population density + employment density + transit propensity score + total pedestrian generators

**Constant to be determined.*

Use scores and demand scores will then be summed into a total score and stops will be ranked from highest to lowest priority using this score.

Bus Stop Prioritization Metrics	
Existing Use	**Existing Demand***
Ridership (total weekday boardings)	Population Density
Number of bus routes served	Employment Density
Number of bus trips	Transit Propensity Score: a) Population in labor force density b) Population over 65 density c) Families in poverty density d) Zero-car households density e) Transit commuters density f) Household density *Transit propensity score is calculated by ranking each census tract in descending order in each demographic category and then assigning it a score from 0 to 100 in each category based on that ranking. With 6 categories, the maximum score is 600.*
	Number of major pedestrian generators within ¼ mile, including: g) Multi-family housing h) Employment centers (not sure how to size these) i) Bus stops j) K-12 schools - points and walk zone polygons k) Hospitals l) Civic buildings m) Shopping/eating/entertainment areas/venues n) Colleges o) Trail heads, parks and trails

**Demand metrics will be obtained by census tract and assigned to all stops within each census tract.*

Each metric will be weighted in order to calculate an overall prioritization score.

PEDESTRIAN GENERATOR SCORING

Category	Score
Maple Lawn	4
JHU Applied Physics Lab	4
Howard Community College	4
Howard General Hospital	4
Elementary School	4
High School	4
Library	4
Middle School	4
Park	4
Assisted Living	3
Community College	3
Government	3
Major County Office	3
Other County Office	3
Pools	3
Post Office	3
Private School	3
50+ Center	3
Special School	3
Worship	3
Columbia Gateway Center	2
Law Enforcement	2
Police Station	2
Bus Stop	2
Entertainment	2
Grocery Store	2

Category	Score
Hospital	2
Medical	2
Nursing Home	2
Restaurant	2
Retail	2
Bank	1
Business	1
Cleaners	1
Convenience Store	1
Cosmetic	1
Day Care	1
Dentist	1
Financial	1
Fire Station	1
Hotel/Motel	1
Insurance	1
Liquor	1
Pharmacy	1
Physician	1
Veterinary	1
Agriculture	0
Cemetery	0
Gas Station	0
Automobile Related	0
Vacant	0
Water Tower	0

Appendix E: Planning level cost estimate unit costs

The following unit costs were used to develop planning level cost estimates for structured projects. Unit costs are those currently in use by the County for its project cost estimating.

Project type	Mitigation Description	Cost: Total, Unit, Assumptions
Bus stop	Apply bus shelter label	$ 450
All	Cut back vegetation	$.50 per linear foot
Sidewalk or Pathway	Demolish and replace sidewalk	$62 per square feet, based on a 5' wide sidewalk
Bus stop	Demolish existing and install new bus stop landing pad	$1100 total for 40 square feet comprised of: $20 per square foot to demolish $7.50 per square foot to install
Bus stop	Demolish old and install new bus shelter	$19,800 total cost includes: $15,000 to install (see above) $1200 to demolish existing old shelter $3600 to demolish existing 180 square foot pad
Sidewalk or Pathway	Install a boardwalk	$300 linear foot for a pathway $1200 per linear foot for a bridge Both include mobilization and installation
Intersection	Install audio cues for signals	$12,500 to purchase and install for four approaches
Intersection	Install bus shelter light	$150
Bus stop	Install bus shelter pad	$2500
Bus stop	Install new bus stop landing pad	$300 total for 40 square feet at $7.50 per square feet
Intersection	Install crosswalk	$1100 per crosswalk based on 44' wide roadway and $25 per linear foot
Intersection	Install electric service at intersection	$14,500 planning cost includes: $50 per hour for an electrician $5K for BGE service $4500 for solar retrofit
Intersection	Install electric service at intersection	$12,750 used as average price based on: $4500 for solar retrofit; includes separate pole, battery, panel mounting, etc. $1500 to $15000 per service connection for BGE; includes transformer, conduit, wiring, etc.

Project type	Mitigation Description	Cost: Total, Unit, Assumptions
Bus stop	Install map holder at bus stop	$75 each
Bus stop	Install new bus shelter	$15,000 total cost includes: $6000 to purchase the shelter $3500 to install landing pad (or sidewalk) $5500 to install the shelter
Intersection	Install or replace (in lieu of repair) curb ramps at intersection	$2500 each including planning, designing, mobilizing, etc.
Intersection	Install or replace curb ramp	$20 per square foot to demolish $25 per square foot to install
Intersection	Install or replace existing truncated domes on curb ramp	$250 each
Bus stop	Install or replace sign at bus stop	$400 each
Bus stop	Install or replace stop sign	$200 each
Sidewalk or Pathway	Install pathway	$75 per linear foot with right-of-way
All	Install pedestrian light	$8000 per light
Intersection	Install pedestrian refuge median	$35 sf for median; $4200 for refuge
Bus stop	Install pedestrian sign	$400 each
Intersection	Install pedestrian signal (indications with pole)	$3500 total comprised of: $2000 each for heads $1500 each for pedestal Assumes four pedestrian signals per intersection
Bus stop	Install recycle can at bus stop	$100 each
Sidewalk or Pathway	Install sidewalk	$800 with curb and gutter $50 without curb and gutter Both assume right-of-way ownership; grading needed

Project type	Mitigation Description	Cost: Total, Unit, Assumptions
All	Install street or pedestrian-oriented light	$4500 to $8000
Bus stop	Install trash receptacle	$200
All	Install vehicle bollards	$500 each
Bus stop	Install wheelchair bay	$700
Intersection	Modify audio cue for signals	$1000 per approach
Bus stop	Modify bus stop landing pad	$1100 total for 40 square feet to replace comprised at $7.50 per square foot
Bus stop	Modify door access at bus stop	$800
Intersection	Modify pedestrian signal	$4800
Sidewalk or Pathway	Move or replace sidewalk to resolve obstruction	$35 per square yard Add $50 to $60 per square yard to install new sidewalk
Bus stop	Move recycle can at bus shelter	$200 each
Intersection	Reconstruct curb ramp	$3000 each
Bus stop	Remove front of bus shelter panel	$200 each
Sidewalk or Pathway	Remove, repair, or replace pathway	$10 per square foot to remove $100 per square foot to install Assumes 5' wide
Bus stop	Repair bus shelter light	$150 each
Bus stop	Repair bus shelter pad	$4950 total for 180 square feet comprised of: $20 per square foot to demolish $7.50 per square foot to install
Intersection	Repair or replace crosswalk	$250 each
Sidewalk or Pathway	Repair sidewalk only (no curb and gutter)	$50 per linear foot Add $35 per square yard to demolition and restore
All	Repair street or pedestrian-oriented light	$5500 used as average price based on range of $3000 to $8000
Bus stop	Replace or modify bus shelter bench	$800 each

Appendix F: Grant Funding Sources

BICYCLE AND PEDESTRIAN FUNDING OPPORTUNITIES: US DEPARTMENT OF TRANSPORTATION, FEDERAL TRANSIT, AND FEDERAL HIGHWAY FUNDS

The Federal Highway Administration created a data-table to assist communities in understanding which Federal funding programs could be used for bicycle and pedestrian projects. The table provides an overview; specific program requirements must be met and eligibility must be determined on a case-by-case basis. For example: transit funds must provide access to transit and Congestion Mitigation and Air Quality Improvement (CMAQ) funds must benefit air quality in eligible areas.

www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm

OTHER FEDERAL

Bus and Bus Facilities Program, Ladders of Opportunity Initiative (5309)

The funds in this program may be used to modernize and expand transit bus service specifically for the purpose of connecting disadvantaged and low-income individuals, veterans, seniors, youths, and others with local workforce training, employment centers, health care, and other vital services.

www.fta.dot.gov/grants/13077_16008.html

Federal Community Services Block Grant Program (CSBG)

The Community Services Block Grant provides funds to alleviate the causes and conditions of poverty in communities and includes transportation projects. Administered by the Department of Health and Human Services, funding is allocated to states who then make it available to local communities. Funded projects have included: commercial district streetscape improvements; sidewalk improvements; safe routes to school; and neighborhood-based bicycling and walking facilities that improve local transportation options or help revitalize neighborhoods.

www.acf.hhs.gov/programs/ocs/programs/csbg/about

Sustainable Communities Regional Planning Grants and the Partnership for Sustainable Communities

This grant program supports locally-led collaborative efforts that bring together diverse interests to determine how best to target housing, economic and workforce development, and infrastructure investments to create more jobs and regional economic activity. The Program places a priority on investing in partnerships, including nontraditional partnerships (e.g., arts and culture, recreation, public health, food systems, regional planning agencies and public education entities). The program is a key initiative of the Partnership for Sustainable Communities, in which HUD works with the U.S. Department of Transportation (DOT) and the U.S. Environmental Protection Agency (EPA) to coordinate and leverage programs and investments.

http://portal.hud.gov/hudportal/HUD?src=/program_offices/economic_resilience/sustainable_communities_regional_planning_grants

https://www.sustainablecommunities.gov/partnership-resources

Federal Lands Access Program (FLAP)

The FLAP program provides funding to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program supplements State and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators.

http://flh.fhwa.dot.gov/programs/flap

National Scenic Byways Program

The federal National Scenic Byways Program was established as a grass-roots collaborative effort to help recognize, preserve and enhance selected roads throughout the United States. Funds may be used for "construction along a scenic byway of a facility for pedestrians and bicyclists."

www.fhwa.dot.gov/hep/scenic_byways/grants

Surface Transportation Block Grant Program Set-Aside

This set-aside, established in the 2015 transportation bill, Fixing America's Surface Transportation Act (FAST Act), replaces the Transportation Alternatives Program (TAP). Activities which were eligible under the Transportation Alternatives Program, which itself included the former Transportation Enhancements Program, the Safe Routes to School Program, and the Recreational Trails Program are now eligible under this set-aside. Larger Metropolitan Planning Organizations control a share of the funds to distribute locally through a competitive process.

Recreational Trails Program (RTP)

The RTP provides funds to States to develop and maintain trails and trail-related facilities. Projects can include: planning and design; land acquisition; maintenance and the purchase of maintenance equipment, and educational programming. Although under the FAST Act the program has been consolidated into the Surface Transportation Block Grant Set-Aside, each state administers it independently with funding set at 2009 levels.

www.fhwa.dot.gov/environment/recreational_trails/

Congestion Mitigation and Air Quality Improvement (CMAQ) Program

The CMAQ program supports surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. Non-motorized projects can be funded through this program because of their link to air quality improvements. Projects must be located in areas that do not meet, or have recently not met, minimum air quality standards.

www.fhwa.dot.gov/environment/air_quality/cmaq

SECTION 402 STATE AND COMMUNITY HIGHWAY

Safety Grant Program

The Section 402 program provides grants to states to improve driver behavior and reduce deaths and injuries from motor vehicle-related crashes. The program is jointly administered by the National Highway Traffic Safety Administration (NHTSA) and the Federal Highway Administration (FHWA) at the federal level and by State Highway Safety Offices at the state level. Funds may be used to reduce impaired driving, reduce speeding, improve pedestrian and bicycle safety, and reduce school bus deaths and injuries, among other activities. Child and adult bicycle safety education is eligible for funding.

www.ghsa.org/html/stateinfo/programs/402.html

Highway Safety Improvement Program (HSIP)

HSIP funds are available for safety projects aimed at reducing traffic fatalities and serious injuries. Bike lanes, roadway shoulders, crosswalks, intersection improvements, underpasses and signs are examples of eligible projects. Projects in high-crash locations are most likely to receive funding. States that have identified bicycle safety and pedestrian safety as Emphasis Areas are more likely to fund bicycle and pedestrian safety projects.

http://safety.fhwa.dot.gov/hsip

Better Utilizing Investments to Leverage Development (BUILD) Grant

BUILD grants fund a broad array of road, rail, transit, and bicycle and pedestrian projects. The program focuses on capital projects that generate economic development and improve access to reliable, safe, and affordable transportation especially for disadvantaged communities. The grant funds projects that have gone through preliminary design stages and prioritizes projects with broad stakeholder support. Applicants are required to demonstrate that project benefits outweigh the costs. Projects in urban areas must request at least $5 million (with a 20% match) and projects in rural areas must request at least $1 million (with no required match).

www.transportation.gov/BUILDgrants

MARYLAND

Urban Reconstruction (SHA Fund 84)

Formerly known as "Community and Safety Enhancement" this fund is for improvements including for pedestrians and bicyclists along SHA roadways within urban centers that promote safety and economic development.

Maryland Highway Safety Office Grants

The purpose of the highway safety grant program is to fund activities aimed at reducing the number of motor vehicle-related crashes, deaths and injuries on Maryland roadways. Funding is available for education, enforcement, and engineering projects which address pedestrian and bicyclist safety.

www.mva.maryland.gov/safety/mhso/grants-management.htm

Community Legacy Program

The Community Legacy program provides funding for projects aimed at strengthening communities through activities such as business retention and attraction, encouraging homeownership and commercial revitalization and includes funding for streetscape improvements. To be eligible, communities must first apply for a Sustainable Communities designation.

http://dhcd.maryland.gov/Communities/Pages/programs/CL.aspx

http://dhcd.maryland.gov/Communities/Pages/dn/default.aspx

Program Open Space

The Maryland Department of Natural Resources operates the Open Space program which provides funding to local communities for the planning, acquisition, and/or development of recreation land or open space areas and the development of community parks and playgrounds.

http://dnr2.maryland.gov/land/Pages/Programs.aspx

Maryland Heritage Areas Program

The Maryland Heritage Areas Program is governed by the Maryland Heritage Areas Authority (MHAA). MHAA provides targeted financial and technical assistance within thirteen locally designated Heritage Areas, each of which has a distinct focus or theme that represents a unique aspect of Maryland's character. Management entities may receive MHAA matching grant funding for support of their operations, marketing, and management plan updates.

http://mht.maryland.gov/heritageareas.shtml

ADA Retrofit (SHA Fund 33)

The ADA Retrofit (SHA Fund 33) program allocates funding toward upgrading existing sidewalks, curb ramps, intersections and driveway entrances along state roadways to be compliant with the Americans with Disabilities Act (ADA).

http://roads.maryland.gov/Index.aspx?PageId=576

Local Government Infrastructure Financing

Local Government Infrastructure Financing offers a cost effective way to finance public purpose capital projects; enabling the delivery of essential services to support communities and the people they serve. The Maryland Department of Housing and Community Development's Community Development Administration issues bonds, on behalf of counties, municipalities and/or their instrumentalities, to finance projects that serve the community at large. These projects can include, but are not limited to, streetscape improvements and transportation enhancements.

http://dhcd.maryland.gov/Communities/Pages/lgif/default.aspx

New Sidewalk Construction for Pedestrian Access (SHA Fund 79)

This fund is focused on constructing missing sidewalk segments along State roadways to fill gaps within the pedestrian network. The missing segment must be located in an Urban Area (as defined by the Census).

Safe Routes to Schools

This program provides funding for education, enforcement, evaluations and infrastructure improvements near elementary and middle schools that promote students walking and bicycling to school. This was a federally funded program between 2005 and 2012. Funds provided to States during that time do not expire and may still be available. It has since been combined with other programs. Under the FAST Act, funding to States can still be provided via the Surface Transportation Block Grant Program Set-Aside.

www.roads.maryland.gov/Index.aspx?PageId=735

http://saferoutesinfo.org/about-us/newsroom/new-transportation-legislation-maintains-srts-funding-through-2020

FOUNDATION AND INNOVATIVE

Crowdfunding

Crowdfunding focuses on raising money for projects through many small donations, typically via the internet. Websites, such as gofundme.com, ioby.com and indiegogo.com, allow fundraising campaigns to be easily established. In 2014, Memphis raised $70,000 in this way to build a separated bicycle lane. In 2015, Denver launched a crowdfunding campaign focused on corporate donors for the planning and design of bicycle facilities.

Walmart Foundation

Walmart Foundation provides significant funding for projects that align with their key focus areas: Opportunity, Sustainability and Community. In addition, staff are encouraged to participate in volunteer projects and can provide smaller levels of financial support.

http://giving.walmart.com/apply-for-grants

National Recreation and Park Association (NRPA)

NRPA routinely partners with foundations to provide grants for projects in parks, such as the Walk With Ease Grant, which is a partnership between the NRPA and the Centers for Disease Control, or the NFL Play 60 After-School Kick Off Grant, a partnership with the NFL Network to fund fields, equipment and staff. Additional fundraising resources and strategies are also provided.

http://www.nrpa.org/partnerships/

Boy Scouts of America

The Boy Scouts of America is one of the nation's largest youth development organizations. The BSA provides a program for young people that builds character, trains them in the responsibilities of participating citizenship, and develops personal fitness. Many Scout troops embrace the opportunity to build or clear trails and small bridges, add benches, and address other transportation barriers.

www.scouting.org

THIS PAGE INTENTIONALLY LEFT BLANK

WalkHoward

moving forward