



# Georgetown Pike

## *Footpath Feasibility Study*



PREPARED FOR:



EASTERN FEDERAL LANDS HIGHWAY DIVISION



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NOVEMBER 2019



# Georgetown Pike

## *Footpath Feasibility Study*

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November 2019



# Georgetown Pike

## *Footpath Feasibility Study*

### Executive Summary

#### INTRODUCTION

This Georgetown Pike Footpath Feasibility Study has been completed to assess the feasibility of constructing a footpath in the Georgetown Pike corridor, from the Difficult Run Trail in Great Falls Park to the Madeira School frontage along Georgetown Pike in McLean, Virginia. Such a footpath would provide an opportunity to complete a connection within the Potomac Heritage National Scenic Trail (PHNST) network, while also providing a connection to surrounding local trails and to neighborhoods in the McLean and Great Falls areas of Fairfax County. Building segments of this footpath within the park and along Georgetown Pike, including building a foot bridge over Difficult Run, would benefit the many people who want to travel by foot, bicycle, or horse within this popular trail network.

This study has been led by the Federal Highway Administration (FHWA) Eastern Federal Lands Highway Division (EFLHD), in partnership with the National Park Service (NPS), with assistance from Kimley-Horn through a professional services contract with EFLHD. This study has also involved key stakeholders:

- **Local agencies:** Fairfax County Board of Supervisors, Dranesville District (Supervisor John W. Foust); Fairfax County Department of Transportation (FCDOT); and Fairfax County Park Authority (FCPA)
- **Local school:** The Madeira School
- **State and regional agencies:** Virginia Department of Transportation (VDOT), NOVA Parks (formerly Northern Virginia Regional Park Authority), and Northern Virginia Regional Commission (NVRC)
- **Citizen groups:** McLean Citizens Association and Great Falls Citizens Association
- **Advocacy groups:** Potomac Heritage Trail Association (PHTA), Mid-Atlantic Off-Road Enthusiasts (MORE), and Fairfax Trails and Streams

#### SITE ANALYSES AND ENVIRONMENTAL REVIEW

In coordination with these stakeholders, the FHWA study team examined the feasibility of options for the foot path, consistent with the goals of each stakeholder and in the historic context of the corridor. The feasibility analysis first involved the development of mapping, review of traffic data, conducting field investigations, and performing a detailed environmental review of the study area to support concept design. From site analyses and environmental reviews, the study team concluded that there do not appear to be any showstoppers to implementing a

footpath in the project area with respect to field conditions and environmental permitting processes. While Georgetown Pike is listed on the National Register and other resources are eligible for listing, a footpath could be constructed in this corridor by following processes required by the permitting agencies

## CONCEPTUAL ALIGNMENTS, CROSS SECTIONS, AND BRIDGES

With this conclusion, the study team examined various footpath alignments, including alignments considered but dismissed, as well as design elements of footpath cross sections and bridge crossings. The field visits, desktop analyses, and conceptual design effort resulted in four footpath alignments, each with two bridge crossing options, as shown in **Figure ES-1**. These alignments were presented and discussed at the workshops with the stakeholders.

The study team researched the appropriate typical cross sections for segments of the footpath within Great Falls Park and along Georgetown Pike. In all locations, the recommended width of the footpath is 6 feet, with shoulders 1-foot shoulders. A typical section for the proposed footpath in Great Falls Park is shown in **Figure ES-2**. Typical sections of the footpath along Georgetown Pike will vary depending on existing topography and the need for drainage improvements and utility relocations.

A foot bridge will be needed to provide the connection between the Difficult Run Trail and the footpath alignments to the south and east. Consistent with the desire of NPS and the other project stakeholders, the clear width of the bridge crossing is recommended to be 6 feet (consistent with the 6-foot-wide trail). The length of the bridge would be dependent upon its location and whether the bridge spans the floodplain or is designed to withstand occasional flooding of Difficult Run.

Several crossing locations and many types of bridges were considered in this footpath feasibility study. FCPA also provided excellent information on their experience with constructing and maintaining trail bridges. A steel truss bridge is recommended as the longer-term solution for carrying the Georgetown Pike Footpath over Difficult Run. This type of bridge will maximize accessibility for users of all abilities. The bridge can be constructed and maintained within the floodplain and should survive most storms. **Figure ES-3** shows a rendering of a steel truss footbridge over Difficult Run.

For the near-term, the study team concluded that fair-weather crossings could be constructed. These crossings could include small timber bridges linking the banks of Difficult Run with the mid-channel island or boulders placed in appropriate locations for stepping across Difficult Run.

# Georgetown Pike Footpath Feasibility Study

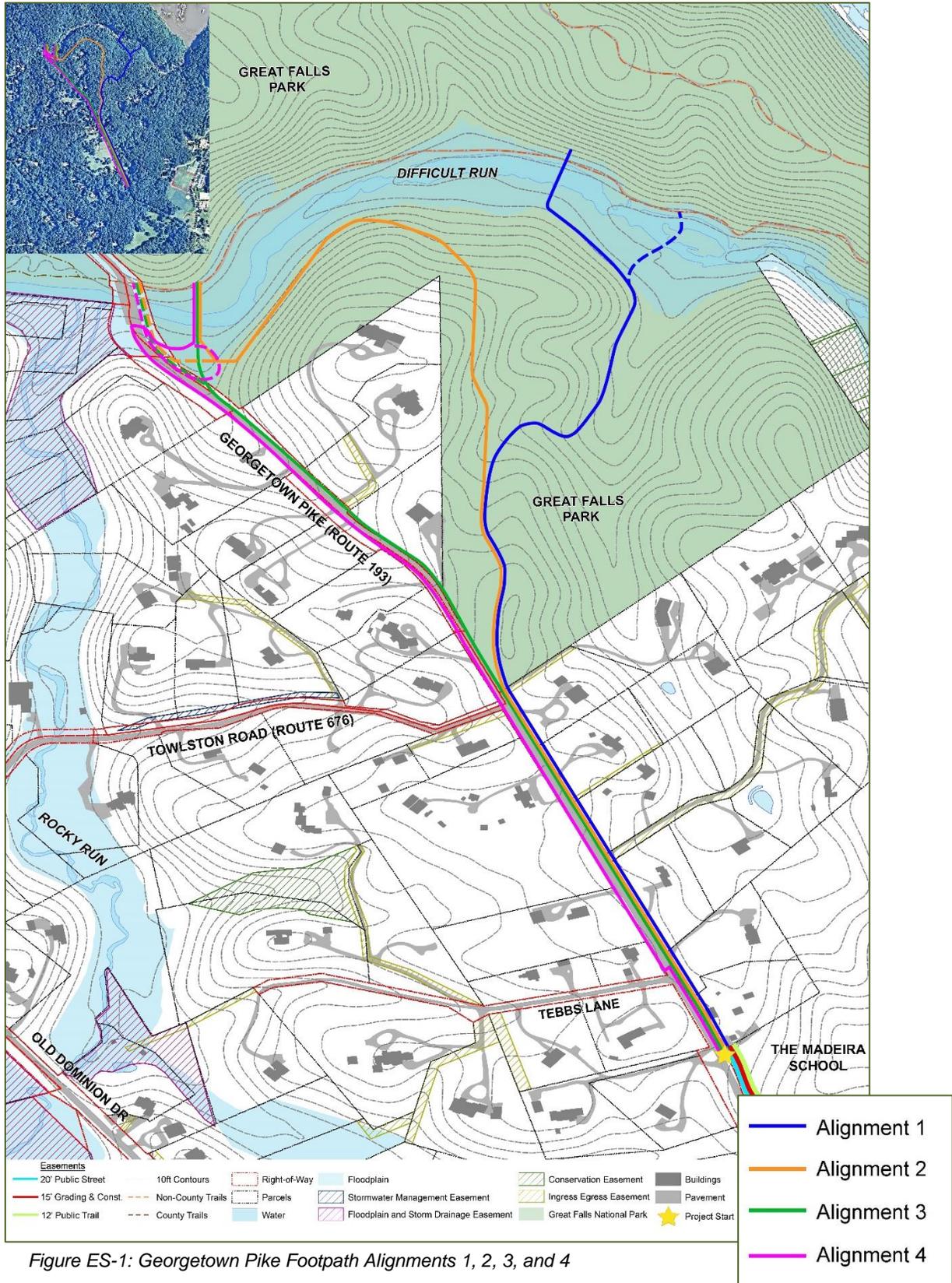


Figure ES-1: Georgetown Pike Footpath Alignments 1, 2, 3, and 4

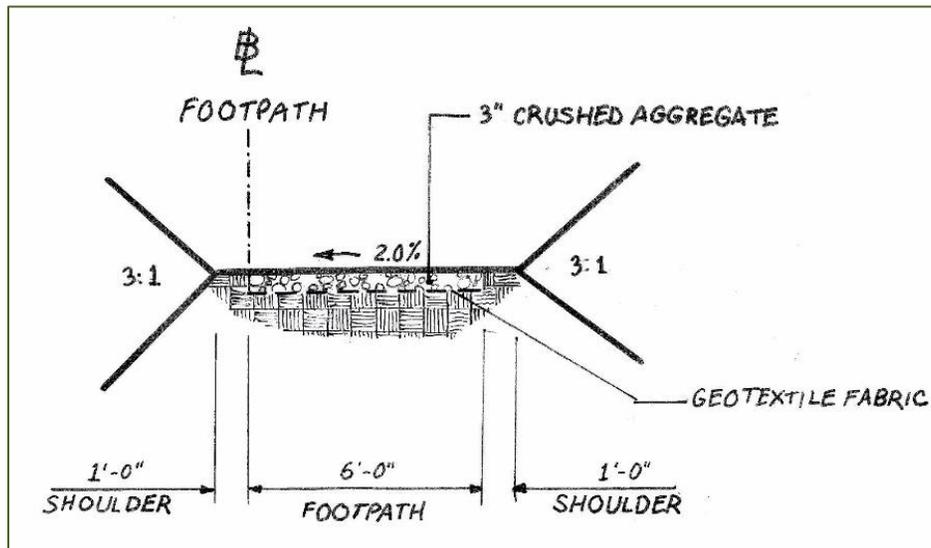


Figure ES-2: Typical section for footpath in Great Falls Park



Figure ES-3: Potential Difficult Run crossing location and rendering of possible steel truss bridge

Following the development of preliminary concepts for the alignments, the typical sections, and bridge locations and types, as well as the presentation and discussion these design elements with the project stakeholders, the study team completed their analyses, drawing conclusions, and finalizing 30% plans. The desired outcome of the conceptual design effort was an alignment that will result in a complete, functioning footpath project meeting the goals of FHWA, NPS, and the other project stakeholders.

Given the conceptual design (30% plans) and considering the possible near- and longer-term footbridge options, the study team concluded that each of the Alignments 1 through 4 could be feasibly constructed. When comparing the pros and cons of each alignment, the study team vetted the following conclusions with the stakeholders:

- Construction challenges for all alignments will include:
  - Grading along the steep slopes within Great Falls Park and along Georgetown Pike
  - Developing drainage solutions that fit within the context of the park and the corridor and are maintainable
  - Relocating and/or avoiding overhead and underground utilities
- According to GIS records, there is not sufficient right-of-way along Georgetown Pike for any of the alignments to be built without acquiring right-of-way or easements from private property owners.
- A more detailed survey will better quantify amount of land needed as right-of-way or public use easement for the footpath.
  - Within Great Falls Park, a footpath can be constructed with minimal impact to drainage, slopes, and existing vegetation.
  - Alignments 1 and 2 have more of the footpath in Great Falls Park and would require the least amount of new right-of-way or new easements from private property owners, as compared with Alignments 3 and 4.
- All of the alignments will need to overcome the “pinch point” (narrow space between edge of roadway and existing building called “Drover’s Rest”) along the east side of Georgetown Pike; a solution may involve a narrower trail through this area.

## POTENTIAL PROJECT COSTS

A preliminary opinion of probable cost (OPC) was prepared for each potential footpath alignment to aid in evaluating the alignments and bridge crossing options. Each alignment was evaluated with a steel-truss bridge spanning Difficult Run, partially within the flood plain. The total estimated project costs included engineering design, right-of-way acquisition, utility relocation, permitting, construction, construction-related services (18.5%), and contingency (30%). These costs are summarized in **Table ES-1**.

**Table ES-1: Estimated Project Cost of Each Alignment**

<i>Alignment 1</i>	<i>Alignment 2</i>	<i>Alignment 3</i>	<i>Alignment 4</i>
\$ 3,940,000	\$ 4,550,000	\$ 5,300,000	\$ 5,570,000

The lowest cost option for both options was Alignment 1, despite the additional bridge mobilization cost included due to the more difficult access at that bridge location. Alignment 1 had a lower cost compared to Alignment 2 due to the shorter overall length and decreased amount of grading within steep slopes. Alignments 1 and 2 had a lower comparative cost due to avoiding additional roadway construction and right-of-way acquisition. Alignments 3 and 4 had similar costs given they both run adjacent to Georgetown Pike for their entire lengths.

## EVALUATION OF ALIGNMENTS

The four alignments were evaluated using seven evaluation criteria or factors developed by the study team and confirmed with FHWA, NPS, and the other stakeholders. These criteria and the scoring of the alignments are shown in **Table ES-2**.

**Table ES-2: Evaluation of Footpath Alignments**

<i>Criteria</i>	<i>Alignment 1</i>	<i>Alignment 2</i>	<i>Alignment 3</i>	<i>Alignment 4</i>
General walking quality	●	●	◐	◐
Fewer visual impacts	●	○	○	○
Protection from traffic	●	●	◐	○
Fewer right-of-way impacts	◐	◐	○	○
Ease of trail construction	●	◐	◐	○
Ease of bridge construction	○	◐	◐	◐
Preliminary project cost	●	◐	○	○
<b>Scores</b>	<b>19</b>	<b>17</b>	<b>14</b>	<b>13</b>

Key: ● = Best (3 points) ◐ = Good (2 points) ○ = Fair (1 point)

The study team drew several conclusions on the scoring of the alignments:

- Alignment 1 ranked highest compared to the other alignments, which was consistent with the stakeholders' preference discussed at the workshops that as much of the trail as possible should be in Great Falls Park. More of the footpath in the park would result in a better experience for trail users, more protection from traffic, less need for right-of-way, an "easier" trail to construct, and lower cost.

- Alignment 1 edged out Alignment 2 due to its relative ease of constructing the trail and fewer visual impacts. Much of Alignment 2 in Great Falls Park would need to be constructed by cutting a bench into a steep side slope, which would mean a wider swath of clearing through the woods.
- Constructing the bridge for Alignments 2, 3 and 4 should be slightly easier than doing so for the more distant Alignment 1 location, but there will likely not be a great deal of difference in price for each location.
- Construction of the footpath in the park is anticipated to be easier than construction along Georgetown Pike, which would require roadside grading, one-way flagging operations, daytime peak period restrictions, nighttime operations (if allowed by the residents), and barriers, as well as avoidance or relocation utilities. In contrast, a natural surface footpath in a forest would follow natural grades and have the need for minor drainage improvements.

## PREFERRED ALIGNMENT

Alignment 1 is the preferred alignment, as concluded by the study team and confirmed with the stakeholder. This alignment would start within Great Falls Park along the Difficult Run Trail approximately a quarter mile east of the Georgetown Pike bridge over Difficult Run. The trail would cross Difficult Run at one of two places—upstream of the falls in the area of boulders and bedrock or downstream of the falls making use of the sandy, mid-channel island. The footpath would then follow the natural grade through Great Falls Park up the hill to Georgetown Pike opposite the intersection with Towlston Road. The path would emerge from the park then proceed along the east side of Georgetown Pike, through the pinch point at Drover’s Rest, and to the west end of the Public Access (Trail) Easement on the Madeira School property.

## PATH FORWARD

The study team recommends advancing Alignment 1, the stakeholders’ preferred alignment, in a phased approach.

### **Near-term: Build portion of Alignment 1, with fair weather crossing of Difficult Run**

1. Build a fair-weather crossing of Difficult Run with stepping stones or smaller timber bridges at the mid-channel crossing (old ford site) of Difficult Run
2. Construct footpath along Alignment 1 within Great Falls Park; terminate this segment of trail at Georgetown Pike, opposite the intersection with Towlston Road
3. Maintain this new footpath
4. Continue advocacy and planning activities for implementing the longer-term stream crossing and footpath alignment

### **Longer-term: Build all of Alignment 1, with steel truss bridge crossing of Difficult Run**

1. Construct the entirety of Alignment 1 to provide access for people of all abilities.

2. Install a one- or two-span steel truss bridge upstream of the mid-channel island in the boulder/bedrock area.
3. Construct a 6-foot-wide trail (wherever possible) along Georgetown Pike from Towlston Road to the western edge of The Madeira School property, including through the “pinch point” at Drover’s Rest.
4. Maintain this new footpath
5. Advocate for other parties (e.g., FCDOT or FCPA) build the connecting trail on The Madeira School property within the existing Public Use (Trail) Easement

A phased approach would serve to accomplish the goals of this project more quickly and to build community support and momentum for the longer-term solution. Near-term improvements could be constructed by NPS contractors and/or by other agencies such as FCPA or FCDOT, as well as local volunteer groups with permission from NPS. A near-term project could present educational opportunities about the construction and maintenance of a trail and about the history and characteristics of Great Falls Park and Difficult Run. Longer-term improvements will require additional advocacy, planning, design, and programming—which could be initiated in the near term.

## CLOSING

A Georgetown Pike Footpath has the opportunity to embrace the historical context of the corridor, build on previous studies and ongoing advocacy efforts, and provide connections to a variety of trails, parks, and neighborhoods. This study report is intended to be a tool for use by the stakeholders for moving forward with the next steps in project development, including environmental compliance, for the design, construction, and maintenance of footpath segments in the near-, mid-, and longer-term. The report’s appendices, including the 30% Concept Plans, are intended to provide a foundation implementing the footpath in the near- and longer-term.

Building upon this feasibility study, the stakeholders can realize the vision of a Georgetown Pike Footpath providing a connection within the Potomac Heritage National Scenic Trail network. With the continued leadership and collaboration, as well as creative approaches to funding and design, the stakeholders can construct and maintain this footpath so that it is usable for persons of all abilities for generations to come.

## Acknowledgements

The Federal Highway Administration (FHWA) Eastern Federal Lands Highway Division (EFLHD) and the National Park Service (NPS) gratefully acknowledge the following stakeholder organizations for their contributions to the Georgetown Pike Footpath Feasibility Study:

- Fairfax County Board of Supervisors, Dranesville District (Supervisor John W. Foust)
- McLean Citizens Association
- Great Falls Citizens Association
- The Madeira School
- Virginia Department of Transportation (VDOT)
- Fairfax County Department of Transportation (FCDOT)
- Fairfax County Park Authority (FCPA)
- NOVA Parks (formerly Northern Virginia Regional Park Authority)
- Northern Virginia Regional Commission (NVRC)
- Potomac Heritage Trail Association (PHTA)
- Mid-Atlantic Off-Road Enthusiasts (MORE)
- Fairfax Trails and Streams

Representatives from each of these stakeholder groups actively participated in the three study workshops and provided helpful background information and critical input on findings and recommendations. Of note, representatives from PHTA participated with the FHWA/NPS study team in the initial site visit after the first workshop and in a follow-up site visit after the third workshop.

Representatives from Supervisor Foust's office hosted each of the workshops at the McLean Governmental Center Community Room. This location east of the study area benefitted the study greatly by providing a convenient and practical meeting space for the workshops.

FHWA EFLHD and NPS thank the stakeholder representatives for their valuable input to this study. This final report is a result of this input. The report is intended to be used by the stakeholders for continued collaboration in moving forward with project development and implementation.

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# Georgetown Pike

## *Footpath Feasibility Study*

### 1. Introduction

A footpath in the Georgetown Pike corridor, from the Difficult Run Trail in Great Falls Park to the Madeira School frontage along Georgetown Pike in McLean, Virginia, would provide an opportunity to complete a connection within the Potomac Heritage National Scenic Trail (PHNST) network, while also providing a connection to surrounding local trails and to neighborhoods in the McLean and Great Falls areas of Fairfax County. Building segments of this footpath within the park and along Georgetown Pike, including building a foot bridge over Difficult Run, would benefit the many people who want to travel by foot, bicycle, or horse within this popular trail network.

This Georgetown Pike Footpath Feasibility Study has been completed to help advance the design and construction of this trail connection. The study was led by the Federal Highway Administration (FHWA) Eastern Federal Lands Highway Division (EFLHD), in partnership with the National Park Service (NPS), with assistance from Kimley-Horn through a professional services contract with EFLHD.



*Potential footpath locations across Difficult Run, in Great Falls Park, and along Georgetown Pike*

The scope of the study was to assess the feasibility of options for a footpath or trail connection in the Georgetown Pike corridor within the study area shown in **Figure 1**. This study report discusses the background for this footpath connection and documents the analyses, reviews, findings, concept designs, potential costs, funding sources, and recommendations for moving forward with implementation.

Stakeholder involvement was a key component of this study. A series of stakeholder workshops and follow-up input is also documented in this report. Appendices include references, documentation of the workshops, easement information, an environmental review of the project area, 30% concept plans and details, and opinions of probable cost for the various footpath alignments. This report is intended to be a tool for use by the stakeholders for moving forward with the next steps in project development, including environmental compliance, for the implementation of footpath segments in the near-, mid-, and longer-term.

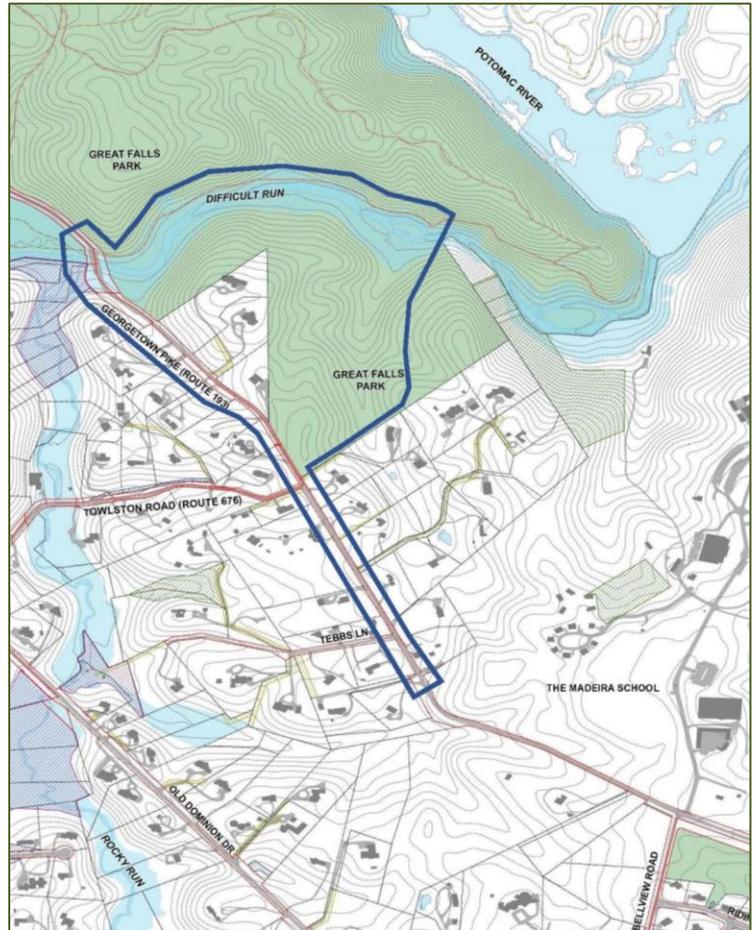


Figure 1: Study Area

### 1.1 Project Vision

The vision or overarching theme of the Georgetown Pike Footpath project is **connections**. These connections include completing a segment of the regional PHNST and connecting it to other trails and pedestrian, bicycle, and equestrian facilities in the local area. An example of such a trail is Fairfax County's Gerry Connolly Cross-County Trail (CCT), the northern end of which terminates in Great Falls Park.

In addition to trail connections, this study has also served to make connections among people representing stakeholder organizations, many of whom came together in the study's workshops in April 2018, and in May and June 2019. These collaborative connections will be beneficial to establishing partnerships for obtaining funding and for moving forward with implementation.

## 1.2 Purpose of Study

The purpose of this study was to investigate the feasibility of establishing a footpath or trail in the Georgetown Pike corridor in Fairfax County, Virginia—from the Difficult Run Trail within Great Falls Park over Difficult Run and to the intersection of Georgetown Pike and Towlston Road (Route 676), then along Georgetown Pike to the west end of the Public Access (Trail) Easement located along The Madeira School property parallel to Georgetown Pike. This study also examined the feasibility of options for a pedestrian bridge over Difficult Run within Great Falls Park or within Virginia Department of Transportation (VDOT) right-of-way along Georgetown Pike Bridge (either just north of the bridge or attached to the bridge).

## 1.3 Goals and Objectives

### 1.3.1 Project Goal

The goal of this project is to provide a footpath within Great Falls Park and the Georgetown Pike corridor that would link to the larger network of PHNST trails. This network connects the Potomac River at the Chesapeake Bay to the Allegheny Highlands in western Pennsylvania through a series of trails and routes for travel by foot, bicycle, horse, or boat. This national scenic trail incorporates both existing and planned trails managed by federal, state, local, and nonprofit entities. There are several gaps within the PHNST network, and this proposed Georgetown Pike footpath would help to close one of those gaps between Great Falls Park and Scotts Run Nature Preserve.

**Figure 2** shows a portion of the PHNST network and the general area of this missing link to be partially completed by this footpath project. The map is courtesy of NPS, as noted in **Appendix A – References**.

### 1.3.2 National Park Service Goal of Connecting People to Parks

This project is consistent with the NPS goal of connecting people with parks across the nation. This goal was established in 2016 with the centennial of the Park Service and the National Park Foundation’s “Find Your Park” campaign. Great Falls Park is one of the most visited parks in the region. Similarly, Scott’s Run Nature Preserve (a Fairfax County facility) also is a frequently visited park. The current PNHST network is heavily

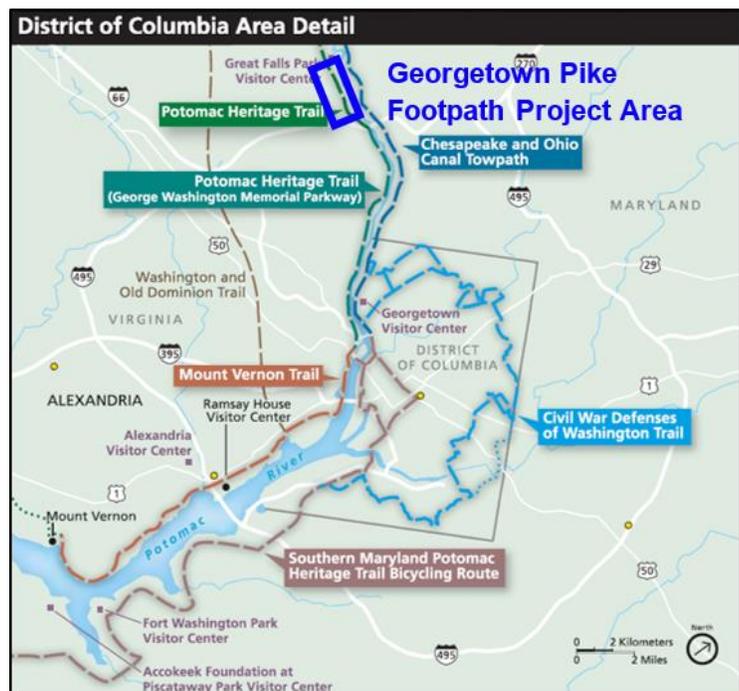


Figure 2: Project Area within Potomac Heritage National Scenic Trail Network

traveled but needs better connections, especially between Great Falls Park and Scott's Run Nature Preserve. In addition, this project is consistent with the recent policies of the Department of Interior to expand recreational opportunities on public lands and waterways.

### **1.3.3 Public Health Goals**

This project supports NPS goals related to improving the health of people and communities through better access to public parks and trails. As discussed in the publication "Improving Public Health through Public Parks and Trails: Eight Common Measures":

*"The public health benefits of parks and trails are broad and cross-cutting. For individuals, benefits include providing places for physical activity, improving mental health, reducing stress, providing connections to nature, and increasing social interactions. Parks and trails can simultaneously provide venues for community events, activities, and public health programs and improve the environment."*



*Hikers in Great Falls Park*

Further, parks and trails can provide health benefits by:

- Providing opportunities to practice healthy lifestyles
- Creating destinations and venues for physical activity
- Reducing stress and improving mental wellness
- Fostering community interaction and social support networks
- Providing beneficial, low impact use of sensitive areas, reducing injury and property loss that could occur if the land was used for other functions
- Reducing air and water pollution
- Mitigating urban heat islands
- Preserving important habitat, environmental, and cultural sites

As this Georgetown Pike footpath project moves forward, there also is the opportunity for NPS to evaluate, plan, and promote the project with respect its public health aspects.

### **1.3.4 Fairfax County Goals**

The goals for this project also are consistent with the Fairfax County Comprehensive Plan, specifically, the Countywide Trails Plan, adopted by the Fairfax County Board of Supervisors on October 28, 2014 and amended through July 1, 2018. The trails plan identifies the County's planned trail system and is an element of the transportation section of the Comprehensive Plan.

## Georgetown Pike Footpath Feasibility Study

The most recent version of the trails plan shows this Georgetown Pike footpath connection as a planned segment within the County's "Major Regional Trail System" and labeled as the Potomac Heritage National Scenic Trail. The trails plan notes that the trail may have surface materials that will vary from "paved, natural surface, to stone dust." (It also is interesting to note that the alignment shown on the Countywide Trails Plan for the Georgetown Pike Footpath project mimics the recommended Alignment 1 discussed in Section 4 of this report.)

### 1.3.5 VDOT Goals

This footpath project also is consistent with VDOT's "Policy for Integrating Bicycle and Pedestrian Accommodations," which provides a framework for VDOT to accommodate bicyclists and pedestrians in the planning, funding, design, construction, operation, and maintenance of Virginia's transportation network. As stated in the policy:

*"Appropriate bicycle and pedestrian accommodations provide the public, including the disabled community, with access to the transportation network; connectivity with other modes of transportation; and independent mobility regardless of age, physical constraints, or income. Effective bicycle and pedestrian accommodations enhance the quality of life and health, strengthen communities, increase safety for all highway users, reduce congestion, and can benefit the environment."*

### 1.3.6 Advocacy Groups

This project is consistent with the goals and the advocacy efforts of the Potomac Heritage Trail Association (PHTA), Mid-Atlantic Off-Road Enthusiasts (MORE), and Fairfax Trails and Streams. Representatives of these groups provided valuable stakeholder input for this study.



FHWA, VDOT, PHTA, and other stakeholders at Workshop #1, followed by the study's initial site visit

## 1.4 Study Process

This feasibility study for a footpath in Great Falls Park and the Georgetown Pike corridor has progressed through a logical planning process to set up the next steps in implementation.

### 1.4.1 Project Area

As shown in Figure 1, the area for the feasibility analysis of the footpath project encompasses both sides of Georgetown Pike from northwest of Difficult Run to the west end of the Madeira School Public Access (Trail) Easement. The project area within Great Falls Park is bounded by the Difficult Run Trail and the portion of the park southeast of Difficult Run.

### 1.4.2 Study Tasks

Tasks within the scope of the feasibility study included stakeholder outreach, mapping, concept planning, environmental reviews, constructability and cost analyses, and summary report with recommendations on next steps. Throughout the completion of the tasks, the study team of FHWA EFLHD, NPS, and Kimley-Horn coordinated extensively within the team and with the stakeholders discussed in Section 1.5.

### 1.4.3 Study Schedule

The study began in the spring of 2018 with stakeholder outreach and Workshop #1, the initial planning workshop. The mapping used for concept planning was developed using Fairfax County geographic information system (GIS) data converted to MicroStation base files. With the mapping of the project area, the study team conducted field investigations in May 2018 and in October 2018.

As concepts were developed, the study team also conducted a “desktop” environmental review. The concepts were refined and a draft 30% design package was submitted to EFLHD in January 2019. This package included plans, profiles, typical sections, details, and supporting information for three trail alignments.

Following the review of these plans by EFLHD, NPS, VDOT, and Fairfax County, the study team facilitated Workshop #2 on May 2, 2019 to present findings from the analyses and to present and discuss the three possible alignments. Following this workshop, a fourth alignment was added to the study, and the team refined the plans and facilitated Workshop #3 on June 13, 2019.

While consensus was achieved on a preferred alignment at this workshop, the study team continued to receive additional input from stakeholders in July and August 2019 related to details on the trail itself, as well as bridge crossing locations and bridge types. This stakeholder input was invaluable in informing this study and providing recommendations for moving this project forward into implementation.

The study process and schedule are summarized in **Figure 3**.

# Georgetown Pike Footpath Feasibility Study

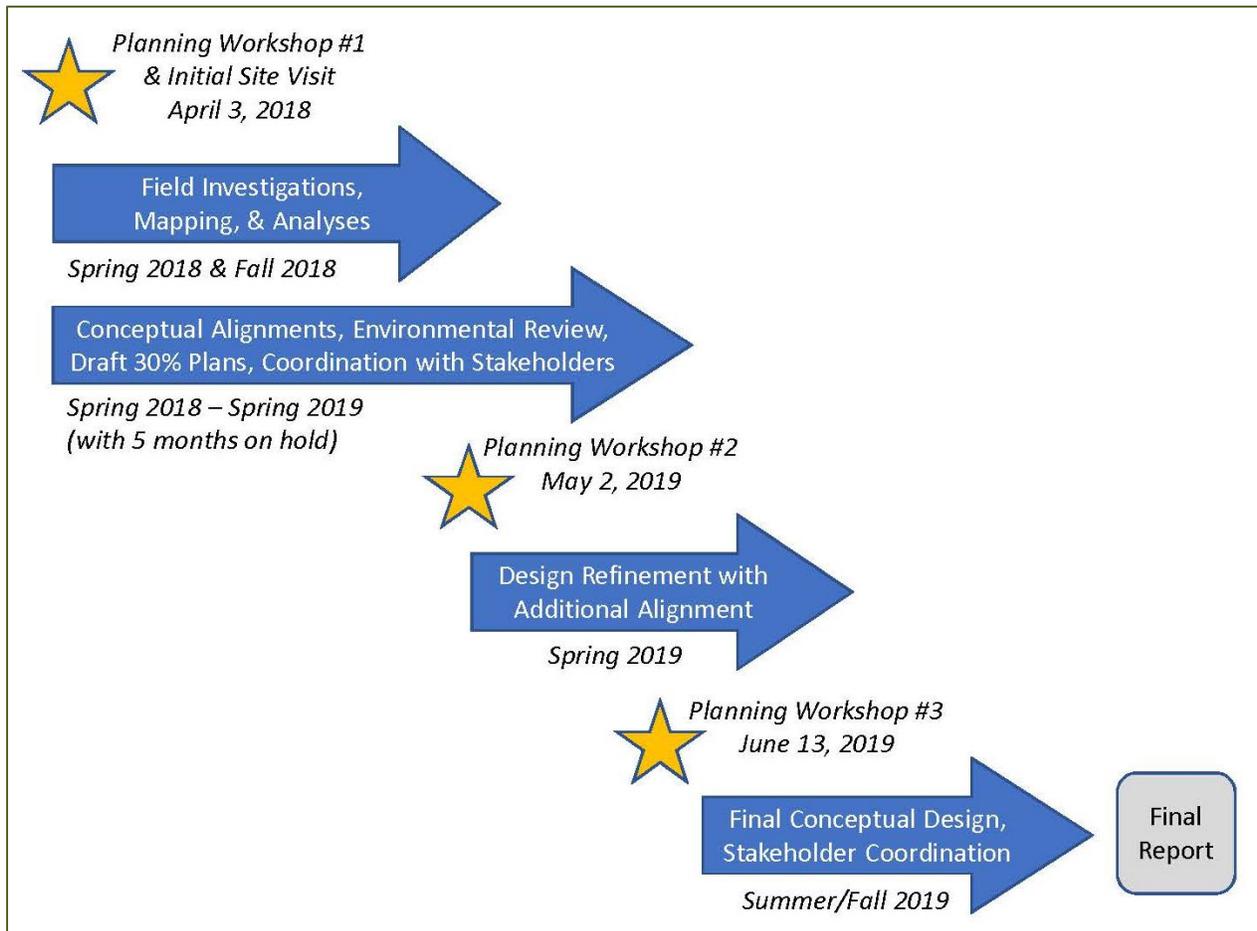


Figure 3: Study Process

## 1.5 Stakeholders and Workshops

Stakeholder input was a key component of this study—leading to consensus on a preferred alignment for implementing the Georgetown Pike Footpath Project. These stakeholders and their connections with this project are discussed in **Table 1**. During the course of this feasibility study, FHWA’s study team facilitated three workshops. Outcomes of these workshops are briefly discussed below. Minutes and presentation materials for these workshops are included in **Appendix B – Workshop Summaries**.

- **Workshop #1, April 3, 2018:** Stakeholders gathered to confirm the purpose of the project as a trail study and to discuss background of the study area and the project. Of note was the input provided by The Madeira School on their easement along Georgetown Pike to be used for a future trail. In addition to a discussion aided by a PowerPoint presentation, stakeholders used markers to draw possible footpath alignments, as shown in **Figure 4**.

A major outcome of this workshop was consensus on the need to study the feasibility of adding a 0.3-mile-segment to the scope of this project, i.e., the segment from Towlston Road to the west end of the existing easement along The Madeira School property. This segment was subsequently added to the scope of the study.

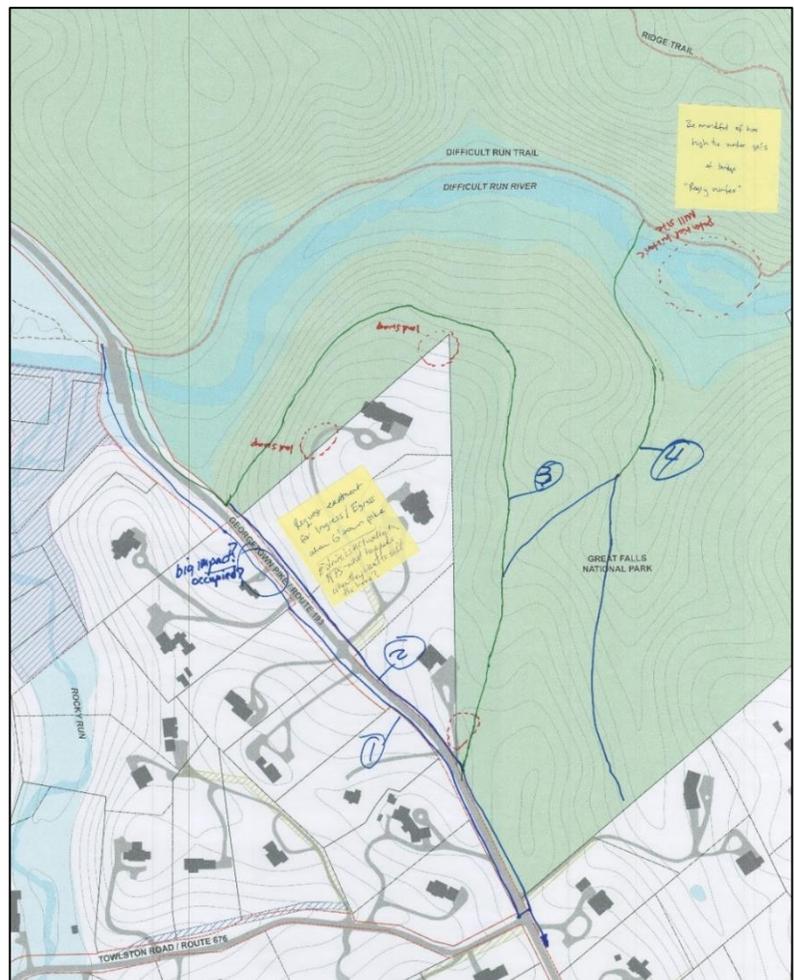


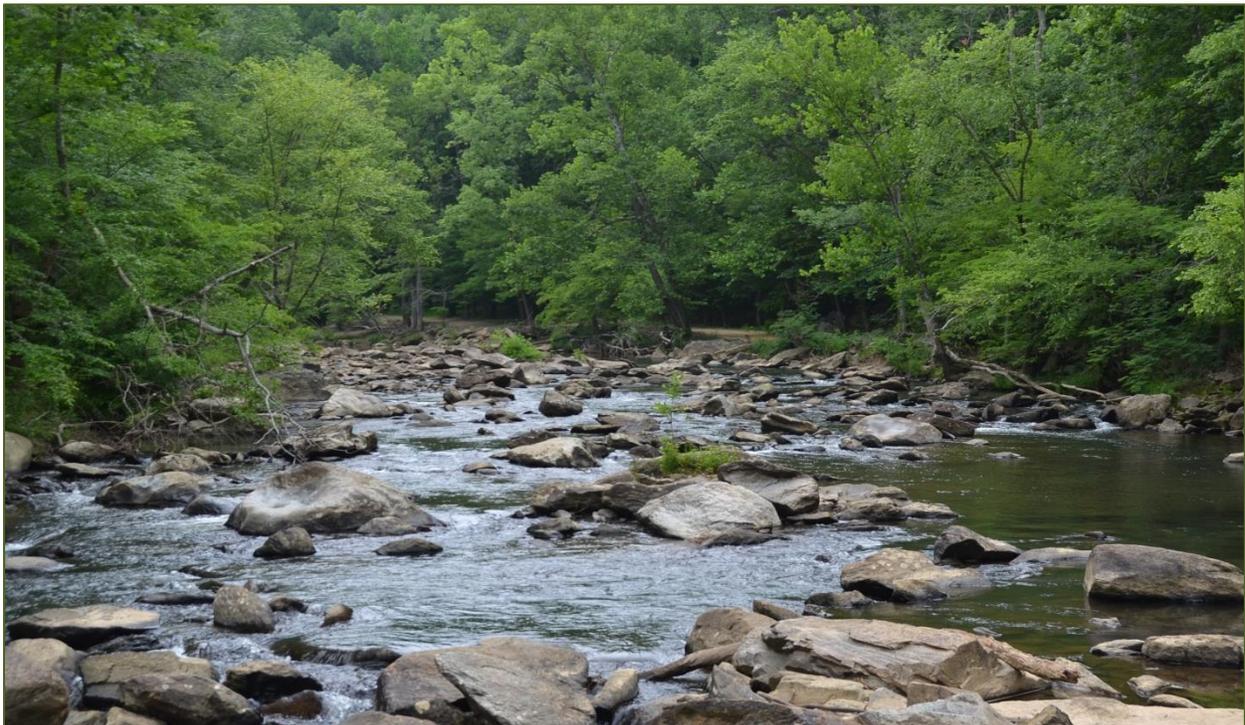
Figure 4: Sketch of Possible Footpath Alignments from Workshop #1

**Table 1: Project Stakeholders**

<b>Stakeholder</b>	<b>Connection to Project</b>
Fairfax County Board of Supervisors, Dranesville District (Supervisor John W. Foust)	District in which project is located and where nearby citizens reside
McLean Citizens Association	Group representing citizens in the greater McLean area
Great Falls Citizens Association	Group representing citizens in the Great Falls area
The Madeira School	Private girls school established in 1931, located adjacent to project area, with a Public Access (Trail) Easement donated to Fairfax County in 1991 for the construction of future trail along Georgetown Pike by the County or others
FHWA Eastern Federal Lands Highway Division (EFLHD)	Lead agency for this feasibility study; EFLHD contract used for consultant support
National Park Service (NPS)	Lead coordinating agency for this feasibility study; landowner of Great Falls Park. Two groups within NPS connected with this study: <ul style="list-style-type: none"> <li>– Region 1 – National Capital Area</li> <li>– George Washington Memorial Parkway (GWMP)</li> </ul>
Virginia Department of Transportation (VDOT)	State agency that owns and maintains Georgetown Pike (Route 193)
Fairfax County Department of Transportation (FCDOT)	Local agency that plans, designs, constructs, and maintains trails (pedestrian and bicycle facilities) throughout the County
Fairfax County Park Authority (FCPA)	Local agency that plans, designs, constructs, and maintains trails in County parks and coordinates closely with FCDOT, VDOT, and NPS properties
NOVA Parks (formerly Northern Virginia Regional Park Authority)	Regional agency that plans, designs, constructs, and maintains trails in regional parks throughout Northern Virginia in coordination with local jurisdictions, state and federal agencies, and NPS
Northern Virginia Regional Commission (NVRC)	Regional agency that provides funding and assists with implementation of multimodal projects in Northern Virginia, including trails
Potomac Heritage Trail Association (PHTA)	Advocacy group for the PHNST and its connections to local and regional trails
Mid-Atlantic Off-Road Enthusiasts (MORE)	Advocacy group for trails with emphasis on mountain biking
Fairfax Trails and Streams	Advocacy group in Fairfax County for trails

- **Workshop #2, May 2, 2019:** Stakeholders reviewed and discussed preliminary findings from field visits, the environmental review, and the design analyses; three potential trail alignments; and concepts for the alignments, cross sections, and bridges over Difficult Run. The group discussed pros and cons of each alignment and their various cross sections, as well as accessibility and potential funding programs to consider. One outcome was the addition of a fourth trail alignment (i.e., Alignment 2 discussed in Section 4). Overall, the stakeholders provided feedback on the analyses, findings, and initial recommendations, which informed the refinement of concepts for the next workshop.
- **Workshop #3, June 13, 2019:** Stakeholders reviewed and discussed the four potential trail alignments, as well as the pros and cons of each. The discussion also included options for bridge types and the potential location of the bridges along Difficult Run and the potential elevation of the bridges above the water level. Consensus was reached on a preferred alignment (discussed in Sections 4 and 5).

Following the third workshop, representatives from NPS and PHTA participated in subsequent field visits in July 2019, and stakeholders provided additional input on the concepts, as well as information to support the final report.



*Difficult Run looking upstream toward Difficult Run Trail*

## 2. History and Context

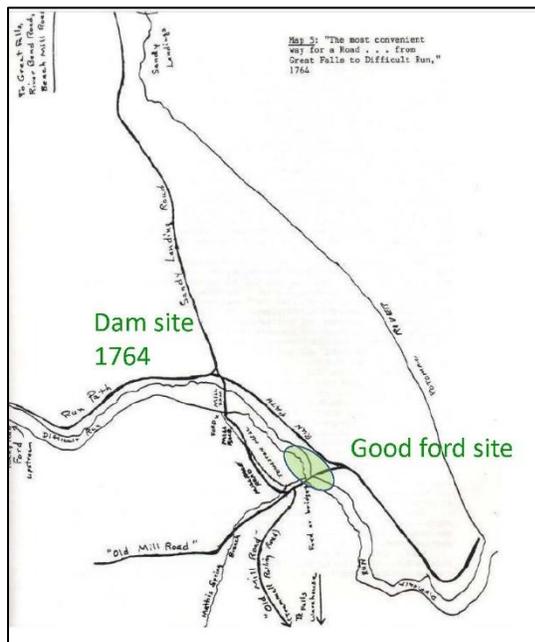
The Georgetown Pike Footpath has the opportunity to embrace history in the corridor, build on previous studies, and provide connections to a variety of trails, parks, and neighborhoods.

### 2.1 History of Corridor

Georgetown Pike generally follows a trail originally used by Native Americans and by grazing herds of eastern buffalo that passed by the falls as they roamed the area between the Chesapeake Bay and west of the Blue Ridge Mountains. In the 1700s, as European settlers moved into the region, trails and wagon roads traversed the area known today as Great Falls Park and the Georgetown Pike corridor. Remnants of these early roads are evident in the woods south of Difficult Run and north of the Difficult Run Trail.



*Remnants of an early road and culvert*



*Figure 5: Map by Winslow R. Hatch with annotation by Bill Niedringhaus, PHTA*

Evidence of the existence of these early roads is further provided in the 1764 Fairfax Court order for a road be opened “the most convenient way” from the Great Falls to Difficult Run and on to the Falls Warehouse at the mouth of Pimmit Run, which is south of the today’s Chain Bridge crossing of the Potomac River. Likely candidate locations for where an early road would have crossed Difficult Run are downstream of the present-day Georgetown Pike bridge crossing and upstream of the gorge leading to the Potomac River, i.e., at the midstream island and just upstream of this location. The present-day mid-channel could have been the ford used to cross Difficult Run, as shown in **Figure 5**.

## Georgetown Pike Footpath Feasibility Study

These early roads accessed the Potomac River, which was a trading place for American Indians and early colonists. In the late 1700s, these roads supported commerce north and south of Difficult Run, including providing access to the Patowmack Canal and to the canal-side town of Matildaville.

The Patowmack Company was organized in 1784 and by 1802, it opened a canal on the Virginia side of the Potomac River. In 1790, the Town of Matildaville was founded by Henry "Light-Horse Harry" Lee, a major general in the Continental Army, congressman, and ninth Governor of Virginia. Located near Great Falls and along the Patowmack Canal, the town flourished for nearly 30 years but declined in the late 1820s with the advent of the Chesapeake and Ohio (C&O) Canal.

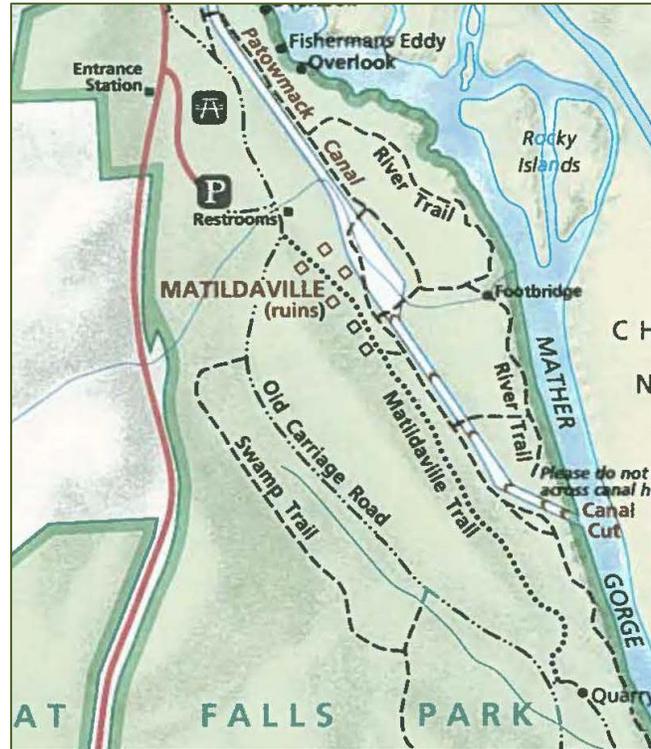
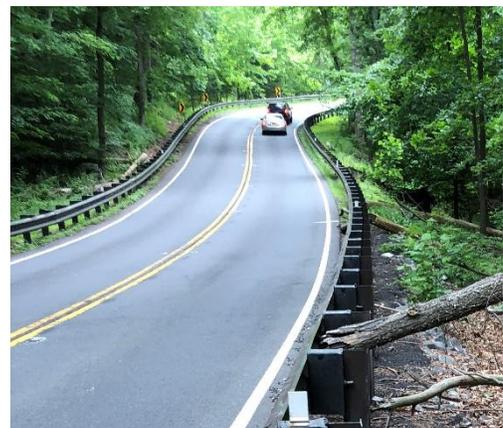


Figure 6: Excerpt of Great Falls Park Map from NPS showing the location of the Town Matildaville and Patowmack Canal

In 1828, the C&O Canal Company bought the Patowmack Canal and its rights and began construction of a canal on the Maryland side of the river that would link Washington, DC with Pittsburg, PA. By 1850, while operating as intended, the C&O Canal began to lose its effectiveness as railroads and newer modes of transportation began hauling larger loads much faster than the canal boats. Still the canal operated until 1924. Today, as shown in **Figure 6**, footpaths in Great Falls Park lead to remnants of Matildaville and the Patowmack Canal.

By 1830, Georgetown Pike had been constructed in its present-day alignment by the Falls Bridge Turnpike Company, which had extended the road to Drane's Tavern on Leesburg Pike, establishing a direct connection between Leesburg and the milling and shipping center of Georgetown. In 1973, at the request of the Fairfax County Board of Supervisors, the Commonwealth Transportation Board, in cooperation with the Virginia Department of Conservation and Recreation (DCR), designated Georgetown Pike as the Commonwealth's first scenic byway.



Georgetown Pike near Difficult Run  
(looking west)



*Georgetown Pike near Difficult Run (looking west)*

While considerable growth and development has occurred throughout the corridor, Georgetown Pike still retains many of the natural and scenic characteristics for which it was designated a scenic byway. Today, Georgetown Pike functions as the primary access to Great Falls Park, as a “main street” in Great Falls, and as a major commuting route for thousands of people every day. Members of the communities in the corridor have expressed support for a trail protecting users from the traffic and providing connections to the history and natural settings of the Great Falls Park area.

## **2.2 Previous Studies and Related Projects**

This Georgetown Pike Footpath Feasibility Study builds upon previous studies conducted by various groups over the past dozen years. These studies addressed trail connections, as well as building upon the historic routes of the 18th century trails and wagon roads. These studies are summarized below.

### **2.2.1 Georgetown Pike Trail Feasibility Summary Findings (2007)**

This study was completed by the Northern Virginia Regional Commission (NVRC) in June 2007 and outlined the issues affecting the feasibility of a bicycle or pedestrian trail along Georgetown Pike between the Capital Beltway and Great Falls Park—issues that exist today and are addressed with this current study. This report discussed the unique history and nature of Georgetown Pike as a scenic byway that both provides an opportunity to support trail connections and presents challenges to implementing such a trail. The report also cites a 1999 traffic calming study that examined crossing locations for trails and sidewalks. NVRC will continue to be a stakeholder in the implementation of this footpath project.

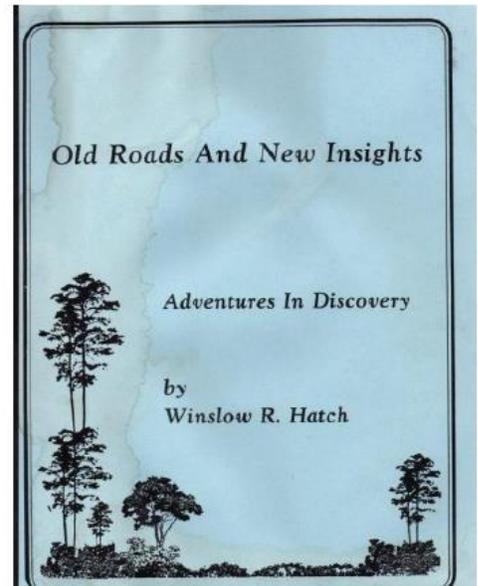
### **2.2.2 FHWA Field Trip Report (2017)**

In March 2017, FHWA EFLHD led a group on a field trip to the current project area to explore potential opportunities for an alignment to close the gap in the PHNST network. This field trip served as the pre-scoping site visit for this current footpath feasibility study. Representatives of both FHWA EFLHD and NPS participated in the field trip. A report documenting the field trip was prepared and is serving as a reference for the current study.

### 2.2.3 Potomac Heritage Trail Association (PHTA) Efforts

In support of this current study, PHTA provided reports of studies and site visits. These reports helped to provide the history of the corridor (discussed above), as well as to provide context on the connections that this footpath will make. The reports included:

- Summary of the work by Winslow R. Hatch called “Old Roads and New Insights” (ca. 1980), discussing the likely alignments of colonial and early American trails and wagon roads in this study’s project area
- Documentation of walking from Great Falls Park to Kimberwicke Road
- Copies of presentations to elected officials and stakeholder groups advocating for the completion of trails to fill gaps in the PHNST network



Cover of Hatch Document, courtesy of PHTA

PHTA continues to advocate for connections in the study area, as well as segments of PHNST to the south. This advocacy group will continue to be a key stakeholder in the implementation of the recommendations of this study.

### 2.2.4 Fairfax County efforts

Fairfax County is administering the implementation of trail connections east and west of this project’s study area:

- Between Leesburg Pike (Route 7) and Great Falls, the County is delivering multiuse path projects in four phases, with federal money being applied to three of these phases. Two phases are complete, and the remaining two phases are nearing completion.
- East of the Capital Beltway (I-495), pedestrian and multiuse path improvements recently have been constructed in the vicinity of the intersection of Georgetown Pike and Dolley Madison Boulevard (Route 123). These improvements help with access to the County’s Langley Fork Park and to bus transit stops along Route 123.

In addition, Fairfax County’s Comprehensive Plan includes a Countywide Bicycle Master Plan and Countywide Trails Plan that helped to guide this project. The trails plan includes a PHNST connection in the project area. While the general type and location of bicycle facilities and trails are shown on the plan, *specific* types and locations need to be planned and designed for trails to become reality.

## 2.3 Connecting Trails

At each of the stakeholder workshops, completing connections to existing and planned trails was a discussion topic. **Figure 7** shows these regional trail connections and how this Georgetown

## Georgetown Pike Footpath Feasibility Study

Pike Footpath Project would aid in connecting to various trails, bicycle routes, and future projects to the northwest and the south. These connecting facilities are summarized below.

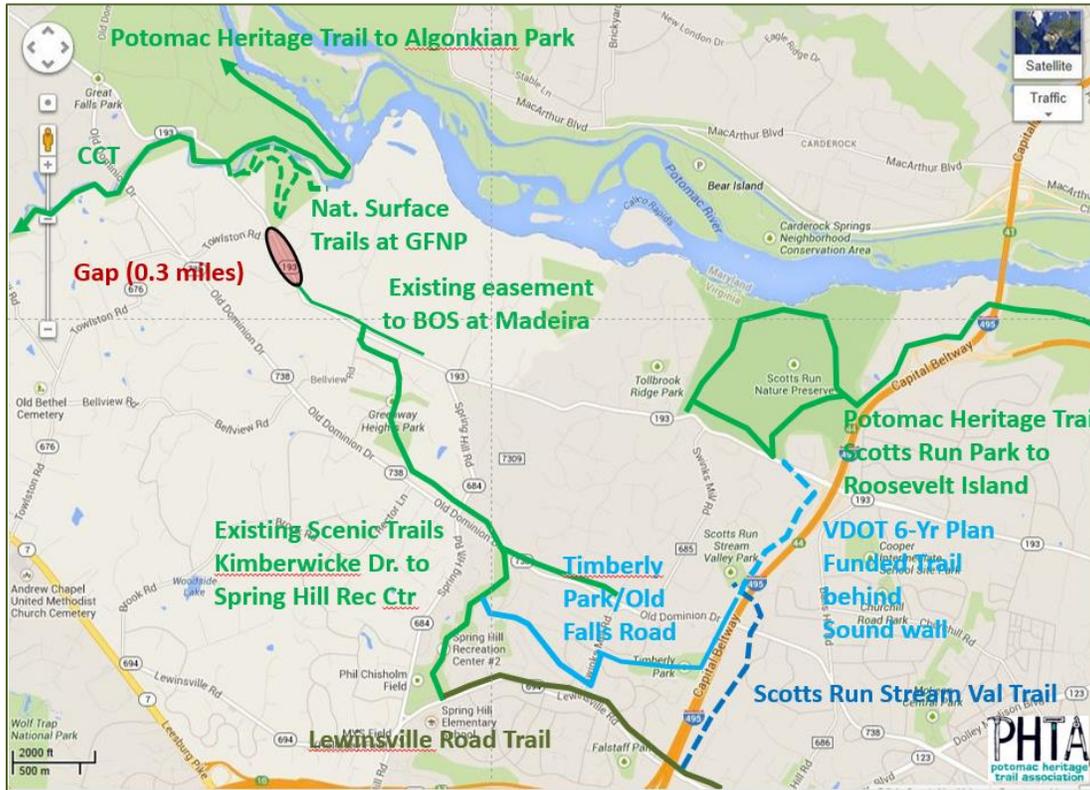


Figure 7: Map of Connecting Trails, courtesy of PHTA

- **Great Falls Park** is crisscrossed with trails along old carriage roads and along the Potomac River Gorge. These trails are part of the PHNST network and extend from the Difficult Run Trail northward to Riverbend Park in Fairfax County and Algonkian Park in Loudoun County.
- **The Madeira School** established a “Public Use (Trail) Easement” for approximately three-quarters of a mile along its frontage parallel to Georgetown Pike. A copy of the easement language, with a plat, is included in **Appendix C – Deed of Reservation and Easement Agreement**. Recorded in October 1991, this easement provides for a 12-foot easement for public use purposes. The edge of this easement closest to Georgetown Pike is 60 feet from the centerline of the Pike, which provides a substantial buffer from the street for a future trail, which will need to be planned, funded, designed, constructed, and maintained by Fairfax County and entities other than The Madeira School.

## Georgetown Pike Footpath Feasibility Study

- **Gerry Connolly Cross County Trail (CCT)** to the northwest of the project area extends approximately 40 miles from Great Falls Park to Lorton, VA across Fairfax County.
- **Existing connections** to the south of the study area include existing designated trails from Kimberwicke Drive to the Spring Hill Recreational Center, a Timberly Park/Old Falls Road trail, Scott's Run Stream Trail, and a trail within the PHNST network from Scott's Run Park to Roosevelt Island in Washington, DC.
- **A future trail connection** is slated to be funded by the I-495 Express Lanes project and will be parallel I-495.



*CCT near Georgetown Pike and Difficult Run*

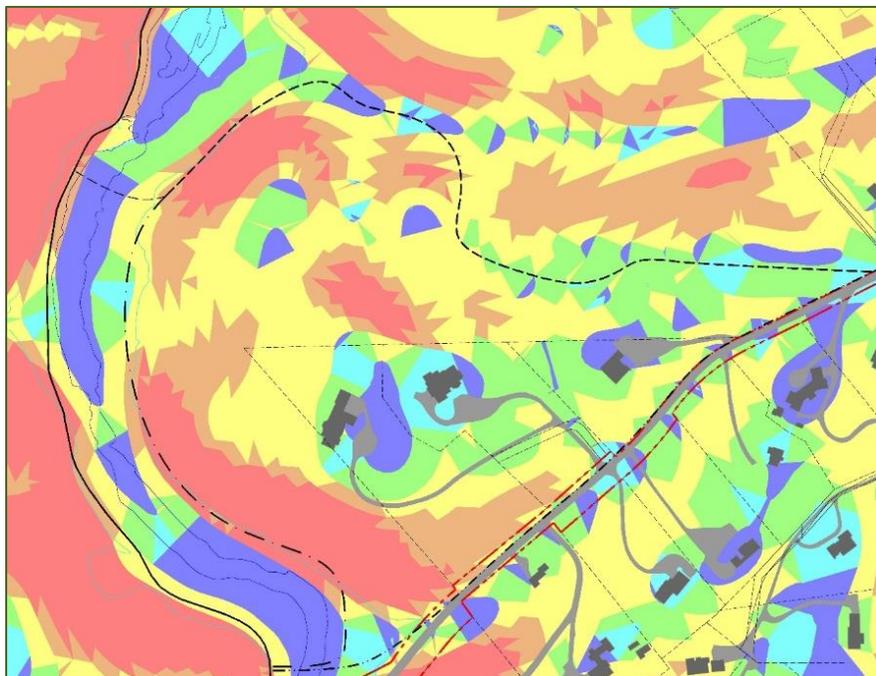
### 3. Study Area Analysis

The feasibility analysis of a footpath in the Georgetown Pike corridor involved the development of mapping, review of traffic data, field investigations, and a detailed environmental review of the study area to support concept design, stakeholder involvement, and future implementation steps.

#### 3.1 Field Investigations and Observations

##### 3.1.1 Mapping

The development of base mapping was a first step in the field investigations. The mapping served to support desktop analyses and conceptual design. Most of the mapping information was acquired from the most recent Fairfax County GIS and Mapping Services Open Geospatial Data as of spring 2018. Roadway, driveway, sidewalk, trail, buildings, and water feature data was acquired from a 2016 data set, based on 2009 aerial imagery. Property lines and easements were acquired from the 2018 data set. Contour elevations were downloaded from the 2016 U.S. Geological Survey 10-foot contour interval data. In addition, 2-foot contours were reviewed for reference through Fairfax County online mapping applications. This mapping information was supplemented by other mapping sources (e.g., Google Maps) and from site visits to enhance the information shown on the maps. **Figure 8** shows an example of this mapping output.



*Figure 8: GIS base mapping layer showing slopes and potential footpath alignments (red indicates steepest slopes)*

**3.1.2 Existing Traffic Conditions**

A desktop review of traffic volumes published by VDOT determined that Georgetown Pike experiences an average of 16,000 vehicles per day and 17,000 to 18,000 vehicles per weekday. To the east of the study area, as the corridor crosses Fairfax County’s “urban boundary,” traffic volumes average 22,000 vehicles per day, with 23,000 vehicles per weekday. Comparatively, Towlston Road, a narrow and very hilly 2-lane local street, carries 650 vehicles per day and 700 vehicles per weekday. See **Table 2**.

These traffic volumes are relatively high for a two-lane road. It was noted at the workshops that with more development occurring to the west in Loudoun County, traffic volumes have increased significantly in the corridor. The posted speed limit on Georgetown Pike is 35 miles per hour; however, study team members observed many vehicles traveling faster than the posted speed limit during field visits.

**Table 2: Existing Traffic Volumes in Study Area**

<i>Route No.</i>	<i>Route Name</i>	<i>From</i>	<i>To</i>	<i>Annual Average Daily Traffic (AADT)</i>	<i>Average Annual Weekday Daily Traffic (AAWDT)</i>
193	Georgetown Pike	Rt 683 Leigh Mill Rd	Rt 676 Towlston Rd	16,000	18,000
193	Georgetown Pike	Rt 676 Towlston Rd	Urban Boundary	16,000	17,000
193	Georgetown Pike	Urban Boundary	I-495 Capital Beltway	22,000	23,000
676	Towlston Road	Rt 738 Old Dominion Drive	Rt 193 Georgetown Pike	650	700

Source: 2018 VDOT Daily Traffic Volume Estimates

[https://www.virginiadot.org/info/resources/Traffic\\_2018/AADT\\_029\\_Fairfax\\_2018.pdf](https://www.virginiadot.org/info/resources/Traffic_2018/AADT_029_Fairfax_2018.pdf)



*Difficult Run Trail*

### **3.1.3 Field Observations**

The project team conducted field visits in the spring and fall of 2018 and again in the spring of 2019. These visits (along with discussions with stakeholders at the workshops) form the basis for the following observations within the study area, including observations on the apparent challenges with constructing a footpath within Great Falls Park and along Georgetown Pike.

- **Difficult Run Trail:** This trail begins south of Great Falls Park and proceeds through the park along the north side of Difficult Run to the Potomac River. The trail serves people who want to hike, bike, or ride horses and is generally in good condition. Portions of the trail are well above Difficult Run (with steep banks to the run) while other portions are closer to the water level. Access to Difficult Run is easier in these lower locations, but it is known that the water of Difficult Run can rise significantly and be turbulent during and after storms. Recent repairs to the trail are evident.



*Difficult Run Trail with recent repairs of wash out due to flood event*

A future pedestrian bridge crossing will need to consider the potential depth and volume of the water during and after storms. Fair-weather crossings where the Difficult Run Trail is closer to the water appear to be possible within the study area.



*Difficult Run*

- **Difficult Run:** During the site visits, the study team noted that Difficult Run is a relatively fast flowing stream in most locations. (There is wider segment within the project area that serves as a local swimming hole.) Diabase boulders and rock outcroppings indicate that bedrock is at or near the water surface. Some locations have sandy deposits, especially in the location below the last set of falls within the study area, where there is a mid-channel island. It is this location that may have served as a ford for an early trail or wagon road through the area. East of the project area, Difficult Run transitions into a gorge before the run empties into the Potomac River.

Attempting to cross Difficult Run on foot without a bridge and without getting wet is a challenge. During low flow periods, there are locations where crossing is possible by leaping from boulder to boulder or wading across shallower areas. It may be possible to construct fair-weather crossings within the boulder areas (formalizing them as stepping stones) or at the mid-channel island, perhaps with low-cost wooden bridges (tied off to a tree or other anchor to prevent the bridge from washing downstream during high-water events). Persons with physical disabilities may not be able to cross Difficult Run using a fair-weather crossing. An all-weather bridge crossing would support potential users of all abilities. It appears that all-weather crossings also are feasible. The elevation of the bridge will need to be determined with the help of a hydraulic and hydrologic analysis.



*Potential crossing location of Difficult Run*

## Georgetown Pike Footpath Feasibility Study

- **Great Falls Park:** Within the study area, south of Difficult Run, Great Falls Park offers heavily wooded ridges and rolling hills, with some steep slopes. Remnants of old trails or roads is evident on side slopes and along a small creek (called Mathis Spring Branch in the literature) that flows into Difficult Run. Observations of the Great Falls Park property south of Difficult Run concluded that a footpath would be possible in this area by following ridges and traversing some side slopes. It should be noted that “social trails” were observed in this area of Great Falls Park near Difficult Run. Social trails are those created informally by frequent visitors to the park. NPS does not authorize or maintain social trails.
- **Georgetown Pike:** This historic roadway travels through the study area from just northwest of Difficult Run in a southeasterly direction. Northwest of the study area is the main vehicle entrance to Great Falls Park and beyond that the village of Great Falls. Southeast of the study area is The Madeira School with its main entrance off of Georgetown Pike, and continuing east, Georgetown Pike provides vehicle access to Scott’s Run Nature Preserve. East of Scott’s Run is an interchange with the Capital Beltway and the McLean area.



*Member of study team on informal trail in Great Falls Park south of Difficult Run*



*Georgetown Pike (looking west)*

The hills and curves along the historic alignment of Georgetown Pike result in limited sight distance along this corridor for vehicles and other modes of travel. In addition, shoulders are narrow and large drainage ditches and steep side slopes exist for much of this portion of Georgetown Pike. Many utility poles are close to the edge of pavement, and overhead and underground utilities exist just off the roadway.

## Georgetown Pike Footpath Feasibility Study



*Georgetown Pike: narrow shoulders, overhead utilities, and numerous driveways*

Georgetown Pike within the project area also has several side streets and many driveways. From the GIS mapping, the public right-of-way is limited to the roadway itself, except at the crossing of Difficult Run, where the right-of-way is wider.



*Drover's Rest "pinch point" along Georgetown Pike*

Of note is the "pinch point" or narrow area between the edge of the Georgetown Pike pavement and the fence at the Drover's Rest area at the southeast end of the project area. A solution will be needed in this location for the footpath that may involve a narrower trail, additional protection from vehicles, acquisition of right-of-way and/or easements, and replacement of fencing.

Given the physical features of the road and the existing high traffic volumes, pedestrian and bicycle travel along the road is currently challenging. Site distance is limited for pedestrian crossings and there is little space next to the roadway for walking. From the base mapping and from observations along both shoulders of Georgetown Pike, a footpath could be constructed and maintained on either side of the road. However, challenges will include overcoming steep side slopes, minimal available right-of-way, utility conflicts, driveway crossings, and limited sight distance for vehicles, pedestrians, cyclists, and equestrians. The road and the footpath would need to have adequate drainage, and the project would need to provide a barrier (e.g., double-faced guardrail) for protection of pedestrians from vehicles.

**Georgetown Pike Bridge over Difficult Run:** During the field visits, it was noted that this bridge has an existing cantilevered pedestrian facility on the west side (upstream side) of the bridge. This walkway was permanently closed due to corrosion of structural members. It appears that the wooden deck of the pedestrian facility did not protect the underlying steel members from rain, snow, and salt, which accelerated the deterioration of the steel. It was noted by VDOT representatives at the workshops that this cantilever structure was closed more than 30 years ago due to the structural concerns. It also was noted that the vehicle bridge itself is structurally sound with a “5” rating, meaning that VDOT will not be replacing the bridge in the near term. Stakeholders pointed out that prior to closure of the pedestrian path across the bridge, there was a greater amount of pedestrian activity than there is today, partially due to a parking lot that used to be on the west side of Georgetown Pike, just south of Difficult Run.

The bridge itself supports one travel lane in each direction, each approximately 11 feet wide, and narrow shoulders approximately 6 feet wide between the white edge lines and the face of the parapet walls. While some stakeholders advocated for striping a pedestrian path on the existing bridge by shifting vehicle lane lines and making a wider space for pedestrians, from the field observations, it will be challenging to accommodate pedestrian traffic on the existing bridge given the roadway approaches, existing runs of guardrail on each side of the road at both ends of the bridge, very narrow shoulders in front of and the behind guardrail, high vehicular traffic speeds, and limited site distance for vehicles and pedestrians.



*Georgetown Pike bridge over Difficult Run (looking east)*



*Westbound approach to Georgetown Pike bridge over Difficult Run*

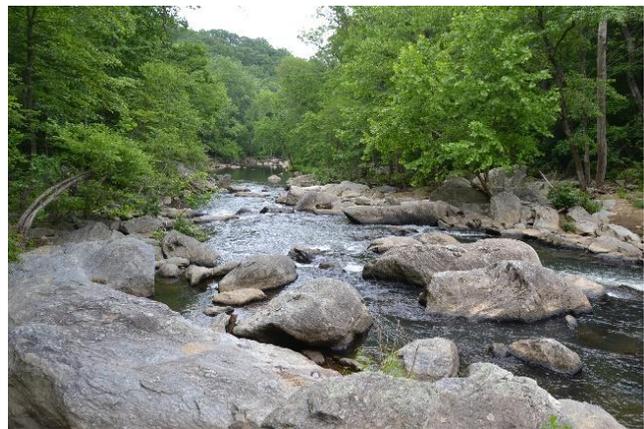
## 3.2 Environmental Review

As part of this Georgetown Pike Footpath feasibility analysis, the Kimley-Horn team assessed environmental elements of the study area including water resources, protected species, hazardous materials, historic resources, Environmental Justice, and Section 4(f) and Section 6(f), and Community Facilities. Kimley-Horn team members conducted a “desktop” review of publicly available GIS and database information to identify sensitive resources within the study area. The team also conducted a limited field review to verify the findings of the database review and to identify unmapped or previously unidentified environmental features.

This environmental review was not conducted to satisfy the requirements of the National Environmental Policy Act (NEPA). Instead, this review was intended to support the feasibility analysis and to support the next steps in the project development process. Any implementation of the recommendations in this study will require compliance with all relevant laws and regulations, including NEPA. Detailed results of this study’s environmental review are included in **Appendix D – Environmental Features Summary**. The review and its results are summarized below.

### 3.2.1 Water Resources

The study area contains many water resources that need to be considered during the final design of the footpath. Difficult Run, Rocky Run, and an unnamed perennial tributary to Difficult Run (also called Mathis Spring Branch per documents provided by PHTA) are all within the study area. Hydric soils were identified within the study area through the desktop analyses, indicating the presence of unidentified wetlands. As this footpath project moves forward into final design, it is



*Difficult Run*

recommended that a site-specific wetland delineation be conducted for the proposed limited of disturbance (LOD), in accordance with the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, and be confirmed by USACE through the Jurisdiction Determination process.

A pedestrian bridge crossing that moves forward into final design will require a Joint Permit Application (JPA) to be submitted to the Virginia Marine Resources Commission (VMRC). In addition, if additional wetlands and streams are identified within the project limits of disturbance, additional authorization from the Virginia Department of Environmental Quality (VDEQ) and USACE may be required. It is anticipated that the project would qualify for USACE Nationwide Permit (NWP) 23, with the assumption that a Categorical Exclusion (completed per NEPA) would be approved. Pre-construction notification (PCN) to USACE will be required; however, no VDEQ Water Protection (VWP) permits are expected to be required.

A floodplain study also will be required to complete the design of a pedestrian bridge over Difficult Run. The Fairfax County Department of Land Development Services will require approval of a Floodplain Use Determination Request for work taking place within a floodplain. Although trails and footpaths are exempt from compliance with Resource Protection Area (RPA) regulations, a written request for exemption may be required to be submitted to the Fairfax County Department of Land Development Services for the portion(s) of the footpath within the RPA.

### **3.2.2 Protected Species**

There are protected or endangered species identified near the study, although no confirmed occurrences were identified. No suitable habitat is present within the study area for all species. These species are discussed below:

- **Bald Eagles** may be present within the study area; however, no nests were identified, and a review of the U.S. Fish and Wildlife Service (USFWS) Bald Eagle Concentration Areas revealed no areas within 660 feet of the study area.
- **Yellow Lance Clams** may be present within the study area; however, no confirmed occurrences were identified, and no suitable habitat is present within the study area.
- **Northern Long-Eared Bats** may be present within the study area; however, no winter hibernacula were identified within 0.25 miles of the study area, no maternity roost trees were identified within 150 feet of the study area, and no confirmed occurrences of this species were identified within a 2-mile radius of the study area.
- **Little Brown Bats** are listed as an endangered species within 2 miles of the study area; however, no hibernacula or known maternity roosts were identified within 150 feet of the study area.
- **Tri-Colored Bats** are listed as an endangered species within 2 miles of the study area; however, no hibernacula or known maternity roosts were identified within 150 feet of the study area.
- **Wood Turtles** are listed as a threatened species, and Difficult Run is a confirmed habitat. The bridge crossing of Difficult Run will require additional coordination with the Virginia Department of Game and Inland Fisheries (VDGIF). Construction taking place within 900 feet of Difficult Run may be subject to a restriction from April 1 to September 30 to protect wood turtle nesting areas.

### **3.2.3 Hazardous Materials**

The study team conducted a search of a commercial database of known or potential hazardous material or waste sites within a half mile of each footpath alignment. A total of seven locations were identified, including six Leaking Petroleum Storage Tanks (LTANKS) and one Underground Storage Tank (UST). All LTANKS were associated with leaking residential heating oil tanks, and the UST is associated with a former gasoline station. In all cases the tanks have been closed by VDEQ, and there should be no impact to this footpath project moving forward.

### 3.2.4 Cultural Resources

The study team reviewed the Virginia Department of Historic Resources' (VDHR) Virginia Cultural Resource Information System (V-CRIS) database to identify known or suspected historic or archaeological sites within the project limits that are listed on the National Register of Historic Places (NRHP) or eligible or potentially eligible for listing on the NRHP. A search of V-CRIS identified seven architectural resources that are listed in, eligible for, or potentially eligible for listing in the NRHP within the study area, including:

- **Georgetown Pike:** The roadway is listed on the NRHP and the Virginia Landmark Register (VLR), and the footpath project would be located within the historic boundary of this roadway.
- **Great Falls Park Historic District:** The northern portion of study area falls within this district, also known as the Potomac Canal Historic District, and is listed on the NRHP and the VLR.
- **Drover's Rest:** The site is an approximately 2-acre property with several structures, including a home believed to have been built between 1757 and 1785, and is eligible for listing on the NRHP. Drover's Rest is located in the southern portion of the study area, and the juxtaposition of the historic structures and the edge of Georgetown Pike present the "pinch point" challenge for a footpath alignments through this area.
- **The Madeira School:** Built in 1931, The Madeira School has not been evaluated but is recommended eligible for listing on the NRHP, according to V-CRIS. The school is located at the southeast end of all four footpath alignments. The existing Public Access (Trail) Easement on the school property along Georgetown Pike is the envisioned adjacent segment of the PHNST network.
- **Difficult Run Trail:** This trail was recommended in 2016 to not be eligible as a historic place, although it has been identified as a contributing resource to the George Washington Memorial Parkway and Great Falls Park Historic Districts. While not eligible, the proposed footpath alignments all connect to this trail.
- **Gauging Station:** A gauging station for Difficult Run water levels is located near a potential footpath bridge crossing; however, in 2007, it was recommended to not be eligible as a historic resource.
- **Unnamed archaeological site:** There is reportedly a site near or within the study area containing prehistoric petroglyphs; the exact location is unknown.

While a formal consultation with VDHR will be required to determine if the project will result in adverse effects to any of these resources, it is important to note that being on the NRHP does not preclude the footpath project from moving forward with final design.

### 3.2.5 Environmental Justice

After reviewing data at the census block group level, the study team determined that no minority or low-income populations are present within the study area.

### **3.2.6 Sections 4(f) & 6(f)**

The study team reviewed available GIS data to determine whether the proposed alignment options would require a use of properties that qualify for protection under Section 4(f) of the Department of Transportation Act. Section 4(f) resources include publicly-owned parks and recreational lands, wildlife and waterfowl refuges, and publicly or privately-owned historic sites listed on or eligible for listing in the NRHP. A “use” of a Section 4(f) resource may include permanent acquisition or permanent easement, temporary occupancy, or constructive use.

All proposed alignments would result in a direct, permanent use of the Difficult Run Trail, Great Falls Park Historic District, and the Georgetown Pike historic road bed. Permanent and/or temporary uses of Drover’s Rest, and The Madeira School property also may be required depending on final design. Coordination with NPS and VDHR will be required to determine if use of these properties would qualify for a *de minimis* determination. Individual Section 4(f) evaluations may be required if the project is determined to result in an adverse effect to one or more historic properties.

The Land and Water Conservation Fund Act (LWCFA) of 1965 (16 U.S. Code 4601-4 *et seq.*) established a funding source to assist state and federal agencies in the acquisition and development of public outdoor recreational areas and facilities. Section 6(f) of the LWCFA requires that all properties acquired or developed, either partially or wholly, with Land and Water Conservation Fund money must be maintained as such in perpetuity. No Section 6(f) resources were identified within the study area.

### **3.2.7 Community Facilities**

There are currently no existing or planned community facilities within the study area according to a review of Fairfax County GIS data and available comprehensive and master plans. The proposed footpath project would increase connectivity to local and regional parks and trails, which is a primary goal of the Fairfax County Parks and Recreation System Master Plan. The project also would contribute to the ultimate completion of the PHNST, as discussed throughout this report.

## **3.3 Conclusions on Study Area Analyses**

From site analyses and environmental reviews, the study team concluded that there do not appear to be any showstoppers to implementing a footpath in the project area with respect to field conditions and environmental permitting processes. This conclusion was shared with the stakeholders at Workshop #2.

While Georgetown Pike is listed on the National Register and other resources are eligible for listing, a footpath could be constructed in this corridor by following processes required by the agencies such as VDEQ and VDHR and the Army Corps of Engineers. These processes are anticipated to be relatively straightforward as the project moves through final design and into construction.

**Georgetown Pike** ~~~~~  
**Footpath Feasibility Study**



*Georgetown Pike looking west near The Madeira School and Drover's Rest*

## 4. Conceptual Alignments and Design Elements

Considering the base mapping, field investigations, and environmental review, the study team examined various footpath alignments, including footpath alignments considered but dismissed, as well as design elements of footpath cross sections and bridge crossings. The desired outcome of this conceptual design effort was a preferred alignment that will result in a complete, functioning footpath project meeting the goals of FHWA, NPS, and the other project stakeholders.

### 4.1 Alignment Options

The study team considered design elements that were variable (such as location of the footpath) and those that were fixed (such as the desired 6-foot width of the footpath) and developed various alignments. The discussion of possible alignments began with Workshop #1, during which the participants used the base mapping to sketch ideas (see Figure 4.) Many alignments were considered and analyzed. Some alignments were dismissed, while others moved forward.

By the spring of 2019, three alignments had emerged and were presented at Workshop #2:

- Alignment 1a starting within Great Falls Park well to the east of Georgetown Pike, crossing Difficult Run, proceeding through the park to Georgetown Pike, and proceeding along Georgetown Pike to The Madeira School easement.
- Alignment 1b starting within Great Falls Park adjacent to Georgetown Pike and proceeding along the east side of the Pike to The Madeira School easement.
- Alignment 2 starting within Great Falls Park adjacent to Georgetown Pike and proceeding down the west wide of Georgetown Pike to The Madeira School easement.

One outcome of Workshop #2 was the introduction of a fourth alignment that connected Alignment 1b and Alignment 1a, south of and parallel to Difficult Run on a relatively steep side slope. Following Workshop #2, the alignments were renumbered and the resulting four possible alignments were presented and discussed with the stakeholders at Workshop #3. These four alignments are shown in **Figure 9** and described below.



*Steep side slope in Great Falls Park*

# Georgetown Pike Footpath Feasibility Study

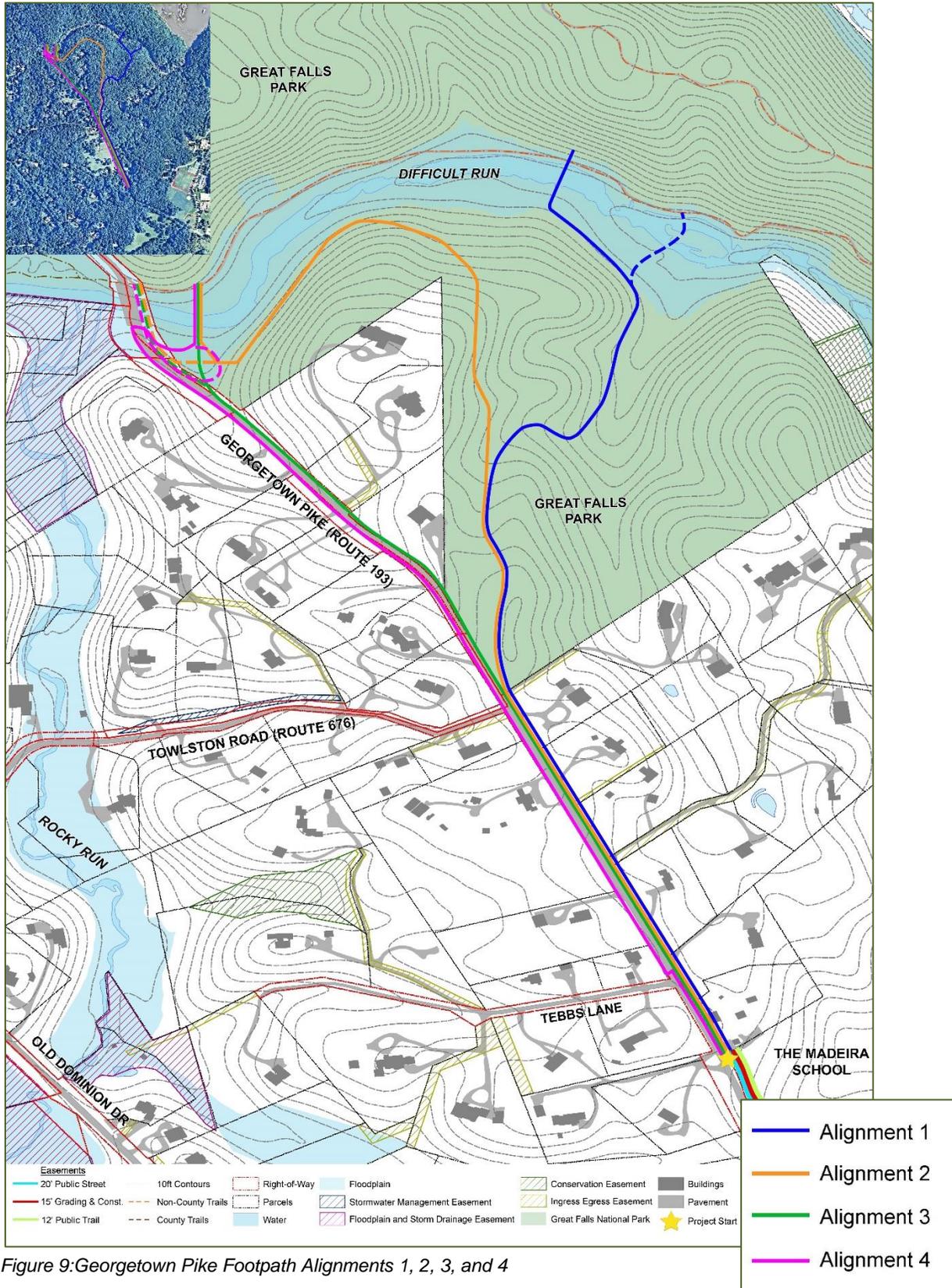


Figure 9: Georgetown Pike Footpath Alignments 1, 2, 3, and 4

#### **4.1.1 Alignment 1**

This alignment starts within Great Falls Park along the Difficult Run Trail approximately a quarter mile east of the Georgetown Pike bridge over Difficult Run. The trail crosses Difficult Run at one of two places—upstream of the falls in the area of boulders and bedrock or downstream of the falls making use of the sandy, mid-channel island. The footpath then follows the natural grade through Great Falls Park up the hill to Georgetown Pike opposite the intersection with Towlston Road. The path emerges from the park then proceeds along the east side of Georgetown Pike, through the pinch point at Drover’s Rest, and to the west end of the Public Access (Trail) Easement on the Madeira School property.

#### **4.1.2 Alignment 2**

This alignment starts at the Difficult Run Trail within Great Falls Park and crosses Difficult Run close to the east side (downstream side) of the existing Georgetown Pike vehicle bridge, perhaps within the existing VDOT right-of-way. The foot bridge could also be adjacent to the east side of the vehicle bridge, either as a separate structure or as part of a future bridge rehabilitation project. The footpath then proceeds along the south side of Difficult Run, cutting into the existing side slope. Like Alignment 1, the footpath then follows the natural grade through Great Falls Park up the hill to Georgetown Pike opposite the intersection with Towlston Road. The path emerges from the park then proceeds along the east side of Georgetown Pike, through the pinch point at Drover’s Rest, and to the west end of the easement on the Madeira School property.

#### **4.1.3 Alignment 3**

This alignment starts at the Difficult Run Trail within Great Falls Park and, like Alignment 2, crosses Difficult Run close to the east side of the existing Georgetown Pike vehicle bridge. The foot bridge could also be adjacent to the east side of the vehicle bridge, either as a separate structure or as part of a future Georgetown Pike bridge rehabilitation project. The footpath then proceeds along the east side of Georgetown Pike, winding up the hill to the intersection with Towlston Road. From this point, like Alignments 1 and 2, the path proceeds along the east side of Georgetown Pike, through the pinch point at Drover’s Rest, and to the west end of the Madeira School easement.

#### **4.1.4 Alignment 4**

This alignment starts at the Difficult Run Trail within Great Falls Park and, like Alignments 2 and 3, crosses Difficult Run close to the east side of the existing Georgetown Pike vehicle bridge or adjacent to the vehicle bridge, either as a separate structure or as part of a future bridge rehabilitation project. The footpath then turns right (or left) and proceeds under the vehicular bridge and up the side slope to the west side of Georgetown Pike. From this location (the former parking lot for access to the Difficult Run Trail), the footpath proceeds along the west side of Georgetown Pike, winding up the hill, through the intersection with Towlston Road and to the intersection with Tebbs Lane. The footpath crosses Georgetown Pike at this intersection, making use of a pedestrian crosswalk and warning signs (including flashing lights and other

technology as warranted during design). From this point, like Alignments 1, 2, and 3, the path proceeds along the east side of Georgetown Pike, through the pinch point at Drover's Rest, and to the west end of the Madeira School easement.

### 4.1.5 Alignments Considered but Dismissed

As shown in **Figure 10**, the study team considered other alignments and discussed these with the stakeholders at the workshops. These alignments are discussed below and were dismissed for the reasons cited.

- A. **Footpath crossing south of Georgetown Pike vehicle bridge.** The start of this alignment, while along the Difficult Run Trail, would be outside of Great Falls Park and would require a longer pedestrian bridge to span Difficult Run, given the wide floodplain on the north side of Difficult Run and steep slope on the south side.
- B. **Footpath over existing Georgetown Pike vehicle bridge.** This alignment would rely on restriping of the bridge, adding a barrier on the bridge, and constructing a footpath on approaches to the bridge that have very steep side slopes. The study team concluded that the existing bridge is not wide enough to accommodate the two traffic lanes, a narrow footpath, and a barrier separating vehicles from pedestrians. Making use of the existing bridge for a footpath alignment without a barrier was discussed with the stakeholders and considered briefly by the study team, but it was dismissed as unsafe.

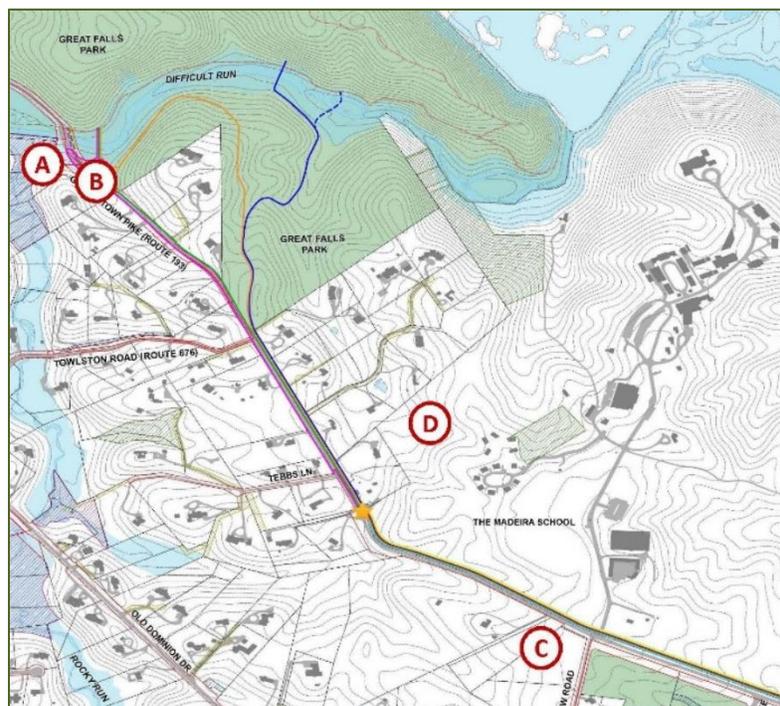


Figure 10: Alignments Considered but Dismissed

- C. **Footpath extending on the west side of Georgetown Pike to opposite the vehicle entrance to The Madeira School.** This alignment would require the acquisition of additional right-of-way from private property owners, as well as an unsignalized pedestrian crossing. This alignment also would not take advantage of more than half of the easement that is offered by The Madeira School property. In the future, if a signal were installed at The Madeira School entrance, a pedestrian crossing could also be signalized, making this alignment more attractive, especially in connecting to trails south and east of the project area.
- D. **Footpath along west side of The Madeira School property.** This alignment would require an additional easement from The Madeira School as well as access through land not controlled by NPS. The representatives from The Madeira School stated at the workshops that they are opposed to such an alignment, given concerns for the security of their students and the sanctity of their campus. Further, the school has provided the easement along their Georgetown Pike frontage to Fairfax County to be a segment of the PHNST network that would cross their property (vs. behind their property along the Potomac River). (It should be noted that in June 2018, The Madeira School penned a letter to PHTA articulating their reasons for opposing an alignment on their property that is not along Georgetown Pike. A copy of this letter is included as **Appendix E – Letter from The Madeira School.**)

#### **4.1.6 Conclusions on Alignments**

The study team concluded that each of the Alignments 1 through 4 could be constructed; however, there are specific conclusions that can be drawn when analyzing construction feasibility of each alignment or comparing pros and cons of each alignment.

1. Construction challenges for all alignments will include:
  - a. Grading along the steep slopes within Great Falls Park and along Georgetown Pike
  - b. Developing drainage solutions that fit within the context of the park and the corridor and are maintainable
  - c. Relocating and/or avoiding overhead and underground utilities
2. According to GIS records, there is not sufficient right-of-way along Georgetown Pike for any of the alignments to be built without acquiring right-of-way or easements from private property owners. A more detailed survey will better quantify amount of land needed as right-of-way or public use easement for the footpath.
3. Within Great Falls Park, a footpath can be constructed with minimal impact to drainage, slopes, and existing vegetation.
4. All of the alignments will need to overcome the pinch point at Drover’s Rest along the east side of Georgetown Pike; a solution that may involve a narrower trail through this area.

- Alignments 1 and 2 have more of the footpath in Great Falls Park and would require the least amount of new right-of-way or new easements from private property owners, as compared with Alignments 3 and 4.
- Alignment 2 requires cutting a trail into a steep side slope, which is feasible, but will add cost as compared with Alignment 1.
- Alignments 3 and 4 will cross more driveways and will need to overcome more steep side slopes and ditches along Georgetown Pike than Alignments 1 and 2.
- With respect to the candidate pedestrian bridge crossings of Difficult Run, a bridge would be feasible in each of the locations. A land survey and a design study, including a hydrologic and hydraulic analysis, will be needed to help determine the appropriate length of the bridge over Difficult Run.
- Construction of the Alignment 1 bridge a quarter mile from Georgetown Pike may be more challenging than closer to the existing road, given the logistics of staging materials. Project would need access along Difficult Run and the future Alignment 1 path for bridge construction downstream of Georgetown Pike. Lay down areas may need to be along the Difficult Run Trail and/or on the south side of Difficult Run constructed with the trail through Great Falls Park. See discussion in Section 4.3 on bridge types and locations.

## 4.2 Footpath Cross Sections

The study team researched the appropriate typical cross sections for segments of the footpath within Great Falls Park and along Georgetown Pike. In all locations, the recommended width of the footpath is 6 feet, with shoulders that are each 1 foot wide. Cross sections will vary, however, depending on the location. The following typical sections are recommended:

### 4.2.1 Typical Section within Great Falls Park

The recommended typical section for the footpath in Great Falls Park is shown in **Figure 11**. The cross section shown was derived from typical details in NPS design guidelines.

Multiple options exist for surface treatment, including crusher run, gravel, heavily compacted soil, and mulch. During final design, the choice for surface treatment will likely depend on the preference of NPS as well as current costs and availability of materials. Care will need to be taken in constructing the footpath with minimal laydown areas for materials.

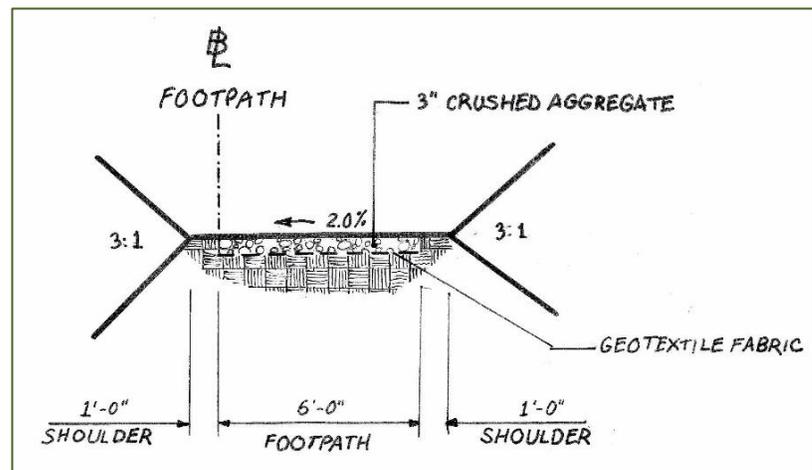


Figure 11: Typical section for footpath in Great Falls Park

#### 4.2.2 Typical Section along VDOT Right-of-Way

Along Georgetown Pike, most of the existing cross section includes open ditches with minimal shoulders. See **Figures 12 and 13**. Some locations have steep cut slopes; other locations have gradual side slopes. Many locations have guardrail protecting traffic from the deep ditches or from steep fill slopes (embankments). Sight distance is limited due to the horizontal and vertical curves that have resulted over time as the road evolved from a wagon road in the 1800s to the heavily-traveled VDOT route that it is today.

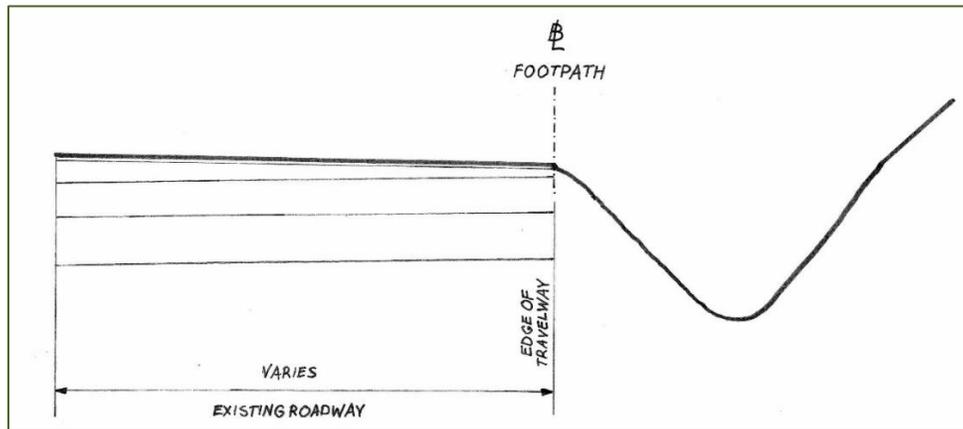


Figure 12: Existing Typical Roadside Ditch Cross Section of Georgetown Pike

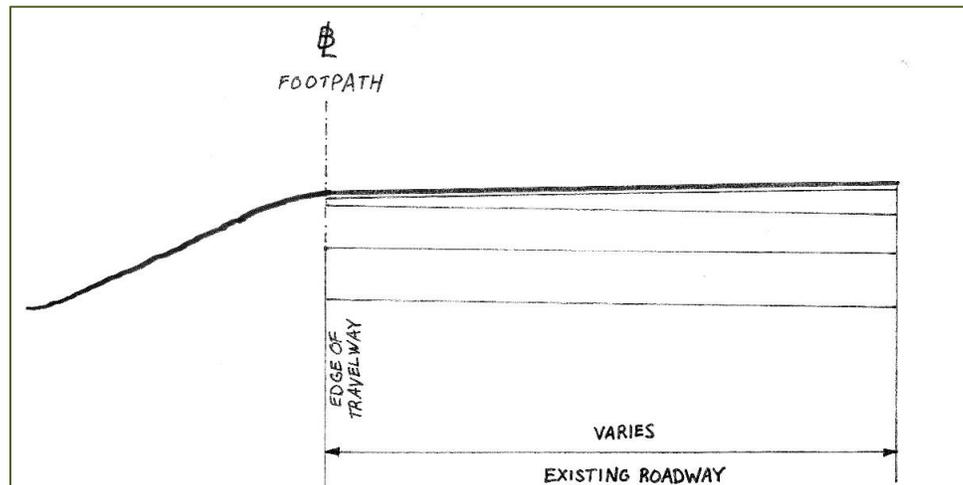


Figure 13: Existing Typical Roadside Slope Cross Section of Georgetown Pike

Within existing right-of-way (or within right-of-way or easements to be acquired as part of project implementation), the typical section for a footpath along Georgetown Pike will need to provide the following:

- Appropriate pedestrian protection from vehicles
- Application of VDOT design criteria for safety and accessibility
- Surface treatment that would minimize erosion and minimize maintenance needs

## Georgetown Pike Footpath Feasibility Study

Thus, the footpath typical section along Georgetown Pike will vary, depending on the existing conditions and on the desire of the agencies owning and maintaining the trail after construction. Stakeholders also will want to provide input during final design. Several options for typical sections are shown in **Figures 14 to 17**.

In all cases, the recommended surface treatment for segments of the footpath along Georgetown Pike is asphalt compacted on prepared subbase (e.g., 21A or 21B stone) and flanked by compacted gravel shoulders. In areas with steep side slopes, small retaining walls may be needed (with handrails added for protection from drop-offs).

Drainage solutions will need to be part of the footpath design, and options include surface runoff behind the footpath, the addition of inlets at the back of the asphalt path, and/or curb and gutter for segments along Georgetown Pike. The precedent has been already set for adding curb and gutter to this historic road in the Great Falls area and along segments to the west of the village of Great Falls.

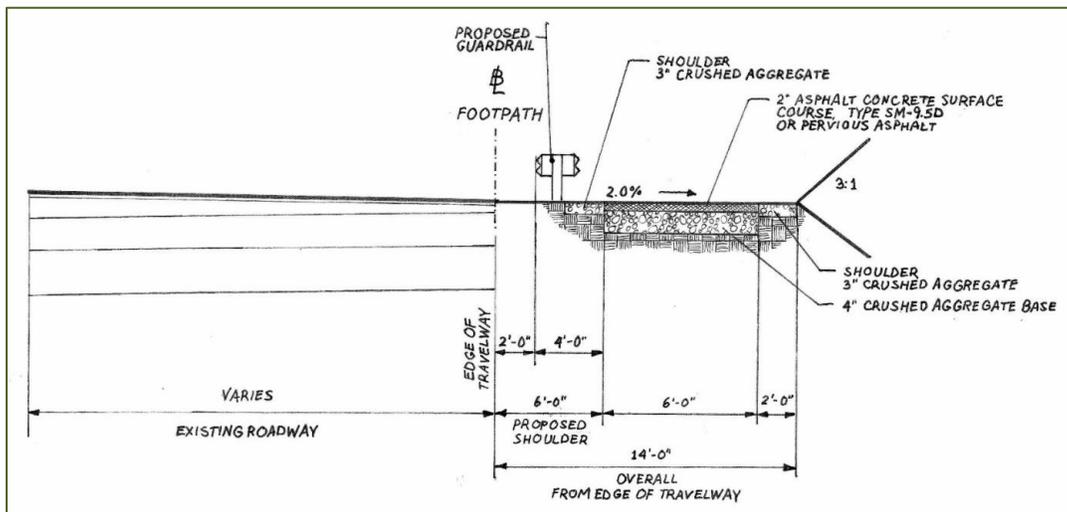


Figure 14: Possible Typical Section for Footpath along Georgetown Pike

# Georgetown Pike Footpath Feasibility Study

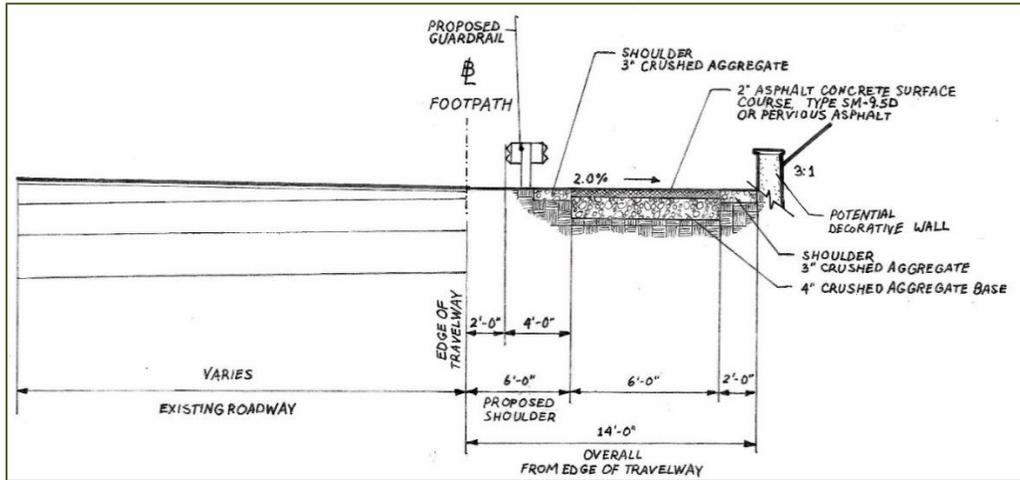


Figure 15: Possible Typical Section for Footpath with Retaining Wall for Cut Slope

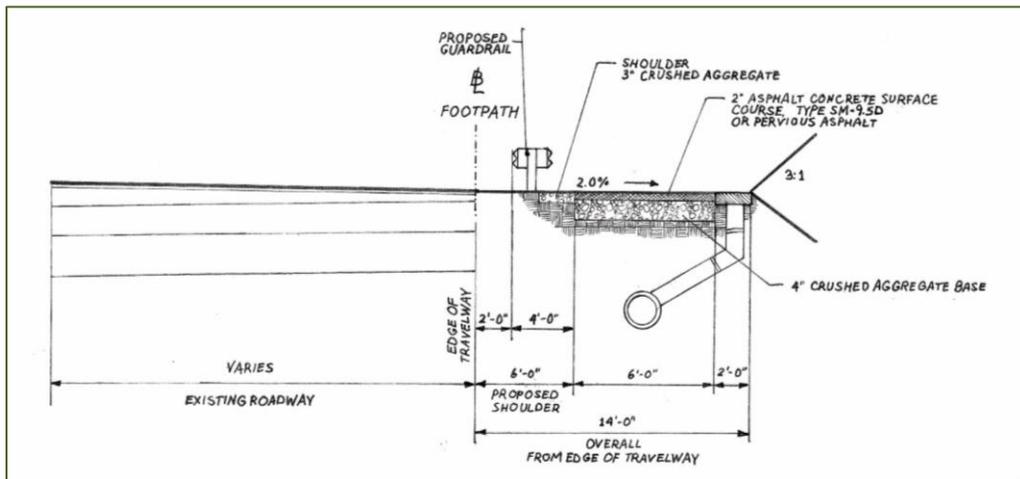


Figure 16: Possible Typical Section for Footpath with Inlet and Drainage System

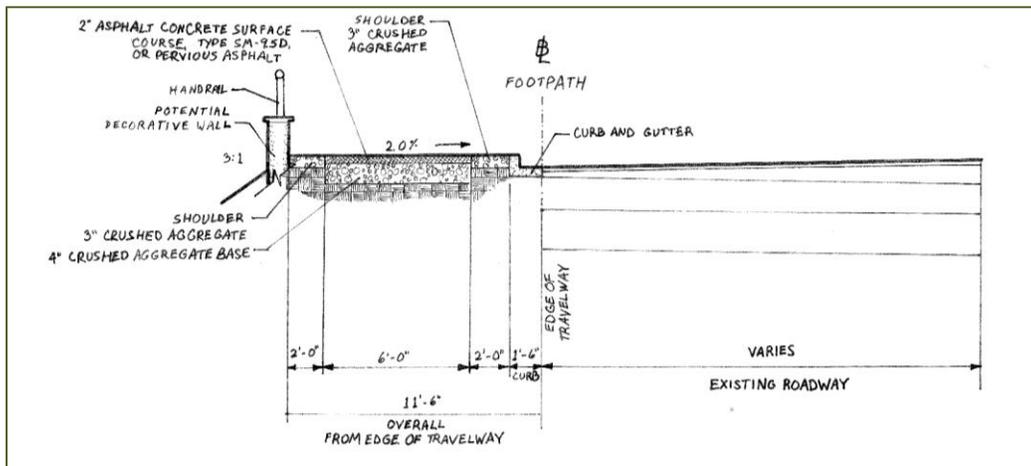


Figure 17: Possible Typical Section for Footpath with Retaining Wall for Fill Slope

#### **4.2.3 Typical Section at Drover's Rest Pinch Point**

Applying the design elements of the typical sections discussed above, the study team developed a concept for squeezing in the footpath between the Drover's Rest buildings and fence and the edge of pavement for Georgetown Pike, as shown in **Figure 18**. The width of this area is approximately 11 feet between the fence and the edge of pavement. A design solution in this location will likely need right-of-way (or an easement) from the landowner, as well as the approval of VDOT and Fairfax County for narrow shoulders and/or a narrow footpath.



*Figure 18: Possible Footpath Solution at Drover's Rest Pinch Point*

### 4.3 Crossing of Difficult Run

To provide the connection between the Difficult Run Trail and the trails to the south and east within the PHNST network, the Georgetown Pike Footpath will need to cross Difficult Run. It is the desire of NPS and the other project stakeholders that the clear width of the bridge crossing be 6 feet (consistent with the 6-foot-wide trail). The length of the bridge would be dependent upon its location and whether or not the bridge spans the floodplain.

Several crossing locations and many types of bridges were considered in this footpath feasibility study. Fairfax County Park Authority (FCPA) also provided excellent information on their experience with constructing and maintaining trail bridges.

#### 4.3.1 Crossing Locations

When analyzing a location for crossing Difficult Run, the study team considered the following:

- Height of the banks of Difficult Run:
  - Lower banks could assist with low-water crossings, but bridge headers would need to be built for higher crossings, which could have more of an impact on the floodplain.
  - Higher banks could assist with higher crossings, but the bridge lengths may be longer than desired given budget constraints.
- Stability of channel at crossing locations:
  - Bedrock channel bottoms indicate a more stable stream channel and provide better opportunities for anchoring bridges.
  - Minimal bank erosion also indicates a more stable channel.
  - Channels with sediment deposits, such mid-channel “depositional” (sand) bar and bends, indicate less stability. These stream features will likely change over time.
  - Low-water crossings tend to last longer and be more maintainable when located in a stable section of a stream or river, such as upstream of an existing waterfall or on a bedrock outcropping.
  - For a longer-term (higher cost) bridge solution, a location with good channel stability is preferred.
- Floodplain:
  - Spanning the Difficult Run floodplain will require a higher, longer bridge span as compared with constructing a bridge within the floodplain.
  - A bridge within the floodplain will be permissible as long as agency approval processes are followed.
  - A land survey and floodplain analysis will be needed during the detailed design phase.

Thus, the footpath bridge will need to be engineered to span Difficult Run and to avoid or withstand frequent flood events while minimizing cost. Using the GIS mapping, supplemented by field visits, the potential bridge locations would result in bridges longer than 200 feet if

spanning the floodplain. Shorter spans are possible within the floodplain. For conceptual design and cost estimating purposes of this feasibility analysis, it was assumed that 120 feet would be the optimal length for withstanding occasional flooding while minimizing costs. With a land survey, floodplain analysis, and detailed design, the bridge span could be shorter.

As shown in **Figure 19**, Alignment 1 offers two potential locations for crossing Difficult Run, both approximately one quarter mile downstream of the Georgetown Pike vehicle bridge. Both locations offer a setting away from the busy Georgetown Pike and closer to the Potomac River. The locations also offer a connection with the Difficult Run Trail that is closer to trails and other destinations within Great Falls Park.



*Figure 19: Alignment 1 Bridge Crossing Locations*

The upstream crossing location is in the more stable, bedrock area of the channel. The downstream location is the less stable location; however, it is the likely historic location of the ford that was used by the wagon roads of the 1700s. Each of these locations is feasible depending on the type of bridge and the time frame for implementation. This upstream location would require a span of approximately 100 to 120 feet or two spans of approximately 50 to 60 feet if a pier is anchored in the stream bed. The downstream location could support a clear span bridge of approximately 120 feet or two short span bridges, each 30 to 50 feet long.

As shown in **Figure 20**, Alignments 2, 3, and 4 make use of two potential locations just to the east (downstream) of the vehicle bridge. A free-standing pedestrian bridge is possible between the higher banks of Difficult Run just downstream of Georgetown Pike or next to the existing vehicle bridge. When the vehicle bridge is ready for replacement, a pedestrian bridge could be integrated into the new bridge, allowing another footpath or shared use path to be constructed in the study area.

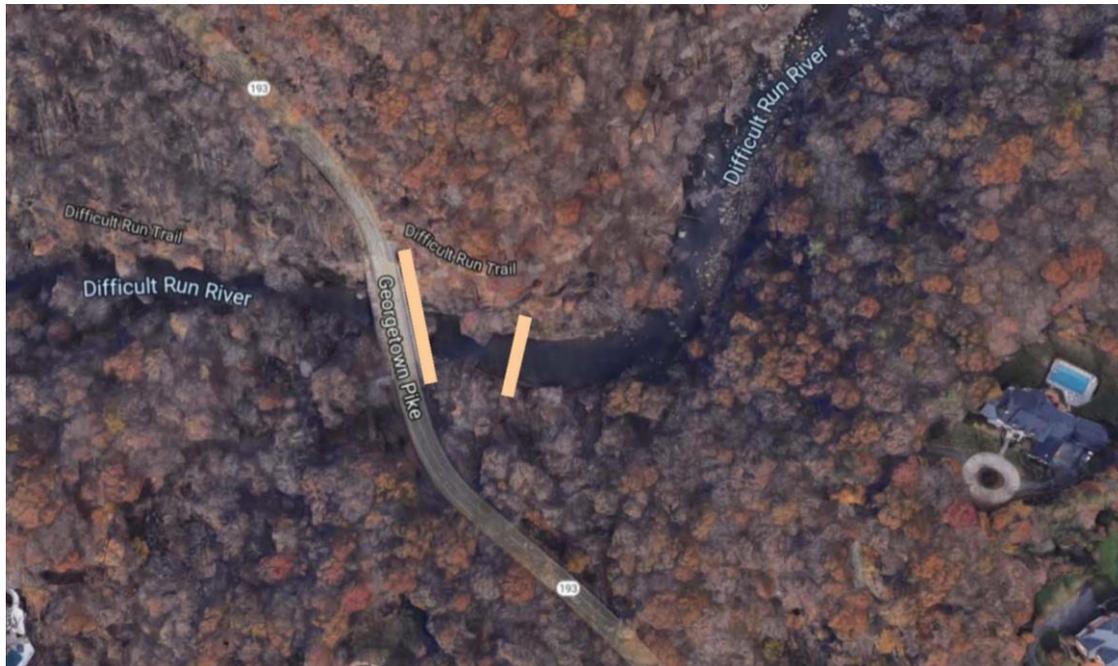


Figure 20: Alignments 2, 3, and 4 Bridge Crossing Locations

During stakeholder meetings, VDOT noted that the existing bridge structure on Georgetown Pike has a rating of 5 (Fair). A 4 rating would be considered structurally deficient. While it is difficult to predict how long it will be before the structure reaches a 4 rating and would need to be replaced, when it is replaced, VDOT will consider a pedestrian facility with an upgraded bridge design, consistent with current VDOT policy.

### 4.3.2 Potential Bridge Types

The type of bridge needed to carry the 6-foot-wide Georgetown Pike Footpath over Difficult Run would need to be designed to be high enough and long enough to span the floodplain or if within the floodplain resistant enough to avoid wash out from anticipated flood levels. Given this requirement, as well as the potential locations for a bridge, the study team considered the following types of bridges:

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**Single log stringer bridge:** This type of bridge is seen in more remote locations within National Parks and National Forests. Hand rails can be on one side or both sides of the log. This type of bridge could be a shorter-term solution for the Georgetown Pike Footpath at the mid-channel island in Difficult Run (one of the Alignment 1 crossing options), but it will not support the six-foot-wide trail desired by NPS and other project stakeholders.



*Single Log Stringer Bridge, Great Smokey Mountains National Park, Cataloochee, NC*

### **Sawn timber stringer bridge:**

This type of bridge is popular in parks and forests as shorter bridges for trails that need to span streams. This type of bridge could be a shorter-term solution for the Georgetown Pike Footpath at the mid-channel island in Difficult Run, and it could carry a 6-foot-wide trail across the stream. Such a bridge also could be tied off with a cable to prevent the wooden bridge from floating downstream during a flood event. NPS staff or volunteers would need to put the bridge back in its place after such an event.



*Sawn Timber Stringer Bridge with Cable, Prince William Forest Park, Triangle, VA*

**Glulam stringer bridge:** This type of bridge can be engineered to carry wide trails and even light vehicle loads over relatively long spans. These bridges can be more attractive but also tend to be more expensive with respect to construction and maintenance than a steel truss bridge.



*Glulam Bridge example*

**Prefabricated steel truss:** This type of bridge can be engineered to carry a trail over spans as long as 250 feet. This bridge can support the 6-foot-wide trail (as well as 2-foot shoulders, if desired). The truss structure would be outside of this 10-foot width. Other types of truss bridge materials included aluminum and fiberglass; however, steel is less expensive and more readily available.



*Prefabricated Steel Truss bridge example*

A steel truss bridge is recommended as the longer-term solution for carrying the Georgetown Pike Footpath over Difficult Run. This type of bridge will maximize accessibility for the users of all abilities. The bridge can be constructed and maintained within the floodplain and should survive most storms; however, fallen trees and other debris could cause damage. When discussed with the stakeholders, NPS representatives offered that the trusses provide an open structure that has a better chance of success in a storm event than other designs. Fairfax County Park Authority (FCPA) representatives agreed. A rendering of a steel truss bridge over Difficult Run is shown in a “before and after” comparison in **Figure 21** on the following page.

Moving forward following this feasibility study, the design of a footbridge crossing Difficult Run will require a land survey and analysis related to the floodplain. This design will determine if the bridge will span all of Difficult Run or if a pier in the stream channel will be needed.

**Georgetown Pike**  
**Footpath Feasibility Study**



*Figure 21: Potential Difficult Run crossing location and rendering of possible steel truss bridge*

### 4.3.3 Fairfax County Park Authority Steel Truss Bridges

Following Workshop #3, FCPA provided additional documentation in support of this study, including several examples of steel bridges installed over the past several years. The width of these bridges ranged from 4 to 14 feet. Examples of FCPA bridges are shown the photos on this page. Additional documentation is included in **Appendix F – Fairfax County Park Authority Bridge Information**, including a generic “Not for Construction” example, design information for the 14-foot bridge, and bridge specifications and shop drawings for that structure. It has been FCPA’s experience that these types of bridges are able to withstand significant stream loads during flooding events, and they have proven to be good at standing up to large amounts of debris. These bridges are designed for low maintenance during a 75-year lifespan and are suitable for pedestrian, bicycle, and equestrian uses.



*Steel Truss Bridge during flood event (photo courtesy of FCPA)*

It is FCPA’s opinion that the “half-through pony truss” is the best design for these bridges. Other bridge types (including a fiberglass bridge and a concrete arch span) have bowed under stream loads, have had decks pop off during flood events, have been difficult to install, or have had railings torn off by flooding waters. The truss structure FCPA now specifies seems to take the worst of the flow, even with debris piling up against and under the bridge. FCPA says this bridge type is also reasonably affordable.



*Prefabricated Steel Truss Bridge (photo courtesy of FCPA)*

#### 4.3.4 Fair-Weather Crossings

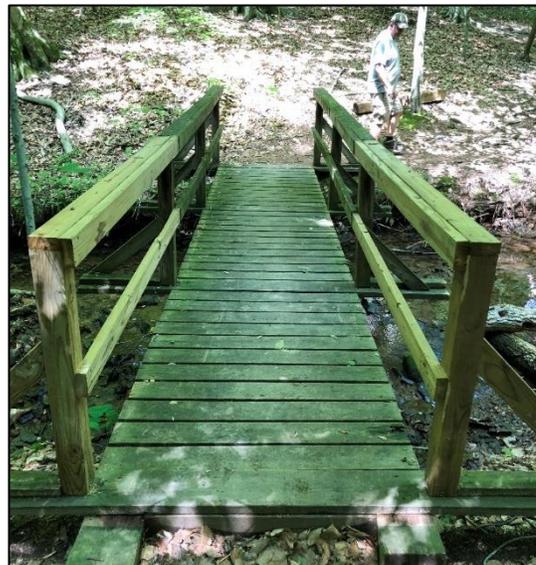
Near-term “fair-weather” crossings are possible for the Alignment 1 crossing locations, given the desires of the stakeholders moving forward quickly following this feasibility study. Two types of fair-weather crossings may be applicable for a near-term solution for the Georgetown Pike Footpath:

**Stepping stones:** This crossing involves adding large boulders to the stream bed. A similar solution was recently constructed for the Fairfax County Cross-County Trail. These boulders tend to work best when located in a stable section of a river, such as upstream of an existing waterfall or anchored to bedrock. A rendering of this possible solution is shown in **Figure 22**. It should be noted that this solution doesn’t provide accessibility for some potential trail users.



Figure 22: Fair-weather crossing – addition of stepping stones in stream bed

**Sawn timber stringer bridges to mid-channel island.** Shorter-span wooden bridges could provide access to the mid-channel island and thus carry the footpath across Difficult Run. To mitigate the chance of these bridges floating off during flood events, they could be tied off (anchored) and put back in place after the event.



Fair-weather crossing:  
Sawn Timber Stringer Bridge

## 5. Concept Design and Analysis

Following the development of preliminary concepts for the alignments, typical sections, and bridge locations and types, as well as the presentation and discussion these design elements with the project stakeholders, the study team completed their analyses, drawing conclusions and finalizing 30% concept plans.

### 5.1 30% Concept Plans

Based on the analyses conducted during this study of footpath alignments, cross sections, and bridge crossings, concept plans for all four alignments were completed by the study team. These plans are included with this report as **Appendix G**. The cover sheet of the plan set is shown in **Figure 23**. The plans were completed in accordance with the FHWA EFLHD, NPS, and VDOT design standards and include plan views, details, high-level construction quantities, and a footpath profile. The plans were used in the evaluation of potential project costs, and they are intended to form the basis for FHWA, NPS, and/or other stakeholders to move forward with the detailed design of the preferred alignment of the footpath.

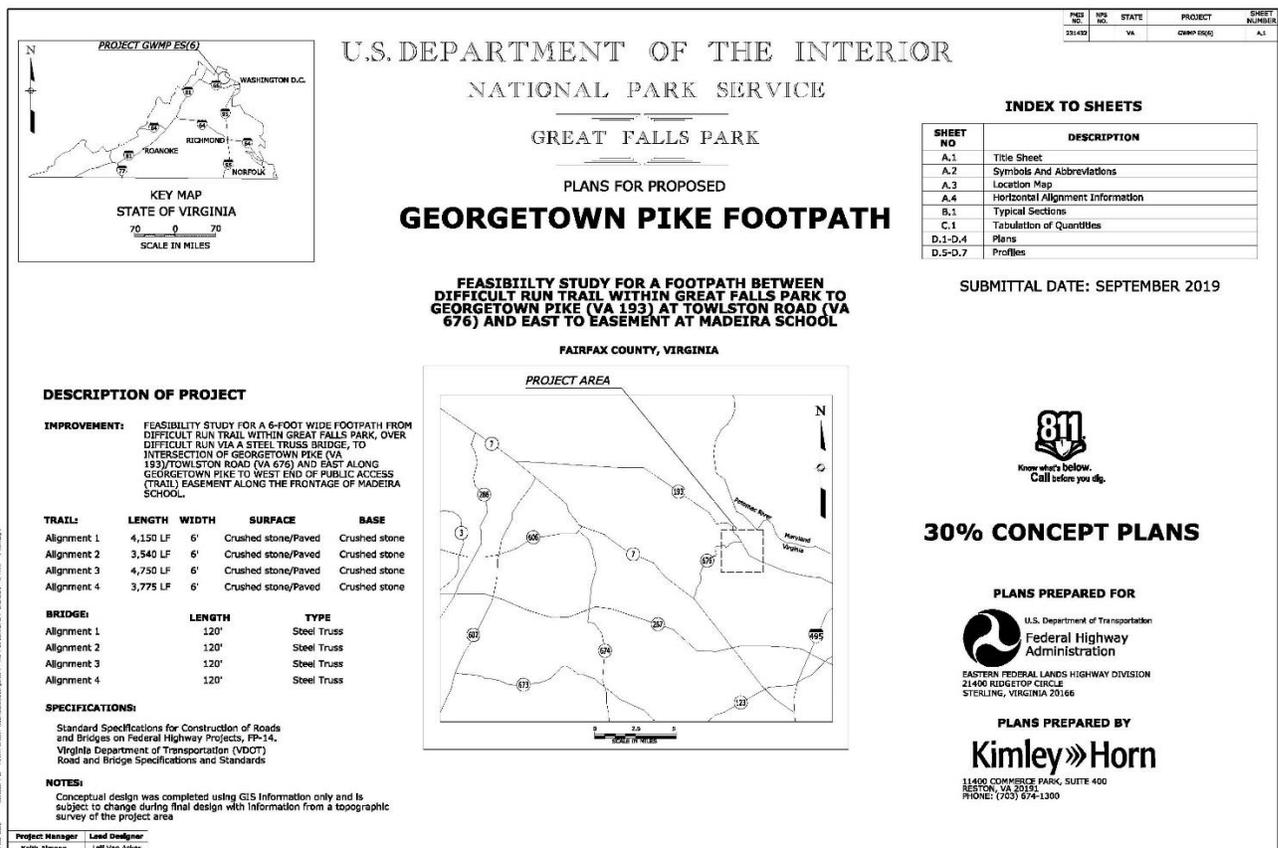


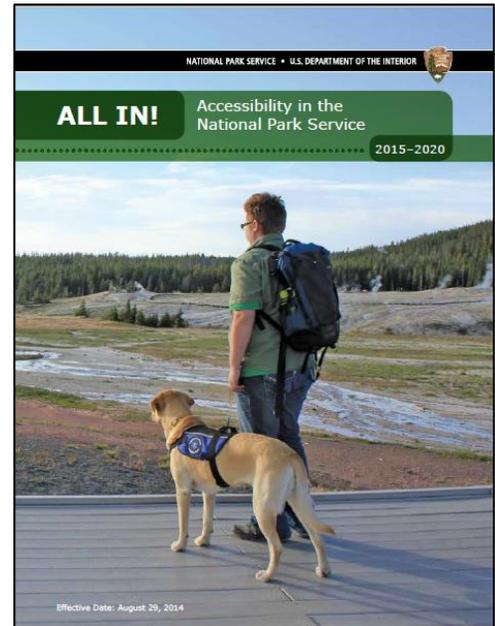
Figure 23: 30% Concept Plans Cover Sheet

### 5.2 Accessibility

FHWA, NPS, and other stakeholders expressed the desire that the Georgetown Pike Footpath planning and design process results in a facility that maximizes access for people of all abilities. NPS Management Policies (2006) states:

*“National parks belong to all Americans, and the National Park Service will welcome all Americans to experience their parks.”*

This policy and the goals of NPS and all of the stakeholders supported the concept design and the recommendations of this study. To guide the design of the footpath, NPS considers the Architectural Barriers Act Accessibility Standard (ABAAS) for improving access for all users. Americans with Disabilities Act (ADA) requirements are typically applied for facilities in VDOT right-of-way.



*NPS Accessibility Guidance*

For the segment of the trail within Great Falls Park, the design would need to take into account ABAAS requirements. As stated in NPS design guidelines, the degree of accessibility provided is proportionately related to the degree of human-made modifications in the area—as well as to the importance of the facility to people visiting or working in a park. Great Falls Park is visited frequently, and the longer-term solution for a footpath should be designed to maximize accessibility. A fair-weather crossing of Difficult Run would be a short-term solution as a precursor to the longer-term steel truss bridge that would provide the ABAAS solution. The footpath through the woods would need to be designed to minimize steep grades and to provide a surface that supports as many people with differing abilities as possible.

Along Georgetown Pike, it is presumed that the footpath would be constructed in what will be VDOT right-of-way; thus, ADA design guidelines will need to be followed. At each crossing of an intersecting side street or driveway, concrete curb ramps with detectable surfaces will need to be installed. The asphalt surface of the trail, as well as the barrier separating vehicles and pedestrians, will need to be designed to maximize accessibility for persons of all abilities.

### 5.3 Permitting

The construction of the Georgetown Pike Footpath will require a number of permits from various agencies. The required permits will be confirmed during the design phase of the preferred alignment. For VDOT projects, permits typically include a grading permit from the local stormwater management agency (Fairfax County in this case), right-of-way permits for construction access, and the environmental permits discussed in Section 3 of this report. Again, there do not appear to be any showstoppers to implementing a footpath in the project area with respect to the permitting processes.

With respect to specific permits for the crossing of Difficult Run, a U.S. Army Corps of Engineers (USACE) permit would be needed, and the project should be covered by a current Nationwide USACE Permit. The permitting process would include developing and submitting a statement of Findings to NPS with (1) rationale for locating improvements in the floodplain, (2) disclosure of risk associated with the site, and (3) a detailed floodplain mitigation plan. The design team would need to model the floodplain with proposed improvements to determine if the flood elevation will rise with the installation of a new crossing and the extent of the rise and its impact to surrounding properties.

## 5.4 Costs

A preliminary opinion of probable cost (OPC) was prepared for each potential footpath alignment to aid in evaluating the alignments and bridge crossing options. Each alignment was evaluated with a steel-truss bridge either spanning the entire floodplain or only the Difficult Run stream itself. The total estimated project costs included engineering design, right-of-way acquisition, utility relocation, permitting, construction, construction-related services (18.5%), and contingency (30%). These costs are summarized in **Table 3**. More detail is included in **Appendix H**.

**Table 3: Estimated Project Cost of Each Alignment**

<i>Alignment 1</i>	<i>Alignment 2</i>	<i>Alignment 3</i>	<i>Alignment 4</i>
\$ 3,940,000	\$ 4,550,000	\$ 5,300,000	\$ 5,570,000

The lowest cost option for both options was Alignment 1, despite the additional bridge mobilization cost included due to the more difficult access at that bridge location. Alignment 1 had a lower cost compared to Alignment 2 due to the shorter overall length and decreased amount of grading within steep slopes. Alignments 1 and 2 had a lower comparative cost due to avoiding additional roadway construction and right-of-way acquisition. Alignments 3 and 4 had similar costs given they both run adjacent to Georgetown Pike for their entire lengths.

## 5.5 Evaluation Criteria

Each of the four alignments was evaluated using seven evaluation criteria or factors developed by the study team and confirmed with FHWA, NPS, and the other stakeholders. These criteria are summarized below:

- **General walking quality:** Given that the basis of this project is a footpath (which may be used by walkers or hikers, as well as people with wheelchairs, people with strollers, bicyclists, and horse enthusiasts), this factor qualitatively evaluated the anticipated experience of users with respect to ease of use, avoidance of noise and fumes from traffic, and opportunity to be within a park-like setting.
- **Visual impact:** Visual impact was identified in Workshop #3 as an additional factor to consider. This factor evaluated impact to viewsheds, given the importance of viewsheds to the PNHST network.

- **Protection from traffic:** This factor took a straightforward look at distance from traffic, the presence of barriers, and whether or not the trail crossed Georgetown Pike.
- **Right-of-way impacts:** This factor compared the amount of right-of-way or easements needed for each alignment.
- **Ease of trail construction:** Given the preliminary plans produced for each alignment, this factor examined constructability of the footpath.
- **Ease of bridge construction:** This factor examined constructability of the bridge crossing options.
- **Preliminary project cost:** This factor compared costs of the alignments.

During Workshop #3, NPS representatives offered that it may be helpful to understand any impacts to species or natural resources. The participants concluded that these impacts will likely be similar for all alignments within the general study corridor and should be considered during the detailed design phase.

## 5.6 Scoring

The study team evaluated the alignments by applying the criteria discussed above. An initial evaluation was conducted by the team and then discussed with the stakeholders at Workshop #2 for three alignments, after which a fourth alignment was added. The criteria were then applied to all four alignments, and results or scores were discussed at Workshop #3. With the additional of visual impacts and using a scoring system of best, good, and fair, the study team applied the factors to all four alignments. Scoring results are shown in **Table 4**.

**Table 4: Evaluation of Footpath Alignments**

<i>Criteria</i>	<i>Alignment 1</i>	<i>Alignment 2</i>	<i>Alignment 3</i>	<i>Alignment 4</i>
General walking quality	●	●	●	●
Fewer visual impacts	●	○	○	○
Protection from traffic	●	●	●	○
Fewer right-of-way impacts	●	●	○	○
Ease of trail construction	●	●	●	○
Ease of bridge construction	○	●	●	●
Preliminary project cost	●	●	○	○
<b>Scores</b>	<b>19</b>	<b>17</b>	<b>14</b>	<b>13</b>

Key: ● = Best (3 points) ● = Good (2 points) ○ = Fair (1 point)

The study team drew several conclusions on the scoring of the alignments:

- Alignment 1 ranked highest compared to the other alignments, which was consistent with the stakeholders' preference discussed at the workshops that as much of the trail as possible should be in Great Falls Park. More of the footpath in the park would result in a better experience for trail users, more protection from traffic, less need for right-of-way, an "easier" trail to construct, and lower cost.
- Alignment 1 edged out Alignment 2 due to its relative ease of constructing the trail and fewer visual impacts. Much of Alignment 2 in Great Falls Park would need to be constructed by cutting a bench into a steep side slope, which would mean a wider swath of clearing through the woods.
- Constructing the bridge for Alignments 2, 3, and 4 should be slightly easier than doing so for the more distant Alignment 1 location, but there will likely not be a great deal of difference in price for each location.
- Construction of the footpath in the park is anticipated to be easier than construction along Georgetown Pike, which would require roadside grading, one-way flagging operations, daytime peak period restrictions, nighttime operations (if allowed by the residents), and barriers, as well as avoidance or relocation utilities. In contrast, a natural surface footpath in a forest would follow natural grades and have the need for minor drainage improvements.

## 6. Recommendations

Based on the analyses conducted as part of this Georgetown Pike Footpath Feasibility Study, the development and evaluation of footpath alignments, and the extensive coordination with FHWA, NPS, and other project stakeholders, the following recommendations are offered for moving forward with the design, construction, and maintenance of the Georgetown Pike Footpath—another link in the Potomac Heritage National Scenic Trail.

### 6.1 Move Forward with Alignment 1

The study team recommends advancing Alignment 1, the stakeholders' preferred alignment, in a phased approach.

#### 6.1.1 ***Near-term phase: Build portion of Alignment 1, with fair weather crossing of Difficult Run***

1. Build a fair-weather crossing of Difficult Run with stepping stones or smaller timber bridges at the mid-channel crossing (old ford site) of Difficult Run
2. Construct footpath along Alignment 1 within Great Falls Park; terminate this segment of trail at Georgetown Pike, opposite the intersection with Towlston Road
3. Maintain this new footpath
4. Continue advocacy and planning activities for implementing the longer-term stream crossing and footpath alignment

#### 6.1.2 ***Longer-term phase: Build all of Alignment 1, with steel truss bridge crossing of Difficult Run***

1. Construct the entirety of Alignment 1 to provide access for people of all abilities.
2. Install a one- or two-span steel truss bridge upstream of the mid-channel island in the boulder/bedrock area.
3. Construct a 6-foot-wide trail (wherever possible) along Georgetown Pike from Towlston Road to the western edge of The Madeira School property, including through the “pinch point” at Drover’s Rest.
4. Maintain this new footpath
5. Advocate for other parties (e.g., FCDOT or FCPA) build the connecting trail on The Madeira School property within the existing Public Use (Trail) Easement

A phased approach would serve to accomplish the goals of the project more quickly and to build community support and momentum for the longer-term solution. Near-term improvements could be constructed by NPS contractors and/or by other agencies such as FCPA or FCDOT, as well as local volunteer groups with permission from NPS. A near-term project could present educational opportunities about the construction and maintenance of a trail and about the history and characteristics of Great Falls Park and Difficult Run. Longer-term improvements will require additional advocacy, planning, design, and programming—which could be initiated in the near term.

This phased approach is consistent with the “evolution of trails” concept. Many trails develop organically, starting as informal or social trails and becoming more and more recognizable to bicyclists, hikers, runners, cyclists, and other users. These trails can grow into more formal trails (and even paved roads and major transportation corridors). During this study’s workshops, the stakeholders agreed that while some social trails exist in the study area, they would like this Georgetown Pike Footpath to be purposefully planned and that phasing could help with advocating for and funding longer-term, more accessible solutions.



*Location of near-term footpath terminus along Georgetown Pike across from Towlston Lane*

Looking to the future, when Alignment 1 is constructed and providing its many users the experiences the stakeholders intended, and when the time comes for VDOT to replace the Georgetown Pike bridge over Difficult Run, an additional footpath facility could be constructed. For this future phase, VDOT may construct a parallel pedestrian facility on or adjacent to the bridge, per their policies. With this bridge crossing, a segment of Alignment 2 could also be constructed to proceed parallel to the south side of Difficult Run and to connect to Alignment 1 in Great Falls Park.

## 6.2 Funding Options

Successful funding of the Georgetown Pike Footpath Project, whether implemented in phases or all together, will likely occur when there is a combination of funding sources, along with project champions who can lead the project into the new steps including the development of a funding plan. Such a plan for the project could consider one or more of the following funding opportunities:

- Federal:
  - FHWA’s Congestion Mitigation and Air Quality (CMAQ) Program for projects linked to vehicular trip reduction
  - FHWA’s Transportation Alternatives Program (TAP) for pedestrian and bike improvements
  - FHWA’s Federal Lands Access Program (FLAP) to improve access to recreational amenities
  - Federal Lands Recreation Enhance Act (Recreation Fee)
  - Federal Lands Recreational Trails Program (RTP)
  - Centennial Challenge (50% NPS and 50% partner/donor cost share)

- Virginia:
  - VDOT SMART SCALE funds
  - VDOT maintenance funds for roadside repairs and upgrades
  - Recreational Trails Program, a federal program through the Virginia DCR
- Regional:
  - Northern Virginia Transportation Authority (NVTA) TransAction funds to reduce regional congestion
  - Northern Virginia Transportation Commission (NVTC) Commuter Choice program for funding multimodal projects
  - NOVA Parks (formerly Northern Virginia Regional Park Authority)
- Fairfax County:
  - NVTA's 30% funds for local transportation projects
  - FCDOT Capital Improvement Plan (CIP) funding
- Advocacy and citizen/private groups: Fund raising and financial support, including private contributions for construction and operation and maintenance (O&M)
  - National Park Foundation
  - PHTA, MORE, and others
- In-kind services by NPS, VDOT, and/or FCDOT and FCPA
- Volunteer groups for performing minor construction and O&M

In considering these funding sources, the FHWA programs support reducing vehicle trips, adding pedestrian improvements, or providing access to recreational facilities. VDOT has set aside some SMART SCALE funds that go to pedestrian and bike projects, and VDOT's maintenance program funds roadside repairs and upgrades. In Virginia, there is good partnership between FHWA and VDOT and other agencies, including DCR, to fund trails throughout the Commonwealth.

It's also important to note that securing federal or state funding often requires a commitment for maintenance. Having a VDOT or Fairfax County maintenance agreement in place with NPS, for instance, would demonstrate a partnership with NPS and perhaps help to obtain grant funding.

Regionally, NVTA funds aim to reduce regional congestion, while NVTC programs focus on transit and multimodal projects. NVTC also allocates 30% of its funds for local transportation projects, such as projects implemented by FCDOT and FCPA, which also is moving forward with the many projects in their CIPs focused on pedestrian and bicycle improvements.

Other funding opportunities may be possible from advocacy groups and private citizen groups, in-kind services, or volunteer services. There are recent success stories of NPS and other agencies partnering with advocacy groups such as the National Park Foundation, PHTA, MORE, Potomac Appalachian Trail Club (PATC), and Golden Gate National Recreation Area:

- Advocacy efforts of PHTA and MORE have resulted in miles of constructed trails, including the recent completion of a segment of the PHNST network in Prince William County through a cost-sharing grant.
- PATC manages a number of trails in the region through their volunteer efforts, including the Appalachian Trail.
- Golden Gate National Recreation Area works with a local construction company that is using a new type of concrete, donating this concrete, and teaching youth and adult volunteers who are working on improvements at Alcatraz about construction.

Volunteer organizations for small projects and minor maintenance could include Scout Troops, Boys and Girls Clubs, and private companies such as REI. These organizations may be able to provide in-kind services or volunteer work throughout the project. These services are successful when there are champions with both the agency and private organization to coordinate the efforts and lead their teams.

Involving businesses as stakeholders may be helpful in moving forward with implementation. Potential business and professional associations could come from the McLean and Great Falls areas. Homeowners' associations could also be in the mix, and charitable foundations or non-profit organizations that help support the environment, parks, and trails could provide funding and additional advocacy.

An additional set of supporters for this trail could come from educators, equestrians, and health care advocates. This project presents an opportunity to bring in an educational component on the construction and maintenance of a trail through the woods and on the history and natural features of Great Falls Park and Difficult Run. The footpath also presents an opportunity to support equestrian programs that include trail riding, and there are numerous community health benefits that will come with the construction of this footpath.

## 6.3 Path Forward

This report and its appendices are intended to provide a foundation upon which the Georgetown Pike Footpath Project can move forward into project development. Considering the analyses, concept plans, and Alignment 1 recommendations discussed in this report, the following implementation steps are recommended:

### 6.3.1 Near-term

1. Determine the champions for the near-term and longer-term phases, form a leadership team, and continue advocacy efforts and collaboration among stakeholders for all of Alignment 1
2. Involve more groups in the collaboration such as local citizens associations and business associations, charitable foundations, and non-profit organizations

3. Develop an approach for NEPA compliance, permitting, and construction; and maintenance agreements for the near-term phase (including a maintenance plan for fixing or recovering the fair weather crossing after a major storm event)
4. Establish a funding plan, considering the variety of possible funding sources, for constructing and maintaining all of Alignment 1
5. Establish maintenance agreement(s) for all or portions of Alignment 1 between NPS, VDOT, and other stakeholders and applicable advocacy groups and/or volunteer groups
6. Design and construct a near-term version of Alignment 1:
  - a. Install the fair weather crossing of Difficult Run
  - b. Construct a 2- to 3-foot wide walking path along Alignment 1
7. Initiate planning and design activities for the longer-term version of Alignment 1:
  - a. Perform a land survey of the entire Alignment 1 project area
  - b. Initiate detailed design of the Alignment 1 segments:
    - i. Steel truss foot bridge over Difficult Run
    - ii. Full 6-foot-wide gravel trail with shoulders in Great Falls Park
    - iii. Shared use asphalt path along Georgetown Pike
  - c. Determine which organization will lead the construction of which segments of Alignment 1, e.g., NPS, VDOT, FCDOT, FCPA, volunteer group, etc.)
  - d. Initiate NEPA compliance and other permitting requirements

### **6.3.2 Longer-term**

1. Obtain funding from a variety of sources, per the funding plan, for construction and maintenance
2. Complete the design of all segments of Alignment 1
3. Obtain appropriate permits
4. Construct all of Alignment 1 in the appropriate construction phases, given availability of funding and given the agencies leading the construction of the phases
5. Maintain Alignment 1, making use of continuous funding programs

Building upon this feasibility study, the stakeholders can realize the vision of a Georgetown Pike Footpath providing a connection within the Potomac Heritage National Scenic Trail network. With the continued leadership and collaboration, as well as creative approaches to funding and design, the stakeholders can construct and maintain this footpath so that it is usable for persons of all abilities for generations to come.

## **APPENDICES**

**A. References**

**B. Workshop Meeting Minutes and Presentation Materials**

**C. Public Use (Trail) Easement on The Madeira School  
Property**

**D. Environmental Review Memorandum**

**E. Letter from The Madeira School**

**F. Fairfax County Park Authority Pedestrian Bridge  
Information**

**G. 30% Concept Plans**

**H. Opinions of Probable Cost**

